AS FILED WITH THE SECURITIES AND EXCHANGE COMMISSION ON MARCH 15, 1999

REGISTRATION NO. 333-71363

SECURITIES AND EXCHANGE COMMISSION
WASHINGTON, D.C. 20549

AMENDMENT NO. 2

TO

FORM S-1
REGISTRATION STATEMENT
UNDER
THE SECURITIES ACT OF 1933

MKS INSTRUMENTS, INC.
(EXACT NAME OF REGISTRANT AS SPECIFIED IN ITS CHARTER)

MASSACHUSETTS	3823	04-2277512
(STATE OR OTHER JURISDICTION OF INCORPORATION OR ORGANIZATION)	(PRIMARY STANDARD INDUSTRIAL CLASSIFICATION CODE NUMBER)	(I.R.S. EMPLOYER IDENTIFICATION NUMBER)

SIX SHATTUCK ROAD
ANDOVER, MA 01810
(978) 975-2350
(ADDRESS, INCLUDING ZIP CODE, AND TELEPHONE NUMBER, INCLUDING AREA CODE, OF REGISTRANT'S PRINCIPAL EXECUTIVE OFFICES)

JOHN R. BERTUCCI
CHAIRMAN, CHIEF EXECUTIVE OFFICER, AND PRESIDENT
MKS INSTRUMENTS, INC.
SIX SHATTUCK ROAD
ANDOVER, MA 01810
(978) 975-2350
(NAME, ADDRESS, INCLUDING ZIP CODE, AND TELEPHONE NUMBER, INCLUDING AREA CODE, OF AGENT FOR SERVICE)

COPIES TO:

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BOSTON, MASSACHUSETTS 02109	BOSTON, MASSACHUSETTS 02110
(617) 526-6000	(617) 951-7000

APPROXIMATE DATE OF COMMENCEMENT OF PROPOSED SALE TO THE PUBLIC: As soon as practicable after the effective date hereof.

If any of the securities being registered on this Form are to be offered on a delayed or continuous basis pursuant to Rule 415 under the Securities Act of 1933, check the following box. [ ]

If this Form is filed to register additional securities for an offering pursuant to Rule 462(b) under the Securities Act, check the following box and list the Securities Act registration statement number of the earlier effective registration statement for the same offering. [ ]

If this Form is a post-effective amendment filed pursuant to Rule 462(c) under the Securities Act, check the following box and list the Securities Act registration statement number of the earlier effective registration statement for the same offering. [ ]

If this Form is a post-effective amendment filed pursuant to Rule 462(d) under the Securities Act, check the following box and list the Securities Act registration statement number of the earlier effective registration statement for the same offering. [ ]

If delivery of the prospectus is expected to be made pursuant to Rule 434, please check the following box: [ ]

THE REGISTRANT HEREBY AMENDS THIS REGISTRATION STATEMENT ON SUCH DATE OR DATES AS MAY BE NECESSARY TO DELAY ITS EFFECTIVE DATE UNTIL THE REGISTRANT SHALL FILE A FURTHER AMENDMENT WHICH SPECIFICALLY STATES THAT THIS REGISTRATION STATEMENT SHALL THEREAFTER BECOME EFFECTIVE IN ACCORDANCE WITH SECTION 8(a) OF THE SECURITIES ACT OF 1933 OR UNTIL THE REGISTRATION STATEMENT SHALL BECOME EFFECTIVE ON SUCH DATE AS THE COMMISSION, ACTING PURSUANT TO SECTION 8(a), MAY DETERMINE.

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The information contained in this prospectus is not complete and may be changed. The underwriters may not confirm sales of these securities until the registration statement filed with the Securities and Exchange Commission becomes effective. This prospectus is not an offer to sell these securities, and is not soliciting an offer to buy these securities in any state where the offer or sale is not permitted.

SUBJECT TO COMPLETION, DATED MARCH 15, 1999

6,500,000 SHARES
[MKS LOGO]

COMMON STOCK

MKS Instruments, Inc. is offering 6,000,000 shares of its common stock and the selling stockholders are selling an additional 500,000 shares. This is MKS's initial public offering and no public market currently exists for its shares. We have been approved for quotation on the Nasdaq National Market under the symbol "MKSI" for the shares we are offering. We estimate that the initial public offering price will be between $15.00 and $17.00.

INVESTING IN OUR COMMON STOCK INVOLVES A HIGH DEGREE OF RISK. SEE "RISK FACTORS" BEGINNING ON PAGE 7.

	Per Share	Total
Public Offering Price	$	$
Discounts and Commissions to Underwriters	$	$
Proceeds to MKS	$	$
Proceeds to the Selling Stockholders	$	$

NEITHER THE SECURITIES AND EXCHANGE COMMISSION NOR ANY STATE SECURITIES COMMISSION HAS APPROVED OR DISAPPROVED OF THESE SECURITIES OR DETERMINED IF THIS PROSPECTUS IS TRUTHFUL OR COMPLETE. ANY REPRESENTATION TO THE CONTRARY IS A CRIMINAL OFFENSE.

MKS has granted the underwriters a 30-day option to purchase up to an additional 975,000 shares of common stock to cover over-allotments.

NATIONSBANC MONTGOMERY SECURITIES LLC
DONALDSON, LUFKIN & JENRETTE
LEHMAN BROTHERS

The date of this prospectus is   , 1999

MKS INSTRUMENTS, INC.
PROSPECTUS COVER
JANUARY 28, 1999

INSIDE FRONT COVER (PG. 2):

This page is produced in four-color process. Amidst a dark background, the MKS logo appears at the top right of the page, and to the top left is the phrase "A Wide Range of Products Made Using MKS Process Control Instruments." Two paragraphs describing the role MKS plays in complex advanced materials manufacturing processes also appear on this page, and are as follows:

(first paragraph) "MKS Surrounds the Process. Technologically complex, gas-related manufacturing processes are used to create such products as semiconductor devices, flat panel displays, fiber optic cables, solar panels, magnetic and optical storage media, and gas lasers. These processes build up very thin layers of materials, step by step, through the interaction of specific gases and materials inside tightly controlled process chambers. Maintaining control of these complex steps throughout the entire manufacturing process is critical to maximizing uptime, yield and throughput (second paragraph) MKS's process control instruments are integrated into many gas-related processes--managing the flow rates of gases entering and exiting the process chamber; controlling the gas composition and pressure inside the chamber; analyzing and monitoring the composition of the gases; and isolating the gases from the outside environment."

In the center of the page is a photo montage, displaying images of semiconductor devices, flat panel displays, fiber optic cables, solar panels, magnetic and optical storage media and gas lasers. Each of these images has a text label adjacent to it.

MKS, MKS Instruments, Baratron and ORION are trademarks of MKS. This prospectus contains trademarks, service marks and trade names of companies and organizations other than MKS.

INSIDE SPREAD (PGS. 3 AND 4):

These pages are produced in four-color process. The main focus of the spread is the illustration of a typical process chamber, with numerous MKS products surrounding the chamber. At the top of the illustration, centered across the two pages, is the title "MKS Instruments...Surrounding the Process." Each product is described in a brief paragraph, and the paragraphs appear on both sides of the illustration--left and right columns. The paragraphs are as follows:

DIRECT LIQUID INJECTION SUBSYSTEMS
For use in the delivery of a wide variety of new materials to the process chamber that cannot be delivered using conventional thermal-based mass flow controllers.

AUTOMATIC PRESSURE CONTROLLERS WITH INTEGRATED BARATRON(R) PRESSURE TRANSDUCERS
A compact, integrated measurement and control package for use in controlling upstream or downstream process chamber pressure.

ULTRA-CLEAN MASS FLOW CONTROLLERS
For the precise measurement and control of mass flow rates of inert or corrosive gases and vapors into the process chamber.

ULTRA-CLEAN MINI-BARATRON(R) PRESSURE TRANSDUCERS
For use in gas cabinets to feed ultra-pure gases to critical process systems.

PRESSURE CONTROL VALVES
To precisely control the flow of gases to a process chamber in a wide range of flow rates.

GAS BOX RATE OF RISE CALIBRATORS
For fast verification of mass flow controller accuracy and repeatability during a process.

DIGITAL COLD CATHODE IONIZATION AND CONVECTION VACUUM GAUGES
A variety of indirect pressure gauges for measuring very low chamber pressures and conveying information digitally to host computers.

ORION(R) PROCESS MONITORS AND RESIDUAL GAS ANALYZERS
For the analysis of the composition of background and process gases inside the process chamber.

PRESSURE SWITCHES
Provide protection of vacuum equipment and processes by signaling when atmospheric pressure has been achieved.

BARATRON(R) PRESSURE MEASURING INSTRUMENTS
For the accurate measurement and control of a wide range of process pressures.

IN-SITU DIAGNOSTICS ACCESS VALVE
Enables accurate calibration and diagnostics of vacuum gauges and pressure transducers while directly mounted on the process chamber.

EXHAUST THROTTLE VALVES AND AUTOMATIC PRESSURE CONTROLLERS
For isolation and downstream control of process chamber pressures and pressure control within the exhaust systems.

HIGH VACUUM VALVES
To isolate the process chamber from both the pumps and atmospheric gases.

HEATED PUMPING LINES
To reduce contaminants in the vacuum pump and pump exhaust stream.

VAPOR SUBLIMATION TRAP
To collect by-products and particulates that could otherwise contaminate devices in the process chamber and damage vacuum pumps.

Prices of products shown above range from $200 to $80,000.

The above graphic depicts a generalized process chamber with a number of MKS's manufactured products shown.

YOU SHOULD RELY ONLY ON THE INFORMATION CONTAINED IN THIS PROSPECTUS. WE HAVE NOT AUTHORIZED ANYONE TO PROVIDE YOU WITH INFORMATION DIFFERENT FROM THAT CONTAINED IN THIS PROSPECTUS. WE ARE OFFERING TO SELL, AND SEEKING OFFERS TO BUY, SHARES OF COMMON STOCK ONLY IN JURISDICTIONS WHERE OFFERS AND SALES ARE PERMITTED. THE INFORMATION CONTAINED IN THIS PROSPECTUS IS ACCURATE ONLY AS OF THE DATE OF THIS PROSPECTUS, REGARDLESS OF THE TIME OF DELIVERY OF THIS PROSPECTUS OR OF ANY SALE OF OUR COMMON STOCK. IN THIS PROSPECTUS, "MKS," "WE," "US" AND "OUR" REFER TO MKS INSTRUMENTS, INC. (UNLESS THE CONTEXT OTHERWISE REQUIRES).

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PROSPECTUS SUMMARY

This summary highlights information contained elsewhere in this prospectus. You should read this entire prospectus carefully. Unless otherwise indicated, all information contained in this prospectus assumes that the underwriters will not exercise their over-allotment option. This prospectus contains forward-looking statements, which involve risks and uncertainties. MKS's actual results could differ materially from those anticipated in these forward-looking statements as a result of certain factors, including those set forth under "Risk Factors" and elsewhere in this prospectus. All information contained in this prospectus reflects an amendment to MKS's Articles of Organization to be effected prior to the closing of this offering to convert the shares of Class A common stock and Class B common stock into a single class of common stock.

MKS INSTRUMENTS, INC.

We are a leading worldwide developer, manufacturer and supplier of instruments and components used to measure, control and analyze gases in semiconductor manufacturing and similar industrial manufacturing processes. We sold products to over 4,000 customers in 1998. In addition to semiconductors, our products are used in processes to manufacture a diverse range of products, such as flat panel displays, solar cells, gas lasers, fiber optic cables, diamond thin films and coatings for food packagings.

The ability of semiconductor device manufacturers to offer integrated circuits with smaller geometries and greater functionality at higher speeds requires continuous improvements in semiconductor process equipment and process controls. Manufacturing a semiconductor, or a similar industrial product, requires hundreds of process steps, many of which involve the precise measurement and control of gases. In the fabrication of semiconductors, for example, these process steps take place within a process chamber. Specific gas mixtures at precisely controlled pressures are used in the process chamber to control the required process atmosphere and are used as a source of material to manufacture a semiconductor.

Given the complexity of the semiconductor manufacturing process, the value of the products manufactured and the significant cost of semiconductor manufacturing equipment and facilities, significant importance is placed upon:

- uptime, which is the amount of time that semiconductor manufacturing equipment is available for processing

- yield, which is the ratio of acceptable output to total output

- throughput, which is the aggregate output that can be processed per hour

The design and performance of instruments that control the pressure or flow of gases are becoming more critical to the semiconductor manufacturing process since they directly affect uptime, yield and throughput. In addition, the increasing sophistication of semiconductor devices requires an increase in the number of components and subsystems used in the design of semiconductor manufacturing process tools. To address manufacturing complexity, improve quality and reliability, and ensure long-term service and support, semiconductor device manufacturers and semiconductor capital equipment manufacturers are increasingly seeking to reduce their supplier base and are, therefore, choosing to work with suppliers that provide a broad range of integrated, technologically advanced products backed by worldwide service and support.

We believe that we offer the widest range of pressure and vacuum measurement and control products serving the semiconductor industry. Our products measure pressures from as low as one trillionth of atmospheric pressure to as high as two hundred times atmospheric pressure. Our objective is to be the leading worldwide supplier of instruments and components used to measure, control and analyze gases in semiconductor and other advanced thin-film processing applications and to help semiconductor device manufacturers achieve improvements in their return on investment capital. Our strategy to accomplish this objective includes:

- extending our technology leadership

- continuing to broaden our comprehensive product offering

- building upon our close working relationships with customers

- expanding the application of our existing technologies to related markets

- leveraging our global infrastructure and world class manufacturing capabilities

For over 25 years, we have focused on satisfying the needs of semiconductor capital equipment manufacturers and semiconductor device manufacturers. As a result, we have established long-term relationships with many of our customers. We sell our products primarily to:

- semiconductor capital equipment manufacturers

- semiconductor device manufacturers

- industrial manufacturing companies

- university, government and industrial research laboratories

Our customers include Applied Materials, Inc., Lam Research Corporation, Novellus Systems, Inc., Tokyo Electron Limited, Inc., Air Products and Chemicals, Inc. and Motorola, Inc. We sell our products primarily through our direct sales force located in 22 offices worldwide.

MKS Instruments, Inc. is a Massachusetts corporation organized in June 1961. Our principal executive offices are located at Six Shattuck Road, Andover, MA 01810, and our telephone number is (978) 975-2350.

THE OFFERING

Common stock offered by MKS..........	6,000,000 shares
Common stock offered by the selling stockholders.........................	500,000 shares
Common stock to be outstanding after this offering........................	24,053,167 shares
Use of proceeds......................	For distributions to current stockholders and general corporate purposes. See "Use of Proceeds" and "S Corporation and Termination of S Corporation Status."
Nasdaq National Market symbol........	MKSI

The common stock to be outstanding after this offering is based on shares outstanding as of December 31, 1998 and excludes 2,132,575 shares of common stock issuable upon the exercise of options outstanding as of such date at a weighted average exercise price of $5.19 per share. See "Capitalization" and Note 8 of Notes to Consolidated Financial Statements.

SUMMARY CONSOLIDATED FINANCIAL DATA

MKS has been treated as an S corporation for federal income tax purposes since July 1, 1987. As an S corporation, MKS has not been subject to federal, and certain state, income taxes. The pro forma net income reflects the provision for income taxes that would have been recorded had MKS been a C corporation, assuming an effective tax rate of 39.0% for 1994 and 1995, and 38.0% for 1996, 1997 and 1998. As a result of terminating its S corporation status upon the closing of this offering, MKS will record a one-time non-cash credit to historical earnings for additional deferred taxes. If this credit to earnings had occurred at December 31, 1998, the amount would have been approximately $3.9 million. This amount is expected to increase through the closing of this offering and is excluded from pro forma net income. See Notes 2 and 9 of Notes to Consolidated Financial Statements.

Pro forma balance sheet data set forth below reflects the liability for the distribution of an estimated $35.9 million, calculated as of December 31, 1998, of cumulative undistributed S corporation taxable income for which stockholders of record prior to the closing of this offering have been or will be taxed. The pro forma net income per share and weighted average common shares outstanding for 1998 which are set forth below reflect the effect of an assumed issuance of sufficient shares to fund this distribution as of January 1, 1998. The distribution will be made out of the proceeds of this offering. The actual amount to be distributed is expected to increase based upon taxable earnings for the period January 1, 1999 through the closing of this offering, subject to certain limitations. See "S Corporation and Termination of S Corporation Status." The pro forma as adjusted balance sheet data reflects the sale of 6,000,000 shares of common stock at an assumed initial public offering price of $16.00 per share, after deducting the estimated underwriting discount and offering expenses payable by MKS.

	YEAR ENDED DECEMBER 31,				
	1994	1995	1996	1997	1998
	(IN THOUSANDS, EXCEPT PER SHARE DATA)				
STATEMENT OF INCOME DATA:					
Net sales...	$106,829	$157,164	$170,862	$188,080	$139,763
Gross profit..	47,016	69,461	68,854	80,474	55,979
Income from operations................................	12,087	24,106	16,068	23,963	9,135
Net income..	$ 10,003	$ 21,658	$ 12,503	$ 20,290	$ 7,186
PRO FORMA STATEMENT OF INCOME DATA(1):					
Pro forma net income..................................	$ 6,590	$ 13,821	$ 8,248	$ 13,806	$ 5,044
Pro forma net income per share:					
Basic...	$ 0.37	$ 0.77	$ 0.46	$ 0.76	$ 0.25
Diluted...	$ 0.37	$ 0.77	$ 0.46	$ 0.76	$ 0.24
Pro forma weighted average common shares outstanding:					
Basic...					20,295
Diluted...					20,780

	DECEMBER 31, 1998		
	ACTUAL	PRO FORMA	PRO FORMA AS ADJUSTED
	(IN THOUSANDS)		

BALANCE SHEET DATA:			
Cash and cash equivalents	$ 11,188	$ 11,188	$ 63,942
Working capital (deficit)	31,493	(4,433)	84,247
Total assets	96,232	96,232	148,986
Short-term obligations	12,819	12,819	12,819
Long-term obligations, less current portion	13,786	13,786	13,786
Stockholders' equity	54,826	18,900	107,580

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(1) Data is computed on the same basis as Note 2 of Notes to Consolidated Financial Statements.

RISK FACTORS

You should consider carefully the risks described below before you decide to buy our common stock. If any of the following risks actually occur, our business, financial condition or results of operations would likely suffer. In such case, the trading price of our common stock could fall, and you may lose all or part of the money you paid to buy our common stock.

This prospectus contains forward-looking statements that involve risks and uncertainties. These forward-looking statements are usually accompanied by words such as "believes," "anticipates," "plans," "expects" and similar expressions. Our actual results may differ materially from the results discussed in the forward-looking statements because of factors such as the Risk Factors discussed below.

OUR PERFORMANCE IS AFFECTED BY THE CYCLICALITY OF THE SEMICONDUCTOR INDUSTRY

We estimate that approximately 60% of our sales during 1997 and 1998 were to semiconductor capital equipment manufacturers and semiconductor device manufacturers, and we expect that sales to such customers will continue to account for a substantial majority of our sales. Our business depends substantially upon the capital expenditures of semiconductor device manufacturers, which in turn depend upon the demand for semiconductors and other products utilizing semiconductors. Periodic reductions in demand for the products manufactured by semiconductor capital equipment manufacturers and semiconductor device manufacturers may adversely affect our business, financial condition and results of operations. Historically, the semiconductor market has been highly cyclical and has experienced periods of overcapacity, resulting in significantly reduced demand for capital equipment. For example, in 1996 and 1998 the semiconductor industry experienced a significant decline, which caused a number of our customers to reduce their orders. We cannot be certain that the current semiconductor downturn that began in 1998 will not continue. A further decline in the level of orders as a result of any future downturn or slowdown in the semiconductor industry could have a material adverse effect on our business, financial condition and results of operations.

OUR NET SALES AND RESULTS OF OPERATIONS CAN BE ADVERSELY AFFECTED BY THE INSTABILITY OF ASIAN ECONOMIES

The financial markets in Asia, one of our principal international markets, have experienced significant turbulence. Turbulence in the Asian markets can adversely affect our net sales and results of operations. Our direct net sales to customers in Asian markets have been approximately 17% to 18% of total net sales for the past three years. Our sales include both direct sales to the semiconductor industry in Asia, as well as to semiconductor capital equipment manufacturers that derive a significant portion of their revenue from sales to the Asian semiconductor industry. Turbulence in the Asian markets began to adversely affect the semiconductor device manufacturers and semiconductor capital equipment manufacturers in the fourth quarter of 1997 and continued to adversely affect them in 1998. We expect the turbulence in the Asian markets will continue to adversely affect sales of semiconductor capital equipment manufacturers for at least the first quarter of 1999. As a result, for at least the first quarter we currently expect that our 1999 quarterly net sales and net income will be less than net sales and net income for the comparable quarter of 1998.

THE JUST-IN-TIME NATURE OF OUR BUSINESS COULD CAUSE SUBSTANTIAL FLUCTUATIONS IN OUR QUARTERLY OPERATING RESULTS

A substantial portion of our shipments occur shortly after an order is received and therefore we operate with a low level of backlog. As a consequence of the just-in-time nature of shipments and the low level of backlog, a decrease in demand for our products from one or more customers could occur with limited advance notice and could have a material adverse effect on our results of operations in any particular period.

OUR FIXED COSTS MAY LEAD TO FLUCTUATIONS IN OPERATING RESULTS IF OUR NET SALES ARE BELOW EXPECTATIONS

A significant percentage of our expenses are relatively fixed and based in part on expectations of future net sales. The inability to adjust spending quickly enough to compensate for any shortfall would magnify the adverse impact of a shortfall in net sales on our results of operations. Factors that could cause fluctuations in our net sales include:

- - the timing of the receipt of orders from major customers

- - shipment delays

- - disruption in sources of supply

- - seasonal variations of capital spending by customers

- - production capacity constraints

- - specific features requested by customers

For example, we were in the process of increasing production capacity when the semiconductor capital equipment market began to experience a significant downturn in 1996. This downturn had a material adverse effect on our operating results in the second half of 1996 and the first half of 1997. After an increase in business in the latter half of 1997, the market experienced another downturn in 1998, which had a material adverse effect on our 1998 operating results. As a result of the factors discussed above, it is likely that we will in the future experience quarterly or annual fluctuations and that, in one or more future quarters, our operating results will fall below the expectations of public market analysts or investors. In any such event, the price of our common stock could decline significantly.

THE LOSS OF SALES TO ANY ONE OF OUR MAJOR CUSTOMERS WOULD LIKELY HAVE A MATERIAL ADVERSE EFFECT ON US

Our five largest customers in 1996, 1997 and 1998 accounted for approximately 26%, 32% and 24%, respectively, of our net sales. The loss of a major customer or any reduction in orders by such customers, including reductions due to market or competitive conditions, would likely have a material adverse effect on our business, financial condition and results of operations. During 1998, one customer, Applied Materials, Inc., accounted for approximately 16% of our net sales. While we have entered into a purchase contract with Applied Materials, Inc. which expires in 2000 unless it is extended by mutual agreement, none of our significant customers, including Applied Materials, Inc., has entered into an agreement requiring it to purchase any minimum quantity of our products. The demand for our products from our semiconductor capital equipment customers depends in part on orders received by them from their semiconductor device manufacturer customers.

Attempts to lessen the adverse effect of any loss or reduction through the rapid addition of new customers could be difficult because prospective customers typically require lengthy qualification periods prior to placing volume orders with a new supplier. Our future success will continue to depend upon:

- our ability to maintain relationships with existing key customers
- our ability to attract new customers
- the success of our customers in creating demand for their capital equipment products which incorporate our products

WE MAY HAVE DIFFICULTY PENETRATING SEMICONDUCTOR-RELATED MARKETS CONTROLLED BY OUR COMPETITORS

The markets for our products are highly competitive. Our competitive success often depends upon factors outside of our control. For example, in some cases, particularly with respect to mass flow controllers, semiconductor device manufacturers may direct semiconductor capital equipment manufacturers to use a specified supplier's product in their equipment. Accordingly, for such products, our success will depend in part on our ability to have semiconductor device manufacturers specify that our products be used at their semiconductor fabrication facilities. In addition, we may encounter difficulties in changing established relationships of competitors that already have a large installed base of products within such semiconductor fabrication facilities.

OUR SUCCESS DEPENDS ON OUR ABILITY TO DEVELOP NEW AND ENHANCED PRODUCTS AND TO ANTICIPATE FUTURE PRODUCTS DEMANDED BY THE SEMICONDUCTOR INDUSTRY

To compete effectively we must not only develop products that are technologically current, but we must also be able to anticipate, design and develop products that will be required to support the technologies adopted in the future. For example, to remain competitive, we must have products ready for current use when a fabrication facility is built. To accomplish this objective, we must predict what technologies will be demanded by our customers two to three years prior to the construction of a facility and begin developing products at that time. Our failure to predict accurately the technologies of the future could have a material adverse effect on our business.

FAILURE BY US TO IDENTIFY AND REMEDIATE ALL MATERIAL YEAR 2000 RISKS COULD ADVERSELY AFFECT US

We have implemented a multi-phase Year 2000 project consisting of assessment and remediation, and testing following remediation. We cannot, however, be certain that we have identified all of the potential risks. Failure by us to identify and remediate all material Year 2000 risks could adversely affect our business, financial condition and results of operations. We have identified the following risks you should be aware of:

- we cannot be certain that the entities on whom we rely for certain goods and services that are important for our business will be successful in addressing all of their software and systems problems in order to operate without disruption in the year 2000 and beyond

- our customers or potential customers may be affected by Year 2000 issues that may, in part:

  -- cause a delay in payments for products shipped

  -- cause customers to expend significant resources on Year 2000 compliance matters, rather than investing in our products

- we have not developed a contingency plan related to the failure of our or a third-party's Year 2000 remediation efforts and may not be prepared for such an event

Further, while we have made efforts to notify our customers who have purchased potential non-compliant products, we cannot be sure that customers who purchased such products will not assert claims against us alleging that such products should have been Year 2000 compliant at the time of purchase, which could result in costly litigation and divert management's attention.

WE INTEND TO EXPAND OUR BUSINESS OUTSIDE THE SEMICONDUCTOR INDUSTRY AND OUR BUSINESS COULD BE MATERIALLY ADVERSELY AFFECTED IF WE FAIL TO SUCCESSFULLY PENETRATE ADDITIONAL MARKETS

We plan to build upon our experience in manufacturing and selling gas measurement, control and analysis products used by the semiconductor industry by designing and selling such products for applications in other industries which use production processes similar to those used in the semiconductor industry. Any failure by us to penetrate additional markets would limit our ability to reduce our vulnerability to downturns in the semiconductor industry and could have a material adverse effect on our business, financial condition and results of operations.

We have limited experience selling our products in certain markets outside the semiconductor industry. We cannot be certain that we will be successful in the expansion of our business outside the semiconductor industry. Our future success will depend in part on our ability to:

- identify new applications for our products

- adapt our products for such applications

- market and sell such products to customers

DIFFICULTY IN EXPANDING OUR MANUFACTURING CAPACITY COULD REDUCE OUR MARKET SHARE

During 1999, we plan to add manufacturing capacity to our Austin, Texas operations and further equip our cleanroom facilities in Andover and Methuen, Massachusetts. Our ability to increase sales of certain products depends in part upon our ability to expand our manufacturing capacity for such products in a timely manner. If we are unable to expand our manufacturing capacity on a timely basis or to manage such expansion effectively, our customers could seek such products from others and our market share could be reduced. Because the semiconductor industry is subject to rapid demand shifts which are difficult to foresee, we may not be able to increase capacity quickly enough to respond to a rapid increase in demand in the semiconductor industry. Additionally, capacity expansion could increase our fixed operating expenses and if sales levels do not increase to offset the additional expense levels associated with any such expansion, our business, financial condition and results of operations could be materially adversely affected.

OUR SALES AND RESULTS OF OPERATIONS COULD BE ADVERSELY AFFECTED BY DOWNTURNS IN ECONOMIC CONDITIONS IN COUNTRIES OUTSIDE OF THE UNITED STATES

International sales, which include sales by our foreign subsidiaries, but exclude direct export sales which were less than 10% of our total net sales, accounted for approximately 30% of net sales in 1996, 27% of net sales in 1997 and 32% of net sales in 1998. We anticipate that international sales will continue to account for a significant portion of our net sales. In addition, certain of our key domestic customers derive a significant portion of their revenues from sales in international markets. Therefore, our sales and results of operations could be adversely affected by economic slowdowns and other risks associated with international sales.

EXCHANGE RATE FLUCTUATIONS COULD ADVERSELY AFFECT OUR NET SALES AND RESULTS OF OPERATIONS

Exchange rate fluctuations could have an adverse effect on our net sales and results of operations and we could experience losses with respect to our hedging activities. Unfavorable currency fluctuations could require us to increase prices to foreign customers which could result in lower net sales by us to such customers. Alternatively, if we do not adjust the prices for our products in response to unfavorable currency fluctuations, our results of operations could be adversely affected. In addition, sales made by our foreign subsidiaries are denominated in the currency of the country in which these products are sold and the currency we receive in payment for such sales could be less valuable at the time of receipt as a result of exchange rate fluctuations. While we enter into forward exchange contracts and local currency purchased options to reduce currency exposure arising from these sales and associated intercompany purchases of inventory, we cannot be certain that our efforts will be adequate to protect us against significant currency fluctuations or that such efforts will not expose us to additional exchange rate risks.

WE NEED TO RETAIN AND ATTRACT KEY PERSONNEL SKILLED WITH KNOWLEDGE OF INSTRUMENTS AND COMPONENTS USED IN SEMICONDUCTOR AND INDUSTRIAL MANUFACTURING PROCESSES

Our success depends to a large extent upon the efforts and abilities of a number of key employees and officers, particularly those with expertise in the semiconductor manufacturing and similar industrial manufacturing industries. The loss of key employees or officers could have a material adverse effect on our business, financial condition and results of operations. We believe that our future success will depend in part on our ability to attract and retain highly skilled technical, financial, managerial and marketing personnel. Competition for such personnel is intense, and we cannot be certain that we will be successful in attracting and retaining such personnel. We are the beneficiary of key-man life insurance policies on John R. Bertucci, Chairman, Chief Executive Officer and President, in the amount of $7.2 million.

OUR BUSINESS COULD BE ADVERSELY AFFECTED IF WE ARE UNABLE TO PROTECT OUR PROPRIETARY TECHNOLOGY

Although we seek to protect our intellectual property rights through patents, copyrights, trade secrets and other measures, we cannot be certain that:

- we will be able to protect our technology adequately

- competitors will not be able to develop similar technology independently

- any of our pending patent applications will be issued

- intellectual property laws will protect our intellectual property rights

- third parties will not assert that our products infringe patent, copyright or trade secrets of such parties

PROTECTION OF OUR INTELLECTUAL PROPERTY RIGHTS MAY RESULT IN COSTLY LITIGATION

Litigation may be necessary in order to enforce our patents, copyrights or other intellectual property rights, to protect our trade secrets, to determine the validity and scope of the proprietary rights of others or to defend against claims of infringement. Such litigation could result in substantial costs and diversion of resources and could have a material adverse effect on our business, financial condition and results of operations.

TRADING IN OUR SHARES COULD BE SUBJECT TO EXTREME PRICE FLUCTUATIONS AND YOU COULD HAVE DIFFICULTY TRADING YOUR SHARES

The market for shares in newly public technology companies is subject to extreme price and volume fluctuations. These broad market fluctuations may materially and adversely affect the market price of our common stock. In addition, although our common stock will be quoted on the Nasdaq National Market, an active trading market may not develop and be sustained after this offering.

YOU WILL EXPERIENCE AN IMMEDIATE AND SUBSTANTIAL DILUTION IN THE BOOK VALUE OF YOUR INVESTMENT

Purchasers of common stock in this offering will incur immediate and substantial dilution of $11.53 in the pro forma net tangible book value per share of common stock from the assumed initial public offering price of $16.00 per share.

AFTER THIS OFFERING ONE STOCKHOLDER, ALONG WITH MEMBERS OF HIS FAMILY, WILL HAVE CONTROLLING INTEREST IN MKS AND WILL BE ABLE TO EFFECT IMPORTANT CORPORATE ACTIONS WITHOUT THE APPROVAL OF OTHER STOCKHOLDERS

Upon consummation of this offering, John R. Bertucci, Chairman, Chief Executive Officer and President of MKS, and members of his family will, in the aggregate, beneficially own approximately 70% of our outstanding common stock. As a result, these stockholders, acting together, will be able to take any of the following actions without the approval of our public stockholders:

- amend our Articles of Organization in certain respects or approve a merger, sale of assets or other major corporate transaction

- defeat any non-negotiated takeover attempt that may be beneficial to our public stockholders

- determine the amount and timing of dividends paid to themselves and to our public stockholders

- otherwise control our management and operations and the outcome of all matters submitted for a stockholder vote, including the election of directors

CERTAIN PROVISIONS OF OUR ARTICLES OF ORGANIZATION, OUR BY-LAWS AND MASSACHUSETTS LAW COULD DISCOURAGE POTENTIAL ACQUISITION PROPOSALS AND COULD DELAY OR PREVENT A CHANGE IN CONTROL OF MKS

Anti-takeover provisions could diminish the opportunities for stockholders to participate in tender offers including tender offers at a price above the then current market value of the common stock. Such provisions may also inhibit increases in the market price of the common stock that could result from takeover attempts. For example, while we have no present plans to issue any preferred stock, the Board of Directors, without further stockholder approval, may issue preferred stock that could have the effect of delaying, deterring or preventing a change in control of MKS. The issuance of preferred stock could adversely affect the voting power of the holders of common stock including the loss of voting control to others. In addition, our By-Laws will provide for a classified Board of Directors consisting of three classes. This classified board could also have the effect of delaying, deterring or preventing a change in control of MKS.

FUTURE SALES BY OUR EXISTING STOCKHOLDERS COULD ADVERSELY AFFECT THE MARKET PRICE OF OUR COMMON STOCK

Sales of our common stock in the public market following this offering could adversely affect the market price of the common stock. All of the shares offered under this prospectus will be freely tradable in the open market, and

- 17,553,165 additional shares may be sold after the expiration of 180-day lock-up agreements

- approximately 1,100,000 additional shares may be sold upon the exercise of stock options after the expiration of 180-day lock-up agreements

S CORPORATION AND TERMINATION OF S CORPORATION STATUS

MKS has been treated as an S corporation for federal income tax purposes since July 1, 1987. As a result, MKS currently pays no federal, and certain state, income tax, and all of the earnings of MKS are subject to federal, and certain state, income taxation directly at the stockholder level. MKS's S corporation status will terminate upon the closing of this offering, at which time MKS will become subject to corporate income taxation under Subchapter C of the Internal Revenue Code and applicable state income taxation law. Pro forma statement of income data set forth in this prospectus has been adjusted to include pro forma income tax provisions as if MKS had been a C corporation during the relevant periods.

As soon as practicable following the closing of this offering, MKS intends to make a distribution to the holders of record on the day prior to the closing of this offering in an amount equivalent to the "accumulated adjustments account," as defined in Section 1368(a)(1) of the Internal Revenue Code. The accumulated adjustments account is equal to the cumulative income of MKS, as determined for federal income tax purposes, for the period MKS was an S corporation (from July 1, 1987 through the date of the closing of this offering) minus any distributions made to stockholders during this period. As of December 31, 1998, the outstanding balance of the accumulated adjustments account was estimated to be approximately $35.9 million, and such balance is expected to increase in the period from January 1, 1999 through the closing of this offering. The increase in the accumulated adjustments account for the period January 1, 1999 through the date of the closing of this offering will equal a portion of the taxable income as determined for federal income tax purposes of MKS for the calendar year 1999, excluding any earnings from its international subsidiaries, determined by allocating all of the calendar year 1999 taxable income equally to each day in the year and multiplying the daily taxable income by the number of days from January 1, 1999 through the date of the closing of this offering. Investors purchasing shares in this offering will not receive any portion of the distribution.

MKS expects to enter into a Tax Indemnification and S Corporation Distribution Agreement with its existing stockholders providing for, among other things, the indemnification of MKS by such stockholders for any federal and state income taxes, including interest, incurred by MKS if for any reason MKS is deemed to be treated as a C corporation during any period in which it reported its taxable income as an S corporation. The tax indemnification obligation of the existing stockholders is limited to the amount of any reduction in their tax liability as a result of any such determination. The agreement also provides for the payment, with interest, by the existing stockholders or MKS, as the case may be, for the difference between the amount to be distributed and the actual amount of accumulated adjustments account on the day immediately preceding the closing of this offering. The actual amount of the accumulated adjustments account on the day prior to the closing of this offering cannot be determined until MKS calculates the amount of its taxable income for the year ending December 31, 1999 and can be affected by subsequent income tax audits of MKS. This agreement further provides for the indemnification of MKS by each existing stockholder and of the existing stockholders by MKS for any losses or liabilities with respect to certain additional taxes, including interest and penalties, resulting from MKS's operations during the period in which it was an S corporation, to the extent such adjustments do not cause a payment to be made to the other party as a result of a change in the accumulated adjustment account. Purchasers of common stock in this offering will not be parties to the Tax Indemnification and S Corporation Distribution Agreement.

USE OF PROCEEDS

The net proceeds we will receive from the sale of the 6,000,000 shares of common stock offered by us are estimated to be $88,680,000 ($103,188,000 if the underwriters' over-allotment option is exercised in full), after deducting the estimated underwriting discount and offering expenses payable by us and assuming an initial public offering price of $16.00 per share. We will not receive any of the proceeds from the sale of shares by the selling stockholders.

We will use proceeds from this offering to pay current stockholders our undistributed S corporation earnings through the closing of this offering. The undistributed S corporation earnings were estimated to be approximately $35.9 million at December 31, 1998, and are expected to increase from January 1, 1999 to the closing of this offering. See "S Corporation and Termination of S Corporation Status." We expect to use the remainder of the net proceeds for general corporate purposes, including working capital, product development and capital expenditures.

A portion of the net proceeds after the S corporation distribution may also be used for the acquisition of businesses, products and technologies that are complementary to those of MKS. There are currently no active negotiations, commitments or agreements with respect to any acquisition. Pending such uses, we intend to invest the net proceeds from this offering in short-term, investment-grade, interest-bearing securities.

DIVIDEND POLICY

We currently intend, subject to our contractual obligations under the Tax Indemnification and S Corporation Distribution Agreement, to retain earnings for the continued development of our business. Restrictions or limitations on the payment of dividends may be imposed in the future under the terms of credit agreements or under other contractual provisions. In the absence of such restrictions or limitations, the payment of any dividends will be at the discretion of our Board of Directors.

CAPITALIZATION

The following table sets forth the capitalization of MKS (1) as of December 31, 1998, (2) on a pro forma basis to reflect distributions and adjustments in connection with MKS's S corporation status and (3) as adjusted to reflect the sale of 6,000,000 shares of common stock by MKS at an assumed initial public offering price of $16.00 per share and the application of the net proceeds therefrom. See "Use of Proceeds."

The pro forma data reflects the liability for distribution of an estimated $35.9 million, calculated as of December 31, 1998, of cumulative undistributed S corporation taxable income for which stockholders of record prior to the closing of this offering have been or will be taxed. The actual amount to be distributed is expected to increase based upon taxable earnings for the period from January 1, 1999 through the closing of this offering, subject to certain limitations. See "S Corporation and Termination of S Corporation Status" and Notes 2 and 9 of Notes to Consolidated Financial Statements. The pro forma as adjusted numbers have been adjusted to reflect the issuance of 6,000,000 shares of common stock at an assumed initial public offering price of $16.00 per share, after deducting the estimated underwriting discount and offering expenses payable by MKS. The remaining balance in retained earnings represents accumulated earnings prior to MKS's conversion from a C corporation to an S corporation in 1987, accumulated income in overseas subsidiaries and differences between book and tax accumulated income.

	DECEMBER 31, 1998		
	ACTUAL	PRO FORMA	PRO FORMA AS ADJUSTED
	(IN THOUSANDS, EXCEPT SHARE DATA)		
Long-term obligations, less current portion	$13,786	$13,786	$ 13,786
Stockholders' equity:			
Common stock, no par value; 30,000,000 shares authorized, 18,053,167 shares issued and outstanding (actual and pro forma); 24,053,167 shares issued and outstanding (pro forma as adjusted)	113	113	113
Additional paid-in capital	48	48	88,728
Retained earnings	52,479	16,553	16,553
Accumulated other comprehensive income	2,186	2,186	2,186
Total stockholders' equity	54,826	18,900	107,580
Total capitalization	$68,612	$32,686	$121,366

The common stock to be outstanding after this offering is based on shares outstanding as of December 31, 1998 and excludes 2,132,575 shares of common stock issuable upon the exercise of options outstanding as of such date at a weighted average exercise price of $5.19 per share. See Note 8 of Notes to Consolidated Financial Statements.

DILUTION

As of December 31, 1998, MKS had a net tangible book value of $54,826,000, or $3.04 per share of common stock. After taking into account the sale of the shares offered hereby by MKS, the pro forma net tangible book value as of December 31, 1998 would have been $107,580,000, or $4.47 per share. The pro forma net tangible book value assumes that the proceeds to MKS, net of offering expenses and commissions, will be approximately $52,754,000. This number has also been adjusted to take into account the distribution to current stockholders of the accumulated undistributed S corporation taxable income for which such taxpayers have been or will be taxed as of December 31, 1998. That amount is estimated to be $35.9 million. No other changes occurring after December 31, 1998 have been taken into account. Based on the foregoing, there would be an immediate increase in net tangible book value to existing stockholders attributable to new investors of $2.92 per share and the immediate dilution of $11.53 per share to new investors. The following table illustrates this per share dilution:

Assumed initial public offering price per share		$16.00
Net tangible book value per share at December 31, 1998	$ 3.04	
Decrease per share attributable to the S corporation distribution	(1.49)	
Increase per share attributable to new investors	2.92	
Pro forma net tangible book value per share after this offering		4.47
Dilution per share to new investors		$11.53

The following table sets forth, on a pro forma basis as of December 31, 1998, (1) the number of shares of common stock purchased from MKS, (2) the total consideration paid to MKS and (3) the average price paid per share by existing stockholders and by the new investors purchasing shares of common stock in this offering, at an assumed initial public offering price of $16.00 per share. Underwriting discounts, commissions and other estimated offering expenses have not been deducted. Shares owned by existing stockholders will be reduced by the number of shares sold by them in this offering.

	SHARES PURCHASED		TOTAL CONSIDERATION		AVERAGE PRICE
	NUMBER	PERCENT	AMOUNT	PERCENT	PER SHARE
Existing stockholders	18,053,167	75.1%	$ 161,000	0.2%	$0.009
New investors	6,000,000	24.9	96,000,000	99.8	$16.00
Total	24,053,167	100.0%	96,161,000	100.0%	

As of December 31, 1998, there were options outstanding to purchase a total of 2,132,575 shares of common stock, at a weighted average exercise price of $5.19 per share and 2,401,793 additional shares reserved for future grants of issuances under MKS's stock option and stock purchase plans. To the extent that any of these options are exercised, there will be further dilution to new investors.

SELECTED CONSOLIDATED FINANCIAL DATA

The following selected financial data as of December 31, 1997 and 1998 and for the years ended December 31, 1996, 1997 and 1998 have been derived from MKS's financial statements, included elsewhere in this prospectus, which have been audited by PricewaterhouseCoopers LLP, independent accountants, as indicated in their report. The selected financial data as of December 31, 1994, 1995 and 1996 and for the years ended December 31, 1994 and 1995 are derived from financial statements, which were also audited by PricewaterhouseCoopers LLP, not included herein. The data should be read in conjunction with the Consolidated Financial Statements, including the Notes thereto, and with "Management's Discussion and Analysis of Financial Condition and Results of Operations" included elsewhere in this prospectus.

MKS has been treated as an S corporation under the applicable provisions of the Internal Revenue Code since July 1, 1987. As an S corporation, MKS has not been subject to federal, and certain state, income taxes. The pro forma net income set forth below reflects the provision for income taxes that would have been recorded had MKS been a C corporation, assuming an effective tax rate of 39.0% for 1994 and 1995, and 38.0% for 1996, 1997, and 1998. As a result of terminating its S corporation status upon the closing of this offering, MKS will record a one-time non-cash credit to historical earnings for additional deferred taxes. If this credit to earnings had occurred at December 31, 1998, the amount would have been approximately $3.9 million. This amount is expected to change through the closing of this offering and is excluded from pro forma net income. See Notes 2 and 9 of Notes to Consolidated Financial Statements. Pro forma balance sheet data reflects the liability for the distribution of an estimated $35.9 million, calculated as of December 31, 1998, of cumulative undistributed S corporation taxable income for which stockholders of record prior to the closing of this offering have been or will be taxed. The actual amount to be distributed is expected to increase based upon taxable earnings for the period January 1, 1999 through the closing of this offering, subject to certain limitations. Pro forma net income per share for 1998 reflects the effect of an assumed issuance of sufficient shares to fund the distribution, as of January 1, 1998. See "S Corporation and Termination of S Corporation Status" and Note 2 of Notes to Consolidated Financial Statements.

	YEAR ENDED DECEMBER 31,				
	1994	1995	1996	1997	1998
	(IN THOUSANDS)				
STATEMENT OF INCOME DATA:					
Net sales	$106,829	$157,164	$170,862	$188,080	$139,763
Cost of sales	59,813	87,703	102,008	107,606	83,784
Gross profit	47,016	69,461	68,854	80,474	55,979
Research and development	8,036	10,935	14,195	14,673	12,137
Selling, general and administrative	26,893	34,420	37,191	41,838	34,707
Restructuring	--	--	1,400	--	--
Income from operations	12,087	24,106	16,068	23,963	9,135
Interest expense, net	1,284	1,448	2,286	1,861	1,187
Other income (expense), net	--	--	(479)	166	187
Income before income taxes	10,803	22,658	13,303	22,268	8,135
Provision for income taxes	800	1,000	800	1,978	949
Net income	$ 10,003	$ 21,658	$ 12,503	$ 20,290	$ 7,186

THE HISTORICAL NET INCOME PER SHARE DATA PRESENTED BELOW DOES NOT INCLUDE PROVISIONS FOR FEDERAL INCOME TAXES BECAUSE PRIOR TO THE CLOSING OF THIS OFFERING, MKS WAS TREATED AS AN S CORPORATION FOR FEDERAL INCOME TAX PURPOSES. THE PRO FORMA STATEMENT OF INCOME DATA SET FORTH BELOW PRESENTING NET INCOME PER SHARE DATA AS IF THE MKS HAD BEEN SUBJECT TO FEDERAL INCOME TAXES AS A C CORPORATION DURING THE PERIODS PRESENTED.

	YEAR ENDED DECEMBER 31,				
	1994	1995	1996	1997	1998
HISTORICAL NET INCOME PER SHARE:					
Basic	$0.55	$1.20	$0.69	$1.12	$0.40
Diluted	$0.55	$1.20	$0.69	$1.10	$0.38

	YEAR ENDED DECEMBER 31,				
	1994	1995	1996	1997	1998
	(IN THOUSANDS, EXCEPT PER SHARE DATA)				
PRO FORMA STATEMENT OF INCOME DATA (UNAUDITED):					
Historical income before income taxes	$10,803	$22,658	$13,303	$22,268	$8,135
Pro forma provision for income taxes assuming C Corporation tax	4,213	8,837	5,055	8,462	3,091
Pro forma net income	$ 6,590	$13,821	$ 8,248	$13,806	$5,044
PRO FORMA NET INCOME PER COMMON SHARE:					
Basic	$ 0.37	$ 0.77	$ 0.46	$ 0.76	$ 0.25
Diluted	$ 0.37	$ 0.77	$ 0.46	$ 0.76	$ 0.24

	DECEMBER 31,				DECEMBER 31, 1998	
	1994	1995	1996	1997	ACTUAL	PRO FORMA
	(IN THOUSANDS)					
BALANCE SHEET DATA:						
Cash and cash equivalents	$ 4,059	$ 3,650	$ 3,815	$ 2,511	$ 11,188	$ 11,188
Working capital (deficit)	25,078	32,202	22,404	30,321	31,493	(4,433)
Total assets	72,320	104,511	95,000	106,536	96,232	96,232
Short-term obligations	9,246	15,192	16,124	13,852	12,819	12,819
Long-term obligations, less current portion	14,948	20,462	18,899	15,624	13,786	13,786
Stockholders' equity	37,272	48,392	45,498	52,848	54,826	18,900

MANAGEMENT'S DISCUSSION AND ANALYSIS OF FINANCIAL CONDITION AND RESULTS OF OPERATIONS

The following discussion contains forward-looking statements that involve risks and uncertainties. MKS's actual results could differ materially from those discussed in the forward-looking statements as a result of certain factors including those set forth under "Risk Factors" and elsewhere in this prospectus. The following discussion and analysis should be read in conjunction with "Selected Consolidated Financial Data" and the Consolidated Financial Statements and Notes thereto appearing elsewhere in this prospectus.

OVERVIEW

MKS was founded in 1961. MKS develops, manufactures and supplies instruments and components used to measure, control and analyze gases in semiconductor manufacturing and similar industrial manufacturing processes. During 1997 and 1998, MKS estimates that approximately 60% of its net sales were to semiconductor capital equipment manufacturers and semiconductor device manufacturers. MKS expects that sales to such customers will continue to account for a substantial majority of its sales. MKS's customers include semiconductor capital equipment manufacturers, semiconductor device manufacturers, industrial manufacturing companies and university, government and industrial research laboratories. In 1996, 1997, and 1998, sales to MKS's top five customers accounted for approximately 26%, 32% and 24%, respectively, of MKS's net sales. During 1998, Applied Materials, Inc. accounted for approximately 16% of MKS's net sales. MKS typically enters into contracts with its semiconductor equipment manufacturer customers that provide for quantity discounts. MKS recognizes revenue, and accrues for anticipated returns and warranty costs, upon shipment.

In the third quarter of 1996, as a result of the downturn in the semiconductor industry, MKS recorded a restructuring charge of $1.4 million. The charge was primarily related to a reduction of personnel and the closure of certain facilities and included the cost of severance, lease commitments and the write-off of leasehold improvements. During 1998, as a result of the downturn in the semiconductor industry, MKS reduced its staffing levels by approximately 30% from its year-end 1997 levels.

A significant portion of MKS's sales are to operations in international markets. International sales by MKS's foreign subsidiaries, located in Japan, Korea, Europe, and Canada, were 27.3% and 32.4% of net sales for 1997 and 1998, respectively. Sales by MKS's Japan subsidiary comprised 15.0% and 15.1% of net sales in 1997 and 1998, respectively. MKS does not classify export sales made directly by MKS as international sales. Such export sales have generally been less than 10% of net sales. MKS currently uses, and plans to continue to use, forward exchange contracts and local currency purchased options to reduce currency exposure arising from foreign denominated sales associated with the intercompany purchases of inventory. Gains and losses on derivative financial instruments that qualify for hedge accounting are classified in cost of sales. Gains and losses on derivative financial instruments that do not qualify for hedge accounting are marked-to-market and recognized immediately in other income. See Note 3 to Notes to Consolidated Financial Statements.

MKS has been treated as an S corporation for federal income tax purposes since July 1, 1987. MKS's S corporation status will terminate upon the closing of this offering, at which time MKS will become subject to federal, and certain state, income taxation as a C corporation. The pro forma net income reflects a pro forma effective tax rate of 38.0% to reflect federal and state income taxes which would have been payable for 1998 had MKS been taxed as a C corporation. See "S Corporation and Termination of S Corporation Status."

RESULTS OF OPERATIONS

The following table sets forth for the periods indicated the percentage of total net sales of certain line items included in MKS's consolidated statement of income data:

	YEAR ENDED DECEMBER 31, 1996	1997	1998
Net sales	100.0%	100.0%	100.0%
Cost of sales	59.7	57.2	59.9
Gross profit	40.3	42.8	40.1
Research and development	8.3	7.8	8.7
Selling, general and administrative	21.8	22.3	24.9
Restructuring	0.8	--	--
Income from operations	9.4	12.7	6.5
Interest expense, net	1.3	1.0	0.8
Other income (expense), net	(0.3)	0.1	0.1
Income before income taxes	7.8	11.8	5.8
Provision for income taxes	0.5	1.0	0.7
Net income	7.3%	10.8%	5.1%
Pro forma data:			
Historical income before income taxes	7.8%	11.8%	5.8%
Pro forma provision for income taxes	3.0	4.5	2.2
Pro forma net income	4.8%	7.3%	3.6%

Year Ended 1998 Compared to 1997

Net Sales. Net sales decreased 25.7% to $139.8 million for 1998 from $188.1 million for 1997. International net sales were approximately $45.3 million in 1998 or 32.4% of net sales and $51.4 million in 1997 or 27.3% of net sales. The decrease in net sales was primarily due to decreased sales volume of MKS's existing products in the United States and in Asia caused by the 1998 downturn in the semiconductor capital equipment market.

Gross Profit. Gross profit as a percentage of net sales decreased to 40.1% for 1998 from 42.8% in 1997. The change was primarily due to manufacturing overhead costs being a higher percentage of net sales due to lower sales volume in 1998.

Research and Development. Research and development expenses decreased 17.3% to $12.1 million or 8.7% of net sales for 1998 from $14.7 million or 7.8% of net sales for 1997. The decrease was due to reduced spending for development materials primarily related to certain projects that were completed during 1998.

Selling, General and Administrative. Selling, general and administrative expenses decreased 17.0% to $34.7 million or 24.9% of net sales for 1998 from $41.8 million or 22.3% of net sales for 1997. The decrease was due primarily to a decrease of approximately $4.2 million in compensation expense resulting from the reduction in personnel during 1998 and reduced incentive compensation. Additionally, expenses were reduced as a result of lower spending on advertising, travel, and other selling and administrative costs.

Interest Expense, Net. Net interest expense decreased to $1.2 million for 1998 from $1.9 million for 1997 primarily due to lower debt outstanding during 1998.

Other Income (Expense), Net. Other income of $0.2 million in 1998 primarily represents foreign exchange translation gains on intercompany payables of $1.0 million offset by $0.7 million for costs associated with MKS's planned initial public offering in early 1998 which was postponed. Other income of $0.2 million in 1997 represents gains of $1.2 million from foreign exchange contracts that did not qualify for hedge accounting, offset by a foreign exchange translation loss on an intercompany payable.

Pro Forma Provision for Income Taxes. The pro forma provision for income taxes for 1998 reflects the estimated tax expense MKS would have incurred had it been subject to federal and state income taxes as a C corporation under the Internal Revenue Code. The pro forma provision reflects a pro forma tax rate of 38.0%, which differs from the federal statutory rate due primarily to the effects of state and foreign taxes and certain tax credits.

Year Ended 1997 Compared to 1996

Net Sales. Net sales increased 10.1% to $188.1 million for 1997 from $170.9 million for 1996. International net sales were approximately $51.4 million in both 1997 and 1996 and were 27.3% of net sales in 1997 and 30.1% of net sales in 1996. The increase in net sales was primarily due to increased sales volume of MKS's existing products in the United States.

Gross Profit. Gross profit as a percentage of net sales increased to 42.8% for 1997 from 40.3% for 1996. The change was due primarily to the reduction in fixed costs resulting from the restructuring effected in the third quarter of 1996 and the resulting increase in operational efficiencies.

Research and Development. Research and development expenses increased 3.4% to $14.7 million or 7.8% of net sales for 1997 from $14.2 million or 8.3% of net sales for 1996. The increase was primarily due to an increase in staffing throughout 1997 for certain development projects.

Selling, General and Administrative. Selling, general and administrative expenses increased 12.5% to $41.8 million or 22.3% of net sales for 1997 from $37.2 million or 21.8% of net sales for 1996. The increase was due to increased compensation expense resulting from increased salaries and wages and incentive compensation.

Restructuring. In the third quarter of 1996, as a result of the downturn in the semiconductor industry, MKS recorded a restructuring charge of $1.4 million. The charge included $0.4 million of severance pay, $0.7 million of lease commitments, and $0.3 million for the write-off of leasehold improvements.

Interest Expense, Net. Net interest expense decreased to $1.9 million for 1997 from $2.3 million for 1996 primarily due to lower debt outstanding during 1997.

Other Income (Expense), Net. Other expense for 1996 and other income for 1997 reflect losses and gains of $0.5 million and $1.2 million, respectively, from foreign exchange contracts that did not qualify for hedge accounting, and a foreign exchange translation loss on an intercompany payable from MKS's Korean subsidiary of $1.0 million related to the devaluation of the Korean won in the fourth quarter of 1997.

Pro Forma Provision for Income Taxes. The pro forma provision for income taxes for 1997 reflects the estimated tax expense MKS would have incurred had it been subject to federal and state income taxes as a C corporation under the Internal Revenue Code. The pro forma provision reflects a pro forma tax rate of 38.0%, which differs from the federal statutory rate due primarily to the effects of state and foreign taxes and certain tax credits.

Selected Quarterly Operating Results

The following tables present unaudited consolidated financial information for the eight quarters ended December 31, 1998. In the opinion of management, this information has been presented on the same basis as the audited Consolidated Financial Statements appearing elsewhere in this prospectus. All adjustments which management considers necessary for a fair presentation of the results of such periods have been included to present fairly the unaudited quarterly results when read in conjunction with MKS's Consolidated Financial Statements and Notes thereto. The results for any quarter are not necessarily indicative of future quarterly results of operations.

	QUARTER ENDED							
	MARCH 31, 1997	JUNE 30, 1997	SEPT. 30, 1997	DEC. 31, 1997	MARCH 31, 1998	JUNE 30, 1998	SEPT. 30, 1998	DEC. 31, 1998
	(IN THOUSANDS)							
STATEMENT OF INCOME DATA:								
Net sales	$40,520	$45,749	$48,360	$53,451	$46,163	$34,026	$28,834	$30,740
Cost of sales	24,277	26,413	27,766	29,150	26,757	20,265	18,140	18,622
Gross profit	16,243	19,336	20,594	24,301	19,406	13,761	10,694	12,118
Research and development	2,994	3,563	3,779	4,337	3,794	3,107	2,568	2,668
Selling, general and administrative	9,612	10,321	10,816	11,089	10,112	9,045	7,808	7,742
Income from operations	3,637	5,452	5,999	8,875	5,500	1,609	318	1,708
Interest expense, net	494	527	445	395	375	337	234	241
Other income (expense), net	275	(447)	632	(294)	(281)	123	77	268
Income before income taxes	3,418	4,478	6,186	8,186	4,844	1,395	161	1,735
Provision for income taxes	289	378	523	788	565	163	19	202
Net income	$ 3,129	$ 4,100	$ 5,663	$ 7,398	$ 4,279	$ 1,232	$ 142	$ 1,533

	QUARTER ENDED							
	MARCH 31, 1997	JUNE 30, 1997	SEPT. 30, 1997	DEC. 31, 1997	MARCH 31, 1998	JUNE 30, 1998	SEPT. 30, 1998	DEC. 31, 1998
PERCENTAGE OF NET SALES:								
Net sales	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Cost of sales	59.9	57.7	57.4	54.5	58.0	59.6	62.9	60.6
Gross profit	40.1	42.3	42.6	45.5	42.0	40.4	37.1	39.4
Research and development	7.4	7.8	7.8	8.1	8.2	9.1	8.9	8.6
Selling, general and administrative	23.7	22.6	22.4	20.8	21.9	26.6	27.1	25.2
Income from operations	9.0	11.9	12.4	16.6	11.9	4.7	1.1	5.6
Interest expense, net	1.2	1.1	0.9	0.7	0.8	1.0	0.8	0.8
Other income (expense), net	0.6	(1.0)	1.3	(0.6)	(0.6)	0.4	0.3	0.8
Income before income taxes	8.4	9.8	12.8	15.3	10.5	4.1	0.6	5.6
Provision for income taxes	0.7	0.8	1.1	1.5	1.2	0.5	0.1	0.6
Net income	7.7%	9.0%	11.7%	13.8%	9.3%	3.6%	0.5%	5.0%

MKS's quarterly operating results have varied significantly and are likely to continue to vary significantly due to a number of factors including:

- specific economic conditions in the industries in which MKS's customers operate, particularly the semiconductor industry

- the timing of the receipt of orders from major customers

- customer cancellations or shipment delays

- price competition

- disruption in sources of supply

- seasonal variations of capital spending by customers

- production capacity constraints

- specific features requested by customers

- exchange rate fluctuations

- the introduction or announcement of new products by MKS or its competitors

- other factors, many of which are beyond MKS's control

MKS's net sales have fluctuated over the past eight quarters primarily due to the decline in the semiconductor capital equipment market and the semiconductor device market in 1998 that adversely affected sales of MKS's products in each of the quarters of 1998. MKS expects that the decline in worldwide semiconductor capital equipment orders in the second half of 1998 and the instability of the Asian markets will continue to adversely affect sales of semiconductor capital equipment manufacturers for at least the first quarter of 1999. As a result, for at least the first quarter we currently expect that our 1999 quarterly net sales and net income will be less than net sales and net income for the comparable quarter of 1998.

Gross profit as a percentage of net sales increased in each quarter of 1997 primarily as a result of fuller utilization of existing manufacturing capacity as a result of increased net sales. Gross profit as a percentage of net sales decreased in each of the first three quarters of 1998 as a result of manufacturing overhead costs becoming a higher percentage of net sales due to lower sales volume.

