



UNITED STATES SECURITIES AND EXCHANGE COMMISSION  
Washington, D.C. 20549

**Form 10-K**  
ANNUAL REPORT PURSUANT  
TO SECTIONS 13 OR 15(d) OF THE  
SECURITIES EXCHANGE ACT OF 1934

(Mark One)

ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d)  
OF THE SECURITIES EXCHANGE ACT OF 1934  
For the fiscal year ended December 31, 2008

or  
TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934  
For the transition period from to

Commission File number 0-23621

**MKS INSTRUMENTS, INC.**

(Exact Name of Registrant as Specified in Its Charter)

Massachusetts  
(State or other Jurisdiction of  
Incorporation or Organization)  
2 Tech Drive, Suite 201, Andover, Massachusetts  
(Address of Principal Executive Offices)

04-2277512  
(IRS Employer  
Identification No.)  
01810  
(Zip Code)

Registrant's Telephone Number, including area code  
(978) 645-5500

Securities registered pursuant to Section 12(b) of the Act:

Title of Class  
Common Stock, no par value

Name of Each Exchange on Which Registered  
NASDAQ Global Market

Securities registered pursuant to Section 12(g) of the Act:  
None

Indicate by check mark if the registrant is a well-known seasoned issuer, as defined in Rule 405 of the Securities Act. Yes  No

Indicate by check mark if the registrant is not required to file reports pursuant to Section 13 or Section 15(d) of the Act. Yes  No

Indicate by check mark whether the registrant (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the registrant was required to file such reports), and (2) has been subject to such filing requirements for the past 90 days. Yes  No

Indicate by check mark if disclosure of delinquent filers pursuant to Item 405 of Regulation S-K (§ 229.405 of this chapter) is not contained herein, and will not be contained, to the best of registrant's knowledge, in definitive proxy or information statements incorporated by reference in Part III of this Form 10-K or any amendment to this Form 10-K.

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, or a smaller reporting company. See the definitions of "large accelerated filer," "accelerated filer" and "smaller reporting company" in Rule 12b-2 of the Exchange Act. (Check one):

Large accelerated filer  Accelerated filer  Non-accelerated filer  Smaller reporting company   
(Do not check if a smaller reporting company)

Indicate by check mark whether the registrant is a shell company (as defined in Rule 12b-2 of the Exchange Act). Yes  No

Aggregate market value of the voting and non-voting common equity held by nonaffiliates of the registrant as of June 30, 2008 based on the closing price of the registrant's Common Stock on such date as reported by the Nasdaq Global Market: \$1,045,692,807.

Number of shares outstanding of the issuer's Common Stock, no par value, as of February 18, 2009: 49,536,699

**DOCUMENTS INCORPORATED BY REFERENCE**

Portions of the definitive Proxy Statement for MKS' Annual Meeting of Stockholders to be held on May 4, 2009 are incorporated by reference into Part III of this Form 10-K.

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**SPECIAL NOTE REGARDING FORWARD-LOOKING STATEMENTS**

MKS' management believes that this Annual Report on Form 10-K contains "forward-looking statements" within the meaning of the Private Securities Litigation Reform Act of 1995, Section 27A of the Securities Act and Section 21E of the Securities Exchange Act. When used herein, the words "believe," "anticipate," "plan," "expect," "estimate," "intend," "may," "see," "will," "would" and similar expressions are intended to identify forward-looking statements. These forward-looking statements reflect management's current opinions and are subject to certain risks and uncertainties that could cause actual results to differ materially from those stated or implied. MKS assumes no obligation to update this information. Risks and uncertainties include, but are not limited to, those discussed in the section entitled "Risk Factors" of this annual report on Form 10-K.

**PART I**

**Item 1. Business**

MKS Instruments, Inc. (the "Company" or "MKS") was founded in 1961 as a Massachusetts corporation. We are a leading worldwide provider of instruments, subsystems and process control solutions that measure, control, power, monitor and analyze critical parameters to improve process performance and productivity of advanced manufacturing processes. We also provide services relating to the maintenance and repair of our products, software maintenance, installation services and training.

We are managed as one operating segment. We group our products into three product groups: Instruments and Control Systems, Power and Reactive Gas Products and Vacuum Products. Our products are derived from our core competencies in pressure measurement and control, materials delivery, gas composition analysis, electrostatic charge management, control and information technology, power and reactive gas generation and vacuum technology.

Our products are used in diverse markets, applications and processes. Our primary served markets are manufacturers of capital equipment for semiconductor devices and for other thin film applications including flat panel displays, solar cells, data storage media and other advanced coatings. We also leverage our technology in other markets with advanced manufacturing applications including medical equipment, pharmaceutical manufacturing and energy generation and environmental monitoring.

For over 45 years, we have focused on satisfying the needs of our customers by establishing long-term, collaborative relationships. We have a diverse base of customers that includes manufacturers of semiconductor capital equipment and semiconductor devices, thin film capital equipment used in the manufacture of flat panel displays, solar cells, data storage media and other coating applications; and other industrial, medical and manufacturing companies, and university, government and industrial research laboratories. Our top 10 customers for the year ended December 31, 2008 were Applied Materials, DNS Electronics, Hitachi, Lam Research, Phillips, Novellus Systems, Sharp, Siemens, Tokyo Electron and Ulvac Technologies.

We file reports, proxy statements and other documents with the Securities and Exchange Commission. You may read and copy any document we file at the SEC Headquarters at Office of Investor Education and Assistance, 100 F Street, NE, Washington, D.C. 20549. You should call 1-800-SEC-0330 for more information on the public reference room. Our SEC filings are also available to you on the SEC's internet site at <http://www.sec.gov>.

Our internet address is [www.mksinstruments.com](http://www.mksinstruments.com). We are not including the information contained in our website as part of, or incorporating it by reference into, this annual report on Form 10-K. We make available free of charge through our web site our annual reports on Form 10-K, quarterly reports on Form 10-Q, current reports on Form 8-K and amendments to these reports filed or furnished pursuant to Section 13(a) or 15(d) of the Securities Exchange Act of 1934, as amended, or the Exchange Act, as soon as reasonably practicable after we electronically file such materials with the Securities and Exchange Commission.

## **Markets and Applications**

We are focused on improving process performance and productivity by measuring, controlling, powering, monitoring and analyzing advanced manufacturing processes in semiconductor, thin film and other market sectors. We estimate that approximately 57%, 68% and 70% of our net sales for the years ended December 31, 2008, 2007 and 2006, respectively, were to semiconductor capital equipment manufacturers and semiconductor device manufacturers. Approximately 43%, 32% and 30% of our net sales in the years ended December 31, 2008, 2007 and 2006, respectively, were for other advanced manufacturing applications. These include, but are not limited to, thin-film processing equipment applications such as flat panel displays, solar cells, data storage media, and other thin film coatings as well as medical equipment; energy generation and environmental monitoring processes; pharmaceutical and other industrial manufacturing; and university, government and industrial research laboratories.

We estimate that approximately 43%, 39% and 34% of our net sales for the years ended December 31, 2008, 2007 and 2006, respectively, were to customers located in international markets. International sales include sales by our foreign subsidiaries, but exclude direct export sales.

### ***Semiconductor Manufacturing Applications***

The majority of our sales are derived from products sold to semiconductor capital equipment manufacturers and semiconductor device manufacturers. Our products are used in the major semiconductor processing steps such as depositing thin films of material onto silicon wafer substrates and etching and cleaning circuit patterns. In addition, we provide specialized instruments and software to monitor and analyze process performance.

We anticipate that the semiconductor manufacturing market will continue to account for a substantial portion of our sales. While the semiconductor device manufacturing market is global, major semiconductor capital equipment manufacturers are concentrated in Japan and the United States.

### ***Other Advanced Manufacturing Applications***

Our products are used in the manufacture of flat panel displays, data storage media, solar cells and other coatings including architectural glass that require the same or similar thin film deposition processes as semiconductor manufacturing.

#### ***Flat Panel Display Manufacturing***

Flat panel displays are used in electronic hand-held devices, laptop computers, desktop computer monitors, and television sets. We sell products to flat panel display equipment manufacturers and to end-users in the flat panel display market. Major manufacturers of flat panel displays are concentrated in Japan, Korea and Taiwan, and major manufacturers of flat panel display equipment are concentrated in Japan and the United States. The transition to larger panel sizes and higher display resolution is driving the need for improved process control to reduce defects.

#### ***Solar Cells***

Our products are used in crystalline silicon and emerging thin film processes to manufacture photovoltaic (PV) cells. Crystalline silicon technology requires wafer based deposition systems and is currently the dominant manufacturing technology. Thin film deposition on a non-silicon substrate, such as glass, is the emerging technology.

#### ***Data Storage Media***

Our products are used to manufacture storage media which store and read data magnetically; optical storage media which store and read data using laser technology; hard disks; data storage devices; and digital video discs.

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

*Other Advanced Coatings*

Thin film coatings for diverse applications such as architectural glass and packaging are deposited using processes similar to those used in semiconductor manufacturing. Thin film processing manufacturers are concentrated in Europe, Japan and the United States.

***Other Advanced Applications***

Our products are used in other energy generation and environmental monitoring processes such as nuclear fuel processing, fuel cell research, greenhouse gas monitoring, and chemical agent detection; medical instrument sterilization; consumable medical supply manufacturing and pharmaceutical manufacturing. Our power delivery products are also incorporated into other end-market products such as medical imaging equipment. In addition, our products are sold to government, university and industrial laboratories for vacuum applications involving research and development in materials science, physical chemistry and electronics materials. Major equipment and process providers and research laboratories are concentrated in Europe, Japan and the United States.

**Product Groups**

We group our products into three product groups: Instruments and Control Systems, Power and Reactive Gas Products and Vacuum Products.

**1. *Instruments and Control Systems***

This product group includes pressure measurement and control, materials delivery, gas composition analysis, electrostatic charge management and control and information technology products.

***Pressure Measurement and Control Products.*** Each of our pressure measurement and control product lines consists of products that are designed for a variety of pressure ranges and accuracies.

***Baratron® Pressure Measurement Products.*** 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. We believe we offer the widest range of gas pressure measurement instruments in the semiconductor and advanced thin-film materials processing industries.

***Automatic Pressure and Vacuum Control Products.*** These products enable precise control of process pressure by electronically actuating valves that control the flow of gases in and out of the process chamber to minimize the difference between desired and actual pressure in the chamber.

In most cases, Baratron pressure measurement instruments provide the pressure input to the automatic pressure control device. Together, these components create an integrated automatic pressure control subsystem. Our 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.

***Materials Delivery Products.*** Each of our materials delivery product lines consists of products that are designed for a variety of flow ranges and accuracies.

***Flow Measurement and Control Products.*** Flow measurement products include gas and vapor flow measurement products based upon thermal conductivity, pressure and direct liquid injection technologies. The flow control products combine the flow measurement device with valve control elements based upon solenoid, piezo-electric and piston pump technologies. These products measure and automatically control the mass flow rate of gases and vapors into the process chamber.

***Gas Composition Analysis Products.*** Gas composition analysis instruments are sold to a variety of industries including the semiconductor industry.

***Mass Spectrometry-Based Gas Composition Analysis Instruments.*** These products are based on quadrupole mass spectrometer sensors that separate gases based on molecular weight. These sensors include built-in electronics and are provided with software that analyzes the composition of background and process gases in the process

chamber. These instruments are provided both as portable laboratory systems and as process gas monitoring systems used in the diagnosis of semiconductor manufacturing process systems.

**Fourier Transform Infra-Red (FTIR) Based Gas Composition Analysis Products.** FTIR-based products provide information about the composition of gases by measuring the absorption of infra-red light as it passes through the sample being measured. Gas analysis applications include measuring the compositions of mixtures of reactant gases; measuring the purity of individual process gases; measuring the composition of process exhaust gas streams to determine process health; monitoring gases to ensure environmental health and safety and monitoring combustion exhausts. These instruments are provided as portable laboratory systems and as process gas monitoring systems used in the diagnosis of manufacturing processes.

Mass spectrometry-based and FTIR-based gas monitoring systems can indicate out-of-bounds conditions, such as the presence of undesirable contaminant gases and water vapor or out-of-tolerance amounts of specific gases in the process, which alert operators to diagnose and repair faulty equipment.

**Leak Detection Products.** Helium leak detection is used in a variety of industries including semiconductor, HVAC, automotive and aerospace to ensure the leak integrity of both manufactured products and manufacturing equipment. We believe that our products are the smallest mass spectrometer-based helium leak detectors currently available.

**Electrostatic Charge Management Products.** Semiconductor, flat panel display and data storage industries are vulnerable to electrostatic charge-related contamination and yield problems. We design and manufacture products to control electrostatic attraction, electrostatic discharge and electromagnetic interference. In high throughput industrial applications such as plastics manufacture and printing, ionization is used to improve process control and productivity.

**Control and Information Technology Products.** We design and manufacture a suite of products that allow semiconductor and other manufacturing customers to better control their processes through computer-controlled automation. These products include digital control network products, process chamber and system controllers, connectivity products and data analysis/information products.

**Control Products.** Digital control network products are used to connect sensors, actuators and subsystems to the chamber and system control computers. They support a variety of industry-standard connection methods as well as conventional discrete digital and analog signals. Chamber and system control computers process these signals in real time and allow customers to precisely manage the process conditions.

Connecting sensors, chambers and tools to the factory network is essential for improving quality and productivity. Our connectivity products allow information to flow from the process sensors and subsystems and from the process tool control computer to the factory network. By enabling this information flow, we believe that we help customers optimize their processes through Advanced Process Control ("APC"), and diagnose equipment problems from a remote location ("e-diagnostics").

**Information Technology Products.** We design on-line and off-line software products to analyze data to improve the quality and yield of semiconductor, thin film, biopharmaceutical, injection molding and other manufacturing processes.

## **2. Power and Reactive Gas Products**

This product group includes power delivery products and reactive gas generation products used in semiconductor and other thin film applications, including solar and in medical imaging equipment applications.

**Power Delivery Products.** We design and manufacture microwave, DC and RF power delivery systems as well as RF matching networks and metrology products. In the semiconductor and thin film markets, our power supplies are used to provide energy to various etching, stripping and deposition processes. Our power amplifiers are also used in medical imaging equipment.

**Reactive Gas Generation Products.** Reactive gases are used to process and clean substrates and to clean process chambers to reduce particle contamination. A reactive gas is created when energy is added to a stable gas to

break apart its molecules. When the resulting dissociated gas comes into contact with other matter it produces rapid chemical reactions which result in processing of thin films (deposition of films, etching and cleaning of films and surface modifications) or equipment cleaning.

*Processing Thin Films.* Our reactive gas products include ozone generators and subsystems used for deposition of insulators onto semiconductor devices, ozonated water delivery systems for advanced semiconductor wafer and flat panel display cleaning, microwave plasma based products for photo resist removal and a new line of remote plasma generators which provide reactive gases for a wide range of semiconductor, flat panel and other thin film process applications.

*Equipment Cleaning.* As materials are deposited on wafers, films, or solar cells, the deposited material also accumulates on the walls of the vacuum process chamber. Our atomic fluorine generators are used to clean the process chambers between deposition steps to reduce particulates and contamination caused by accumulated build up on the chamber walls.

### **3. Vacuum Products**

This product group consists of vacuum technology products, including vacuum containment components, vacuum gauges, vacuum valves, effluent management subsystems and custom stainless steel chambers, vessels, biopharmaceutical process equipment (“BPE”) hardware and housings.

*Vacuum Gauging Products.* We offer a wide range of vacuum instruments consisting of vacuum measurement sensors and associated power supply and readout units as well as transducers where the sensor and electronics are integrated within a single package. These gauges complement our Baratron capacitance manometers for medium and high vacuum ranges. Our indirect gauges use thermal conductivity and ionization gauge technologies to measure pressure and vacuum, and our direct gauges use the pressure measurement technology of a MEMS-based piezo sensor.

*Vacuum Valves, Stainless Steel Components, Process Solutions and Custom Stainless Steel Hardware.* Our vacuum valves are used for vacuum isolation of vacuum lines, load locks, vacuum chambers and pumps for chamber isolation and vacuum containment. Our vacuum process solutions consist of vacuum fittings, traps and heated lines that are used downstream from the semiconductor process chamber to control process effluent gasses by preventing condensable materials from depositing particles near or back into the process chamber.

*Custom Manufactured Components.* Our design and manufacturing facilities build high purity chambers for material and thin film coating, ALD, lithography and all semiconductor and solar processes. We design and build custom panels, weldments, ASME (American Society of Manufacturing Engineers) vessels and housings, as well as a line of BPE certified components for biopharmaceutical processes.

### **Customers**

Our largest customers include leading semiconductor capital equipment manufacturers such as Applied Materials, Lam Research, Novellus Systems, and Tokyo Electron. Sales to our top ten customers accounted for approximately 38%, 46% and 49% of net sales for the years ended December 31, 2008, 2007 and 2006, respectively. Applied Materials accounted for approximately 19%, 20% and 21% of our net sales for the years ended December 31, 2008, 2007 and 2006, respectively.

### **Sales, Marketing, Service and Support**

Our worldwide sales, marketing, service and support organization is critical to our strategy of maintaining close relationships with semiconductor capital equipment manufacturers and semiconductor device manufacturers. We sell our products primarily through our direct sales force. As of December 31, 2008, we had 195 sales employees worldwide, located in China, France, Germany, Japan, Korea, the Netherlands, Singapore, Sweden, Taiwan, the United Kingdom and the United States. We also maintain sales representatives and agents in a number of countries, which supplement this direct sales force. We maintain a marketing staff that identifies customer requirements, assists in product planning and specifications, and focuses on future trends in 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, we maintain a worldwide sales and support organization in 17 countries. Technical support is provided from offices in China, France, Germany, Japan, Korea, the Netherlands, Singapore, Taiwan, the United Kingdom and the United States. Repair and calibration services are provided at 25 service depots located worldwide. We typically provide warranties from one to three years, depending upon the type of product.

#### **Research and Development**

Our products incorporate sophisticated technologies to power, measure, control and monitor increasingly complex gas-related semiconductor manufacturing processes, thereby enhancing uptime, yield and throughput for our semiconductor device manufacturing customers. Our products have continuously advanced as we strive to meet our customers' evolving needs. We have developed, and continue to develop, new products to address industry trends, such as the shrinking of integrated circuit critical dimensions to 65 nanometers and below. In addition, we have developed, and continue to develop, products that support the migration to new classes of materials and ultra-thin layers, such as copper for low resistance conductors, high-k dielectric materials for capacitors and gates and low-k dielectric materials for low loss insulators that are used in small geometry manufacturing. We have undertaken an initiative to involve our marketing, engineering, manufacturing and sales personnel in the concurrent development of new products in order to reduce the time to market for new products. Our employees also work closely with our customers' development personnel helping us to identify and define future technical needs on which to focus research and development efforts. We support research at academic institutions targeted at advances in materials science and semiconductor process development. As of December 31, 2008, we had 467 research and development employees, primarily located in the United States. Our research and development expenses were \$78.5 million, \$74.6 million and \$72.2 million for the years ended December 31, 2008, 2007 and 2006, respectively. Our research and development efforts include numerous projects, none of which are individually material, and generally have a duration of 12 to 30 months.

#### **Manufacturing**

Our manufacturing facilities are located in China, Germany, Israel, Japan, Mexico, the United Kingdom and the United States. Manufacturing activities include the assembly and testing of components and subassemblies, which are integrated into our products. We outsource some of our subassembly work. We purchase a wide range of electronic, mechanical and electrical components, some of which are designed to our specifications. We consider our lean manufacturing techniques and responsiveness to customers' significantly fluctuating product demands to be a competitive advantage.

#### **Competition**

The market for our products is highly competitive. Principal competitive factors include:

- historical customer relationships;
- product quality, performance and price;
- breadth of product line;
- manufacturing capabilities; and
- customer service and support.

Although we believe that we compete favorably with respect to these factors, there can be no assurance that we will continue to do so.

We encounter substantial competition in most of our product lines, although no single competitor competes with us across all product lines. Certain of our competitors may have greater financial and other resources than us. In some cases, competitors are smaller than we are, but well established in specific product niches. Celerity offers

products that compete with our pressure and materials delivery products. Advanced Energy and Horiba offer materials delivery products that compete with our product line of mass flow controllers. Nor-Cal Products and VAT offer products that compete with our vacuum components. Inficon offers products that compete with our vacuum measurement and gas analysis products. Brooks Automation and Inficon offer products that compete with our vacuum gauging products. Advanced Energy offers products that compete with our power delivery and reactive gas generator products.

#### **Patents and Other Intellectual Property Rights**

We rely on a combination of patent, copyright, trademark and trade secret laws and license agreements to establish and protect our proprietary rights. As of December 31, 2008, we owned 336 U.S. patents, 235 foreign patents and had 127 pending U.S. patent applications. Foreign counterparts of certain of these applications have been filed or may be filed at the appropriate time.

We require each of our employees, including our executive officers, to enter into standard agreements pursuant to which the employee agrees to keep confidential all of our proprietary information and to assign to us all inventions while they are employed by us.

For a discussion of litigation relating to our intellectual property, see “Legal Proceedings” of this annual report on Form 10-K.

#### **Employees**

As of December 31, 2008, we employed 2,631 persons. We believe that our ongoing success depends upon our continued ability to attract and retain highly skilled employees for whom competition is intense. None of our employees are represented by a labor union or are party to a collective bargaining agreement. We believe that our employee relations are good.

#### **Acquisitions**

We completed one acquisition in 2007. On November 7, 2007, we acquired Yield Dynamics, Inc. (“YDI”), a provider of yield management technology located in Sunnyvale, California. YDI’s data and yield management software, along with MKS’ portfolio of sensors that control critical processes, data collection and integration hardware, and real-time fault detection and classification software, provides a comprehensive offering for generating, collecting and analyzing process sensor data and correlating the data to wafers, chambers and tools across the semiconductor fab as well as other thin film manufacturing processes.

We completed three acquisitions in 2006. On October 11, 2006, we completed our acquisition of Novx Corp. (“Novx”), a provider of electrostatic charge monitoring technology for semiconductor, data storage, telecommunication, medical device and other markets. Novx’s technology expands our capability to monitor, detect and control electrostatic charge in advanced process environments, such as semiconductor and hard disk drive manufacturing. On January 3, 2006, we completed our acquisition of Ion Systems, Inc. (“Ion”), a leading provider of electrostatic management solutions located in Alameda, California. Ion’s ionization technology monitors electrostatic charges to reduce process contamination and improve yields, which complements our process monitoring and control technologies. Additionally, on January 3, 2006, we completed our acquisition of Umetrics, AB (“Umetrics”), a leader in multivariate data analysis and modeling software located in Umea, Sweden. Umetrics’ multivariate data analysis and modeling software converts process data into useable information for yield improvement, when linked with our open and modular platform of process sensors and data collection, integration, data storage, and visualization capabilities.

#### **Item 1A. Risk Factors**

The following factors could materially affect MKS’ business, financial condition or results of operations and should be carefully considered in evaluating the Company and its business, in addition to other information presented elsewhere in this report.

***Our business depends substantially on capital spending in the semiconductor industry which is characterized by periodic fluctuations that may cause a reduction in demand for our products.***

We estimate that approximately 57%, 68% and 70% of our net sales for the years ended December 31, 2008, 2007 and 2006, respectively, 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 portion of our sales. Our business depends upon the capital expenditures of semiconductor device manufacturers, which in turn depend upon the demand for semiconductors.

Historically, the semiconductor market has been highly cyclical and has experienced periods of overcapacity, resulting in significantly reduced demand for capital equipment which may result in lower gross margins due to reduced absorption of manufacturing overhead. In addition, many semiconductor manufacturers have operations and customers in Asia, a region that in past years has experienced serious economic problems including currency devaluations, debt defaults, lack of liquidity and recessions. Recent reductions in demand for the products manufactured by semiconductor capital equipment manufacturers and semiconductor device manufacturers have adversely affected our business. Our product sales during the year ended December 31, 2008 to these customers have decreased by 35%. As we enter 2009, global economic uncertainty is prolonging a steep downturn in semiconductor capital equipment spending and adversely affecting our business, financial condition and results of operations. We cannot be certain of the timing or magnitude of future semiconductor industry downturns. A decline in the level of orders as a result of any downturn or slowdown in the semiconductor capital equipment industry could have a material adverse effect on our business, financial condition and results of operations. Although we cannot predict when demand from these customers will rebound, we expect further decreases in demand from these customers during 2009 and as a result we are estimating lower sequential revenues for the quarter ended March 31, 2009 compared to December 31, 2008.

***MKS is exposed to risks associated with the ongoing financial crisis and weakening global economy.***

The recent severe tightening of the credit markets, turmoil in the financial markets, and weakening global economy are contributing to slowdowns in the industries in which MKS operates, which slowdowns are expected to worsen if these economic conditions are prolonged or deteriorate further. The markets for semiconductors and flat panel displays in particular depend largely on consumer spending. Economic uncertainty exacerbates negative trends in consumer spending and may cause certain MKS customers to push out, cancel, or refrain from placing equipment or service orders, which may affect MKS' ability to convert backlog to sales and may reduce our net sales. Difficulties in obtaining capital and deteriorating market conditions may also lead to the inability of some customers to obtain affordable financing, resulting in lower sales for MKS. Customers with liquidity issues may lead to additional bad debt expense for MKS. These conditions may also similarly affect key suppliers, which could affect their ability to deliver parts and result in delays for MKS' products. Further, these conditions and uncertainty about future economic conditions make it challenging for MKS to forecast its operating results, make business decisions, and identify the risks that may affect its business, financial condition and results of operations. If MKS is not able to timely and appropriately adapt to changes resulting from the difficult macroeconomic environment, MKS' business, financial condition or results of operations may be materially and adversely affected.

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, such as the current global economic crisis, and other risks associated with international sales. International sales include sales by our foreign subsidiaries, but exclude direct export sales. International sales accounted for approximately 43%, 39% and 34%, of net sales for the years ended December 31, 2008, 2007 and 2006, respectively, a significant portion of which were sales to Japan.

***Our quarterly operating results have fluctuated, and are likely to continue to vary significantly, which may result in volatility in the market price of our common stock.***

A substantial portion of our shipments occurs shortly after an order is received and therefore we operate with a low level of backlog. As a result, 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. A significant percentage of our expenses is 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 in capital spending by customers;
- production capacity constraints; and
- specific features requested by customers.

In addition, our quarterly operating results may be adversely affected due to charges incurred in a particular quarter, for example, relating to inventory obsolescence, warranty or asset impairments.

As a result of the factors discussed above, it is likely that we may in the future experience quarterly or annual fluctuations and that, in one or more future quarters, our operating results may fall below the expectations of public market analysts or investors. In any such event, the price of our common stock could fluctuate or decline significantly.

***The loss of net sales to any one of our major customers would likely have a material adverse effect on us.***

Our top ten customers accounted for approximately 38%, 46% and 49% of our net sales for the years ended December 31, 2008, 2007 and 2006, respectively. The loss of a major customer or any reduction in orders by these 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 the years ended December 31, 2008, 2007 and 2006, one customer, Applied Materials, accounted for approximately 19%, 20% and 21%, respectively, of our net sales. None of our significant customers, including Applied Materials, 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 of net sales 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;
- our ability to introduce new products in a timely manner for existing and new customers; and
- the successes of our customers in creating demand for their capital equipment products that incorporate our products.

***As part of our business strategy, we have entered into and may enter into or seek to enter into business combinations and acquisitions that may be difficult and costly to integrate, may be disruptive to our business, may dilute stockholder value or may divert management attention.***

We made several acquisitions in the years 2000 through 2002 and, more recently in 2006 and 2007. As a part of our business strategy, we may enter into additional business combinations and acquisitions. Acquisitions are typically accompanied by a number of risks, including the difficulty of integrating the operations, technology and personnel of the acquired companies, the potential disruption of our ongoing business and distraction of management, possible internal control weaknesses of the acquired companies, expenses related to the acquisition and

potential unknown liabilities associated with acquired businesses. If we are not successful in completing acquisitions that we may pursue in the future, we may be required to reevaluate our growth strategy, and we may incur substantial expenses and devote significant management time and resources in seeking to complete proposed acquisitions that will not generate benefits for us.

In addition, with future acquisitions, we could use substantial portions of our available cash as all or a portion of the purchase price. We could also issue additional securities as consideration for these acquisitions, which could cause significant stockholder dilution without achieving the desired accretion to our business. Further, our prior acquisitions and any future acquisitions may not ultimately help us achieve our strategic goals and may pose other risks to us.

As a result of our previous acquisitions, we have added several different decentralized operating and accounting systems, resulting in a complex reporting environment. We will need to continue to modify our accounting policies, internal controls, procedures and compliance programs to provide consistency across all our operations. In order to increase efficiency and operating effectiveness and improve corporate visibility into our decentralized operations, we are currently implementing a worldwide Enterprise Resource Planning ("ERP") system. We expect to continue to implement the ERP system in phases over the next few years. Any future implementations may risk potential disruption of our operations during the conversion periods and the implementations could require significantly more management time and higher implementation costs than currently estimated.