The increase in research and development expenses for the second, third and fourth quarters of 1997 was primarily due to increased staffing levels. The decrease in research and development expenses for the first, second, and third quarters of 1998 was due to reduced spending for development materials primarily related to certain projects that were completed during 1998.

Selling, general and administrative expenses increased in the second, third and fourth quarters of 1997 primarily due to increased compensation expense and the write-off of certain abandoned assets. The decrease in selling, general and administrative expenses in the first, second, and third quarters of 1998 was primarily due to a decrease in compensation expense along with other selling related expenses.

Other income primarily represents gains and losses on foreign exchange contracts and a foreign exchange translation loss on an intercompany payable from MKS's Korean subsidiary of $1.0 million in the fourth quarter of 1997 related to the devaluation of the Korean won. Other expenses in the first quarter of 1998 include $0.7 million for costs associated with MKS's planned initial public offering in early 1998 which was postponed.

LIQUIDITY AND CAPITAL RESOURCES

MKS has financed its operations and capital requirements through a combination of cash provided by operations, long-term real estate financing, capital lease financing and short-term lines of credit.

Operations provided cash of $26.3 million, $16.8 million and $23.0 million for 1996, 1997 and 1998, respectively, primarily impacted in each period by net income, depreciation and changes in the levels of inventory and accounts receivable. Investing activities utilized cash of $10.2 million, $3.3 million and $2.1 million in 1996, 1997 and 1998, respectively, primarily for the purchase of property and equipment in each period. Financing activities utilized cash of $15.6 million, $16.2 million and $11.8 million in 1996, 1997 and 1998, respectively, primarily for stockholder distributions in each period. Cash flows from financing activities for each period were primarily from short-term and long-term borrowings.

Working capital was $31.5 million as of December 31, 1998. MKS has a combined $30.0 million line of credit with two banks, expiring December 31, 1999, all of which is available. Interest on future borrowings under the line of credit would be payable monthly at a rate based on LIBOR, which was 7.131% at December 31, 1998. MKS also has lines of credit through its foreign subsidiaries with several financial institutions totaling $15.0 million at December 31, 1998. The total unused balance under these lines of credit was $5.3 million at December 31, 1998. The interest rates on borrowings outstanding as of December 31, 1998 on these lines of credit ranged from 1.3% to 1.7%. Interest on future borrowings under the unused balance of these lines of credit would be at rates ranging from 1.5% to 7.85%. These lines generally expire and are renewed at six month intervals. In addition, MKS has outstanding term loans and mortgage loans from banks totaling $12.0 million (net of the current portion) at December 31, 1998. See Notes 6 and 13 of Notes to Consolidated Financial Statements.

In 1997 and 1998, MKS distributed $12.4 million and $6.2 million, respectively, of undistributed S corporation earnings to its stockholders. As soon as practicable following the closing of this offering, MKS intends to make a distribution to the holders of record on the day prior to the closing of this offering in an amount equivalent to the accumulated adjustments account. The accumulated adjustments account is cumulatively equal to financial reporting income, adjusted for differences between the methods of accounting used for financial accounting and for federal income tax purposes from July 1, 1987 through the date of termination of MKS's S corporation status, that has not been previously distributed. Investors purchasing shares in this offering will not receive any portion of the distribution. As of December 31, 1998, the outstanding balance of the accumulated adjustments account was estimated to be approximately $35.9 million, and such balance is expected to increase in the period from January 1, 1999 through the closing of this offering.

MKS believes that the net proceeds from this offering, together with the cash anticipated to be generated from operations and funds available from existing credit facilities, will be sufficient to satisfy its estimated working capital and planned capital expenditure requirements through at least the next 24 months.

EFFECT OF CURRENCY EXCHANGE RATES AND EXCHANGE RATE RISK MANAGEMENT

A significant portion of MKS's business is conducted outside of the United States through its foreign subsidiaries. The foreign subsidiaries maintain their accounting records in their local currencies. Consequently, period to period comparability of results of operations is affected by fluctuations in exchange rates. MKS derives a significant portion of its cash flows from foreign denominated revenue. To the extent the dollar value of foreign denominated revenue is diminished as a result of a strengthening U.S. dollar, MKS's results of operations and cash flows could be adversely affected.

The primary currencies to which MKS has exposure are the Japanese yen and the German mark. The nature of this exposure is from MKS selling inventory to its overseas subsidiaries for resale in local currency. Consequently, the cash flows from the overseas subsidiaries are affected by exchange rate fluctuations. To reduce the risks associated with foreign currency rate fluctuations, MKS has entered into forward exchange contracts and local currency purchased options on a continuing basis in amounts and timing consistent with the underlying currency exposures.

The factors MKS considers in determining whether forward exchange contracts or purchased options qualify for hedge accounting include:

- whether the notional amounts of the derivatives offset the underlying currency exposures in terms of timing and amounts

- for forward exchange contracts, whether the underlying transactions being hedged are pursuant to firm commitments

- for local currency purchased options, whether it is probable that the underlying hedging transaction will occur

Gains on forward exchange contracts and local currency purchased options, qualifying for hedge accounting, amounted to $2.5 million, $1.2 million and $0.3 million for the years ended December 31, 1996, 1997 and 1998, respectively, and are classified in cost of sales. Losses of $0.5 million, gains of $1.2 million and losses of $0.2 million on forward exchange contracts that did not qualify for hedge accounting were recognized in earnings for 1996, 1997 and 1998, respectively, and are classified in other income (expense), net. These amounts are net of a foreign exchange translation loss of $1.0 million and a gain of $1.0 million on intercompany payables from its subsidiaries in 1997 and 1998 respectively. Foreign exchange translation gains and losses from unhedged intercompany balances were not material in 1996. While MKS does not issue or hold derivative financial instruments for trading purposes, there can be no assurance that any losses realized on such instruments will be fully offset by gains on the underlying exposure. Prospectively, MKS plans to continue to use forward exchange contracts and local currency purchased options to seek to mitigate the impact of exchange rate fluctuations. See Notes 2 and 3 of Notes to Consolidated Financial Statements.

MARKET RISK AND SENSITIVITY ANALYSIS

Foreign Exchange Rate Risk

The potential fair value loss for a hypothetical 10% adverse change in forward currency exchange rates on MKS's forward exchange contracts at December 31, 1998 would be $949,000. The potential loss was estimated by calculating the fair value of the forward exchange contracts at December 31, 1998 and comparing that with those calculated using the hypothetical forward currency exchange rates.

The value of the local currency purchased options at December 31, 1998 was immaterial. Any loss related to the local currency purchased options is limited to the unamortized premium of $155,000 at December 31, 1998.

At December 31, 1998, MKS had $9,687,000 related to short-term borrowings denominated in Japanese yen. The carrying value of these short-term borrowings approximates fair value due to their short period to maturity. Assuming a hypothetical 10% adverse change in the Japanese yen to U.S. dollar year end exchange rate, the fair value of these short-term borrowings would increase by $1,077,000. The potential increase in fair value was estimated by calculating the fair value of the short-term borrowings at December 31, 1998 and comparing that with the fair value using the hypothetical year end exchange rate.

Interest Rate Risk

MKS is exposed to fluctuations in interest rates in connection with its variable rate term loans. In order to minimize the effect of changes in interest rates on earnings, MKS entered into an interest rate swap that fixed the interest rate on its variable rate term loans. Under the swap agreement, MKS pays a fixed rate of 5.85% on the notional amount and receives LIBOR. At December 31, 1998, the notional amount of the interest rate swap was equal to the principal amount of the variable rate term loans. The potential increase in the fair value of term loans when adjusting for the interest rate swap paying at a fixed rate resulting from a hypothetical 10% decrease in interest rates was not material.

RECENTLY ISSUED ACCOUNTING PRONOUNCEMENTS

See Note 2 of Notes to Consolidated Financial Statements for a discussion of the impact of recently issued accounting pronouncements.

YEAR 2000 COMPLIANCE

The Year 2000 problem stems from the fact that many currently installed computer systems include software and hardware products that are unable to distinguish 21st century dates from those in the 20th century. As a result, computer software and/or hardware used by many companies and governmental agencies may need to be upgraded to comply with Year 2000 requirements or risk system failure or miscalculations causing disruptions to normal business activities.

State of Readiness

MKS designed and began implementation of a multi-phase Year 2000 project which consists of:

- assessment of the corporate systems and operations including both information technology and non-information technology that could be affected by the Year 2000 problem

- remediation of non-compliant systems and components

- testing of systems and components following remediation

MKS, under the guidance of its Information Technology Steering Committee, has focused its Year 2000 review on four areas:

- internal computer software and hardware

- product compliance

- facilities and manufacturing equipment

- third-party compliance

Internal Computer Software and Hardware. MKS uses information technology for its internal infrastructure, which consists of its main enterprise systems which include the systems used, in part, for purchase orders, invoicing, shipping and accounting, and individual workstations, including personal computers, and its network systems.

Because MKS's business and manufacturing systems, such as its main enterprise systems, are essential to its business, financial condition and results of operations, MKS began its assessment of these systems prior to its other non-critical information technology systems. MKS began its assessment in the fall of 1997, and in November 1997, MKS developed a remediation plan for all identified noncompliant business and manufacturing systems. This remediation plan was implemented in January 1998. By July 1998, MKS had installed new systems or upgraded existing systems. Based upon post-implementation testing and review, management believes that all business and manufacturing systems within its manufacturing operations are Year 2000 compliant.

One of MKS's international subsidiaries is currently undergoing conversion of its business systems in order to become Year 2000 compliant. Management believes that these systems will be operational by June 1999. This phase of the Year 2000 project is currently on schedule.

MKS's personal computer based systems were assessed in early 1998. MKS believes that all non-compliant hardware and software was identified by March 1998, at which time it made a list prioritizing databases to be remedied. Critical databases were identified and were scheduled for remediation prior to other databases. Remediation plans to convert the databases were initiated in November 1998. MKS anticipates that it will complete its critical and non-critical conversions by June 1999. This phase of the Year 2000 project is currently on schedule.

Product Compliance. Throughout 1998, MKS assessed and addressed the Year 2000 compliance of its products. This assessment resulted in the identification of MKS's products that were compliant and non-compliant. The substantial majority of MKS's products were deemed to be compliant.

The date related functions of all non-compliant products, other than certain residual gas analysis products, are believed by MKS to be non-critical in that such noncompliance would not affect the independent performance of the product; would not cause the MKS product to cease operating on any particular date; and independently would not pose a safety risk. MKS believes that Year 2000 problems associated with non-compliant residual gas analysis products will also be non-critical. However, these products contain components of other manufacturers and cannot be tested and therefore it is possible that such products could cause unanticipated performance problems. The non-compliant features of our other products primarily relate to non-essential functions such as date displays. MKS made available to its customers a list which describes Year 2000 readiness of its products. This phase of the Year 2000 project is currently on schedule.

Facilities and Manufacturing Equipment. Some aspects of MKS's facilities and manufacturing equipment may include embedded technology, such as microcontrollers. The Year 2000 problem could cause a system failure or miscalculation in such facilities or manufacturing equipment which could disrupt MKS's operations. Affected areas include security systems, elevator controls, voice mail and phone systems, clean room environmental controls, numerically controlled production machinery and computer based production equipment. MKS organized a team of experienced managers in November 1998 to assess the potential problems in these areas. An assessment of all facilities and manufacturing equipment was conducted through December 1998, and a remediation plan was developed in January 1999. MKS anticipates completion of all corrective actions by June 1999 with testing and review of corrected items to occur in the summer of 1999. This phase of the Year 2000 project is currently on schedule.

Third-Party Compliance. MKS has relationships with third-parties including customers and vendors and suppliers of goods, services and computer interfaces. The failure of such persons to implement and execute Year 2000 compliance measures in a timely manner, if at all, could, among other things:

- adversely affect MKS's ability to obtain components in a timely manner

- cause a reduction in the quality of components obtained by MKS

- cause a reduction, delay or cancellation of customer orders received by MKS or a delay in payments by its customers for products shipped

- result in the loss of services that would be necessary for MKS to operate in the normal course of business

MKS assessed which of these third-party goods, services and interfaces were critical to its operations and developed and mailed a standard survey to each third-party deemed critical in January 1998. By March 1998, MKS had reviewed most responses received. To date, the responses received indicate that the third-parties are either in the process of developing remediation plans, or are compliant. MKS anticipates further assessment to continue through March 1999 and plans to conduct reviews at that time. A remediation plan is expected to be in place by June 1999 with all critical third-parties achieving satisfactory compliance by August 1999. This phase of the Year 2000 project is currently on schedule.

Costs

MKS's costs to date associated with assessment, remediation and testing activities concerning the Year 2000 problem have been approximately $1,500,000. MKS estimates that an additional $1,500,000, the major portion of which will be capitalized and expensed over the life of the assets, will be required to complete the replacement or modification of its facilities, manufacturing equipment, computer software and products and to address the noncompliance of key third-parties. MKS has funded and will continue to fund these activities principally through cash provided by operations and existing leasing lines of credit. It is not possible for MKS to completely estimate the costs incurred in its remediation effort as many of its employees have focused and will continue to focus significant efforts in evaluating MKS's Year 2000 state of readiness and in remediating problems that have arisen, and will continue to arise, from such evaluation.

Contingency Plan

To date, MKS has not formulated contingency plans related to the failure of its or a third-party's Year 2000 remediation efforts. Contingency plans for the failure to implement compliance procedures have not been completed because it is the intent of MKS to complete all required modifications and to test modifications thoroughly prior to December 31, 1999. However, as discussed above, MKS is engaged in ongoing assessment, remediation and testing activities and the internal results as well as the responses received from third-parties will be taken into account in determining the nature and extent of any contingency plans if necessary.

BUSINESS

MKS is a leading worldwide developer, manufacturer and supplier of instruments and components used to measure, control and analyze gases in semiconductor manufacturing and similar industrial manufacturing processes. MKS offers a comprehensive line of products which are used to manufacture, among other things:

- semiconductors
- flat panel displays
- magnetic and optical storage devices and media, including:
  - compact disks
  - hard disk storage devices
  - magnetic devices for reading disk data
  - digital video disks
  - optical storage disks or laser readable disks
- solar cells which convert light into electrical current
- fiber optic cables for telecommunications
- optical coatings, such as eyeglass coatings
- coatings for architectural glass
- hard coatings to minimize wear on cutting tools
- diamond thin films

Our products include:

- instruments used to measure, control and analyze:
  - gas pressure
  - gas flow
  - gas composition
- vacuum technology products:
  - vacuum gauges
  - vacuum valves and components

For over 25 years, MKS has focused on satisfying the needs of semiconductor capital equipment manufacturers and semiconductor device manufacturers and has established long-term relationships with many of its customers. Over 4,000 customers worldwide purchased products from MKS during 1998 including:

- semiconductor capital equipment manufacturers
- semiconductor device manufacturers
- industrial manufacturing companies
- university, government and industrial research laboratories

MKS's customers include Applied Materials, Inc., Lam Research Corporation, Novellus Systems, Inc., Tokyo Electron Limited, Inc., Air Products and Chemicals, Inc. and Motorola, Inc. MKS sells its products primarily through its sales force which consists of 118 employees, as of December 31, 1998, in 22 offices in France, Germany, Japan, Korea, The Netherlands, Singapore, Taiwan, the United Kingdom and the United States.

INDUSTRY BACKGROUND

In the past 40 years, significant advances in materials science and processing technologies have made possible the manufacture of products ranging from highly complex microprocessor chips to simple but effective airtight coatings for food packagings. In many materials processing applications, specific gas mixtures at precisely controlled pressures are used:

- to create and maintain the required process atmosphere
- as a source of materials to be deposited on a surface, such as a silicon wafer
- to remove or etch materials from a surface to form a circuit pattern

The largest commercial application employing materials science and processing technologies is the manufacture of semiconductors. Worldwide semiconductor sales have increased as the use of semiconductors has expanded beyond personal computers and computer systems to a wide array of additional applications such as telecommunications and data communications systems, automotive products, consumer goods, medical products and household appliances. In large part, this growth has been facilitated by the ability of semiconductor device manufacturers to produce increasingly fast, more complex, higher performance semiconductors while steadily reducing cost per function, power consumption requirements and size of these products to meet end-user and system designer requirements. These improvements in the ratio of price to performance have been enabled by advancements in semiconductor processing technologies, which have facilitated the ability to reduce circuit pattern sizes and subsequently increase the number of individual semiconductor circuits on a silicon wafer. These trends have driven the need for increasingly complex and sophisticated semiconductor device manufacturing processes, process equipment and process controls.

Semiconductor Manufacturing Process

The manufacturing of semiconductors requires hundreds of process steps. Many steps involve the controlled application or removal of layers of materials to or from a surface referred to as a substrate. These process steps take place within a process chamber, which provides a controlled environment for the fabrication of semiconductor devices. Most of the key processes used in the production of semiconductors require precise automatic control of gas pressure, flow and composition in the process chamber.

To ensure the integrity and performance of the manufacturing process, semiconductor device manufacturers require sophisticated instruments that can provide precise automated control of all major process variables within the process chamber. The process steps required to produce circuit patterns involve the control of multiple gases flowing into the process chamber at specified intervals, and at controlled pressure and vacuum levels. In a typical process step, the process chamber is evacuated to a base pressure established by a vacuum pumping system and measured with vacuum gauges. Automatic shut-off valves are sequenced to protect pumps and process instruments from exposure to atmospheric pressure. Chamber leak integrity may be checked by gas analyzers scanning for the presence of undesirable atmospheric gases or water vapor. Mass flow controllers automatically control the flow rates of multiple gases into the process chamber. Simultaneously, the automatic pressure control system for the process chamber measures the pressure in the chamber and controls it at the desired level by electronically adjusting the position of a control valve located between the process chamber and the vacuum pump. Downstream of the process chamber, heated lines, particle traps, and vacuum valves and switches are used to prevent contamination of the process chamber as a result of the backstream of particles and exhaust gases back into the process chamber. This improves circuit quality, reduces maintenance and prolongs vacuum pump life.

The pressures used in semiconductor manufacturing processes range from as low as one trillionth of atmospheric pressure to as high as two hundred times atmospheric pressure. The following table shows the wide range of pressures required for typical semiconductor manufacturing processes:

[PRESSURE RANGES OF TYPICAL SEMICONDUCTOR MANUFACTURING PROCESSES CHART]

[This table graphically depicts, using graybars, the gas pressure ranges, from one trillionth of atmospheric pressure to two hundred times atmospheric pressure used in various typical semiconductor manufacturing process steps (introduction of gases into process chamber, deposition of materials and thin films on to substrates, introduction of gases to etch circuit patterns, deposition of conductive metal layers onto substrates and implantation of positively charged atoms into substrates).

The fabrication of a semiconductor circuit requires varying flow rates, pressures and gases. A typical process step uses from three to five different gases.

Uptime, yield and throughput are critical semiconductor manufacturing concepts. Uptime is the amount of time that the semiconductor processing tool is available for processing. Yield is the ratio of acceptable circuits to total circuits processed. Throughput is the number of wafers that can be processed per hour. Uptime, yield, and throughput depend in major part upon:

- precise repeatable measurement and control of the specific gas pressure, flow rates and composition

- the maintenance of the vacuum integrity of the process chamber

- the prevention of wafer contamination from particles entering the chamber

Pressure variations of as little as one one-hundred-thousandth of atmospheric pressure can change process yields significantly and errors in gas flow rates and composition may impair circuit performance. Atmospheric contamination and particle contamination can produce defects that significantly reduce wafer yields and the time required to remove contaminates reduces uptime and throughput. The speed of response and precision of the automatic control systems directly affects uptime, throughput of wafers and process yields.

Other Similar Industrial Manufacturing Processes

Many of the same processes used to manufacture semiconductors are also used to manufacture: flat panel displays; magnetic and optical storage devices and media; solar cells; fiber optic cables for telecommunications; optical coatings; coatings for architectural glass; hard coatings to minimize wear on cutting tools; and diamond thin films.

Trends in Semiconductor Manufacturing

The ability of semiconductor device manufacturers to offer integrated circuits with smaller geometries and greater functionality at higher speeds requires continuous improvements in semiconductor process equipment and process controls. The transition to smaller circuit patterns, such as 0.18 micron and smaller line-widths, requires more process steps. It is also leading to the introduction of new materials such as copper for conductors and a whole new class of organic and inorganic materials for insulators. These in turn require new technologies for delivery of gases and vapors to the process chamber. In addition, the introduction of advanced processes such as high density plasma is leading to a need for lower pressures, which are more difficult to measure and control than higher pressures. These trends, along with increased wafer sizes, which result in higher circuit value per wafer, are leading to the need for increased sophistication of semiconductor processing equipment, a heightened emphasis on uptime, yield and throughput and the need for more precise process controls. As a result, the design and performance of instruments that control pressure or the flow of gases, or analyze the composition of gases, are becoming even more critical to the semiconductor manufacturing process.

To address the increasing complexity of semiconductor devices, semiconductor device manufacturers typically develop processes to create particular device features using specific manufacturing equipment. The process for each feature is then documented and may be subsequently replicated for use in multiple fabrication facilities around the world. The precision, repeatability and reliability of the measurement and control instrumentation used for each process is critical to providing uptime, high yield and throughput on manufacturing equipment at all facilities employing such processes. Semiconductor device manufacturers are placing increasing importance on uptime, yield, throughput and process consistency throughout their facilities to minimize:

- capital equipment expenditures
- facility construction costs
- overall ongoing operating costs

The increasing sophistication of semiconductor devices requires an increase in the number of components and subsystems used in the design of semiconductor manufacturing process tools. To reduce manufacturing complexity, improve quality and reliability and ensure long-term service and support, semiconductor capital equipment manufacturers and semiconductor device manufacturers are increasingly seeking to establish relationships with a smaller group of broad-based suppliers that meet their needs on a worldwide basis and provide:

- advanced technological capabilities to address the increasing complexities of the semiconductor manufacturing process
- instrument and component designs that ensure repeatable processes around the world
- value-added, integrated instruments and components
- a worldwide sales, service and support infrastructure

MKS SOLUTION AND STRATEGY

MKS's objective is to be the leading worldwide supplier of instruments and components used to measure, control and analyze gases in semiconductor and other advanced thin-film materials processing applications and to help semiconductor device manufacturers achieve improvements in their return on invested capital. The principal elements of MKS's solution and strategy to achieve this objective are set forth below:

Technology Leadership. MKS's products incorporate leading-edge technologies to control and monitor increasingly complex gas-related semiconductor manufacturing processes, thereby enhancing uptime, yield and throughput which can improve the investment return on capital equipment and facilities. The instruments and components in MKS's product offering provides the required capabilities through:

- high precision operation over the extreme and variable pressure ranges required for semiconductor processes

- precise, consistent and repeatable measurement and control performance that allows processes to be replicated in manufacturing facilities around the world

- advanced control technologies which enhance uptime, yield and throughput

- multiple, diverse and alternative technologies for controlling the flow rate and composition of gases and vapors needed for new classes of advanced materials for next generation semiconductor devices

- innovative vacuum technology subsystems that reduce atmospheric and particle contamination, thereby enhancing uptime, yield and throughput

MKS's products have continuously advanced as its customers' needs have evolved. MKS seeks to extend its technological leadership by applying its expertise in vacuum, pressure, flow and gas composition measurement control and analysis technologies to develop advanced products that meet the critical gas-related process requirements of semiconductor and advanced thin-film materials manufacturers.

MKS has introduced technological innovations including:

- corrosion-resistant pressure and vacuum sensors

- automatic pressure and vacuum control systems

- compact single unit gas composition analyzers to replace bulky multi-component systems

MKS has developed, and continues to develop, new products to address emerging industry trends such as the transition from the use of 200mm wafers to 300mm wafers and the shrinking of integrated circuit line-widths from 0.25 micron to 0.18 micron and smaller. MKS has supplied pre-production equipment to be incorporated into semiconductor capital equipment manufacturers' 300mm pre-production semiconductor wafer process equipment, which is expected to be included in pilot production lines of device manufacturers.

MKS has also developed equipment that is being used by research laboratories for semiconductor devices using less than 0.18 micron line-widths. In addition, MKS has developed, and continues to develop, materials delivery systems for new classes of materials, such as copper for conductors, titanium nitride for barriers and a class of organic and inorganic dielectric materials that are beginning to be used in small geometry manufacturing.

MKS has been a leader in making its products compatible with emerging digital network standards, such as DeviceNet. DeviceNet enables components used in semiconductor manufacturing processes to transmit self-diagnostic and other information on a digital host network. This reduces system complexity and space requirements.

To ensure that MKS maintains its leading-edge position, MKS aligns its research and development program to the Semiconductor Industry Association Technology Roadmap. The Semiconductor Industry Association Technology Roadmap identifies technological developments, as well as obstacles, required to produce future generations of semiconductor devices. MKS also maintains associations with leading universities to anticipate future semiconductor production needs three to seven years in advance.

Comprehensive Product Offering. MKS currently offers, and intends to continue to offer, the widest range of pressure and vacuum measurement and control products serving the semiconductor manufacturing and similar industrial manufacturing industries. MKS offers a full line of products including a wide range of gas pressure, flow and composition analysis measurement and control instruments and vacuum gauges, valves and components.

Since the development of its original Baratron laboratory-based pressure measurement instrument in 1961, MKS has continuously enhanced and expanded its product offerings in response to the evolving needs of its customers. For example, MKS recently introduced the Micro Baratron instrument, a significantly smaller version of its pressure measurement product, and a new low vapor pressure material delivery system. MKS plans to introduce new products throughout 1999, including a line of mass flow calibrators and process monitoring hardware and software for gas analysis.

MKS's products are designed to meet the increasingly complex needs of its customers. With the increasing sophistication of semiconductor capital equipment leading to an increasing number of components and subsystems in semiconductor manufacturing process tools, MKS delivers products that reduce equipment size and improve process performance. MKS's subsystem products combine several components into single integrated solutions. MKS's integrated solutions deliver higher performance at a lower cost than similar subsystems built from discrete components. Additionally, MKS's integrated solutions are easier to install and configure, further reducing the overall cost to the customer.

MKS plans to continue to expand its product lines through both internal development and acquisitions of complementary businesses, products and technologies. MKS's comprehensive product offering enables MKS to meet a broad range of customer needs and provide a single source of solutions for semiconductor device and semiconductor capital equipment manufacturers as they seek to consolidate their supplier relationships to a smaller select group.

Close Working Relationships with Customers. MKS has focused on satisfying the needs of semiconductor device manufacturers and semiconductor capital equipment manufacturers for over 25 years and has established long-term relationships with many of its customers. MKS works with its customers at the pre-design and design stage to identify and respond to their requests for current and future generations of products. These close working relationships allow MKS to understand and address the cost and performance expectations of its customers. MKS plans to enhance its relationships with its major customers and identify opportunities to develop similar relationships with additional semiconductor capital equipment manufacturers and semiconductor device manufacturers.

Applications in Related Markets. MKS is leveraging its accumulated expertise in the semiconductor industry by developing products for applications that employ production processes similar to semiconductor fabrication processes in their reliance upon gases and vacuum-based production technologies. Applications served by MKS outside the semiconductor industry include vacuum freeze-drying of pharmaceuticals and foods, sterilization of medical appliances, and applications that involve advanced thin-film manufacturing such as flat panel displays, magnetic and optical storage media, solar cells, fiber optic cables and optical coatings. MKS plans to continue to identify and develop products that address advanced materials processing applications where gas management plays a critical role.

Global Infrastructure and World Class Manufacturing Capabilities. As semiconductor device manufacturers have become increasingly global, they have required that suppliers offer comprehensive local repair service and close customer support. Manufacturers require close support to enable them to calibrate, repair, modify, upgrade and retrofit their equipment to improve process consistency, uptime, yield and throughput. To meet these market requirements, MKS maintains a global sales and support organization with 22 offices worldwide. MKS currently manufactures its products at nine facilities in the United States and abroad. MKS continues to devote significant resources to expand and maintain its worldwide production and service capabilities to meet the global demand for gas measurement, control and analysis instruments and vacuum technology components. MKS opened a sales and support facility in Singapore in 1998 and during 1999 plans to add manufacturing capabilities to its Austin, Texas facility and further equip its cleanroom facilities in Andover and Methuen, Massachusetts.

MKS believes that the ability to manufacture reliable instruments and components in a cost-effective manner is critical to meet the demanding just-in-time delivery requirements of semiconductor capital equipment manufacturers and semiconductor device manufacturers. MKS's worldwide production and manufacturing facilities provide MKS with the ability to manufacture reliable gas measurement, control and analysis instruments and components in a timely and cost-effective manner. With a total of approximately 250,000 square feet of manufacturing capacity in five locations in the United States and four others in Germany, Japan, the United Kingdom and Korea, MKS has implemented world class practices in quality and delivery techniques. MKS's manufacturing facilities in the United States, the United Kingdom and Germany are ISO 9001 certified.

PRODUCTS

MKS offers a full line of instruments and components that are used to measure, control and analyze gases in semiconductor manufacturing and other advanced thin-film manufacturing processes. MKS supplies products in two principal areas:

- measurement and control instrumentation products

- vacuum technology products

The following schematic shows where MKS products are used in a typical semiconductor manufacturing process.
[CHART]
[Schematic showing where MKS products are used in a typical semiconductor manufacturing process.]

MEASUREMENT AND CONTROL INSTRUMENTATION PRODUCTS. MKS designs and manufactures a wide range of gas pressure, flow and composition analysis measurement and control instrumentation. Each product line consists of products which are designed for a variety of pressure, flow and composition ranges and accuracies.

Baratron Pressure Measurement Products. MKS's Baratron pressure measurement products are high precision, pressure measurement instruments. MKS has five Baratron product families that range from high accuracy digital output instruments to simple electronic switches. These products are typically used to measure the pressure of the gases being distributed upstream of the process chambers, to measure process chamber pressures and to measure pressures between process chambers, vacuum pumps and exhaust lines. Baratron instruments measure pressures at ranges from two hundred times atmospheric pressure to one billionth of atmospheric pressure. MKS believes it offers the widest range of gas pressure measurement instruments in the semiconductor and advanced thin-film materials processing industries.

A key feature of Baratron instruments is the ability to measure pressure independent of gas composition, which is critical for precise pressure control of semiconductor processes that involve gas mixtures. In these processes, there is a need to control both pressure and gas mixture, but the pressure measurement instrument must measure only the pressure of the sum of the gases in the chamber, independent of gas composition. The Baratron instruments enable users to achieve a highly precise, accurate and repeatable measurement of gas pressure. Pressure measurement, independent of gas composition, is also useful during process steps used to remove atmospheric gases as well as those used to introduce specific amounts of various types of gases. Such processes are used to manufacture fluorescent bulbs and to fabricate gas lasers.

The following table shows MKS's principal Baratron pressure measurement product lines:

BARATRON PRESSURE MEASUREMENT PRODUCTS

PRODUCT LINES	DESCRIPTION	RANGES OF LIST PRICES
High precision, high accuracy pressure and vacuum measurement instruments	Instruments with built-in temperature stabilization features, for high precision, high accuracy and high temperature operation	$2,900-$6,400
General purpose pressure and vacuum measurement instruments	Rugged instruments with and without built-in temperature stabilization features, for reliable, precise and accurate process measurement	$450-$4,200
Ultra-clean high pressure and vacuum measurement instruments	Instruments with ultra- clean surfaces exposed to gas, for precise, high purity applications	$550-$1,050
General purpose "MINI" pressure and vacuum measurement instruments	Small footprint instruments for precise, accurate, general purpose process measurement	$650-$1,400
Electronic pressure and vacuum switches	Economical, stable instrument providing "go/no-go" output for precise pressure trip-points and alarms	$350-$750

MKS's list prices for its Baratron measurement products vary depending upon precision, accuracy, pressure range, operating temperature range, stability and gas purity specifications.

Automatic Pressure and Vacuum Control Products. MKS's automatic pressure control products consist of analog and digital automatic pressure and vacuum control electronic instruments and valves. These products enable precise control of process pressure by electronically actuating valves which control the flow of gases in and out of the process chamber to minimize the difference between desired and actual pressure in the chamber. The electronic controllers vary from simple analog units with precise manual tuning capability to state-of-the-art self-tuning, digital signal processing controllers. The valve products vary from small gas inlet valves to large exhaust valves.

In most cases, MKS's Baratron pressure measurement instruments provide the pressure input to the automatic pressure control device. Together, these components create an integrated automatic pressure control system. MKS's pressure control products can also accept inputs from other measurement instruments, enabling the automatic control of gas input or exhaust based on parameters other than pressure.

AUTOMATIC PRESSURE AND VACUUM CONTROL PRODUCTS

PRODUCT LINES	DESCRIPTION	RANGES OF LIST PRICES
Automatic throttle control valve controllers	Analog controllers, self-tuning digital controllers and displayless self-tuning controllers	$800-$2,650
Throttle control valves	Non-sealing and sealing valves; high speed sealing throttle control valves; automatic, microprocessor-based smart throttle control valves	$1,400-$8,800
Automatic solenoid control valve controllers	Stand-alone control electronics packages or integrated sensor, valve and control electronics packages	$1,850-$2,900
Solenoid control valves	Elastomer and all-metal-sealed solenoid control valves	$450-$1,500

MKS has recently introduced a line of integrated pressure controllers that combine the functions of its Baratron pressure measurement instrument, flow measurement instrument, control electronics and valve into a four-inch long instrument which can be placed directly on a gas line to control pressure downstream of the instrument while indicating the gas flow rate. This addresses the need for smaller components, saving valuable clean room space.

Flow Measurement and Control Products. MKS's flow measurement products include gas, vapor and liquid flow measurement products based upon thermal conductivity, pressure and direct liquid injection technologies. The flow control products combine the flow measuring device with valve control elements based upon solenoid, piezo-electric and piston pump technologies. The products measure and automatically control the mass flow rate of gases and vapors into the process chamber. MKS's broad product lines include products that allow the precise, automatic flow control of inert or corrosive gases, the automatic control of low vapor pressure gases and heated liquid source materials, and the automatic control of delicate, advanced technology liquid sources and vaporized solid sources for next generation devices.

MKS's line of thermal-based mass flow controllers, which control gas flow based on the molecular weight of gases, includes all-metal-sealed designs and ultra-clean designs for semiconductor applications, and general purpose controllers for applications where all-metal-sealed construction is not required. MKS has also developed pressure-based mass flow controllers, based on Baratron pressure instrument measurement and control technology, which use flow restrictors in the gas line to transform pressure control into mass flow control.

FLOW MEASUREMENT AND CONTROL PRODUCTS

PRODUCT LINES	DESCRIPTION	RANGES OF LIST PRICES
Direct liquid injection subsystem	Pumps and vaporizes liquid precursors for metals and dielectrics into process chamber	$8,500-$24,900
Gas box rate of rise calibrator	Measures pressure increase with time in a known volume	$8,100-$11,800
Pressure-based vapor delivery systems	Measures and controls flow of low pressure vapors into chamber	$4,900-$12,400
Pressure-based mass flow controllers	Gas flow controller consisting of Baratron sensor, control valve, orifice and electronics	$2,700
Ultra-clean, all-metal-sealed thermal mass flow controllers	Gas flow controller consisting of sensor, control valve and electronics	$1,400-$9,500
General purpose elastomer-sealed mass flow controllers	Gas flow controller consisting of sensor, control valve and electronics	$1,050-$2,450

Certain new materials required for the next generation of semiconductor devices are difficult to control using traditional thermal mass flow technology. To control these new materials, MKS has designed a direct liquid injection subsystem which pumps a precise volume of liquid into a vaporizer, which in turn supplies a controlled flow of vapor into the process chamber. The direct liquid injection subsystem pump and vaporizer are presently used principally for research and development applications for next generation semiconductor device conductors, diffusion barriers and insulators, such as copper, titanium nitride and dielectric materials.

MKS's flow measurement products also include a calibration system which independently measures mass flow and compares this measurement to that of the process chamber mass flow controller. The demand for the MKS calibration system is driven by the increasingly stringent process control needs of the semiconductor industry and the need to reduce costly downtime resulting from stopping operations to address mass flow controller problems.

Gas Composition Analysis Instruments. MKS's gas analysis instruments are sold primarily to the semiconductor industry. The residual gas analysis product lines include a quadrapole mass spectrometer sensor, which is a device that separates gases based on molecular weight. MKS's quadrapole mass spectrometer sensors include built-in electronics to analyze the composition of background and process gases in the process chamber. MKS's ORION process monitoring system is a sophisticated quadrapole mass spectrometer process analyzer for statistical process monitoring of manufacturing processes operating from very low pressures to atmospheric pressure. These instruments are provided both as portable laboratory systems and as process gas monitoring systems used in the diagnosis of semiconductor manufacturing process systems and are sold at prices ranging up to $80,000. The gas monitoring systems can indicate out-of-bounds conditions, such as the presence of undesirable atmospheric gases, water vapor or out-of-tolerance amounts of specific gases in the process chamber, enabling operators to diagnose and repair faulty equipment. MKS's gas sampling systems provide a turn-key solution for withdrawing gases from chambers at relatively high pressures for introduction into the low pressure gas analyzers. Next generation semiconductor manufacturing processes, with smaller circuit patterns and larger wafer sizes, are expected to require sophisticated gas analysis instruments and/or monitoring equipment to ensure tighter process control and earlier diagnosis of equipment malfunction.

VACUUM TECHNOLOGY PRODUCTS. MKS designs and manufactures a wide variety of vacuum technology products, including vacuum gauges, vacuum valves and components.

Vacuum Gauging Products. MKS offers a wide range of vacuum instruments consisting of vacuum measurement sensors and associated power supply and readout units. These vacuum gauges measure phenomena that are related to the level of pressure in the process chamber and downstream of the process chamber between the chamber and the pump. Unlike Baratron pressure measurement instruments, vacuum gauges do not measure pressure directly. These gauges are used to measure vacuum at pressures lower than those measurable with a Baratron pressure measurement instrument or to measure vacuum in the Baratron pressure measurement instrument range where less accuracy is required. MKS's indirect pressure gauges use thermal conductivity and ionization gauge technologies to measure pressure from atmospheric pressure to one trillionth of atmospheric pressure. MKS's Baratron pressure measurement instruments, together with its vacuum gauges, are capable of measuring the full range of pressures used in semiconductor and other thin-film manufacturing processes from two hundred times atmospheric pressure to one trillionth of atmospheric pressure.

MKS also manufactures a wide range of vacuum gauge instruments in which the associated electronics are packaged with the vacuum sensor, reducing panel space and installation cost. MKS offers both analog and digital versions of these vacuum gauge transducers.

Vacuum Valves and Components. MKS's vacuum valves are used on the gas lines between the process chamber and the pump downstream of the process chamber. MKS's vacuum components consist of flanges, fittings, traps and heated lines that are used downstream from the process chamber to provide leak free connections and to prevent condensable materials from depositing particles near or back into the chamber. The manufacture of small circuit patterns cannot tolerate contamination from atmospheric leaks or particles. MKS's vacuum components are designed to minimize such contamination and thus increase yields and uptimes.

VACUUM TECHNOLOGY PRODUCTS

PRODUCT LINES	DESCRIPTION	RANGES OF LIST PRICES
Cold cathode and hot filament vacuum gauges	Electronic gauges to measure pressure down to one trillionth of atmospheric pressure	\$600-\$6,200
Convection gauges	Electronic gauges to measure from one atmosphere down to one millionth of atmospheric pressure	\$200-\$700
Right-angle and in-line shut-off valves	High vacuum rapid action poppet valves	\$250-\$4,500
Vapor sublimation traps	Contaminant particle trap	\$1,800-\$4,600
Other vacuum components	Flanges, fittings, valves and heated lines	\$50-\$3,050

MARKETS AND APPLICATIONS

MKS estimates that approximately 60% of its sales in 1998 were made to the semiconductor industry. MKS's products are also used in other markets and applications including the manufacture of, among other things:

- flat panel displays

- magnetic and optical storage devices and media

- solar cells which convert light into electrical current

- fiber optic cables for telecommunications

- optical coatings, such as eyeglass coatings

- coatings for architectural glass

- hard coatings to minimize wear on cutting tools

- diamond thin films

MKS sells its products primarily through its direct sales force in 22 offices in France, Germany, Japan, Korea, The Netherlands, Singapore, Taiwan, the United Kingdom and the United States. This direct sales force is supplemented by sales representatives and agents in Canada, China, India, Israel, and Italy and in selected U.S. cities. The major markets for MKS's products include:

Semiconductor Manufacturing

MKS's products are sold to semiconductor capital equipment manufacturers and semiconductor device manufacturers. MKS's products are used in the major semiconductor processing steps such as:

- depositing materials on to substrates

- etching circuit patterns

- implanting positively charged atoms into a substrate to alter electrical characteristics

MKS's products are also used for process facility applications such as gas distribution, pressure control and vacuum distribution in clean rooms where semiconductor manufacturing takes place. MKS anticipates that the semiconductor manufacturing market will continue to account for a substantial portion of its sales. While the semiconductor device manufacturing market is global, the major semiconductor capital equipment manufacturers are concentrated in the United States, Japan and Europe.

Flat Panel Display Manufacturing

MKS's products are used in the manufacture of flat panel displays, which require the same or similar fabrication processes as semiconductor manufacturing. MKS sells its products both to flat panel original equipment manufacturers and to end-users in the flat panel display market. The transition to larger panel size and higher definition is driving the need for defect reduction which requires tighter process controls. The major manufacturers for flat panel displays and flat panel display equipment are concentrated in Japan.

Magnetic and Optical Storage Devices and Media

MKS's products are used in the manufacture of:

- magnetic storage media which store and read data magnetically

- optical storage media which store and read data using laser technology

- compact disks

- hard disks

- data storage devices

- digital video or versatile disks

The transition to higher density storage capacity requires manufacturing processes incorporating tighter process controls. While storage media manufacturing is global, the major manufacturers are concentrated in Japan and the Asia-Pacific region and storage media capital equipment manufacturers are concentrated in the United States, Japan and Europe.

Optical Fiber and Optical Coating

MKS's products are used in optical fiber and optical thin-film coating processes. MKS's products are sold both to coating equipment manufacturers and to manufacturers of products made using optical thin-film coating processes. Optical fibers used for data transmission are manufactured using processes to deposit chemical vapors which are similar to those used in semiconductor manufacturing. The requirement for greater data transmission is driving the need for tighter control of optical fiber coating processes. Optical thin films for eyeglasses, solar panels and architectural glass are deposited using processes to deposit chemical vapors and gaseous metals similar to those used in semiconductor manufacturing. Optical fiber manufacturing and optical thin-film processing are concentrated in the United States, Japan and Europe.

Other Coating Markets

MKS's pressure and flow measurement and control instruments are also used in processes for the application of thin films to harden tool bit surfaces, in the production of diamond thin films, coatings for food container packagings and coatings for jewelry and ornaments. The major equipment and process providers are concentrated in the United States, Japan and Europe.

MKS estimates that the flat panel display, magnetic and optical storage media, optical fiber, optical coating markets and other coating markets combined, accounted for approximately 12% and 14% of net sales for 1997 and 1998, respectively.

Other Markets

MKS's pressure measurement and control instruments and vacuum components are used in plasma processes used to sterilize medical instruments, in vacuum freeze drying of pharmaceuticals, foods and beverages, and in vacuum processes involved in light bulb and gas laser manufacturing. MKS's products are also sold to government, university and industrial laboratories for vacuum applications involving research and development in materials science, physical chemistry and electronics materials. The major equipment and process providers and research laboratories are concentrated in the United States, Japan and Europe.

CUSTOMERS

MKS's largest customers are leading semiconductor capital equipment manufacturers such as Applied Materials, Lam Research, Novellus and Tokyo Electron, semiconductor device manufacturers such as Motorola, and specialty gas providers such as Air Products and Chemicals. In 1996, 1997, and 1998, sales to MKS's top five customers accounted for approximately 26%, 32% and 24%, respectively, of MKS's net sales. During the same periods, international sales represented approximately 30%, 27% and 32% of total net sales, respectively. During 1998, Applied Materials accounted for approximately 16% of MKS's net sales. Applied Materials purchases products from MKS under the terms of an agreement, with no minimum purchase requirements, that expires in 2000.

SALES, MARKETING AND SUPPORT

MKS's worldwide sales, marketing and support organization is critical to its strategy of maintaining close relationships with semiconductor capital equipment manufacturers and semiconductor device manufacturers. MKS sells its products primarily through its direct sales force. As of December 31, 1998, MKS had 118 sales employees in 22 offices in France, Germany, Japan, Korea, The Netherlands, Singapore, Taiwan, the United Kingdom and the United States. This direct sales force is supplemented by sales representatives and agents in Canada, China, India, Israel, and Italy and in selected U.S. cities. MKS maintains a marketing staff, which as of December 31, 1998, consisted of 14 employees, to identify customer requirements, assist in product planning and specifications and to focus on future trends in the semiconductor and other markets.

As semiconductor device manufacturers have become increasingly sensitive to the significant costs of system downtime, they have required that suppliers offer comprehensive local repair service and close customer support. Manufacturers require close support to enable them to repair, modify, upgrade and retrofit their equipment to improve yields and adapt new materials or processes. To meet these market requirements, MKS maintains a worldwide sales and support organization with offices in 22 locations. Technical support is provided by applications engineers located at offices in Arizona, California, Colorado, Massachusetts, Oregon and Texas, as well as Canada, France, Germany, India, Israel, Italy, Japan, Korea, The Netherlands, Singapore, Taiwan and the United Kingdom. Repair and calibration services are provided at 14 service depots located worldwide. MKS provides warranties from one to three years, depending upon the type of product. In addition, MKS offers training programs for its customers in a wide range of vacuum and gas processing technologies.

MANUFACTURING

MKS believes that the ability to manufacture reliable gas management instruments and components in a cost-effective manner is critical to meeting the demanding requirements of semiconductor capital equipment manufacturers and semiconductor device manufacturers. MKS monitors and analyzes product lead times, warranty data, process yields, supplier performance, field data on mean time between failures, inventory turns, repair response time and other indicators so that it may continuously improve its manufacturing processes. MKS has adopted a total quality management process. MKS's manufacturing facilities in the United States, the United Kingdom and Germany are ISO 9001 certified.

MKS is devoting significant financial and management resources to maintain and expand its worldwide production and service capabilities to meet the global demand for gas management instruments and components. MKS believes that the ability to manufacture reliable instruments and components in a cost-effective manner is critical to meet the demanding just-in-time delivery requirements of semiconductor capital equipment manufacturers and semiconductor device manufacturers. Due to the short time between the receipt of orders and shipments, MKS normally operates with a level of backlog that is not significant. MKS currently manufactures its products at nine facilities in the United States and abroad. MKS plans to add manufacturing capabilities in 1999 to its Austin, Texas facilities and further equip its cleanroom facilities in Andover and Methuen, Massachusetts.

MKS's principal manufacturing activities consist of precision assembly, test, calibration, welding and machining activities. MKS subcontracts a portion of its assembly, machining and printed circuit board assembly and testing. All other assembly, test and calibration functions are performed by MKS. Critical assembly activities are performed in cleanroom environments at MKS's facilities.

RESEARCH AND DEVELOPMENT

MKS's research and development efforts are directed toward developing and improving MKS's gas management instruments and components for semiconductor and advanced thin-film processing applications and identifying and developing products for new applications for which gas management plays a critical role. MKS has undertaken an initiative to involve its marketing, engineering, manufacturing and sales personnel in the concurrent development of new products in order to reduce the time to market for new products. MKS's employees also work closely with its customers' development personnel. These relationships help MKS identify and define future technical needs on which to focus its research and development efforts. In addition, MKS participates in SEMI/SEMATECH, a consortium of semiconductor equipment suppliers, to assist in product development and standardization of product technology, and it supports research at academic institutions targeted at advances in materials science and semiconductor process development.

As of December 31, 1998, MKS employed a research and development staff of 89 employees. In 1996, 1997 and 1998, MKS's research and development expenditures were approximately $14.2 million, $14.7 million and $12.1 million, respectively, representing approximately 8.3%, 7.8% and 8.7% of net sales, respectively.

COMPETITION

The market for MKS's products is highly competitive. Principal competitive factors include:

- historical customer relationships

- product quality, performance and price

- breadth of product line

- manufacturing capabilities

- customer service and support

While MKS believes that it competes favorably with respect to these factors, there can be no assurance that it will continue to do so.

MKS encounters substantial competition in each of its product lines from a number of competitors, although no one competitor competes with MKS across all product lines. Certain of MKS's competitors have greater financial and other resources than MKS. In some cases, the competitors are smaller than MKS, but well-established in specific product niches. Millipore Corporation offers products that compete with MKS's pressure and flow products. Aera Corporation, STEC (Horiba Ltd.), and Unit Instruments, Inc., each offer products that compete with MKS's mass flow control products. Nor-Cal Products, Inc. and MDC Vacuum Products, Inc., each offer products that compete with MKS's vacuum components. Leybold-Inficon, Inc., offers products that compete with MKS's vacuum measuring and gas analysis products. Helix Technology Corporation offers products that compete with MKS's vacuum gauging products. Spectra International LLC offers products that compete with MKS's gas analysis products.

In some cases, particularly with respect to mass flow controllers, semiconductor device manufacturers may direct semiconductor capital equipment manufacturers to use a specified supplier's product in their equipment. Accordingly, MKS's success depends in part on its ability to have semiconductor device manufacturers specify that its products be used at their fabrication facilities and MKS may encounter difficulties in changing established relationships of competitors with a large installed base of products at such customers' fabrication facilities. In addition, MKS's competitors can be expected to continue to improve the design and performance of their products. There can be no assurance that competitors will not develop products that offer price or performance features superior to those of MKS's products.

PATENTS AND OTHER INTELLECTUAL PROPERTY RIGHTS

MKS relies on a combination of patent, copyright, trademark and trade secret laws and license agreements to establish and protect its proprietary rights. MKS has 49 U.S. patents and 8 pending U.S. patent applications. Foreign counterparts of certain of these applications have been filed or may be filed at the appropriate time. While MKS believes that certain patents may be important for certain aspects of its business, MKS believes that its success depends more upon close customer contact, innovation, technological expertise, responsiveness and worldwide distribution.

MKS requires each of its employees, including its executive officers, to enter into standard agreements pursuant to which the employee agrees to keep confidential all proprietary information of MKS and to assign to MKS all inventions made while in the employ of MKS.

EMPLOYEES

As of December 31, 1998, MKS employed 821 persons, including 486 in manufacturing, 89 in research and development, 246 in marketing, sales, support and general and administrative activities. Management believes that MKS's ongoing success depends upon its continued ability to attract and retain highly skilled employees. None of MKS's employees is represented by a labor union or party to a collective bargaining agreement. MKS believes that its employee relations are good.

FACILITIES

MKS sells its products primarily through its direct sales force in 22 offices in France, Germany, Japan, Korea, The Netherlands, Singapore, Taiwan, the United Kingdom and the United States. The direct sales force is supplemented by sales representatives and agents in Canada, China, India, Israel, and Italy and in selected U.S. cities. MKS's corporate headquarters are located in Andover, Massachusetts. Manufacturing and other operations are conducted in a number of locations worldwide. MKS's minimum payments for leased real estate for the year ending December 31, 1999 are expected to be $1,484,000. MKS believes that the current facilities along with the planned addition for 1999 will be adequate and suitable to meet its needs for the foreseeable future. The following table provides information concerning MKS's principal and certain other owned and leased facilities:

LOCATION	SQ. FT.	ACTIVITY	PRODUCTS MANUFACTURED	LEASE EXPIRES
Andover, Massachusetts	82,000	Headquarters, Manufacturing, Customer Support and Research & Development	Baratron pressure measurement products	(1)
Boulder, Colorado	86,000	Manufacturing, Customer Support, Service and Research & Development	Vacuum gauges, valves and components	(2)
Methuen, Massachusetts	85,000	Manufacturing, Customer Support, Service and Research & Development	Pressure control and flow measurement and control products	(1)
Lawrence, Massachusetts	40,000	Manufacturing	Baratron pressure measurement products	(1)
Tokyo, Japan	20,700	Manufacturing, Sales, Customer Support, Service and Research & Development	Mass flow measurement and control products	(3)
Santa Clara, California	15,600	Sales, Customer Support and Service	Not applicable	(4)*

LOCATION	SQ. FT.	ACTIVITY	PRODUCTS MANUFACTURED	LEASE EXPIRES
Richardson, Texas	14,600	Manufacturing, Sales, Customer Support and Service	Subassemblies	8/31/01
Munich, Germany	14,100	Manufacturing, Sales, Customer Support, Service and Research & Development	Mass flow measurement and control products	(1)
Le Bourget, France	13,700	Sales, Customer Support and Service	Not applicable	(1)
Austin, Texas	8,200	Sales, Customer Support and Service	Not applicable	1/30/03
Seoul, Korea	4,760	Manufacturing, Sales, Customer Support and Service	Mass flow measurement and control products	5/30/00**
Manchester, U.K.	2,200	Manufacturing, Sales, Customer Support and Service	Mass flow measurement and control products	10/5/09
Singapore	2,050	Sales, Customer Support and Service	Not applicable	3/25/01
Taiwan	2,050	Sales, Customer Support and Service	Not applicable	12/31/01

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(1) This facility is owned by MKS.

(2) MKS leases one facility which has 39,000 square feet of space and a lease term which expires 10/31/01 and owns a second and third facility with 28,000 and 19,000 square feet of space, respectively.

(3) MKS leases a facility which has 14,000 square feet of space and a lease term which expires 4/30/99 and owns another facility with 6,700 square feet of space.

(4) MKS leases one facility with 4,000 square feet of space on a month-to-month basis, a second facility of 4,000 square feet with a lease term which expires on 1/30/00 and a third facility of 2,600 square feet with a lease term which expires 6/30/99. MKS owns a fourth facility of 5,000 square feet.

* MKS has an option to extend its leases at this location for a period of 18 months.

** MKS has an option to extend this lease for a period of two years.

In addition to manufacturing and other operations conducted at the foregoing leased or owned facilities, MKS provides worldwide sales, customer support and services from various other leased facilities throughout the world not listed in the table above. See "Business -- Sales, Marketing and Support."

LEGAL PROCEEDINGS

MKS is not a party to any material legal proceedings.

MANAGEMENT

EXECUTIVE OFFICERS AND DIRECTORS

The executive officers and directors of MKS as of December 31, 1998 are as follows:

NAME	AGE	POSITION
John R. Bertucci	58	Chairman, Chief Executive Officer and President
Ronald C. Weigner	53	Vice President and Chief Financial Officer
John J. Sullivan	63	Executive Vice President of Technology
William D. Stewart	54	Corporate Vice President and General Manager, Vacuum Products
Joseph A. Maher, Jr.	51	Corporate Vice President and General Manager, Measurement and Control Products
Leo Berlinghieri	45	Corporate Vice President, Customer Support Operations
Richard S. Chute(1)	60	Director
Owen W. Robbins(2)	69	Director
Robert J. Therrien	64	Director
Louis P. Valente(1)(2)	68	Director

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(1) Member of Compensation Committee.

(2) Member of Audit Committee.

Mr. Bertucci has served as President and a Director of MKS since 1974 and has been Chairman of the Board of Directors and Chief Executive Officer since November 1995. From 1970 to 1974, he was Vice President and General Manager. Mr. Bertucci has an M.S. in Industrial Administration and a B.S. in Metallurgical Engineering from Carnegie-Mellon University. Mr. Bertucci is also a director of Applied Science and Technology Corporation and Intellisense Corporation.

Mr. Weigner has served as Vice President and Chief Financial Officer of MKS since November 1995. From September 1993 until November 1995, he was Vice President and Corporate Controller and from 1980 to 1993 he was Corporate Controller. Mr. Weigner is a certified public accountant and has a B.S. in Business Administration from Boston University.

Mr. Sullivan has served as Executive Vice President of Technology of MKS since March 1995. From 1982 to March 1995, he was Vice President of Marketing, and from 1975 to 1982, he was Vice President of Sales and Marketing. Mr. Sullivan has an M.S. and a B.S. in Physics from Northeastern University.

Mr. Stewart has served as Corporate Vice President of MKS and General Manager of Vacuum Products since November 1997. From October 1986 to November 1997, he was President of HPS Vacuum Products group, which MKS acquired in October 1986. Mr. Stewart co-founded HPS in 1976. Mr. Stewart has an M.B.A. from Northwestern University and a B.S. in Business Administration from the University of Colorado. Mr. Stewart also serves on the board of directors of the Janus Fund.

Mr. Maher has served as Corporate Vice President of MKS and General Manager of Measurement and Control Products since November 1997. From March 1997 through November 1997, he served as Vice President of the Process Control Instrumentation Group. Mr. Maher was a Vice President of Lam Research Corporation from 1993 through 1996, and from 1980 through 1993, he was Executive Vice President of Drytek Corporation, which was purchased by Lam Research Corporation in 1993. Mr. Maher has a B.S. in Electrical Engineering from Northeastern University.

Mr. Berlinghieri has served as Corporate Vice President, Customer Support Operations of MKS since November 1995. From 1980 to November 1995, he served in various management positions at MKS, including Manufacturing Manager, Production & Inventory Control Manager, and Director of Customer

Support Operations. Mr. Berlinghieri is also Treasurer of the TQM-BASE Council, Inc., a non-profit quality management consortium comprised of Boston-area semiconductor capital equipment manufacturers.

Mr. Chute has served as a director of MKS since 1974. Mr. Chute has been a member of the law firm of Hill & Barlow, a professional corporation, since November 1971.

Mr. Robbins has served as a director of MKS since February 1996. Mr. Robbins was Executive Vice President of Teradyne, Inc., a manufacturer of electronic test systems and backplane connection systems used in the electronics and telecommunications industries from March 1992 to May 1997, and its Chief Financial Officer from February 1980 to May 1997. Mr. Robbins has served on the board of directors of Teradyne, Inc. since March 1992 and was its Vice Chairman from January 1996 to May 1997.

Mr. Therrien has served as a director of MKS since February 1996. Mr. Therrien has been President and Chief Executive Officer of Brooks Automation, Inc., a manufacturer of semiconductor processing equipment, since 1989.

Mr. Valente has served as a director of MKS since February 1996. Mr. Valente has been Chairman and Chief Executive Officer of Palomar Medical Technologies, Inc., a company which designs, manufactures and markets cosmetic lasers, since September 1997. He has been a director of Palomar Medical Technologies, Inc. since February 1997 and was its President and Chief Executive Officer from May 1997 to September 1997. Mr. Valente was a Senior Vice President of Acquisitions, Mergers and Investments of EG&G, Inc. from 1991 until July 1995. Mr. Valente is also a director of Micrion Corporation.

Executive officers of MKS are elected by the Board of Directors on an annual basis and serve until their successors are duly elected and qualified. There are no family relationships among any of the executive officers of MKS.

COMMITTEES OF THE BOARD OF DIRECTORS

The Compensation Committee consists of Messrs. Chute and Valente. The Compensation Committee reviews and evaluates the salaries, supplemental compensation and benefits of all officers of MKS, reviews general policy matters relating to compensation and benefits of employees of MKS and makes recommendations concerning these matters to the Board of Directors. The Compensation Committee also administers MKS's stock option and stock purchase plans. See "-- Stock Plans."

The Audit Committee consists of Messrs. Robbins and Valente. The Audit Committee reviews with MKS's independent auditor the scope and timing of its audit services, the auditor's report on MKS's financial statements following completion of its audit and MKS's policies and procedures with respect to internal accounting and financial controls. In addition, the Audit Committee will make annual recommendations to the Board of Directors for the appointment of independent auditors for the ensuing year.

DIRECTOR COMPENSATION

Directors of MKS are reimbursed for expenses incurred in connection with their attendance at Board of Directors and committee meetings. Directors who are not employees of MKS are paid an annual fee of $10,000 and $1,000 for each Board of Directors meeting they attend and $500 for each committee meeting they attend which is not held on the same day as a Board of Directors meeting. Messrs. Chute, Robbins, Therrien and Valente, MKS's four non-employee directors, have each been granted options, under MKS's 1996 Director Stock Option Plan (under which no further grants will be made), to purchase 8,592 shares of common stock at a weighted average exercise price of $4.81 per share. Each has also been granted options to purchase 6,000 shares of common stock at an exercise price of $14.40 per share under the 1997 Director Stock Option Plan.

COMPENSATION COMMITTEE INTERLOCKS AND INSIDER PARTICIPATION

The Compensation Committee is currently comprised of Messrs. Chute and Valente. No member of the Compensation Committee was at any time an employee of MKS. No executive officer of MKS serves as a member of the Board of Directors or Compensation Committee of any other entity which has one or more executive officers serving as a member of MKS's Board of Directors or Compensation Committee.

EXECUTIVE COMPENSATION

The following table sets forth information with respect to the compensation of MKS's Chief Executive Officer and each of the four other most highly compensated executive officers for the year ended December 31, 1998 (the "Named Executive Officers").

SUMMARY COMPENSATION TABLE FOR 1998

	ANNUAL COMPENSATION			LONG-TERM COMPENSATION AWARDS	
NAME AND PRINCIPAL POSITION	SALARY	BONUS	OTHER ANNUAL COMPENSATION	SECURITIES UNDERLYING OPTIONS(#)	ALL OTHER COMPENSATION(1)
John R. Bertucci........... Chief Executive Officer and President	$337,440	--	--	--	$12,264
Ronald C. Weigner.......... Vice President and Chief Financial Officer	164,257	--	--	60,000	8,000
Joseph A. Maher, Jr........ Corporate Vice President and General Manager, Measurement and Control Products	161,307	--	--	60,000	8,000
William D. Stewart......... Corporate Vice President and General Manager, Vacuum Products	173,893	--	--	60,000	8,000
Leo Berlinghieri........... Corporate Vice President, Customer Support Operations	152,559	--	--	60,000	3,200

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(1) Includes a premium of $4,264 paid on a life insurance policy and estimated payments of $8,000 paid into a 401(k) plan for Mr. Bertucci, and estimated payments paid into a 401(k) plan for Messrs. Weigner, Maher, Stewart and Berlinghieri.