***An inability to convince semiconductor device manufacturers to specify the use of our products to our customers that are semiconductor capital equipment manufacturers would weaken our competitive position.***

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.

***If our products are not designed into successive generations of our customers' products, we will lose significant net sales during the lifespan of those products.***

New products designed by semiconductor capital equipment manufacturers typically have a lifespan of five to ten years. Our success depends on our products being designed into new generations of equipment for the semiconductor industry. We must develop products that are technologically advanced so that they are positioned to be chosen for use in each successive generation of semiconductor capital equipment. If customers do not choose our products, our net sales may be reduced during the lifespan of our customers' products. In addition, we must make a significant capital investment to develop products for our customers well before our products are introduced and before we can be sure that we will recover our capital investment through sales to the customers in significant volume. We are thus also at risk during the development phase that our products may fail to meet our customers' technical or cost requirements and may be replaced by a competitive product or alternative technology solution. If that happens, we may be unable to recover our development costs.

***The semiconductor industry is subject to rapid demand shifts which are difficult to predict. As a result, our inability to expand our manufacturing capacity in response to these rapid shifts may cause a reduction in our market share.***

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 implement our competitors' products and, as a result, 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. 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.

***A material amount of our assets represents goodwill and intangible assets, and our net income will be reduced if our goodwill or intangible assets become impaired.***

As of December 31, 2008, our goodwill and intangible assets, net, represented approximately \$358.8 million, or 36.4%, of our total assets. Goodwill is generated in our acquisitions when the cost of an acquisition exceeds the fair value of the net tangible and identifiable intangible assets we acquire. Goodwill is subject to an impairment analysis at least annually based on the fair value of the reporting unit. Intangible assets, which relate primarily to the customer technologies, relationships and patents and trademarks acquired by us as part of our acquisitions of other companies, are subject to an impairment analysis whenever events or changes in circumstances exist that indicate that the carrying value of the intangible asset might not be recoverable. During the year ended December 31, 2008, we recorded non-cash impairment charges of \$6.1 million related to intangible assets. Due to the ongoing uncertainty in market conditions, which may continue to negatively impact our financial performance, we will continue to monitor and evaluate the carrying value of goodwill and intangible assets. If market and economic conditions or business performance deteriorate further, this could increase the likelihood of the Company recording an impairment charge, which could materially and adversely affect our results of operations.

***We operate in a highly competitive industry.***

The market for our products is highly competitive. Principal competitive factors include:

- historical customer relationships;
- product quality, performance and price;
- breadth of product line;
- manufacturing capabilities; and
- customer service and support.

Although we believe that we compete favorably with respect to these factors, we may not be able to continue to do so. We encounter substantial competition in most of our product lines. Certain of our competitors may have greater financial and other resources than we have. In some cases, competitors are smaller than we are, but well established in specific product niches. We may encounter difficulties in changing established relationships of competitors with a large installed base of products at such customers' fabrication facilities. In addition, our competitors can be expected to continue to improve the design and performance of their products. Competitors may develop products that offer price or performance features superior to those of our products. If our competitors develop superior products, we may lose existing customer and market share.

***We have significant foreign operations, and outsource certain operations offshore, which pose significant risks.***

We have significant international sales, service, engineering and manufacturing operations in Europe, Israel and Asia, and have outsourced a portion of our manufacturing to Mexico. We may expand the level of manufacturing and certain other operations that we do offshore in order to take advantage of cost efficiencies available to us in those countries. However, we may not achieve the significant cost savings or other benefits that we anticipate from this program. These foreign operations expose us to operational and political risks that may harm our business, including:

- political and economic instability;
- fluctuations in the value of currencies and high levels of inflation, particularly in Asia and Europe;
- changes in labor conditions and difficulties in staffing and managing foreign operations, including, but not limited to, labor unions;

- reduced or less certain protection for intellectual property rights;
- greater difficulty in collecting accounts receivable and longer payment cycles;
- burdens and costs of compliance with a variety of foreign laws;
- increases in duties and taxation;
- costs associated with compliance programs for import and export regulations;
- imposition of restrictions on currency conversion or the transfer of funds;
- changes in export duties and limitations on imports or exports;
- expropriation of private enterprises; and
- unexpected changes in foreign regulations.

If any of these risks materialize, our operating results may be adversely affected.

***Unfavorable currency exchange rate fluctuations may lead to lower operating margins or may cause us to raise prices, which could result in reduced sales.***

Currency 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, most sales made by our foreign subsidiaries are denominated in the currency of the country in which these products are sold and the currency they receive in payment for such sales could be less valuable at the time of receipt as a result of exchange rate fluctuations. We enter into forward foreign exchange contracts and may enter into local currency purchased options to reduce currency exposure arising from intercompany sales of inventory. However, 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.

***Changes in tax rates or tax liabilities could affect results of operations.***

As a global company, MKS is subject to taxation in the United States and various other countries. Significant judgment is required to determine and estimate worldwide tax liabilities. MKS' future annual and quarterly tax rates could be affected by numerous factors, including changes in the: (1) applicable tax laws; (2) composition of pre-tax income in countries with differing tax rates; or (3) valuation of MKS' deferred tax assets and liabilities. In addition, MKS is subject to regular examination by the Internal Revenue Service and other tax authorities. MKS regularly assesses the likelihood of favorable or unfavorable outcomes resulting from these examinations to determine the adequacy of its provision for income taxes. Although MKS believes its tax estimates are reasonable, there can be no assurance that any final determination will not be materially different from the treatment reflected in MKS' historical income tax provisions and accruals, which could materially and adversely affect MKS' financial condition and results of operations.

***Key personnel may be difficult to attract and retain.***

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. We cannot be certain that we will be successful in attracting and retaining such personnel.

***Our proprietary technology is important to the continued success of our business. Our failure to protect this proprietary technology may significantly impair our competitive position.***

As of December 31, 2008, we owned 336 U.S. patents, 235 foreign patents and had 127 pending U.S. patent applications. 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;
- domestic and international intellectual property laws will protect our intellectual property rights; or
- 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. We are, from time to time, involved in lawsuits enforcing or defending our intellectual property rights and may be involved in such litigation in the future. 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.

We may need to expend significant time and expense to protect our intellectual property regardless of the validity or successful outcome of such intellectual property claims. If we lose any litigation, we may be required to seek licenses from others or change, stop manufacturing or stop selling some of our products.

***The market price of our common stock has fluctuated and may continue to fluctuate for reasons over which we have no control.***

The stock market has from time to time experienced, and is likely to continue to experience, extreme price and volume fluctuations. Prices of securities of technology companies have been especially volatile and have often fluctuated for reasons that are unrelated to the operating performance of the companies. The market price of shares of our common stock has fluctuated greatly since our initial public offering and could continue to fluctuate due to a variety of factors. In the past, companies that have experienced volatility in the market price of their stock have been the objects of securities class action litigation. If we were the object of securities class action litigation, it could result in substantial costs and a diversion of our management's attention and resources.

***Our dependence on sole, limited source suppliers, and international suppliers, could affect our ability to manufacture products and systems.***

We rely on sole, limited source suppliers and international suppliers for a few of our components and subassemblies that are critical to the manufacturing of our products. This reliance involves several risks, including the following:

- the potential inability to obtain an adequate supply of required components;
- reduced control over pricing and timing of delivery of components; and
- the potential inability of our suppliers to develop technologically advanced products to support our growth and development of new systems.

We believe that in time we could obtain and qualify alternative sources for most sole, limited source and international supplier parts. Seeking alternative sources of the parts could require us to redesign our systems, resulting in increased costs and likely shipping delays. We may be unable to redesign our systems, which could result in further costs and shipping delays. These increased costs would decrease our profit margins if we could not

pass the costs to our customers. Further, shipping delays could damage our relationships with current and potential customers and have a material adverse effect on our business and results of operations.

***We are subject to governmental regulations. If we fail to comply with these regulations, our business could be harmed.***

We are subject to federal, state, local and foreign regulations, including environmental regulations and regulations relating to the design and operation of our products. We must ensure that the affected products meet a variety of standards, many of which vary across the countries in which our systems are used. For example, the European Union has published directives specifically relating to power supplies. In addition, the European Union has issued directives relating to regulation of recycling and hazardous substances, which may be applicable to our products, or to which some customers may voluntarily elect to adhere to. In addition, China has adopted, and certain other Asian countries have indicated an intention to adopt, similar regulations. We must comply with any applicable regulation adopted in connection with these types of directives in order to ship affected products into countries that adopt these types of regulations. We believe we are in compliance with current applicable regulations, directives and standards and have obtained all necessary permits, approvals, and authorizations to conduct our business. However, compliance with future regulations, directives and standards, or customer demands beyond such requirements, could require us to modify or redesign certain systems, make capital expenditures or incur substantial costs. If we do not comply with current or future regulations, directives and standards:

- we could be subject to fines;
- our production could be suspended; or
- we could be prohibited from offering particular systems in specified markets.

***Some provisions of our restated articles of organization, as amended, our amended and restated by-laws and Massachusetts law could discourage potential acquisition proposals and could delay or prevent a change in control of us.***

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 price 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, our 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 us. The issuance of preferred stock could adversely affect the voting power of the holders of our common stock, including the loss of voting control to others. In addition, our amended and restated by-laws provide for a classified board of directors consisting of three classes. The classified board could also have the effect of delaying, deterring or preventing a change in control of the Company.

***Changes in financial accounting standards may adversely affect our reported results of operations.***

A change in accounting standards or practices could have a significant effect on our reported results and may even affect our reporting of transactions completed before the change was effective. New accounting pronouncements and varying interpretations of existing accounting pronouncements have occurred and may occur in the future. Such changes may adversely affect our reported financial results or may impact our related business practice.

For example, Statement on Financial Accounting Standards No. 123R “Share-Based Payment” (“SFAS 123R”), which requires us to measure all employee stock-based compensation awards using a fair value method and record such expense in our consolidated financial statements, was adopted in the first quarter of 2006, and had a material adverse impact on our consolidated financial statements as reported under generally accepted accounting principles in the United States for the first quarter of 2006 and adversely impacted our consolidated financial statements for fiscal 2006.

**Item 1B. Unresolved Staff Comments**

None.

**Item 2. Properties**

The following table provides information concerning MKS' principal and certain other owned and leased facilities as of December 31, 2008:

Location	Sq. Ft.	Activity	Products Manufactured	Lease Expires
Alameda, California	50,000	Manufacturing and Research & Development	Electrostatic Management Programs and Systems	March 31, 2011
Akishima, Japan	26,300	Manufacturing, Customer Support and Research & Development	Materials and Power Delivery Products	September 11, 2018
Andover, Massachusetts	118,000	Manufacturing, Research & Development and Corporate Headquarters	Pressure Measurement and Control Products	(5)
Austin, Texas	20,880	Manufacturing, Sales, Customer Support, Service and Research & Development	Control & Information Management Products	May 31, 2012
Berlin, Germany	20,750	Manufacturing, Customer Support, Service and Research & Development	Reactive Gas Generation Products	December 13, 2010
Boulder, Colorado	124,000	Manufacturing, Customer Support, Service and Research & Development	Vacuum Products	(2)
Carmiel, Israel	11,800	Manufacturing and Research & Development	Control & Information Management Products	December 31, 2009
Cheshire, United Kingdom	16,000	Manufacturing, Sales, Customer Support and Service	Materials Delivery Products	(3)
Colorado Springs, Colorado	24,000	Research & Development	Power Delivery Products	(1)
Filderstadt, Germany	9,300	Sales & Service	Not applicable	July 31, 2009
Fukuoka, Japan	9,300	Customer Support and Service	Pressure Measurement and Control Products	October 19, 2010
Lawrence, Massachusetts	40,000	Manufacturing	Pressure Measurement and Control Products	(1)
Lod, Israel	10,500	Customer Support and Research & Development	Pressure Measurement and Control Products	May 31, 2010
Methuen, Massachusetts	85,000	Manufacturing, Customer Support, Service and Research & Development	Pressure Measurement and Control Products; Materials Delivery Products	(1)
Munich, Germany	14,000	Manufacturing, Sales, Customer Support, Service and Research & Development	Pressure Measurement and Control Products; Materials Delivery Products	(1)
Nogales, Mexico	67,700	Manufacturing	Pressure Measurement and Control Products; Reactive Gas Generation Products	March 31, 2014
Richardson, Texas	8,800	Sales, Customer Support and Service	Not applicable	November 30, 2012
Rochester, New York	156,000	Manufacturing, Sales, Customer Support, Service and Research & Development	Power Delivery Products	(1)
San Jose, California	32,000	Sales, Customer Support and Service	Not applicable	April 30, 2011
Seoul, Korea	18,000	Sales, Customer Support and Service	Not applicable	(6)
Shenzhen, China	242,000	Manufacturing	Power Delivery Products	May 31, 2017
Shropshire, United Kingdom	25,000	Manufacturing	Control & Information Management Products	October 18, 2010

<b>Location</b>	<b>Sq. Ft.</b>	<b>Activity</b>	<b>Products Manufactured</b>	<b>Lease Expires</b>
Singapore	6,100	Sales, Customer Support and Service	Not applicable	July 7, 2010
Sunnyvale, California	10,000	Vacant	Not applicable	July 7, 2010
Taiwan	21,400	Sales, Customer Support and Service	Not applicable	August 25, 2010
Tianjin, China	12,917	Research & Development	Not applicable	August 1, 2011
Tokyo, Japan		Manufacturing, Sales, Customer Support, Service and Research & Development	Materials Delivery Products	(4)
Umea, Sweden	63,300	Sales, Customer Support and Research & Development	Control & Information Management Products	August 31, 2009
Wilmington, Massachusetts	7,000	Manufacturing, Sales, Customer Support, Service and Research & Development	Reactive Gas Generation Products; Power Delivery Products	(1)
	118,000			

- (1) This facility is owned by MKS.
- (2) MKS leases two facilities, one has 39,000 square feet of space and the other has 38,000 square feet of space. Both leases expire on May 31, 2015. MKS also owns a third and fourth facility with 27,000 and 20,000 square feet of space, respectively.
- (3) MKS leases two facilities, one has 5,000 square feet of space and a lease term which expires November 6, 2018 and the second has 11,000 square feet of space with a lease term which expires November 6, 2018.
- (4) MKS leases three facilities, one has 19,800 square feet of space with a lease term that expires December 31, 2010 the second has 10,600 square feet of space with a lease term that expires on March 19, 2009 and the third has 26,300 square feet of space with a lease term that expires September 11, 2018. MKS owns a fourth facility of 6,600 square feet.
- (5) MKS owns one facility with 82,000 square feet of space used for manufacturing and research and development and leases 36,000 square feet of space used for its corporate headquarters with a lease term which expires January 1, 2018.
- (6) MKS leases two facilities, one has 7,700 square feet of space and one has 10,300 square feet of space. Both leases expire on May 29, 2009.

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."

**Item 3. Legal Proceedings**

We filed suit against Celerity, Inc. in federal district court in Texas on September 8, 2008 for infringement of two of our patents relating to our PiMFC technology. The complaint was amended on September 9, 2008 to include a claim of infringement for one additional related MKS patent, which had issued earlier that day. We dismissed the suit without prejudice on February 6, 2009.

We are also subject to various other legal proceedings and claims, which have arisen in the ordinary course of business. In the opinion of management, the ultimate disposition of these matters will not have a material adverse effect on our results of operations, financial condition or cash flows.

**Item 4. Submission of Matters to a Vote of Security Holders**

No matters were submitted to a vote of security holders during the fourth quarter of 2008 through the solicitation of proxies or otherwise.

## PART II

**Item 5. Market for the Registrant's Common Equity, Related Stockholder Matters and Issuer Purchases of Equity Securities****Price Range of Common Stock**

Our common stock is traded on the NASDAQ Global Market under the symbol MKSI. On February 18, 2009, the closing price of our common stock, as reported on the NASDAQ Global Market, was \$14.62 per share. The following table sets forth for the periods indicated the high and low bid prices per share of our common stock as reported by the NASDAQ Global Market.

Price Range of Common Stock	2008		2007	
	High	Low	High	Low
First Quarter	\$ 22.24	\$ 15.90	\$ 26.00	\$ 21.11
Second Quarter	25.88	20.91	28.47	25.46
Third Quarter	25.00	19.00	28.15	18.91
Fourth Quarter	19.79	11.76	21.71	16.94

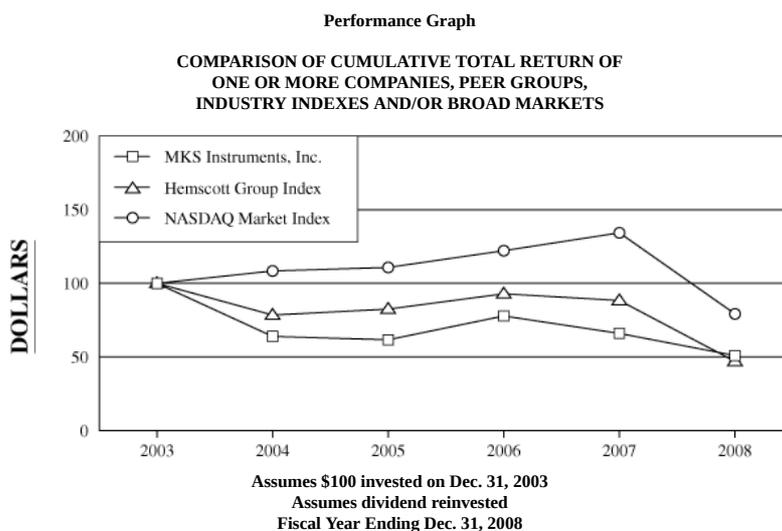
On February 18, 2009, we had approximately 572 stockholders of record.

**Dividend Policy**

We have never declared or paid any cash dividends on our common stock. We currently intend to retain earnings, if any, to support our growth strategy and do not anticipate paying cash dividends in the foreseeable future. Payment of future dividends, if any, will be at the discretion of our board of directors after taking into account various factors, including our financial condition, operating results and current and anticipated cash needs.

**Comparative Stock Performance**

The following graph compares the cumulative total shareholder return (assuming reinvestment of dividends) from investing \$100 on December 31, 2003, and plotted at the last trading day of each of the fiscal years ended December 31, 2004, 2005, 2006, 2007 and 2008, in each of (i) the Company's Common Stock; (ii) an industry group index of semiconductor equipment/material manufacturers (the "Hemscott Group Index"), compiled by Hemscott Data ("Hemscott"), a business owned by Morningstar, Inc.; and (iii) the NASDAQ Market Index of companies (the "NASDAQ Market Index"). The graph was compiled by Hemscott. The stock price performance on the graph below is not necessarily indicative of future price performance. The Company's Common Stock is listed on the NASDAQ Global Market under the ticker symbol "MKSI."



	2003	2004	2005	2006	2007	2008
MKS Instruments, Inc.	\$ 100.00	\$ 63.97	\$ 61.69	\$ 77.86	\$ 66.00	\$ 51.00
Hemscott Group Index	\$ 100.00	\$ 78.48	\$ 82.52	\$ 92.91	\$ 88.36	\$ 47.01
NASDAQ Market Index	\$ 100.00	\$ 108.41	\$ 110.79	\$ 122.16	\$ 134.29	\$ 79.25

The information included under the heading "Performance Graph" in Item 5 of this Annual Report on Form 10-K is "furnished" and not "filed" and shall not be deemed to be "soliciting material" or subject to Regulation 14A, shall not be deemed "filed" for purposes of Section 18 of the Exchange Act, or otherwise subject to the liabilities of that section, nor shall it be deemed incorporated by reference in any filing under the Securities Act of 1933, as amended, or the Exchange Act.

**Purchases of Equity Securities**

On February 12, 2007, our Board of Directors approved a share repurchase program (the "Program") for the repurchase of up to \$300 million of our outstanding stock over the next two years. The repurchases were made from time to time on the open market or through privately negotiated transactions. The timing and amount of any shares repurchased under the Program were dependent upon a variety of factors, including price, corporate and regulatory requirements, capital availability, and other market conditions. During the year ended December 31, 2008, we repurchased 5,667,000 shares of common stock for \$116 million for an average price of \$20.42 per share. The Program expired on February 11, 2009 with no additional share repurchases in 2009. The following table provides information about purchases by the Company during the quarter ended December 31, 2008 of equity securities that are registered by the Company pursuant to Section 12 of the Exchange Act:

**PURCHASES OF EQUITY SECURITIES**

<b>Period</b>	<b>Total Number of Shares Purchased during Period(1)</b>	<b>Average Price Paid per Share</b>	<b>Total Number of Shares Purchased since Adoption of Program as Part of Publicly Announced Plans or Programs(2)</b>	<b>Approximate Dollar Value of Shares that May Yet Be Purchased Under the Plans or Programs</b>
10/01/08-10/31/08	—	—	10,446,097	\$ 83,119,596
11/01/08-11/30/08	—	—	10,446,097	\$ 83,119,596
12/01/08-12/31/08	—	—	10,446,097	\$ 83,119,596

(1) We repurchased an aggregate of 10,446,097 shares of our common stock pursuant to the repurchase program that we publicly announced on February 12, 2007 (the "Program"). We did not repurchase any of our common shares during the three months ended December 31, 2008.

(2) Our Board of Directors approved the repurchase by us of up to an aggregate of \$300 million of our common stock pursuant to the Program. The Program expired on February 11, 2009 with no additional share repurchases in 2009.

Item 6. Selected Financial Data

Selected Consolidated Financial Data

	Year Ended December 31,				
	2008	2007	2006	2005	2004
	(In thousands, except per share data)				
<b>Statement of Operations Data</b>					
Net sales	\$ 646,994	\$ 780,487	\$ 782,801	\$ 509,294	\$ 555,080
Gross profit	259,943	331,487	338,122	200,434	219,371
Income from operations(1)	35,533	106,985	122,541	40,548	59,913
Net income(2)	\$ 30,117	\$ 86,360	\$ 94,235	\$ 34,565	\$ 69,839
Net income per share:					
Basic	\$ 0.61	\$ 1.53	\$ 1.70	\$ 0.64	\$ 1.30
Diluted	\$ 0.59	\$ 1.51	\$ 1.68	\$ 0.63	\$ 1.28
<b>Balance Sheet Data</b>					
Cash and cash equivalents	\$ 119,261	\$ 223,968	\$ 215,208	\$ 220,573	\$ 138,389
Short-term investments	159,608	99,797	74,749	72,046	97,511
Working capital	452,793	514,235	461,541	410,060	347,700
Long-term investments	—	—	2,816	857	4,775
Total assets	984,939	1,076,260	1,043,720	863,740	828,677
Short-term obligations	18,678	20,203	23,021	18,886	24,509
Long-term obligations, less current portion	396	5,871	6,113	6,152	6,747
Stockholders' equity	\$ 886,698	\$ 954,009	\$ 901,219	\$ 762,843	\$ 726,634

- (1) Income from operations for the years ended December 31, 2008, 2007 and 2006 includes stock-based compensation of \$15.3 million, \$12.9 million and \$13.1 million, respectively, as a result of adopting SFAS 123R in 2006. Income from operations for the year ended December 31, 2008 includes an impairment charge of \$6.1 million related to the write down of intangible assets.
- (2) Net income for the years ended December 31, 2008, 2007 and 2006 includes stock-based compensation of \$9.9 million, \$8.4 million and \$8.7 million, net of tax, respectively. Net income for the year ended December 31, 2004 includes a gain from the collection of a note receivable of \$5.0 million and a deferred tax benefit of \$10.2 million related to a reduction in a valuation allowance against net deferred tax assets.

**Item 7. Management's Discussion and Analysis of Financial Condition and Results of Operations**

**Overview**

We are a leading worldwide provider of instruments, subsystems and process control solutions that measure, control, power, monitor and analyze critical parameters to improve process performance and productivity of advanced manufacturing processes.

We are managed as one operating segment. We group our products into three product groups: Instruments and Control Systems, Power and Reactive Gas Products and Vacuum Products. Our products are derived from our core competencies in pressure measurement and control, materials delivery, gas composition analysis, electrostatic charge management, control and information technology, power and reactive gas generation and vacuum technology. Our products are used in diverse markets, applications and processes. Our primary served markets are manufacturers of capital equipment for semiconductor devices, and for other thin film applications including flat panel displays, solar cells, data storage media and other advanced coatings. We also leverage our technology in other markets with advanced manufacturing applications including medical equipment, pharmaceutical manufacturing, and energy generation and environmental monitoring.

We have a diverse base of customers that includes manufacturers of semiconductor capital equipment and semiconductor devices, thin film capital equipment used in the manufacture of flat panel displays, solar cells, data storage media, and other coating applications; and other industrial, medical and manufacturing companies, and university, government and industrial research laboratories. During the years ended December 31, 2008, 2007 and 2006, we estimate that approximately 57%, 68% and 70% of our net sales, respectively, were to semiconductor capital equipment manufacturers and semiconductor device manufacturers. We expect that sales to semiconductor capital equipment manufacturers and semiconductor device manufacturers will continue to account for a substantial portion of our sales.

Our product revenues sold to our other markets, which exclude semiconductor capital equipment and semiconductor device product applications, increased by 8.3% for the year ended December 31, 2008. This is mainly due to increased sales to the solar market, which is one of our fastest growing markets. We continued to penetrate the solar market in 2008 which was demonstrated by several product design wins for our technologies and the increase in our solar customer base.

Recent reductions in demand for the products manufactured by semiconductor capital equipment manufacturers and semiconductor device manufacturers have adversely affected our business. Our product sales during the year ended December 31, 2008 to these customers have decreased by 35%. However, the semiconductor capital equipment industry is subject to rapid demand shifts, which are difficult to predict, and we are uncertain how long these sales levels may be maintained or the timing or extent of any future downturn or upturn in the semiconductor capital equipment industry. As we enter 2009, global economic uncertainty is prolonging a steep downturn in semiconductor capital equipment spending and adversely affecting our business, financial condition and results of operations. Although we cannot predict when demand from these customers will rebound, we expect further decreases in demand from these customers during 2009 and as a result we are estimating lower sequential revenues for the quarter ended March 31, 2009 compared to December 31, 2008 as a result of the continuing downturn.

A significant portion of our net sales is to operations in international markets. International net sales include sales by our foreign subsidiaries, but exclude direct export sales. International net sales accounted for approximately 43%, 39% and 34% of net sales for the years ended December 31, 2008, 2007 and 2006, respectively, a significant portion of which were sales in Japan. We expect that international net sales will continue to represent a significant percentage of our total net sales.

**Recent Acquisitions**

On November 7, 2007, we acquired Yield Dynamics, Inc. ("YDI"), a provider of yield management technology located in Sunnyvale, California. YDI's data and yield management software, along with MKS' portfolio of sensors that control critical processes, data collection and integration hardware, and real-time fault detection and classification software, provides a comprehensive offering for generating, collecting and analyzing process sensor data and correlating the data to wafers, chambers and tools across the semiconductor fab as well as

other thin film manufacturing processes. The purchase price consisted of \$23.7 million in cash, net of \$0.7 million in cash acquired, and \$0.4 million in acquisition related costs. The purchase agreement includes contingent payments of up to \$10.0 million based upon achieving specific annual and cumulative revenue targets between 2008 and 2010. There were no contingent payments earned in 2008.

On October 11, 2006, we completed our acquisition of Novx Corp. ("Novx"), a provider of electrostatic charge monitoring technology for semiconductor, data storage, telecommunication, medical device and other markets. Novx's technology expands our capability to monitor, detect and control electrostatic charge in advanced process environments, such as semiconductor and hard disk drive manufacturing. The total purchase price was \$2.6 million.

On January 3, 2006, we completed our acquisition of Ion Systems, Inc. ("Ion"), a leading provider of electrostatic management solutions located in Alameda, California, pursuant to an Agreement and Plan of Merger dated November 25, 2005. Ion's ionization technology monitors electrostatic charges to reduce process contamination and improve yields, which complements our process monitoring and control technologies. The aggregate purchase price consisted of \$68.1 million in cash, net of \$5.1 million in cash acquired, and \$0.8 million in acquisition related costs.

Additionally, on January 3, 2006, we completed our acquisition of Umetrics, AB ("Umetrics"), a leader in multivariate data analysis and modeling software located in Umea, Sweden, pursuant to a Sale and Purchase Agreement dated December 15, 2005. Umetrics' multivariate data analysis and modeling software converts process data into useable information for yield improvement, when linked with our open and modular platform of process sensors and data collection, integration, data storage, and visualization capabilities. The purchase price consisted of \$27.4 million in cash, net of \$2.6 million in cash acquired, and \$0.4 million in acquisition related costs.

#### **Critical Accounting Policies and Estimates**

Management's Discussion and Analysis of Financial Condition and Results of Operations discusses our consolidated financial statements, which have been prepared in accordance with accounting principles generally accepted in the United States. The preparation of these financial statements requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities and the disclosure of contingent liabilities at the date of the financial statements and the reported amounts of revenues and expenses during the reporting period. On an on-going basis, we evaluate our estimates and judgments, including those related to revenue recognition and allowance for doubtful accounts, inventory, warranty costs, stock-based compensation expense, intangible assets, goodwill and other long-lived assets, in-process research and development and income taxes. We base our estimates and judgments on historical experience and on various other factors that are believed to be reasonable under the circumstances, the results of which form the basis for making judgments about the carrying values of assets and liabilities that are not readily apparent from other sources. Actual results may differ from these estimates under different assumptions or conditions.