STOCK OPTION GRANTS

The following table contains information concerning the grants of options to purchase MKS's common stock made to each of the Named Executive Officers for the year ended December 31, 1998. Stock options are generally granted at 100% of the fair value of MKS's common stock as determined by the Board of Directors on the date of grant. In reaching the determination of fair value at the time of each grant, the Board of Directors considers a range of factors, including MKS's current financial position, its recent revenues, results of operations and cash flows, its assessment of MKS's competitive position in its markets and prospects for the future, the status of MKS's product development and marketing efforts, current valuations for comparable companies and the illiquidity of an investment in MKS's common stock.

OPTION GRANTS IN 1998

	INDIVIDUAL GRANTS				POTENTIAL REALIZABLE VALUE AT ASSUMED ANNUAL RATES OF STOCK PRICE APPRECIATION FOR OPTION TERM(2)	
NAME	NUMBER OF SECURITIES UNDERLYING OPTIONS GRANTED(1)	PERCENT OF TOTAL OPTIONS GRANTED TO EMPLOYEES IN FISCAL YEAR	EXERCISE OR BASE PRICE PER SHARE	EXPIRATION DATE	5%	10%
John R. Bertucci............	--	--	--	--	--	--
Ronald C. Weigner...........	60,000	9.47%	$6.67	7/9/08	$251,684	$637,816
Joseph A. Maher, Jr.	60,000	9.47	6.67	7/9/08	251,684	637,816
William D. Stewart..........	60,000	9.47	6.67	7/9/08	251,684	637,816
Leo Berlinghieri............	60,000	9.47	6.67	7/9/08	251,684	637,816

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(1) These options become exercisable with respect to 20% of the shares granted on July 9, 1999 and with respect to the remainder of the shares on a quarterly basis during the following four years.

(2) Amounts represent hypothetical gains that could be achieved for the respective options if exercised at the end of the option term. These gains are based on assumed rates of stock price appreciation of 5% and 10% compounded annually from the date the respective options were granted to their expiration date. These numbers are calculated based on rules promulgated by the Securities and Exchange Commission and do not reflect MKS's estimate of future stock price growth. Actual gains, if any, on stock option exercises and common stock are dependent on the timing of such exercise and the future performance of the common stock.

OPTION EXERCISES AND HOLDINGS

The following table sets forth information concerning option exercises and option holdings for the fiscal year ended December 31, 1998 with respect to each of the Named Executive Officers.

AGGREGATED OPTION EXERCISES IN 1998
AND YEAR-END OPTION VALUES

	NUMBER OF SHARES UNDERLYING UNEXERCISED OPTIONS AT YEAR-END		VALUE OF UNEXERCISED IN-THE-MONEY OPTIONS AT YEAR-END(1)	
NAME	EXERCISABLE	UNEXERCISABLE	EXERCISABLE	UNEXERCISABLE
John R. Bertucci...........................	--	--	--	--
Ronald C. Weigner..........................	75,961	110,639	$757,331	$ 968,671
Joseph A. Maher, Jr.	44,310	142,290	441,771	1,284,231
William D. Stewart.........................	75,961	110,639	757,331	968,671
Leo Berlinghieri...........................	75,961	110,639	757,331	968,671

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(1) Values are based on the difference between the fair market value of the underlying shares at December 31, 1998 ($14.40 per share) and the exercise price of each option listed (between $4.43 and $6.67 per share).

STOCK PLANS

1995 Stock Incentive Plan

MKS's Amended and Restated 1995 Stock Incentive Plan (the "1995 Stock Plan") provides for the grant of incentive stock options, nonstatutory stock options, stock appreciation rights, performance shares and awards of restricted stock and unrestricted stock. An aggregate of 3,750,000 shares of common stock may be issued pursuant to the 1995 Stock Plan (subject to adjustment for certain changes in MKS's capitalization). No award may be made under the 1995 Stock Plan after November 30, 2005.

The 1995 Stock Plan is administered by the Board of Directors and the Compensation Committee. The Board of Directors has the authority to grant awards under the 1995 Stock Plan and to accelerate, waive or amend certain provisions of outstanding awards. The Board of Directors has authorized the Compensation Committee to administer certain aspects of the 1995 Stock Plan and has authorized the Chief Executive Officer of MKS to grant awards to non-executive officer employees. The maximum number of shares represented by such awards may not exceed 450,000 shares in the aggregate or 30,000 shares to any one employee.

Incentive Stock Options and Nonstatutory Options. Optionees receive the right to purchase a specified number of shares of common stock at some time in the future at an option price and subject to such terms and conditions as are specified at the time of the grant. Incentive stock options and options that the Board of Directors or Compensation Committee intends to qualify as performance-based compensation under Section 162(m) of the Internal Revenue Code may not be granted at an exercise price less than the fair market value of the common stock on the date of grant (or less than 110% of the fair market value in the case of incentive stock options granted to optionees holding 10% or more of the voting stock of MKS). All other options may be granted at an exercise price that may be less than, equal to or greater than the fair market value of the common stock on the date of grant.

Stock Appreciation Rights and Performance Shares. A stock appreciation right is based on the value of common stock and entitles the holder to receive consideration to the extent that the fair market value on the date of exercise of the shares of common stock underlying the right exceeds the fair market value of the underlying shares on the date the right was granted. A performance share award entitles the recipient to acquire shares of common stock upon the attainment of specified performance goals.

Restricted and Unrestricted Stock. Restricted stock awards entitle recipients to acquire shares of common stock, subject to the right of MKS to repurchase all or part of such shares at their purchase price from the recipient in the event that the conditions specified in the applicable stock award are not satisfied prior to the end of the applicable restriction period established for such award. MKS may also grant (or sell at a purchase price not less than 85% of the fair market value on the date of such sale) to participants shares of common stock free of any restrictions under the 1995 Stock Plan.

All of the employees, officers, directors, consultants and advisors of MKS and its subsidiaries who are expected to contribute to MKS's future growth and success are eligible to participate in the 1995 Stock Plan.

Section 162(m) of the Internal Revenue Code disallows a tax deduction to public companies for certain compensation in excess of $1.0 million paid to a company's chief executive officer or to any of the four other most highly compensated executive officers. Certain compensation, including "performance-based compensation," is not included in compensation subject to the $1.0 million limitation. The 1995 Stock Plan limits to 1,350,000 the maximum number of shares of common stock with respect to which awards may be granted to any employee in any calendar year. This limitation is intended to preserve the tax deductions to MKS that might otherwise be unavailable under Section 162(m) with respect to certain awards.

Prior to the date of this prospectus, MKS plans to grant options (to vest 20% after one year and 5% per quarter thereafter) to purchase approximately 350,000 shares of common stock to certain employees of MKS, at an exercise price equal to the initial public offering price.

1999 Employee Stock Purchase Plan

MKS's 1999 Employee Stock Purchase Plan (the "Purchase Plan") authorizes the issuance of up to an aggregate of 450,000 shares of common stock to participating employees. MKS will make one or more offerings to employees to purchase common stock under the Purchase Plan. Offerings under the Purchase Plan commence on June 1 and December 1 and terminate, respectively on November 30 and May 31. During each offering, the maximum number of shares which may be purchased by a participating employee is determined on the first day of this offering period under a formula whereby 85% of the market value of a share of common stock on the first day of this offering period is divided into an amount equal to 10% of the employee's annualized compensation (or such lower percentage as may be established by the Compensation Committee) for the immediately preceding six-month period. An employee may elect to have up to 10% deducted from his or her regular salary (or such lower percentage as may be established by the Compensation Committee) for this purpose. The price at which an employee's option is exercised is the lower of (1) 85% of the closing price of the common stock on the Nasdaq National Market on the day that this offering commences or (2) 85% of the closing price on the day that this offering terminates.

The Purchase Plan is administered by the Board of Directors and the Compensation Committee. With certain exceptions, all eligible employees, including directors and officers, regularly employed by MKS for at least six months on the applicable offering commencement date are eligible to participate in the Purchase Plan. The Purchase Plan is intended to qualify as an "employee stock purchase plan" as defined in Section 423 of the Internal Revenue Code.

1997 Director Stock Option Plan

MKS's 1997 Director Stock Option Plan (the "1997 Director Plan") authorizes the issuance of up to an aggregate of 300,000 shares of common stock. The 1997 Director Plan is administered by MKS's Board of Directors. Options are granted under the 1997 Director Plan only to directors of MKS who are not employees of MKS. Under the 1997 Director Plan, prior to the date of this prospectus each existing eligible director will receive an option to purchase 10,500 shares of common stock at an exercise price equal to the initial public offering price and future non-employee directors will receive an option to purchase 11,250 shares of common stock upon their initial election to the Board of Directors. Each initial option will vest over a three-year period in 12 equal quarterly installments following the date of grant. On the date of each annual meeting of the stockholders, options will be automatically granted to each eligible director who has been in office for at least six months prior to the date of the annual meeting of the stockholders. Each annual option will entitle the holder to purchase 6,000 shares of common stock. Each annual option will become exercisable on the day prior to the first annual meeting of stockholders following the date of grant, or if no such meeting is held within 13 months after the date of grant, on the 13-month anniversary of the date of grant. The exercise price of all options granted under the 1997 Director Plan is equal to the fair market value of the common stock on the date of grant. Options granted under the 1997 Director Plan terminate upon the earlier of three months after the optionee ceases to be a director of MKS or ten years after the grant date. In the event of a change in control of MKS, the vesting of all options then outstanding would be accelerated in full and any restrictions on exercising outstanding options would terminate.

The Company's 1996 Director Stock Option Plan, under which options have been granted to, and may still be exercised by, four non-employee directors of MKS, has been terminated. See "-- Director Compensation."

Employment Agreements

MKS entered into an employment agreement with each of Messrs. Stewart, Maher, Berlinghieri and Weigner.

Each agreement sets a base salary for each employee which is reviewed annually. In addition to a base salary, each employee is entitled, under MKS's Management Incentive Program, to a bonus equal to a percentage of his base salary if MKS attains specified financial goals during the year. Each employee is also entitled to standard benefits including:

- participation in a profit sharing and retirement savings plan
- vacation days
- life insurance
- medical/dental insurance

The remaining provisions of each agreement are also substantially the same.

The term of employment for each is from month to month with termination:

- upon the death of the employee
- at the election of MKS if the employee fails or refuses to perform
- at the election of MKS if the employee commits any acts not in MKS's best interest

Payment by MKS upon termination depends on how employment is terminated:

- if employment is terminated after the expiration of a 30 day notice period, MKS has no further obligation for compensation
- if employment is terminated by death, MKS must pay the employee's estate the compensation owed to him at the end of the month of his death
- if employment is terminated at the election of MKS, MKS must pay the employee through the last day of actual employment

Each of the agreements contains non-competition provisions during the term of employment and for the period one year after termination of employment. Under these provisions, Messrs. Stewart, Maher, Berlinghieri and Weigner may not:

- engage in any competitive business or activity
- for the 12 months subsequent to termination, work for, employ, become a partner with, or cause to be employed any employee, officer or agent of MKS
- for the 12 months subsequent to termination, give, sell or lease any competitive services or goods to any customer of MKS
- have any financial interest in or be a director, officer, stockholder, partner, employee or consultant to any competitor of MKS

CERTAIN TRANSACTIONS

Mr. Chute, a director of MKS, MKS's clerk, and a co-trustee of certain of the Bertucci Family Trusts (see "Principal Stockholders") and Mr. Thomas H. Belknap, a co-trustee of certain of the Bertucci Family trusts, are attorneys at the law firm of Hill & Barlow, a professional corporation. Hill & Barlow has provided legal services to MKS during the calendar year ended December 31, 1998 for which it was compensated by MKS in the aggregate amount of $183,000.

Mr. Stewart, Corporate Vice President and General Manager of Vacuum Products, is the general partner of Aspen Industrial Park Partnership. On October 12, 1989, MKS entered into a lease with Aspen, which has been periodically extended, for certain facilities occupied by MKS's Vacuum Products group in Boulder, Colorado. MKS currently pays Aspen approximately $350,000 annually to lease such facilities.

MKS has been treated as an S corporation for federal income tax purposes since July 1, 1987. As a result, MKS currently pays no federal, and certain state, income tax and all of the earnings of MKS are subject to federal, and certain state, income taxation directly at the stockholder level. MKS's S corporation status will terminate upon the closing of this offering, at which time MKS will become subject to corporate income taxation under Subchapter C of the Internal Revenue Code. In 1997 and 1998, MKS distributed $12.4 million and $6.2 million, respectively, of undistributed S corporation earnings to its stockholders. As soon as practicable following the closing of this offering, MKS intends to make a distribution to the holders of record on the day prior to the closing of this offering in an amount equivalent to the accumulated adjustments account. As of December 31, 1998, the outstanding balance of the accumulated adjustments account was approximately $35.9 million and such balance is expected to increase in the period from January 1, 1999 through the closing of this offering. See "S Corporation and Termination of S Corporation Status."

MKS believes that the transactions listed above were made on terms no less favorable to the Company than could have been obtained from unaffiliated third parties. Commencing on the effective date of this offering, all future transactions between MKS and its officers, directors or other affiliates must (1) be approved by a majority of the members of the Board of Directors and a majority of the disinterested members of the Board; and (2) be on terms no less favorable to MKS than could be obtained from unaffiliated third parties.

PRINCIPAL AND SELLING STOCKHOLDERS

The following table sets forth certain information regarding beneficial ownership of MKS's common stock as of December 31, 1998, and as adjusted to reflect the sale of shares offered hereby, by (1) each of the directors of MKS, (2) each of the Named Executive Officers, (3) each person known to MKS to own beneficially more than 5% of MKS's common stock and (4) all directors and executive officers as a group.

Unless otherwise indicated, each person named in the table has sole voting power and investment power or shares such power with his or her spouse with respect to all shares of capital stock listed as owned by such person. Beneficial ownership is determined in accordance with the rules of the Securities and Exchange Commission and includes voting or investment power with respect to the securities. The number of shares of common stock outstanding used in calculating the percentage for each listed person includes any shares the individual has the right to acquire within 60 days of December 31, 1998.

All of the shares being offered by the selling stockholders are owned by trusts for the benefit of Mr. Bertucci and members of his family.

NAME OF BENEFICIAL OWNER	SHARES BENEFICIALLY OWNED PRIOR TO OFFERING		NUMBER OF SHARES OFFERED	SHARES BENEFICIALLY OWNED AFTER OFFERING	
	NUMBER	PERCENT		NUMBER	PERCENT
John R. Bertucci	17,261,915(1)	95.6%	500,000	16,761,915	69.7%
Ronald C. Weigner	82,291(2)	*	--	82,291	*
John J. Sullivan	614,010(3)	3.4	--	614,010	2.6
Joseph A. Maher, Jr.	44,310(2)	*	--	44,310	*
William D. Stewart	82,291(2)	*	--	82,291	*
Leo Berlinghieri	82,291(2)	*	--	82,291	*
Richard S. Chute	2,766,852(4)	15.3	300,000	2,466,852	10.3
Owen W. Robbins	8,027(2)	*	--	8,027	*
Robert J. Therrien	8,027(2)	*	--	8,027	*
Louis P. Valente	8,027(2)	*	--	8,027	*
Thomas H. Belknap	2,331,902(5)	12.9	200,000	2,131,902	8.9
All executive officers and directors as a group	18,199,216	99.0%	500,000	17,699,216	72.6%

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* Less than 1% of outstanding common stock.

(1) Includes 6,046,208 shares held directly by Mr. Bertucci, 6,124,980 shares held directly by Mr. Bertucci's wife, and 5,090,727 shares held by Bertucci family trusts for which either Mr. or Mrs. Bertucci serves as a co-trustee.

(2) Comprised solely of options exercisable within 60 days of December 31, 1998.

(3) Includes 316,500 shares held in a grantor retained annuity trust.

(4) Includes 2,758,825 shares held by certain of the Bertucci family trusts for which Mr. Chute serves as a co-trustee and 8,027 shares subject to options held by Mr. Chute exercisable within 60 days of December 31, 1998.

(5) Represents shares held by certain of the Bertucci family trusts for which Mr. Belknap serves as a co-trustee.

DESCRIPTION OF CAPITAL STOCK

The authorized capital stock of MKS will consist of 50,000,000 shares of common stock, no par value per share, and 2,000,000 shares of preferred stock, $.01 par value per share, after giving effect to the amendment and restatement of MKS's Restated Articles of Organization which will be filed with the Secretary of State of The Commonwealth of Massachusetts prior to the closing of this offering.

COMMON STOCK

As of December 31, 1998, there were 18,053,167 shares of common stock outstanding and held of record by twenty-three stockholders.

Upon the closing of this offering, all holders of common stock shall be entitled to one vote for each share held on all matters submitted to a vote of stockholders and will not have cumulative voting rights. Accordingly, holders of a majority of the shares of common stock entitled to vote in any election of directors may elect all of the directors standing for election. Holders of common stock are entitled to receive ratably such dividends, if any, as may be declared by the Board of Directors out of funds legally available therefor, subject to any preferential dividend rights of any outstanding preferred stock. Upon the liquidation, dissolution or winding up of MKS, the holders of common stock are entitled to receive ratably the net assets of MKS available after the payment of all debts and other liabilities, subject to the prior rights of any outstanding preferred stock. Holders of the common stock have no preemptive, subscription, redemption or conversion rights. The outstanding shares of common stock are, and the shares offered by MKS in this offering made by this prospectus will be, when issued and paid for, fully paid and nonassessable. The rights, preferences and privileges of holders of common stock are subject to, and may be adversely affected by, the rights of the holders of shares of any series of preferred stock that MKS may designate and issue in the future. There are no shares of preferred stock outstanding.

PREFERRED STOCK

The Articles of Organization authorize the Board of Directors, subject to certain limitations prescribed by law, without further stockholder approval, from time to time to issue up to an aggregate of 2,000,000 shares of preferred stock in one or more series and to fix or alter the designations, preferences and rights, and any qualifications, limitations or restrictions thereof, of the shares of each such series, including the number of shares constituting any such series and the dividend rights, dividend rates, conversion rights, voting rights, terms of redemption (including sinking fund provisions), redemption price or prices and liquidation preferences thereof. The issuance of preferred stock may have the effect of delaying, deferring or preventing a change in control of MKS. MKS has no present plans to issue any shares of preferred stock.

MASSACHUSETTS LAW AND CERTAIN PROVISIONS OF MKS'S RESTATED ARTICLES OF ORGANIZATION AND BY-LAWS

MKS intends to amend and restate its By-Laws prior to the closing of this offering. The By-Laws will include a provision excluding MKS from the applicability of Massachusetts General Laws Chapter 110D, entitled "Regulation of Control Share Acquisitions." In general, this statute provides that any stockholder of a corporation subject to this statute who acquires 20% or more of the outstanding voting stock of a corporation may not vote such stock unless the stockholders of the corporation so authorize. The Board of Directors will be able to amend the By-Laws at any time to subject MKS to this statute prospectively.

Massachusetts General Laws Chapter 156B, Section 50A generally requires that publicly-held Massachusetts corporations have a classified board of directors consisting of three classes as nearly equal in size as possible, unless the corporation elects to opt out of the statute's coverage. The By-Laws will contain provisions which give effect to Section 50A.

The By-Laws will require that nominations for the Board of Directors made by a stockholder of a planned nomination must be given not less than 30 and not more than 90 days prior to a scheduled meeting, provided that if less than 40 days' notice is given of the date of the meeting, a stockholder will have ten days within which to give such notice. The stockholder's notice of nomination must include particular information about the stockholder, the nominee and any beneficial owner on whose behalf the nomination is made. MKS may require any proposed nominee to provide such additional information as is reasonably required to determine the eligibility of the proposed nominee.

The By-Laws will also require that a stockholder seeking to have any business conducted at a meeting of stockholders give notice to MKS not less than 60 and not more than 90 days prior to the scheduled meeting, provided in certain circumstances that a ten-day notice rule applies. The notice from the stockholder will be required to describe the proposed business to be brought before the meeting and include information about the stockholder making the proposal, any beneficial owner on whose behalf the proposal is made, and any other stockholder known to be supporting the proposal. The By-Laws will require MKS to call a special stockholders meeting at the request of stockholders holding at least 40% of the voting power of MKS.

The Articles of Organization will provide that the directors and officers of MKS shall be indemnified by MKS to the fullest extent authorized by Massachusetts law, as it now exists or may in the future be amended, against all expenses and liabilities reasonably incurred in connection with service for or on behalf of MKS. In addition, the Articles of Organization will provide that the directors of MKS will not be personally liable for monetary damages to MKS for breaches of their fiduciary duty as directors, unless they violated their duty of loyalty to MKS or its stockholders, acted in bad faith, knowingly or intentionally violated the law, which could include securities laws, authorized illegal dividends or redemptions or derived an improper personal benefit from their action as directors.

The Articles of Organization will provide that any amendment to the Articles of Organization, the sale, lease or exchange of all or substantially all of MKS's property and assets, or the merger or consolidation of MKS into or with any corporation may be authorized by the approval of the holders of a majority of the shares of each class of stock entitled to vote thereon, rather than by two-thirds as otherwise provided by statute, provided that the transactions have been authorized by a majority of the members of the Board of Directors and the requirements of any other applicable provisions of the Articles of Organization have been met.

The Articles of Organization will contain a provision excluding MKS from the applicability of Massachusetts General Laws Chapter 110F, entitled "Business Combinations with Interested Shareholders." In general, Chapter 110F places limitations on a Massachusetts corporation's ability to engage in business combinations with certain stockholders for a period of three years, unless the corporation elects to opt out of the statute's coverage by including such a provision in its Articles of Organization.

TRANSFER AGENT AND REGISTRAR

The Transfer Agent and Registrar for the common stock is BankBoston, N.A.

SHARES ELIGIBLE FOR FUTURE SALE

Prior to this offering, there has been no public market for the securities of MKS. Upon completion of this offering, based upon the number of shares outstanding at December 31, 1998, there will be shares of common stock of MKS outstanding assuming the underwriters do not exercise their over-allotment option, and no options are exercised. Of these shares, the 6,500,000 shares sold in this offering will be freely tradable without restriction or further registration under the Securities Act, except that any shares purchased by "affiliates" of MKS, as that term is defined in Rule 144 under the Securities Act, may generally only be sold in compliance with the limitations of Rule 144 described below.

SALES OF RESTRICTED SHARES

The outstanding shares of common stock not sold in this offering will be deemed "restricted securities" under Rule 144 under the Securities Act. Of these shares, 17,553,165 are subject to 180-day lock-up agreements with the representatives. Upon expiration of the lock-up agreements 180 days after the date of this prospectus, all such shares will be available for sale in the public market, subject to the provisions of Rule 144.

Stockholders who are parties to the lock-up agreement have agreed that for a period of 180 days after the date of this prospectus, they will not sell, offer, contract or grant any option to sell, pledge, transfer, establish an open put equivalent position or otherwise dispose of any shares of common stock, any options to purchase shares of common stock or any shares convertible into or exchangeable for shares of common stock, owned directly by such persons or with respect to which they have the power of disposition, without the prior written consent of NationsBanc Montgomery Securities LLC.

In general, under Rule 144, beginning 90 days after the effective date of this prospectus, a stockholder who has beneficially owned his or her restricted securities for at least one year will be entitled to sell, within any three-month period, a limited number of such shares. The number of shares may not exceed the greater of 1% of the then outstanding shares of common stock or the average weekly trading volume in the common stock during the four preceding calendar weeks. In addition, under Rule 144(k), if a period of at least two years has elapsed since the date restricted securities were acquired from MKS, a stockholder who is not an affiliate of MKS at the time of sale and has not been an affiliate of MKS for at least three months prior to the sale will be entitled to sell the shares immediately without restriction.

Securities issued in reliance on Rule 701, such as shares of common stock acquired upon exercise of certain options granted under MKS's stock plans, are also restricted and, beginning 90 days after the effective date of this prospectus, may be sold by stockholders other than affiliates of MKS subject only to the manner of sale provisions of Rule 144 and by affiliates under Rule 144 without compliance with its one-year holding period requirement.

OPTIONS

As of December 31, 1998 there were options outstanding to purchase an aggregate of 2,132,575 shares of MKS's common stock, of which options to purchase an aggregate of 804,701 shares were exercisable. Of these, 802,009 shares were subject to lock-up agreements. The option to purchase the remaining 2,692 shares has since expired. MKS intends to file registration statements on Form S-8 under the Securities Act to register all shares of common stock issuable under each of the 1995 Stock Plan, Purchase Plan, the 1997 Director Plan and the 1996 Director Stock Option Plan promptly following the consummation of this offering. Shares issued pursuant to such plans shall be, after the effective date of the Form S-8 registration statements, eligible for resale in the public market without restriction, subject to Rule 144 limitations applicable to affiliates and the lock-up agreements noted above, if applicable.

UNDERWRITING

MKS is offering the shares of common stock described in this prospectus through a number of underwriters. NationsBanc Montgomery Securities LLC, Donaldson, Lufkin & Jenrette Securities Corporation and Lehman Brothers Inc. are the representatives of the underwriters. MKS and the selling stockholders have entered into an underwriting agreement with the representatives. Subject to the terms and conditions of the underwriting agreement, MKS and the selling stockholders have agreed to sell to the underwriters, and the underwriters have each agreed to purchase, the number of shares of common stock listed next to its name in the following table.

UNDERWRITER	NUMBER OF SHARES
NationsBanc Montgomery Securities LLC......................	
Donaldson, Lufkin & Jenrette Securities Corporation.........	
Lehman Brothers Inc.	
Total...	6,500,000

The underwriters initially will offer shares to the public at the price specified on the cover page of this prospectus. The underwriters may allow to some dealers a concession of not more than $ per share. The underwriters also may allow, and any other dealers may reallow, a concession of not more than $ per share to some other dealers. If all the shares are not sold at the initial public offering price, the underwriters may change the offering price and the other selling terms. The common stock is offered subject to a number of conditions, including:

- receipt and acceptance of our common stock by the underwriters

- the right to reject orders in whole or in part

MKS has granted an option to the underwriters to buy up to 975,000 additional shares of common stock. These additional shares would cover sales of shares by the underwriters which exceed the number of shares specified in the table above. The underwriters have 30 days to exercise this option. If the underwriters exercise this option, they will each purchase additional shares approximately in proportion to the amounts specified in the table above.

MKS and all holders of its stock prior to this offering, as well as most holders of stock options, have entered into lock-up agreements with the underwriters. Under those agreements, MKS and those holders of stock and options may not dispose of or hedge any MKS common stock or securities convertible into or exchangeable for shares of MKS common stock. These restrictions will be in effect for a period of 180 days after the date of this prospectus. At any time and without notice, NationsBanc Montgomery Securities LLC may, in its sole discretion, release all or some of the securities from these lock-up agreements.

MKS and the selling stockholders will indemnify the underwriters against some liabilities, including some liabilities under the Securities Act. If MKS is unable to provide this indemnification, MKS and the selling stockholders will contribute to payments the underwriters may be required to make in respect of those liabilities.

In connection with this offering, the underwriters may purchase and sell shares of common stock in the open market. These transactions may include:

- short sales

- stabilizing transactions

- purchases to cover positions created by short sales

Short sales involve the sale by the underwriters of a greater number of shares than they are required to purchase in this offering. Stabilizing transactions consist of bids or purchases made for the purpose of preventing or retarding a decline in the market price of the common stock while this offering is in progress.

The underwriters also may impose a penalty bid. This means that if the representatives purchase shares in the open market in stabilizing transactions or to cover short sales, the representatives can require the underwriters that sold those shares as part of this offering to repay the underwriting discount received by them.

The underwriters may engage in activities that stabilize, maintain or otherwise affect the price of the common stock, including:

- over-allotment

- stabilization

- syndicate covering transactions

- imposition of penalty bids

As a result of these activities, the price of the common stock may be higher than the price that otherwise might exist in the open market. If the underwriters commence these activities, they may discontinue them at any time. The underwriters may carry out these transactions on the Nasdaq National Market, in the over-the-counter market or otherwise.

The underwriters do not expect sales to discretionary accounts to exceed 5% of the total number of shares of common stock offered by this prospectus.

Prior to this offering, there has been no public market for the common stock of MKS. The initial public offering price will be negotiated among MKS, the selling stockholders and the underwriters. Among the factors to be considered in such negotiations are:

- the history of, and prospects for, MKS and the industry in which it competes

- the past and present financial performance of MKS

- an assessment of MKS's management

- the present state of MKS's development

- the prospects for future earnings of MKS

- the prevailing market conditions of the applicable U.S. securities market at the time of this offering

- market valuations of publicly traded companies that MKS and the representatives believe to be comparable to MKS

- other factors deemed relevant

LEGAL MATTERS

The validity of the common stock offered hereby will be passed upon for MKS by Hale and Dorr LLP, Boston, Massachusetts. Certain legal matters in connection with this offering will be passed upon for the underwriters by Ropes & Gray, Boston, Massachusetts.

EXPERTS

The consolidated balance sheets of MKS Instruments, Inc. at December 31, 1997 and 1998 and the consolidated statements of income, stockholders' equity and cash flows for each of the three years in the period ended December 31, 1998 included in this prospectus have been included herein in reliance on the report of PricewaterhouseCoopers LLP, independent accountants, given upon the authority of that firm as experts in accounting and auditing.

ADDITIONAL INFORMATION

MKS has filed with the Securities and Exchange Commission, a registration statement on Form S-1 under the Securities Act with respect to the common stock offered hereby. This prospectus, which constitutes part of the registration statement, does not contain all of the information set forth in the registration statement, certain parts of which are omitted in accordance with the rules and regulations of the Securities and Exchange Commission. For further information with respect to MKS and the common stock offered hereby, reference is made to the registration statement. Statements contained in this prospectus as to the contents of any contract or other document filed as an exhibit to the registration statement are not necessarily complete, and in each instance reference is made to the copy of such document filed as an exhibit to the registration statement, each such statement being qualified in all respects by such reference. The registration statement (and all amendments, exhibits and schedules thereto) may be inspected without charge at the principal office of the Securities and Exchange Commission in Washington, D.C. and copies of all or any part of which may be inspected and copied at the public reference facilities maintained by the Securities and Exchange Commission at 450 Fifth Street, N.W., Judiciary Plaza, Room 1024, Washington, D.C. 20549, and at the Securities and Exchange Commission's regional offices located at Citicorp Center, 500 West Madison Street, Suite 1400, Chicago, Illinois 60661-2511 and 7 World Trade Center, Suite 1300, New York, New York 10048. Copies of such material can also be obtained at prescribed rates by mail from the Public Reference Section of the Securities and Exchange Commission at 450 Fifth Street, N.W., Washington, D.C. 20549. In addition, the Securities and Exchange Commission maintains a website (http://www.sec.gov) that contains reports, proxy and information statements and other information regarding registrants that file electronically with the Securities and Exchange Commission.

MKS intends to distribute to its stockholders annual reports containing audited consolidated financial statements.

MKS INSTRUMENTS, INC.

INDEX TO CONSOLIDATED FINANCIAL STATEMENTS

REPORT OF INDEPENDENT ACCOUNTANTS

To the Board of Directors and Stockholders of
MKS Instruments, Inc.:

In our opinion, the accompanying consolidated balance sheets and related consolidated statements of income, stockholders' equity and cash flows present fairly, in all material respects, the financial position of MKS Instruments, Inc. and its subsidiaries at December 31, 1997 and 1998 and the results of their operations and their cash flows for each of the three years in the period ended December 31, 1998, in conformity with generally accepted accounting principles. These financial statements are the responsibility of the Company's management; our responsibility is to express an opinion on these financial statements based on our audits. We conducted our audits of these statements in accordance with generally accepted auditing standards which require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement. An audit includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements, assessing the accounting principles used and significant estimates made by management, and evaluating the overall financial statement presentation. We believe that our audits provide a reasonable basis for the opinion expressed above.

PRICEWATERHOUSECOOPERS LLP

Boston, Massachusetts
January 22, 1999, except for the
information in the first and second
paragraph of Note 13 as to which the date
is January 28, 1999 and February 24, 1999,
respectively

MKS INSTRUMENTS, INC.

CONSOLIDATED BALANCE SHEETS
(IN THOUSANDS, EXCEPT SHARE DATA)

	DECEMBER 31, 1997	DECEMBER 31, 1998 ACTUAL	DECEMBER 31, 1998 PRO FORMA (NOTE 2) (UNAUDITED)
ASSETS			
Current assets:			
Cash and cash equivalents	$ 2,511	$11,188	$11,188
Marketable equity securities	614	538	538
Trade accounts receivable, net of allowance for doubtful accounts of $610 and $656 at December 31, 1997 and 1998, respectively	32,439	20,674	20,674
Inventories	29,963	24,464	24,464
Deferred tax asset	682	698	698
Other current assets	1,670	971	971
Total current assets	67,879	58,533	58,533
Property, plant and equipment, net	33,976	32,725	32,725
Other assets	4,681	4,974	4,974
Total assets	$106,536	$96,232	$96,232
LIABILITIES AND STOCKHOLDERS' EQUITY			
Current liabilities:			
Short-term borrowings	$ 10,721	$ 9,687	$ 9,687
Current portion of long-term debt	2,070	2,058	2,058
Current portion of capital lease obligations	1,061	1,074	1,074
Accounts payable	7,433	3,677	3,677
Accrued compensation	7,501	3,985	3,985
Other accrued expenses	6,883	5,280	5,280
Income taxes payable	1,889	1,279	1,279
Distribution payable	--	--	35,926
Total current liabilities	37,558	27,040	62,966
Long-term debt	13,748	12,042	12,042
Long-term portion of capital lease obligations	1,876	1,744	1,744
Deferred tax liability	133	117	117
Other liabilities	373	463	463
Commitments and contingencies (Note 7)			
Stockholders' equity:			
Common Stock, Class A, no par value; 11,250,000 shares authorized, 7,766,910 issued and outstanding	40	40	40
Common Stock, Class B (non voting) no par value; 18,750,000 shares authorized; 10,286,255 and 10,286,257 shares issued and outstanding at December 31, 1997 and 1998, respectively	73	73	73
Additional paid-in capital	48	48	48
Retained earnings	51,443	52,479	16,553
Accumulated other comprehensive income	1,244	2,186	2,186
Total stockholders' equity	52,848	54,826	18,900
Total liabilities and stockholders' equity	$106,536	$96,232	$96,232

The accompanying notes are an integral part of the consolidated financial statements.

MKS INSTRUMENTS, INC.

CONSOLIDATED STATEMENTS OF INCOME
(IN THOUSANDS, EXCEPT PER SHARE DATA)

	YEAR ENDED DECEMBER 31,		
	1996	1997	1998
Net sales	$170,862	$188,080	$139,763
Cost of sales	102,008	107,606	83,784
Gross profit	68,854	80,474	55,979
Research and development	14,195	14,673	12,137
Selling, general and administrative	37,191	41,838	34,707
Restructuring	1,400	--	--
Income from operations	16,068	23,963	9,135
Interest expense	2,378	2,132	1,483
Interest income	92	271	296
Other income (expense), net	(479)	166	187
Income before income taxes	13,303	22,268	8,135
Provision for income taxes	800	1,978	949
Net income	$ 12,503	$ 20,290	$ 7,186
Historical net income per share:			
Basic	$ 0.69	$ 1.12	$ 0.40
Diluted	$ 0.69	$ 1.10	$ 0.38
Historical weighted average common shares outstanding:			
Basic	18,053	18,053	18,053
Diluted	18,053	18,388	18,720
Pro forma data (unaudited):			
Historical income before income taxes	$ 13,303	$ 22,268	$ 8,135
Pro forma provision for income taxes assuming C corporation tax	5,055	8,462	3,091
Pro forma net income	$ 8,248	$ 13,806	$ 5,044
Pro forma net income per share:			
Basic	$ 0.46	$ 0.76	$ 0.25
Diluted	$ 0.46	$ 0.76	$ 0.24
Pro forma weighted average common shares outstanding:			
Basic	18,053	18,053	20,295
Diluted	18,053	18,262	20,780

The accompanying notes are an integral part of the consolidated financial statements.

MKS INSTRUMENTS, INC.

CONSOLIDATED STATEMENTS OF STOCKHOLDERS' EQUITY
FOR THE YEARS ENDED DECEMBER 31, 1996, 1997 AND 1998
(IN THOUSANDS, EXCEPT SHARE DATA)

	COMMON STOCK					
	CLASS A		CLASS B			
	SHARES	AMOUNT	SHARES	AMOUNT	ADDITIONAL PAID-IN CAPITAL	RETAINED EARNINGS
Balance at December 31, 1995	7,766,910	$40	10,286,255	$73	$48	$45,550
Distributions to stockholders						(14,500)
Comprehensive income:						
Net income						12,503
Other comprehensive income:						
Foreign currency translation adjustment						
Unrealized loss on investments						
Comprehensive income						
Balance at December 31, 1996	7,766,910	40	10,286,255	73	48	43,553
Distributions to stockholders						(12,400)
Comprehensive income:						
Net income						20,290
Other comprehensive income:						
Foreign currency translation adjustment						
Unrealized gain on investments						
Comprehensive income						
Balance at December 31, 1997	7,766,910	40	10,286,255	73	48	51,443
Distributions to stockholders						(6,150)
Issuance of common stock			2			
Comprehensive income:						
Net income						7,186
Other comprehensive income:						
Foreign currency translation adjustment						
Unrealized loss on investments						
Comprehensive income						
Balance at December 31, 1998	7,766,910	$40	10,286,257	$73	$48	$52,479

	ACCUMULATED OTHER COMPREHENSIVE INCOME	COMPREHENSIVE INCOME	TOTAL STOCKHOLDERS' EQUITY
Balance at December 31, 1995	$2,681		$ 48,392
Distributions to stockholders			(14,500)
Comprehensive income:			
Net income		$12,503	12,503
Other comprehensive income:			
Foreign currency translation adjustment	(766)	(766)	(766)
Unrealized loss on investments	(131)	(131)	(131)
Comprehensive income		$11,606	
Balance at December 31, 1996	1,784		45,498
Distributions to stockholders			(12,400)
Comprehensive income:			
Net income		20,290	20,290
Other comprehensive income:			
Foreign currency translation adjustment	(786)	(786)	(786)
Unrealized gain on investments	246	246	246
Comprehensive income		$19,750	
Balance at December 31, 1997	1,244		52,848
Distributions to stockholders			(6,150)
Issuance of common stock			
Comprehensive income:			
Net income		7,186	7,186
Other comprehensive income:			
Foreign currency translation adjustment	992	992	992
Unrealized loss on investments	(50)	(50)	(50)
Comprehensive income		$ 8,128	
Balance at December 31, 1998	$2,186		$ 54,826

The accompanying notes are an integral part of the consolidated financial statements.

MKS INSTRUMENTS, INC.

CONSOLIDATED STATEMENTS OF CASH FLOWS
(IN THOUSANDS)

	YEAR ENDED DECEMBER 31, 1996	1997	1998
Cash flows from operating activities:			
Net income	$ 12,503	$ 20,290	$ 7,186
Adjustments to reconcile net income to net cash provided by operating activities:			
Depreciation and amortization of property, plant, and equipment	5,920	5,712	6,242
Loss on disposal of property, plant and equipment	--	552	48
Deferred taxes	(277)	(145)	(32)
Provision for doubtful accounts	(20)	258	253
Forward exchange contract loss (gain) realized	302	132	(1,211)
Stock option compensation	--	95	--
Changes in operating assets and liabilities:			
(Increase) decrease in trade accounts receivable	6,119	(12,509)	12,908
(Increase) decrease in inventories	4,145	(5,930)	6,479
(Increase) decrease in other current assets	3,239	(1,261)	554
Increase (decrease) in accrued compensation	(220)	2,386	(3,516)
Increase (decrease) in other accrued expenses	(1,520)	3,312	(1,602)
Increase (decrease) in accounts payable	(4,221)	2,638	(3,682)
Increase (decrease) in income taxes payable	331	1,283	(647)
Net cash provided by operating activities	26,301	16,813	22,980
Cash flows from investing activities:			
Purchases of property, plant and equipment	(9,417)	(3,269)	(3,137)
Proceeds from sale of property, plant and equipment	--	203	60
Increase in other assets	(443)	(123)	(270)
Cash received (used) to settle forward exchange contracts	(302)	(132)	1,211
Net cash used in investing activities	(10,162)	(3,321)	(2,136)
Cash flows from financing activities:			
Net (payments) borrowings on demand notes payable	224	(1,875)	--
Proceeds from short-term borrowings	11,025	24,110	15,242
Payments on short-term borrowings	(9,628)	(22,938)	(17,569)
Proceeds from long-term debt	400	--	--
Principal payments on long-term debt	(2,093)	(2,217)	(2,057)
Cash distributions to stockholders	(14,500)	(12,400)	(6,150)
Principal payments under capital lease obligations	(982)	(870)	(1,257)
Net cash used in financing activities	(15,554)	(16,190)	(11,791)
Effect of exchange rate changes on cash and cash equivalents	(420)	1,394	(376)
Increase (decrease) in cash and cash equivalents	165	(1,304)	8,677
Cash and cash equivalents at beginning of period	3,650	3,815	2,511
Cash and cash equivalents at end of period	$ 3,815	$ 2,511	$ 11,188
Supplemental disclosure of cash flow information:			
Cash paid during the period for:			
Interest	$ 2,363	$ 2,030	$ 1,526
Income taxes	$ 770	$ 1,078	$ 1,608
Noncash transactions during the period:			
Equipment acquired under capital leases	$ 2,074	$ 145	$ 1,138

The accompanying notes are an integral part of the consolidated financial statements.

MKS INSTRUMENTS, INC.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS
(TABLES IN THOUSANDS, EXCEPT PER SHARE DATA)

1. DESCRIPTION OF BUSINESS:

MKS Instruments, Inc. (the "Company") is a worldwide developer, manufacturer, and supplier of instruments and components that are used to measure, control and analyze gases in semiconductor manufacturing and similar industrial manufacturing processes. The Company's products include pressure and flow measurement and control instruments; vacuum gauges, valves and components; and gas analysis instruments. The Company is subject to risks common to companies in the semiconductor industry including, but not limited to, the highly cyclical nature of the semiconductor industry leading to recurring periods of over supply, development by the Company or its competitors of new technological innovations, dependence on key personnel and the protection of proprietary technology.

2. SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES:

BASIS OF PRESENTATION

The consolidated financial statements include the accounts of the Company and its subsidiaries. All significant intercompany accounts and transactions have been eliminated in consolidation. The Company has reflected the approximately 77.5% owned foreign subsidiaries as wholly-owned subsidiaries pursuant to common control accounting. Upon the closing of this offering for which these financial statements are being prepared, the shares of the foreign subsidiaries owned directly by the ultimate stockholders will be contributed to the Company.

PRO FORMA BALANCE SHEET PRESENTATION (UNAUDITED)

The Company intends to distribute the balance of its accumulated and undistributed S corporation earnings from the proceeds of this offering for which this registration statement is being prepared. The unaudited pro forma balance sheet has been prepared assuming an estimated $35,926,000 distribution was payable as of December 31, 1998. The remaining balance in retained earnings represents accumulated earnings prior to the Company converting from a C corporation to an S corporation in 1987, accumulated income in overseas subsidiaries and differences between book and tax accumulated income.

HISTORICAL AND PRO FORMA (UNAUDITED) NET INCOME PER SHARE

The Company computes basic and diluted earnings per share in accordance with Statement of Financial Accounting Standards No. 128 ("SFAS 128") "Earnings per Share." SFAS 128 requires both basic earnings per share, which is based on the weighted average number of common shares outstanding, and diluted earnings per share, which is based on the weighted average number of common shares outstanding and all dilutive potential common equivalent shares outstanding. The dilutive effect of options is determined under the treasury stock method using the average market price for the period. Common equivalent shares are included in the per share calculations where the effect of their inclusion would be dilutive.

Historical net income per share is not meaningful based upon the Company's planned conversion from an S corporation to a C corporation upon the closing of this offering for which these financial statements have been prepared. Historical net income has been adjusted for the pro forma provision for income taxes calculated assuming the Company was subject to income taxation as a C corporation, at a pro forma tax rate of 38.0%. In accordance with a regulation of the Securities and Exchange Commission, pro forma net income per share has been presented for the year ended December 31, 1998 to reflect the effect of the assumed issuance of 2,242,272 shares of common stock of the Company necessary to be sold at the mid-point of the estimated initial public offering price in order to fund the intended distribution of the accumulated and undistributed S corporation earnings as of January 1, 1998.

(TABLES IN THOUSANDS, EXCEPT PER SHARE DATA)

The following is a reconciliation of basic to diluted pro forma and historical net income per share:

	FOR THE YEAR ENDED DECEMBER 31,					
	1996		1997		1998	
	PRO FORMA	HISTORICAL	PRO FORMA	HISTORICAL	PRO FORMA	HISTORICAL
Net income	$ 8,248	$12,503	$13,806	$20,290	$ 5,044	$ 7,186
Shares used in net income per common share -- basic	18,053	18,053	18,053	18,053	20,295	18,053
Effect of dilutive securities:						
Employee and director stock options	--	--	209	335	485	667
Shares used in net income per common share -- diluted	18,053	18,053	18,262	18,388	20,780	18,720
Net income per common share -- basic	$ 0.46	$ 0.69	$ 0.76	$ 1.12	$ 0.25	$ 0.40
Net income per common share -- diluted	$ 0.46	$ 0.69	$ 0.76	$ 1.10	$ 0.24	$ 0.38

FOREIGN EXCHANGE

The functional currency of the Company's foreign subsidiaries is the applicable local currency. For those subsidiaries, assets and liabilities are translated to U.S. dollars at year-end exchange rates. Income and expense accounts are translated at the average exchange rates prevailing for the year. The resulting translation adjustments are included in accumulated other comprehensive income in consolidated stockholders' equity.

REVENUE RECOGNITION

The Company recognizes revenue upon shipment. The Company accrues for anticipated returns and warranty costs upon shipment.

CASH AND CASH EQUIVALENTS

All highly liquid investments with an original maturity of three months or less at the date of purchase are considered to be cash equivalents. Cash equivalents consist of money market instruments.

INVESTMENTS

The appropriate classification of investments in debt and equity securities is determined at the time of purchase. Debt securities that the Company has both the intent and ability to hold to maturity are carried at amortized cost. Debt securities that the Company does not have the intent and ability to hold to maturity or equity securities are classified either as "available-for-sale" or as "trading" and are carried at fair value. Marketable equity securities are carried at fair value and classified either as available-for-sale or trading. Unrealized gains and losses on securities classified as available-for-sale are included in accumulated other comprehensive income in consolidated stockholders' equity. Unrealized gains and losses on securities classified as trading are reported in earnings.

INVENTORIES

Inventories are stated at the lower of cost or market. Cost is determined on the first-in, first-out method.

PROPERTY, PLANT AND EQUIPMENT

Property, plant and equipment are stated at cost. Equipment acquired under capital leases is recorded at the present value of the minimum lease payments required during the lease period. Expenditures for major renewals and betterments that extend the useful lives of property, plant and equipment are capitalized. Expenditures for maintenance and repairs are charged to expense as incurred. When assets are sold or otherwise disposed of, the cost and related accumulated depreciation are eliminated from the accounts and any resulting gain or loss is recognized in earnings.

Depreciation is provided on the straight-line method over the estimated useful lives of 20 years for buildings and three to five years for machinery and equipment. Leasehold improvements are amortized over the shorter of the lease term or the estimated useful life of the lease.

RESEARCH AND DEVELOPMENT

Research and development costs are expensed as incurred.

NEW ACCOUNTING PRONOUNCEMENTS

In March 1998, the American Institute of Certified Public Accountants issued Statement of Position (SOP) 98-1, "Accounting for the Costs of Software Developed or Obtained for Internal Use" which provides guidance on the accounting for the costs of software developed or obtained for internal use. SOP 98-1 is effective for fiscal years beginning after December 15, 1998. The Company does not expect the SOP 98-1 to have a material impact on its financial position or results of operations.

In June 1998, the Financial Accounting Standards Board issued Statement of Financial Accounting Standards (SFAS) No. 133, "Accounting for Derivative Instruments and Hedging Activities." SFAS No. 133 requires that all derivative instruments be recorded on the balance sheet at their fair value. Changes in the fair value of derivatives are recorded each period in current earnings or other comprehensive income, depending on whether a derivative is designated as part of a hedge transaction and, if it is, the type of hedge transaction. The statement is effective for all fiscal quarters of all fiscal years beginning after June 15, 1999. The Company has not yet determined the impact that the adoption SFAS No. 133 will have on its financial position or results of operations.

USE OF ESTIMATES

The preparation of financial statements in conformity with generally accepted accounting principles requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities and disclosure of contingent assets and liabilities at the dates of the financial statements and the reported amounts of revenues and expenses during the reporting periods. Actual results could differ from those estimates.

RECLASSIFICATION OF PRIOR YEAR BALANCES

Certain reclassifications have been made to prior years' consolidated financial statements to conform to the current presentation.

3. FINANCIAL INSTRUMENTS AND RISK MANAGEMENT:

FOREIGN EXCHANGE RISK MANAGEMENT

The Company uses forward exchange contracts and local currency purchased options in an effort to reduce its exposure to currency fluctuations on future U.S. dollar cash flows derived from foreign currency denominated sales associated with the intercompany purchases of inventory. The Company has entered into forward exchange contracts and local currency purchased options to hedge a portion of its probable anticipated, but not firmly committed transactions. The anticipated transactions whose risks are being hedged are the intercompany purchases of inventory by the foreign subsidiaries from the U.S. parent for resale in their local currency. The time period of the anticipated transactions that are hedged generally approximate one year. The Company has also used forward exchange contracts to hedge firm commitments. Market value gains and losses on forward exchange contracts are recognized immediately in earnings unless a firm commitment exists. Market value gains and premiums on local currency purchased options on probable anticipated transactions and market value gains and losses on forward exchange contracts hedging firm commitments are recognized when the hedged transaction occurs. These contracts, which relate primarily to Japanese and European currencies generally have terms of twelve months or less. The Company does not hold or issue derivative financial instruments for trading purposes.

Realized and unrealized gains and losses on forward exchange contracts and local currency purchased options that qualify for hedge accounting are recognized in earnings in the same period as the underlying hedged item. Realized and unrealized gains and losses on forward exchange contracts and local currency purchased option contracts that do not qualify for hedge accounting are recognized immediately in earnings. Forward exchange contracts receive hedge accounting on firmly committed transactions when they are designated as a hedge of the designated currency exposure and are effective in minimizing such exposure. Options receive hedge accounting on probable anticipated transactions when they are designated as a hedge of the currency exposure and are effective in minimizing such exposure. The cash flows resulting from forward exchange contracts and local currency purchased options that qualify for hedge accounting are classified in the statement of cash flows as part of cash flows from operating activities. Cash flows resulting from forward exchange contracts and local currency purchased options that do not qualify for hedge accounting are classified in the statement of cash flows as investing activities.

Forward exchange contracts with notional amounts totaling none, $9,800,000, and $8,000,000 to exchange foreign currencies for U.S. dollars, were outstanding at December 31, 1996, 1997, and 1998, respectively. Of such forward exchange contracts $6,900,000 and $7,800,000 to exchange Japanese yen for U.S. dollars, were outstanding at December 31, 1997 and 1998, respectively. The forward exchange contracts with notional amounts outstanding at December 31, 1998 totaling $8,000,000 do not qualify for hedge accounting and accordingly are marked to market and recognized immediately in earnings. Local currency purchased options with notional amounts totaling $3,722,000, $12,738,000, and $10,221,000 to exchange foreign currencies for U.S. dollars were outstanding at December 31, 1996, 1997, and 1998, respectively.

Foreign exchange losses of $479,000, foreign exchange gains of $1,166,000 and foreign exchange losses of $168,000 on forward exchange contracts that did not qualify for hedge accounting were recognized in earnings during 1996, 1997 and 1998, respectively, and are classified in Other income (expense), net. Gains on forward exchange contracts that qualify for hedge accounting of $978,000 were deferred and classified in other accrued expenses at December 31, 1996. Gains on local currency purchased options deferred at December 31, 1996 that qualify for hedge accounting of $200,000 were deferred in other accrued expenses. Gains on forward exchange contracts and local currency purchased options that qualify for hedge accounting are classified in cost of goods sold and totaled $2,476,000, $1,178,000, and $310,000 for the years ended December 31, 1996, 1997, and 1998, respectively.

The fair value of forward exchange contracts at December 31, 1998, determined by applying period end currency exchange rates to the notional contract amounts, amounted to a loss of $349,000. The fair values of local currency purchased options at December 31, 1997 and 1998 which were obtained through dealer quotes were immaterial.

The Company recorded a foreign exchange translation loss on intercompany payables of $1,000,000 and a foreign exchange translation gain on intercompany payables of $1,000,000 in Other income (expense), net in 1997 and 1998, respectively. Foreign exchange translation gains and losses from unhedged intercompany balances were not material in 1996.

The market risk exposure from forward exchange contracts is assessed in light of the underlying currency exposures and is controlled by the initiation of additional or offsetting foreign currency contracts. The market risk exposure from options is limited to the cost of such investments. Credit risk exposure from forward exchange contracts and local currency purchased options are minimized as these instruments are contracted with a major financial institution. The Company monitors the credit worthiness of this financial institution and full performance is anticipated.

INTEREST RATE RISK MANAGEMENT

The Company utilizes an interest rate swap to fix the interest rate on certain variable rate term loans in order to minimize the effect of changes in interest rates on earnings. In 1998, the Company entered into a four-year interest rate swap agreement on a declining notional amount basis which coincides with the scheduled principal payments with a major financial institution for the notional amount of $10,528,000 equal to the term loans described in Note 6. Under the agreement, the Company pays a fixed rate of 5.85% on the notional amount and receives LIBOR. The interest differential payable or accruable on the swap agreement is recognized on an accrual basis as an adjustment to interest expense. The criteria used to apply hedge accounting for this interest rate swap is based upon management designating the swap as a hedge against the variable rate debt combined with the terms of the swap matching the underlying debt including the notional amount, the timing of the interest reset dates, the indices used and the paydates. At December 31, 1998, the fair value of this interest rate swap, which represents the amount the Company would receive or pay to terminate the agreement, is a net payable of $151,000, based on dealer quotes. The variable rate received on the swap at December 31, 1998 was 5.5%.

The market risk exposure from the interest rate swap is assessed in light of the underlying interest rate exposures. Credit risk exposure from the swap is minimized as the agreement is with a major financial institution. The Company monitors the credit worthiness of this financial institution and full performance is anticipated.

CONCENTRATIONS OF CREDIT RISK

The Company's significant concentrations of credit risk consist principally of cash and cash equivalents and trade accounts receivable. The Company maintains cash and cash equivalents with financial institutions including the bank it has borrowings with. Concentrations of credit risk with respect to trade accounts receivable are limited due to the large number of geographically dispersed customers. Credit is extended for all customers based on financial condition and collateral is not required.

MKS INSTRUMENTS, INC.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS -- (CONTINUED)
(TABLES IN THOUSANDS, EXCEPT PER SHARE DATA)

FAIR VALUE OF FINANCIAL INSTRUMENTS

The fair value of the term loans, including the current portion, approximates its carrying value given its variable rate interest provisions. The fair value of mortgage notes is based on borrowing rates for similar instruments and approximates its carrying value. For all other balance sheet financial instruments, the carrying amount approximates fair value because of the short period to maturity of these instruments.

4. INVENTORIES:

Inventories consist of the following:

	DECEMBER 31,	
	1997	1998
Raw material	$ 9,981	$ 7,544
Work in process	7,241	5,718
Finished goods	12,741	11,202
	$29,963	$24,464

5. PROPERTY, PLANT AND EQUIPMENT:

Property, plant and equipment consist of the following:

	DECEMBER 31,	
	1997	1998
Land	$ 8,350	$ 8,834
Buildings	26,241	26,020
Machinery and equipment	24,861	27,394
Furniture and fixtures	9,697	10,578
Leasehold improvements	882	1,814
	70,031	74,640
Less: accumulated depreciation and amortization	36,055	41,915
	$33,976	$32,725

6. DEBT:

CREDIT AGREEMENTS AND SHORT-TERM BORROWINGS

In February 1996, the Company entered into loan agreements with two banks, which provide access to a revolving credit facility. These agreements have since been amended. The revolving credit facility, as amended, provides for uncollateralized borrowings up to $30,000,000, which expires on December 31, 1999. Interest on borrowings is payable quarterly at either the banks' base rate or the LIBOR Rate, as defined in the agreement, at the Company's option. At December 31, 1997 and 1998, the Company had no borrowings under this revolving credit facility.

Additionally, certain of the Company's foreign subsidiaries have lines of credit and short-term borrowing arrangements with various financial institutions which provide for aggregate borrowings as of December 31, 1998 of up to $15,003,000, which generally expire and are renewed at six month intervals. At December 31, 1997 and 1998, total borrowings outstanding under these arrangements were $10,721,000, and $9,687,000, respectively, at interest rates ranging from 1.3% to 1.6%, and 1.3% to 1.7%, respectively. Foreign short-term borrowings are generally collateralized by certain trade accounts receivable and are guaranteed by a domestic bank.

(TABLES IN THOUSANDS, EXCEPT PER SHARE DATA)

LONG-TERM DEBT

Long-term debt consists of the following:

	DECEMBER 31, 1997	DECEMBER 31, 1998
Term loans	$12,194	$10,528
Mortgage notes	3,624	3,572
Total long-term debt	15,818	14,100
Less: current portion	2,070	2,058
Long-term debt less current portion	$13,748	$12,042

On November 1, 1993, the Company entered into a term loan agreement with a bank, which provided for borrowings of $10,000,000. Principal payments are payable in equal monthly installments of $56,000 through October 1, 2000, with the remaining principal payment due on November 1, 2000. The loan is collateralized by certain land, buildings, and equipment. Interest is payable monthly at either the bank's base rate, at a rate based on the long-term funds rate, or at the LIBOR Rate, as defined in the agreement, at the Company's option.

On October 31, 1995, the Company also entered into a term loan agreement with the same bank, which provided additional uncollateralized borrowings of $7,000,000. Principal payments are payable in equal monthly installments of $83,000 through June 1, 2002, with the remaining principal payment due on June 30, 2002. Interest is payable monthly at either the bank's base rate or at the LIBOR Rate, as defined in the agreement, at the Company's option.

At December 31, 1997 and 1998, the interest rates in effect for the term loan borrowings were 6.975% and 7.131%, respectively.

The terms of the revolving credit facility and term loan agreements, as amended, contain, among other provisions, requirements for maintaining certain levels of tangible net worth and other financial ratios. The agreement also contains restrictions with respect to acquisitions. Under the most restrictive covenant, the operating cash flow to debt service ratio for a fiscal quarter shall not be less than 1.25 to 1.0. In the event of default of these covenants or restrictions, any obligation then outstanding under the loan agreement shall become payable upon demand by the bank. See Note 13 for subsequent event.

The Company has loans outstanding from various foreign banks in the form of mortgage notes at interest rates ranging from 2.0% to 6.2%. Principal and interest are payable in monthly installments through 2010. The loans are collateralized by mortgages on certain of the Company's foreign properties.

Aggregate maturities of long-term debt over the next five years are as follows:

YEAR ENDING DECEMBER 31,	AGGREGATE MATURITIES
1999	$ 2,058
2000	7,343
2001	1,405
2002	1,329
2003	422
Thereafter	1,543
	$14,100

(TABLES IN THOUSANDS, EXCEPT PER SHARE DATA)

7. LEASE COMMITMENTS:

The Company leases certain of its facilities and machinery and equipment under capital and operating leases expiring in various years through 2002 and thereafter. Generally, the facility leases require the Company to pay maintenance, insurance and real estate taxes. Rental expense under operating leases totaled $2,487,000, $2,478,000, and $2,388,000 for the years ended December 31, 1996, 1997, and 1998, respectively.

Minimum lease payments under operating and capital leases are as follows:

	OPERATING LEASES		CAPITAL LEASES
YEAR ENDING DECEMBER 31,	REAL ESTATE	EQUIPMENT	EQUIPMENT
1999	$1,484	$437	$1,202
2000	882	251	974
2001	660	130	537
2002	153	36	333
2003	84	13	116
Thereafter	51	42	--
Total minimum lease payments	$3,314	$909	$3,162
Less: amounts representing interest			344
Present value of minimum lease payments			2,818
Less: current portion			1,074
Long-term portion			$1,744

8. STOCKHOLDERS' EQUITY:

COMMON STOCK

The Company has two classes of common stock. Stockholders of Class A common stock are entitled to voting rights with one vote for each share of common stock. Stockholders of Class B common stock are not entitled to voting rights.

Upon the closing of this offering for which this Registration Statement is being prepared each outstanding share of Class A and Class B common stock of the Company will be converted into an aggregate of 18,053,167 shares of common stock.

STOCK OPTION PLANS

On January 9, 1998, the stockholders of the Company approved the following: (1) an increase in the number of shares that may be granted under the 1995 Stock Incentive Plan to 3,750,000 shares of common stock; (2) the adoption of the 1997 Director Stock Option Plan pursuant to which options may be granted to purchase up to an aggregate of 300,000 shares of common stock; (3) the adoption of the 1997 Employee Stock Purchase Plan pursuant to which the Company may issue up to an aggregate of 450,000 shares of common stock; and (4) that 3,750,000 shares, 300,000 shares, and 450,000 shares of common stock be reserved for issuance under the 1995 Stock Incentive Plan, the 1997 Director Stock Option Plan, and the 1997 Employee Stock Purchase Plan, respectively.

The Company grants options to employees under the 1995 Stock Incentive Plan (the "Plan") and to directors under the 1996 Director Stock Option Plan (the "Director Plan").

MKS INSTRUMENTS, INC.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS -- (CONTINUED)
(TABLES IN THOUSANDS, EXCEPT PER SHARE DATA)

At December 31, 1998 options to purchase 1,651,793 shares of the Company's common stock were reserved for issuance under the Plan. At December 31, 1998, under the Director Plan, options to purchase 28,932 shares of common stock were reserved for issuance. Stock options are granted at 100% of the fair value of the Company's common stock as determined by the Board of Directors on the date of grant. In reaching the determination of fair value at the time of each grant, the Board of Directors considered a range of factors, including the Company's current financial position, its recent revenues, results of operations and cash flows, its assessment of the Company's competitive position in its markets and prospects for the future, the status of the Company's product development and marketing efforts, current valuations for comparable companies and the illiquidity of an investment in the Company's common stock. Generally, stock options under the Plan vest 20% after one year and 5% per quarter thereafter, and expire 10 years after the grant date. Under the Director Plan, the options granted in 1996 vest over three years and options granted in 1997 and later vest at the earlier of (1) the next annual meeting, (2) 13 months from date of grant or (3) the effective date of an acquisition as defined in the Director Plan.

The following table presents the activity for options under the Plan.

	YEAR ENDED DECEMBER 31, 1996		YEAR ENDED DECEMBER 31, 1997		YEAR ENDED DECEMBER 31, 1998	
	OPTIONS	WEIGHTED AVERAGE EXERCISE PRICE	OPTIONS	WEIGHTED AVERAGE EXERCISE PRICE	OPTIONS	WEIGHTED AVERAGE EXERCISE PRICE
Outstanding -- beginning of period...	608,270	$11.06	810,442	$4.43	1,564,449	$4.50
Granted..............................	810,442	4.43	785,657	4.57	629,969	6.80
Exercised............................	--	--	--	--	(2)	4.43
Forfeited or Expired.................	(608,270)	11.06	(31,650)	4.43	(96,209)	4.43
Outstanding -- end of period.........	810,442	$ 4.43	1,564,449	$4.50	2,098,207	$5.20
Exercisable at end of period.........	114,782	$ 4.43	476,451	$4.43	778,473	$4.46

At December 31, 1998, Plan options included 1,436,588, 566,669, and 94,950 shares outstanding at exercise prices of $4.43, $6.67, and $8.00 per share. The weighted average remaining contractual life of these options was 8.2 years.

During 1996, 27,128 options were granted at an exercise price of $4.43 per share under the Director Plan and were outstanding at December 31, 1996. Of these options, 4,524 were exercisable at December 31, 1996. During 1997, options for 3,620 shares were granted under the Director Plan at an exercise price of $4.43 per share. Of these options, 30,748 were outstanding with 13,564 exercisable at the $4.43 per share price at December 31, 1997. During 1998, options for 3,620 shares were granted under the Director Plan at an exercise price of $8.00 per share. Of these options, 34,368 were outstanding with 26,228 exercisable at the $4.43 per share price at December 31, 1998.

The Company has adopted the disclosure-only provisions of Statement of Financial Accounting Standards No. 123 (SFAS No. 123), "Accounting for Stock-Based Compensation." The Company has chosen to continue to account for stock-based compensation using the intrinsic value method prescribed in Accounting Principles Board Opinion No. 25, "Accounting for Stock Issued to Employees" and related interpretations. Accordingly, compensation cost for stock options is measured as the excess, if any, of the fair value of the Company's stock at the date of grant over the amount an employee must pay to acquire the stock.

The disclosures required under SFAS No. 123 have been omitted as they are not meaningful based upon the Company's planned conversion from an S corporation to a C corporation upon the closing of this offering for which these financial statements are being prepared. Had the fair value based method prescribed in SFAS No. 123 been used to account for stock-based compensation cost, there would have

MKS INSTRUMENTS, INC.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS -- (CONTINUED)
(TABLES IN THOUSANDS, EXCEPT PER SHARE DATA)

been no change in pro forma net income and pro forma earnings per share from that reported based on the following assumptions: dividend yield of 8%, risk free interest rate of 5.44% and an expected life of 8 years.

9. INCOME TAXES:

The Company has elected to be taxed as an S corporation for federal and certain states income tax purposes and, as a result, is not subject to Federal taxation but is subject to state taxation on income in certain states. The stockholders are liable for individual Federal and certain state income taxes on their allocated portions of the Company's taxable income.

The components of income before income taxes and the historical related provision for income taxes consist of the following:

	YEAR ENDED DECEMBER 31,		
	1996	1997	1998
Income before income taxes:			
United States	$11,953	$21,858	$6,169
Foreign	1,350	410	1,966
	13,303	22,268	8,135
Current taxes:			
State	285	1,331	197
Foreign	792	792	784
	1,077	2,123	981
Deferred taxes:			
State	(156)	(72)	(39)
Foreign	(121)	(73)	7
	(277)	(145)	(32)
Provision for income taxes	$ 800	$ 1,978	$ 949

As the Company is not subject to Federal income taxes, a reconciliation of the effective tax rate to the Federal statutory rate is not meaningful.

At December 31, 1996, 1997, and 1998 the components of the deferred tax asset and deferred tax liability were as follows:

	DECEMBER 31,		
	1996	1997	1998
Deferred tax assets (liabilities):			
Inventories	$234	$344	$265
Intercompany profits	160	214	152
Compensation	72	77	127
Investment booked under the equity method	(28)	(41)	(59)
Other	(34)	(45)	96
Total	$404	$549	$581

10. EMPLOYEE BENEFIT PLANS:

The Company has a 401(k) profit-sharing plan for U.S. employees meeting certain requirements in which eligible employees may contribute from 1% up to 12% of their compensation. The Company, at its discretion, may provide a matching contribution which will generally match up to the first 2% of each participant's compensation, plus 25% of the next 4% of compensation. At the discretion of the Board of Directors, the Company may also make additional contributions for the benefit of all eligible employees. The Company's contributions are generally paid annually, and were $2,170,000 and $2,500,000 for the years ended December 31, 1996 and 1997. Approximately $1,400,000 has been accrued as the estimated Company contribution for the year ended December 31, 1998 and is included in accrued compensation.

The Company maintains a bonus plan which provides cash awards to key employees, at the discretion of the Compensation Committee of the Board of Directors, based upon operating results and employee performance. Bonus expense to key employees was none, $1,425,000, and none for the years ended December 31, 1996, 1997, and 1998, respectively.

11. RESTRUCTURING:

In 1996, the Company recorded a restructuring charge of $1,400,000, primarily related to reduction of personnel and the closure of facilities in Phoenix, AZ and San Jose, CA. These charges include $425,000 of severance pay, $710,000 of lease commitments, and $265,000 for the write-off of leasehold improvements. The facilities closure concluded during 1997. The remaining balance of approximately $126,000 for lease commitments is included in Other accrued expenses in the accompanying balance sheet at December 31, 1998.

12. GEOGRAPHIC FINANCIAL INFORMATION AND SIGNIFICANT CUSTOMER:

See Note 1 for a brief description of the Company's business. The Company is organized around two similar product lines domestically and by geographic locations internationally and has three reportable segments: North America, Far East, and Europe. Net sales to unaffiliated customers are based on the location in which the sale originated. Transfers between geographic areas are at negotiated transfer prices and have been eliminated from consolidated net sales. Income from operations consists of total net sales less operating expenses and does not include either interest income, interest expense or income taxes. The Company had one customer comprising 15%, 22% and 16% of net sales for the years ended December 31, 1996, 1997, and 1998, respectively. This data is presented in accordance with SFAS 131, "Disclosures About Segments of an Enterprise and Related Information," which the Company has retroactively adopted for all periods presented.

MKS INSTRUMENTS, INC.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS -- (CONTINUED)
(TABLES IN THOUSANDS, EXCEPT PER SHARE DATA)

	YEAR ENDED DECEMBER 31, 1998			
	NORTH AMERICA	FAR EAST	EUROPE	TOTAL
Net sales to unaffiliated customers...	$ 95,607	$23,902	$20,254	$139,763
Intersegment net sales................	26,657	290	1,015	27,962
Depreciation and amortization.........	5,627	210	405	6,242
Income from operations................	6,319	1,298	1,518	9,135
Segment assets........................	65,560	20,768	9,904	96,232
Long-lived assets.....................	28,960	5,655	3,084	37,699
Capital expenditures..................	2,635	179	323	3,137
	YEAR ENDED DECEMBER 31, 1997			
Net sales to unaffiliated customers...	$138,186	$31,559	$18,335	$188,080
Intersegment net sales................	35,429	225	749	36,403
Depreciation and amortization.........	5,096	259	357	5,712
Income from operations................	22,847	886	230	23,963
Segment assets........................	77,302	19,906	9,328	106,536
Long-lived assets.....................	30,738	4,904	3,015	38,657
Capital expenditures..................	2,899	128	242	3,269
	YEAR ENDED DECEMBER 31, 1996			
Net sales to unaffiliated customers...	$121,061	$31,066	$18,735	$170,862
Intersegment net sales................	34,100	199	1,426	35,725
Depreciation and amortization.........	5,145	388	387	5,920
Income from operations................	14,534	653	881	16,068
Segment assets........................	66,593	18,524	9,883	95,000
Long-lived assets.....................	33,402	5,554	3,551	42,507
Capital expenditures..................	8,332	208	877	9,417

Included in North America are the United States and Canada. Net sales to unaffiliated customers from the United States were $119,423,000, $136,653,000 and $94,449,000 for the years ended December 31, 1996, 1997 and 1998, respectively. Long-lived assets within the United States amounted to $33,315,000, $30,667,000 and $28,902,000 at December 31, 1996, 1997, and 1998, respectively.

Included in the Far East are Japan, Korea and Singapore. Included in Europe are Germany, France and the United Kingdom. Net sales to unaffiliated customers from Japan were $28,242,000, $28,184,000 and $21,153,000 for the years ended December 31, 1996, 1997 and 1998, respectively. Long-lived assets within Japan amounted to $5,141,000, $4,792,000 and $5,431,000 at December 31, 1996, 1997 and 1998, respectively.

13. SUBSEQUENT EVENTS:

On January 28, 1999, the Company amended its revolving credit facility and its term loan agreements described in Note 6. The amendments include revised quarterly cash flow to debt service ratios. The most restrictive covenant is the cash flow to debt service ratio of 1.25 to 1.0 in the fourth quarter of 1999 and thereafter.

On February 24, 1999 the Company effected a 3-for-2 stock split, in the form of a stock dividend of its common stock and increased the number of authorized shares of common stock to 30,000,000. Accordingly, all share data has been restated to reflect the common stock split.

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INSIDE BACK COVER (PG.5):

The inside back cover graphically depicts MKS's message of being a worldwide provider of process control solutions. It is produced in four-color process. In the center of the page is a photo of the Earth, with the tag line "Providing Solutions Around the Process, Around the World" wrapping around the photo. The word "Solutions" is highlighted with slightly larger type size. The background of the page is dark, with the MKS logo appearing at the top right, knocking out to white. Photos of MKS's products surround the photo of the Earth and include MKS Baratron Capacitance Manometers, a Throttling Poppet Valve, a Pressure Controller, Mass Flow Controllers, an In-Situ Flow Verifier, a Direct Liquid Injection Subsystem and a Residual Gas Analyzer.

6,500,000 SHARES

LOGO

COMMON STOCK

Prospectus

, 1999

NationsBanc Montgomery Securities LLC

Donaldson, Lufkin & Jenrette

Lehman Brothers

Until , 1999 (25 days after the date of this prospectus), all dealers effecting transactions in the common stock, whether or not participating in this distribution, may be required to deliver a prospectus. This is in addition to the obligation of dealers to deliver a prospectus when acting as underwriters and with respect to their unsold allotments or subscriptions.

PART II

INFORMATION NOT REQUIRED IN PROSPECTUS

ITEM 13. OTHER EXPENSES OF ISSUANCE AND DISTRIBUTION.

Estimated expenses payable in connection with the sale of the common stock offered hereby are as follows:

SEC Registration Fee	$ 35,327
NASD Filing Fee	$ 12,708
Printing, Engraving and Mailing Expenses	$120,000
Nasdaq Listing Fee	$ 95,000
Legal Fees and Expenses	$150,000
Accounting Fees and Expenses	$150,000
Blue Sky Fees and Expenses	$ 7,500
Transfer Agent and Registrar Fees	$ 10,000
Miscellaneous	$ 19,465
Total	$600,000

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The Company will bear all expenses shown above.

ITEM 14. INDEMNIFICATION OF DIRECTORS AND OFFICERS.

Section 67 of Chapter 156B of the Massachusetts General Laws provides that a corporation may indemnify its directors and officers to the extent specified in or authorized by (1) the articles of organization; (2) a by-law adopted by the stockholders; or (3) a vote adopted by the holders of a majority of the shares of stock entitled to vote on the election of directors. In all instances, the extent to which a corporation provides indemnification to its directors and officers under Section 67 is optional. In its Amended and Restated Articles of Organization (the "Articles of Organization"), the Registrant has elected to commit to provide indemnification to its directors and officers in specified circumstances. Generally, Article 6 of the Registrant's Articles of Organization provides that the Registrant shall indemnify directors and officers of the Registrant against liabilities and expenses arising out of legal proceedings brought against them by reason of their status as directors or officers or by reason of their agreeing to serve, at the request of the Registrant, as a director or officer with another organization. Under this provision, a director or officer of the Registrant shall be indemnified by the Registrant for all costs and expenses (including attorneys' fees), judgments, liabilities and amounts paid in settlement of such proceedings, even if he is not successful on the merits, if he acted in good faith in the reasonable belief that his action was in the best interests of the Registrant. The Board of Directors may authorize advancing litigation expenses to a director or officer at his request upon receipt of an undertaking by any such director of officer to repay such expenses if it is ultimately determined that he is not entitled to indemnification for such expenses.

Article 6 of the Registrant's Articles of Organization eliminates the personal liability of the Registrant's directors to the Registrant or its stockholders for monetary damages for breach of a director's fiduciary duty, except to the extent Chapter 156B of the Massachusetts General Laws prohibits the elimination or limitation of such liability.

The Underwriting Agreement, a form of which is filed at Exhibit 1.1 to this Registration Statement on Form S-1 (the "Underwriting Agreement"), provides that the underwriters are obligated under certain circumstances to indemnify directors, officers and controlling persons of the Registrant against certain liabilities, including liabilities under the Securities Act of 1933, as amended (the "Securities Act"). Reference is made to the form of Underwriting Agreement.

The Company has obtained directors and officers liability insurance for the benefit of its directors and certain of its officers.

ITEM 15. RECENT SALES OF UNREGISTERED SECURITIES.

In the three years preceding the filing of this Registration Statement, the Registrant sold 2 shares of its common stock for total proceeds of $6.64 to an employee. The registrant awarded options to purchase 837,570 shares of common stock at a weighted average exercise price of $4.43 per share and 789,277 shares of common stock at a weighted average exercise price of $4.57 per share, in 1996 and 1997, respectively, to employees and directors of the Company.

In 1998, the registrant awarded options to purchase shares of common stock to employees and directors of the Company on the dates, in the amounts, and at the exercise price set forth below:

DATE	NUMBER OF OPTIONS	EXERCISE PRICE PER SHARE
January 9, 1998	3,620	$8.00
January 26, 1998	31,650	$8.00
March 31, 1998	31,650	$8.00
July 9, 1998	450,000	$6.67
November 10, 1998	116,669	$6.67

The grant of options were exempt from registration under the Securities Act by virtue of the provisions of Section 4(2) of the Securities Act or Rule 701 thereunder.

ITEM 16. EXHIBITS AND FINANCIAL STATEMENT SCHEDULES.

(a) Exhibits:

EX. NO.	DESCRIPTION
1.1	Form of Underwriting Agreement
+3.1	Restated Articles of Organization, as amended
+3.2	Form of Amended and Restated Articles of Organization
+3.3	By-Laws, as amended
+3.4	Form of Amended and Restated By-Laws
+4.1	Specimen certificate representing the common stock
5.1	Opinion of Hale and Dorr LLP
+10.1	Amended and Restated 1995 Stock Incentive Plan
+10.2	1996 Amended and Restated 1996 Director Stock Option Plan
+10.3	1997 Director Stock Option Plan
+10.4	1999 Employee Stock Purchase Plan
+10.5	Amended and Restated Employment Agreement dated as of December 15, 1995 between Leo Berlinghieri and the Registrant
+10.6	Amended and Restated Employment Agreement dated as of December 15, 1995 between John J. Sullivan and the Registrant
+10.7	Amended and Restated Employment Agreement dated as of December 15, 1995 between Ronald C. Weigner and the Registrant
+10.8	Amended and Restated Employment Agreement dated as of December 15, 1995 between William D. Stewart and the Registrant
+10.9	Loan Agreement dated as of October 31, 1995, as last amended January 28, 1999, by and between the First National Bank of Boston and the Registrant
+10.10	Lease Agreement dated as of October 12, 1989, as extended November 1, 1998, by and between Aspen Industrial Park Partnership and the Registrant
+10.11	Loan Agreement dated as of November 1, 1993, as last amended January 28, 1999, between the First National Bank of Boston and the Registrant

EX. NO.	DESCRIPTION
+10.12	Lease dated as of September 21, 1995 by and between General American Life Insurance Company and the Registrant
+10.13	Loan Agreement dated as of February 23, 1996, as last amended January 28, 1999, between BankBoston, N.A., Chemical Bank and the Registrant
+10.14	Revolving Credit Note ($8,000,000) dated February 23, 1996 between Chemical Bank, The First National Bank of Boston and the Registrant
+10.15	Revolving Credit Note ($12,000,000) dated February 23, 1996 between Chemical Bank, The First National Bank of Boston and the Registrant
+10.16	Promissory Note dated as of August 1990 between Jefferson National Life Insurance Company and the Registrant
**10.17	Comprehensive Supplier Agreement #982812 dated October 23, 1998 by and between Applied Materials, Inc. and the Registrant
**10.18	Management Incentive Program
+10.19	Lease dated as of December 21, 1989, as last amended December 1996, between Walpole Park South II Trust and the Registrant
+10.20	Lease dated as of January 1, 1996 between MiFuji Kanzai Co. Ltd. and the Registrant (covering Floor 5)
+10.21	Lease dated as of April 21, 1997 between MiFuji Kanzai Co. Ltd. and the Registrant (covering Floors 1 and 2)
+10.22	Split-Dollar Agreement dated as of September 12, 1991 between the Registrant, John R. Bertucci and Claire R. Bertucci and Richard S. Chute, Trustees of the John R. Bertucci Insurance Trust of January 10, 1986
+10.23	Split-Dollar Agreement dated as of September 12, 1991 between the Registrant, John R. Bertucci and John R. Bertucci and Thomas H. Belknap, Trustees of the Claire R. Bertucci Insurance Trust of January 10, 1986
*10.24	Form of Tax Indemnification and S Corporation Distribution Agreement
+10.25	Employment Agreement dated March 7, 1997 between Joseph Maher and the Registrant
10.26	Form of Contribution Agreement
+21.1	Subsidiaries of the Registrant
23.1	Consent of Hale and Dorr LLP (contained in Exhibit 5.1)
23.2	Consent of PricewaterhouseCoopers LLP
+24	Power of Attorney (included on Page II-5)
+27	Financial Data Schedule

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* To be filed by amendment.
** Confidential materials omitted and filed separately with the Securities and Exchange Commission.
\+ Previously filed.

(b) FINANCIAL STATEMENTS SCHEDULES

Report of Independent Accountants on Schedule II -- Valuation and Qualifying Accounts

Schedule II -- Valuation and Qualifying Accounts

ITEM 17. UNDERTAKINGS.

Insofar as indemnification for liabilities arising under the Securities Act of 1933 may be permitted to directors, officers and controlling persons of the registrant pursuant to the foregoing provisions, or otherwise, the registrant has been advised that in the opinion of the Securities and Exchange Commission such indemnification is against public policy as expressed in the Act and is, therefore, unenforceable. In the event that a claim for indemnification against such liabilities (other than the payment by the registrant of expenses incurred or paid by a director, officer or controlling person of the registrant in the successful defense of any action, suit or proceeding) is asserted by such director, officer and controlling person in connection with the securities being registered, the registrant will, unless in the opinion of its counsel the matter has been settled by controlling precedent, submit to a court of appropriate jurisdiction the questions whether such indemnification by it is against public policy as expressed in the Act and will be governed by the final adjudication of such issue.

The undersigned registrant hereby undertakes that:

(1) For purposes of determining any liability under the Securities Act of 1933, the information omitted from the form of prospectus filed as part of a registration statement in reliance upon Rule 430A and contained in the form of prospectus filed by the registrant pursuant to Rule 424(b)(1) or (4) or 497(h) under the Securities Act shall be deemed to be part of this registration statement as of the time it was declared effective.

(2) For the purpose of determining any liability under the Securities Act of 1933, each post-effective amendment that contains a form of prospectus shall be deemed to be a new registration statement relating to the securities offer therein, and this offering of such securities at that time shall be deemed to be the initial bona fide offering thereof.

The undersigned registrant hereby further undertakes to provide to the underwriters at the closing specified in the underwriting agreements, certificates in such denominations and registered in such names as required by the underwriters to permit prompt delivery to each purchaser.

SIGNATURES

Pursuant to the requirements of the Securities Act of 1933, the Registrant has duly caused this amendment to the Registration Statement (File No. 333-71363) to be signed on its behalf by the undersigned, thereunto duly authorized, in the City of Boston, Commonwealth of Massachusetts, on this 15th day of March, 1999.

MKS INSTRUMENTS, INC.

By: /s/ MARK G. BORDEN

MARK G. BORDEN

ATTORNEY-IN-FACT

Pursuant to the requirements of the Securities Act of 1933, this Registration Statement has been signed by the following persons in the capacities and on the dates indicated.

SIGNATURES	TITLE	DATE
/s/ JOHN R. BERTUCCI* JOHN R. BERTUCCI	Chairman of the Board of Directors, President and Chief Executive Officer (Principal Executive Officer)	March 15, 1999
/s/ RONALD C. WEIGNER* RONALD C. WEIGNER	Vice President and Chief Financial Officer (Principal Financial and Accounting Officer)	March 15, 1999
/s/ RICHARD S. CHUTE* RICHARD S. CHUTE	Director	March 15, 1999
/s/ OWEN W. ROBBINS* OWEN W. ROBBINS	Director	March 15, 1999
/s/ ROBERT J. THERRIEN* ROBERT J. THERRIEN	Director	March 15, 1999
/s/ LOUIS P. VALENTE* LOUIS P. VALENTE	Director	March 15, 1999

*By: /s/ MARK G. BORDEN

MARK G. BORDEN
ATTORNEY-IN-FACT

REPORT OF INDEPENDENT ACCOUNTANTS

To the Board of Directors and Stockholders
of MKS Instruments, Inc.:

Our audits of the consolidated financial statements referred to in our report dated January 22, 1999, except for the information in the first and second paragraph of Note 13 as to which the date is January 28, 1999 and February 24, 1999, respectively, of MKS Instruments, Inc. also included an audit of the consolidated financial statement schedule listed in Item 16(b) herein. In our opinion, this consolidated financial statement schedule presents fairly, in all material respects, the information set forth therein when read in conjunction with the related consolidated financial statements.

PRICEWATERHOUSECOOPERS LLP

Boston, Massachusetts
January 22, 1999

SCHEDULE II

MKS INSTRUMENTS, INC.

VALUATION AND QUALIFYING ACCOUNTS
(IN THOUSANDS)

	BALANCE AT BEGINNING OF PERIOD	PROVISION CHARGED TO EXPENSE	ACCOUNTS WRITTEN OFF	BALANCE AT END OF PERIOD
YEAR ENDED DECEMBER 31, 1996				
Allowance for Doubtful Accounts	$542	(20)	40	$482
YEAR ENDED DECEMBER 31, 1997				
Allowance for Doubtful Accounts	$482	258	130	$610
YEAR ENDED DECEMBER 31, 1998				
Allowance for Doubtful Accounts	$610	253	207	$656

EXHIBIT INDEX

EX. NO.	DESCRIPTION	SEQUENTIALLY NUMBERED PAGE
1.1	Form of Underwriting Agreement	
+3.1	Restated Articles of Organization, as amended	
+3.2	Form of Amended and Restated Articles of Organization	
+3.3	By-Laws, as amended	
+3.4	Form of Amended and Restated By-Laws	
+4.1	Specimen certificate representing the common stock	
5.1	Opinion of Hale and Dorr LLP	
+10.1	Amended and Restated 1995 Stock Incentive Plan	
+10.2	1996 Amended and Restated 1996 Director Stock Option Plan	
+10.3	1997 Director Stock Option Plan	
+10.4	1999 Employee Stock Purchase Plan	
+10.5	Amended and Restated Employment Agreement dated as of December 15, 1995 between Leo Berlinghieri and the Registrant	
+10.6	Amended and Restated Employment Agreement dated as of December 15, 1995 between John J. Sullivan and the Registrant	
+10.7	Amended and Restated Employment Agreement dated as of December 15, 1995 between Ronald C. Weigner and the Registrant	
+10.8	Amended and Restated Employment Agreement dated as of December 15, 1995 between William D. Stewart and the Registrant	
+10.9	Loan Agreement dated as of October 31, 1995, as last amended January 28, 1999, by and between the First National Bank of Boston and the Registrant	
+10.10	Lease Agreement dated as of October 12, 1989, as extended November 1, 1998, by and between Aspen Industrial Park Partnership and the Registrant	
+10.11	Loan Agreement dated as of November 1, 1993, as last amended January 28, 1999, between the First National Bank of Boston and the Registrant	
+10.12	Lease dated as of September 21, 1995 by and between General American Life Insurance Company and the Registrant	
+10.13	Loan Agreement dated as of February 23, 1996, as last amended January 28, 1999, between BankBoston, N.A., Chemical Bank and the Registrant	
+10.14	Revolving Credit Note ($8,000,000) dated February 23, 1996 between Chemical Bank, The First National Bank of Boston and the Registrant	
+10.15	Revolving Credit Note ($12,000,000) dated February 23, 1996 between Chemical Bank, The First National Bank of Boston and the Registrant	
+10.16	Promissory Note dated as of August 1990 between Jefferson National Life Insurance Company and the Registrant	
**10.17	Comprehensive Supplier Agreement #982812 dated October 23, 1998 by and between Applied Materials, Inc. and the Registrant	
**10.18	Management Incentive Program	
+10.19	Lease dated as of December 21, 1989, as last amended December 1996, between Walpole Park South II Trust and the Registrant	

EX. NO.	DESCRIPTION	SEQUENTIALLY NUMBERED PAGE
+10.20	Lease dated as of January 1, 1996 between MiFuji Kanzai Co. Ltd. and the Registrant (covering Floor 5)	
+10.21	Lease dated as of April 21, 1997 between MiFuji Kanzai Co. Ltd. and the Registrant (covering Floors 1 and 2)	
+10.22	Split-Dollar Agreement dated as of September 12, 1991 between the Registrant, John R. Bertucci and Claire R. Bertucci and Richard S. Chute, Trustees of the John R. Bertucci Insurance Trust of January 10, 1986	
+10.23	Split-Dollar Agreement dated as of September 12, 1991 between the Registrant, John R. Bertucci and John R. Bertucci and Thomas H. Belknap, Trustees of the Claire R. Bertucci Insurance Trust of January 10, 1986	
*10.24	Form of Tax Indemnification and S Corporation Distribution Agreement	
+10.25	Employment Agreement dated March 7, 1997 between Joseph Maher and the Registrant	
10.26	Form of Contribution Agreement	
+21.1	Subsidiaries of the Registrant	
23.1	Consent of Hale and Dorr LLP (contained in Exhibit 5.1)	
23.2	Consent of PricewaterhouseCoopers LLP	
+24	Power of Attorney (included on Page II-5)	
+27	Financial Data Schedule	

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* To be filed by amendment.

** Confidential materials omitted and filed separately with the Securities and Exchange Commission.

\+ Previously filed.

Exhibit 1.1

NATIONSBANC MONTGOMERY SECURITIES LLC
FORM UNDERWRITING AGREEMENT
Draft of January 26, 1999
[Execution Copy]

6,500,000 Shares

MKS Instruments, Inc.

Common Stock

Underwriting Agreement

dated March __, 1999

6,500,000 Shares

MKS INSTRUMENTS, INC.

Common Stock

UNDERWRITING AGREEMENT

March ___, 1999

NATIONSBANC MONTGOMERY SECURITIES LLC
DONALDSON, LUFKIN & JENRETTE SECURITIES CORPORATION
LEHMAN BROTHERS INC.
As Representatives of the several Underwriters
c/o NATIONSBANC MONTGOMERY SECURITIES LLC
600 Montgomery Street
San Francisco, California 94111

Ladies and Gentlemen:

Introductory. MKS Instruments, Inc., a Massachusetts corporation (the "Company), proposes to issue and sell to the several underwriters named in Schedule A (the "Underwriters") an aggregate of 6,000,000 shares of its Common Stock, no par value per share (the "Common Stock") and the stockholders of the Company named in Schedule B hereto (the "Selling Stockholders") severally propose to sell to the Underwriters an aggregate of 500,000 shares of Common Stock, each Selling Stockholder selling the amount set forth opposite such Selling Stockholder's name in Schedule B (the aggregate of 6,500,000 shares to be sold by the Company and the Selling Stockholders is herein called the "Firm Common Shares"). In addition, the Company has granted to the Underwriters an option to purchase up to an additional 975,000 shares of Common Stock (the aggregate of additional shares to be sold by the Company is herein called the "Optional Common Shares"), as provided in Section 2. The Firm Common Shares and, if and to the extent such option is exercised, the Optional Common Shares are collectively called the "Common Shares". NationsBanc Montgomery Securities LLC ("NMS"), Donaldson, Lufkin & Jenrette Securities Corporation and Lehman Brothers, Inc. have agreed to act as representatives of the several Underwriters (in such capacity, the "Representatives") in connection with the offering and sale of the Common Shares.

The Company has prepared and filed with the Securities and Exchange Commission (the "Commission") a registration statement on Form S-1 (File No. 333-71363), which contains a form of prospectus to be used in connection with the public offering and sale of the Common Shares. Such registration statement, as amended, including the financial statements, exhibits and schedules thereto, in the form in which it was declared effective by the Commission under the Securities Act of 1933 and the rules and regulations promulgated thereunder (collectively, the "Securities Act"), including any information deemed to be a part thereof at the time of effectiveness pursuant to Rule 430A or Rule 434 under the Securities Act, is called the "Registration Statement". Any registration statement filed by the Company pursuant to Rule 462(b) under the Securities Act is called the "Rule 462(b) Registration

Statement", and from and after the date and time of filing of the Rule 462(b) Registration Statement the term "Registration Statement" shall include the Rule 462(b) Registration Statement. Such prospectus, in the form first used by the Underwriters to confirm sales of the Common Shares, is called the "Prospectus"; provided, however, if the Company has, with the consent of NMS, elected to rely upon Rule 434 under the Securities Act, the term "Prospectus" shall mean the Company's prospectus subject to completion (each, a "preliminary prospectus") dated [___] (such preliminary prospectus is called the "Rule 434 preliminary prospectus"), together with the applicable term sheet (the "Term Sheet") prepared and filed by the Company with the Commission under Rules 434 and 424(b) under the Securities Act and all references in this Agreement to the date of the Prospectus shall mean the date of the Term Sheet. All references in this Agreement to the Registration Statement, the Rule 462(b) Registration Statement, a preliminary prospectus, the Prospectus or the Term Sheet, or any amendments or supplements to any of the foregoing, shall include any copy thereof filed with the Commission pursuant to its Electronic Data Gathering, Analysis and Retrieval System ("EDGAR").

Each of the Company and the Selling Stockholders hereby confirms its agreements with the Underwriters as follows:

Section 1A. Representations and Warranties of the Company. The Company hereby represents, warrants and covenants to each Underwriter as follows:

(a) Compliance with Registration Requirements. The Registration Statement and any Rule 462(b) Registration Statement have been declared effective by the Commission under the Securities Act. The Company has complied to the Commission's satisfaction with all requests of the Commission for additional or supplemental information. No stop order suspending the effectiveness of the Registration Statement or any Rule 462(b) Registration Statement is in effect and no proceedings for such purpose have been instituted or are pending or, to the best knowledge of the Company, are contemplated or threatened by the Commission.

Each preliminary prospectus and the Prospectus when filed complied in all material respects with the Securities Act and, if filed by electronic transmission pursuant to EDGAR (except as may be permitted by Regulation S-T under the Securities Act), was textually identical to the copy thereof delivered to the Underwriters for use in connection with the offer and sale of the Common Shares. Each of the Registration Statement, any Rule 462(b) Registration Statement and any post-effective amendment thereto, at the time it became effective and at all subsequent times up to and including the Closing Date, complied and will comply in all material respects with the Securities Act and did not and will not contain any untrue statement of a material fact or omit to state a material fact required to be stated therein or necessary to make the statements therein not misleading. The Prospectus, as amended or supplemented, as of its date and at all subsequent times up to and including the Closing Date, did not and will not contain any untrue statement of a material fact or omit to state a material fact necessary in order to make the statements therein, in the light of the circumstances under which they were made, not misleading. The representations and warranties set forth in the two immediately preceding sentences do not apply to statements in or omissions from the Registration Statement, any Rule 462(b) Registration Statement, or any post-effective amendment thereto, or the Prospectus, or any amendments or supplements thereto, made in reliance upon and in conformity with information relating to any Underwriter furnished to the Company in writing by the Representatives expressly for use therein. There are no contracts or other documents required to be described in the Prospectus or to be filed as exhibits to the Registration Statement which have not been described or filed as required.

(b) Offering Materials Furnished to Underwriters. The Company has delivered to the Representatives one complete manually signed copy of the Registration Statement and of each consent and certificate of experts filed as a part thereof, and conformed copies of the Registration Statement (without exhibits) and preliminary prospectuses and the Prospectus, as amended or supplemented, in such quantities and at such places as the Representatives have reasonably requested for each of the Underwriters.

(c) Distribution of Offering Material By the Company. The Company has not distributed and will not distribute, prior to the later of the Second Closing Date (as defined below) and the completion of the Underwriters' distribution of the Common Shares, any offering material in connection with the offering and sale of the Common Shares other than a preliminary prospectus, the Prospectus or the Registration Statement.

(d) The Underwriting Agreement. This Agreement has been duly authorized, executed and delivered by, and is a valid and binding agreement of, the Company, enforceable in accordance with its terms, except as rights to indemnification hereunder may be limited by applicable law and except as the enforcement hereof may be limited by bankruptcy, insolvency, reorganization, moratorium or other similar laws relating to or affecting the rights and remedies of creditors or by general equitable principles.

(e) Authorization of the Common Shares. The Common Shares to be purchased by the Underwriters from the Company have been duly authorized for issuance and sale pursuant to this Agreement and, when issued and delivered by the Company pursuant to this Agreement, will be validly issued, fully paid and nonassessable.

(f) No Applicable Registration or Other Similar Rights. There are no persons with registration or other similar rights to have any equity or debt securities registered for sale under the Registration Statement or included in the offering contemplated by this Agreement, except for such rights as have been duly waived.

(g) No Material Adverse Change. Except as otherwise disclosed in the Prospectus, subsequent to the respective dates as of which information is given in the Prospectus: (i) there has been no material adverse change, or any development that could reasonably be expected to result in a material adverse change, in the condition, financial or otherwise, or in the earnings, business, operations or prospects, whether or not arising from transactions in the ordinary course of business, of the Company and its subsidiaries, considered as one entity (any such change is called a "Material Adverse Change"); (ii) the Company and its subsidiaries, considered as one entity, have not incurred any material liability or obligation, indirect, direct or contingent, not in the ordinary course of business nor entered into any material transaction or agreement not in the ordinary course of business; and (iii) there has been no dividend or distribution of any kind declared, paid or made by the Company or, except for dividends paid to the Company or other subsidiaries, any of its subsidiaries on any class of capital stock or repurchase or redemption by the Company or any of its subsidiaries of any class of capital stock.

(h) Independent Accountants. PricewaterhouseCoopers LLP, who have expressed their opinion with respect to the financial statements (which term as used in this Agreement includes the related notes thereto) filed with the Commission as a part of the Registration Statement and included in the Prospectus, are independent public or certified public accountants as required by the Securities Act.

(i) Preparation of the Financial Statements. The financial statements filed with the Commission as a part of the Registration Statement and included in the Prospectus present fairly the consolidated financial position of the Company and its subsidiaries as of and at the dates indicated and the results of their operations and cash flows for the periods specified. Such financial statements and supporting schedules have been prepared in conformity with generally accepted accounting principles applied on a consistent basis throughout the periods involved, except as may be expressly stated in the related notes thereto. No other financial statements or supporting schedules are required to be included in the Registration Statement. The financial data set forth in the Prospectus under the captions "Prospectus Summary--Summary Consolidated Financial Data", "Selected Consolidated Financial Data" and "Capitalization" fairly present the information set forth therein on a basis consistent with that of the audited financial statements contained in the Registration Statement.

(j) Incorporation and Good Standing of the Company and its Subsidiaries. Each of the Company and its subsidiaries has been duly incorporated and is validly existing as a corporation in good standing under the laws of the jurisdiction of its incorporation and has corporate power and authority to own, lease and operate its properties and to conduct its business as described in the Prospectus and, in the case of the Company, to enter into and perform its obligations under this Agreement. Each of the Company and each subsidiary is duly qualified as a foreign corporation to transact business and is in good standing in each other jurisdiction in which such qualification is required, whether by reason of the ownership or leasing of property or the conduct of business, except for such jurisdictions where the failure to so qualify or to be in good standing would not, individually or in the aggregate, result in a Material Adverse Change. All of the issued and outstanding capital stock of each subsidiary has been duly authorized and validly issued, is fully paid and nonassessable and immediately prior to the sale of the Common Shares on the First Closing Date shall be owned by the Company, directly or through subsidiaries, free and clear of any security interest, mortgage, pledge, lien, encumbrance or claim. The Company does not own or control, directly or indirectly, any corporation, association or other entity other than the subsidiaries listed in Exhibit 21.1 to the Registration Statement.

(k) Capitalization and Other Capital Stock Matters. After giving effect to the assumptions set forth in the Prospectus, (i) the authorized, issued and outstanding capital stock of the Company as of December 31, 1998, was as set forth in the Prospectus under the caption "Capitalization" (other than for subsequent issuances, if any, pursuant to employee benefit plans described in the Prospectus or upon exercise of outstanding options described in the Prospectus), (ii) the Common Stock (including the Common Shares) conforms in all material respects to the description thereof contained in the Prospectus. All of the issued and outstanding shares of Common Stock (including the shares of Common Stock owned by Selling Stockholders) have been duly authorized and validly issued, are fully paid and nonassessable and have been issued in compliance with federal and state securities laws. None of the outstanding shares of Common Stock were issued in violation of any preemptive rights, rights of first refusal or other similar rights to subscribe for or purchase securities of the Company. There are no authorized or outstanding options, warrants, preemptive rights, rights of first refusal or other rights to purchase, or equity or debt securities convertible into or exchangeable or exercisable for, any capital stock of the Company or any of its subsidiaries other than those accurately described in the Prospectus. The description of the Company's stock option, stock bonus and other stock plans or arrangements, and the options or other rights granted thereunder, set forth in the Prospectus accurately and fairly presents the information required to be shown with respect to such plans, arrangements, options and rights.

(l) Stock Exchange Listing. The Common Shares have been approved for listing on the Nasdaq National Market, subject only to official notice of issuance.

(m) Non-Contravention of Existing Instruments; No Further Authorizations or Approvals Required. Neither the Company nor any of its subsidiaries is in violation of its charter or by-laws or is in default (or, with the giving of notice or lapse of time, would be in default) ("Default") under any indenture, mortgage, loan or credit agreement, note, contract, franchise, lease or other instrument to which the Company or any of its subsidiaries is a party or by which it or any of them may be bound, or to which any of the property or assets of the Company or any of its subsidiaries is subject (each, an "Existing Instrument"), except for such Defaults as would not, individually or in the aggregate, result in a Material Adverse Change. The Company's execution, delivery and performance of this Agreement and consummation of the transactions contemplated hereby and by the Prospectus (i) have been duly authorized by all necessary corporate action and will not result in any violation of the provisions of the charter or by-laws of the Company or any subsidiary, (ii) will not conflict with or constitute a breach of, or Default under, or result in the creation or imposition of any lien, charge or encumbrance upon any property or assets of the Company or any of its subsidiaries pursuant to, or require the consent of any other part to, any Existing Instrument, except for such conflicts, breaches, Defaults, liens, charges or encumbrances as would not, individually or in the aggregate, result in a Material Adverse Change and (iii) will not result in any violation of any law, administrative regulation or administrative or court decree applicable to the Company or any subsidiary. No consent, approval, authorization or other order of, or registration or filing with, any court or other governmental or regulatory authority or agency, is required for the Company's execution, delivery and performance of this Agreement and consummation of the transactions contemplated hereby and by the Prospectus, except such as have been obtained or made by the Company and are in full force and effect under the Securities Act, applicable state securities or blue sky laws and from the National Association of Securities Dealers, Inc. (the "NASD").

(n) No Material Actions or Proceedings. There are no legal or governmental actions, suits or proceedings pending or, to the best of the Company's knowledge, threatened (i) against or affecting the Company or any of its subsidiaries, (ii) which has as the subject thereof any officer or director of, or property owned or leased by, the Company or any of its subsidiaries or (iii) relating to environmental or discrimination matters, where in any such case (A) there is a reasonable possibility that such action, suit or proceeding might be determined adversely to the Company or such subsidiary and (B) any such action, suit or proceeding, if so determined adversely, would reasonably be expected to result in a Material Adverse Change or adversely affect the consummation of the transactions contemplated by this Agreement. No material labor dispute with the employees of the Company or any of its subsidiaries exists or, to the best of the Company's knowledge, is threatened or imminent.

(o) Intellectual Property Rights. The Company and its subsidiaries own or possess sufficient trademarks, trade names, patent rights, copyrights, licenses, approvals, trade secrets and other similar rights (collectively, "Intellectual Property Rights") reasonably necessary to conduct their businesses as now conducted; and the expected expiration of any of such Intellectual Property Rights would not result in a Material Adverse Change. Neither the Company nor any of its subsidiaries has received any notice of infringement or conflict with asserted Intellectual Property Rights of others, which infringement or conflict, if the subject of an unfavorable decision, would result in a Material Adverse Change.

(p) All Necessary Permits, etc. The Company and each subsidiary possess such valid and current certificates, authorizations or permits issued by the appropriate state, federal or foreign regulatory agencies or bodies necessary to conduct their respective businesses (other than any the absence of which would not, singly or in the aggregate, result in a Material Adverse Change, and neither the Company nor any subsidiary has received any notice of proceedings relating to the revocation or modification of, or non-compliance with, any such certificate, authorization or permit which, singly or in the aggregate, if the subject of an unfavorable decision, ruling or finding, could result in a Material Adverse Change.

(q) Title to Properties. The Company and each of its subsidiaries has good and marketable title to all the properties and assets reflected as owned in the financial statements referred to in Section (i) above (or elsewhere in the Prospectus), in each case, except as disclosed in the Prospectus, free and clear of any security interests, mortgages, liens, encumbrances, equities, claims and other defects, except such as do not materially and adversely affect the value of such property and do not materially interfere with the use made or proposed to be made of such property by the Company or such subsidiary. The real property, improvements, equipment and personal property held under lease by the Company or any subsidiary are held under valid and enforceable leases, with such exceptions as are not material and do not materially interfere with the use made or proposed to be made of such real property, improvements, equipment or personal property by the Company or such subsidiary.

(r) Tax Law Compliance. The Company and its subsidiaries have filed all necessary federal, state and foreign income and franchise tax returns or have properly requested extensions thereof and have paid all taxes required to be paid by any of them and, if due and payable, any related or similar assessment, fine or penalty levied against any of them except as may be being contested in good faith and by appropriate proceedings. The Company has made adequate charges, accruals and reserves in the applicable financial statements referred to in Section 1(i) above in respect of all federal, state and foreign income and franchise taxes for all periods as to which the tax liability of the Company or any of its subsidiaries has not been finally determined.

(s) Company Not an "Investment Company". The Company has been advised of the rules and requirements under the Investment Company Act of 1940, as amended (the "Investment Company Act"). The Company is not, and after receipt of payment for the Common Shares will not be, an "investment company" within the meaning of Investment Company Act and will conduct its business in a manner so that it will not become subject to the Investment Company Act.

(t) Insurance. Each of the Company and its subsidiaries is insured by recognized and reputable institutions with policies in such amounts and with such deductibles and covering such risks as the Company has reasonably deemed adequate and customary for their businesses including, but not limited to, policies covering real and personal property owned or leased by the Company and its subsidiaries against theft, damage, destruction, and acts of vandalism. The Company has no reason to believe that it or any subsidiary will not be able (i) to renew its existing insurance coverage as and when such policies expire or (ii) to obtain comparable coverage from similar institutions as may be necessary or appropriate to conduct its business as now conducted and at a cost that would not result in a Material Adverse Change. Neither of the Company nor any subsidiary has been denied any insurance coverage which it has sought or for which it has applied.

(u) No Price Stabilization or Manipulation. The Company has not taken and will not take, directly or indirectly, any action designed to or that might be reasonably expected to cause or result in stabilization or manipulation of the price of the Common Stock to facilitate the sale or resale of the Common Shares.

(v) Related Party Transactions. There are no business relationships or related-party transactions involving the Company or any subsidiary or any other person required to be described in the Prospectus which have not been described as required.

(w) No Unlawful Contributions or Other Payments. Neither the Company nor any of its subsidiaries nor, to the best of the Company's knowledge, any employee or agent of the Company or any subsidiary, has made any contribution or other payment to any official of, or candidate for, any federal, state or foreign office in violation of any law or of the character required to be disclosed in the Prospectus.

Any certificate signed by an officer of the Company and delivered to the Representatives or to counsel for the Underwriters shall be deemed to be a representation and warranty by the Company to each Underwriter as to the matters set forth therein.

Section 1B. Representations and Warranties of the Selling Stockholders. Each Selling Stockholder represents, warrants and covenants to each Underwriter as follows:

(a) The Underwriting Agreement. This Agreement has been duly executed and delivered by or on behalf of such Selling Stockholder and is a valid and binding agreement of such Selling Stockholder, enforceable in accordance with its terms, except as rights to indemnification hereunder may be limited by applicable law and except as the enforcement hereof may be limited by bankruptcy, insolvency, reorganization, moratorium or other similar laws relating to or affecting the rights and remedies of creditors or by general equitable principles.

(b) The Custody Agreement and Power of Attorney. Each of the (i) Custody Agreement signed by such Selling Stockholder and [___], as custodian (the "Custodian"), relating to the deposit of the Common Shares to be sold by such Selling Stockholder (the "Custody Agreement") and (ii) Power of Attorney appointing certain individuals named therein as such Selling Stockholder's attorneys-in-fact (each, an "Attorney-in-Fact") to the extent set forth therein relating to the transactions contemplated hereby and by the Prospectus (the "Power of Attorney"), of such Selling Stockholder has been duly executed and delivered by such Selling Stockholder and is a valid and binding agreement of such Selling Stockholder, enforceable in accordance with its terms, except as rights to indemnification thereunder may be limited by applicable law and except as the enforcement thereof may be limited by bankruptcy, insolvency, reorganization, moratorium or other similar laws relating to or affecting the rights and remedies of creditors or by general equitable principles.

(c) Title to Common Shares to be Sold; All Authorizations Obtained. Such Selling Stockholder has, and on the First Closing Date and the Second Closing Date (as defined below) will have, good and valid title to all of the Common Shares which may be sold by such Selling Stockholder pursuant to this Agreement on such date and the legal right and power, and all authorizations and approvals required by law and under its trust agreement or other organizational documents to enter into this Agreement and its Custody Agreement and Power of Attorney, to sell, transfer and deliver all of the Common Shares which may be sold by such Selling Stockholder pursuant to this Agreement and to comply with its other obligations hereunder and thereunder.

(d) Delivery of the Common Shares to be Sold. Delivery of the Common Shares which are sold by such Selling Stockholder pursuant to this Agreement will pass good and valid title to such Common Shares, free and clear of any security interest, mortgage, pledge, lien, encumbrance or other claim.

(e) Non-Contravention; No Further Authorizations or Approvals Required. The execution and delivery by such Selling Stockholder of, and the performance by such Selling Stockholder of its obligations under, this Agreement, the Custody Agreement and the Power of Attorney will not contravene or conflict with, result in a breach of, or constitute a Default under, or require the consent of any other party to, the trust agreement of such Selling Stockholder or any other agreement or instrument to which such Selling Stockholder is a party or by which it is bound or under which it is entitled to any right or benefit, any provision of applicable law or any judgment, order, decree or regulation applicable to such Selling Stockholder of any court, regulatory body, administrative agency, governmental body or arbitrator having jurisdiction over such Selling Stockholder. No consent, approval, authorization or other order of, or registration or filing with, any court or other governmental authority or agency, is required for the consummation by such Selling Stockholder of the transactions contemplated in this Agreement, except such as have been obtained or made and are in full force and effect under the Securities Act, applicable state securities or blue sky laws and from the NASD.

(f) No Registration or Other Similar Rights. Such Selling Stockholder does not have any registration or other similar rights to have any equity or debt securities registered for sale by the Company under the Registration Statement or included in the offering contemplated by this Agreement, except for such rights as are described in the Prospectus under "Shares Eligible for Future Sale."

(g) No Further Consents, etc. No consent, approval or waiver is required under any instrument or agreement to which such Selling Stockholder is a party or by which it is bound or under which it is entitled to any right or benefit, in connection with the offering, sale or purchase by the Underwriters of any of the Common Shares which may be sold by such Selling Stockholder under this Agreement or the consummation by such Selling Stockholder of any of the other transactions contemplated hereby.

(h) Disclosure Made by Such Selling Stockholder in the Prospectus. All information furnished by or on behalf of such Selling Stockholder in writing expressly for use in the Registration Statement and Prospectus is, and on the First Closing Date and the Second Closing Date will be, true, correct, and complete in all material respects, and does not, and on the First Closing Date and the Second Closing Date will not, contain any untrue statement of a material fact or omit to state any material fact necessary to make such information not misleading. Such Selling Stockholder confirms as accurate the number of shares of Common Stock set forth opposite such Selling Stockholder's name in Schedule B to this Agreement (both prior to and after giving effect to the sale of the Common Shares).

(i) No Price Stabilization or Manipulation. Such Selling Stockholder has not taken and will not take, directly or indirectly, any action designed to or that might be reasonably expected to cause or result in stabilization or manipulation of the price of the Common Stock to facilitate the sale or resale of the Common Shares.

(j) Confirmation of Company Representations and Warranties. Such Selling Stockholder has no reason to believe that the representations and warranties of the Company contained in Section 1A hereof are not true and correct, is familiar with the Registration Statement and the Prospectus and has no knowledge of any material fact, condition or information not disclosed in the Registration Statement or the Prospectus which has had or may have a Material Adverse Effect and is not prompted to sell shares of Common Stock by any information concerning the Company which is not set forth in the Registration Statement and the Prospectus.

Any certificate signed by or on behalf of any Selling Stockholder and delivered to the Representatives or to counsel for the Underwriters shall be deemed to be a representation and warranty by such Selling Stockholder to each Underwriter as to the matters covered thereby.

Section 2. Purchase, Sale and Delivery of the Common Shares.

The Firm Common Shares. Upon the terms set forth herein, (i) the Company agrees to issue and sell to the several Underwriters an aggregate of 6,000,000 Firm Common Shares and (ii) the Selling Stockholders agree to sell to the several Underwriters an aggregate of 500,000 Firm Common Shares, each Selling Stockholder selling the number of Firm Common Shares set forth opposite such Selling Stockholder's name on Schedule B. On the basis of the representations, warranties and agreements herein contained, and upon the terms but subject to the conditions herein set forth, the Underwriters agree, severally and not jointly, to purchase from the Company and the Selling Stockholders the respective number of Firm Common Shares set forth opposite their names on Schedule A. The purchase price per Firm Common Share to be paid by the several Underwriters to the Company and the Selling Stockholders shall be $[___] per share.

The First Closing Date. Delivery of certificates for the Firm Common Shares to be purchased by the Underwriters and payment therefor shall be made at the offices of NMS, 600 Montgomery Street, San Francisco, California (or such other place as may be agreed to by the Company and the Representatives) at 6:00 a.m. San Francisco time, on [___], or such other time and date not later than 10:30 a.m. San Francisco time, on [___] as the Representatives shall designate by notice to the Company (the time and date of such closing are called the "First Closing Date"). The Company and the Selling Stockholders hereby acknowledge that circumstances under which the Representatives may provide notice to postpone the First Closing Date as originally scheduled include, but are in no way limited to, any determination by the Company, the Selling Stockholders or the Representatives to recirculate to the public copies of an amended or supplemented Prospectus or a delay as contemplated by the provisions of Section 10.

The Optional Common Shares; the Second Closing Date. In addition, on the basis of the representations, warranties and agreements herein contained, and upon the terms but subject to the conditions herein set forth, the Company hereby grants an option to the several Underwriters to purchase, severally and not jointly, up to an aggregate of 975,000 Optional Common Shares from the Company at the purchase price per share to be paid by the Underwriters for the Firm Common Shares. The option granted hereunder is for use by the Underwriters solely in covering any over-allotments in connection with the sale and distribution of the Firm Common Shares. The option granted hereunder may be exercised at any time (but not more than once) upon notice by the Representatives to the Company, which notice may be given at any time within 30 days from the date of this Agreement. Such notice shall set forth (i) the aggregate number of Optional Common Shares as to which the Underwriters are exercising the option, (ii) the names and denominations in which the certificates for the Optional Common Shares are to be registered and (iii) the time, date and place at which such certificates will be delivered (which time and date may be simultaneous with, but not earlier than, the First Closing Date; and in such case the term "First Closing Date" shall refer to the time and date of delivery of certificates for the Firm Common Shares and the Optional Common Shares). Such time and date of delivery, if subsequent to the First Closing Date, is called the "Second Closing Date" and shall be determined by the Representatives and shall not be earlier than three nor later than five full business days after delivery of such notice of exercise. If any Optional Common Shares are to be purchased, (a) each Underwriter agrees, severally and not jointly, to purchase the number of Optional Common Shares (subject to such adjustments to eliminate fractional shares as the Representatives may determine) that bears the same proportion to the total number of Optional Common Shares to be purchased as the number of Firm Common Shares set forth on Schedule A opposite the name of such Underwriter bears to the total number of Firm Common Shares and (b) the Company agrees to sell the number of Optional Common Shares (subject to such adjustments to eliminate fractional shares as the Representatives may determine) that bears the same proportion to the total number of Optional Common Shares to be sold as the number of Optional Common Shares to be sold by the Company as set forth in the paragraph "Introductory" of this Agreement bears to the total number of Optional Common Shares. The Representatives may cancel the option at any time prior to its expiration by giving written notice of such cancellation to the Company.

Public Offering of the Common Shares. The Representatives hereby advise the Company and the Selling Stockholders that the Underwriters intend to offer for sale to the public, as described in the Prospectus, their respective portions of the Common Shares as soon after this Agreement has been executed and the Registration Statement has been declared effective as the Representatives, in their sole judgment, have determined is advisable and practicable.

Payment for the Common Shares. Payment for the Common Shares. Payment for the Common Shares to be sold by the Company shall be made at the First Closing Date (and, if applicable, at the Second Closing Date) by wire transfer of immediately available funds to the order of the Company. Payment for the Common Shares to be sold by the Selling Stockholders shall be made at the First Closing Date by wire transfer of immediately available funds to the order of the Custodian.

It is understood that the Representatives have been authorized, for their own account and the accounts of the several Underwriters, to accept delivery of and receipt for, and make payment of the purchase price for, the Firm Common Shares and any Optional Common Shares the Underwriters have agreed to purchase. NMS, individually and not as the Representatives of the Underwriters, may (but shall not be obligated to) make payment for any Common Shares to be purchased by any Underwriter whose funds shall not have been received by the Representatives by the First Closing Date or the Second Closing Date, as the case may be, for the account of such Underwriter, but any such payment shall not relieve such Underwriter from any of its obligations under this Agreement.

Each Selling Stockholder hereby agrees that (i) it will pay all stock transfer taxes, stamp duties and other similar taxes, if any, payable upon the sale or delivery of the Common Shares to be sold by such Selling Stockholder to the several Underwriters, or otherwise in connection with the performance of such Selling Stockholder's obligations hereunder and (ii) the Custodian is authorized to deduct for such payment any such amounts from the proceeds to such Selling Stockholder hereunder and to hold such amounts for the account of such Selling Stockholder with the Custodian under the Custody Agreement.

Delivery of the Common Shares. The Company and the Selling Stockholders shall deliver, or cause to be delivered, to the Representatives for the accounts of the several Underwriters certificates for the Firm Common Shares to be sold by them at the First Closing Date, against the irrevocable release of a wire transfer of immediately available funds for the amount of the purchase price therefor. The Company shall also deliver, or cause to be delivered, to the Representatives for the accounts of the several Underwriters, certificates for the Optional Common Shares the Underwriters have agreed to purchase from it on the First Closing Date or the Second Closing Date, as the case may be, against the irrevocable release of a wire transfer of immediately available funds for the amount of the purchase price therefor. The certificates for the Common Shares shall be in definitive form and registered in such names and denominations as the Representatives shall have requested at least two full business days prior to the First Closing Date (or the Second Closing Date, as the case may be) and shall be made available for inspection on the business day preceding the First Closing Date (or the Second Closing Date, as the case may be) at a location in New York City as the Representatives may designate. Time shall be of the essence, and delivery at the time and place specified in this Agreement is a further condition to the obligations of the Underwriters.

Delivery of Prospectus to the Underwriters. Not later than 12:00 p.m. on the second business day following the date the Common Shares are released by the Underwriters for sale to the public, the Company shall deliver or cause to be delivered copies of the Prospectus in such quantities and at such places as the Representatives shall request.

Section 3A. Additional Covenants of the Company. The Company further covenants and agrees with each Underwriter as follows:

(a) Representatives' Review of Proposed Amendments and Supplements. During such period beginning on the date hereof and ending on the later of the First Closing Date or such date, as in the opinion of counsel for the Underwriters, the Prospectus is no longer required by law to be delivered in connection with sales by an Underwriter or dealer (the "Prospectus Delivery Period"), prior to amending or supplementing the Registration Statement (including any registration statement filed under Rule 462(b) under the Securities Act) or the Prospectus, the Company shall furnish to the Representatives for review a copy of each such proposed amendment or supplement, and the Company shall not file any such proposed amendment or supplement to which the Representatives reasonably object.

(b) Securities Act Compliance. After the date of this Agreement, the Company shall promptly advise the Representatives in writing (i) of the receipt of any comments of, or requests for additional or supplemental information from, the Commission, (ii) of the time and date of any filing of any post-effective amendment to the Registration Statement or any amendment or supplement to any preliminary prospectus or the Prospectus, (iii) of the time and date that any post-effective amendment to the Registration Statement becomes effective and (iv) of the issuance by the Commission of any stop order suspending the effectiveness of the Registration Statement or any post-effective amendment thereto or of any order preventing or suspending the use of any preliminary prospectus or the Prospectus, or of any proceedings to remove, suspend or terminate from listing or quotation the Common Stock from any securities exchange upon which it is listed for trading or included or designated for quotation, or of the threatening or initiation of any proceedings for any of such purposes. If the Commission shall enter any such stop order at any time, the Company will use its best efforts to obtain the lifting of such order at the earliest possible moment. Additionally, the Company agrees that it shall comply with the provisions of Rules 424(b), 430A and 434, as applicable, under the Securities Act and will use its reasonable efforts to confirm that any filings made by the Company under such Rule 424(b) were received in a timely manner by the Commission.

(c) Amendments and Supplements to the Prospectus and Other Securities Act Matters. If, during the Prospectus Delivery Period, any event shall occur or condition exist as a result of which it is necessary to amend or supplement the Prospectus in order to make the statements therein, in the light of the circumstances when the Prospectus is delivered to a purchaser, not misleading, or if in the opinion of the Representatives or counsel for the Underwriters it is otherwise necessary to amend or supplement the Prospectus to comply with law, the Company agrees to promptly prepare (subject to Section 3A(a) hereof), file with the Commission and furnish at its own expense to the Underwriters and to dealers, amendments or supplements to the Prospectus so that the statements in the Prospectus as so amended or supplemented will not, in the light of the circumstances when the Prospectus is delivered to a purchaser, be misleading or so that the Prospectus, as amended or supplemented, will comply with law.