We believe the following critical accounting policies affect the most significant judgments, assumptions and estimates we use in preparing our consolidated financial statements:

*Revenue Recognition and Accounts Receivable Allowances.* Revenue from product sales is recorded upon transfer of title and risk of loss to the customer provided that there is evidence of an arrangement, the sales price is fixed or determinable, and collection of the related receivable is reasonably assured. In most transactions, we have no obligations to our customers after the date products are shipped other than pursuant to warranty obligations. In some instances, we provide installation, training, support and services to customers after the product has been shipped. We defer the fair value of any undelivered elements until the undelivered element is delivered. Fair value is the price charged when the element is sold separately. Shipping and handling fees billed to customers, if any, are recognized as revenue. The related shipping and handling costs are recognized in cost of sales.

We monitor and track the amount of product returns, provide for accounts receivable allowances and reduce revenue at the time of shipment for the estimated amount of such future returns, based on historical experience. While product returns have historically been within our expectations and the provisions established, there is no assurance that we will continue to experience the same return rates that we have in the past. Any significant increase

in product return rates could have a material adverse impact on our operating results for the period or periods in which such returns materialize.

While we maintain a credit approval process, significant judgments are made by management in connection with assessing our customers' ability to pay at the time of shipment. Despite this assessment, from time to time, our customers are unable to meet their payment obligations. We continuously monitor our customers' credit worthiness, and use our judgment in establishing a provision for estimated credit losses based upon our historical experience and any specific customer collection issues that we have identified. While such credit losses have historically been within our expectations and the provisions established, there is no assurance that we will continue to experience the same credit loss rates that we have in the past. A significant change in the liquidity or financial position of our customers could have a material adverse impact on the collectability of accounts receivable and our future operating results.

*Inventory.* We value our inventory at the lower of cost (first-in, first-out method) or market. We regularly review inventory quantities on hand and record a provision to write down excess and obsolete inventory to our estimated net realizable value, if less than cost, based primarily on our estimated forecast of product demand. Demand for our products can fluctuate significantly. A significant increase in the demand for our products could result in a short-term increase in the cost of inventory purchases as a result of supply shortages or a decrease in the cost of inventory purchases as a result of volume discounts, while a significant decrease in demand could result in an increase in the charges for excess inventory quantities on hand. In addition, our industry is subject to technological change, new product development and product technological obsolescence that could result in an increase in the amount of obsolete inventory quantities on hand. Therefore, any significant unanticipated changes in demand or technological developments could have a significant impact on the value of our inventory and our reported operating results. Due to a sharp decrease in demand during the fourth quarter of 2008, we took a charge for excess and obsolete inventory of \$6.5 million. For the twelve months ended December 31, 2008, our total charges for excess and obsolete inventory totaled \$11.4 million.

*Warranty costs.* We provide for the estimated costs to fulfill customer warranty obligations upon the recognition of the related revenue. We provide warranty coverage for our products ranging from 12 to 36 months, with the majority of our products ranging from 12 to 24 months. We estimate the anticipated costs of repairing our products under such warranties based on the historical costs of the repairs and any known specific product issues. The assumptions we use to estimate warranty accruals are reevaluated periodically in light of actual experience and, when appropriate, the accruals are adjusted. Our determination of the appropriate level of warranty accrual is based upon estimates. Should product failure rates differ from our estimates, actual costs could vary significantly from our expectations.

*Stock-Based Compensation Expense.* We account for share-based compensation expense in accordance with SFAS 123R, which requires the measurement and recognition of compensation expense for all share-based payment awards made to employees and directors based on estimated fair values. We have estimated the fair value of share-based options on the date of grant using the Black Scholes pricing model, which is affected by our stock price as well as assumptions regarding a number of complex and subjective variables. These variables include our expected stock price volatility over the term of the awards, actual and projected employee option exercise behaviors, risk free interest rate and expected dividends. We are also required to estimate forfeitures at the time of grant and revise those estimates in subsequent periods if actual forfeitures differ from those estimates.

Management determined that blended volatility, a combination of historical and implied volatility, is more reflective of market conditions and a better indicator of expected volatility than historical or implied volatility. The assumptions used in calculating the fair value of share-based payment awards represent management's best estimates, but these estimates involve inherent uncertainties and the application of management judgment. As a result, if factors change and we use different assumptions, our stock-based compensation expense could be materially different in the future.

*Intangible assets, goodwill and other long-lived assets.* As a result of our acquisitions, we have identified intangible assets and generated significant goodwill. Intangible assets are valued based on estimates of future cash flows and amortized over their estimated useful life. Goodwill is subject to annual impairment testing as well as testing upon the occurrence of any event that indicates a potential impairment. Intangible assets and other long-lived

assets are subject to an impairment test if there is an indicator of impairment. The carrying value and ultimate realization of these assets is dependent upon estimates of future earnings and benefits that we expect to generate from their use. If our expectations of future results and cash flows are significantly diminished, intangible assets and goodwill may be impaired and the resulting charge to operations may be material. When we determine that the carrying value of intangibles or other long-lived assets may not be recoverable based upon the existence of one or more indicators of impairment, we use the projected undiscounted cash flow method to determine whether an impairment exists, and then measure the impairment using discounted cash flows. To measure impairment for goodwill, we compare the fair value of our reporting units by measuring discounted cash flows to the book value of the reporting units. Goodwill would be impaired if the resulting implied fair value of goodwill was less than the recorded book value of the goodwill.

During the fourth quarter of 2008, we incurred an intangible asset impairment charge of \$6.1 million related to the acquired Yield Dynamics ("YDI") customer technologies, relationships, and patents and trademarks. The impairment charge was primarily related to lower than previously estimated revenues from our YDI management software due to the macroeconomic environment and industry downturn.

The estimation of useful lives and expected cash flows require us to make significant judgments regarding future periods that are subject to some factors outside of our control. Changes in these estimates can result in significant revisions to the carrying value of these assets and may result in material charges to the results of operations.

We have elected to perform our annual goodwill impairment testing as required under FAS 142 on October 31 of each fiscal year, or more often if events or circumstances indicate that there may be impairment. Reporting units are defined as operating segments or one level below an operating segment, referred to as a component. We have determined that our reporting units are components of our one operating segment. We allocate goodwill to reporting units at the time of acquisition and base that allocation on which reporting units will benefit from the acquired assets and liabilities. The estimated fair values of our reporting units were based on discounted cash flow models derived from internal earnings and external market forecasts. Assumptions in estimating future cash flows are subject to a high degree of judgment and complexity. We make every effort to forecast these future cash flows as accurately as possible with the information available at the time the forecast is developed. Based on current results and expectations and our analysis, we have determined that the fair values of our reporting units continue to exceed their carrying values. Therefore, we determined that no goodwill impairment charge was required as of December 31, 2008. Due to the ongoing uncertainty in market conditions, which may continue to negatively impact the financial performance of our reporting units, we will continue to monitor and evaluate the carrying value of goodwill. Earnings forecasts relating to our reporting units have generally declined over the past few quarters. If market and economic conditions or business performance deteriorate further, this could increase the likelihood of us recording an impairment charge.

*In-process research and development.* We value tangible and intangible assets acquired through our business acquisitions, including in-process research and development ("IPR&D"), at fair value. We determine IPR&D through established valuation techniques for various projects for the development of new products and technologies and expense IPR&D when technical feasibility is not reached. The value of IPR&D is determined using the income approach, which discounts expected future cash flows from projects under development to their net present value. Each project is analyzed and estimates and judgments are made to determine the technological innovations included in the utilization of core technology, the complexity, cost and time to complete development, any alternative future use or current technological feasibility and the stage of completion. If we acquire other companies with IPR&D in the future, we will value the IPR&D through established valuation techniques and will incur future IPR&D charges if those products under development have not reached technical feasibility.

*Income taxes.* We evaluate the realizability of our net deferred tax assets and assess the need for a valuation allowance on a quarterly basis. The future benefit to be derived from our deferred tax assets is dependent upon our ability to generate sufficient future taxable income to realize the assets. We record a valuation allowance to reduce our net deferred tax assets to the amount that may be more likely than not to be realized. To the extent we established a valuation allowance, an expense is recorded within the provision for income taxes line in the statement of operations. In future periods, if we were to determine that it was more likely than not that we would not be able to

realize the recorded amount of our remaining net deferred tax assets, an adjustment to the valuation allowance would be recorded as an increase to income tax expense in the period such determination was made.

We adopted the provisions of FASB Interpretation No. 48, "Accounting for Uncertainty in Income Taxes" ("FIN 48") as of January 1, 2007. FIN 48 contains a two-step approach to recognizing and measuring uncertain tax positions accounted for in accordance with SFAS No. 109, "Accounting for Income Taxes." The first step is to evaluate the tax position for recognition by determining if the weight of available evidence indicates that it is more likely than not that the position will be sustained upon audit, including resolutions of related appeals or litigation processes, if any. The second step is to measure the tax benefit as the largest amount that is more than 50% likely of being realized upon ultimate settlement. We reevaluate these uncertain tax positions on a quarterly basis. This evaluation is based on factors including, but not limited to, changes in facts or circumstances, changes in tax law, effectively settled issues under audit and new audit activity. Any change in these factors could result in the recognition of a tax benefit or an additional charge to the tax provision.

**Results of Operations**

The following table sets forth, for the periods indicated, the percentage of total net sales of certain line items included in our consolidated statement of operations data:

	Year Ended December 31,		
	2008	2007	2006
Net sales	100.0%	100.0%	100.0%
Cost of sales	59.8	57.5	56.8
Gross profit	40.2	42.5	43.2
Research and development	12.2	9.6	9.2
Selling, general and administrative	20.2	17.0	16.0
Amortization of acquired intangible assets	1.4	2.1	2.2
Purchase of in-process technology	—	0.1	0.1
Impairment of purchased intangibles	0.9	—	—
Income from operations	5.5	13.7	15.7
Interest income, net	1.0	1.9	1.0
Impairment of investments	(0.1)	(0.2)	—
Income before income taxes	6.4	15.4	16.7
Provision for income taxes	1.7	4.3	4.7
Net income	4.7%	11.1%	12.0%

**Year Ended 2008 Compared to 2007 and 2006**

*Net Revenues*

	Year Ended December 31,			% Change in 2008	% Change in 2007
	2008	2007	2006		
Product	\$ 560.9	\$ 708.5	\$ 720.7	(20.8)	(1.7)
Service	86.1	72.0	62.1	19.5	16.1
Total net revenues	\$ 647.0	\$ 780.5	\$ 782.8	(17.1)	(0.3)

Product revenues decreased \$147.6 million or 20.8% during the year ended December 31, 2008 mainly due to a decrease in worldwide demand from our semiconductor capital equipment manufacturer and semiconductor device manufacturer customers compared to the same period for the prior year. Product revenues related to these customers decreased \$166.3 million or 34.5% compared to the same period for the prior year. This decrease was partially offset by an \$18.7 million or 8.3% increase in revenues related to other markets, mainly solar. Our domestic product

revenues decreased by \$114.8 million or 25.6% mainly due to a high concentration of sales to the semiconductor capital equipment and device manufacturer customers. Our international product revenues decreased \$32.8 million or 12.6% during the year ended December 31, 2008. This decrease consists of a \$59.0 million decrease in product revenues from our semiconductor customers offset by an increase of \$26.2 million related to other markets, mainly solar.

Product revenues decreased \$12.2 million or 1.7% during the year ended December 31, 2007 mainly due to a decrease in demand from our semiconductor capital equipment manufacturer customers compared to the same period for the prior year. Product revenues related to these customers decreased \$26.4 million or 5.2% compared to the same period for the prior year. This decrease was partially offset by a \$14.2 million or 6.7% increase in revenues related to other markets. Our domestic product revenues decreased by \$39.8 million or 8.2% mainly due to a high concentration of sales to the semiconductor capital equipment and device manufacturer customers. Our international product revenues increased \$27.6 million or 11.9% during the year ended December 31, 2007. This increase is mainly due to increased demand from our semiconductor capital equipment manufacturer customers.

Service revenues consisted mainly of fees for services related to the maintenance and repair of our products, software maintenance, installation services and training. Service revenues increased \$14.1 million and \$9.9 million for the years ended 2008 and 2007, respectively. The increases are mainly due to a higher installed base of products and increased software maintenance fees.

Total international net revenues were \$281.3 million for the year ended December 31, 2008 or 43.5% of net sales compared to \$302.7 million for the same period of 2007 or 38.8% of net sales and \$266.9 million or 34.1% of net sales for the year ended December 31, 2006.

*Gross Profit*

	Year Ended December 31,			% Points Change in 2008	% Points Change in 2007
	2008	2007	2006		
Product	40.7%	43.4%	43.8%	(2.7)%	(0.4)%
Service	36.5%	33.5%	36.1%	3.0%	(2.6)%
Total gross profit percentage	40.2%	42.5%	43.2%	(2.3)%	(0.7)%

Gross profit on product revenues decreased by 2.7 percentage points for the year ended December 31, 2008 compared to the prior year. The decrease consists of approximately 3.2 lower percentage points from decreased revenue volumes, 0.4 percentage points from unfavorable foreign currency fluctuations and 0.8 percentage points from additional excess and obsolete inventory charges. These decreases were offset by 1.7 percentage points from lower overhead spending due to lower sales volumes and favorable product mix.

Gross profit on product revenues decreased by 0.4 percentage points for the year ended December 31, 2007 compared to the prior year. The decrease is mainly due to higher overhead costs offset by lower warranty costs in 2007.

Cost of service revenues consists primarily of costs of providing services for repair and training which includes salaries and related expenses and other fixed costs. Service gross profit increased by 3.0 percentage points for the year ended December 31, 2008 compared to the prior year. The increase is a result of increased revenue volumes partly related to our Yield Dynamics acquisition ("Yield acquisition") in the fourth quarter of 2007. Gross profit decreased 2.6 percentage points for the year ended December 31, 2007 primarily due to increased material costs.

*Research and Development*

	Year Ended December 31,			% Change in 2008	% Change in 2007
	2008	2007	2006		
Research and development expenses	\$78.5	\$74.6	\$72.2	5.2	3.3

Our research and development is primarily focused on developing and improving our instruments, components, subsystems and process control solutions to improve process performance and productivity.