(d) Copies of any Amendments and Supplements to the Prospectus. The Company agrees to furnish the Representatives, without charge, during the Prospectus Delivery Period, as many copies of the Prospectus and any amendments and supplements thereto as the Representatives may request.

(e) Blue Sky Compliance. The Company shall cooperate with the Representatives and counsel for the Underwriters to qualify or register the Common Shares for sale under (or obtain exemptions from the application of) the state securities or blue sky laws or Canadian provincial Securities laws of those jurisdictions designated by the Representatives, shall comply with such laws and shall continue such qualifications, registrations and exemptions in effect so long as required for the distribution of the Common Shares. The Company shall not be required to qualify as a foreign corporation or to take any action that would subject it to general service of process in any such jurisdiction where it is not presently qualified or where it would be subject to taxation as a foreign corporation. The Company will advise the Representatives promptly of the suspension of the qualification or registration of (or any such exemption relating to) the Common Shares for offering, sale or trading in any jurisdiction or any initiation or threat of any proceeding for any such purpose, and in the event of the issuance of any order suspending such qualification, registration or exemption, the Company shall use its best efforts to obtain the withdrawal thereof at the earliest possible moment.

(f) Use of Proceeds. The Company shall apply the net proceeds from the sale of the Common Shares sold by it in the manner described under the caption "Use of Proceeds" in the Prospectus.

(g) Transfer Agent. The Company shall engage and maintain, at its expense, a registrar and transfer agent for the Common Stock.

(h) Earnings Statement. As soon as practicable, the Company will make generally available to its security holders and to the Representatives an earnings statement (which need not be audited) covering the twelve-month period ending [March 31, 2000] that satisfies the provisions of Section 11(a) of the Securities Act.

(i) Periodic Reporting Obligations. During the Prospectus Delivery Period the Company shall file, on a timely basis, with the Commission and the Nasdaq National Market all reports and documents required to be filed under the Exchange Act.

(j) Agreement Not To Offer or Sell Additional Securities. During the period of 180 days following the date of the Prospectus, the Company will not, without the prior written consent of NMS (which consent may be withheld at the sole discretion of NMS), directly or indirectly, sell, offer, contract or grant any option to sell, pledge, transfer or establish an open "put equivalent position" within the meaning of Rule 16a-1(h) under the Exchange Act, or otherwise dispose of or transfer, or announce the offering of, or file any registration statement under the Securities Act in respect of, any shares of Common Stock, options or warrants to acquire shares of the Common Stock or securities exchangeable or exercisable for or convertible into shares of Common Stock (other than as contemplated by this Agreement with respect to the Common Shares); provided, however, that the Company may issue shares of its Common Stock or options to purchase its Common Stock, or Common Stock upon exercise of options, pursuant to any stock option, stock bonus or other stock plan or arrangement described in the Prospectus, (ii) file one or more Registration Statements on Form S-8, and (iii) issue shares in connection with any acquisition if recipients agree in writing not to sell, offer, dispose of or otherwise transfer any such shares during such 180 day period without the prior written consent of NMS (which consent may be withheld at the sole discretion of the NMS).

(k) Future Reports to the Representatives. During the period of five years hereafter the Company will furnish to the Representatives at [600 Montgomery Street, San Francisco, CA 94111] [9 West 57th Street, New York, NY 10022] [Two International Place, Boston, MA 02110] Attention:[ ]: (i) as soon as practicable after the end of each fiscal year, copies of the Annual Report of the Company containing the balance sheet of the Company as of the close of such fiscal year and statements of income, stockholders' equity and cash flows for the year then ended and the opinion thereon of the Company's independent public or certified public accountants; (ii) as soon as practicable after the filing thereof, copies of each proxy statement, Annual Report on Form 10-K, Quarterly Report on Form 10-Q, Current Report on Form 8-K or other report filed by the Company with the Commission, the NASD or any securities exchange; and (iii) as soon as available, copies of any report or communication of the Company mailed generally to holders of its capital stock.

Section 3B. Covenants of the Selling Stockholders. Each Selling Stockholder further covenants and agrees with each Underwriter:

(a) Agreement Not to Offer or Sell Additional Securities. Such Selling Stockholder will not, without the prior written consent of NMS (which consent may be withheld in its sole discretion), directly or indirectly, sell, offer, contract or grant any option to sell (including without limitation any short sale), pledge, transfer, establish an open "put equivalent position" within the meaning of Rule 16a-1(h) under the Exchange Act, or otherwise dispose of any shares of Common Stock, options or warrants to acquire shares of Common Stock, or securities exchangeable or exercisable for or convertible into shares of Common Stock currently or hereafter owned either of record or beneficially (as defined in Rule 13d-3 under Securities Exchange Act of 1934, as amended) by the undersigned, or publicly announce the undersigned's intention to do any of the foregoing, for a period commencing on the date hereof and continuing through the close of trading on the date 180 days after the date of the Prospectus.

(b) Delivery of Forms W-8 and W-9 . To deliver to the Representative prior to the First Closing Date a properly completed and executed United States Treasury Department Form W-8 (if the Selling Stockholder is a non-United States person) or Form W-9 (if the Selling Stockholder is a United States Person).

Section 4. Payment of Expenses. The Company agrees to pay all costs, fees and expenses incurred in connection with the performance of its obligations hereunder and in connection with the transactions contemplated hereby, including without limitation (i) all expenses incident to the issuance and delivery of the Common Shares (including all printing and engraving costs), (ii) all fees and expenses of the registrar and transfer agent of the Common Stock, (iii) all necessary issue, transfer and other stamp taxes in connection with the issuance and sale of the Common Shares to the Underwriters, (iv) all fees and expenses of the Company's counsel, independent public or certified public accountants and other advisors, (v) all costs and expenses incurred in connection with the preparation, printing, filing, shipping and distribution of the Registration Statement (including financial statements, exhibits, schedules, consents and certificates of experts), each preliminary prospectus and the Prospectus, and all amendments and supplements thereto, and this Agreement, (vi) all filing fees, attorneys' fees and expenses incurred by the Company or the Underwriters in connection with qualifying or registering (or obtaining exemptions from the qualification or registration of) all or any part of the Common Shares for offer and sale under the state securities or blue sky laws or the provincial securities laws of Canada, and, if requested by the Representatives, preparing and printing a "Blue Sky Survey" or memorandum, and any supplements thereto, advising the Underwriters of such qualifications, registrations and exemptions, subject to a maximum fee of $7,500 (vii) the filing fees incident to, and the reasonable fees and expenses of counsel for the Underwriters in connection with, the NASD's review and approval of the Underwriters' participation in the offering and distribution of the Common Shares, (viii) the fees and expenses associated with [listing] the Common Shares on the Nasdaq National Market, and (ix) all other fees, costs and expenses referred to in Item 13 of Part II of the Registration Statement. Except as provided in this Section 4, Section 6, Section 8 and Section 9 hereof, the Underwriters shall pay their own expenses, including the fees and disbursements of their counsel.

The Selling Stockholders further agree with each Underwriter to pay (directly or by reimbursement) all fees and expenses incident to the performance of their obligations under this Agreement which are not otherwise specifically provided for herein, including but not limited to (i) fees and expenses of counsel and other advisors for such Selling Stockholders, (ii) fees and expenses of the Custodian and (iii) expenses and taxes incident to the sale and delivery of the Common Shares to be sold by such Selling Stockholders to the Underwriters hereunder (which taxes, if any, may be deducted by the Custodian under the provisions of Section 2 of this Agreement).

This Section 4 shall not affect or modify any separate, valid agreement relating to the allocation of payment of expenses between the Company, on the one hand, and the Selling Stockholders, on the other hand.

Section 5. Conditions of the Obligations of the Underwriters. The obligations of the several Underwriters to purchase and pay for the Common Shares as provided herein on the First Closing Date and, with respect to the Optional Common Shares, the Second Closing Date, shall be subject to the accuracy of the representations and warranties on the part of the Company and the Selling Stockholders set forth in Sections 1A and 1B hereof as of the date hereof and as of the First Closing Date as though then made and, with respect to the Optional Common Shares, as of the Second Closing Date as though then made, to the timely performance by the Company and the Selling Stockholders of their covenants and other obligations hereunder, and to each of the following additional conditions:

(a) Accountants' Comfort Letter. On the date hereof, the Representatives shall have received from PricewaterhouseCoopers LLP, independent public or certified public accountants for the Company, a letter dated the date hereof addressed to the Underwriters, in form and substance satisfactory to the Representatives, containing statements and information of the type ordinarily included in accountant's "comfort letters" to underwriters, delivered according to Statement of Auditing Standards No. 72 (or any successor bulletin), with respect to the audited and unaudited financial statements and certain financial information contained in the Registration Statement and the Prospectus (and the Representatives shall have received an additional [___] conformed copies of such accountants' letter for each of the several Underwriters).

(b) Compliance with Registration Requirements; No Stop Order; No Objection from NASD. For the period from and after effectiveness of this Agreement and prior to the First Closing Date and, with respect to the Optional Common Shares, the Second Closing Date:

(i) the Company shall have filed the Prospectus with the Commission (including the information required by Rule 430A under the Securities Act) in the manner and within the time period required by Rule 424(b) under the Securities Act; or the Company shall have filed a post-effective amendment to the Registration Statement containing the information required by such Rule 430A, and such post-effective amendment shall have become effective; or, if the Company elected to rely upon Rule 434 under the Securities Act and obtained the Representatives' consent thereto, the Company shall have filed a Term Sheet with the Commission in the manner and within the time period required by such Rule 424(b);

(ii) no stop order suspending the effectiveness of the Registration Statement, any Rule 462(b) Registration Statement, or any post-effective amendment to the Registration Statement, shall be in effect and no proceedings for such purpose shall have been instituted or threatened by the Commission; and

(iii) the NASD shall have raised no objection to the fairness and reasonableness of the underwriting terms and arrangements.

(c) No Material Adverse Change or Ratings Agency Change. For the period from and after the date of this Agreement and prior to the First Closing Date and, with respect to the Optional Common Shares, the Second Closing Date:

(i) in the judgment of the Representatives there shall not have occurred any Material Adverse Change; and

(ii) there shall not have occurred any downgrading, nor shall any notice have been given of any intended or potential downgrading or of any review for a possible change that does not indicate the direction of the possible change, in the rating accorded any securities of the Company or any of its subsidiaries by any "nationally recognized statistical rating organization" as such term is defined for purposes of Rule 436(g)(2) under the Securities Act.

(d) Opinion of Counsel for the Company. On each of the First Closing Date and the Second Closing Date the Representatives shall have received the favorable opinion of Hale and Dorr, counsel for the Company, dated as of such Closing Date, reasonably satisfactory to the Representatives with respect to the matters set forth in Exhibit A-1 attached hereto. On each of the First Closing Date and the Second Closing Date the Representatives shall have received the favorable opinion of Hill & Barlow, counsel for the Company, dated as of such Closing Date, reasonably satisfactory to the Representatives with respect to the matters set forth in Exhibit A-2 attached hereto. In each case, the Representatives shall have received an additional [___] conformed copies of such counsel's legal opinions for each of the several Underwriters.

(e) Opinion of Counsel for the Underwriters. On each of the First Closing Date and the Second Closing Date the Representatives shall have received the favorable opinion of Ropes & Gray, counsel for the Underwriters, dated as of such Closing Date, with respect to the matters set forth in paragraphs (i), (viii), (ix) and the next-to-last paragraph of Exhibit A-1 (and the Representatives shall have received an additional [___] conformed copies of such counsel's legal opinion for each of the several Underwriters).

(f) Officers' Certificate. On each of the First Closing Date and the Second Closing Date the Representatives shall have received a written certificate executed by the Chairman of the Board, Chief Executive Officer or President of the Company and the Chief Financial Officer or Chief Accounting Officer of the Company, dated as of such Closing Date, to the effect set forth in subsections (b)(ii) and (c)(ii) of this Section 5, and further to the effect that:

(i) for the period from and after the date of this Agreement and prior to such Closing Date, there has not occurred any Material Adverse Change;

(ii) the representations, warranties and covenants of the Company set forth in Section 1A of this Agreement are true and correct with the same force and effect as though expressly made on and as of such Closing Date; and

(iii) the Company has complied with all the agreements and satisfied all the conditions on its part to be performed or satisfied at or prior to such Closing Date.

(g) Bring-down Comfort Letter. On each of the First Closing Date and the Second Closing Date the Representatives shall have received from PricewaterhouseCoopers LLP, independent public or certified public accountants for the Company, a letter dated such date, in form and substance satisfactory to the Representatives, to the effect that they reaffirm the statements made in the letter furnished by them pursuant to subsection (a) of this Section 5, except that the specified date referred to therein for the carrying out of procedures shall be no more than three business days prior to the First Closing Date or Second Closing Date, as the case may be (and the Representatives shall have received an additional [___] conformed copies of such accountants' letter for each of the several Underwriters).

(h) Lock-Up Agreement from Stockholders and Optionholders of the Company. On the date hereof, the Company shall have furnished to the Representatives an agreement in the form of Exhibit B hereto from those stockholders and optionholders of the Company as agreed among the Company and the Representatives, and such agreement shall be in full force and effect on each of the First Closing Date and the Second Closing Date.

(i) Opinion of Counsel for the Selling Stockholders. On the First Closing Date the Representatives shall have received the favorable opinion of [___], counsel for the Selling Stockholders, dated as of such Closing Date, the form of which is attached as Exhibit A-3 (and the Representatives shall have received an additional [___] conformed copies of such counsel's legal opinion for each of the several Underwriters).

(j) Selling Stockholders' Certificate. On the First Closing Date the Representatives shall received a written certificate executed by each Selling Stockholder, dated as of such Closing Date, to the effect that:

(i) the representations, warranties and covenants of such Selling Stockholder set forth in Section 1B of this Agreement are true and correct with the same force and effect as though expressly made by such Selling Stockholder on and as of such Closing Date; and

(ii) such Selling Stockholder has complied with all the agreements and satisfied all the conditions on its part to be performed or satisfied at or prior to such Closing Date.

(k) Selling Stockholders' Documents. On the date hereof, the Company and the Selling Stockholders shall have furnished for review by the Representatives copies of the Powers of Attorney and Custody Agreements executed by each of the Selling Stockholders and such further information, certificates and documents as the Representatives may reasonably request.

(l) Additional Documents. On or before each of the First Closing Date and the Second Closing Date, the Representatives and counsel for the Underwriters shall have received such information, documents and opinions as they may reasonably require for the purposes of enabling them to pass upon the issuance and sale of the Common Shares as contemplated herein, or in order to evidence the accuracy of any of the representations and warranties, or the satisfaction of any of the conditions or agreements, herein contained.

If any condition specified in this Section 5 is not satisfied when and as required to be satisfied, this Agreement may be terminated by the Representatives by notice to the Company and the Selling Stockholders at any time on or prior to the First Closing Date and, with respect to the Optional Common Shares, at any time prior to the Second Closing Date, which termination shall be without liability on the part of any party to any other party, except that Section 4, Section 6, Section 8 and Section 9 shall at all times be effective and shall survive such termination.

Section 6. Reimbursement of Underwriters' Expenses. If this Agreement is terminated by the Representatives pursuant to Section 5, Section 7, or Section 11 (iv) or 11(v), or if the sale to the Underwriters of the Common Shares on the First Closing Date is not consummated because of any refusal, inability or failure on the part of the Company or the Selling Stockholders to perform any agreement herein or to comply with any provision hereof, the Company agrees to reimburse the Representatives and the other Underwriters (or such Underwriters as have terminated this Agreement with respect to themselves), severally, upon demand for all out-of-pocket expenses that shall have been reasonably incurred by the Representatives and the Underwriters in connection with the proposed purchase and the offering and sale of the Common Shares, including but not limited to fees and disbursements of counsel, printing expenses, travel expenses, postage, facsimile and telephone charges.

Section 7. Effectiveness of this Agreement.

This Agreement shall not become effective until the later of (i) the execution of this Agreement by the parties hereto and (ii) notification by the Commission to the Company or the Representatives of the effectiveness of the Registration Statement under the Securities Act.

Prior to such effectiveness, this Agreement may be terminated by any party by notice to each of the other parties hereto, and any such termination shall be without liability on the part of (a) the Company or the Selling Stockholders to any Underwriter, except that the Company and the Selling Stockholders shall be obligated to reimburse the expenses of the Representatives and the Underwriters pursuant to Sections 4 and 6 hereof, (b) of any Underwriter to the Company or the Selling Stockholders, or (c) of any party hereto to any other party except that the provisions of Section 8 and Section 9 shall at all times be effective and shall survive such termination.

Section 8. Indemnification.

(a) Indemnification of the Underwriters. (1) The Company agrees to indemnify and hold harmless each Underwriter, its officers and employees, and each person, if any, who controls any Underwriter within the meaning of the Securities Act and the Exchange Act against any loss, claim, damage, liability or expense, as incurred, to which such Underwriter or such controlling person may become subject, under the Securities Act, the Exchange Act or other federal or state statutory law or regulation, or at common law or otherwise (including in settlement of any litigation, if such settlement is effected with the written consent of the Company), insofar as such loss, claim, damage, liability or expense (or actions in respect thereof as contemplated below) arises out of or is based (i) upon any untrue statement or alleged untrue statement of a material fact contained in the Registration Statement, or any amendment thereto, including any information deemed to be a part thereof pursuant to Rule 430A or Rule 434 under the Securities Act, or the omission or alleged omission therefrom of a material fact required to be stated therein or necessary to make the statements therein not misleading; or (ii) upon any untrue statement or alleged untrue statement of a material fact contained in any preliminary prospectus or the Prospectus (or any amendment or supplement thereto), or the omission or alleged omission therefrom of a material fact necessary in order to make the statements therein, in the light of the circumstances under which they were made, not misleading; or (iii) in whole or in part upon any inaccuracy in the representations and warranties of the Company or the Selling Stockholders contained herein; or (iv) in whole or in part upon any failure of the Company or the Selling Stockholders to perform their obligations hereunder or under law; or (v) any act or failure to act or any alleged act or failure to act by any Underwriter in connection with, or relating in any manner to, the Common Stock or the offering contemplated hereby, and which is included as part of or referred to in any loss, claim, damage, liability or action arising out of or based upon any matter covered by clause (i) or (ii) above, provided that the Company and the Selling Stockholders shall not be liable under this clause (v) to the extent that a court of competent jurisdiction shall have determined by a final judgment that such loss, claim, damage, liability or action resulted directly from any such acts or failures to act undertaken or omitted to be taken by such Underwriter through its bad faith or willful misconduct; and to reimburse each Underwriter and each such controlling person for any and all expenses (including the fees and disbursements of counsel chosen by NMS) as such expenses are reasonably incurred by such Underwriter or such controlling person in connection with investigating, defending, settling, compromising or paying any such loss, claim, damage, liability, expense or action; provided, however, that the foregoing indemnity agreement shall not apply to any loss, claim, damage, liability or expense to the extent, but only to the extent, arising out of or based upon any untrue statement or alleged untrue statement or omission or alleged omission made in reliance upon and in conformity with written information furnished to the Company by the Representatives expressly for use in the Registration Statement, any preliminary prospectus or the Prospectus (or any amendment or supplement thereto); and provided, further, that with respect to any preliminary prospectus, the foregoing indemnity agreement shall not inure to the benefit of any Underwriter from whom the person asserting any loss, claim, damage, liability or expense purchased Common Shares, or any person controlling such Underwriter, if copies of the Prospectus were timely delivered to the Underwriter pursuant to Section 2 and a copy of the Prospectus (as then amended or supplemented if the Company shall have furnished any amendments or supplements thereto) was not sent or given by or on behalf of such Underwriter to such person, if required by law so to have been delivered, at or prior to the written confirmation of the sale of the Common Shares to such person, and if the Prospectus (as so amended or supplemented) would have cured the defect giving rise to such loss, claim, damage, liability or expense. The indemnity agreement set forth in this Section 8(a) shall be in addition to any liabilities that the Company and the Selling Stockholders may otherwise have.

(2) Each of the Selling Stockholders, severally and not jointly, agrees to indemnify and hold harmless each Underwriter, its officers and employees, and each person, if any, who controls any Underwriter within the meaning of the Securities Act and the Exchange Act against any loss, claim, damage, liability or expense, as incurred, to which such Underwriter or such controlling person may become subject, under the Securities Act, the Exchange Act or other federal or state statutory law or regulation, or at common law or otherwise (including in settlement of any litigation, if such settlement is effected with the written consent of the Company), insofar as such loss, claim, damage, liability or expense (or actions in respect thereof as contemplated below) arises out of or is based (i) upon any untrue statement or alleged untrue statement of a material fact contained in the Registration Statement, or any amendment thereto, including any information deemed to be a part thereof pursuant to Rule 430A or Rule 434 under the Securities Act, or the omission or alleged omission therefrom of a material fact required to be stated therein or necessary to make the statements therein not misleading but only to the extent that such untrue statement or alleged untrue statement or omission or alleged omission was made in reliance upon and in conformity with information furnished to the Company or the Underwriters by such Selling Stockholder, directly or indirectly through such Selling Stockholder's representatives, for use in the preparation of the Registration Statement or such amendment or supplement; or (ii) upon any untrue statement or alleged untrue statement of a material fact contained in any preliminary prospectus or the Prospectus (or any amendment or supplement thereto), or the omission or alleged omission therefrom of a material fact necessary in order to make the statements therein, in the light of the circumstances under which they were made, not misleading but only to the extent that such untrue statement or alleged untrue statement or omission or alleged omission was made in reliance upon and in conformity with information furnished to the Company or the Underwriters by such Selling Stockholder, directly or through such Selling Stockholders representatives for use in the preparation of such Prospectus or such amendment or supplement; or (iii) in whole or in part upon any inaccuracy in the representations and warranties of such Selling Stockholder contained herein; or (iv) in whole or in part upon any failure of

such Selling Stockholder to perform its obligations hereunder or under law; or (v) any act or failure to act or any alleged act or failure to act by any Underwriter in connection with, or relating in any manner to, the Common Stock or the offering contemplated hereby, and which is included as part of or referred to in any loss, claim, damage, liability or action arising out of or based upon any matter covered by clause (i) or (ii) above, provided that such Selling Stockholder shall not be liable under this clause (v) to the extent that a court of competent jurisdiction shall have determined by a final judgment that such loss, claim, damage, liability or action resulted directly from any such acts or failures to act undertaken or omitted to be taken by such Underwriter through its bad faith or willful misconduct; and to reimburse each Underwriter and each such controlling person for any and all expenses (including the fees and disbursements of counsel chosen my NMS) as such expenses are reasonably incurred by such Underwriter or such controlling person in connection with investigating, defending, settling, compromising or paying any such loss, claim, damage, liability, expense or action; provided, however, that the foregoing indemnity agreement shall not apply to any loss, claim, damage, liability or expense to the extent, but only to the extent, arising out of or based upon any untrue statement or alleged untrue statement or omission or alleged omission made in reliance upon and in conformity with written information furnished to the Company by the Representatives expressly for use in the Registration Statement, any preliminary prospectus or the Prospectus (or any amendment or supplement thereto); and provided, further, that with respect to any preliminary prospectus, the foregoing indemnity agreement shall not inure to the benefit of any Underwriter from whom the person asserting any loss, claim, damage, liability or expense purchased Common Shares, or any person controlling such Underwriter, if copies of the Prospectus were timely delivered to the Underwriter pursuant to Section 2 and a copy of the Prospectus (as then amended or supplemented if the Company shall have furnished any amendments or supplements thereto) was not sent or given by or on behalf of such Underwriter to such person, if required by law so to have been delivered, at or prior to the written confirmation of the sale of the Common Shares to such person, and if the Prospectus (as so amended or supplemented) would have cured the defect giving rise to such loss, claim, damage, liability or expense. The indemnity agreement set forth in this Section 8(a) shall be in addition to any liabilities that the Selling Stockholders may otherwise have.

(b) Indemnification of the Company, its Directors and Officers. Each Underwriter agrees, severally and not jointly, to indemnify and hold harmless the Company, each of its directors, each of its officers who signed the Registration Statement, the Selling Stockholders and each person, if any, who controls the Company or a selling stockholder within the meaning of the Securities Act or the Exchange Act, against any loss, claim, damage, liability or expense, as incurred, to which the Company, or any such director, officer, Selling Stockholder or controlling person may become subject, under the Securities Act, the Exchange Act, or other federal or state statutory law or regulation, or at common law or otherwise (including in settlement of any litigation, if such settlement is effected with the written consent of such Underwriter), insofar as such loss, claim, damage, liability or expense (or actions in respect thereof as contemplated below) arises out of or is based upon any untrue or alleged untrue statement of a material fact contained in the Registration Statement, any preliminary prospectus or the Prospectus (or any amendment or supplement thereto), or arises out of or is based upon the omission or alleged omission to state therein a material fact required to be stated therein or necessary to make the statements therein not misleading, in each case to the extent, but only to the extent, that such untrue statement or alleged untrue statement or omission or alleged omission was made in the Registration Statement, any preliminary prospectus, the Prospectus (or any amendment or supplement thereto), in reliance upon and in conformity with written information furnished to the Company by the Representatives expressly for use therein; and to reimburse the Company, or any such director, officer, Selling Stockholder or controlling person for any legal and other expense reasonably incurred by the Company, or any such director, officer or controlling person in connection with investigating, defending, settling, compromising or paying any such loss, claim, damage, liability, expense or action. Each of the Company and the Selling Stockholders hereby acknowledges that the only information that the Underwriters have furnished to the Company expressly for use in the Registration Statement, any preliminary prospectus or the Prospectus (or any amendment or supplement thereto) are the statements set forth under the caption "Underwriting" in the Prospectus; and the Underwriters confirm that such statements are correct. The indemnity agreement set forth in this Section 8(b) shall be in addition to any liabilities that each Underwriter may otherwise have.

(c) Notifications and Other Indemnification Procedures. Promptly after receipt by an indemnified party under this Section 8 of notice of the commencement of any action, such indemnified party will, if a claim in respect thereof is to be made against an indemnifying party under this Section 8, notify the indemnifying party in writing of the commencement thereof, but the omission so to notify the indemnifying party will not relieve it from any liability which it may have to any indemnified party for contribution or otherwise than under the indemnity agreement contained in this Section 8 or to the extent it is not prejudiced as a proximate result of such failure. In case any such action is brought against any indemnified party and such indemnified party seeks or intends to seek indemnity from an indemnifying party, the indemnifying party will be entitled to participate in, and, to the extent that it shall elect, jointly with all other indemnifying parties similarly notified, by written notice delivered to the indemnified party promptly after receiving the aforesaid notice from such indemnified party, to assume the defense thereof with counsel reasonably satisfactory to such indemnified party; provided, however, if the defendants in any such action include both the indemnified party and the indemnifying party and the indemnified party shall have reasonably concluded that a conflict may arise between the positions of the indemnifying party and the indemnified party in conducting the defense of any such action or that there may be legal defenses available to it and/or other indemnified parties which are different from or additional to those available to the indemnifying party, the indemnified party or parties shall have the right to select separate counsel to assume such legal defenses and to otherwise participate in the defense of such action on behalf of such indemnified party or parties. Upon receipt of notice from the indemnifying party to such indemnified party of such indemnifying party's election so to assume the defense of such action and approval by the indemnified party of counsel, the indemnifying party will not be liable to such indemnified party under this Section 8 for any legal or other expenses subsequently incurred by such indemnified party in connection with the defense thereof unless (i) the indemnified party shall have employed separate counsel in accordance with the proviso in the preceding sentence (it being understood, however, that the indemnifying party shall not be liable for the expenses of more than one separate counsel (together with local counsel), approved by the indemnifying party (NMS in the case of Section 8(b) and Section 9), representing the indemnified parties who are parties to such action) or (ii) the indemnifying party shall not have employed counsel satisfactory to the indemnified party to represent the indemnified party within a reasonable time after notice of commencement of the action, in each of which cases the fees and expenses of counsel shall be at the expense of the indemnifying party.

(d) Settlements. The indemnifying party under this Section 8 shall not be liable for any settlement of any proceeding effected without its written consent, but if settled with such consent or if there be a final judgment for the plaintiff, the indemnifying party agrees to indemnify the indemnified party against any loss, claim, damage, liability or expense by reason of such settlement or judgment. No indemnifying party shall, without the prior written consent of the indemnified party, effect any settlement, compromise or consent to the entry of judgment in any pending or threatened action, suit or proceeding in respect of which any indemnified party is or could have been a party and indemnity was or could have been sought hereunder by such indemnified party, unless such settlement, compromise or consent includes an unconditional release of such indemnified party from all liability on claims that are the subject matter of such action, suit or proceeding.

(e) Limitation on Liability of Selling Stockholders. The liability of each Selling Stockholder under the representations, warranties and agreements contained herein and under the indemnity and contribution agreements contained in the provisions of this Section 8 shall be limited to an amount equal to the aggregate initial public offering price of all Shares sold by such Selling Stockholder to the Underwriters minus the amount of the underwriting discount paid thereon to the Underwriters by such Selling Stockholder. The Company and such Selling Stockholders may agree, as among themselves and without limiting the rights of the Underwriters under this Agreement, as to the respective amount of such liability for which they each shall be responsible.

Section 9. Contribution.

If the indemnification provided for in Section 8 is for any reason held to be unavailable to or otherwise insufficient to hold harmless an indemnified party in respect of any losses, claims, damages, liabilities or expenses referred to therein, then each indemnifying party shall contribute to the aggregate amount paid or payable by such indemnified party, as incurred, as a result of any losses, claims, damages, liabilities or expenses referred to therein (i) in such proportion as is appropriate to reflect the relative benefits received by the Company and the Selling Stockholders, on the one hand, and the Underwriters, on the other hand, from the offering of the Common Shares pursuant to this Agreement or (ii) if the allocation provided by clause (i) above is not permitted by applicable law, in such proportion as is appropriate to reflect not only the relative benefits referred to in clause (i) above but also the relative fault of the Company and the Selling Stockholders, on the one hand, and the Underwriters, on the other hand, in connection with the statements or omissions or inaccuracies in the representations and warranties herein which resulted in such losses, claims, damages, liabilities or expenses, as well as any other relevant equitable considerations. The relative benefits received by the Company and the Selling Stockholders, on the one hand, and the Underwriters, on the other hand, in connection with the offering of the Common Shares pursuant to this Agreement shall be deemed to be in the same respective proportions as the total net proceeds from the offering of the Common Shares pursuant to this Agreement (before deducting expenses) received by the Company and the Selling Stockholders, and the total underwriting discount received by the Underwriters, in each case as set forth on the front cover page of the Prospectus (or, if Rule 434 under the Securities Act is used, the corresponding location on the Term Sheet) bear to the aggregate initial public offering price of the Common Shares as set forth on such cover. The relative fault of the Company and the Selling Stockholders, on the one hand, and the Underwriters, on the other hand, shall be determined by reference to, among other things, whether any such untrue or alleged untrue statement of a material fact or omission or alleged omission to state a material fact or any such inaccurate or alleged inaccurate representation or warranty relates to information supplied by the Company and the Selling Stockholders, on the one hand, or the Underwriters, on the other hand, and the parties' relative intent, knowledge, access to information and opportunity to correct or prevent such statement or omission.

The amount paid or payable by a party as a result of the losses, claims, damages, liabilities and expenses referred to above shall be deemed to include, subject to the limitations set forth in Section 8(c), any legal or other fees or expenses reasonably incurred by such party in connection with investigating or defending any action or claim. The provisions set forth in Section 8(c) with respect to notice of commencement of any action shall apply if a claim for contribution is to be made under this Section 9; provided, however, that no additional notice shall be required with respect to any action for which notice has been given under Section 8(c) for purposes of indemnification.

The Company, the Selling Stockholders and the Underwriters agree that it would not be just and equitable if contribution pursuant to this Section 9 were determined by pro rata allocation (even if the Underwriters were treated as one entity for such purpose) or by any other method of allocation which does not take account of the equitable considerations referred to in this Section 9.

Notwithstanding the provisions of this Section 9, no Underwriter shall be required to contribute any amount in excess of the underwriting commissions received by such Underwriter in connection with the Common Shares underwritten by it and distributed to the public. No person guilty of fraudulent misrepresentation (within the meaning of Section 11(f) of the Securities Act) shall be entitled to contribution from any person who was not guilty of such fraudulent misrepresentation. The Underwriters' obligations to contribute pursuant to this Section 9 are several, and not joint, in proportion to their respective underwriting commitments as set forth opposite their names in Schedule A. For purposes of this Section 9, each officer and employee of an Underwriter and each person, if any, who controls an Underwriter within the meaning of the Securities Act and the Exchange Act shall have the same rights to contribution as such Underwriter, and each director of the Company, each officer of the Company who signed the Registration Statement, each selling stockholder and each person, if any, who controls the Company or a selling stockholder with the meaning of the Securities Act and the Exchange Act shall have the same rights to contribution as the Company.

Section 10. Default of One or More of the Several Underwriters. If, on the First Closing Date or the Second Closing Date, as the case may be, any one or more of the several Underwriters shall fail or refuse to purchase Common Shares that it or they have agreed to purchase hereunder on such date, and the aggregate number of Common Shares which such defaulting Underwriter or Underwriters agreed but failed or refused to purchase does not exceed 10% of the aggregate number of the Common Shares to be purchased on such date, the other Underwriters shall be obligated, severally, in the proportions that the number of Firm Common Shares set forth opposite their respective names on Schedule A bears to the aggregate number of Firm Common Shares set forth opposite the names of all such non-defaulting

Underwriters, or in such other proportions as may be specified by the Representatives with the consent of the non-defaulting Underwriters, to purchase the Common Shares which such defaulting Underwriter or Underwriters agreed but failed or refused to purchase on such date. If, on the First Closing Date or the Second Closing Date, as the case may be, any one or more of the Underwriters shall fail or refuse to purchase Common Shares and the aggregate number of Common Shares with respect to which such default occurs exceeds 10% of the aggregate number of Common Shares to be purchased on such date, and arrangements satisfactory to the Representatives and the Company for the purchase of such Common Shares are not made within 48 hours after such default, this Agreement shall terminate without liability of any party to any other party except that the provisions of Section 4, Section 8 and Section 9 shall at all times be effective and shall survive such termination. In any such case either the Representatives or the Company shall have the right to postpone the First Closing Date or the Second Closing Date, as the case may be, but in no event for longer than seven days in order that the required changes, if any, to the Registration Statement and the Prospectus or any other documents or arrangements may be effected.

As used in this Agreement, the term "Underwriter" shall be deemed to include any person substituted for a defaulting Underwriter under this Section 10. Any action taken under this Section 10 shall not relieve any defaulting Underwriter from liability in respect of any default of such Underwriter under this Agreement.

Section 11. Termination of this Agreement. Prior to the First Closing Date this Agreement may be terminated by the Representatives by notice given to the Company if at any time (i) trading or quotation in any of the Company's securities shall have been suspended or limited by the Commission or by the Nasdaq Stock Market, or trading in securities generally on either the Nasdaq Stock Market or the New York Stock Exchange shall have been suspended or limited, or minimum or maximum prices shall have been generally established on any of such stock exchanges by the Commission or the NASD; (ii) a general banking moratorium shall have been declared by any of federal, New York or California authorities; (iii) there shall have occurred any outbreak or escalation of national or international hostilities or any crisis or calamity, or any change in the United States or international financial markets, or any substantial change or development involving a prospective substantial change in United States' or international political, financial or economic conditions, as in the judgment of the Representatives is material and adverse and makes it impracticable to market the Common Shares in the manner and on the terms described in the Prospectus or to enforce contracts for the sale of securities; (iv) in the judgment of the Representatives there shall have occurred any Material Adverse Change; or (v) the Company shall have sustained a loss by strike, fire, flood, earthquake, accident or other calamity of such character as in the reasonable judgment of the Representatives may interfere materially with the conduct of the business and operations of the Company regardless of whether or not such loss shall have been insured. Any termination pursuant to this Section 11 shall be without liability on the part of (a) the Company or the Selling Stockholders to any Underwriter, except that the Company and the Selling Stockholders shall be obligated to reimburse the expenses of the Representatives and the Underwriters pursuant to Sections 4 and 6 hereof, (b) any Underwriter to the Company or the Selling Stockholders, or (c) of any party hereto to any other party except that the provisions of Section 8 and Section 9 shall at all times be effective and shall survive such termination.

Section 12. Representations and Indemnities to Survive Delivery. The respective indemnities, agreements, representations, warranties and other statements of the Company, of its officers, of the Selling Stockholders and of the several Underwriters set forth in or made pursuant to this Agreement will remain in full force and effect, regardless of any investigation made by or on behalf of any Underwriter or the Company or any of its or their partners, officers or directors or any controlling person, or the

Selling Stockholders, as the case may be, and will survive delivery of and payment for the Common Shares sold hereunder and any termination of this Agreement.

Section 13. All communications hereunder shall be in writing and shall be mailed, hand delivered or telecopied and confirmed to the parties hereto as follows:

If to the Representatives:

NationsBanc Montgomery Securities, Inc.
600 Montgomery Street
San Francisco, California 94111
Facsimile: 415-249-5558
Attention: Richard A. Smith

with copies to:

NationsBanc Montgomery Securities, Inc.
600 Montgomery Street
San Francisco, California 94111
Facsimile: (415) 249-5553
Attention: David A. Baylor, Esq.

and

Ropes & Gray
One International Place
Boston, MA 02110
Facsimile: (617) 951-7050
Attention: David C. Chapin

If to the Company:

MKS Instruments, Inc.
Six Shattuck Road
Andover, MA 01810
Facsimile: (978) 975-2350
Attention: President

with a copy to:

Hale and Dorr
60 State Street
Boston, MA 02109

Facsimile: (617) 526-5000
Attention: Mark G. Borden

If to the Selling Stockholders:

[Custodian]
[address]
Facsimile: [_________________]
Attention: [__________________]

Section 14. Successors. This Agreement will inure to the benefit of and be binding upon the parties hereto, including any substitute Underwriters pursuant to Section 10 hereof, and to the benefit of the employees, officers and directors and controlling persons referred to in Section 8 and Section 9, and in each case their respective successors, and no other person will have any right or obligation hereunder. The term "successors" shall not include any purchaser of the Common Shares as such from any of the Underwriters merely by reason of such purchase.

Section 15. Partial Unenforceability. The invalidity or unenforceability of any Section, paragraph or provision of this Agreement shall not affect the validity or enforceability of any other Section, paragraph or provision hereof. If any Section, paragraph or provision of this Agreement is for any reason determined to be invalid or unenforceable, there shall be deemed to be made such minor changes (and only such minor changes) as are necessary to make it valid and enforceable.

Section 16. (a) Governing Law Provisions. THIS AGREEMENT SHALL BE GOVERNED BY AND CONSTRUED IN ACCORDANCE WITH THE INTERNAL LAWS OF THE STATE OF NEW YORK APPLICABLE TO AGREEMENTS MADE AND TO BE PERFORMED IN SUCH STATE.

Section 17. Failure of One or More of the Selling Stockholders to Sell and Deliver Common Shares. If one or more of the Selling Stockholders shall fail to sell and deliver to the Underwriters the Common Shares to be sold and delivered by such Selling Stockholders at the First Closing Date pursuant to this Agreement, then the Underwriters may at their option, by written notice from the Representatives to the Company and the Selling Stockholders, either (i) terminate this Agreement without any liability on the part of any Underwriter or, except as provided in Sections 4, 6, 8 and 9 hereof, the Company or the Selling Stockholders, or (ii) purchase the shares which the Company and other Selling Stockholders have agreed to sell and deliver in accordance with the terms hereof. If one or more of the Selling Stockholders shall fail to sell and deliver to the Underwriters the Common Shares to be sold and delivered by such Selling Stockholders pursuant to this Agreement at the First Closing Date, then the Underwriters shall have the right, by written notice from the Representatives to the Company and the Selling Stockholders, to postpone the First Closing Date, but in no event for longer than seven days in order that the required changes, if any, to the Registration Statement and the Prospectus or any other documents or arrangements may be effected.

Section 18. General Provisions. This Agreement constitutes the entire agreement of the parties to this Agreement and supersedes all prior written or oral and all contemporaneous oral agreements, understandings and negotiations with respect to the subject matter hereof. This Agreement may be executed in two or more counterparts, each one of which shall be an original, with the same effect as if the signatures thereto and hereto were upon the same instrument. This Agreement may not be amended or modified unless in writing by all of the parties hereto, and no condition herein (express or implied) may be waived unless waived in writing by each party whom the condition is meant to benefit. The Table of Contents and the Section headings herein are for the convenience of the parties only and shall not affect the construction or interpretation of this Agreement.

Each of the parties hereto acknowledges that it is a sophisticated business person who was adequately represented by counsel during negotiations regarding the provisions hereof, including, without limitation, the indemnification provisions of Section 8 and the contribution provisions of Section 9, and is fully informed regarding said provisions. Each of the parties hereto further acknowledges that the provisions of Sections 8 and 9 hereto fairly allocate the risks in light of the ability of the parties to investigate the Company, its affairs and its business in order to assure that adequate disclosure has been made in the Registration Statement, any preliminary prospectus and the Prospectus (and any amendments and supplements thereto), as required by the Securities Act and the Exchange Act.

If the foregoing is in accordance with your understanding of our agreement, kindly sign and return to the Company the enclosed copies hereof, whereupon this instrument, along with all counterparts hereof, shall become a binding agreement in accordance with its terms.

Very truly yours,

MKS INSTRUMENTS, INC.

By:__________________________
President

[Selling Stockholders]

By:__________________________
Attorney-in Fact

The foregoing Underwriting Agreement is hereby confirmed and accepted by the Representatives in San Francisco, California as of the date first above written.

NATIONSBANC MONTGOMERY SECURITIES LLC
DONALDSON, LUFKIN & JENRETTE SECURITIES CORPORATION
LEHMAN BROTHERS INC.

Acting as Representatives of the
several Underwriters named in
the attached Schedule A.

By NATIONSBANC MONTGOMERY SECURITIES LLC

By:_______________________
Title

SCHEDULE A

Underwriters	Number of Firm Common Shares to be Purchased
NationsBanc Montgomery Securities LLC	
Donaldson, Lufkin & Jenrette Securities Corporation	
Lehman Brothers Inc.	

SCHEDULE B

	Number of Firm Common Shares to be Sold	Number of Optional Common Shares to be Sold (if Maximum Option is Exercised)
The Company	6,000,000	975,000
Claire R. Bertucci CBS Retained Annuity Trust of 1998	50,000	0
Claire R. Bertucci JCB Retained Annuity Trust of 1998	50,000	0
John R. Bertucci CBS Retained Annuity Trust of 1998	50,000	0
John R. Bertucci Family Retained Annuity Trust of 1998	50,000	0
John R. Bertucci JCB Retained Annuity Trust of 1998	50,000	0
Claire R. Bertucci CBS Retained Annuity Trust of 1997	50,000	0
Claire R. Bertucci JCB Retained Annuity Trust of 1997	50,000	0
John R. Bertucci CBS Retained Annuity Trust of 1997	50,000	0
John R. Bertucci Family Retained Annuity Trust of 1997	50,000	0
John R. Bertucci JCB Retained Annuity Trust of 1997	50,000	0

EXHIBIT A-1

The final opinion in draft form should be attached as Exhibit A-1 at the time this Agreement is executed.

Opinion of counsel for the Company to be delivered pursuant to Section 5(d) of the Underwriting Agreement.

References to the Prospectus in this Exhibit A include any supplements thereto at the Closing Date.

(i) The Company is validly existing as a corporation in good standing under the laws of The Commonwealth of Massachusetts.

(ii) The authorized, issued and outstanding capital stock of the Company (including the Common Stock) conform as to legal matters in all material respects to the descriptions thereof set forth [or incorporated by reference] in the Prospectus. All of the outstanding shares of Common Stock have been duly authorized and validly issued, are fully paid and nonassessable. The form of certificate used to evidence the Common Stock is in due and proper form and complies with all applicable requirements of the charter and by-laws of the Company and The Commonwealth of Massachusetts.

(iii) The Underwriting Agreement has been duly authorized, executed and delivered by the Company.

(iv) The Common Shares to be purchased by the Underwriters from the Company have been duly authorized for issuance and sale pursuant to the Underwriting Agreement and, when issued and delivered by the Company pursuant to the Underwriting Agreement against payment of the consideration set forth therein, will be validly issued, fully paid and nonassessable.

(v) Based upon the advice of the staff of the SEC, each of the Registration Statement and the Rule 462(b) Registration Statement, if any, has been declared effective by the Commission under the Securities Act. To the knowledge of such counsel, (A) no stop order suspending the effectiveness of either of the Registration Statement or the Rule 462(b) Registration Statement, if any, has been issued under the Securities Act and (B) no proceedings for such purpose have been instituted or are pending or have been threatened by the Commission. Any required filing of the Prospectus and any supplement thereto pursuant to Rule 424(b) under the Securities Act has been made in the manner and within the time period required by such Rule 424(b).

(vi) The Registration Statement, including any Rule 462(b) Registration Statement, the Prospectus, and each amendment or supplement to the Registration Statement and the Prospectus, as of their respective effective or issue dates (other than the financial statements and supporting schedules included therein or in exhibits to or excluded from the Registration Statement, as to which no opinion need be rendered) comply as to form in all material respects with the applicable requirements of the Securities Act.

(vii) The Common Shares have been approved for quotation on the Nasdaq National Market.

(viii) The statements (i) in the Prospectus under the caption "Shares Eligible for Future Sale" and (ii) in Item 14 and Item 15 of the Registration Statement, insofar as such statements constitute matters of law or legal conclusions, has been reviewed by such counsel and are correct, in all material respects.

(ix) To the knowledge of such counsel, there are no legal or governmental actions, suits or proceedings pending or overtly threatened which are required to be disclosed in the Registration Statement, other than those disclosed therein.

(x) To the knowledge of such counsel, there are no agreements other than as listed in Exhibit A thereto, required by the Securities Act to be described to in the Registration Statement or to be filed as exhibits thereto other than those described to therein or filed or incorporated by reference as exhibits thereto as is required.

(xi) No consent, approval, authorization or other order of, or registration or filing with, any court or other governmental authority or agency, is required for the Company's execution, delivery and performance of the Underwriting Agreement and The Company's consummation of the transactions contemplated thereby and by the Prospectus, except as required under the Securities Act, applicable state securities or blue sky laws and from the NASD.

(xii) The execution and delivery of the Underwriting Agreement by the Company and the performance by the Company of its obligations thereunder (other than performance by the Company of its obligations under the indemnification and contribution sections of the Underwriting Agreement, as to which no opinion need be rendered) (i) have been duly authorized by all necessary corporate action on the part of the Company; (ii) will not result in any violation of the provisions of the charter or by-laws of the Company or any subsidiary; (iii) will not constitute a breach of, or default under, or result in the creation or imposition of any lien, charge or encumbrance upon any property or assets of the Company pursuant to any of the agreements listed on Exhibit A thereto filed as an exhibit to the Registration Statement; or (iv) to the knowledge of such counsel, will not result in any violation of any United States, Federal or Massachusetts state law, administrative regulation or administrative or court decree applicable to the Company (other than state securities laws).

(xiii) The Company is not, and after receipt of payment for the Common Shares as herein contemplated and the application of the net proceeds therefrom as described in the Prospectus will not be, an "investment company" within the meaning of Investment Company Act.

In addition, such counsel shall state that they have participated in conferences with officers and other representatives of the Company, representatives of the independent public or certified public accountants for the Company and with representatives of the Underwriters at which the contents of the Registration Statement and the Prospectus, and any supplements or amendments thereto, and related matters were discussed and, while the limitations inherent in the independent verification of factual matters and the character of determinations involved in the registration process are such that such counsel is not passing upon and does not assume any responsibility for the accuracy, completeness or fairness of the statements contained in the Registration Statement or the Prospectus (other than as specified above), and any supplements or amendments thereto, subject to and on the basis of the foregoing, no facts have come to their attention which has caused them to believe that either the Registration Statement or any amendments thereto, at the time the Registration Statement or such amendments became effective, contained an untrue statement of a material fact or omitted to state a material fact required to be stated therein or necessary to make the statements therein not misleading or that the Prospectus, as of its date or at the First Closing Date or the Second Closing Date, as the case may be, contained an untrue statement of a material fact or omitted to state a material fact necessary in order to make the statements therein, in the light of the circumstances under which they were made, not misleading (it being understood that such counsel need express no belief as to the financial statements or schedules or notes thereto or other financial or statistical information, or information regarding the Underwriters or the method of distribution of Common Shares included in the Registration Statement or the Prospectus or any amendments or supplements thereto).

In rendering such opinion, such counsel may (A) state that they render no opinion as to matters involving the application of laws of any jurisdiction other than the General Corporation Law statute of the State of Delaware, laws of the Commonwealth of Massachusetts or the federal law of the United States, and (B) rely as to matters of fact, to the extent they deem reasonable, on certificates of responsible officers of the Company and public officials.

EXHIBIT A-2

The final opinion in draft form should be attached as Exhibit A-2 at the time this Agreement is executed.

Opinion of counsel for the Company to be delivered pursuant to Section 5(d) of the Underwriting Agreement.

References to the Prospectus in this Exhibit A include any supplements thereto at the Closing Date.

(xiv) The Company has been duly incorporated.

(xv) The Company has corporate power and authority to own, lease and operate its properties and to conduct its business as described in the Prospectus and to enter into and perform its obligations under the Underwriting Agreement.

(xvi) The Company is duly qualified as a foreign corporation to transact business and is in good standing in each United States jurisdiction in which such qualification is required by reason of the ownership or leasing of property, except for such jurisdictions where the failure to so qualify or to be in good standing would not, individually or in the aggregate, result in a Material Adverse Change.

(xvii) Each significant subsidiary incorporated (as defined in Rule 405 under the Securities Act) in the United States has been duly incorporated and is validly existing as a corporation in good standing under the laws of the jurisdiction of its incorporation, has corporate power and authority to own, lease and operate its properties and to conduct its business as described in the Prospectus and, to the best knowledge of such counsel, is duly qualified as a foreign corporation to transact business and is in good standing in each United States jurisdiction in which such qualification is required, whether by reason of the ownership or leasing of property , except for such jurisdictions where the failure to so qualify or to be in good standing would not, individually or in the aggregate, result in a Material Adverse Change.

(xviii) All of the issued and outstanding capital stock of each such significant subsidiary incorporated in the United States has been duly authorized and validly issued, is fully paid and non-assessable and is owned by the Company, directly or through subsidiaries, to such counsel's knowledge, free and clear of any security interest, mortgage, pledge, lien, encumbrance or any pending or threatened claim.

(xix) No stockholder of the Company or any other person has any preemptive right, right of first refusal or other similar right to subscribe for or purchase securities of the Company arising (i) by operation of the charter or by-laws of the Company or (ii) to the best knowledge of such counsel, otherwise.

(xx) Except as disclosed in the Prospectus, to the knowledge of such counsel, there are no persons with registration or other similar rights to have any equity or debt securities registered for sale under the Registration Statement or included in the offering contemplated by the Underwriting Agreement, except for such rights as have been duly waived.

(xxi) To the knowledge of such counsel, the Company is not in violation of its charter or by-laws, except for such violations as would not, individually or in the aggregate, result in a Material Adverse Change.

In rendering such opinion, such counsel may rely (A) as to matters involving the application of laws of any jurisdiction other than the General Corporation Law of the State of Delaware, laws of the Commonwealth of Massachusetts or the federal law of the United States, to the extent they deem proper and specified in such opinion, upon the opinion (which shall be dated the First Closing Date or the Second Closing Date, as the case may be, shall be satisfactory in form and substance to the Underwriters, shall expressly state that the Underwriters may rely on such opinion as if it were addressed to them and shall be furnished to the Representatives) of other counsel of good standing whom they believe to be reliable and who are satisfactory to counsel for the Underwriters; provided, however, that such counsel shall further state that they believe that they and the Underwriters are justified in relying upon such opinion of other counsel, and (B) as to matters of fact, to the extent they deem proper, on certificates of responsible officers of the Company and public officials.

EXHIBIT A-3

The final opinion in draft form should be attached as Exhibit A-3 at the time this Agreement is executed.

The opinion of such counsel pursuant to Section 5(i) shall be rendered to the Representatives at the request of the Company and shall so state therein. References to the Prospectus in this Exhibit A-3 include any supplements thereto at the Closing Date.

(i) The Underwriting Agreement has been duly executed and delivered by or on behalf of, and is a valid and binding agreement of, such Selling Stockholder, enforceable in accordance with its terms.

(ii) The execution and delivery by such Selling Stockholder of, and the performance by such Selling Stockholder of its obligations under, the Underwriting Agreement and its Custody Agreement and its Power of Attorney will not contravene or conflict with, result in a breach of, or constitute a default under the trust agreement of such Selling Stockholder, or, to the best of such counsel's knowledge, violate or contravene any provision of applicable law or regulation, or violate, result in a breach of or constitute a default under the terms of any other agreement or instrument to which such Selling Stockholder is a party or by which it is bound, or any judgment, order or decree applicable to such Selling Stockholder of any court, regulatory body, administrative agency, governmental body or arbitrator having jurisdiction over such Selling Stockholder.

(iii) To the knowledge of such counsel, immediately prior to the date hereof, such Selling Stockholder is the sole registered owner of all of the Common Shares which may be sold by such Selling Stockholder under the Underwriting Agreement and has the legal right and power, and all authorizations and approvals required under its trust agreement to enter into the Underwriting Agreement and its Custody Agreement and its Power of Attorney, to sell, transfer and deliver all of the Common Shares which may sold by such Selling Stockholder under the Underwriting Agreement and to comply with its other obligations under the Underwriting Agreement, its Custody Agreement and its Power of Attorney.

(iv) Each of the Custody Agreement and Power of Attorney of such Selling Stockholder has been duly executed and delivered by such Selling Stockholder and is a valid and binding agreement of such Selling Stockholder, enforceable in accordance with its terms.

(v) Assuming that the Underwriters purchase the Common Shares which are sold by such Selling Stockholder pursuant to the Underwriting Agreement for value, in good faith and without notice of any adverse claim within the meaning of Section 8-302 of the Massachusetts Uniform Commercial Code, the delivery of such Common Shares pursuant to the Underwriting Agreement will, to the knowledge of such counsel, pass good and valid title to such Common Shares, free and clear of any security interest, mortgage, pledge, lieu encumbrance or other claim.

(vi) To the best of such counsel's knowledge, no consent, approval, authorization or other order of, or registration or filing with, any court or governmental authority or agency, is required for the consummation by such Selling Stockholder of the transactions contemplated in the Underwriting Agreement, except as required under the Securities Act, applicable state securities or blue sky laws, and from the NASD.

In rendering such opinion, such counsel may rely (A) as to matters involving the application of laws of any jurisdiction other than the General Corporation Law of the State of Delaware, the laws of the Commonwealth of Massachusetts or the federal law of the United States, to the extent they deem proper and specified in such opinion, upon the opinion (which shall be dated the First Closing Date or the Second Closing Date, as the case may be, shall be satisfactory in form and substance to the Underwriters, shall expressly state that the Underwriters may rely on such opinion as if it were addressed to them and shall be furnished to the Representative) of other counsel of good standing whom they believe to be reliable and who are satisfactory to counsel for the Underwriters; provided, however, that such counsel shall further state that they believe that they and the Underwriters are justified in relying upon such opinion of other counsel, and (B) as to matters of fact, to the extent they deem proper, on certificates of the Selling Stockholders and public officials

EXHIBIT B

___________, 1999

NationsBanc Montgomery Securities LLC
Donaldson, Lufkin & Jenrette Securities Corporation
Paine Webber

As Representatives of the Several Underwriters
c/o NationsBanc Montgomery Securities LLC
600 Montgomery Street
San Francisco, California 94111

RE: MKS Instruments Inc. (the "Company")

Ladies & Gentlemen:

The undersigned is an owner of record or beneficially of certain shares of Common Stock of the Company ("Common Stock") or securities convertible into or exchangeable or exercisable for Common Stock. The Company proposes to carry out a public offering of Common Stock (the "Offering") for which you will act as the representatives of the underwriters. The undersigned recognizes that the Offering will be of benefit to the undersigned and will benefit the Company [by, among other things, raising additional capital for its operations]. The undersigned acknowledges that you and the other underwriters are relying on the representations and agreements of the undersigned contained in this letter in carrying out the Offering and in entering into underwriting arrangements with the Company with respect to the Offering.

In consideration of the foregoing, the undersigned hereby agrees that the undersigned will not, without the prior written consent of NMS (which consent may be withheld in its sole discretion), directly or indirectly, sell, offer, contract or grant any option to sell (including without limitation any short sale), pledge, transfer, establish an open "put equivalent position" within the meaning of Rule 16a-1(h) under the Securities Exchange Act of 1934, or otherwise dispose of any shares of Common Stock, options or warrants to acquire shares of Common Stock, or securities exchangeable or exercisable for or convertible into shares of Common Stock currently or hereafter owned either of record or beneficially (as defined in Rule 13d-3 under Securities Exchange Act of 1934, as amended) by the undersigned, or publicly announce the undersigned's intention to do any of the foregoing, for a period commencing on the date hereof and continuing through the close of trading on the date 180 days after the date of the Prospectus. The undersigned also agrees and consents to the entry of stop transfer instructions with the Company's transfer agent and registrar against the transfer of shares of Common Stock or securities convertible into or exchangeable or exercisable for Common Stock held by the undersigned except in compliance with the foregoing restrictions.

With respect to the Offering only, the undersigned waives any registration rights relating to registration under the Securities Act of any Common Stock owned either of record or beneficially by the undersigned, including any rights to receive notice of the Offering.

This agreement is irrevocable and will be binding on the undersigned and the respective successors, heirs, personal representatives, and assigns of the undersigned.

Printed Name of Holder

By:
Signature

Printed Name of Person Signing
(and indicate capacity of person signing if signing as custodian, trustee, or on behalf of an entity)

EXHIBIT 5.1

HALE AND DORR LLP
Counsellors at Law
60 State Street
Boston, Massachusetts 02109
(617) 526-6000 FAX (617) 526-5000

March 15, 1999

MKS Instruments, Inc.
Six Shattuck Road
Andover, MA 01810

Re: Registration Statement on Form S-1

Ladies and Gentlemen:

This opinion is furnished to you in connection with a Registration Statement on Form S-1 (File No. 333-71363) (the "Registration Statement") filed with the Securities and Exchange Commission (the "Commission") under the Securities Act of 1933, as amended (the "Securities Act"), for the registration of 7,475,000 shares of Common Stock, no par value per share (the "Shares"), of MKS Instruments, Inc., a Massachusetts corporation (the "Company"), of which (i) up to 6,000,000 Shares will be issued and sold by the Company, (ii) 500,000 Shares will be sold by certain stockholders of the Company (the "Selling Stockholders") and (iii) up to 975,000 Shares may be sold upon exercise of an over-allotment option granted by the Company.

The Shares are to be sold by the Company pursuant to an underwriting agreement (the "Underwriting Agreement") to be entered into by and among the Company and NationsBanc Montgomery Securities LLC, Donaldson, Lufkin, Jenrette and Lehman Brothers, as representatives of the several underwriters named in the Underwriting Agreement, the form of which has been filed as Exhibit 1.1 to the Registration Statement.

We are acting as counsel for the Company in connection with the issue and sale by the Company of the Shares. We have examined signed copies of the Registration Statement as filed with the Commission. We have also examined and relied upon the Underwriting Agreement, minutes of meetings of the stockholders and the Board of Directors of the Company as provided to us by the Company, stock record books of the Company as provided to us by the Company, the Articles of Organization and By-Laws of the Company, each as restated and/or amended to date, and such other documents and certificates as we have deemed necessary for purposes of rendering the opinions hereinafter set forth.

In our examination of the foregoing documents, we have assumed the genuineness of all signatures, the authenticity of all documents submitted to us as originals, the conformity to original documents of all documents submitted to us as copies, the authenticity of the originals of such latter documents and the legal competence of all signatories to such documents.

We express no opinion herein as to the laws of any state or jurisdiction other than the state laws of the Commonwealth of Massachusetts, and the federal laws of the United States of America. To the extent that any other laws govern the matters as to which we are opining herein, we have assumed that such laws are identical to the state laws of the Commonwealth of Massachusetts, and we are expressing no opinion herein as to whether such assumption is reasonable or correct.

Based upon and subject to the foregoing, we are of the opinion that (i) the Shares to be issued and sold by the Company have been duly authorized for issuance and, when such Shares are issued and paid for in accordance with the terms and conditions of the Underwriting Agreement, the Shares will be validly issued, fully paid and nonassessable and (ii) the Shares to be sold by the Selling Stockholders have been duly authorized and are validly issued, fully paid and non assessable.

It is understood that this opinion is to be used only in connection with the offer and sale of the Shares while the Registration Statement is in effect.

Please note that we are opining only as to the matters expressly set forth herein, and no opinion should be inferred as to any other matters. This opinion is based upon currently existing statutes, rules, regulations and judicial decisions, and we disclaim any obligation to advise you of any change in any of these sources of law or subsequent legal or factual developments which might affect any matters or opinions set forth herein.

We hereby consent to the filing of this opinion with the Commission as an exhibit to the Registration Statement in accordance with the requirements of Item 601(b)(5) of Regulation S-K under the Securities Act and to the use of our name therein and in the related Prospectus under the caption "Legal Matters." In giving such consent, we do not hereby admit that we are in the category of persons whose consent is required under Section 7 of the Securities Act or the rules and regulations of the Commission.

Very truly yours,

HALE AND DORR LLP

EXHIBIT 10.17

Confidential Materials omitted and filed separately with the Securities and Exchange Commission. Asterisks denote omissions.

COMPREHENSIVE SUPPLIER AGREEMENT #982812

This Agreement dated October 23,1998 is by and between Applied Materials, Inc., ("Applied"), a Delaware corporation, having its place of business in Santa Clara, California and Austin, Texas and MKS Instruments, (MKS), a Massachusetts corporation, having its place of business in Andover, Massachusetts.

The parties agree as follows:

Definitions

The following capitalized terms will have the following meanings:

A. "Applied" means Applied Materials, Inc., including all of its domestic and international divisions and subsidiaries.

B. MKS means MKS Instruments, including all of its divisions and subsidiaries (except HPS).

C "Item" or "items" means the good(s) or service(s) that MKS is to provide to Applied wider this Agreement, including all Applied Materials purchase orders and related agreements that are governed by this CSA, as specified from time to time by Applied and set forth in Attachment 1 and any amendments to Attachment 1.

D. "Applied's Standard Terms and Conditions of Purchase" means the terms and conditions contained in Exhibit 1 to this Agreement.

E. "Additional Provisions" means all requirements contained in this Comprehensive Supplier Agreement.

F. "Agreement" means this Comprehensive Supplier Agreement and/or the Applied's Purchase Order, and other Exhibits or Attachments to the Comprehensive Supplier Agreement and/or Purchase Order together with any Nondisclosure Agreement defined below as "NDA".

G. "Comprehensive Supplier Agreement" means the Comprehensive Supplier Agreement No.982812, including Exhibit 1, the Applied Terms and Conditions of Purchase.

H. "NDA" means any and all Nondisclosure Agreement(s) between Applied and MKS and any specific Nondisclosure Agreement that may be attached to this Agreement.

I. "Will" or "shall" have the same meaning and are used to convey an affirmative duty or obligation (i.e., a requirement).

J. "Release," or "release" means individual purchase orders, spot buys, pick cards or other orders for items issued by Applied to MKS under this Agreement

K. "Proprietary Information" means the Proprietary Information, as that term is defined by the NDA, of Applied.

L. "Confidential Information" means the Confidential Information, as that term is defined by the NDA, of Applied.

1. SCOPE

1.1 INTENTION/DESCRIPTION OF COMPREHENSIVE SUPPLIER AGREEMENT PRINCIPLES

This Comprehensive Supplier Agreement ("CSA") serves as a tool to manage the items Applied purchases from MKS as well as sub-assemblies MKS processes for Applied. Attachment 1 lists the items covered by this Agreement. Any modifications to this document will include a current list of the items covered by this CSA.

This Agreement defines the relationship and requirements between Applied and MKS to ensure a consistent supply of material that meets Applied's specifications. Decisions regarding future purchases from MKS will be based upon MKS' performance under this CSA as stated in Section 6, and their achievement toward Applied's business objectives, e.g. Hoshin goals.

1.2 MKS DETAILS

MKS Instruments	Account Manager: John Kranik
Six Shattuck Road	Sales Manager: Jeff Peters:
Andover. MA 01810	Customer Service Representative: Barbara Guthrie
Phone: (978)975-2350	Engineering Manager: Joe Maher
Fax: (978)975-0093	

1.3 ENTIRE AGREEMENT

This CSA, including the Applied Standard Terms and Conditions of Purchase (Exhibit 1) and any other Exhibits or Attachments which are incorporated by reference into this CSA, together with any NDA sets forth the entire understanding and agreement of the parties as to the subject matter of this CSA and supersedes all prior agreements, understandings, negotiations and discussions between the parties as to the subject matter. No amendment to or modification of this CSA will be binding unless in writing and signed by a duly authorized representative of both parties. In the event of any conflict between the terms of the CSA and the terms of the Exhibits and Attachments, the order of precedence shall be given first to the CSA, followed by the Applied Standard Terms and Conditions of Purchase, drawings, specifications or other technical documents.

The following lists all of the Exhibits and Attachments referenced in this agreement:

Exhibit/Attachment	Revision	Release Date
Exhibit 1	no revision	10/23/98
Attachment 1	A	10/23/98
Attachment 2	no revision	10/15/97
Attachment 3	no revision	
Attachment 4	no revision	any example - will be in contract

Exhibit/Attachment	Revision	Release Date
Attachment 5	A	4/27/98
Attachment 6	K	6/15/98
Attachment 7	no revision	
Attachment 8	n/a	
Attachment 9	n/a	
Attachment 10	no revision	
Attachment 11	no revision	
Attachment 12	no revision	
Attachment 13	no revision	
Attachment 14	n/a	
Attachment 15	n/a	
Attachment 16	no revision	
Attachment 17	no revision	8/27/98

1.4 ITEMS COVERED

In general, all Items supplied to Applied by MKS will be covered by this agreement. The list of Items covered by this CSA is shown in Attachment 1. New Items may be added to Attachment 1 upon mutual agreement between Applied and MKS. Items may be removed by Applied from Attachment 1 from time to time in accordance with this Agreement. MKS may recommend or Applied may implement removal for the following reasons without limitations:

a. Specification changes that MKS is unable to comply with
b. Quality or delivery default
c. Obsolete Items
d. Outsourcing of the parent assembly

1.5 DURATION OF AGREEMENT

This Agreement commences on and as of the date of the latter of the two signatures shown in Section 9, Effective Date, when each party has executed and delivered one or more counterparts of this CSA to the other (the "Effective Date") and will remain in effect through October 23, 2000 (the "Initial Term"). Provided that MKS has complied with all contract requirements and specifically those requirements identified in section 6.0 (Performance Management), both parties may mutually agree to expand the term of the agreement up to 24 months from the conclusion of the initial term. Any extension of this agreement will be subject to all terms and conditions of this agreement.

1.6 RESPONSIBILITIES

1.6.1 Applied Responsibilities

Applied agrees to:

- Provide demand signals to MKS as defined in section 2.5.1;
- Provide updated twenty-six week rolling forecasts to MKS;
- Measure inventory levels and scoring compliance to days-of-supply metric as stated in Section 6;
- Receive and inspect Items from MKS and measuring quality for quality metric as stated in Section 6;
- Notify MKS of any discrepancies;
- Provide suggestions on how MKS can improve its operation of this agreement;
- Make recommendations as to how MKS might reduce costs and improve the quality of Items purchased from MKS;
- Respond to any of MKS' inquiries;
- Identity, in conjunction with MKS, possible solutions to resolve any exceptions that might arise;
- Write and record action plans to resolve exceptions;
- Provide MKS with MKS performance reports;
- Meet with MKS quarterly to review its performance;

1.6.2 MKS Responsibilities

MKS agrees to fully perform all requirements of this Agreement MKS obligations include but are not limited to:

- Produce high quality and high reliability Items;
- Deliver Items on time to Applied;
- Respond in a timely manner to any of Applied's inquiries and requests;
- Continuously improve MKS' operations to better serve Applied's needs and support Applied's business objectives, e.g. Hoshin goals;
- Work with Applied to improve operation of this agreement;
- Work with Applied to reduce costs and improve the quality for all Items MKS produces for Applied;
- Review regularly the updated forecasts to adjust MKS operation for changes in Applied's plans;
- Work with Applied to resolve any exceptions that may arise;
- Complete any tasks assigned to resolve exceptions on time;
- Meet with Applied quarterly to review performance;
- Monitor and report to Applied the finished goods inventory levels of the Items listed in Attachment 1 of this Agreement.

2. LOGISTICS FRAMEWORK

2.1 OPERATION OF CSA

2.1.1 Operating calendar & holidays

This CSA operates by Applied fiscal year calendar, shown in Attachment 2. Recognized holidays are those holidays shown on Applied fiscal year calendar. Should any discrepancies between the operating calendars of Applied and MKS arise, MKS must make provisions so that Applied's operations are unaffected.

2.1.2 Flowchart of day to day operations (Reserved)

2.1.3 Forecasts

MKS' production of Items will be guided by Applied's most current 26 week rolling forecast, as provided by Applied to MKS on a weekly basis ("Applied's Forecast"). MKS will plan, manufacture, and stock inventory to meet Applied's forecast. MKS will keep each of Applied's forecasts for audit purposes for a minimum of six (6) months and may be asked to present this document for verification of authorized inventory levels. Applied's forecast is Proprietary Information to be used only by MKS to meet its obligations to Applied under this Agreement.

2.1.4 Releases

Applied may require a part or Items on an accelerated basis, either in addition to or in place of Items forecast for release or scheduled for delivery at a later date. If feasible, as determined by Applied and MKS, such Items will be provided by MKS to meet Applied's requirements. Unless otherwise agreed to by Applied, such accelerated deliveries will not affect the delivery schedule of any Items currently allocated for forecast requirements. Lead times for each accelerated release will be agreed upon by both parties. If MKS and Applied are unable to agree on delivery schedule or other terms affecting Items for accelerated delivery, Applied shall have the right to purchase or procure affected Items from other persons, without obligation to MKS.

2.1.5 Delivery Guidelines

2.1.5.1 General Delivery

MKS will exercise all efforts to meet Applied's delivery requirements on time. Shipments to Applied by MKS will be delivered in the right quantities ordered by Applied.

For part orders issued via a separate purchase order form ("Spot Buy"), deliveries will be accepted on the requested date or up to 2 days before the requested date. For Spot Buy purchases for spares, deliveries will be accepted on the requested date or up to two days before the requested date.

2.1.6 Replenishment Approach

MKS will be expected to supply Items using one or more of the following replenishment approaches:

- Bus Route
- Spot Buy

The replenishment methodology to be used for a particular Items are defined on Attachment 1. Specific delivery mechanics are outlined on Attachment 3.

2.1.7 Electronic Commerce

MKS is required to communicate with Applied using EDI ANSI X.12 standards and encouraged to use either GElS or EDICT software.

2.1.8 Changes to Logistics

Applied may on occasion change any aspect of any logistics requirement. Applied will expect MKS to accommodate these changes to the best of its ability. MKS will be given at least three weeks notification prior to the change being implemented. Applied will then consider all claims for pricing adjustment due to the change in the logistics framework if made within the three week notification period.

2.2 SERVICE LEVELS

2.2.1 Inventory Levels

MKS, if involved in supporting lean manufacturing, is expected to have Finished Goods Inventory ("FGI") of the Items on Attachment 1 in order to manage demand fluctuations. MKS will maintain a minimum FGI of 4 weeks and a maximum of 6 weeks of each Item, for each Item identified in Attachment 1 as requiring FGI, to meet Applied's needs based on the most recent rolling forecast (see Attachment 4 for example of forecast). After MKS exhibits ability to decrease cycle times, both parties will agree to lower FGI requirements.

MKS may present a claim for "non-purchase" for payment of inventory manufactured in response to a valid Applied purchase order, or an authorized demand signal, as explained in Section 2.5.1, if Applied has not taken delivery of the FGI within 6 months from date of manufacture. This claim must be made within thirty (30) days from the end of the 6 months time frame. Applied is not responsible for payment to MKS for FGI built without a valid Applied purchase order, an authorized demand signal (as explained in Section 2.5.1), or Applied's Forecast (as explained in Section 2.1.3).

Applied will not hold any financial responsibility for FGI consisting of "off-the-shelf" Items that MKS is able to sell to other customers.

2.2.1.1 WIP Tracking

MKS is expected to monitor, track, and report their Work-In-Process ("WIP") inventory (dollars). In the future, Applied will implement regular reporting mechanisms which MKS will be expected to participate in.

2.2.1.2 Excess and Obsolete Items

Applied will not be responsible for excess and obsolete parts other than to the amounts specified above in Section 2.2.1, and in any event MKS must make all efforts to mitigate claims for "non- purchase".

In the event that MKS desires to submit a claim for reimbursement of costs associated with obsolete Applied unique build-to-print parts, MKS shall submit its claim to Applied's authorized purchasing representative within 90 days from the date Applied designated the part as obsolete. MKS' claim proposal shall be submitted in accordance with Section 26, Termination for Convenience, of Applied's Standard Terms and Conditions of Purchase.

Confidential Materials omitted and filed separately with the Securities and Exchange Commission. Asterisks denote omissions.

MKS agrees to physically dispose of the excess and obsolete parts as directed by Applied's authorized purchasing representative. Parts that are to be delivered to Applied's facilities must be delivered in accordance with the requirements of this Agreement and/or any supplemental instructions provided by Applied's authorized purchasing representative. With regard to Applied unique build-to-print parts, in lieu of delivery to Applied, Applied may elect to request MKS to destroy or otherwise scrap these parts such that these parts are non-functional MKS agrees to destroy or otherwise scrap these parts in a manner that is satisfactory to Applied and to provide Applied with a certification of destruction and/or evidence that the parts have been properly disposed of.

2.2.2 Response Requirements

Responses to the following types of inquiries are expected within the time periods in the tables below.

2.2.2.1 MKS Response Time

Inquiry Type	MKS Response Time	MKS Contact
Lead-time	1 business day	Master Planner
Technical	1 business day	Manufacturing Engineer
Quotations	1 business day	Customer Service Representative
Quality	1 business day	Quality Engineer
Price/invoice	1 business day	Customer Service Representative
Component failure & field safety	3 hours	Quality Engineer
Product Problems	1 business day	Account Manager

2.2.2.2 Applied Response Time

Inquiry Type	MKS Response Time	MKS Contact
Lead-time	1 business day	MKS Account Team Lead/Member
Technical	1 business day	MKS Account Team Lead/Member
Quality	1 business day	MKS Account Team Lead/Member
Price/invoice	1 business day	MKS Account Team Lead/Member

2.2.3 Flexibility Requirements

MKS is expected to perform regular capacity planning and to demonstrate reasonable upside/downside manufacturing flexibility in case of demand volume changes at Applied. For Bus Route Items, MKS shall be capable of manufacturing to unplanned sustained increases/decreases in demand above/below Applied's forecast as defined below. For Spot Buy Items, MKS allows the following increases/decreases to Purchase Order Quantities above/below the quantities originally requested:

Weeks until Delivery Date	[**]	[**]	[**]	[**]	[**]
Flexibility +/-	[**]	[**]	[**]	[**]	[**]

2.2.4 On-site support requirements

As determined by Applied, MKS may be asked to provide logistics, quality engineering, and new product development support on-site at Applied's facilities. At the appropriate juncture, Applied will require MKS to execute the On-site Representative Agreement prior to issuing a building badge to MKS' representatives.

2.2.5 Global Support

For the Items listed in Attachment 1, and all other Items that MKS provides to Applied, MKS will provide support globally for Applied and Applied's customers.

Technical assistance and product support services shall be provided at no additional charge during normal business hours. MKS must have an established and deployed global service capability. The required support services must be available globally, however, MKS may utilize a MKS distributor, or other -fled entity designated by MKS to meet this requirement MKS is expected to use best efforts to provide a resolution to requests for assistance.

2.2.6 Turn-around time for Repairs

MKS will supply Applied with repair Items under warranty within [**] business days from receipt of product. The [**] day cycle is not guaranteed if Applied ships repair Items in unreasonable batch sizes. MKS will supply Applied with repair Items not under warranty within [**] business days from receipt of product.

2.3 INFORMATION

2.3.1 Applied Planning Systems

MKS may be given electronic access to Applied's planning data. This access, if granted, should only be used to facilitate production and delivery of Items to support Applied's requirements. MKS' access to, and utilization of, Applied's planning data is subject to the confidentiality terms of this Agreement and any NDA.

2.3.3 Applied New Product Plans

MKS will on occasion and at Applied's discretion, be invited to forums in which Applied's new product plans are shared. Any Applied new product plans provided to MKS is subject to the confidentiality provisions of this Agreement and any NDA.

2.4 PACKAGING AND TRANSPORTATION

2.4.1 Packaging and Shipment

MKS will have all Items packaged "ready for use" in accordance with Applied's packaging specification (Attachment 6). MKS will mark and identify every item in compliance with Applied's part identification specifications and requirements (reference Attachment 6).

2.4.2 Bar Coding

All shipments should be bar coded to Applied's specifications (Attachment 5).

2.4.3 Transportation Mode

Items will be transported, FOB Origin, Freight Collect in accordance with Attachment A of Applied's Corporate Transportation Routing Guide which is provided in Attachment 7.

2.5 PAYMENT

2.5.1 Demand Signal

BUS ROUTE

Each day by 10:00 a.m., Applied sends via EDI transmission an order sheet to MS containing Applied's material requirements information. This information is organized at the part-number level and represents Applied's daily purchase from MKS. This EDI transmission constitutes an authorized demand signal.

SPOT BUY

As needed, Applied sends via fax an order sheet to MKS containing Applied's material requirements information. This information is organized at the part number level and represents an Applied purchase from MKS. This fax constitutes an authorized demand signal.

2.5.2 Invoices

Invoices shall contain the following information: purchase order number, item number, description of goods, sizes, quantities, unit prices, and extended totals in addition to any other information requested. Applied's payment of invoice does not represent unconditional acceptance of items and will be subject to adjustment for errors, shortages, or defects. Applied may at any time set off any amount owed by Applied to MKS against any amount owed by MKS or any of its affiliated companies to Applied.

All invoices must be sent directly to Accounts Payable in Austin:

Accounts Payable
Applied Materials
9700 US Highway 290 East M/S 4500
Austin, TX 78724-1199

2.5.3 Cash Discounts

Payment will be made net thirty (30) days from receipt of:

a. invoice, in form and substance acceptable to Applied, or

b. delivery and acceptance of the invoiced Item(s), whichever is later.

If payment is made within ten (10) days of the later of either (a) or (b) above, Applied may [**] from the invoice total as a prompt payment discount.

2.6 DISASTER RECOVERY PLAN

MKS is expected to develop and provide to Applied, upon request, reasonable information describing (provide evidence of a disaster recovery plan that includes emergency back up capacity and appropriate record protection and recovery. Furthermore, MKS represents that its information systems are year 2000 compatible and hereby grants Applied the right to verity MKS' internal processes for ensuring compliance with this provision. MKS agrees to include this same requirement in its purchase orders to its supply base and to provide reasonable efforts to verity its supply base is compliant with the requirements herein.

2.7 MANAGING EXCEPTIONS

2.7.1 Identifying constraints

MKS is responsible for anticipating inability to perform its obligations and limitations on manufacturing, delivery and other performance to meeting CSA objectives, informing Applied when those constraints occur, and initiating action plans to resolve the Constraints might typically include, but not be limited to:

a. Consumption over forecast

b. Consumption under forecast

c. Quality problems

d. Capacity/production problems

e. Secondary supplier supply-chain management problems

f. Other business issues

2.7.2 Process for Exceptions

Applied will work with MKS to determine the impact of an exception and approve and execute or disapprove the action plans in accordance with Section 24, Changes, of Applied's Standard Terms and Conditions of Purchase. MKS will notify the MKS Account Team Lead as soon as exceptions are identified.

3. QUALITY FRAMEWORK

3.1 SUPPLIER NON-CONFORMANCES AND CORRECTIVE ACTION

MKS' quality must meet all applicable Applied specifications as stated elsewhere in the Agreement (including all technical specifications and detailed drawings). MKS is required to replace or repair defective Items at MKS' expense in a timely manner. MKS are required to use the most expeditious manner possible to affect the corrections including the use of overnight delivery

Confidential Materials omitted and filed separately with the
Securities and Exchange Commission. Asterisks denote omissions.

services for shipment of Items; at Applied's request, in certain circumstances, MKS may be asked to provide new Items in lieu of repairing a part to ensure immediate corrective action.

MKS will be notified of defects with a corrective action form, Attachment 10, to which they are expected to respond appropriately. A corrective action process to resolve non-conformances will be documented and used. In addition, MKS will participate in continuous improvement plans and programs as defined by Applied and MKS.

Should MKS fail to conform to the specifications established in this Agreement, Applied may purchase comparable items in the open market as necessary to meet its requirements. Applied may at its option charge MKS with any reasonable cost differential between the contract price and the price paid in the open market. This cost may include premium costs for expedited delivery, administrative costs incurred to process replacement purchase orders.

3.2 APPLIED NON-CONFORMANCES AND CORRECTIVE ACTION

Applied will return Items at Applied's expense that do not conform to Applied's requirements due to Applied errors. These Items will be returned for potential rework. Applied and MKS will agree in advance on "standard" repair costs (labor, Items and freight) on items not covered under warranty; the standard repair costs will be identified in the Items list (Attachment 1B).

To the extent that a "standard" repair cost has not been established, MKS will assess rework costs and timing and inform Applied before work is performed. The parties agree that MKS will inform Applied if the total price charged for repairing a part will exceed 40% of the current purchase price stated in Attachment 1.

MKS agrees to repair and return all Items within [**] business days from receipt of damaged Item. Applied shall have the right to designate certain Items for "Same Day" or "24 Hour" repair turnaround. Any premium charges for "Same Day" or "24 Hour" repair turnaround will not exceed [**] per Item.

Prior to return of repaired items to Applied, MKS will mark Items with Applied's part number, serial number, RMA number, purchase order number, range and gas (ff applicable). Applied shall bear the risk of loss or damage during transit of Items whether or not the Items meets warranty requirements.

In addition, as stated below in the quality assurance section, a corrective action process to resolve non-conformance(s) will be documented and used.

3.3 QUALITY ASSURANCE

All Items purchased under this CSA will be subject to inspection and test by Applied at appropriate time and place, including the period of manufacture and anytime prior to final acceptance. If inspection or test is made by Applied on MKS' premises, MKS will provide all reasonable facilities and assistance for the safety and convenience of Applied's inspectors at no charge to Applied. No preliminary inspection or test shall constitute acceptance. Records of all inspection work shall be kept complete and available to Applied during the performance of this order and for such further period as Applied may determine.

Certificate of Conformance (COC): MKS agrees to certify that Items have passed all production acceptance tests and configuration requirements and provide a "Certificate of Conformance" (see Attachment 16) and a Calibration Data Report that will be included with each product during shipment.

With regard to repair services, MKS shall maintain documentation evidencing that all test inspections have been performed. The documentation shall indicate the nature and number of observations made, the quantities approved and rejected as well as the nature of the corrective action take MKS' service centers shall be responsible for submitting this data for Applied's review of the delivery summaries. The data shall be submitted monthly not later than five days after the close of each of Applied's fiscal months to Applied's Contract Specialist and Applied's IBSS Repairs Purchasing Group.

At Applied's request, MKS will provide a certificate and/or a copy of the final inspection records showing compliance to applicable specifications, contract requirements and any other required documents stipulated in Applied's repair authorization. MKS also agrees to provide Applied with copies of its current procedures relative to repairs, range change and warranty repairs.

Through MKS' internal Quality Service organization, MKS will track and maintain its internal manufacturing reject rate by percentage of assemblies, and/or part per million ("TPM"). Trend reporting and corrective actions shall be furnished to Applied as requested by Applied Purchasing or Quality representatives. MKS will provide quality data in the format, as shown in Attachment 11, and as received by Applied MKS may also be required to provide reasonable additional data to support qualification and certification programs.

3.4 WARRANTY

MKS warrants that all Items delivered to Applied will be free from defects in workmanship, material, and manufacture; will comply with the requirements of this Agreement, and, where design is MKS' responsibility, will be free from defects in design. All services will be performed in a competent, professional and workmanlike manner, free from defects and in accordance with best professional practices or the like. MKS FURTHER WARRANTS ALL ITEMS PURCHASED OR REPAIRED WILL BE OF MERCHANTABLE QUALITY AND WILL BE FIT AND SUITABLE FOR THE PURPOSE INTENDED BY APPLIED. THESE WARRANTIES ARE IN ADDITION TO ALL OTHER WARRANTIES, WHETHER EXPRESSED OR IMPLIED, AND WILL SURVIVE ANY DELIVERY, INSPECTION, ACCEPTANCE, OR PAYMENT BY APPLIED. If any Items delivered by MKS do not meet the warranties specified herein or otherwise applicable, Applied may, at its option:

(i) require MKS to correct at no cost to Applied any defective or non-conforming Items by repair or replacement, or

(ii) return such defective or non-conforming Item at MKS' expense to MKS and recover from MKS the order price thereof, or

(iii) correct the defective or non-conforming Item itself or through a mutually approved third party and charge MKS with the cost of such correction

(iv) cancel the balance of the undelivered non-conforming Item and/or this CSA in accordance with Section 25, Termination for Default, of Applied's standard Terms and Conditions of Purchase.

All warranties will run to Applied and to its customers. Applied's approval of MKS' material or design will not relieve MKS of the warranties established in this agreement. In addition, if Applied waives any drawing or specification requirement for one or more of thE goods, it will not constitute a waiver of all requirements for the remaining goods to be delivered unless stated by Applied in writing.

3.5 OTHER QUALITY PROGRAMS

3.5.1 MKS' Quality System

MKS' quality system must be in compliance with ISO 9000. If MKS is not currently ISO 9000 certified, MKS must provide their documented plans to achieve certification with a tune that is mutually agreeable to both parties. MKS also agrees to participate in the SSQA development and implementation plan.

3.5.2 MKS' Process Quality

Applied Materials requirements and workmanship standards shall be integrated into MKS' processes and identified accordingly. MKS shall identify the critical processes effecting the product quality and develop a validated list of the critical processes by discussing with Applied Materials. All data generated as a result of the critical manufacturing processes shall be collected, processed and used for process control and continuous improvement Evidence of process control of critical processes is a requirement and the presence of control charts and statistical process control is required. Processes not exhibiting a Cpk of 1.33 will require a formal corrective action plan to achieve the required process control. The critical manufacturing processes on pressure transducers, flow products and electronic products are:

[**]

[**]

[**]

[**]

[**]

3.5.3 Part quality containment and corrective action

When Applied Materials identifies a product non-conformance on a piece part and requests MKS to implement containment action on the part failure, MKS shall respond within [**] with a documented containment plan and shall have implemented the plan. MKS shall provide follow up to this containment plan with a closed loop corrective action identifying the root cause, a permanent fix and tune line to implement the corrective action. Applied Materials may perform a follow up audit to verify the effective implementation of the corrective action and approve the closure of the corrective action.

Applied Materials may develop or request MKS to develop Inspection Standard Sheets on identified part numbers for deployment in MKS' operation. ISS's will be deployed in final inspection, completed and records maintained as part of MKS' quality system. Template will be provided by Applied Materials supplier quality organization.

3.5.4 MKS Audits

Applied Materials will conduct the following audits, as required, to ensure a high level of quality of parts and assemblies purchased from MKS.

3.5.4.1 Source Inspection

Applied Materials may conduct source inspection at MKS' site at any time. Performance of source inspection does not waive MKS responsibility for any defects that might subsequently be identified by Applied Materials or its customers.

3.5.4.2 Piece part audits

Piece part audits may be performed at MKS' site or at Applied Materials. MKS shall identify the failure and respond commitment to contain the part failure with in [**] from notification. MKS shall also perform the root cause analysis of the failure for containment and corrective action. MKS shall agree to inform Applied Materials about the root cause, corrective action, its implementation plan and schedule with in the time period agreed upon.

3.5.4.3 Process audits

When a systemic failure trend is observed in the piece part or assembly supplied, Applied Materials or MKS shall identify the process which are causing the failure and audit the processes at MKS' site. Any deficiencies or opportunities for improvements identified from the audit will be discussed with MKS and a closed loop corrective action will be established, specifying the correction action required with a specified timeline for implementation. MKS shall agree to work on the corrective action and provide closure to all deficiencies within the time period agreed upon.

3.5.4.4 System assessment

Applied Materials, at any time may decide to perform a quality system audit at MKS' site. Any deficiencies or opportunities for improvements identified from the audit will be discussed with MKS and a closed loop corrective action will be established, specifying the corrective action required with a specified timeline for implementation. MKS shall agree to work on the corrective action and provide closure to all deficiencies within the time period agreed upon.

3.5.5 MKS' control over their subcontractors

MKS shall demonstrate control over the selection of subtier suppliers and maintain a controlled Approved Suppliers List that is supported by on site audits and completed corrective actions prior to selection and periodically to ensure the highest quality of procured parts and assemblies. MKS is required to provide Applied Materials with a quality plan for the selection, control and maintenance of subtier suppliers and will include periodic testing performed by MKS to ensure compliance to Applied Materials specifications. Quality records of MKS' subtier suppliers shall be made available, upon request, to Applied Materials for review.

3.5.6 MKS communication

MKS agrees to send a report on their quality performance on either a weekly or monthly basis the frequency and content of which is to be mutually agreed to between the quality engineering representatives from each party. Applied's quality engineer may schedule a periodic meeting with the MKS representative managing the quality to discuss the contents of MKS' quality report, parts containment, closed loop corrective action, audit findings or any other issues related to quality. MKS agrees to develop, with the help and approval of Applied Materials, a pro-active quality road map to improve their part quality to meet the Applied Materials quality goals. And the status of the effectiveness of the implementation plan will be monitored by MKS and reviewed with Applied Materials on a periodic basis.

3.5.7 Formal Quality Plan

A formal quality plan will be developed jointly by MKS and Applied Materials and will contain part and process specific requirements identified to ensure the manufacture of high quality parts. MKS will conform to all requirements of the plan. Periodic assessments of the quality plan will be performed by the Applied supplier quality engineer to ensure conformance to all requirements. The completed plan will be an attachment to this contract.

3.5.8 Pro-active Action Plans

MKS is advised to work with Applied Materials in a pro-active way on the following.

1. Work with the Quality Engineers on the manufacturing floor to receive the DMR parts as soon as possible.

2. Work with the WMO/PBG buyers in reversing the PPMs from MKS fault to Applied Materials' fault in applicable cases.

4. PRICING FRAMEWORK

4.1 PRICING BY PART NUMBER

The pricing for the Items are shown in Attachments 1A (part numbers) and 1B (service and repair). Any modifications to these must be made in accordance with Section 7 of this Agreement. MKS commits to on-going cost improvement during the period of this Agreement in accordance with Section 6.

At the time of the Agreement Effective Date, the remaining balance of undelivered items on all open purchase orders will be revised to the agreement price.

Specific circumstances may result in a review of the agreement terms, including prices. These include, but are not limited to:

a. Volume increases resulting in an increase in agreement value of over [**] (subsequent to completion of negotiations on the existing prices);

b. Addition of Items to the agreement increasing the value of the Agreement over [**]

c. Cost reductions(savings over and above those committed in the MKS performance plan.;

d. Price reductions in accordance with Section 6,[**], of Applied's standard Terms and Conditions of Purchase.

4.2 COOPERATIVE PRICING MODELS/FORMULAS

SEE ATTACHMENT 1

4.3 VOLUME

MKS will be provided a range of potential volume that may be purchased. Applied does not commit to buy a specific volume of a part number from a MKS. Applied does not limit its ability to buy the same part number from multiple sources.

4.4 EXPORT PRICING

MKS should quote Applied in unit prices based upon delivery FCA Free carrier. MKS is expected to prepare the export paperwork and be the exporter of record. MKS must utilize Applied's preferred carriers to arrange the export of the goods. Applied will pay the freight charges based on Applied's rates with its preferred carriers. Applied will be responsible for importing the goods into the destination country.

4.5 CURRENCY

All prices are quoted in US dollars; prices for foreign manufactured Items will not be adjusted to reflect changes in the exchange rate. MKS is encouraged to obtain any necessary currency exchange protection it deems appropriate.

Notwithstanding the agreement to quote product in U.S. Dollars, the parties agree that any Applied entity operating in the same country as MKS's manufacturing plant or sales and service depots may issue orders for MKS's products using the local currency for the purposes of effecting payment. The prices will be converted to local currency as follows:

PARTS MANUFACTURED EXCLUSIVELY OUTSIDE OF THE UNITED STATES:

The U.S. Dollar prices in Attachment 1 will be converted to local currency, on a quarterly basis, using the official exchange rate listed in Bloomberg(TM) or Olsen(TM) publications. The exchange rate shall be the mid point between the bid and ask price listed at the close of the following days: January 2nd, April 1st, July 1st, October 1st.

Confidential Materials omitted and filed separately with the Securities and Exchange Commission. Asterisks denote omissions.

PARTS MANUFACTURED EXCLUSIVELY WITHIN THE UNITED STATES:

The various packaging, shipping, export and import costs associated with parts manufactured exclusively within the United States and offered for sale outside the United States will be paid by MKS as part of its normal operating expenses. In consideration for said costs, Applied agrees that MKS may increase the U.S. Dollar prices in Attachment 1 by not more than [**] prior to converting the U.S. price to the local currency price using the official exchange rate listed in Bloomberg(TM) or OIsen(TM) publications. The exchange rate shall be the mid point between the bid and ask price listed at the close of the following days: January 2nd, April 1st, July 1st, October 1st.

4.6 PROTOTYPES

MKS is committed to price all Items consistent with contract prices.

MKS agrees to provide prototype Items priced considering the total value of Applied's business with MKS. This may be accomplished in several ways, including:

a. a specific number of prototype Items may be provided free of charge

b. Items may be priced at production levels

4.7 ADVANCES FOR RAW MATERIALS

Applied does not provide advance payments for the purchase of raw materials.

5. TECHNICAL FRAMEWORK

5.1 ENGINEERING CHANGE ORDERS

Applied may change its drawings, design, and specifications at any time in accordance with Section 25, Changes, of Applied's Standard Terms and Conditions of Purchase. Applied Supplier Engineer will review with MKS all proposed Engineering Change Orders (ECO's) that impact the form, fit, or function of Items. Applied will, in writing, provide approved ECO's (refer to Attachment 12) and state the effective dates of all changes. Unless otherwise notified, Applied Receiving Inspection will inspect to the latest revision in effect at the time of receipt

MKS may request engineering changes via a MKS Problem Sheet (refer to Attachment 13). This form should be submitted to Applied Supplier Engineer. Changes shall not be implemented by MKS until written permission to proceed is given by Applied's authorized purchasing representative and the agreement is modified accordingly. Applied will consider claims for adjustment in the terms of this Agreement if made before the implementation of the changes.

5.2 TOOLING

Unless otherwise agreed to in writing, special dies, tools, patterns and drawings used in the manufacture of Items shall be furnished by and at the expense of, MKS.

5.3 DESIGN CHANGES AND RESOLUTION

For the term of this Agreement, MKS will not make changes to the design of any part that may alter form, fit, function or a significant manufacturing process without a documented engineering change request and prior written approval from Applied's authorized purchasing representative and the agreement is modified accordingly.

If Applied's design changes impact the pricing, delivery, lead-time, or other terms and conditions of this Agreement, and agreement upon alternate terms cannot be reached with MKS, then Applied may remove the subject Items from this Agreement without affecting the remaining Items.

5.4 PROCESS CHANGES AND RESOLUTION

MKS is expected to inform Applied of process and MKS changes to include changes in specifications, manufacturing locations, even when specifications are met. MKS must receive written approval in writing from Applied before implementing changes. MKS must use the specified Applied "approved" list of secondary process suppliers, where designated. The use of Applied approved secondary process suppliers does not relieve MKS of the responsibility for management of the subtier supplier and for ensuring the quality of parts received.

5.5 SUBCONTRACTING

MKS shall not subcontract for completed or substantially completed components and processes supplied to Applied without prior written approval of Applied. MKS will ensure that all subcontractors to MKS that have access (directly or indirectly) to Applied specifications must be covered by a NDA that is similar in form and substance to Applied's NDA.

5.6 FIRST ARTICLES

A new Item, Item with revised drawings, or other changes as delineated above, must have a first article evaluated and accepted by Applied (a "First Article"). An Item will not be authorized for deliveries until acceptance of the First Article by Applied. MKS will maintain First Article qualifications/evidence data file with content as defined by Applied for the specific part. First Article data is to be made available to Applied upon request and shall be retained by MKS during the performance of this Agreement or subsequent agreements.

5.7 OUTSOURCING

Applied may at its discretion elect to outsource an assembly or module to a third party ("Subassembler") and if the selected assembly or module includes any Item under this CSA (an "affected Item"), Applied will advise MKS of the Subassembler, unless precluded from doing so by confidentiality or other requirements. MKS understands that the selection and responsibility for sourcing any affected Items will generally be the responsibility of the Subassembler. If MKS is not selected as the source for an affected Item, any affected items or applicable quantities of affected Items may, at Applied's discretion, be removed from this Agreement.

5.8 PRODUCT SUPPORT

MKS agrees to provide Items, and technical and service support to Applied for all of the Items for a minimum of ten years from the date of final shipment of a part to Applied.

Confidential Materials omitted and filed separately with the Securities and Exchange Commission. Asterisks denote omissions.

Alternatively, the parties may agree to establish a product support period less than ten years provided that MKS agrees to grant to Applied a non-exclusive license to make, have made, use, sell, and support the Items in a form and on terms acceptable to Applied.

5.9 COMMODITY SPECIFIC ISSUES

Reserved

5.10 TECHNOLOGY ROADMAP

Reserved

6. PERFORMANCE MANAGEMENT

6.1 SUPPLIER PERFORMANCE PLAN

As part of this Comprehensive Supplier Agreement, Applied and MKS agree to jointly develop a Supplier Performance Plan. Attachment 15 outlines the performance plan.

6.2 SUPPLIER PERFORMANCE MANAGEMENT

6.2.1 Metrics and Targets

MKS agrees to target the operational performance targets defined below. Performance targets for FY2000 are listed. Intermediate performance targets are established in the Supplier Performance Management Plan. The following defines how Applied and MKS will measure performance metrics:

Measure	Definition	Calculation	FY 1999 End Target	FY 2000 End Target
Quality ppm	Number of quality discrepancies detected prior to shipping a completed system to an end customer, expressed as parts per million	Quantity of parts with recorded DMR occurrences provided by the supplier over the prior 13-week period, divided by the total quantity of parts received from that supplier over the same period, multiplied by 1 million	[**]	[**]
Supplier Fault DMRs	Number of DMR transactions for part quality discrepancies detected in-house prior to system installation in the field	Number of DMR occurrences recorded against the supplier accumulated over the prior 13-week period	[**]	[**]

Confidential Materials omitted and filed separately with the Securities and Exchange Commission. Asterisks denote omissions.

Measure	Definition	Calculation	FY 1999 End Target	FY 2000 End Target
Late Delivery ppm	Number of parts delivered later than the agreed upon commit date	Quantity of parts received one day or more after the commit date, accumulated for each supplier over a rolling 13-week period, divided by the total quantity of parts received over the same period, multiplied by 1 million	[**]	[**]
Early Delivery ppm	Number of parts received three or more days before the commit date	Quantity of parts received three or more days before the commit date, accumulated over a rolling 13-week period, divided by the total quantity of parts received over the same period, multiplied by 1	[**]	[**]
Average Lead Time of Production Parts (Order Fulfillment Cycle Time)				
Source Cycle Time (supplier reported)	Average of the total times, from placement of an order through receipt at Applied Materials, of parts supplied to volume production (including transportation time)	The average of the number of days between order date and receipt date for all production parts recorded for the supplier, based on Austin volume production activity.	[**]	[**]
Make Cycle Time (supplier reported)	Total cycle time to source all materials required to produce an order, based on contracted parts supplied to volume production	Elapsed time, as determined through process audits and supplier self-assessments	[**]	[**]

Confidential Materials omitted and filed separately with the Securities and Exchange Commission. Asterisks denote omissions.

Measure	Definition	Calculation	FY 1999 End Target	FY 2000 End Target
Cost Reduction	Total production time required to fulfill an order, including manufacturing order release and build time, based on contracted parts supplied to volume production	Elapsed time, as determined through process audits and supplier self-assessments	[**]	[**]
	Percentage difference between the average unit price paid for materials in the prior year and price paid in the current year	Calculated for each contract by the SAT, using the method accepted by the SMO commodity group (see Attachment 17)	[**]	[**]

7. AMENDMENTS AND MODIFICATIONS

This CSA may be revised by the mutual consent of Applied and MKS. Revisions to this CSA must be in writing, signed by both Applied and MKS duly authorized representatives, traced by revision numbers and attached to this original agreement. A change to one attachment of this agreement will constitute a revision level change. The master copy of this CSA and any revisions are to be maintained by Applied.

Updates to Section 2.2, Service levels, and changes may be communicated via memos sent by mail, fax or e-mail.

8. GLOSSARY

TBD

9. ACCEPTANCE

Accepted:

/s/ Michael Berkaw	/s/ Leo Berlinghieri
Applied Materials, Inc.	MKS
Michael Berkaw	Leo Berlinghieri
Contract Specialist	VP of Customer Service
Chemical Delivery SMO	MKS Instruments
Date: 10/22/98	10/22/98

EXHIBIT 1

APPLIED MATERIALS TERMS AND CONDITIONS OF PURCHASE

1 Acceptance

The terms and conditions stated in these Applied Materials Standard Terms and Conditions of Purchase become the agreement between the parties covering the purchase of the goods or services (collectively referred to as "Items") ordered in the Purchase Agreement/Comprehensive Supplier Agreement/Basic Supplier Agreement of which these Terms and Conditions are a part when this Agreement is accepted by acknowledgment or commencement of performance. This Agreement can be accepted only in these terms and conditions. Additional or different terms proposed by Supplier will not be applicable unless accepted in writing by the Buyer. No change, modification, or revision of this Agreement will be effective unless in writing and signed by duly authorized representative of Buyer.

2. Confidential and Proprietary Information

Supplier will observe and is bound by the terms and conditions of any and all Non- Disclosure Agreements (NDAs) executed by Supplier with or for the benefit of Buyer, whether now or hereafter in effect. In addition, all schematics, drawings, specifications and manuals, and all other technical and business information provided to Supplier by Buyer during the term of, or in connection with the negotiation, performance or enforcement of this Agreement shall be deemed included in the definition (subject to any applicable exclusions therefrom) of "Proprietary Information" for purposes of this Agreement.

Supplier may use Buyer's Proprietary Information only for the purpose of providing Items, parts or components of Items or services to Buyer. Supplier will not discuss and further will not use any of Buyer's Proprietary Information, directly or indirectly, for any other purpose including, without limitation, (a) developing, designing, manufacturing, refurbishing, selling or offering for sale parts or components of Items or parts, or providing services, for or to any party other than Buyer, and (b) assisting any third party, in any manner, to perform any of the activities described herein. All Proprietary Information shall (a) be clearly marked by Supplier as Buyer's property and segregated when not in use, and (b) be returned to Buyer promptly upon request.

Supplier acknowledges and agrees that Buyer would suffer irreparable harm for which monetary damages would be an inadequate remedy if Supplier were to breach its obligations under this provision. Supplier further acknowledges and agrees that equitable relief, including injunctive relief, would be appropriate to protect Buyer's rights and interests if such a breach were to arise, or threatened, or were asserted.

Supplier will use reasonable efforts to notify Buyer of any third party requests to engage in any of the activities prohibited by this Article.

3. Intellectual Property

Nothing in this Agreement shall be deemed to grant to Supplier any license or other right under any of Buyer's intellectual property (including, without limitation, Buyer's patents, copyrights, trade and service marks, trade secrets, and Proprietary Information) for Supplier's own benefit or to provide or offer Items to any party other than Buyer.

All Items supplied by Supplier and the sale of Items by Supplier and, as applicable, use thereof by Buyer or its subsequent purchasers or transferees will be free from liability for or claim by any persons of royalties, patent rights, copyright, trademark, mechanics' liens or other encumbrances, and trade secrets or confidential or proprietary intellectual property rights (collectively "rights" and "encumbrances"), and Supplier shall defend, indemnify and hold harmless Buyer against all claims, demands, costs and actions for actual or alleged infringements of patent, copyright, trademark or trade secret rights or other rights and encumbrances in the use, sale or re-sale of any Item which are valid at the time of or after the effective date of this Agreement; except to the extent that the infringement was unavoidably caused by Supplier's compliance with a detailed design furnished and required by Buyer or by Buyer's non-compliance with Supplier's prior written advice or warning of a possible and likely infringement

At the request of Buyer, Supplier will provide to Buyer the most current and complete specifications and drawings (the "Drawings") for each Item manufactured or produced for Buyer that is based on Buyer's design or Drawings showing the complete specifications and design for the Item as manufactured or produced by Supplier. All Drawings are the sole property of Buyer.

Upon termination of this Agreement, Supplier will return all Applied Proprietary Information and documentation to Buyer. Notwithstanding this requirement, Supplier may request Buyer approval to destroy any Proprietary Information of Buyer that has become obsolete or outdated (e.g., financial projections, forecasts, et cetera); provided that Supplier certifies to Buyer the destruction of such Proprietary Information.

4. Patent License

Supplier, as part consideration for this Agreement and without further cost to Buyer, hereby grants to Buyer an irrevocable, non-exclusive, paid-up world-wide right and license to make, have made, use, and sell any inventions derivative works, improvements, enhancements, or intellectual property (the "Inventions"') made by or for Supplier in the performance of this Agreement. Supplier shall cause any employee, consultant, contractor or other persons who provides work for hire to Supplier to assign to Supplier for licensing as above of any such inventions. In addition, Buyer shall be entitled to license Buyer's customers to use such inventions during the operation of Buyer's products.

5. Press Releases/Public Disclosure Not Authorized

Supplier will not, without the prior written approval of Buyer, issue any press releases, advertising, publicity, public statements or in any way engage in any other form of public disclosure that indicates the terms of this Agreement, Buyer's relationship with Supplier or implies any endorsement by Buyer of Supplier or Supplier's products or services. Supplier further agrees not to use, without the prior written consent of Buyer, the name or trademarks (including, but not limited to Buyer's corporate symbol). Any requests under this Section must be made in writing and submitted to the parties designated by Buyer for the review and authorization of such matters.

Confidential Materials omitted and filed separately with the Securities and Exchange Commission. Asterisks denote omissions.

6. [**]

Supplier does not presently sell or offer any Item that is similar in form, fit or function to any Item to any third party for prices and terms and conditions of sale (including, without limitation, warranties, services or other benefits) (collectively, "Benefits") [**] to Buyer in this Agreement. If during the term of this Agreement,[**] for any Item than those available to Buyer under this Agreement (a "Third Party Arrangement"), Supplier will notify Buyer [**], Supplier will notify Buyer [**] and this Agreement will be deemed [**]. However, Buyer, at its option, may [**]. If any [**], Supplier will [**] that Buyer [**] from the effective date [**] shall be [**] of the effective date [**]. In no event shall Supplier quote prices to Buyer that would be unlawfully discriminatory under any applicable law.

7. Duty Drawback

Supplier will provide Buyer with U.S. Customs entry data, including information and receipts for duties paid directly or indirectly on all Items that are either imported or contain imported parts or components, that Buyer determines is necessary for Buyer to qualify for duty drawback ("Duty Drawback Information"). This data will be provided to Buyer within fifteen (15) days after each calendar quarter (or fiscal year quarter of Buyer, and be accompanied by a completed Certificate of Delivery of Imported Merchandise or Certificate of Manufacture and Delivery of Imported Merchandise (Customs Form 331) as promulgated pursuant to 19 CFR 191.

8. ODC Elimination

In the event Supplier's goods are manufactured with or contain Class I ODCs as defined under Section 602 of the Federal Clean Air Act (42 USE Section 7671 a) and implementing regulations, or if Supplier suspects that such a condition exists, Supplier shall notify Buyer prior to performing any work against this Agreement. Buyer reserves the right to: (a) terminate all Agreements for such goods without penalties, (b) to return any and all goods delivered which are found to contain or have been manufactured with Class I ODCs, or (c) to terminate any outstanding Agreements for such goods without penalties. Supplier shall reimburse Buyer all monies paid to Supplier and all additional costs incurred by Buyer in purchasing and returning such goods.

9. Compliance With Laws

Supplier warrants that no law, rule, or ordinance of the United States, a state, any other governmental agency, or that of any country has been violated in supplying the goods or services ordered herein.

10. Equal Employment Opportunity

Supplier represents and warrants that it is in compliance with Executive Agreement 11246, any amending or supplementing Executive Agreements, and implementing regulations unless exempted.

11. Applicable Law, Consent to Jurisdiction, Venue

This Agreement shall be governed by, be subject to, and be construed in accordance with the internal laws of the State of California, excluding conflicts of law rules. The parties agree that any suit arising out of this Agreement, for any claim or cause of action, whether in contract, in tort, statutory, at law or in equity, shall exclusively be brought in the United States District Court for the Northern District of California or in the Superior or Municipal Courts of Santa Clara County, California, or in the United States District Court for the Western District of Texas, Austin Division, or the Texas State District Courts of Travis County, Texas, provided that such court has jurisdiction over the subject matter of the action. Each party agrees that each of the named courts shall have personal jurisdiction over it and consents to such jurisdiction. Supplier further agrees that venue of any suit arising out of this Agreement is proper and appropriate in any of the courts identified above; Supplier consents to such venue therein as Buyer selects and to any transfer of venue that Buyer may seek to any of such courts, without respect to the initial forum.

With respect to transactions to which the 1980 United Nations Convention of Contracts for the International Sale of Goods would otherwise apply, the rights and obligations of the parties under the Agreement, including these terms and conditions, shall not be governed by the provisions of the 1980 United Nations Convention of Contracts for the International Sale of Goods; instead' applicable laws of the State of California, including the Uniform Commercial Code as adopted therein (but exclusive of such 1980 United Nations Convention) shall govern.

12. Notice of Labor Disputes

Whenever an actual or potential labor dispute, or any government embargoes, regulatory or tribunal proceedings relating thereto is delaying or threatens to delay the timely performance of this Agreement, Supplier will immediately notify Buyer of such dispute and furnish all relevant details regardless of whether said dispute arose directly, or indirectly, as a result of an actual or potential dispute within the Supplier's subtier supply base or its own operations.

13. Taxes

Unless otherwise specified, the agreed prices include all applicable federal, state, and local taxes. All such taxes shall be stated separately on Supplier's invoice.

14. Responsibility for Goods; Risk of Loss

Notwithstanding any prior inspections, Supplier shall bear all risks of loss, damage, or destruction to the Items called for hereunder until final acceptance by Buyer at Buyer's facility(s) delivery destination specified in the Agreement, which risk of loss shall not be altered by statement of any at F.O.B. point here. These Supplier responsibilities remain with respect to any Items rejected by Buyer provided, however, that in either case, Buyer shall be responsible for any loss occasioned by the gross negligence of its employees acting within the scope of their employment. Items are not accepted by reason of any preliminary inspection or test, at any location.

15. Insurance

A. Supplier shall maintain (i) comprehensive general liability insurance covering bodily injury, property damage, contractual liability, products liability and completed operations, (ii) Workers Compensation and employer's liability insurance, and (iii) auto insurance, in such amounts as are necessary to insure against the risks to Supplier's operations.

B. Minimally, Supplier will obtain and keep in force, insurance of the types and in the amounts set forth below:

Insurance	Minimum Limits of Liability
Worker's Compensation	Statutory
Employer's Liability	$1,000,000
Automobile Liability	$1,000,000 per occurrence
Comprehensive General Liability (including Products Liability)	$1,000,000 per occurrence
Umbrella/Excess Liability	$1,000,000 per occurrence

All policies must be primary and non-contributing, and shall include Buyer as an additional insured. Supplier also waives all rights of subrogation. Supplier will also require and verify that each of its subcontractors carry at least the same insurance coverage and minimum limits or insurance as Supplier carries under this Agreement. Supplier shall notify Buyer at least thirty (30) days prior to the cancellation of or implementation of any material change in the foregoing policy coverage that would affect the Buyer's interests. Upon request, Supplier shall furnish to Buyer as evidence of insurance a certificate of insurance stating that the coverage would not be canceled or materially altered without thirty (30) days prior notice to the Buyer.

16. Change of Control

Supplier will notify Buyer immediately of any change of control or change (including any change in person or persons with power to direct or cause the direction of management or policies of Seller) or any change (35% or more) in the ownership of Supplier, or of any materially adverse change in Supplier's financial condition or in the operation of Supplier's business, including, but not limited to, Supplier's net worth, assets, production capacity, properties, obligations or liabilities (fixed or contingent) (collectively, a "change of control").

17. Assignments

A. No right or obligation under this Agreement shall be assigned by Supplier without the prior written consent of Buyer, and any purported assignment without such consent shall be void.

B. Buyer may assign this Agreement in whole or part at any time if such assignment is considered necessary by Buyer in connection with a sale of Buyer's assets, or a transfer of any of its contracts or obligations under such contracts, or a transfer to a third party of manufacturing activities previously conducted by Buyer.

18. Gratuities

Supplier warrants that it has not offered or given and will not offer or give any gratuity to induce this or any other agreement. Upon Buyer's written request, an officer of Supplier shall certify in writing that Supplier has complied with and continues to comply with this Section. Any breach of this warranty shall be a material breach of each and every agreement and contract between Buyer and Supplier.

19. Insolvency

The insolvency of Supplier, the filing of a voluntary or involuntary petition for relief by or against Supplier under any bankruptcy, insolvency or like law, or the making of an assignment for the benefit of creditors, by Supplier, shall be a material breach hereof and default.

20. Waiver

In the event Buyer fails to insist on performance of any of the terms and conditions, or fails to exercise any of its rights or privileges hereunder, such failure shall not constitute a waiver of such terms, conditions, rights or privileges.

21. Disclaimer and Limitation of Liability

In no event shall Buyer be liable for any special, indirect, incidental, consequential, or contingent damages (the foregoing being collectively called "Damages"), whether or not Buyer has been advised of the possibility of such damages, for any reason. Buyer excludes and Supplier waives any liability of Buyer for any "Damages", as so defined.

22. Indemnity by Supplier

Supplier shall defend, indemnify and hold harmless Buyer from and against, and shall solely and exclusively bear and pay, any and all claims, suits, losses, penalties, damages (whether actual, punitive, consequential or otherwise) and all liabilities and the associated costs and expenses (including attorney's fees, expert's fees, and costs of investigation (all of the foregoing being collectively called "Indemnified Liabilities"), caused in whole or in part by Supplier's breach of any term or provision of this Agreement, or in whole or in any part by any negligent, grossly negligent or intentional acts, errors or omissions by Supplier, its employees, officers, agents or representatives in the performance of this Agreement or that are for, that are in the nature of, or that arise under, strict liability or products liability with respect to or in connection with the Items. The indemnity by Supplier in favor of Buyer shall extend to Buyer, its officers, directors, agents, and representatives and shall include and is intended to include Indemnified Liabilities which arise from or are caused by, in whole or in part, the concurrent negligence, including negligence or gross negligence of Supplier but shall not extend to Indemnified Liabilities to the extent such are caused by the negligence or willful misconduct of Buyer. Supplier assumes no liability under this warranty for system failures, personal injury or property damage resulting from improper operation, improper maintenance, abuse or modifications from the original product specifications or configuration on the part of Buyer, it's customers, agents and other third parties.

23. Force Majeure

A failure by either party to perform due to causes beyond the control and without the fault or negligence of the party is deemed excusable during the period in which the cause of the failure persists. Such causes may include, but not be limited to, acts of God or the public enemy, acts of the Government in either sovereign or contractual capacity, fires, floods, epidemics, strikes, freight embargoes and unusually severe weather. If the failure to perform is caused by the default of a subcontractor, and such default arises out of causes beyond the control of both the Supplier and subcontractor, and without the fault or negligence of either of them, the Supplier will not be liable for any excess cost for failure to perform, unless the supplies or services to be furnished by the subcontractor were obtainable from other sources in sufficient time to permit the Supplier to meet the required delivery releases. When Supplier becomes aware of any potential force majeure condition as described in this Agreement, Supplier shall immediately notify Buyer of the condition and provide relevant details.

24. Changes

Buyer may at anytime, by a written order and without notice to sureties or assignees, suspend performance hereunder, increase or decrease the Agreement quantities, or make changes within the general scope of this Agreement in any one or more of the following:

(a) applicable drawings, designs, or specification;

(b) method of shipment or packing, and/or;

(c) place and date of delivery;

(d) place and date of inspection or acceptance.

If any such change causes an increase or decrease in the cost of or time required for performance of the Agreement, an equitable adjustment shall be made in the Agreement price or delivery schedule, or both, and the Agreement shall be modified in writing accordingly. No claim by Supplier for adjustment hereunder shall be valid unless asserted within thirty (30) days from the date of receipt by Supplier of the notification of change, provided, however, that such period may be extended upon the written approval of Buyer. However, nothing in this clause shall excuse Supplier from proceeding with the Agreement as changed or amended.

25. Termination for Default

(a) Buyer may, by notice, terminate this Agreement in whole or in part (i) if Supplier fails to deliver goods or services on agreed delivery schedules or any installments thereof strictly within the time specified; (ii) if Supplier fails to replace or correct defective goods or services; (iii) if Supplier fails to comply strictly with any provision of, or repudiates this agreement, or (iv) Supplier defaults under, or any event or condition stated to be a default occurs under, any provision of the Agreement, including these Applied Materials Standard Terms and Conditions of Purchase.

(b) In the event of termination pursuant to this Section:

(i) Supplier shall continue to supply any portion of the Items contracted for under this Agreement that are not terminated;

(ii) Supplier shall be liable for additional costs, if any, for the purchase of such similar goods and services to cover such default;

(iii) At Buyer's request Supplier will transfer title and deliver to Buyer (1) any completed goods, (2) any partially completed goods and (3) all unique materials. Prices for partially completed goods and unique materials so accepted shall be negotiated. However, such prices shall not exceed the Agreement price per item.

(c) Buyer's rights and remedies herein or otherwise stated in this Agreement, any Purchase Order, Comprehensive Supplier Agreement or Basic Supplier Agreement are in addition to and shall not limit or preclude resort to any other rights and remedies provided by law or in equity. Termination under this Agreement shall constitute "cancellation" under the Uniform Commercial Code.

26. Termination for convenience

(a) Buyer may terminate, for convenience, work under this Agreement in whole or in part, at any time by written or electronic notice. Upon any such termination Supplier shall, to the extent and at the time specified by Buyer, stop all work on this Agreement, place no further orders hereunder, terminate work outstanding hereunder, assign to Buyer all Supplier's interests under terminated subcontracts and Agreements, settle all claims thereunder after obtaining Buyer's approval, protect all property in which Buyer has or may acquire an interest, and transfer title and make delivery to Buyer of all Items, materials, work in process, or other things held or acquired by Supplier in connection with the terminated portion of this Agreement. Supplier shall proceed promptly to comply with Buyer's directions respecting each of the foregoing without awaiting settlement or payment of its termination claim.

(b) Within six (6) months from such termination, Supplier may submit to Buyer its written claim for termination charges, in the form and with supporting data and detail prescribed by Buyer. Failure to submit such claim within the prescribed time frame and with such items shall constitute a waiver of all claims and a release of all Buyer's liability arising out of such termination.

(c) The parties may agree upon the amount to be paid Supplier for such termination. If they fail to agree, Buyer shall pay Supplier the amount due for Items delivered prior to termination and in addition thereto but without duplication, shall pay the following amounts:

(i) The contract price for all Items completed in accordance with this Agreement and not previously paid for;

(ii) The actual costs for work in process incurred by Supplier which are properly allocable or apportionable under Generally Accepted Accounting Principles (GAAP) to the terminated portion of this Agreement and a sum constituting a fair and reasonable profit on such costs. The Supplier agrees to keep true, complete, and accurate records in compliance with GAAP for the purpose of determining allocability of Suppliers costs under this agreement. Such records shall contain sufficient detail to permit a determination of the accuracy of the costs; Independent nationally recognized accountants (the "Auditor") designated by Buyer and reasonably acceptable to Supplier shall have the right, at Buyer's expense and upon reasonable notice, to conduct audits of all of the relevant books and records of Supplier in order to determine the accuracy and allocability of costs submitted by Supplier to Buyer under this provision.

(iii) The reasonable costs of Supplier in making settlement hereunder and in protecting Items to which Buyer has or may acquire an interest.

(d) Payments made under subparagraphs (c)(i) and (c)(ii) shall not exceed the aggregate price specified in this Agreement, less payment otherwise made or to be made. Buyer shall have no obligation to pay for Items lost, damaged, stolen or destroyed prior to delivery to Buyer.

(e) The foregoing paragraphs (a) to (d) inclusive, shall be applicable only to a termination for Buyer's convenience and shall not affect or impair any right of Buyer to terminate this Agreement for Supplier's default in the performance hereof.

Confidential Materials omitted and filed separately with the
Securities and Exchange Commission. Asterisks denote omissions.