We have hundreds of products and our research and development efforts primarily consist of a large number of projects related to these products, none of which is individually material to us. Current projects typically have a duration of 12 to 30 months depending upon whether the product is an enhancement of existing technology or a new product. Our current initiatives include projects to enhance the performance characteristics of older products, to develop new products and to integrate various technologies into subsystems. These projects support in large part the transition in the semiconductor industry to larger wafer sizes and smaller integrated circuit geometries, which require more advanced process control technology. Research and development expenses consist primarily of salaries and related expenses for personnel engaged in research and development, fees paid to consultants, material costs for prototypes and other expenses related to the design, development, testing and enhancement of our products as well as legal costs associated with maintaining and defending our intellectual property.

Research and development expense increased \$3.9 million during the year ended December 31, 2008 compared to the prior year, mainly due to \$3.7 million in expenses related to the Yield acquisition and \$1.0 million in other research and development costs, primarily patent legal fees. These increases were offset by \$0.8 million in lower compensation expenses as a result of decreased staffing levels.

Research and development expense increased \$2.4 million during the year ended December 31, 2007 mainly due to \$1.9 million in increased compensation, resulting from increased headcount, and \$1.8 million in consulting expenses, primarily offset by \$0.8 million in lower project material costs as compared to the same period in the prior year.

We believe that the continued investment in research and development and ongoing development of new products are essential to the expansion of our markets, and expect to continue to make significant investment in research and development activities. We are subject to risks if products are not developed in a timely manner, due to rapidly changing customer requirements and competitive threats from other companies and technologies. Our success primarily depends on our products being designed into new generations of equipment for the semiconductor industry. We develop products that are technologically advanced so that they are positioned to be chosen for use in each successive generation of semiconductor capital equipment. If our products are not chosen to be designed into our customers' products, our net sales may be reduced during the lifespan of those products.

*Selling, General and Administrative*

	Year Ended December 31,			% Change in 2008	% Change in 2007
	2008	2007	2006		
Selling, general and administrative expenses	\$130.8	\$132.8	\$125.2	(1.5)	6.1

Selling, general and administrative expenses decreased \$2.0 million during the year ended December 31, 2008 compared to the prior year. The decrease includes a \$5.6 million decrease in consulting and professional fees and a \$2.3 million decrease in foreign exchange costs. These decreases were partially offset by a \$5.3 million increase related to the Yield acquisition and a \$1.0 million increase in facilities costs related to the relocated corporate headquarters. The decrease in consulting and professional fees was due primarily to lower IT infrastructure spending. The foreign exchange gains during the year ended December 31, 2008 were primarily attributable to the settlement of cash and intercompany loans at different foreign exchange rates in connection with a legal entity consolidation in the first quarter of 2008 between some of our foreign subsidiaries.

Selling, general and administrative expenses increased \$7.6 million during the year ended December 31, 2007 primarily due to \$3.8 million of increased IT spending to support current and future initiatives including the implementation of an ERP system, \$0.7 million in increased compensation, an \$0.9 million increase in costs of operating facilities mainly in Asia, and by \$1.1 million in foreign currency exchange losses as compared to the same period in the prior year.

*Amortization of Acquired Intangible Assets*

	Year Ended December 31,			% Change in 2008	% Change in 2007
	2008	2007	2006		
Amortization of acquired intangible assets	\$9.0	\$16.2	\$17.4	(44.4)	(6.9)

Amortization expense for the year ended December 31, 2008 decreased \$7.2 million primarily related to intangible assets from earlier acquisitions that became fully amortized during the year ended December 31, 2008.

Amortization expense for the year ended December 31, 2007 decreased \$1.2 million primarily related to intangible assets from earlier acquisitions that became fully amortized during the year ended December 31, 2007.

*Purchase of in-process technology*

	<u>Year Ended December 31,</u>		
	<u>2008</u>	<u>2007</u>	<u>2006</u>
Purchase of in-process technology	\$—	\$0.9	\$0.8

In-process research and development amounts related to our acquisition of YDI in 2007 and Ion and Umetrics in 2006. The purchase price of the acquisitions was allocated to the assets acquired, including intangible assets, based on estimated fair values. The intangible assets included acquired in-process technology for projects, generally expected to have durations of 12 months, which did not have alternative future uses. Accordingly, these costs were expensed in the year of acquisition.

*Interest Income, Net*

	<u>Year Ended December 31,</u>			<u>% Change in 2008</u>	<u>% Change in 2007</u>
	<u>2008</u>	<u>2007</u>	<u>2006</u>		
Interest income, net	\$6.4	\$14.5	\$8.4	(55.7)	72.5

Net interest income decreased \$8.1 million during the year ended December 31, 2008 compared to the prior year mainly related to lower average outstanding cash and investment balances in 2008 and lower average rates. The lower cash and investment balances were mainly a result of our stock repurchase program.

Net interest income increased \$6.1 million during the year ended December 31, 2007 compared to the prior year mainly related to higher average outstanding cash and investment balances in 2007 and higher average rates.

*Impairments*

	<u>Year Ended December 31,</u>		
	<u>2008</u>	<u>2007</u>	<u>2006</u>
Impairment of investments	\$(0.9)	\$(1.5)	\$—
Impairment of purchased intangibles	(6.1)	—	—

During the fourth quarter of 2008, we incurred an intangible asset impairment charge of \$6.1 million related to the acquired Yield customer technologies, relationships, and patents and trademarks. The impairment charge was primarily related to lower than previously estimated revenues from our YDI management software due to the macroeconomic environment and industry downturn. The lower estimated future cash flows were based on the amount by which the carrying value of the intangible assets exceeded the estimated fair value. Fair value was determined based on a discounted estimate of future cash flows expected to be derived from the intangible assets.

During the fourth quarter of 2007, we determined that declines in the fair value of our investments in certain commercial paper were other-than-temporary. This commercial paper was issued by two structured investment vehicles (SIVs) that entered into receivership during the fourth quarter of 2007 and they failed to make payments at maturity. Due to the mortgage-related assets these issuers held, they were exposed to adverse market conditions that affected the value of their collateral and their ability to access short-term funding. These investments are not currently trading on active markets, and therefore, have no readily determinable market value. As a result of our evaluation as of December 31, 2007, we recorded a \$1.5 million impairment charge to earnings, based upon receiving contemporaneous quotes from established third-party pricing services.

For the year ended December 31, 2008, we recorded additional net impairment charges of \$0.9 million related to these two investments. We liquidated our position in these two impaired investments during the third quarter of 2008, one by sale and the other by a structured payment. We received a combined total of \$3.4 million from the

settlement of these investments during 2008. The liquidation of these two impaired investments leaves the remaining portfolio consisting of direct U.S. Government and Agency obligations and high quality, liquid, short term corporate debt obligations.

#### Provision for Income Taxes

	Year Ended December 31,		
	2008	2007	2006
Provision for income taxes	\$10.9	\$33.7	\$36.7

The provision for income taxes in 2008, 2007 and 2006 are comprised of federal, state and foreign income taxes.

Our effective tax rate for the years ended December 31, 2008, 2007 and 2006 was 26.6%, 28.0% and 28.0%, respectively. The effective tax rate in 2008 is less than the statutory tax rate primarily due to the benefit from federal research and development credits, the profits of our international subsidiaries being taxed at rates lower than the U.S. statutory tax rate, and discrete reserve releases.

The effective tax rate in 2007 is less than the statutory tax rate primarily due to the benefit from the federal research and development credits and the profits of our international subsidiaries being taxed at rates lower than the U.S. statutory tax rate.

The effective tax rate in 2006 is less than the statutory tax rate primarily due to certain discrete tax matters related to our international operations, the benefit from the federal research and development credits, the reduction in the valuation allowance for state tax credits, and the profits of our international subsidiaries being taxed at rates lower than the U.S. statutory tax rate.

We adopted FASB Interpretation 48, Accounting for Uncertainty in Income Taxes ("FIN 48"), as of January 1, 2007. At December 31, 2007, the total amount of gross unrecognized tax benefits, which excludes interest and penalties discussed below, was approximately \$16.1 million. If these benefits were recognized in a future period, the timing of which is not estimable, the net unrecognized tax benefit of \$13.2 million would impact our effective tax rate. The total amount of gross unrecognized tax benefits at December 31, 2008 was approximately \$14.7 million, excluding penalties and interest. The decrease from January 1, 2007 was primarily attributable to the close of U.S. statute of limitations on the 2004 tax year. At December 31, 2008, if these benefits were recognized in a future period, the timing of which is not estimable, the net unrecognized tax benefit of approximately \$11.8 million, excluding penalties and interest, would impact our effective tax rate.

MKS and its subsidiaries are subject to U.S. federal income tax as well as the income tax of multiple state and foreign jurisdictions. We have concluded all U.S. federal income tax matters for years through 2002. While the U.S. 2004 federal tax year is closed, the 2003 federal tax year remains open to the extent of the loss carryforward to 2005. As of December 31, 2008 and currently, we are under a federal audit for the 2005 and 2006 tax years, as well as other ongoing audits in various other tax jurisdictions for various years.

Over the next 12 months it is reasonably possible that we may recognize \$8.0 million to \$8.5 million of previously unrecognized tax benefits related to various federal, state and foreign tax positions as a result of the conclusion of various audits and the expiration of the statute of limitations. The following tax years, in the major tax jurisdictions noted, are open for assessment or refund: U.S. Federal: 2003, 2005 to 2007, Germany: 2001 to 2007, Korea: 2006 to 2007, Japan: 2001 to 2007, and the United Kingdom: 2006 and 2007.

We accrue interest and penalties, if applicable, for any uncertain tax positions. This interest and penalty expense is a component of income tax expense. At December 31, 2008 and at December 31, 2007, we had \$1.7 million and \$1.5 million, respectively, accrued for interest on unrecognized tax benefits.

On a quarterly basis, we evaluate both positive and negative evidence that bears on the realizability of net deferred tax assets and assesses the need for a valuation allowance. The future benefit to be derived from its deferred tax assets is dependent upon its ability to generate sufficient future taxable income to realize the assets. During the year ended December 31, 2008, we increased our valuation allowance by \$3.3 million for state tax credit carryforwards and \$0.8 million for federal capital loss carryforwards, as we determined it is more likely than

not that the deferred tax assets related to these attributes will not be realized. In addition, we recorded a benefit to income tax expense of \$3.0 million due to discrete reserve releases primarily related to the close of statute of limitations.

During the year ended December 31, 2007, we amended prior federal tax returns to reflect revised estimates for qualifying federal research and development costs that allowed us to claim additional research tax credits. As a result of this claim, we recorded a benefit to income tax expense of \$1.8 million.

During the year ended December 31, 2006, we received a notification letter from the Israeli Ministry of Industry Trade and Labor (“MITL”) indicating that our Israeli operations were in compliance with requirements relating to the tax holiday granted to our manufacturing operations in Israel in 2001. This tax holiday is anticipated to expire in 2011 and is subject to meeting continued investment, employment and other requirements under the guidelines of the MITL. Additionally, we recorded the impact of both a change in German tax rules allowing interest deductions on certain loans and an adjustment relating to transfer pricing. As a result of these items we recorded a net benefit to income tax expense of \$1.6 million for the year ended December 31, 2006.

#### **Liquidity and Capital Resources**

Cash, cash equivalents and short-term marketable securities totaled \$278.9 million at December 31, 2008 compared to \$323.8 million at December 31, 2007. This decrease was mainly due to \$115.7 million of cash used to repurchase common stock and \$13.5 million of cash used to purchase property, plant and equipment offset by an increase of \$89.8 million of cash provided by operations. The primary driver in our current and anticipated future cash flows is and will continue to be cash generated from operations, consisting mainly of our net income and changes in operating assets and liabilities. In periods when our sales are growing, higher sales to customers will result in increased trade receivables, and inventories will generally increase as we build products for future sales. This may result in lower cash generated from operations. Conversely, in periods when our sales are declining, our trade accounts receivable and inventory balances will generally decrease, resulting in increased cash from operations.

Net cash provided by operating activities was \$89.8 million for the year ended December 31, 2008 and resulted mainly from net income of \$30.1 million, a \$38.3 million decrease in operating assets, non-cash charges of \$30.5 million for depreciation, amortization and impairments, a \$15.3 million charge for stock-based compensation, a decrease in net operating liabilities of \$16.8 million and a deferred tax benefit of \$5.0 million. The decrease in operating assets consisted of a \$23.6 million decrease in accounts receivable as a result of lower sales in the last two months of 2008 compared to 2007 and an \$18.5 million decrease in inventories due to lower ordering levels and additional charges for excess and obsolete inventory. The decrease in operating liabilities is mainly caused by a decrease of \$9.2 million in accounts payable primarily as a result of lower inventory procurement activities and a decrease of \$4.4 million in accrued expenses and other current liabilities primarily as a result of lower accrued compensation.

Net cash provided by operating activities was \$119.1 million for the year ended December 31, 2007 and resulted mainly from net income of \$86.4 million, a \$26.1 million decrease in operating liabilities and non-cash charges of \$30.6 million for depreciation and amortization and \$12.9 million for stock-based compensation, and a decrease in net operating assets of \$20.2 million and a deferred tax benefit of \$10.3 million. The \$26.1 million net decrease in operating liabilities is mainly caused by a decrease of \$18.9 million in accounts payable primarily as a result of inventory procurement activities and a decrease of \$6.6 million in accrued expenses and other current liabilities primarily as a result of lower accrued compensation and warranty costs. The \$20.2 million decrease in operating assets consisted primarily of an \$18.3 million decrease in accounts receivable as a result of lower sales in the last two months of 2007 compared to 2006.

Net cash used in investing activities was \$74.1 million for the year ended December 31, 2008 and resulted primarily from the net purchases of \$60.7 million of available for sale investments and purchases of property, plant and equipment of \$13.5 million. The purchases of property, plant and equipment relate to leasehold improvements in Japan to facilitate a consolidation of facilities, IT hardware to reduce system operating costs in the future and test equipment. Net cash used in investing activities of \$60.9 million for the year ended December 31, 2007, resulted primarily from the purchase of one technology company for \$24.0 million, purchases of property, plant and

equipment of \$15.1 million, including approximately \$6.3 million related to our new China facility and net purchases of \$23.7 million of available for sale investments.

Net cash used in financing activities of \$114.8 million for the year ended December 31, 2008, resulted from \$115.7 million used to repurchase common stock, \$4.8 million in net repayment of short-term borrowings and \$6.3 million in principal payments on capital lease obligations and long-term debt, primarily to retire a \$5.0 million industrial development revenue bond, offset by \$8.9 million in proceeds from the exercise of stock options and purchases under our employee stock purchase plan. Net cash used in financing activities of \$58.7 million for the year ended December 31, 2007, resulted from \$101.2 million used to repurchase common stock and \$4.1 million in net repayment of short-term borrowings, offset primarily by \$45.3 million in proceeds from the exercises of stock options and purchases under our employee stock purchase plan.

On August 1, 2008, we renewed an unsecured short-term LIBOR based loan agreement with a bank to be utilized primarily by our Japanese subsidiary for short-term liquidity purposes. The credit line, which expires on July 31, 2009, allows us to borrow, in multiple currencies, up to an equivalent of \$35.0 million U.S. dollars. At December 31, 2008, we had outstanding borrowings of \$1.1 million U.S. dollars, payable on demand, at an interest rate of 1.65%, with \$33.9 million available for future borrowings.

Our Japanese subsidiary also has credit lines and short-term borrowing arrangements with a financial institution, which provide for aggregate borrowings as of December 31, 2008 of up to \$27.5 million, which generally expire and are renewed in three-month intervals. At December 31, 2008, total borrowings outstanding under these arrangements were \$16.7 million, at interest rates ranging from 1.20% to 1.68%, with \$10.8 million available for future borrowings.

On January 26, 2009, we committed to a plan of termination with respect to approximately 10% of our workforce. This decision was based on the overall economic slowdown, particularly in the semiconductor capital equipment industry. As a result, we expect to incur approximately \$2.5 million in cash expenditures for severance and related costs, which we expect to record in the quarter ending March 31, 2009. We expect annual compensation-related savings of approximately \$19.0 million as a result of these reductions.

We have provided financial guarantees for certain unsecured borrowings and have standby letters of credit, some of which do not have fixed expiration dates. At December 31, 2008, our maximum exposure as a result of these standby letters of credit and performance bonds was approximately \$1.0 million.

Future payments due under debt, lease and purchase commitment obligations as of December 31, 2008 are as follows:

Contractual Obligations (In thousands)	Payment Due By Period					
	Total	Less than 1 Year	1-3 years	3-5 years	After 5 years	Other
Operating lease obligations	\$ 38,194	\$ 8,652	\$ 12,825	\$ 8,592	\$ 8,125	\$ —
Purchase obligations(1)	96,298	90,155	6,143	—	—	—
Capital lease obligations	1,266	870	396	—	—	—
Other long-term liabilities reflected on the Balance Sheet under GAAP(2)	21,910	110	—	—	10,044	11,756
Contingent purchase consideration in connection with acquisitions(3)	7,500	2,500	5,000	—	—	—
Total	\$ 165,168	\$ 102,287	\$ 24,364	\$ 8,592	\$ 18,169	\$ 11,756

(1) The majority of the outstanding inventory purchase commitments of approximately \$76.9 million at December 31, 2008 are to be purchased within the next 12 months. Additionally, approximately \$14.9 million represents a commitment, as of December 31, 2008, to a third party engaged to provide certain computer equipment, IT network services and IT support. This contract is for a period of approximately six years that began in September 2004 and has a significant penalty for early termination. The actual timing of payments and amounts may vary based on equipment deployment dates. However, the amount noted represents our expected obligation based on anticipated deployment.

- (2) The majority of this balance relates to income taxes payable and accrued compensation for certain executives related to supplemental retirement benefits.
- (3) In connection with the YDI acquisition, additional purchase consideration may be payable upon the achievement of specific annual and cumulative revenue targets between 2009 and 2010.

We believe that our working capital, together with the cash anticipated to be generated from operations, will be sufficient to satisfy our estimated working capital and planned capital expenditure requirements through at least the next 12 months.

On February 12, 2007, our Board of Directors approved a share repurchase program (the "Program") for the repurchase of up to \$300.0 million of our outstanding stock over the next two years. The repurchases were made from time to time on the open market or through privately negotiated transactions. The timing and amount of any shares repurchased under the Program were dependent upon a variety of factors, including price, corporate and regulatory requirements, capital availability and other market conditions. During the year ended December 31, 2008, we repurchased 5,667,000 shares of common stock for \$115.7 million for an average price of \$20.42 per share. There were no share repurchases during 2009 and the Program expired on February 11, 2009.

To the extent permitted by Massachusetts law, our Restated Articles of Organization, as amended, require us to indemnify any of our current or former officers or directors or any person who has served or is serving in any capacity with respect to any of our employee benefit plans. Because no claim for indemnification has been pursued by any person covered by the relevant provisions of our Restated Articles of Organization, we believe that the estimated exposure for these indemnification obligations is currently minimal. Accordingly, we have no liabilities recorded for these requirements as of December 31, 2008.

We also enter into agreements in the ordinary course of business which include indemnification provisions. Pursuant to these agreements, we indemnify, hold harmless and agree to reimburse the indemnified party, generally our customers, for losses suffered or incurred by the indemnified party in connection with certain patent or other intellectual property infringement claims, and, in some instances, other claims, by any third party with respect to our products. The terms of these indemnification obligations are generally perpetual after execution of the agreements. The maximum potential amount of future payments we could be required to make under these indemnification agreements is, in some instances, not contractually limited. We have never incurred costs to defend lawsuits or settle claims related to these indemnification obligations. As a result, we believe the estimated fair value of these obligations is minimal. Accordingly, we have no liabilities recorded for these obligations as of December 31, 2008.

When, as part of an acquisition, we acquire all of the stock or all of the assets and liabilities of another company, we assume liability for certain events or occurrences that took place prior to the date of acquisition. The maximum potential amount of future payments we could be required to make for such obligations is undeterminable at this time. Other than obligations recorded as liabilities at the time of the acquisitions, historically we have not made significant payments for these indemnifications. Accordingly, no liabilities have been recorded for these obligations.

In conjunction with certain asset sales, we may provide routine indemnifications whose terms range in duration and often are not explicitly defined. Where appropriate, an obligation for such indemnifications is recorded as a liability. Because the amounts of liability under these types of indemnifications are not explicitly stated, the overall maximum amount of the obligation under such indemnifications cannot be reasonably estimated. Other than obligations recorded as liabilities at the time of the asset sale, historically we have not made significant payments for these indemnifications.

#### **Derivatives**

We conduct our operations globally. Consequently, the results of our operations are exposed to movements in foreign currency exchange rates. We hedge a portion of our forecasted foreign currency denominated intercompany sales of inventory, over a maximum period of 15 months, using forward foreign exchange contracts ("forward exchange contracts") primarily related to Japanese, Korean and European currencies. These derivatives are designated as cash-flow hedges, and changes in their fair value are carried in accumulated other comprehensive income in our consolidated statements of stockholder's equity until the hedged transaction affects earnings. When

the hedged transaction affects earnings, the appropriate gain or loss from the derivative designated as a hedge of the transaction is reclassified from accumulated other comprehensive income to cost of sales in the consolidated statements of operations. As of December 31, 2008, the unrealized gain that will be reclassified from accumulated other comprehensive income to cost of sales over the next twelve months is \$0.7 million. The ineffective portions of the derivatives are recorded in selling, general and administrative costs and were immaterial in 2008, 2007 and 2006, respectively.

We also hedge certain intercompany and other payables with forward exchange contracts. Typically, as these derivatives hedge existing amounts that are denominated in foreign currencies, the derivatives do not qualify for hedge accounting. The foreign exchange gain or loss on these derivatives was a gain of \$2.7 million in 2008 and was immaterial in 2007 and 2006.

Realized and unrealized gains and losses on forward exchange contracts that do not qualify for hedge accounting are recognized immediately in earnings. The cash flows resulting from forward exchange contracts are classified in our consolidated statements of cash flows as part of cash flows from operating activities. We do not hold or issue derivative financial instruments for trading purposes.

We had forward exchange contracts with notional amounts totaling \$30.6 million outstanding at December 31, 2008 of which \$17.3 million were outstanding to exchange Japanese yen for U.S. dollars. We had forward exchange contracts with notional amounts totaling \$66.7 million outstanding at December 31, 2007, of which \$39.9 million were outstanding to exchange Japanese yen for U.S. dollars. We had forward exchange contracts with notional amounts totaling \$20.3 million outstanding at December 31, 2006, of which \$14.6 million were outstanding to exchange Japanese yen for U.S. dollars.

Gains and losses on forward exchange contracts that qualify for hedge accounting are classified in cost of goods sold, which totaled a loss of \$1.2 million, gains of \$1.3 million and \$1.9 million for the years ended December 31, 2008, 2007 and 2006, respectively.

#### **Off-Balance Sheet Arrangements**

We do not have any financial partnerships with unconsolidated entities, such as entities often referred to as structured finance, special purpose entities or variable interest entities which are often established for the purpose of facilitating off-balance sheet arrangements or other contractually narrow or limited purposes. Accordingly, we are not exposed to any financing, liquidity, market or credit risk that could arise if we had such relationships.

#### **Recently Issued Accounting Pronouncements**

In December 2007, the Financial Accounting Standards Board ("FASB") issued SFAS No. 141(R), "Business Combinations" ("SFAS No. 141R"), which replaces SFAS No. 141. This revised standard requires assets, liabilities and non-controlling interests acquired to be measured at fair value and requires that costs incurred to effect the acquisition be recognized separately from the business combination. In addition, this statement expands the scope to include all transactions and other events in which one entity obtains control over one or more businesses. This statement is effective for all business combinations for which the acquisition date is on or after the beginning of the first annual reporting period beginning on or after December 15, 2008. We are in the process of evaluating whether the adoption of this standard will have a material effect on our consolidated financial results.

In December 2007, the FASB issued SFAS No. 160, "Noncontrolling Interests in Consolidated Financial Statements, an Amendment of ARB No. 51" ("SFAS No. 160"). This statement establishes accounting and reporting standards for the non-controlling interest in a subsidiary and for the deconsolidation of a subsidiary. This statement is effective for fiscal years beginning on or after December 15, 2008. This statement does not have a material impact on our consolidated financial statements, as we do not have any minority interests.

In March 2008, the FASB issued SFAS No. 161, "Disclosures about Derivative Instruments and Hedging Activities, an amendment of FASB Statement No. 133" ("SFAS 161"). This statement is intended to improve transparency in financial reporting by requiring enhanced disclosures of an entity's derivative instruments and hedging activities and their effects on the entity's financial position, financial performance, and cash flows. SFAS 161 applies to all derivative instruments within the scope of SFAS 133, "Accounting for Derivative

Instruments and Hedging Activities” (“SFAS 133”). Entities with instruments subject to SFAS 161 must provide more robust qualitative disclosures and expanded quantitative disclosures. SFAS 161 is effective prospectively for financial statements issued for fiscal years and interim periods beginning after November 15, 2008, with early application permitted. We are currently evaluating the disclosure implications of this statement.

In April 2008, the FASB issued FASB Staff Position (“FSP”) No. 142-3, “Determination of the Useful Life of Intangible Assets” (“FSP 142-3”). FSP 142-3 amends the factors an entity should consider in developing renewal or extension assumptions used in determining the useful life of recognized intangible assets under FASB Statement No. 142, “Goodwill and Other Intangible Assets.” This new guidance applies prospectively to intangible assets that are acquired individually or with a group of other assets in business combinations and asset acquisitions. FSP 142-3 is effective for financial statements issued for fiscal years and interim periods beginning after December 15, 2008. Early adoption is prohibited. We are currently evaluating the potential impact of the implementation of FSP 142-3 on our financial position and results of operations.

**Item 7A. Quantitative and Qualitative Disclosures about Market Risk**

**Market Risk and Sensitivity Analysis**

Our primary exposures to market risks include fluctuations in interest rates on our investment portfolio, short and long-term debt as well as fluctuations in foreign currency exchange rates.

**Foreign Exchange Rate Risk**

We enter into forward exchange contracts to reduce currency exposure arising from intercompany sales of inventory.

There were forward exchange contracts with notional amounts totaling \$30.6 million and \$66.7 million outstanding at December 31, 2008 and 2007, respectively. Of such forward exchange contracts, \$17.3 million and \$39.9 million, respectively, were outstanding to exchange Japanese yen for U.S. dollars with the remaining amounts relating to contracts to exchange the British pound, Korean Won and Euro for U.S. dollars. The potential fair value loss for a hypothetical 10% adverse change in the currency exchange rate on our forward exchange contracts at December 31, 2008 and 2007 would be \$3.1 million and \$6.7 million, respectively. The potential losses in 2008 and 2007 were estimated by calculating the fair value of the forward exchange contracts at December 31, 2008 and 2007 and comparing that with those calculated using the hypothetical forward currency exchange rates.

At December 31, 2008 and 2007 we had \$0.6 million and \$134.3 million, respectively, in loans outstanding between subsidiaries that were subject to foreign exchange exposure. The majority of the intercompany loans were related to our UK subsidiary, which were incurred in late December 2007 and were repaid in January 2008. At December 31, 2008 and 2007 a hypothetical 10% adverse change in foreign exchange rates would result in a net transaction loss of \$0.1 million and \$14.9 million, respectively, which would be recorded in current earnings.

At December 31, 2008 and 2007, we had \$17.8 million and \$19.0 million, respectively, related to short-term borrowings and current portion of long-term debt 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 \$2.0 million and \$2.1 million, respectively. The potential increase in fair value was estimated by calculating the fair value of the short-term borrowings at December 31, 2008 and 2007, respectively, and comparing that with the fair value using the hypothetical year-end exchange rate.

**Interest Rate Risk**

Due to its short-term duration, the fair value of our cash and investment portfolio at December 31, 2008 and 2007 approximated its carrying value. Interest rate risk was estimated as the potential decrease in fair value resulting from a hypothetical 10% increase in interest rates for securities contained in the investment portfolio. The resulting hypothetical fair value was not materially different from the year-end carrying values.

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Our total long-term debt outstanding, including the current portion, at December 31, 2008 and 2007 was \$0.0 and \$5.0 million, respectively, and consisted of a mortgage note and industrial development revenue bond. The interest rate on these debt instruments was 4.0% at December 31, 2007. We repaid the entire debt agreement on July 1, 2008.

From time to time, MKS has outstanding short-term borrowings with variable interest rates, primarily denominated in Japanese yen. At December 31, 2008 and 2007, we had \$17.8 million and \$19.0 million, respectively, outstanding related to these short-term borrowings at interest rates ranging from 1.20% to 1.68% and 1.24% to 1.88%, respectively. Due to the short-term nature and amount of this short-term debt, a hypothetical change of 10% in interest rates would not have a material effect on our near-term financial condition or results of operations.