ATTACHMENT 1A
FIXED PRICING

PART NO	PART DESCRIPTION	UNIT PRICE
0010-00744	HE PRESSURE CONTROL (20SCCM) ASSY	$ [**]
0010-13150	ASSY, IHC CAMBER D $ SHC (20SCCM)	$ [**]
0010-13152	ASSY, IHC CHAMBERD D & SHC (50 SCCM)	$ [**]
0010-35404	IHC ASSY, 5200 MCVD CENTURA	$ [**]
0010-35650	ASSY, INDEPENDENT HELIUM CONTROL	$ [**]
0010-40240	IHC ASSY,5300 W/RSTR	$ [**]
0010-76952	ASSY, IHC CHAMBER A, B, AND C, (50 SCCM)	$ [**]
0190-18037	ASSEMBLY, DUAL IHC	$ [**]
0224-01921	XDCR, MKS, 0-100 PSI 1/4FVCR 12-32VDC 15P-D 5RA	$ [**]
0224-42759	XDUCER, PRESSUER -MKS 850 5RA G223	$ [**]
0225-10104	1 TORR VCR MONOMETER	$ [**]
0225-10105	100 TR VCR MONOMETER	$ [**]
0225-33295	XDCR, PRESS 0-10TORR, 1/2 VCR	$ [**]
0226-09052	45D BARATRON W/VCR FTG, 10 TORR 10948-1	$ [**]
0226-10754	EXDCR PRESSURE 0-10TORR, 1/2 VCR 0222-	$ [**]
0226-40111	TRANSDUCER,THRU TUBE,MKS TYPE 852,F-F,BENDIX	$ [**]
0226-41024	CABLE METER XDCR 0-100PSI 15PIN-D 27IN.L	$ [**]
0226-41187	XDCR PRESS 0-100 PSIG 1/4 VCR F/F 13-32VDC 10RA	$ [**]
0226-41188	METER XDCR 3-1/2 LCD 0-100 PSIG 13-32VDC 15 PIN-D	$ [**]
05-88029-00	CABLE SHLD W/RT ANG CON	$ [**]

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ATTACHMENT 1A
FIXED PRICING

PART NO	PART DESCRIPTION	UNIT PRICE
0620-01022	CABLE ASSY 12 COND 22AWG SHIELDED MUTLI-COLOR	$ [**]
0620-02563	CABLE ASSY SENSOR HEAD - BARATRON	$ [**]
0690-01954	BRKT SENSOR HEAD MTG	$ [**]
1040-01092	METER XDCR 3-1/2LCD 0-60PSI 12-32VCD 15PIN-D	$ [**]
1350-01005	XDCR PRESS 1TORR 8VCO-F +/-15VDC @ 250MA 45C	$ [**]
1350-01011	XDCR PRESS 0-10 TORR VCO D CONNECTOR	$ [**]
1350-01016	XDCR PRESS 10TORR 8VCO-F +/-15VDC @ 250 MA 45C	$ [**]
1350-01019	XDCR PRESS 0-10TORR 8 VCR WIRE STRIP CONN SP	$ [**]
1350-01021	XDCR PRESS 100MTORR 8VCR-F +/-15VDC @ 250MA 45C	$ [**]
1350-01025	XDCR PRESS 100TORR 8VCR-F +/-14VDC @ 250MA 45C	$ [**]
1350-01035	XDCR PRESS 0-100 TORR VCR D CONN	$ [**]
1350-01036	XDCR PRESS 0-1 TORR VCR D CONNECTOR	$ [**]
1350-01045	XDCR PRESS 10TORR 8VCR-F +/-15VDC @ 250MA 45C	$ [**]
1350-01051	XDCR PRESS BARATRON, HEATED 10 TORR	$ [**]
1350-01052	XDCR PRESS BARATRON, HEATED 100 TORR	$ [**]
1350-01055	XDCR PRESS 10 TORR CAJON 8 VCR FEMALE FTG .12%	$ [**]
1350-01072	XDCR PRESS 1000TORR 8VCR-F +/-15VDC @ 250MA 45C	$ [**]

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ATTACHMENT 1A
FIXED PRICING

PART NO	PART DESCRIPTION	UNIT PRICE
1350-01075	XDCR PRESS 0-100TORR SHRT 8FVCR TERM-STRIP +/-15V	$ [**]
1350-01078	XDCR PRESS 0-250PSIA 1/4VCR-M/M 0-10VDC 6'PIGTAIL	$ [**]
1350-01079	XDCR PRESS 2TORR 8VCR-F +/-15VDC @ 250MA 45DED-C	$ [**]
1350-01083	XDCRPRESS 0-60PSIA 1/4VCR-M 12-32VDC 50DEGC 10RA	$ [**]
1350-01086	XDCR PRESS 0-1000TORR 1/4VCR-M 12-32VDC 50C 10RA	$ [**]
1350-01089	XDCR PRESS 100MTORR 1/8FVCR .25%ACC 100C 15-PDSUB	$ [**]
1350-01092	XDCR PRESS 1TORR 1/2FVCR .12%ACC 45DEG-C 15P-DSUB	$ [**]
1350-01098	XDCR PRESS 1TOR 1/2FVCR .25%ACC 100C 150-DSUB	$ [**]
1350-01101	XDCR PRESS 2-100TORR 1/2VCR-F .5%ACC +/-15VDC	$ [**]
1350-01102	XDCR PRESS 10TORR 8FVCR DCONN +/-15VDC@35MA .93"L	$ [**]
1350-01121	XDCR PRESS 0-20TORR 45C 15VDC 15P D-CONN 1/2"VCO	$ [**]
1350-01143	XDCR PRESS 1TORR RF FLTR 8FVCR +/-15VDC@250MA 45C	$ [**]
1400-01217	SNSR HEAD 1 TORR 1/4VCR W/ THERMAL BLANKER	$ [**]
3030-01050	MFC 1159 50SCCM HE 1/4VCR VITON N/C 15P-DSUB SST	$ [**]

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ATTACHMENT 1A

FIXED PRICING

PART NO	PART DESCRIPTION	UNIT PRICE
3030-01172	MFC 1159 20SCCM HE 1/4VCR VITON N/C 9P-DSUB SST	$ [**]
3870-01463	VALVE EXHAUST THROTTLE 1 3/8IDXKF40 W/KEMREZ ORING	$ [**]
3870-02311	VALVE BUTTERFLY THROTTLE W/KF 40 FLANGE	$ [**]

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ATTACHMENT 1A

AUSTIN BUSROUTE

PARTNO	PARTDESC	UNITPRICE
0010-00744	HE PRESSURE CONTROL (20SCCM) ASSY	$ [**]
0010-13150	ASSY, IHC CHAMBER D $ SHC (20SCCM)	$ [**]
0010-13152	ASSY, IHC CHAMBER D & SHC (50SCCM)	$ [**]
0010-35404	IHC ASSY,5200 MCVD CENTURA	$ [**]
0010-35650	ASSY,INDEPENDENT HELIUM CONTROL	$ [**]
0010-37643	ASSY,INDEPENDENT HELIUM CONTROL,DPS WOUT/FILTER	$ [**]
0010-40240	ICH ASSY,5300 W/RSTR	$ [**]
0010-76952	ASSY, IHC CHAMBER A,B, AND C, (50 SCCM)	$ [**]
0190-18037	ASSEMBLY, DUAL IHC	$ [**]
0620-02211	CABLE ASSY TRANSDUCER 27"LG 15P-D CONN	$ [**]
1040-01093	METER XDCR 3.1/2 LCD 0-100 PSI 13032VDC 15PIN-D	$ [**]
1350-01012	XDCR PRESS 0-100 TORR VCO D CONNECTION	$ [**]
1350-01025	XDCR PRESS 100TORR 8VCR-F +/-15VDC @ 250MA 45C	$ [**]
1350-01026	XDCR PRESS 1TORR 8VCR-F +/-15VDC @ 250MA 45C	$ [**]
1350-01027	XDCR PRESS 0-1000 TORR W/FEM #8 VCO D CONN	$ [**]
1350-01028	XDCR PRESS 2-1000 TORR CAJON 8 VCR FEM FTG	$ [**]
1350-01039	XDCR 0-10 TORR CAP MANO 1/2 VCR D-CONN	$ [**]
1350-01045	XDCR PRESS 10TORR 8VCR-F +/-15VDC @ 250MA 45C	$ [**]
1350-01067	XDCR PRESS 100MTORR 45C 15VDC 8VCR FEM FTG VERTCL	$ [**]

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ATTACHMENT 1A

AUSTIN BUSROUTE

PARTNO	PARTDESC	UNITPRICE
1350-01091	XDCR PRESS 100TORR 1/2FVCR .12%ACC 45C 15P-DSUB	$ [**]
1350-01110	XDCR PRESSURE 100TORR 1/2FVCR 15P-DSUB W/OVERPRES	$ [**]
1350-01121	XDCR PRESS 0-20TORR 45C 15VDC 15P D-CONN 1/2" VCO	$ [**]
1350-01124	XDCR PRESS SPEC CALIBRTN 10/100MTORR 1/8FVCR 1%AC	$ [**]
1350-01133	XDCR PRESS 0-100PSI 1/4VCR F/F 15P D 13-32VDC 10RA	$ [**]
1350-01138	XDCR PRESS 0-10TORR 1/2VCR FEMALE 2SET POINTS	$ [**]
1350-01141	XDCR PRESS 0-100TORR 0-10VDC OUT 1/4VCR 1% 9PD	$ [**]
1350-01143	XDCR PRESS 1TORR RF FLTR 8FVCR +/-15VDC@250MA 45C	$ [**]
1350-01212	XDCR PRESS 1TORR 1/2FVCR .12%ACC 45C HORIZ 15P-D	$ [**]
3030-01113	MFC1159 50SCCM HE 1/4VCR VITON N/C 15P-DSUB SST	$ [**]
3030-02284	MFC 1159 2SLM AR 1/4VCR VITON N/C 15P-DSUB SST	$ [**]
3870-02373	VALVE EXH THROT 1-3/9ID X KF40 W/CHMRZ ORING 15P-D	$ [**]
3920-01278	CNTRL PRESS 640 SER 10T 1/4VCR VITON CAJON MALE	$ [**]

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ATTACHMENT 1A

SANTA CLARA BUSROUTE

PARTNO	PARTDESC	UNITPRICE
0010-37643	ASSY,INDEPENDENT HELIUM CONTROL,DPS WOUT/FILTER	$ [**]
0620-02211	CABLE ASSY TRANSDUCER 27"LG 15P-D CONN	$ [**]
0720-03620	CONN ADPTR 15P-D TO 9P-HEX 1FT CABLE	$ [**]
1040-01012	METER SENSOR 0-10VDC 50/60HZMULTI-RANGE	$ [**]
1040-01092	METER XDCR 3-1/2LCD 0-60PSI 12-32VDC 15PIN-D	$ [**]
1040-01093	METER XDCR 3.1/2 LCD 0-100 PSI 13-32VDC 15PIN-D	$ [**]
1270-01803	SW PRESS FLOWTHRU -25TORR GUAGE SP 1/4MVCR 9P-D	$ [**]
1350-01012	XDCR PRESS 0-100 TORR VCO D CONNECTOR	$ [**]
1350-01026	XDCR PRESS 1TORR 8VCR-F +/-15VDC @ 250MA 45C	$ [**]
1350-01027	SDCR PRESS 0-1000 TORR W/FEM #8VCO D CONN	$ [**]
1350-01028	XDCR PRESS 2-1000 TORR CAJON 8 VCR FEM FTG	$ [**]
1350-01035	XDCR PRESS 0-100 TORR VCR D CONN	$ [**]
1350-01039	XDCR 0-10 TORR CAP MANO 1/2 VCR D-CONNN	$ [**]
1350-01054	XDCR PRESS 1000MMHG 1/8FVCR .12%ACC 45C W/SET-PT	$ [**]
1350-01055	XDCR PRESS 10 TORR CAJON 8 VCR FEMALE FTG .12%	$ [**]
1350-01067	XDCR PRESS 100MTORR 45C 15VDC 8VCR FEM FTG VERTCL	$ [**]
1350-01068	XDCR PRESS 1--,TPRR 45C 15VDC 9VCR FE, FTG HORIZT	$ [**]

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ATTACHMENT 1A

SANTA CLARA BUSROUTE

PARTNO	PARTDESC	UNITPRICE
1350-01090	XDCR PRESS 10TORR 1/8FVCR .25%ACC 100C 15P-DSUB	$ [**]
1350-01093	XDCR PRESS 1000TORR 1/4FVCR +/-12-32V 0-10VDC 9PD	$ [**]
1350-01096	XDCR PRESS 10TORR 1/4VCR-F +/-14VDC 15P-D SET-PT	$ [**]
1350-01097	XDCR PRESS 10-100TORR 1/4VCR-F +/-15VDC 15P-D	$ [**]
1350-01103	XDCR PRESS 0-60PSIA 1/4VCR-F/F 15D 12-32VDC 10RA	$ [**]
1350-01124	XDCR PRESS SPEC CALIBRTN 10/100MTORR 1/8FVCR 1%AC	$ [**]
1350-01131	XDCRPRESS 1000 TORR 1/4VCR 1% 9PIN DSUB	$ [**]
1350-01133	XDCR PRESS 0-100PSI 1/4VCR F/F 15P D 13032VDC 10RA	$ [**]
1350-0113893	XDCR PRESS 0-10TORR 1/2VCR FEMALE 2SET POINTS	$ [**]
1350-01140	XDCR PRESS 10TORR 8VCR-F +/-15VDC @ 35MA 50C	$ [**]
1350-01163	XDCR PRESS 10-100 TORR 1/4VCR-F +/-15VDC	$ [**]
3030-01113	MFC1159 50SCCM HE 1/4VCR VITON N/C 15P-DSUB SST	$ [**]
3030-01172	MFC 1159 20SCCM HE 1/4VCR VITON N/C 9P-DSUB SST	$ [**]
3870-01470	VALVE THROTTLE TVC 100MM SMART NW50 W/CNTRL HITEMP	$ [**]
3870-01512	VALVE THROTTLE TVC 50MM SMART NW50 W/CNTRL HI-TEMP	$ [**]

Confidential Materials omitted and filed separately with the Securities and Exchange Commission. Asterisks denote omissions.

ATTACHMENT 1A

SANTA CLARA BUSROUTE

PARTNO	PARTDESC	UNITPRICE
3870-01817	VALVE EXH THRTL NW160 8.9PDX5.879ID 2CTR-BORE-HOL	$ [**]
3920-01278	CNTRL PRESS 640 SER 107 1/4VCR VITON CAJON MALE	$ [**]

Confidential Materials omitted and filed separately with the
Securities and Exchange Commission. Asterisks denote omissions.

ATTACHMENT 1B

SERVICE AND REPAIR

AMAT PARTNO	ITEM DESCRIPTION	MKS PARTNO	CAL PRICE	REBUILD PRICE
010-00744	HE PRESSURE CONTROL (20SCCM) ASSY	121002-G1	[**]	[**]
010-13150	ASSY, IHC CHAMBER D $ SHC (20SCCM)	121002-G2	[**]	[**]
01110-13152	ASSY, IHC CHAMBER D & SHC (50 SCCM)	1210-02-G4	[**]	[**]
010-35404	IHC ASSY, 5200 MCVD CENTURA	202407	[**]	[**]
010-35650	ASSY, INDEPENDENT HELIUM CONTROL	202258	[**]	[**]
010-37643	ASSY, INDEPENDENT HELIUM CONTROL, DPS WOUT/FILTER	120657-G2	[**]	[**]
010-40240	IHC ASSY, 5300 W/RSTR	190094-G1	[**]	[**]
010-76952	ASSY, IHC CHAMBER A, B, AND C 50 SCCM)	121002-G3	[**]	[**]
190-18037	ASSEMBLY, DUAL IHC	202406	[**]	[**]
224-01921	XDCR, MKS, 0-100 PSI 1/4FVCR 12-32VDC 15P-5RA	852B-13384	[**]	[**]
224-42759	XDUCER, PRESSURE -MKS 850 5RA G223	850A-12951	[**]	[**]
225-10104	1 TORR VCR MONOMETER	127A-00001B	[**]	[**]
225-10105	100 TR VCR MONOMETER	127A-00100B	[**]	[**]
225-33295	XDCR, PRESS 0-10TO44,1/2VCR	122BA-00010BB	[**]	[**]
226-09052	45D BARATRON W/VCR FTG, 10 TORR 10948-1	127BA-00010BB	[**]	[**]
226-10754	EXDCR PRESSURE 0-10TORR, 1/2VC 0222-	127A-11356	[**]	[**]
226-40111	TRANSDUCER, THRU TUBE, MKS TYPE 852, F-F, BENDIX	852B61PCJ4GH	[**]	[**]
226-41024	CABLE METER XDCR O-100PSI 15PIN-D27IN.L	CB852-5-2.5	[**]	[**]

226-41187	XDCR PRESS 0-100 PSIG 1/4 VCR F/F 13-32VDC 10RA	842B12PCJ2GC	[**]	[**]
226-41188	METER XDCR 3-1/2 LCD 0-100 PSIG 13-32VDC 15 PIN-D	LDM-A12PB2CC1	[**]	[**]
6-88029-00	CABLE SHLD W/RT ANG CON	CB036-11075	[**]	[**]
620-01022	CABLE ASSY 12 COND 22AWG SHIELDED MULTI-COLOR	CB036-11016	[**]	[**]
620-02211	CABLE ASSY TRANSDUCER 27"LG 15P-D CONN	CB852-5-2.5	[**]	[**]
620-02563	CABLE ASSY SENSOR HEAD - BARATRON	CB036-11016	[**]	[**]
690-01954	BRKT SENSOR HEAD MTG		[**]	[**]
720-03620	CONN ADPTR 15P-D TO 9P-HEX 1FT CABLE	CB6551-31-1	[**]	[**]
040-01012	METER SENSOR 0-10VDC 50/60HZMULTI-RANGE	170M-6C	[**]	[**]
040-01092	METER XDCR 3-1/2CD 0-60PSI 12-32VDC 15PIN-D	LDM-A61PA2CC1	[**]	[**]
040-01093	METER XDCR 3.1/2 LCD 0-100 PSI 13-32VDC 15PIN-D	LDM-A12PA2CC1	[**]	[**]
270-01803	SW PRESS FLOWTHRU -25 TORR GAUGE SP 1/4MVCR 9P-D	42A13DCH2AA025	[**]	[**]
350-01005	XDCR PRESS 1TORR 8VCO-F +/-15VDC @ 250MA 45C	127A-00001E	[**]	[**]
350-01011	XDCR PRESS 0-10 TORR VCO D CONNECTOR	122BA-00010EB	[**]	[**]
350-01012	XDCR PRESS 0-100 TORR VCO D CONNECTOR	122BA-0010EB	[**]	[**]
350-01016	XDCR PRESS 10TORR 8VCO-F +/-15VDC @ 250MA 45C	127AA-00010E	[**]	[**]
350-01019	XDCR PRESS 0-10 TORR 8 VCR WIRE STRIP CONN SP	122A-116063	[**]	[**]
350-01021	XDCR PRESS 100MTORR 8VCR-F +/-15VDC @ 250MA 45C	127AA-000.1B	[**]	[**]
350-01025	XDCR PRESS 100TORR 8VCR-F +/-15VDC @ 250MA 45C	127A-00100B	[**]	[**]

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Securities and Exchange Commission. Asterisks denote omissions.

350-01026	XDCR PRESS 1TORR 8VCR-F +/- 15VDC @ 250MA 45C	127A-00001B	[**]	[**]
350-01027	XDCR PRESS 0-1000 TORR W/FEM #8 VCO D CONN	122BA-0100EB	[**]	[**]
350-01028	XDCR PRESS 2-1000 TORR CAJON 8 VCR FEM FTG	124AA010000BB	[**]	[**]
350-01035	XDCR PRESS 0-100 TORR VCR D CONN	122BA-00100BB	[**]	[**]
350-01036	XDCR PRESS 0-1 TORR VCR D CONNECTOR	122BA-00001BB	[**]	[**]
350-01039	XDCR 0-10 TORR CAP MANO1/2VCR D-CONN	122B-11411	[**]	[**]
350-01045	XDCR PRESS 10TORR 8VCR-F +/-15 VDC @ 250MA 45C	127A-00010B	[**]	[**]
350-01051	XDCR PRESS BARATRON, HEATED 10 TORR	621C11TBFHC	[**]	[**]
350-01052	XDCR PRESS BARATRON, HEATED 1000 TORR	621C13TBFH	[**]	[**]
350-01054	XDCR PRESS 1000MMHG 1/8FVCR.12%ACC 45C W/SET-PT	624A13TBC	[**]	[**]
350-01055	XDCR 10 TORR CAJON 8 VCR FEMALE FTC.12%	627A11TBC	[**]	[**]
350-01067	XDCR PRESS 100MTORR 45C 15VDC 8VCR FEM FTG VERTCL	627A.1TBD	[**]	[**]
350-01068	XDCR PRESS 100MTORR 45C 15VDC 8VCR FEM FTG HORIZT	627A-11985	[**]	[**]
350-01072	XDCR PRESS 100OTORR 8VCR-F +/-15VDC @ 250MA 45C	127AA-0100B	[**]	[**]
350-01075	XDCR PRESS 0-100TORR SHRT 8FVCR TERM-STRIP +/-15V	122A-11064	[**]	[**]
350-01078	XDCR PRESS 0-250PSIA 1/4VCR-M/M 0-10VDC 6"PIGTAIL		[**]	[**]
350-01079	XDCR PRESS 2TORR 8VCR-F +/-15VDC @ 250MA 45DED-C	127AA-00002B	[**]	[**]
350-01083	XDCR PRESS 0-60PSIA 1/4VCR-M 12-32VDC 50DECG 10RA	852B61PCA2NC	[**]	[**]
350-01086	XDCR PRESS 0-1000TORR 1/4 VCR-M12-32VDC 50C 10RA	852BA13TCA2NC	[**]	[**]

Confidential Materials omitted and filed separately with the
Securities and Exchange Commission. Asterisks denote omissions.

350-01089	XDCR PRESS 100MTORR 1/8FVCR .25%ACC 100C 15P-DSUB	628A.1TBE	[**]	[**]
350-01090	XDCR PRESS 10TORR 1/8FVCR .25%ACC 100C 15P-DSUB	628A12TBC	[**]	[**]
350-01091	XDCR PRESS 100TORR 1/2FVCR .12%ACC 45C 15P-DSUB	627A12TBC	[**]	[**]
350-01092	XDCR PRESS 1TORR 1/2FVCR .12%ACC 45DEG-C 15P-DSUB	627A01TBC	[**]	[**]
350-01093	XDCR PRESS 1000TORR 1/4FVCR +/-12-32V 0-10VDC 9PD	751A-12772	[**]	[**]
350-01096	XDCR PRESS 10TORR 1/4VCR-F +/-15VDC 15P-D SET-PT	R750B11TCD2GC	[**]	[**]
350-01097	XDCR PRESS 10-100TORR 1/RVCR-F +/-15VDC 15P-D	CV7527A-01	[**]	[**]
350-01098	XDCR PRESS 1TOR 1/2FVCR .25%ACC 100C 15P-DSUB	628A01TBE	[**]	[**]
350-01101	XDCR PRESS 2-100TORR 1/2VCR-F .5%ACC +/-15VDC	124AA-00100BB	[**]	[**]
350-01102	XDCR PRESS 10TORR 8FVCR DCONN +/-15VDC@35MA .93"L	122B-12773	[**]	[**]
350-01103	XDCR PRESS 0-60PSIA 1/4VCR-F/F 15D 12-32VDC 15RA	852B61PCJ2GC	[**]	[**]
350-01110	XDCR PRESSURE 100TORR 1/2FVCR 15P-DSUB W/OVERPRE	624A-13092	[**]	[**]
350-01121	XDCR PRESS 0-20TORR 45C 15VDC 15P D-CONN 1/2"VCO	627A-13267	[**]	[**]
350-01124	XDCR PRESS SPEC CALIBRTN 10/100MTORR 1/8FVCR 1%AC	628A-13114	[**]	[**]
350-01131	XDCRPRESS 1000 TORR 1/4VCR 1% SPIN DSUB	750B13TCD2GA	[**]	[**]
350-01133	XDCR PRESS 0-100PSI 1/4VCR F/F 15P D 13-32VDC 10RA	852B12TCJ2GC	[**]	[**]
350-01138	XDCR PRESS 0-10TORR 1/2VCR FEMALE 2SET POINTS	625A-13127	[**]	[**]
350-01140	XDCR PRESS 10TORR 8VCR-F +/-15VDC @ 35MA 50C	626A11TBE	[**]	[**]

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Securities and Exchange Commission. Asterisks denote omissions.

350-01141	XDCR PRESS 0-100TORR 0-10VDC OUT 1/4VCR 1% 9PD	750B12TCD2GA	[**]	[**]
350-01143	XDCR PRESS 1TORR RF FLTR 8FVCR +/-15VDC@250MA 45C	127A-13608	[**]	[**]
350-01163	XDCR PRESS 10-100 TORR 1/4VCR-F +/-15VDC	CV7627A-05	[**]	[**]
350-01212	XDCR PRESS 1TORR 1/2FVCR .125ACC 45C HORIZ 15P-D	627A-14974	[**]	[**]
400-01217	SNSR HEAD 1 TORR 1/4VCR W/THERMAL BLANKER		[**]	[**]
3030-01050	MFC 1159 50SCMM HE 1/4VCR VITON N/C 15P-DSUB SST	1159B-00059SV-S	[**]	[**]
3030-01113	MFC1159 50SCCM HE 1/4VCR VITON N/C 15[-DSUB SST	1159B-00050RV-sp	[**]	[**]
3030-01172	MFC 1159 20SCCM HE 1/4VCR VITON N/C 9[-DSUB SST	1159B-00020RV-S	[**]	[**]
3030-02284	MFC 1159 2SLM AR 1/4VCR VITON N/C 15P-DSUB SST	1159B-02000RV-S	[**]	[**]
3870-01463	VALVE EXHAUST THROTTLE 1 3/8DXKF40 W/KEMREZ ORING	253B-11203	[**]	[**]
3870-01470	VALVE THROTTLE TVC 100MM SMART NW50 W/CINTRL HITEM	153C-1-100-2	[**]	[**]
3870-01512	VALVE THROTTLE TVC 50MM SMART NW50 W/CNTRL HI-TEM	153C-2-50--2	[**]	[**]
3870-01817	VALVE EXH THRTL NW160 8.9ODX5.87691D 2CTR-BORE-HOL	653B-13071	[**]	[**]
3870-02311	VALVE BUTTERFLY THROTTLE W/KF 40 FLANGE	253B-02311	[**]	[**]
3870-02373	VALVE EXH THROT 1-3/81D X KF40 W/CHMRZ ORIGN 15P-D	253B-11203	[**]	[**]
3920-01278	CNTRL PRESS 640 SER 10T 1/4VCR VITON CAJON MALE	640A12TW1V12-S	[**]	[**]

ATTACHMENT 2

APPLIED MATERIALS, Inc.

CORPORATE FISCAL CALENDAR 1998

1ST QUARTER

WK	M	T	W	T	F	S	S
	NOVEMBER						
1	27	28	29	30	31	1	2
2	3	4	5	6	7	8	9
3	10	11	12	13	14	15	16
4	17	18	19	20	21	22	23
5	24	25	26	[27]	[28]	29	30
	DECEMBER						
6	1	2	3	4	5	6	7
7	8	9	10	11	12	13	14
8	15	16	17	18	19	20	21
9	22	23	24	[25]	/26/	27	28
	JANUARY						
10	/29/	/30/	/31/	[1]	/2/	3	4
11	5	6	7	8	9	10	11
12	12	13	14	15	16	17	18
13	19	20	21	22	23	24	25

2ND QUARTER

WK	M	T	W	T	F	S	S
	FEBRUARY						
14	26	27	28	29	30	31	1
15	2	3	4	5	6	7	8
16	9	10	11	12	13	14	15
17	[16]	17	18	19	20	21	22
	MARCH						
18	23	24	25	26	27	28	1
19	2	3	4	5	6	7	8
20	9	10	11	12	13	14	15
21	16	17	18	19	20	21	22
	APRIL						
22	23	24	25	26	27	28	29
23	30	31	1	2	3	4	5
24	6	7	8	9	10	11	12
25	13	14	15	16	17	18	19
26	20	21	22	23	24	25	26

3RD QUARTER

M	T	W	T	F	S	S	WK
MAY							
27	28	29	30	1	2	3	27
4	5	6	7	8	9	10	28
11	12	13	14	15	16	17	29
18	19	20	21	22	23	24	30
JUNE							
[25]	26	27	28	29	30	31	31
1	2	3	4	5	6	7	32
8	9	10	11	12	13	14	33
15	16	17	18	19	20	21	34
JULY							
22	23	24	25	26	27	28	35
29	30	1	2	[3]	4	5	36
6	7	8	9	10	11	12	37
13	14	15	16	17	18	19	38
20	21	22	23	24	25	26	39

4TH QUARTER

M	T	W	T	F	S	S	WK
AUGUST							
27	28	29	30	31	1	2	40
3	4	5	6	7	8	9	41
10	11	12	13	14	15	16	42
17	18	19	20	21	22	23	43
SEPTEMBER							
24	25	26	27	28	29	30	44
31	1	2	3	4	5	6	45
[7]	8	9	10	11	12	13	46
14	15	16	17	18	19	20	47
OCTOBER							
21	22	23	24	25	26	27	48
28	29	30	1	2	3	4	49
5	6	7	8	9	10	11	50
12	13	14	15	16	17	18	51
19	20	21	22	23	24	25	52

[ ] = HOLIDAYS (US ONLY)   / / = SHUTDOWN (US ONLY) | | = HOLIDAYS (AMJ ONLY)

ATTACHMENT 3

DELIVERY MECHANICS

TYPE 1 PURCHASE ORDER (P.O) RELEASE

Releases against this Agreement will be made by issuing purchase orders. Delivery dates shall refer to dates of receipt at Buyer's facility. Seller will not deliver items more than five (5) calendar days in advance of Buyer's required delivery dates without prior approval.

TYPE 5 JUST-IN-TIME/BUS ROUTE MECHANICS

A. This Agreement authorizes Seller to create and maintain inventory, subject to the terms of this Agreement, for the Bus Route Program in accordance to and subject to Article 5 of the Master Purchase Order and Sales Agreement. Items to be included in the Bus Route Program are found in Attachment 1 of the Master Purchase Order and Sales Agreement.

B. Buyer will notify Seller of requirements via facsimile or EDI transmission. (Requirements may be released twice a day, seven days week, no later than 6:00 a.m. and 3:00 p.m.).

C. Seller will attach all "pick cards" to the requested material prior to shipment for easy identification by Buyer.

D. Seller shall have all items ready for pick up by Buyer's truck within three hours of receipt of requirements. Or. Seller can deliver parts to Buyer by 9:00 a.m. for morning requirements and 6:00 p.m. for afternoon requirements.

E. If the "pick card" requirement cannot be filled, Seller shall return to Buyer the pick card indicating a back order.

F. For back ordered items Seller will receive a new "pick card" the following day which will have "Back Order" written on it. The Seller should attach the material to this "pick card" with a red dot which identifies the item as a filled back order to the Buyer.

G. Seller will be paid based on Buyer's CMR Transaction Summary, and in accordance with the following, depending on Buyer's Bus Route location:

For Austin, Texas Bus Route:

THE END DATE OF EACH TRANSACTION WEEK WILL BE USED AS THE INVOICE NUMBER FOR PAYMENT OF AUSTIN BUS ROUTE INVOICES, I.E. FRIDAY, APRIL 1, 1995 WOULD BE INVOICE #040195A.

For Santa Clara, California Bus Route:

THE PRINT DATE OF THE CMR TRANSACTION SUMMARY DOCUMENT WILL BE USED AS THE INVOICE NUMBER FOR PAYMENT OF SANTA CLARA BUS ROUTE INVOICES, I.E. FRIDAY, APRIL 1, 1995 WOULD BE INVOICE #040195A.

H. Seller will maintain records of all Items shipped to Buyer to verify against Buyer's weekly accumulated usage report which will be faxed to Seller each Monday morning.

I. Buyer will make changes (quantity/price) to the transaction summary of discrepancies that occur and are validated. These changes/adjustments will be reflected on the transaction summary the following week for payment.

1. If discrepancies in pricing or quantity are found, SELLER will modify the report accordingly, and fax the corrected copy to BUYER/PLANNER.

2. If no discrepancies are found, no further action is required by SELLER, and payment will be made accordingly.

J. Buyer shall make payment to Seller in accordance with the terms established in this agreement.

Attachment 4

CONFIDENTIAL MATERIALS OMITTED AND FILED SEPARATELY

WITH THE SECURITIES AND EXCHANGE COMMISSION

Confidential Materials omitted and filed separately with the Securities and Exchange Commission. Asterisks denote omissions.

Attachment 5

APPLIED MATERIALS

Packaging Specification

Revision	Change ECO #	Originator/Approver	Date
F	ECO #3684	JKK	
G	ECO #A6452	L.U.	
H	ECO #A6920	L.U.	
J	ECO #24033	Z.A.	10/16/96
K	ECO #30186	B.T.	4/30/97

Confidential Materials omitted and filed separately with the Securities and Exchange Commission. Asterisks denote omissions.

DEFINITIONS & ACRONYMS

AMAT	Applied Materials, Inc.
Amine-free	In reference to anti-static materials, amine-free means those materials that do not contain ethoxylated fatty amines, and most likely contain ethoxylated fatty amides. Amine-free materials do not cause crazing (cracking) damage to polycarbonate based products.
Anti-static	The general term used to describe materials that minimize charge buildup when rubbed against or separated from themselves or other similar materials.
ASTM	American Society for Testing and Materials
Conductive	Materials that have a surface resistivity [**].
Critical Surface Part	Parts that have a finish that is functional (e.g. process parts, reflective surfaces, valves, seals, etc.) or cosmetic (i.e. AMAT Cosmetic Specification 0250-01019, greater than Class III-C) in nature and may be damaged by abrasion and shock impacts.
Electrostatic Discharge	(ESD) A transfer of electrostatic charge between bodies at different electrostatic potentials caused by direct contact or induced by an electrostatic field.
Electrostatic Discharge Sensitive	Device whose physical or electrical characteristics are altered as a result of an electrostatic discharge through or across the surface of the part.
Electrostatic Shielding	Materials that have surface resistivities [**].

Confidential Materials omitted and filed separately with the Securities and Exchange Commission. Asterisks denote omissions.

ESD	Electrostatic Discharge
ESDS	Electrostatic Discharge Sensitive
Faraday Cage	An enclosure made of anti-static and conductive materials to shield ESDS items from electrostatic fields.
Fit For Use	Materials delivered to it's point of use ready for consumption with minimal/ no detrashing.
IBSS	Installed Base Support Services
IC	Integrated Circuit
Insulative	Materials that have surface resistivities [**].
IPA	Isopropyl alcohol
ISTA	International Safe Transit Association
Kanban	The manufacturing line replenishment size. The KRO is a multiple of this quantity.
Kgs.	Kilograms
KRO	Kanban Replenishment Order, the size of order that suppliers will ship to Applied Material's re-supply area
Lb.	Pound
Lbs.	Pounds
Lean Manufacturing	[**].
Mil.	One thousandth of an inch (.001)
Ohms per square	Surface resistivity is expressed as ohms per square. The term is used to describe the resistance between two opposite sides of a square and is independent of the size of the square or its dimensional units.
Package	The packaging material together with the product/part
Packaging	The material that contains the product/part

PCB	Printed Circuit Board
PCBA	Printed Circuit Board Assembly
Static Dissipative	Materials that have a surface resistivity [**].

TABLE OF CONTENTS

SUBJECT PAGE NO.

LIST OF ILLUSTRATIONS

1. PREFACE

This document provides packaging specifications for all shippers of parts to and from Applied Materials including internal shipments to the IBSS spares divisions. This specification is in conformance with all local, federal, and international rules and regulations governing the packaging and safe transportation of materials.

Readers of this document who wish to submit comments, suggestions, or who have questions should contact Applied Materials; Corporate Packaging Engineering Department.

2. SCOPE

This specification provides the general and commodity specific requirements for packaging and packing materials to be used to ship parts, products, and materials to and from all Applied Materials manufacturing, warehousing, and distribution facilities.

3. STANDARD MAINTENANCE

The Corporate Packaging Engineering Department is responsible for maintaining and revising this document.

4. APPLICABLE DOCUMENTS

The following specifications are applicable documents and may be specifically referenced within this specification.

4.1 Applied Materials Specifications

0250-09954 AMAT Workmanship Standard

0250-60124 Applied Materials Unit Package Marking and Labeling Vendor Requirements Specification

0250-70700 Lean Manufacturing Packaging Requirements

0190-75034 Applied Materials Receiving Bar Code Specification

4.2 Third Party Specifications

ASTM D 1974 Standard Practice for Methods of Closing, Sealing, and Reinforcing Fiberboard Containers

ASTM D 4169 Standard Practice for Performance Testing of Shipping Containers and Systems

ASTM D 4727 Standard Specification for Corrugated and Solid Fiberboard Sheet Stock (Container Grade) and Cut Shapes

CFR 49 PARTS 106-180 Code of Federal Regulations, Title 49, Parts 106-180

EIA-541 Electronics Industries Association, Packaging Materials Standards for ESN Sensitive Items

FED-STD-209 Federal Standard Airborne Particulate Cleanliness Classes in Cleanrooms and Clean Zones

ISO 780 International Standards Organization, Packaging - Pictorial Marking for Handling of Goods

ISTA Procedure 1/1A International Safe Transit Association, Pre-Shipment Test Procedures
JSCM 5322 Johnson Space Center, Contamination Control Requirements

MIL-B-131 Military Specification Barrier Materials, Water Vaporproof, Greaseproof, Flexible, Heat Sealable

MIL-B-26195 Military Specification Boxes, Wood-Cleated, Skidded, Load-Bearing Base

MIL-B-81705 Military Specification Barrier Materials, Flexible, Electrostatic Protective, Heat Sealable

MIL-D-3464 Military Specification Desiccants, Activated, Bagged, Packaging Use and Static Dehumidification

MIL-P-116 Military Specification Preservation, Methods of

PPP-B-601 Federal Specification Boxes, Wood, Cleated-Plywood

PPP-B-621 Federal Specification Boxes, Wood, Nailed and Lock-Center

5. CONFORMANCE PRIORITY

The order of supercession is as follows: contracts, purchase orders, drawings, and/or specifications.

6. CONVERSION TABLE

This section is intended to help users determine the proper method of packaging for the part/product they are shipping. Readers of this document must read all sections to ensure compliance with the entire document.

The following table is intended to assist in the identification of the appropriate packaging section.

CATEGORY	POSSIBLE AMAT PART NUMBER PREFIXES	REFERENCED SECTION
General - all parts not referred to elsewhere in this table.		Section 7. "General Packaging Requirements"
Quartz, glass, graphite, ceramic or lamps	0040-, 0200-	Section 8.1 "Ceramics, Quartz, Glass, Graphite"
integrated circuits, print circuits or printed circuit boards	0100-, 0300-	Section 8.2 "Printed Circuit Board Assemblies (PCBAs)"
Tubing-rigid (gaslines, weldments)	0010-, 0040-, 0050-	Section 8.3 "Process Gas Lines, Vent Lines and Differential Pumping Lines"
Tubing-flexible (hoses, cables)	0010-, 0190-, 0140-, 3400-, 0150-, 0226-, 0050-	Section 8.5 "Tubing, Hoses, Wires and Cables"
Seals, gaskets, O-rings, foam	0020-, 3700-	Section 8.6 "Seals, Gaskets, O-Rings and Foam"
Critical surface parts	0015-, 0020-, 0021-, 0030-, 0035-, 0040-	Section 8.7 "Critical Surface Parts"
Heat exchangers, chillers, vacuum pumps	Pt. Nos. vary	Section 8.8 "Assemblies"
General assemblies	Pt. Nos. vary	Section 8.8 "Assemblies"
Frames	0010-, 0015-, 0040-, 0240-	Section 8.8 "Assemblies"
Hardware	Pt. Nos. vary	Section 8.9 "Hardware"
Electrostatic sensitive device	Pt. Nos. vary	Section 8.2 "Printed Circuit Board Assemblies"
Cleanroom item	Pt. Nos. vary	Section 7.9 "Cleanroom Packaging"
Kits	0240-, 0242-	Section 7.12 "Kit Packaging"
Hazardous material	Pt. Nos. vary	Section 7.14 "Hazardous Materials"

Figure 6.1. Commodity Code Reference Table

7. GENERAL PACKAGING REQUIREMENTS

7.1. General

This Applied Materials document does not eliminate or supersede any shipper's packaging responsibility. It is the shipper's obligation to make sure that the package and/or palletizing comply with all local, federal, and international laws and regulations. These rules and laws include transportation requirements and regulations pertaining to hazardous materials.

The following are the minimum requirements that apply to all inbound and outbound shipments to and from Applied Materials:

7.1.1. It is the shipper's responsibility to determine the method of packaging, consistent with these guidelines, unless otherwise specifically instructed. Special packaging requirements which conflict with this specification shall take precedence.

7.1.2. IT IS THE SHIPPER'S RESPONSIBILITY TO PACKAGE AND LOAD PARTS IN SUCH A MANNER AS TO ENSURE DAMAGE FREE DELIVER OF BOTH THE CONTAINER AND ITS CONTENTS.

7.1.3. Previously used containers are prohibited, unless Applied Materials has approved and identified them as reusable and acceptable.

7.1.4. Recyclability is of a major concern to Applied Materials, therefore all packaging should allow for easy segregation into their appropriate waste recycling streams when at all possible.

7.1.5. All items are to be packaged individually (1 per box) except matched sets, bulk hardware items, kits, and parts/products identified for use in lean manufacturing. Exemptions from this requirement will be granted on a part by part basis.

7.1.6. Matched sets and kits are to be packaged together.

7.1.7. Multiple parts that make one Applied Materials part number must be identified as one set or one unit and must be consolidated to prevent separation. (One set per container.)

7.1.8. All parts must be clean (free of dust, corrosion, shavings, contaminants, etc.) prior to packaging. It is essential that cleanliness levels attained during parts fabrication are not degrated by the packaging being used.

7.1.9. All parts must be adequately separated to prevent entanglement with one another.

7.1.10. All parts must be packaged to prevent shifting or rubbing of contents, and when necessary, separated to prevent damage.

7.1.11. Voids should be filled as required, however, use of loose-fill dunnage ("peanuts", "popcorn") is prohibited.

7.1.12. Packages should not be filled to the extent that they bulge.

7.1.13. Protect all bagged items from punctures, abrasions, and protrusions to prevent contamination of parts during the handling and distribution cycle.

7.1.14. Heavier parts, and products should always be placed on the bottom of the container.

7.1.15. Do not overload a container to the point where the contents' weight exceeds the container's designed capability.

7.1.16. Use proper labeling to mark packages such as "FRAGILE", "HANDLE WITH CARE", "THIS END UP", "DO NOT STACK", as required.

7.1.17. Package closure shall permit access to the contents for inspection purposes without destroying the containers usefulness (i.e. plastic bags shall be made so that they can be opened and resealed a minimum of one time.)

7.1.18. Ensure that no package is unsafe to the environment or personnel. (i.e., protruding staples, nails, loose banding, etc.).

7.1.19. The use of staples is prohibited as a method of closure of bags.

7.1.20. All pallets shall be the 4-way entry variety.

7.1.21. Overhang on pallets is not permitted.

7.1.22. When the center of gravity is not in the center of the unit or utilized load, the location of the center of gravity shall be marked on all 4 sides to help maintain load stability during material handling.

7.1.23. All ground studs must be capped and all sharp corners and knife edges protected to prevent damages to personnel and/or other parts.

7.1.24. All packaging materials must be compatible with the parts contained within the packaging. Packaging must not adhere to parts, produce corrosion/oxidation, etc.

7.1.25. Same parts must be packaged consistently from shipment to shipment, both in the containers used and quantity of parts per container for a given part number.

7.1.26. All inbound and outbound shipments are subject to inspection. Applied Materials reserves the right to reject any shipment which is not in compliance with these specifications, or to charge back to the supplier any costs incurred from repackaging.

7.2. Package Performance

Package performance is critical to maintaining part integrity during the distribution cycle. Applied Materials requires that the packaging shipped to and from Applied Materials be able to withstand the normal hazards seen during the distribution environment. Applied Materials [**].

Applied Materials, Inc. has recognized ASTM D 4169, Standard Practice for Performance Testing of Shipping Containers and Systems, and ISTA Pre-Shipment Test Procedures I/1A as good methods for determining adequate product protection.

The typical testing that occurs using these test procedures includes [**].

The following describes the typical hazards that may be encountered during the distribution cycle. There are other hazards that a package may see during the distribution cycle, and these must also be accounted for. Distribution systems vary in their specific hazard elements and should be carefully studies by the shipper in order to determine the packaging necessary to deliver damage free goods to Applied Materials.

7.2.1. Vibration

Vibration is the one hazard element that will occur during every transportation phase of a distribution cycle. It is also the one element that is most difficult to understand without performing product vibration testing. Essentially, the package materials that are chosen for a specific product should, ideally, attenuate the forcing frequencies seen in the distribution cycle which are close to or match the natural frequencies the product may have.

7.2.2. Drops

Drops are a common hazard element that may occur in the distribution cycle. Essentially a packaged product will see drop heights that correlate to the size and weight of the packaged product. The smaller the package typically the higher the drop height that may occur. The following table shows a packaged product weight with a corresponding maximum drop height that may occur during the distribution cycle:

PACKAGE PRODUCT (WEIGHT)	DROP HEIGHT (inches)
0 - 10	42
11 - 50	36
51 - 100	24
101 - 250	18
251 -	12
PALLETIZED LOADS	6

Figure 7.1. Drop Height

The product should be adequately cushioned to prevent damage from occurring at the drop height associated with the packaged product weight.

7.2.3. Compression

There are two different types of compression, static compression and dynamic compression. Static comprehensive comes from warehousing and storage while dynamic compression is due to compressive forces incurred during transportation and material handling.

The package should prevent damage due to static compression to the product when stacked 2 pallets high, of if not a palletized item, to a height of 96 inches. The package must also be able to withstand the dynamic compressive forces, due to shock and vibration, normally incident to the distribution environment when stacked 2 pallets high, or if nor palletized, to a height of 96 inches.

Confidential Materials omitted and filed separately with the Securities and Exchange Commission. Asterisks denote omissions.

7.2.4. Impacts

Impacts can be regarded as horizontal shocks. These impacts are common to the rail industry during rail care coupling and in other environments during the sorting of packages. The package should be designed to withstand impacts normally incident to the distribution environment. Special attention should be placed on packages that are being shipped by small parcel shippers. The small parcel environments are extremely hazardous during the sorting process, and impacts to the packaged product can come from any and all directions.

7.3. Handling Requirements

All shipments to and from Applied Materials, Inc. must incorporate handling devices into their packagings as outlined in the following table. The following table shows the type of handling devices that must be incorporated into the packaging based on size and weight of the packaged product. The type of handling that the devices will need to facilitate is also noted. The size calculated by adding the length, width, and depth of the packaged product (L + W+D=size).

	[**]	[**]	[**]	[**]	[**]
[**]	None Required	None Required	2 Person Handholds or Handles*	2 Person Handholds or Handles*	Pallet Jack or Lift Truck Access
[**]	None Required	1 Person Handholds or Handles	2 Person Handholds or Handles*	2 Person Handholds or Handles*	Pallet Jack or Lift Truck Access
[**]	None Required	1 Person Handholds or Handles	2 Person Handholds or Handles*	2 Person Handholds or Handles*	Pallet Jack or Lift Truck Access
[**]	None Required	2 Person Handholds or Handles	2 Person Handholds or Handles*	Pallet Jack or Lift Truck Access	Pallet Jack or Lift Truck Access
[**]	None Required	2 Person Handholds or Handles	Pallet Jack or Lift Truck Access	Pallet Jack or Lift Truck Access	Pallet Jack or Lift Truck Access

*All packages weighing [**] or greater must have heavy labels, part number 0060-76154, or equivalent, located on the top of the package.

Figure 7.2. Handling Requirements

Confidential Materials omitted and filed separately with the Securities and Exchange Commission. Asterisks denote omissions.

This illustration shows a figure attempting to lift a box. A line is drawn through the picture and the word "HEAVY" is written twice to indicate that a package affixed with this label if difficult to lift.

Figure 7.3. Heavy Label

7.4. Size & Weight Limitations

The following chart is a guidelines for determining the outer box style to be used for a specific shipment. The chart references size and weight to determine the box style required. The size is calculated by adding the length, width, and depth of the packaged product (L / W / D = size). This chart shows suggested outer container requirements. The product that is being shipped may require a stronger box to ensure that the product arrives damage free at its destination point.

	[**]	[**]	[**]	[**]	[**]
[**]	200#/32 ECT Singlewall Corrugated or 3mm Plastic Corrugated Containers	275#/44 ECT Singlewall Corrugated or 3mm Plastic Corrugated Containers	350#/51 ECT Doublewall Corrugated or 5mm Plastic Corrugated Containers	350#/51 ECT Doublewall Corrugated or 5mm Plastic Corrugated Containers secured to a pallet	Wood Box (PPP-B-621) if weight exceeds 400 lbs. then use Cleated Plywood box (PPP-B-601)
[**]	275#/44 ECT Singlewall Corrugated or 3mm Plastic Corrugated Containers	275#/44 ECT Singlewall Corrugated or 3mm Plastic Corrugated Containers	350#/51 ECT Doublewall Corrugated or 5mm Plastic Corrugated Containers. If length if greater than 40" then use Wood Box (PPP-B-621)	350#/51 ECT Doublewall Corrugated or 5mm Plastic Corrugated Containers secured to a pallet. If length is greater than 40" then use Wood Box (PPP-B-621)	Wood Box (PPP-B-621) if weight exceeds 400 lbs. then use Cleated Plywood box (PPP-B-601)

[**]	350#/51 ECT Doublewall Corrugated or 5mm Plastic Corrugated Containers. If length if greater than 60" then use Wood Box (PPP-B-621)	350#/51 ECT Doublewall Corrugated or 5mm Plastic Corrugated Containers. If length if greater than 50" then use Wood Box (PPP-B-621)	350#/51 ECT Doublewall Corrugated or 5mm Plastic Corrugated Containers. If length if greater than 40" then use Wood Box (PPP-B-621)	Wood Box (PPP-B-621)	Cleated Plywood box (PPP-B-601)
[**]	350#/51 ECT Doublewall Corrugated or 5mm Plastic Corrugated Containers. If length if greater than 50" then use Wood Box (PPP-B-621) If length is greater than 90" then use Cleated Plywood Box (PPP-B-601)	350#/51 ECT Doublewall Corrugated or 5mm Plastic Corrugated Containers. If length if greater than 40" then use Wood Box (PPP-B-621) If length is greater than 90" then use Cleated Plywood Box (PPP-B-601)	350#/51 ECT Doublewall Corrugated or 5mm Plastic Corrugated Containers. If length if greater than 34" then use Wood Box (PPP-B-621) If length is greater than 90" then use Cleated Plywood Box (PPP-B-601)	Wood Box (PPP-B-621) If length is greater then 90" then use Cleated Plywood Box (PPP-B-601)	Cleated Plywood box (PPP-B-601)
[**]	Wood Box (PPP-B-621). If length is greater than 90" then use Cleated Plywood Box (PPP-B-601)	Wood Box (PPP-B-621). If length is greater than 90" then use Cleated Plywood Box (PPP-B-601)	Wood Box (PPP-B-621). If length is greater than 90" then use Cleated Plywood Box (PPP-B-601)	Cleated Plywood Box (PPP-B-601)	Cleated Plywood Box (PPP-B-601)

Note: If the weight exceeds [**].

Figure 7.4. Size & Weight Limitations

Confidential Materials omitted and filed separately with the Securities and Exchange Commission. Asterisks denote omissions.

7.4.1. The following figure is a guideline for box sealing of typical regular slotted container style boxes. The box sealing that is used must perform adequately during its intended distribution cycle.

This figure is an illustration of 2 boxes, each of which is specifically sealed according to its weight. The lighter box is sealed lengthwise across the middle, while the heavier box, in addition to the previous marks, is also sealed along each of its end edges and corners.

Loads [**] or less Loads over [**]

Figure 7.5. Regular Slotted Container Box Sealing

7.5. Small Parts

This section describes the packaging requirements for small parts.

7.5.1. Small Parts that meet the commodity description and size criteria listed below must be packaged as indicated in this section. For all parts that do not fall into these categories, refer to the commodity sections in this manual for appropriate packaging requirements.

7.5.2. If you are currently packaging or receiving parts from your supplier packaged as 1-each, do not change current packaging practices.

7.5.3. All small parts listed below that are sold in "sets" must be packaged in individual sets (1-set per 1 package).

7.5.4. Refer to the following Charts for the part size and commodity type for proper packaging requirements. All Bags and Cartons must be properly identified with the AMAT Part Number and Quantity.

Packaging Requirement (L=length, D=depth, W=width and Dia.=diameter)

Commodity	Size Limitations	Description	Quantity Breakdown
Glass, ceramics, Quartz, or Graphite {See Cleanroom packaging}	L 1/2"-to-1" W 1/2"-to-1" D less than or equal to 1/4"	o Bubble-bag 1-each or equivalent o Foam or bubble cushioning 1-each o Bulk box	bubble-bagged 1-each and boxed in package quantities per Table-A.
	L less than or equal to 1/2" W less than or equal to 1/2" D less than or equal to 1/4"	o Bag 1-each in a polyethylene bag or equivalent o Bulk box	bagged 1-each and boxed in package quantities per Table-A.
Rods (Glass, Ceramics, Quartz){See Cleanroom packaging}	L less than or equal to 5" Dia. less than or equal to 1/2"	o Bag 1-each in a polyethylene bag or equivalent o Bulk box	Cushioned 1-each and boxed in package quantities per Table-A.

Plastic (non-fragile)	L 1-1/2"-to- 5" W 1-1/2"-to- 5" D 3/4"-to-1-1/4"	o o	Bag 1-each in a polyethylene bag or equivalent Bulk box	bagged 1-each and 5 packages max per carton
	L less than or equal to 1/2" W less than or equal to 1/2" D less than or equal to 3/4"	o o	Bulk Bag Bulk box	package in multiples of 25 maximum per bag and 4 bags max.
Resistors, Diodes, Amplifiers, Transistors, or Capacitors	L less than or equal to 3" W less than or equal to 3/8" D less than or equal to 3/8"	o o	Bulk Bag Bulk Box	Bagged in quantities per Table - B and a maximum of 5 bags per carton
O-Rings (non-cleanroom, non-critical)	Dia. 10"-to-13"	o o	Bag 1-each in polyethylene bag or equivalent Bulk Box	Bagged 1-each and packaged in quantities per Table-A
	Dia. 1-1/4"-to-10"	o o	Bulk Bag 1 Bag per Box	Bagged in quantities per Table-A and 1 bag per carton
	Dia. less than or equal to 1-1/4"	o o	Bulk Bag 1 Bag per Box	Bagged in quantities per quantity Table-B and 1 bag per ctn.
Seals (non-lipseals, non-barrier seals), or Gaskets (clean products)	Dia. less than or equal to 1-1/4"	o o	See Cleanroom Section 7.9 - double - bagged 1-each. Bulk Box	bagged 1-each and packaged in quantities per Table-A
Fittings (Metal), Pipes, Machined Parts (Metal)	L less than or equal to 3" W less than or equal to 2" D less than or equal to 1-1/4"	o o	Bag 1-each in a polyethylene bag or equivalent Bulk Box	Bagged 1-each and 10 bags max per carton
Metal Parts (non-fragile), shims, plates (Non-critical surfaces)	L 2" -to-4" W 2"-to-3" D less than or equal to 3/8"	o o	Bag 1-each Bulk Box	Bagged 1-each and in quantities per Table-A
	L less than or equal to 2" W less than or equal to 2" D less than or equal to 3/8"	o o	Bulk Bag 1 Bag per Box	Bagged in quantities per Table B and 1 bag per carton

Metal Parts (non-fragile), shims, plates (Non-critical surface) (cleanroom)	L less than or equal to 2" W less than or equal to 2" D less than or equal to 1/2"	o o	See Cleanroom Section 7.9 - double-bagged 1-each Bulk Box	Bagged 1-each and packaged in quantities per Table-A
Fuses	L less than or equal to 2" Dia. less than or equal to 1/2"	o o o	Note: Some fuses are already pre-packaged in custom containers (i.e. 5-packs), use these containers if applicable and bulk box (25 maximum per box). - or - Bulk Bag Box 1 bag-each	Bag in quantities per Table-A and 1 bag per carton.
Wires (rigid), or Graphite Tubing	L less than or equal to 7" Dia. less than or equal to 1/8"	o o	Bulk Pack in rigid Tubing or Backing to prevent bending and/or snapping. Box 1-each, if not packaged in rigid tubing	Bulk Pack in quantities per Table-B
Springs	L less than or equal to 3-1/2" Dia. less than or equal to 1"	o o	Bulk Bag in polyethylene bag or equivalent Bulk Box	Package in multiples of 5 maximum per bag and package in quantities per Table-A
Bearings	Dia. less than or equal to 1-1/4"	o o	Bag 1-each Bulk Box	Bagged 1-each and package in quantities per Table-A
Hardware	All Hardware	o	See Hardware Section 8.8	See Hardware Section 8.8

Quantity Table A

Order Quantity	Package (part or Bag) Quantity
1 -to- 100	maximum 10 per pack
101 -to- 1000	maximum 100 per pack

Quantity Table B

Order Quantity	Package (part or bag) Quantity
1 -to- 100	maximum 50 per pack
101 -to- 1000	maximum 500 per pack

Directions: Package ordered quantities per the appropriate table above. Identify the bulk packages with the quantities packaged. Left-over quantities should be packaged and identified with the quantity packaged.

For Example: Your order consists of 2037 same parts that reference Table-A

You should have: 20 packs in multiples of 100 quantity each. (Identified - 100 Qty. on each package)
3 packs in multiples of 10 quantity each. (Identified - 10 Qty. on each package)
1 pack of 7 quantity. (Identified - 7 Qty. on the package)

Figure 7.6. Small Parts Packaging Requirements

7.6. Unitizing

All unitized loads must be secured pallet. The pallet must have 4-way entry and must have sufficient strength to accommodate the load. All loads must be squared off.

Securement to the pallet shall be made by the use of metal or plastic strapping of sufficient strength to adequately secure the load to the pallet and prevent load shifting during transportation. To help with load stability, the use of corrugated fiberboard tie sheets between the layers on the pallet is recommended. The product shall be protected from damage from the straps by the use of rigid plastic or paperboard edge protectors.

The strapping shall be a minimum of 2 straps in one direction and when appropriate, strapping shall be 2 or more straps in 2 or more directions in order to secure the load to the pallet. It is also acceptable to use stretch or shrink wrap in combination with strapping to secure the load to the pallet.

Figures 7.7, 7.8, and 7.9 show proper load securement while Figure 7.10 shows inappropriate load securement. In Figure 7.10, the load should be separated into 2 separate squared off pallets or 1 squared off pallet and separately shipped boxes.

This figure is an illustration of a proper load securement on a pallet. The load must be squared off on a 4-way entry pallet. Securement of the load is ensured by 2 pairs of straps that run through the pallet in opposite directions and intersect on the top and bottom of the load.

Figure 7.7 4-Way Strapping of Load

This figure is an illustration of a proper load securement on a pallet. The load must be squared off on a 4 way entry pallet. Securement of the lead is ensured by 2 parallel straps that run through the pallet and across the perimeter of the load.

Figure 7.8. 2-Way Strapping Of Load

This figure is an illustration of a proper load securement on a pallet. The load must be squared off on a 4 way entry pallet. Securement of the lead is ensured by 2 pairs of straps that run through the pallet in opposite directions and intersect on the top and bottom of the load. A 5th strap encompasses the perimeter, running perpendicular to the 2 pairs and intersecting each one on all four sides.

Figure 7.9. Four-Way And Girth Strapping Of Load

Confidential Materials omitted and filed separately with the Securities and Exchange Commission. Asterisks denote omissions.

This figure is an illustration of improper load securement on a pallet. The load is not squared off and therefore, is not stabilized for shipping.

Figure 7.10. Incorrect, Load Not Squared Off

7.7. Inter-Divisional Movements

All inter-divisional shipments between manufacturing and storage facilities in Austin, Texas and in Santa Clara, California must have the products packaging conform to the requirements of this specification except as noted in this section.

7.7.1. All [**]. If applicable, [**]. Use caution [**].

7.7.2. Verify that all documents pertaining to the shipment are attached and identified as required by appropriate departments.

7.7.3. All packages and subassemblies that are not on casters must not be pushed, pulled, or moved without the proper equipment (i.e. pallet jack, trolleys, carts, etc.)

7.7.4. All parts, products, and assemblies moving between buildings and divisions will require more than one person to handle should be placed on a skid or require the use of appropriate handling equipment. Refer to section 7.3 for handling requirements.

7.8. Labeling

All shipments to Applied Materials, excluding those to IBSS, must be labeled in accordance with 0190-75034, Applied Materials Receiving Bar Code Specification, or its successor specification, as revised from time to time. All shipments to Applied Materials IBSS division and all shipments made directly to end users at the request of Applied Materials ("Requested Direct Shipments") must be labeled in accordance with 0250-60124, Applied Materials Unit Package Marking and Labeling Vendor Requirements Specification. To assist in the determination of labeling requirements, refer to the table to below.

Supplier shall not place any marks, telephone numbers or other information on packaging identifying supplier as the source of the items shipped. Exemptions from this requirement will be granted on a case by case basis.

	Part Label (1)	Individually boxed (2)		Multiple Boxes Overpacked (3)	
		Ship to IBSS	Ship to Mfg.	Individual	Outer
Bagged, P/N visible	N/A	0250-60124	0190-75034	0250-60124	0190-75034
Bagged, P/N not visible	0250-60124	0250-60124	0190-75034	0250-60124	0190-75034
Wrapped, P/N visible	N/A	0250-60124	0190-75034	0250-60124	0190-75034
Wrapped, P/N not visible	0250-60124	0250-60124	0190-75034	0250-60124	0190-75034
No wrap, no bag, P/N visible	N/A	0250-60124	0190-75034	0250-60124	0190-75034

(1) Individual part label to be placed on bag/wrap if part number is not visible through bag/wrap.

(2) If shipping one part packaged individually.

(3) If shipping several individually boxed parts consolidated in one outer container.

Figure 7.11. Labeling Requirements

7.9. Cleanroom Packaging

Clean packaging is required when communicated on part drawing, Purchase Order or Contract.

7.9.1. Cleaning

If cleaning is required, the method of cleaning will be specified on the drawing, purchase order, or contact

7.9.2. Handling

7.9.2.1. Once parts and assemblies have been cleaned, they can only be handled with cleanroom approved gloves. See 0250 -70699, Cleanroom Approved Materials.

7.9.2.2. Gloved hands that touch clean parts must not touch anything else. Immediately replace a glove which has touched an unclean surface, i.e., hair, clothing, bench, etc.

7.9.3. Packaging

7.9.3.1. Verify that all parts are completely dry before packaging.

7.9.3.2. Painted, plated or finished surfaces must be protected to prevent abrasion, nicks, scratches or dents.

7.9.3.3. Sharp protrusions must be protected from puncturing bags.

7.9.3.4. The part shall be sealed in an inner bag, cushioned if applicable, then sealed in an outer bag. Leave enough room for one additional seal. Remove excess air prior to sealing.

7.9.3.5. Attached a label that states "PACKAGED IN CLASS XXXX CLEANROOM" to the inner bag (replace XXXX with appropriate class level. i.e., 100, 1000, 10,000). All labeling must be placed on the inner bag. If it is not visible through the outer bag, the labeling must be placed on the outer bag also.

7.9.4. Overboxing

When plastic corrugate boxes are specified on the contract, purchase order or drawing, the part will only be required to be single bagged. The plastic corrugate box must be bagged and over boxed with a corrugated fiberboard box.

7.9.5. Cleanroom Acceptable Materials

Reference 0250-70699, Cleanroom Approved Materials.

7.10. Electrostatic Discharge Sensitive Items

Electrostatic discharge (ESD) sensitive items have become a significant concern for most electronics companies. Related hazards include electromagnetic interference (EMI) and radio frequency interference (RFI). [**].

All items susceptible to EMI, and RFI damage will need [**].

7.11. Environmentally Sensitive Parts

This section describes the packaging requirements for protecting parts/products against environmental hazards. The main environmental hazards are [**].

[**].

7.11.1. Desiccant

Desiccants are typically the primary material used [**].

[**].

Confidential Materials omitted and filed separately with the
Securities and Exchange Commission. Asterisks denote omissions.

RIGID BARRIER VOLUME (cubic inches)	FLEXIBLE BARRIER AREA (square inches)	DESICCANT UNITS REQUIRED
1,429	90	*
2,857	180	*
4,286	270	*
5,714	360	*
7,143	450	*
14,286	900	*
28,571	1,800	*
57,143	3,600	*
114,286	7,200	*

Figure 7.12. Desiccant Chart

7.11.2. Vapor Corrosion Inhibitors

Vapor Corrosion Inhibitors (VCI's) are those products that emit a vapor that creates a very thin film barrier on a part/product that acts as a barrier between the part/product and water molecules. [**].

7.11.3. Non-Reactive Gas Purge

Purging the packaging with a non-reactive gas will [**].

7.11.4. Ultra Violet Light Degradation

Notwithstanding chemical additives [**].

7.12. Kit Packaging

Kit packaging is defined as the over-boxing of any two or more individual parts, assemblies, matched sets, or bulk hardware parts. The over-box must conform to all the requirements of the general packaging requirements of this specification.

When kit packaging is specified, the individual parts, assemblies, matched sets, and bulk hardware items must be protected from each other by the use of blocking or cushioning. The individual parts, assemblies, matched sets, and hardware parts must have their respective packaging conform to all of the general and commodity specific requirements of this specification.

The parts shall be over-boxed into a single box when at all possible. The over-box shall be appropriately sized to accommodate all parts in the kit.

All voids in the over-box shall be filled with an appropriate dunnage to prevent shifting of the individually boxed parts. The individual parts shall be loaded into the over-box in such a manner as to prevent damage to fragile items (for example: a fragile item weighing 5 lbs. should not have a 50 lb. item placed on top of it).

7.13. Reusable Containers

When specified, reusable containers shall be used. Reusable containers are containers that will be used to facilitate the shipment of product from one facility to another and will then be forwarded back to the original shipper or a third party to be specified. Mark all reusable containers on a minimum of two adjacent sides with the following statement; "REUSABLE CONTAINER, RETURN TO (SHIPPER'S NAME)." Unless limited by space, all verbiage shall be two inches in height minimum.

7.14. Hazardous Materials

All materials that meet the definition of hazardous material as defined in the Code of Federal Regulations Title 49 (CFR 49), must conform to all requirements of CFR 49 and the applicable regulations governing the mode of transportation, by which the material will be shipped, for shipments originating in or destined to the United States of America.

CFR 49 specifies all of the required shipping paper documentation, marking, labeling, packaging, and performance tests required for a shipment of hazardous material. The following is a list of applicable documents, that have specific modal requirements:

- o International Civil Aviation Organization (ICAO) Technical Instructions for the Safe Transport of Dangerous Goods by Air
- o International Air Transport Association (IATA) Dangerous Goods Regulations
- o International Maritime Dangerous Goods (IMDG) Code
- o United Nations Recommendations on the Transport of Dangerous Goods

7.15. Lean Manufacturing Packaging

When parts are to be delivered Fit For Use in a Lean Manufacturing line at Applied Materials, packaging must meet the requirements of 0250- 70700, Lean Manufacturing Packaging Requirements.

8. MINIMUM COMMODITY PACKAGING REQUIREMENTS

8.1. Ceramics, Quartz, Glass, Graphite

This section provides the method of packaging ceramics, quartz, glass and graphite for distribution.

NOTE: THESE ITEMS ARE EXTREMELY FRAGILE AND SHOULD BE HANDLED WITH GREAT CARE TO PREVENT DAMAGE.

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[**].

8.1.1. Materials Requirements

See 0250-70699, Cleanroom Approved Materials.

8.1.2. Packaging Requirements

The part shall be sealed [**].

8.1.3. Overboxing

When plastic corrugate boxes are specified as the outer container on the contract, purchase order or drawing, [**].

Confidential Materials omitted and filed separately with the Securities and Exchange Commission. Asterisks denote omissions.

8.1.4. Labeling Requirements

The following are special labeling requirements in addition to those found in section 7.8.

8.1.4.1. Labeling on the inner bag should read "PACKAGED IN CLASS XXX CLEANROOM" (replace XXXX with appropriate class level. i.e., 100, 1,000, 10,000).

8.1.4.2. If labeling on the inner bag is not legible through the outer bag, place the same label on the outer bag. Mark the exterior of the carton with a "FRAGILE" label.

8.2. Printed Circuit Board Assemblies (PCBA's)

8.2.1. General Packaging Requirements

8.2.1.1. For all ESDS parts [**].

8.2.1.2. Sharp protrusions must be protected from puncturing bags.

8.2.1.3. Fragile parts must be cushioned.

8.2.1.4. Desiccant may be specified [**].

8.2.1.5. When a box is required, [**].

8.2.1.6. Mark the unit carton according to the requirements of section 7.8, Labeling.

8.2.1.7. References Applied Materials Workmanship Standard 0250-09954 for specific handling requirements.

8.2.1.8. The ideal method of packaging ESD sensitive parts and assemblies is to [**].

Confidential Materials omitted and filed separately with the Securities and Exchange Commission. Asterisks denote omissions.

8.2.2. Components, Integrated Circuits and Chips Packaging Requirements

8.2.2.1. Integrated circuits may be packaged [**]

This figure is an illustration of the proper packaging of an integrated circuit.

Figure 8.1. IC Tube Packaging

8.2.2.2. Integrated circuits may be placed [**].

This figure is an illustration of an alternative means of protective packaging for an integrated circuit through the use of conductive foam.

Figure 8.2. IC Conductive Foam Packaging

8.2.2.3. Bag parts individually [**].

8.2.2.4. Place bagged part [**].

8.2.3. Printed Circuit Boards Packaging Requirements

Note: See workmanship Standard 0250-09954, ESD Control, for proper handling procedures.

8.2.3.1. Bag parts [**].

8.2.3.2. If the part has prongs or pins [**].

8.2.3.3. Place bagged part [**].

8.2.4. Wrapping, Bagging, and Boxing Procedures

8.2.4.1. See 0250-70699, Cleanroom Acceptable Materials, for acceptable wrapping materials.

8.2.4.2. The following is a list of bagging requirements:

All parts must be [**].

Bag opening shall be [**].

This figure is an illustration of a properly closed and sealed package that has been tamper-proofed.

Figure 8.3. PCBA Packaging

8.2.4.3. If the bagged part [**].

Confidential Materials omitted and filed separately with the Securities and Exchange Commission. Asterisks denote omissions.

8.3. Process Gas Lines, Vent Lines and Differential Pumping Lines

This section describes the requirements for packaging of process gas lines, vent lines and differential pumping lines.

8.3.1. The gas lines shall be [**].

8.3.2. [**].

8.3.2.1. [**].

8.3.2.2. [**].

8.3.2.3. [**].

8.3.2.4. Follow section 7.9, Cleanroom Packaging Procedures.

8.3.3. Sealed bags [**].

8.3.3. To help prevent possible damage [**].

8.4. UHV Lines (Vacuum Lines, Exhaust Lines, Fore Lines, Roughing Lines, Etc.)

This section describes the method of packaging vacuum lines, exhaust lines, and fore lines. [**].

8.4.1. Protect all [**]. Follow cleanroom packaging requirements, section 7.9, as required.

8.4.2. Double bag [**].

8.4.3. Sealed bags [**].

8.4.4. Label the inside bag [**].

8.4.5. Individually box [**].

8.5. Tubing, Hoses, Wires, And Cables (Flexible)

This section describes the method of packaging flexible tubing, wires, and cables. All flexible tubing, hoses, wires, and cables shall be packaged in such a manner as to prevent damage, taking special care to prevent kinking, bending, or crimping.

8.5.1. Protect all [**].

8.5.2. If the tubing, hose, wire, or cable is [**].

8.5.3. If the tubing, hose, wire, or cable is [**].

8.5.4. Each part shall [**].

8.5.5. The single bagged part [**].

8.6. Seals, Gaskets, O-Rings And Foam (Cure Dated Items)

This section describes the packaging requirements for all seals, gaskets, o-rings, foams and natural rubber items that are cure dated.

8.6.1. Cure Dated Items

Note: Cure dated items are heat and light sensitive, care should be taken to protect these parts from these particular elements.

8.6.1.1. Cure dated items must be [**].

8.6.1.2. Cleanroom cure dated items must be packaged per the following:

- These items shall be [**].
- [**] cleanroom bag shall be marked as follows: "PACKAGED IN CLASS XXXX CLEANROOM" (replace XXXX with appropriate class level. i.e., 100,1000, 10,000).
- The part [**]

8.6.1.3. Cure dated items must be bagged.

8.6.1.4. The exterior bag should contain the following special information:

- [**]
- [**]
- [**]

8.6.1.5. See Figure 0250-70699, Cleanroom Approved Materials, for acceptable bagging materials.

8.6.1.6. All seals with an outside diameter [**].

8.6.1.7. Place the bagged item [**].

Confidential Materials omitted and filed separately with the Securities and Exchange Commission. Asterisks denote omissions.

8.7. Critical Surface Parts

This section describes the packaging requirements for all parts that have a finish that is functional or cosmetic in nature and may be damaged by abrasion and shock impacts.

8.7.1. Packaging Requirements

8.7.1.1. Wrap/cover [**].

8.7.1.2. When applicable, [**].

8.7.1.3. Wrap part [**].

8.7.1.4. Place (1 each) [**].

8.8. Assemblies

This section describes the packaging requirements for assemblies, and pump assemblies.

8.8.1. Assembly Packaging

This section covers all assemblies such as Complex motors, Actuators, Modules, etc.

8.8.1.1. Follow all the applicable requirements of section 7., General Packaging Requirements. [**].

8.8.2. IBSS Requirements for Stand Alone Vacuum Pump Packaging

This section covers all roughing and backing vacuum pumps shipping to IBSS.

8.8.2.1. The unit must be properly [**].

8.8.2.2. [**].

8.8.2.3. Bag shall [**].

8.8.2.4. The unit must [**].

8.8.2.5. The unit must [**].

8.8.2.6. The cap should include: "Applied Materials Part Number", Gross Weight (lbs. &kgs.), and Cube Size (inches & centimeters). [**].

8.8.3. Stand Alone Vacuum Pump Packaging

8.8.3.1. [**].

8.8.3.2. The unit must be [**].

8.8.3.3. Wrap or cover [**].

8.8.4. Frame Assembly Packaging

8.8.4.1. Frames must be [**].

8.8.4.2. Frames must be [**].

8.8.4.3. Frames must be [**].

8.8.4.4. [**].

8.9. Hardware (Screws, Bolts, Washers, Etc.)

This section describes the packaging requirements for all hardware items (nuts, bolts, screws, washers, etc.

8.9.1. All parts must have [**].

8.9.2. All silver-plated hardware shall [**].

8.9.3. Place like parts (same part numbered items) into a bag. [**].

8.9.4. Bulk items [**].

8.9.5. Place the bag [**].

Confidential Materials omitted and filed separately with the Securities and Exchange Commission. Asterisks denote omissions.

Attachment 6

Title: Spot Buy Receiving Label Specification Rev.: B
Part No. 0190-75034 Date: 07/15/97

APPLIED MATERIALS

Spot Buy Receiving Label
Specification

Revision	Change ECO #	Originator/Approver	Date
A	24447	A.Makeriv	11-12-96
B		R.Stern	07-15-97

APPLIED MATERIALS
3050 Bowers Ave., Santa Clara, CA 95054

CONTENTS

PURPOSE AND SCOPE OF THIS SPECIFICATION

The purpose of this specification is to communicate Applied Materials standard practices and requirements for its suppliers to print and apply labels on shipping containers.

This specification addresses only those shipping container labels used to receive Spot Buy material at Applied Materials. Suppliers shall comply with a different specification 0250-06387 Applied Materials Bus Route Receiving Label Specification for their Bus Route material.

The standard practices and requirements of this document are Applied Materials interpretation of the latest version of the following standards: Electronic Industries Association Outer Shipping Container Bar Code Label Standard (EIA 556-A); product package Bar Code Label Standard (EIA 624, [PN 3133]); and the American National Standards Data Application Identifiers for Material Handling (ANSI/MH 10.8 M-1993), which is a Data Identifier guideline.

This specification is intended to be a building block for Applied Materials to streamline its flow of materials. This specification is intended to be flexible enough to accommodate change and facilitate innovations within our industry.

REFERENCES

EIA 556-A Electronic Industries Association Outer Shipping Container Bar Code Label
EIA 624, [PN 3133] Product Package Bar Code Label Standard
ANSI/MH 10.8 M-1993 American National Standards Data Application Identifiers for Material Handling
0250-00098 Applied Materials Packaging Specification
0250-06387 Applied Materials Bus Route Receiving Label Specification

Confidential Materials omitted and filed separately with the Securities and Exchange Commission. Asterisks denote omissions.

DEFINITIONS

ALPHANUMERIC The character set that contains letters, numbers, and usually other characters such as punctuation marks.

AMAT Applied Materials

BAR The darker element of a bar code symbol.

BAR CODE An array of parallel rectangular bars and spaces that represent an individual letter, number, punctuation mark or other symbol.

BAR DENSITY CODE The number of data characters that can be represented in a linear unit of measure. Bar code density is often expressed in characters per inch (CPI). CPI is a function of the "X" dimension, element width ratio, and intercharacter gap.

BAR CODE SCANNER A device user for machine reading of a bar code. Scanners may employ hand held wands, fixed optical beams, moving laser beams, or hand-held moving laser beams.

BAR HEIGHT The bar dimension perpendicular to the bar width. Also called bar length.

BUS ROUTE A JIT delivery system from supplier to AMAT

CODE [**]

CUSTOMER PRODUCT ID A combination of alphanumeric characters used by a customer or buyer (i.e. applied Materials) to identify a product.

DATA FIELD The specific portion or area of a label designated to contain human readable, bar code, or graphic information

DATA IDENTIFIER [**]

DEPTH OF FIELD The difference between the minimum and maximum horizontal distance from the aperture of the bar code reader throughout which the bar code can be read.

EIA Electronic Industries Association, Engineering Dept., 2001 Pennsylvania Ave. NW, Washington., DC 20006 Telephone (800) 854-7179

ELEMENT In a bar code symbol, a single bar or space.

FACT Federation of Automated Coding Technologies, 634 Alpha Drive, Pittsburgh, PA 15238-2802, Phone (412) 963-8588.

INTERCHARACTER GAP The space between the last element of one character and the first element of the adjacent character of a discrete bar code symbol.

INTERMEDIATE CONTAINER A container which is overpacked into an oversized container for consolidation upon shipping.

JIT DELIVERY SYSTEM [**]

LABEL A card, strip of paper, etc. marked and attached to an object to indicate its nature, contents, ownership, destination, etc.

LADDER MODE Bar code oriented with respect to the longer side of a label.

MANDATORY DATA FIELD A data field that must always contain data.

MASTER PACK A number of filled transport packages or other items that are held together by one or more means such as a pallet, slip sheet, strapping, interlocking, glue, shrink wrap, stretch wrap or net wrap to make them suitable for transportation, stacking, and storage as a unit. Sometimes referred to as a Unitized or Unite Load.

MAY Used in this document, this word designates a suggested or acceptable method of complying with a requirement.

MIXED LOAN LABEL A label or tag used to designate a pack or shipping container or non-identical items.

MULTI ORDER LABEL A label or tag used to designate a pack or shipping container of identical products which fulfills multiple AMAT orders.

MULTI ORDER/MIXED LOAD LABEL A label or tag used to designate a pack or shipping container of non-identical products which fulfills multiple AMAT orders.

MUST Used in this document, this word designates a requirement.

OVERPACK A container used to consolidate other packages for the shipping process. Examples of this type are a pallet with shrink wrapping or an oversized corrugated cardboard box.

PACKAGE OR SHIPPING CONTAINER The package or shipping container is the final container that is sufficiently strong to be used in commerce for packing or storing and transporting products.

PICKET FENCE MODE Bar codes oriented with respect to the shorter side of a label.

PO - Purchase Order - A document which legally binds a commitment for materials, facilities, or services.

Confidential Materials omitted and filed separately with the Securities and Exchange Commission. Asterisks denote omissions.

PRODUCT PACKAGE LABEL The product package is the first tied, wrapped, or bagged container applied to a single product or multiple thereof or group identical products.

QUIET ZONE A clear space, which precedes the start character of a bar code symbol and follows the stop character. Sometimes called the "Clear Area".

REFLECTANCE [**]

SHALL Used in this document, this word designates a requirement

SHOULD Used in this document, this word designates a standard practice that is not required but is either desired by Applied Materials, recommended by Applied Materials or both.

SHIPPING CONTAINER LABEL Label that identifies the contents and "ship-to" address of a shipping pack.

SHIPPING PACK A package, shipping container, or final container that is of sufficient strength to be used in commerce for packing, storing, and transporting products.

SINGLE LABEL A label or tag used to identify and summarize the total contents of a package or shipping container.

SINGLE ORDER LABEL A transaction label or tag used to designate a package or container of identical products resulting from a single order.

SPOT BUY A purchase made for material on a one-time basis using a PO.

START AND STOP CHARACTERS Distinct characters or patterns used at the beginning and end of each bar code symbol that provide initial timing references and direction- of-read information to the decoding logic.

SUPPLIER OR MANUFACTURER ID CODE A code that uniquely identifies a supplier or manufacturer.

SUPPLIER OR MANUFACTURER PRODUCT IDENTIFICATION CODE A combination of alphanumeric characters used by a supplier or manufacturer to identify a product (part number).

Confidential Materials omitted and filed separately with the Securities and Exchange Commission. Asterisks denote omissions.

TRANSACTION IDENTIFICATION NUMBER A combination of alphanumeric characters assigned by the customer to the transaction.

UNIFORM CODE COUNCIL An organization that assigns product and supplier or manufacturer identification numbers. 8163 Old Yankee Road, Suite J, Dayton, Ohio 45458, Telephone (513) 435-3870

BAR CODE SPECIFICATIONS

This figure is an illustration of a bar code and is surrounded by several descriptions of its specifications,including: Data Identifier, Field Title, Field Value, Bar code height, Leading quiet zone and Trailing quiet zone.

BAR CODE CHARACTERISTICS

X dimension (width of the narrow line)	[**]
Symbology	[**]
Density	[**]
Element Width Ratio	[**] [**]
Orientation	[**]
Print Quality	[**]
Data Character Set	[**] [**]
Human readable character height (mandatory)	[**] [**]
Quiet zones (mandatory)	[**] [**]

continued on next page

BAR CODE SPECIFICATIONS (CONTINUED)

Each bar code shall [**].
Each bar code shall [**].
Each bar code shall [**].
Each bar code shall [**].
The human readable text for a bar code shall [**].
The human readable information is [**].

Human readable text example:
[**]

Scanning the bar code that corresponds to this human readable information [**] should result in the following:
[**]

Physical characteristics of label

Label material	Label material shall [**]
Adhesive types	[**]
Recyclability	When possible, the label material and adhesive should [**]
Environmental considerations	These labels are intended for indoor use and normal transportation conditions. Care should be taken to [**].

Confidential Materials omitted and filed separately with the Securities and Exchange Commission. Asterisks denote omissions.

OVERALL LABEL DIMENSIONS

The illustrations below depict the acceptable dimensions for each field on a label. The labels are not shown to scale. This depiction is known as Vertical or "Picket Fence" orientation.

Legend

A = FROM
B = SHIP TO:
C = PACKAGE COUNT
D = PACKAGE WEIGHT
E = PKG ID:
F = AMAT ORDER NO:
G = AMAT PART NO:
H = QUANTITY
I = RESUPPLY LOCN:
J = DESCRIPTION
K = DIV. CODE
*when bar code is required

Drawing not to scale

	PREFERRED	MINIMUM	MAXIMUM
a	[**]	[**]	[**]
b	[**]	[**]	[**]
c	[**]	[**]	[**]
d	[**]	[**]	[**]
e	[**]	[**]	[**]
f	[**]	[**]	[**]
m	[**]	[**]	[**]

Bar codes shall be [**]

there are two types of labels described in this document: the (3S) shipping Container Label and the (5S) Outerpack Label. The above dimensions apply to both.

(3S) SHIPPING CONTAINER LABEL

Function This label is [**]

Features Recommended label size[**].

Recyclability Label material and adhesives should [**].

Placement Label should be placed [**].

Label shall [**].

Label shall [**].

Label shall [**].

Care shall [**].

Where parts are packaged in accordance with 0250-00098 Packaging Specification [**].

Confidential Materials omitted and filed separately with the Securities and Exchange Commission. Asterisks denote omissions.

(3S) SHIPPING CONTAINER LABEL (CONTINUED)

Minimum Required Bar Coded Data Fields:

Data Identifier	Field Title	Definition
3(S)	PKG ID:	This field value [**]. The second segment shall [**]. The supplier or manufacturer shall [**].
(K)	AMAT ORDER NO:	This field value [**].
(P)	AMAT PART NO:	This field value [**].
(1P)		Supplier [**].
(Q)	QUANTITY:	This field value [**].
(2Z)	RESUPPLY LOCN:	This field is [**].

*(p) AMAT Product ID shall be used for AMAT PART NO.
(1P) Is used for orders when AMAT's part number is not available.

(3S) SHIPPING CONTAINER LABEL (CONTINUED)

Minimum Required
Human Readable Only
Data Fields:

Field Title	Definition
FROM:	Shall be address from which the shipment was sent.
SHIP TO:	Shall be address to which the shipment is being sent.
DESCRIPTION:	Shall be AMAT description for material provided. this value may be truncated if it does not fit in the space allowed.
DIV. CODE:	This field is reserved for use on Bus Route shipping container labels. On a Spot Buy label, this field should contain the field title only.
PACKAGE WEIGHT:	Should be the weight of the filled package the label is attached to even pound integrators. Weights less than 1 lb should be shown as 1 lb. May be hand written clearly with permanent ink.
PACKAGE COUNT:	For Spot buy labels this field should indicate package "1 of 1". The field indicates which one of several packages this package is. The set of packages includes all those covered by a single packing slip shipped to complete delivery of a single part number on a single AMAT PO. For Spot buys this should be only one shipping container or master pack.

(3S) SHIPPING CONTAINER LABEL (CONTINUED)

Example:

See table above and on previous illustration page for data field definitions.

```
----------------------------------------
FROM:                 SHIP TO:
ABCDEFGHIJKLMNO       ABCDEFGHIJKLMNO
ABCDEFGHIJKLMNO       ABCDEFGHIJKLMNO
ABCDEFGHIJKLMNO       ABCDEFGHIJKLMNO
ABCDEFGHIJKLMNO       ABCDEFGHIJKLMNO
----------------------------------------

----------------------------------------
(3S) PKG ID: 12345678+12345

[Illustration of bar code.]

----------------------------------------
(K) AMAT ORDER NO: 12345678+12345

[Illustration of bar code.]
----------------------------------------
(P) AMAT PART NO: 1234-12345     REV D

[Illustration of bar code.]

----------------------------------------
(Q) QUANTITY: 9999

[Illustration of bar code.]

----------------------------------------
(2Z) RESUPPLY LOCN:

----------------------------------------
DESCRIPTION:             DIV. CODE:
WIDGET, EXTRA CLEAN

----------------------------------------
PACKAGE COUNT            PACKAGE WEIGHT
   1 OF 1                999 LBS
----------------------------------------
```

VERTICAL FORMAT. (not to scale)

Confidential Materials omitted and filed separately with the Securities and Exchange Commission. Asterisks denote omissions.

(5S) OUTERPACK LABEL

Function This label is [**]

The (5S) label shall be used for the following:

- o A single order number with multiple part numbers in an overpack container.
- o Multiple order numbers with a single part number in an overpack container.
- o Multiple order numbers with multiple part numbers in an overpack container.

Features [**]

Recyclability Label material and adhesives should [**]

Placement Label should be placed [**]

Label shall be placed [**].

Label shall [**].

Care shall be taken [**].

Where parts are packaged in accordance with 0250-00098 Packaging Specification and do not have a suitable flat surface, the bar coded shipping container label may be placed on a card stock tag that is then tied or taped by a string to the container.

(5S) OUTERPACK DESCRIPTION LABEL

MINIMUM REQUIRED
BAR CODED
DATA FIELDS

Data Identifier	Field Title	Definition
(5$)	PKG ID:	This field value shall contain two segments. The first segment shall be the 8 digit AMAT supplier identification number. This ID number must be followed by a separator "+" (plus) character. The second segment shall be a package identification code. This package identification code shall be unique for each of the supplier's labels (not necessarily in sequential order) and assigned by the supplier or manufacturer. A supplier may provide a site code within this segment to ensure uniqueness of the package identification code for regional sourcing to AMAT. The supplier or manufacturer shall avoid repeating the exact package identification character sequence within 365 day period. The human readable interpretation of the bar code data shall not contain the start or stop characters. This field value shall be the AMAT Purchase Order Number where the overpack container contains parts for only one Purchase Order Number. This order number shall be bar coded.
(K)	AMAT ORDER NO:	This field value shall be the AMAT Purchase Order Number where the overpack container parts for only one Purchase Order Number. This order number shall be bar coded. Where the overpack container contains parts for more than one Purchase Order Number, the human readable text shall include only the data identifier and the field title. In such a case the field value shall be the text "MULTI ORDER" printed instead of a bar code. This MULTI ORDER text shall be a minimum of 0.25 inches (6.5 mm) high, and shall occupy the space where the bar code would otherwise have been. This field value shall be the AMAT Part Number where the overpack container contains only one AMAT Part Number. This part number shall be bar coded.
(P)	AMAT PART NO:	This field value shall be the AMAT Part Number where the overpack container contains only one AMAT Part Number. This part number shall be bar coded. Where the overpack container contains more than one AMAT part number, the human readable text shall include only the data identifer and the field title. In such a case the field value shall be the text "MIXED LOAD" printed instead of a bar code. This MIXED LOAD text shall be a minimum of 0.25 inches (6.5mm) high, and shall occupy the space where the bar code would otherwise have been.

5S OUTERPACK LABEL DESCRIPTION (CONTINUED)

MINIMUM REQUIRED
HUMAN READABLE ONLY
DATA FIELDS:

FIELD TITLE	DEFINITION
FROM:	Shall be [**].
SHIP TO:	Shall be [**].
DIV. CODE:	This field is [**].
PACKAGE WEIGHT:	Should be the weight of [**]
PACKAGE COUNT:	[**].

Examples: See table above and on previous page for data field definitions.

FROM: ABCDEFGJIJKLMNO ABCDEFGHIJKLMNO ABCDEFGHIJKLMNO ABCDEFGHIJKLMNO	SHIP TO: ABCDEFGHIJKLMNO ABCDEFGHIJKLMNO ABCDEFGHIJKLMNO ABCDEFGHIJKLMNO	FROM: ABCDEFGJIJKLMNO ABCDEFGHIJKLMNO ABCDEFGHIJKLMNO ABCDEFGHIJKLMNO	SHIP TO: ABCDEFGHIJKLMNO ABCDEFGHIJKLMNO ABCDEFGHIJKLMNO ABCDEFGHIJKLMNO
(5S) PKG ID: 12345678+12345 [Illustration of bar code.]		(5S) PKG ID: 12345678+12345 [Illustration of bar code.]	
(K) AMAT ORDER NO: 1234567 [Illustration of bar code.]		(K) AMAT ORDER NO: MULTI ORDER	
(K) AMAT PART NO: MIXED LOAD		(K) AMAT PART NO: MIXED LOAD	
(Q) QUANTITY:		(Q) QUANTITY:	
(2Z) RESUPPLY LOCN:		(2Z) RESUPPLY LOCN:	
DESCRIPTION:	DIV. CODE:	DESCRIPTION:	DIV. CODE:
PACKAGE COUNT	PACKAGE WEIGHT	PACKAGE COUNT	PACKAGE WEIGHT

VERTICAL FORMAT. (not to scale)

BAR CODE LABELING REQUIREMENTS

Each unique part number itemized on the AMAT purchase order must be packaged in a separate shipping container of master pack with its own packing slip.

- o Where there are multiple delivery dates for the lien item, this is required each time the part is shipped.
- o In observing this requirement, the following rules shall apply:

All packaging shall be in compliance with 0250-00098 Applied Materials Packaging Specification.

If the quantity of the part can be placed in one shipping container, supplier shall [**].

If multiple shipping containers are required for [**].

Supplier may [**].

This figure is an illustration of the proper labeling of multiple master packs and/or multiple shipping containers into a single overpack container. Each package within the outerpack container contains the necessary shipping (3S) container label while the overpack container has the proper outerpack (5S) labeling.

Attachment 7

APPLIED MATERIALS CORPORATE ROUTING GUIDE ATTACHMENT A

TRANSPORTATION AND SHIPPING REQUIREMENTS

Applied Materials Corporate Traffic Department has established excellent pricing and service programs with various transportation carriers. Using these approved carrier programs, when Applied Materials is responsible for the freight charges, will contribute to our freight cost reduction goals while continuing to provide a high level of customer satisfaction. Everyone has a responsibility to control and reduce unnecessary expenses.

Requirements for transportation and shipping are as follows:

- All freight collect shipments to Applied Materials must be routed via the appropriate Applied Materials approved carrier, see general routing instructions within the United States.

- An Applied Materials department of division number must be referenced on the carrier documentation.

- All shipments consigned to a third party at the direction of Applied Materials and Applied Materials is paying the freight charges must be routed by an approved Applied Materials carrier. All shipping documentation must indicate billing to third party (Applied Materials).

- For freight routed prepaid by third party, FOB origin, the third party will assume all risk in transit when approved Applied Materials carrier is used.

- Materials must be suitable packaged to withstand normal freight handling and movement while in transit.

- Multiple order shipping by the same carrier and service level, on the same day, must be consolidated into one shipment on one carrier document.

- Material for each purchase order must be packaged separately with it's own packing list.

- Packing lists must be attached to the outside surface of the package and visible from any position (do not hide from view if multiple packages are pelletized).

- When consolidating multiple purchase orders in one overpack carton, all inside orders must be attached to the overpack carton. Overpack carton must be clearly label to indicate multiple orders are packed inside. Each carton within the overpack must be clearly labeled.

Attachment 7

- - DO NOT DECLARE VALUE or request insurance on any freight collect shipment or third party shipments where Applied Materials is paying the freight charges unless specifically authorized.

- - Materials must be shipped in time to meet the due date shown on the purchase order. Materials will not be accepted/received earlier than three (3) days of the due date, unless specifically authorized. Materials shipped earlier will be refused and possibly returned at your expense.

- - Only use air freight at the requested level of service when specifically instructed and authorized in writing by Applied Materials.

- - Suppliers must specifically state or indicate Emergency/Overnight service on the airbill or truck bill of lading to ensure expedited delivery, and only when instructed and authorized in writing by Applied Materials.

- - All shipping documents and package address labels must reference the complete purchase order number(s) for the material included in the package(s) and shipment. When freight codes are provided they must also show on all documents.

- - Any question concerning third party billing or carrier recommendations anywhere within the United States should be addressed to Corporate Traffic Operations:

Santa Clara, California	(408) 235-6053
Outside Santa Clara, California	Toll Free 1-888-TOO-SHIP (1-888-866-7447)

ATTACHMENT 7

APPLIED MATERIALS - ROUTING GUIDE

GENERAL ROUTING INSTRUCTIONS WITHIN THE US

COMMON CARRIER (LTL) TRANSPORTATION UP TO 7,500 LBS.

WEIGHT	AMAT LOCATION OR SERVICE AREA	CARRIER
1-100 lbs.	All points.	Federal Expres - Express Saver
Over 100 lbs.	All interstate shipments.	CF Motor Freight
Over 100 lbs.	Intrastate AZ, CA, & OR	Viking Freight System
Over 100 lbs.	Intrastate Tx, except Augtin & Dallas area	Federal Express - Express Saver Freight
1-50 lbs. Over 50 lbs.	Austin & Dallas area	Sonic Air Federal Express - Express Saver
Over 100 lbs.	Intrastate MA, NY, & PA	Federal Express - Express Saver Freight

Please provide 48 hour advance notice when your shipment is over 7,500 lbs., or on shipments that require special equipment. This will enable sufficient tiem to schedule the carrier that will provide the most economical and timely service. Contact Corporate Traffic 1-888-TOO-SHIP (866-7447).

HIGH VALUE PRODUCTS, AIR RIDE OR PADDED VAN SERVICE

TWI Mayflower	Call traffic (408) 235-6053, for scheduling and transit time details.

NEXT FLIGHT OUT, MESSENGER, AND/OR COURIER SERVICE WITHIN THE US

All weights	Sonic Air call the local office, if no local office call 1-800-528-6070

AIR FREIGHT WITHIN THE US

WEIGHT	SERVICE	CARRIER
1 - 70 lbs.	Priority Overnight - 10:30 AM Next Day Priority Overnight - 3:00 PM Next Day Economy Service - 4:30 PM Second Day	Federal Express
Over 70 lbs.	Priority Overnight - 10:30 AM Next Day Standard Overnight - 4:00 PM Next Day Two Day - 4:00 PM Second Day Deferred Air - 3-5 day delivery	Eagle USA Air Freight

GENERAL ROUTING INSTRUCTIONS FOR ALL INTERNATIONAL LOCATIONS

WEIGHT	SERVICE	CARRIER
1 - 50 Kgs.	Regular Air	Federal Express
All Weights	Next Flight Out or Courier Service	Schencker International*
Over 50 Kgs.	Regular Air or Consolidation	

* Shipments over 50 Kgs. to or from Japan must be routed via Nippon Express.

ATTACHMENT 7

TRANSIT TIMES FOR U.S. CARRIERS

SELECT CARRIER BY REFERING TO GUIDANCE PROVIDED ON PAGE ONE. USE TABLE BELOW TO ENSURE TRANSIT TIME OF SERVICE MEETS DELIVERY REQUIREMENTS.

US TIMETABLE	SHIPMENT SIZE	SAME-DAY	1 DAY	2 DAYS	3 DAYS	4 DAYS	5 DAYS	6 DAYS
Sonicair Courier Next Flight Out	All - see f.	Nationwide	Nationwide					
Sonicair Ground Courier Local	All - see e.	50 miles of AMAT Sites						
Federal Express Express Saver	1-100 lbs, see d.		Up to 350 miles of origin	350 to 1,000 miles of origin	Over 1,000 miles of origin			
Federal Express Express Saver Freight	Over 151 lbs., see d.		Up to 350 miles of origin	350 to 1,000 miles of origin	Over 1,000 miles of origin	Federal Express Express Saver Service commitment by 4:30 PM or by close of business.		
Viking Freight Sys. Between CA, AZ, OR.	Over 100 lbs.		All points in CA ex Calexico. Reno, NV	CA to metro areas in AZ, NV, OR, Denver, CO	Colorado Springs, CO			
CF Motor Freight Between Santa Clara and States	Over 100 lbs.				AZ, ID, NV, OR, WA	CO, MT, NM, UT	IL, IN, KS, KY, LA, MI, MN, MO, ND, NE, OH, OK, SD, TN, WI, WY	DC, DE, FL, GA, LA, MA, MD, ME, MS, NC, NH, NJ, NY, PA, RI, SC, TX, VA, VT, WV
CF Motor Freight between Austin and States	Over 100 lbs.				AR, LA, NM, OK	AL, CO, FL, GA, IA, IL, IN, KS, KY, MI, MS, NC, SC, UT, WI, WY	AZ, CT, DC, DE, ID, MA, MD, ME, MN, MO, MT, ND, NE, NH, NJ, NV, NY, OH, OR, PA, RI, SD, TN, VA, VT, WA, MV	

a. General guidelines call 1-888-TOSHIP for additional information.
b. Viking Freight Systems use for all intrastate California LTL. Can be used for Western States Listed.
c. Express Saver Freight Program should be used for all appropriate non-local intra Texas shipments.
d. Express Saver program should be used for appropriate packages under 100 lbs.
e. Sonic Ground Courier Service can be used for sameday shipments in local area of AMAT sites in Santa Clara, Milpitas, Austin, Dallas, Phoenix, and Boston.
f. Next Flight Out service is used for extremely urgent shipments. Check with carrier for delivery commitment. Consider Federal Express or Eagle if commitment is after 10:30 AM next day.

Attachment 8

Intentionally Omitted

Attachment 9

Intentionally Omitted

ATTACHMENT 10

Applied Materials Incorporated

PRELIMINARY QNRR FORM

SUPPLIER NAME: ________________________________ DATE: _______________________

P/N: ____ SQE: ________________________

==

QNRR Number: ________________________________

==

Levels: Please check one

See Page 3 of 3 for level descriptions

1. Critical [ ]
2. Major [ ]
3. Minor [ ]

==

Brief Description:

____

____

____

==

* This QNR requires corrective action (CA). Please return this form with signature to within ________ working days.

1. CA Approved: [ ]; Applied Materials must sign page 2 of 3 to confirm approval.

2. CA Disapproved: [ ]; Explain below

Applied Materials Explain Briefly:

____
____
____
____
____
____

* Applied Materials to review CA and Approve or Disapprove based on fact. Applied Materials must inform supplier by returning this form with status checked and explained within fourteen working days.

==

==
CA to correct Discrepancy: Explain

____

____

____

____

____

____

____

==
Preventative Measures Described:

____

____

____

____

____

____

____

==
Scheduled Completion Date: _____________________________________

Supplier Signature: _____________________________________

Applied Materials Approval Signature: _____________________________________

==

ATTACHMENT 10

Applied Materials Incorporated

LEVELS OF CORRECTIVE ACTION

LEVEL	NATURE
1. CRITICAL	HAZARDOUS TO HUMAN SAFETY; OR VITAL TO FUNCTIONALITY OF END PRODUCT THUS NON-CONFORMANCE IN MEETING THE REQUIRED SPECIFICATIONS AND CONTRACTUAL AGREEMENTS. EXAMPLES: IMPROPER HEAT TREATEMENT OF CERAMIC MECHNICAL MOTOR MECHANISM, INOPERATIVE BRAKING SYSTEM, EXPLOSIVE COMPONENTS, ETC.
2. MAJOR	A NON-CONFORMANCE RELATED TO THE REQUIRED FUNCTIONALITY SPECIFICATIONS AND/OR NON-CONFORMANCE TO CONTRACTUAL AGREEMENTS. EXAMPLES: CHEMICAL REACTION (RUST), INOPERATIVE MECHANISM, PCBAS.
3. MINOR	A NON-CONFORMANCE TO THE FUNCTIONALITY OF PARTS/MECHANISMS WHICH ARE NOT SHOW STOPPERS. EXAMPLES: CHEMICAL REACTION (RUST), DENTS, SCRATCHES, LOOSE HINGE.

ATTACHMENT 12

Applied Materials ENGINEERING CHANGE NOTICE ECN No.
COMMODITY:

MODEL No. CHARGE No. CONTRACT No. PROGRAM NAME Sheet 1 of

ECN CLASS

DATA ENTRY REQUIRED REASON FOR CHANGE ECP No. Requester TYPE I [ ] II [ ] RCD [ ]

Doc [ ] Bom [ ] Part [ ] Routine Incorporate

DATA ENTRY REQUIRED Customer Approval Date Urgent Changes by

Doc [ ] Bom [ ] Part [ ] Emergency

Parts Disposition Codes

DOCUMENT(S) AFFECTED PART(S) AFFECTED

1. Use part as is (no action)
2. Rework part/build to change
3. Scrap part (do not use)
4. See special instruction

Document Number	Current Rev	New Rev	L/U Rev	TITLE	Part Number	Change Effectivity (S/N, Qty, Dates)	FP/RR	OPEN (OP)	Comp (CP)	Cloased (CL)
							Not Started	In Kitting 10 Mfg.	In Stock	Shipped

DESCRIPTION OF CHANGE

	Project Engineer	Date	Mfg. Engineer	Date	Production Control	Date	ECN Checked by	Date
REQUIRED							Incorporated by	Date
APPROVALS	Quality Engineer	Date	Configuration	Date	Program Manager	Date	Incorporation ck'd by	Date

ATTACHMENT 13

APPLIED MATERIALS SUPPLIER PROBLEM SHEET 95-0957

Date	Vendor	Originator	Telephone No.

Part Number	Part Description

Contract/Spot Buy (circle one)	Purchase Order No.

PROBLEM

APPLIED ACTION

PROBLEM WILL BE RESOLVED BY:	NAME	DATE	RETURN RESPONSE TO ORIGINATOR WITHIN 24 HOURS

Attachment 14

Intentionally Omitted

Attachment 15

Intentionally Omitted

Attachment 16

CERTIFICATE OF CONFORMANCE

"I certify that on _________________________ the ____________________ furnished the supplies or services called for under the Applied Materials' Purchase Contract Number ________________________________ via _______________________ on ____ in accordance with all applicable requirements. I further certify that the supplies or services are of the quality specified and conform in all respects with the contract requirements, including specifications, drawings, preservation, packaging, packing, marking requirements and physical item identification (part number), and are in the quantity shown on this or on the attached acceptance document."

Date of Execution:

Signature:

Name & Title:

****

Instructions:

The _____ signed certificate shall be attached to or included on the top copy of the inspection or receiving report provided to Applied Materials ar the time of delivery. In addition, a copy of the signed completed certificate shall also be maintained at the ______ facility and will be made available to Applied Materials' representatives upon request.

Confidential Materials omitted and filed separately with the Securities and Exchange Commission. Asterisks denote omissions.

Attachment 17

[**] CALCULATION

[**]

NONDISCLOSURE AGREEMENT
Applied Materials, Inc.

APPLIED MATERIALS, INC., a Delaware corporation (including its subsidiaries, "Applied"), having its principal offices in Santa Clara, California and MKS Instruments, Inc., a Massachusetts corporation,("Recipient") having its principal offices in Andover, Massachusetts, hereby agree as follows:

I. IDENTIFICATION OF CONFIDENTIAL INFORMATION

A. Applied may disclose to Recipient the following types of information: SEE ATTACHMENT 1.

B. The information described in A. above shall be deemed "Confidential Information" if:

(1) in the case of a written disclosure, Applied affixes to the document an appropriate legend, such as "Proprietary" or "Confidential", and

(2) in the case of an oral or visual disclosure, Applied makes a contemporaneous oral statement or delivers to Recipient a written statement within thirty (30) days to the effect that such disclosure is confidential or the like.

C. "Confidential Information" does not include information that: (1) becomes a matter of public knowledge through no fault of Recipient, (2) is rightfully received by Recipient from a third party without restriction on disclosure, (3) is independently developed by Recipient without the use of Applied's Confidential Information or (4) is in the possession of Recipient prior to its disclosure by Applied.

D. Each party's Nondisclosure Agreement ("NDA") Coordinator serve as the principal contact for the disclosure or receipt of Confidential Information. Applied's NDA Coordinator will be MICHAEL BERKLAW and Recipient's NDA Coordinator will be LEO BERLINGHIERI.

II. USE OF CONFIDENTIAL INFORMATION

Recipient shall use the Confidential Information only for the purpose of (1) determining whether to enter into a transaction with Applied, (2) purchasing or using products or services supplied by Applied or (3) providing products or services to Applied. Absent a written agreement to the contrary, all information generated or derived by Recipient in connection with any such transaction or provisions of goods or services shall be deemed Confidential Information for purposes of this Agreement.

III. RESPONSIBILITIES OF RECIPIENT

A. Recipient agrees (1) to disclose Confidential Information only to those of its employees who have a need to know such information, are informed of its confidential nature and agree to comply with this Agreement, (2) not to disclose Confidential Information to any third party, except pursuant to a lawful judicial, administrative or governmental order after providing Applied an opportunity to avoid or limit such disclosure, (3) to protect the Confidential Information with at least the degree of care with which it protects its own confidential information, but in no case with less than a reasonable degree of care and (4) to notify Applied promptly of any breach of this Agreement.

B. Within thirty (30) days of a written request by Applied, Recipient shall (1) destroy or return to Applied all documents received from Applied that contain Confidential Information, all documents it may have created that reveal or are based on any Confidential Information, and all copies of the foregoing (except for one copy which may be kept by Recipient's legal department or outside attorneys for archival purposes only), and (2) deliver to Applied a certificate stating that Recipient has complied with such requests.

IV. DISCLOSURE PERIOD AND CONFIDENTIALITY PERIOD

A. The period during which Applied may disclose Confidential Information under this Agreement shall begin on the date of the first disclosure of Confidential Information (which may be prior to the date of this Agreement) and shall end on _______ (if no date is specified, the period shall end three (3) years from the date this Agreement was signed). Either party may terminate the Agreement by giving the other party ten (10) days' written notice.

B. The obligations set forth in Articles II and III shall (1) termination five (5) years from the date of this Agreement and (2) survive the termination or expiration of this Agreement.

V. MISCELLANEOUS

A. Recipient shall not acquire intellectual property rights from Applied other than by a separate written agreement. Nothing in this Agreement shall be deemed to create any obligation to disclose Confidential Information. The Confidential Information is accepted "as is" by Recipient without any warranty of noninfringement or of any other sort by Applied or any of Applied's agents, advisers, consultants or contractors.

B. This Agreement does not create any partnership, joint venture or agency between the parties.

C. Before exporting or reexporting any Confidential Information, Recipient must comply with all applicable regulations of the U.S. Department of Commerce Office of Export Administration and/or other applicable agencies.

D. This Agreement is the complete and exclusive statement of the understanding between the parties regarding the subject matter hereof and supersedes all prior or contemporaneous communications. It may be amended only by a writing signed by both parties.

E. This Agreement shall be interpreted and enforced according to the laws of the State of California (exclusive conflict of law rules).

APPLIED MATERIALS, INC.	MKS INSTRUMENTS, INC. (Print Name of Recipient)
By: /s/ Joe Cestari	By: /s/ Leo Berlinghieri
Name (print) Joe Cestari	Name (print) Leo Berlinghieri
Title: Sr. Director-Chemical Delivery SMO Operations	Title: Corporate VP, Customer Support
Date: 10/23/98	Date: 12-22-98
	Please circle one: Customer Supplier Consultant

Confidential Materials omitted and filed separately with the Securities and Exchange Commission. Asterisks denote omissions.

EXHIBIT 10.18

PERSONAL & CONFIDENTIAL
MEMORANDUM

TO:
FROM: George Manning
DATE:
SUBJECT: 1999 Management Incentive Program

The amount of bonus you may be eligible to earn under the Management Incentive Program in 1999 will be dependent on the consolidated net income achieved by the Corporation for calendar year 1999. Consolidated net income means the consolidated net profits of the Corporation and its subsidiaries after payment by the Corporation of bonuses to all employees of the Corporation, contributions by the Corporation to the Retirement Plan on behalf of all employees of the corporation (in the United States who are eligible to participate in the Retirement Plan), and before payment by the Corporation of all income taxes.

If our consolidated net income for 1999 ends up less than ***********, you will not earn a bonus. If the consolidated net income is ************ or greater, you will earn a bonus in the amount shown on the attached table. However, in no event can your bonus exceed 200% of your targeted bonus for 1999.

In order to receive a payout under this Plan, we must be successful in keeping our non-direct employment at current levels and maintaining tight controls over our spending. In addition, our 1999 net sales must meet or exceed our 1998 net sales. For example, if our annual net sales for 1999 were approximately equal to our annual net sales for 1998, you could receive approximately 10% of your targeted bonus amount. If we were able to grow our net 1999 sales to approximately *** more than our net 1998 sales, you could receive approximately 50% of your targeted bonus amount. And at *** growth over last year, with good cost control measures in place, you could expect to receive your full targeted bonus amount. The consolidated net income objectives are based on current financial conditions. Significant changes in those conditions could cause our net income objectives to be appropriately revised based on new circumstances.

In order to participate in this management Incentive Program, you must be actively employed by MKS Instruments, Inc. as of December 31, 1999.

THIS INFORMATION IS EXTREMELY CONFIDENTIAL AND SHOULD BE TREATED AS SUCH. YOU SHOULD NOT DIVULGE THIS INFORMATION INSIDE OR OUTSIDE OF MKS INSTRUMENTS, INC.

GM: 99-4200:jg
Attachments

Six Shattuck Road, Andover, MA 01810
logo Telephone (978) 975-2350 Fax (978) 975-3756

CONFIDENTIAL MATERIALS OMITTED AND FILED SEPARATELY WITH THE SECURITIES AND EXCHANGE COMMISSION. ASTERISKS DENOTE OMISSIONS.
PERSONAL & CONFIDENTIAL

1999 MANAGEMENT INCENTIVE PROGRAM
CALENDAR YEAR 1999 CONSOLIDATED NET PROFIT TABLE
(JANUARY 1 - DECEMBER 31, 1999)

YOUR TARGET BONUS IS 40% OF YOUR 1999 BASE COMPENSATION, WHICH WILL BE FULLY ACHIEVED IF CONSOLIDATED NET INCOME BEFORE TAXES REACHES ****M. AT ****M CONSOLIDATED NET INCOME BEFORE TAXES, YOU WOULD RECEIVE 200% OF YOUR TARGET BONUS, WHICH WOULD BE 80% OF YOUR 1999 BASE COMPENSATION.

Consolidated Net Income %*	Percent of Target Bonus Earned
< $********	0%
$**********	10%
$**********	25%
$**********	35%
$**********	50%
$**********	65%
$**********	75%
$**********	90%
$**********	100%
$**********	125%
$**********	150%
$**********	175%
>$*********	200%

*Consolidated net income worldwide, before taxes.

THIS INFORMATION IS EXTREMELY CONFIDENTIAL AND SHOULD BE TREATED AS SUCH. YOU SHOULD NOT DIVULGE THIS INFORMATION INSIDE OR OUTSIDE OF MKS INSTRUMENTS, INC.

Exhibit 10.26

CONTRIBUTION AGREEMENT

This CONTRIBUTION AGREEMENT (the "Agreement") is entered into as of March ___, 1999 between MKS INSTRUMENTS, INC., a Massachusetts corporation (the "Parent"), and the persons listed on SCHEDULE A attached hereto (individually a "Stockholder" and collectively the "Stockholders"). Each of the Stockholders owns shares of capital stock of MKS International, Inc., a Massachusetts corporation and a subsidiary of Parent ("MKS International") and/or MKS Instruments France S.A. ("MKS France"). MKS International and MKS France are hereinafter collectively referred to as the "Subsidiaries" and each individually as a "Subsidiary."

WHEREAS, the Parent has filed a Registration Statement on Form S-1 with the Securities and Exchange Commission in connection with a firm commitment underwritten public offering (the "IPO") of shares of its common stock, no par value ("Common Stock");

WHEREAS, in connection with the IPO, the Parent will list its Common Stock for quotation on the Nasdaq National Market System; and

WHEREAS, the Stockholders and the Parent believe that, in order to facilitate the IPO, the Subsidiaries, to the maximum extent allowed under applicable law, should be owned by the Parent;

NOW, THEREFORE, for good and valuable consideration, the sufficiency of which is hereby acknowledged, the undersigned hereby agree as follows:

1. CONTRIBUTION OF SHARES OF SUBSIDIARIES. Subject to the terms and conditions of this Contribution Agreement, each of the Stockholders hereby agrees that, effective immediately prior to the closing of the IPO (the "Closing"), all of his, her or its interest in all shares of the Subsidiaries owned by him, her or it (the "Shares") shall be contributed, transferred, conveyed, assigned and delivered to the Parent or its designee. At the Closing each Stockholder shall deliver to the Parent certificates evidencing the Shares owned by such Stockholder duly endorsed in blank or with stock powers duly executed by such Stockholder.

2. FURTHER ASSURANCES. At any time and from time to time after the Closing, at the Parent's request and without consideration, each of the Stockholders shall promptly execute and deliver such instruments of contribution, transfer, conveyance, assignment and confirmation, and take all such other action as the Parent may reasonably request, more effectively to transfer, convey and assign to the

Parent or its designee, and to confirm the Parent's or its designee's title to, all of the Shares owned by such Stockholder, and to assist the Parent in exercising all rights with respect thereto and to carry out the purpose and intent of this Agreement.

3. REPRESENTATIONS OF THE STOCKHOLDERS. Each Stockholder severally represents and warrants to the Parent as follows:

(a) Except as set forth on Schedule B attached hereto, such Stockholder has good and marketable title to the Shares which are to be transferred to the Parent by such Stockholder pursuant hereto, free and clear of any and all covenants, conditions, restrictions, voting trust arrangements, liens, charges, encumbrances, options and adverse claims or rights whatsoever. SCHEDULE A attached hereto sets forth a true and correct description of all Shares owned by such Stockholder.

(b) Except as set forth on Schedule B attached hereto, such Stockholder has the full right, power and authority to enter into this Agreement and to transfer, convey and assign to the Parent at the Closing the Shares to be contributed by such Stockholder hereunder and, upon consummation of the IPO, the Parent or its designee will acquire from such Stockholder good and marketable title to such Shares, free and clear of all covenants, conditions, restrictions, voting trust arrangements, liens, charges, encumbrances, options and adverse claims or rights whatsoever.

(c) Except as set forth on Schedule B attached hereto, such Stockholder is not a party to, subject to or bound by any agreement or any judgment, order, writ, prohibition, injunction or decree of any court or other governmental body which would prevent the execution or delivery of this Agreement by such Stockholder or the transfer, conveyance and assignment of the Shares to be contributed by such Stockholder to the Parent or its designee pursuant to the terms hereof.

4. MISCELLANEOUS.

4.1 COUNTERPARTS. This Agreement may be executed in several counterparts, each of which shall be deemed an original, but all of which counterparts collectively shall constitute an instrument representing the Agreement between the parties hereto.

4.2 CONSTRUCTION OF TERMS. Nothing herein expressed or implied is intended, or shall be construed, to confer upon or give any person, firm or corporation, other than the parties hereto or their respective successors and assigns, any rights or remedies under or by reason of this Agreement.

4.3 GOVERNING LAW. This Agreement and the legal relations between the parties hereto shall be governed by and construed in accordance with the substantive laws of the Commonwealth of Massachusetts without regard to Massachusetts choice of law rules.

4.4 AMENDMENT AND MODIFICATION. This Agreement may be amended, modified or supplemented only by a written agreement executed by the parties.

4.5 ASSIGNMENT. This Agreement and all of the provisions hereof shall be binding upon and inure to the benefit of the parties hereto and their respective successors and permitted assigns, but neither this Agreement nor any of the rights, interests or obligations hereunder shall be assigned by any of the Stockholders without the prior written consent of the Parent.

4.6 INTERPRETATION. The section headings contained in this Agreement are solely for the purpose of reference, are not part of the agreement of the parties and shall not in any way affect the meaning or interpretation of this Agreement.

4.7 SEVERABILITY. In the event that any one or more of the provisions of this Agreement shall be held to be illegal, invalid or unenforceable in any respect, the same shall not in any respect affect the validity, legality or enforceability of the remainder of this Agreement, and the parties shall use their best efforts to replace such illegal, invalid or unenforceable provisions with an enforceable provision approximating, to the extent possible, the original intent of the parties.

4.8 ENTIRE AGREEMENT. This Agreement embodies the entire agreement and understanding of the parties hereto in respect to the subject matter contained herein. There are no representations, promises, warranties, covenants, or undertakings, other than those expressly set forth or referred to herein. This Agreement supersedes all prior agreements and the understandings between the parties with respect to such subject matter.

4.9 NOTICES. All notices provided for in this Agreement shall be validly given if in writing and delivered personally or sent by registered mail, postage prepaid

if to the Parent, to:

President
MKS Instruments, Inc.
6 Shattuck Road
Andover, MA 01810

copy to:
Richard S. Chute
Hill & Barlow
One International Place
Boston, MA 02110

If to any Stockholder, to the address appearing under such Stockholder's name on Exhibit A attached hereto, or at such other address provided by such Stockholder in writing to the Parent.

4.10 TERMINATION OF AGREEMENT. This Agreement shall terminate and be void, as if it never had been executed, if the Closing shall not have occurred on or before July 31, 1999

IN WITNESS WHEREOF, the parties have executed this Agreement as of the date first written above.

MKS INSTRUMENTS, INC.

By:________________________________
Ronald C. Weigner, Vice President
and Chief Financial Officer

STOCKHOLDERS

____
John R. Bertucci

____
Claire R. Bertucci

____
John J. Sullivan

____
Richard S. Chute

____
Bernard Martin

Claire R. Bertucci Second Family
Trust of December 15, 1986 FBO
Carol B. Bertucci

By:________________________________
John R. Bertucci, Trustee

By:________________________________
Thomas H. Belknap, Trustee

Claire R. Bertucci Second Family
Trust of December 15, 1986 FBO
Janet C. Bertucci

By:________________________________
John R. Bertucci, Trustee

By:________________________________
Thomas H. Belknap, Trustee

John R. Bertucci Second Family
Trust of December 15, 1986 FBO
Carol B. Bertucci

By:________________________________
Claire R. Bertucci, Trustee

By:________________________________
Richard S. Chute, Trustee

John R. Bertucci Second Family
Trust of December 15, 1986 FBO
Janet C. Bertucci

By:________________________________
Claire R. Bertucci, Trustee

By:________________________________
Richard S. Chute, Trustee

SCHEDULE A

STOCKHOLDERS

	MKS International Shares Owned	MKS France Shares Owned
John R. Bertucci c/o MKS Instruments, Inc. 6 Shattuck Road Andover, MA 01810	2,315.0	5.0
Claire R. Bertucci c/o MKS Instruments, Inc. 6 Shattuck Road Andover, MA 01810	2,205.0	5.0
Claire R. Bertucci Second Family Trust of December 15, 1986 f/b/o Carol B. Bertucci c/o Hill & Barlow One International Place Boston, MA 02110	233.5	0
Claire R. Bertucci Second Family Trust of December 15, 1986 f/b/o Janet C. Bertucci c/o Hill & Barlow One International Place Boston, MA 02110	233.5	0
John R. Bertucci Second Family Trust of December 15, 1986 f/b/o Carol B. Bertucci c/o Hill & Barlow One International Place Boston, MA 02110	233.5	0
John R. Bertucci Second Family Trust of December 15, 1986 f/b/o Janet C. Bertucci c/o Hill & Barlow One International Place Boston, MA 02110	233.5	0
John J. Sullivan c/o MKS Instruments, Inc. 6 Shattuck Road Andover, MA 01810	250.0	0
Richard Chute c/o Hill & Barlow One International Place Boston, MA 02110	0	4.0
Bernard Martin c/o MKS Instruments France s.a 43, Rue du Commandant Rolland B.P. 41 F-93352 le Bourget, Cedex	0	5.0

SCHEDULE B

EXHIBIT 23.2

CONSENT OF INDEPENDENT ACCOUNTANTS

We consent to the inclusion in this Amendment No. 2 to the registration statement on Form S-1 (File No. 333-71363) of our report dated January 22, 1999, except for the information in the first and second paragraph of Note 13, as to which the date of January 28, 1999 and February 24, 1999, respectively, on our audit of the consolidated financial statements and our report dated January 22, 1999 on our audit of the financial statement schedule of MKS Instruments, Inc. We also consent to the references to our firm under the captions "Experts" and "Selected Consolidated Financial Data."

/s/ PRICEWATERHOUSECOOPERS LLP
PRICEWATERHOUSECOOPERS LLP

Boston, Massachusetts

March 12, 1999