Item 8. *Financial Statements and Supplementary Data*

**REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM**

To Board of Directors and Shareholders of  
MKS Instruments, Inc.:

In our opinion, the consolidated financial statements listed in the index appearing under Item 15(a)(1) present fairly, in all material respects, the financial position of MKS Instruments, Inc. and its subsidiaries at December 31, 2008 and 2007, and the results of their operations and their cash flows for each of the three years in the period ended December 31, 2008 in conformity with accounting principles generally accepted in the United States of America. In addition, in our opinion, the financial statement schedule listed in the index appearing under Item 15(a)(2) presents fairly, in all material respects, the information set forth therein when read in conjunction with the related consolidated financial statements. Also in our opinion, the Company maintained, in all material respects, effective internal control over financial reporting as of December 31, 2008, based on criteria established in *Internal Control — Integrated Framework* issued by the Committee of Sponsoring Organizations of the Treadway Commission (COSO). The Company's management is responsible for these financial statements and financial statement schedule, for maintaining effective internal control over financial reporting and for its assessment of the effectiveness of internal control over financial reporting, included in the accompanying Management's Report on Internal Control over Financial Reporting appearing under Item 9A. Our responsibility is to express opinions on these financial statements, on the financial statement schedule, and on the Company's internal control over financial reporting based on our integrated audits. We conducted our audits in accordance with the standards of the Public Company Accounting Oversight Board (United States). Those standards require that we plan and perform the audits to obtain reasonable assurance about whether the financial statements are free of material misstatement and whether effective internal control over financial reporting was maintained in all material respects. Our audits of the financial statements included 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. Our audit of internal control over financial reporting included obtaining an understanding of internal control over financial reporting, assessing the risk that a material weakness exists, and testing and evaluating the design and operating effectiveness of internal control based on the assessed risk. Our audits also included performing such other procedures as we considered necessary in the circumstances. We believe that our audits provide a reasonable basis for our opinions.

As discussed in Note 12 to the consolidated financial statements, the Company changed the manner in which it accounts for uncertain tax positions in 2007.

A company's internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles. A company's internal control over financial reporting includes those policies and procedures that (i) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the company; (ii) provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and that receipts and expenditures of the company are being made only in accordance with authorizations of management and directors of the company; and (iii) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use, or disposition of the company's assets that could have a material effect on the financial statements.

Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Also, projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.



Boston, Massachusetts  
February 27, 2009

**MKS INSTRUMENTS, INC.**  
**CONSOLIDATED BALANCE SHEETS**

	December 31,	
	2008	2007
	(In thousands, except share data)	
<b>ASSETS</b>		
Current assets:		
Cash and cash equivalents	\$ 119,261	\$ 223,968
Short-term investments	159,608	99,797
Trade accounts receivable, net of allowances of \$2,148 and \$2,379 at December 31, 2008 and 2007, respectively	85,350	107,504
Inventories	131,519	150,731
Deferred income taxes	19,058	17,984
Other current assets	13,932	9,996
Total current assets	528,728	609,980
Property, plant and equipment, net	82,017	81,365
Goodwill	337,765	337,473
Acquired intangible assets, net	21,069	36,141
Other assets	15,360	11,301
Total assets	\$ 984,939	\$ 1,076,260
<b>LIABILITIES AND STOCKHOLDERS' EQUITY</b>		
Current liabilities:		
Short-term borrowings	\$ 17,808	\$ 18,967
Current portion of capital lease obligations	870	1,236
Accounts payable	19,320	28,683
Accrued compensation	13,768	17,842
Income taxes payable	—	3,649
Other accrued expenses	24,169	25,368
Total current liabilities	75,935	95,745
Long-term debt	—	5,000
Long-term portion of capital lease obligations	396	871
Other liabilities	21,910	20,635
Commitments and contingencies (Note 19)		
Stockholders' equity:		
Preferred Stock, \$0.01 par value, 2,000,000 shares authorized; none issued and outstanding	—	—
Common Stock, no par value, 200,000,000 shares authorized; 49,275,975 and 54,261,947 shares issued and outstanding at December 31, 2008 and 2007, respectively	113	113
Additional paid-in capital	637,938	685,465
Retained earnings	241,428	255,244
Accumulated other comprehensive income	7,219	13,187
Total stockholders' equity	886,698	954,009
Total liabilities and stockholders' equity	\$ 984,939	\$ 1,076,260

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

**MKS INSTRUMENTS, INC.**  
**CONSOLIDATED STATEMENTS OF OPERATIONS**

	Year Ended December 31,		
	2008	2007	2006
(In thousands, except per share data)			
Net Revenues			
Products	\$ 560,888	\$ 708,456	\$ 720,743
Services	86,106	72,031	62,058
Total net revenues	646,994	780,487	782,801
Cost of revenues			
Cost of products	332,366	401,119	405,028
Cost of service	54,685	47,881	39,651
Total cost of revenues	387,051	449,000	444,679
Gross profit	259,943	331,487	338,122
Research and development	78,540	74,628	72,240
Selling, general and administrative	130,800	132,791	125,165
Amortization of acquired intangible assets	9,001	16,183	17,376
Purchase of in-process technology	—	900	800
Impairment of purchased intangibles	6,069	—	—
Income from operations	35,533	106,985	122,541
Interest expense	(577)	(806)	(974)
Interest income	7,002	15,294	9,374
Impairment of investments	(906)	(1,457)	—
Income before income taxes	41,052	120,016	130,941
Provision for income taxes	10,935	33,656	36,706
Net income	<u>\$ 30,117</u>	<u>\$ 86,360</u>	<u>\$ 94,235</u>
Net income per share:			
Basic	<u>\$ 0.61</u>	<u>\$ 1.53</u>	<u>\$ 1.70</u>
Diluted	<u>\$ 0.59</u>	<u>\$ 1.51</u>	<u>\$ 1.68</u>
Weighted average common shares outstanding:			
Basic	49,717	56,349	55,395
Diluted	<u>50,754</u>	<u>57,173</u>	<u>55,961</u>

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

**MKS INSTRUMENTS, INC.**  
**CONSOLIDATED STATEMENTS OF STOCKHOLDERS' EQUITY**

For The Year Ended December 31, 2008, 2007 and 2006

	Common Stock		Additional Paid-In Capital	Retained Earnings  (In thousands, except share data)	Accumulated Other Comprehensive Income (loss)		Comprehensive Income (loss)	Total Stockholders' Equity
	Shares	Amount						
<b>Balance at December 31, 2005</b>	54,397,267	\$ 113	\$ 639,152	\$ 116,642	\$ 6,936		\$ 762,843	
Net issuance under stock-based plans			23,255				23,255	
Stock-based compensation	2,274,358		13,143				13,143	
Tax benefit from stock-based plans			4,614				4,614	
Comprehensive income (net of tax):								
Net income				94,235			94,235	
Other comprehensive income:								
Changes in value of financial instruments designated as cash flow hedges and unrealized (loss) on investments					(43)	(43)	(43)	
Foreign currency translation adjustment					3,172	3,172	3,172	
Comprehensive income						\$ 97,364		
<b>Balance at December 31, 2006</b>	56,671,625	\$ 113	\$ 680,164	\$ 210,877	\$ 10,065		\$ 901,219	
Net issuance under stock-based plans			45,266				45,266	
Stock-based compensation	2,368,954		12,918				12,918	
Tax benefit from stock-based plans			5,712				5,712	
Stock purchases	(4,778,632)		(59,165)	(41,993)			(101,158)	
Other			570				570	
Comprehensive income (net of tax):								
Net income				86,360			86,360	
Other comprehensive income:								
Changes in value of financial instruments designated as cash flow hedges and unrealized (loss) on investments					(622)	(622)	(622)	
Foreign currency translation adjustment					3,744	3,744	3,744	
Comprehensive income						\$ 89,482		
<b>Balance at December 31, 2007</b>	54,261,947	\$ 113	\$ 685,465	\$ 255,244	\$ 13,187		\$ 954,009	
Net issuance under stock-based plans			8,861				8,861	
Stock-based compensation	681,493		15,176				15,176	
Tax benefit from stock-based plans			226				226	
Stock purchases	(5,667,465)		(71,790)	(43,933)			(115,723)	
Comprehensive income (net of tax):								
Net income				30,117			30,117	
Other comprehensive income:								
Changes in value of financial instruments designated as cash flow hedges and unrealized gain on investments					203	203	203	
Foreign currency translation adjustment					(6,171)	(6,171)	(6,171)	
Comprehensive income						\$ 24,149		
<b>Balance at December 31, 2008</b>	49,275,975	\$ 113	\$ 637,938	\$ 241,428	\$ 7,219		\$ 886,698	

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

**MKS INSTRUMENTS, INC.**  
**CONSOLIDATED STATEMENTS OF CASH FLOWS**

	Year Ended December 31,		
	2008	2007 (In thousands)	2006
<b>Cash flows from operating activities:</b>			
Net income	\$ 30,117	\$ 86,360	\$ 94,235
Adjustments to reconcile net income to net cash provided by operating activities:			
Depreciation and amortization	23,524	30,644	31,348
Stock-based compensation	15,274	12,918	13,143
Tax benefit from stock-based compensation	226	5,712	4,614
Excess tax benefit from stock-based compensation	(3,250)	(2,688)	(4,469)
Deferred taxes	(4,975)	(10,283)	(11,518)
Impairment of investments	906	1,457	—
Impairment of intangible assets	6,069	—	—
Other	394	888	562
Changes in operating assets and liabilities, net of effects of businesses acquired:			
Trade accounts receivable	23,565	18,263	(33,555)
Inventories	18,489	1,206	(46,013)
Other current assets	(3,730)	708	2,213
Accrued expenses	(4,384)	(6,615)	15,437
Accounts payable	(9,175)	(18,855)	5,731
Income taxes payable	(3,273)	(596)	6,483
<b>Net cash provided by operating activities</b>	<b>89,777</b>	<b>119,119</b>	<b>78,211</b>
<b>Cash flows from investing activities:</b>			
Acquisitions of businesses, net of cash acquired	—	(24,021)	(98,671)
Purchases of short-term and long-term available-for-sale investments	(324,375)	(183,927)	(108,944)
Maturities and sales of short-term and long-term available-for-sale investments	263,715	160,269	104,302
Purchases of property, plant and equipment	(13,457)	(15,090)	(10,690)
Proceeds from sale of assets	336	370	578
Other	(273)	1,451	(827)
<b>Net cash (used in) investing activities</b>	<b>(74,054)</b>	<b>(60,948)</b>	<b>(114,252)</b>
<b>Cash flows from financing activities:</b>			
Proceeds from short-term borrowings	155,922	137,656	89,547
Payments on short-term borrowings	(160,771)	(141,749)	(84,381)
Repurchases of common stock	(115,723)	(101,158)	—
Payments on long-term debt	(5,000)	—	(1,667)
Principal payments on capital lease obligations	(1,330)	(1,426)	(754)
Proceeds from exercise of stock options and employee stock purchase plan	8,861	45,266	23,255
Excess tax benefit from stock-based compensation	3,250	2,688	4,469
<b>Net cash provided by (used in) financing activities</b>	<b>(114,791)</b>	<b>(58,723)</b>	<b>30,469</b>
Effect of exchange rate changes on cash and cash equivalents	(5,639)	9,312	207
Increase (decrease) in cash and cash equivalents	(104,707)	8,760	(5,365)
Cash and cash equivalents at beginning of year	223,968	215,208	220,573
Cash and cash equivalents at end of year	<b>\$ 119,261</b>	<b>\$ 223,968</b>	<b>\$ 215,208</b>
<b>Supplemental disclosure of cash flow information:</b>			
Cash paid during the period for:			
Interest	\$ 649	\$ 830	\$ 880
Income taxes	\$ 11,625	\$ 27,116	\$ 35,922
<b>Non-cash financing activities:</b>			
Equipment capital leases	\$ 489	\$ 1,244	\$ 1,638

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

MKS INSTRUMENTS, INC.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS  
(Tables in thousands, except share and per share data)

**1) Description of Business**

MKS Instruments, Inc. was founded in 1961 and is a leading worldwide provider of instruments, subsystems and process control solutions that measure, control, power, monitor and analyze critical parameters to improve process performance and productivity of advanced manufacturing processes. MKS is managed as one operating segment which is organized around three product groups: Instruments and Control Systems, Power and Reactive Gas Products and Vacuum Products. MKS' products are derived from its core competencies in pressure measurement and control, materials delivery, gas composition analysis, electrostatic charge management, control and information technology, power and reactive gas generation and vacuum technology.

**2) Summary of Significant Accounting Policies**

**Basis of Presentation**

The consolidated financial statements include the accounts of MKS Instruments, Inc. and its wholly owned subsidiaries (collectively, the "Company"). All significant intercompany accounts and transactions have been eliminated in consolidation.

**Use of Estimates**

The consolidated financial statements have been prepared in accordance with accounting principles generally accepted in the United States of America. The preparation of these financial statements requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities and the disclosure of contingent liabilities at the date of the financial statements and the reported amounts of revenues and expenses during the reporting period. On an on-going basis, management evaluates its estimates and judgments, including those related to revenue recognition, stock-based compensation, inventory, intangible assets, goodwill, and other long-lived assets, in-process research and development, income taxes and investments. Management bases its estimates and judgments on historical experience and on various other factors that are believed to be reasonable under the circumstances, the results of which form the basis for making judgments about the carrying values of assets and liabilities that are not readily apparent from other sources. Actual results may differ from these estimates under different assumptions or conditions.

**Reclassifications**

The Company recorded \$3.3 million in legal costs associated with defending and maintaining its intellectual property in research and development expenses for the year ended December 31, 2008. These costs were previously recorded in selling, general and administrative expenses in the amount of \$2.5 million and \$2.5 million during the years 2007 and 2006, respectively. The 2007 and 2006 patent legal costs have subsequently been classified as research and development expenses.

**Revenue Recognition and Accounts Receivable Allowances**

Revenue from product sales is recorded upon transfer of title and risk of loss to the customer provided that there is evidence of an arrangement, the sales price is fixed or determinable, and collection of the related receivable is reasonably assured. In most transactions, the Company has no obligations to customers after the date products are shipped other than pursuant to warranty obligations. In some instances, the Company provides installation, training, support and services to customers after the product has been shipped. For revenue arrangements with multiple deliverables, the Company defers the fair value related to any undelivered elements until the undelivered element is delivered. Fair value is the price charged when the element is sold separately. The Company provides for the estimated costs to fulfill customer warranty obligations upon the recognition of the related revenue. Shipping and handling fees, if any, billed to customers are recognized as revenue. The related shipping and handling costs are

MKS INSTRUMENTS, INC.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS — (CONTINUED)  
(Tables in thousands, except share and per share data)

recognized in cost of sales. Accounts receivable allowances include sales returns and bad debt allowances. The Company monitors and tracks the amount of product returns and reduces revenue at the time of shipment for the estimated amount of such future returns, based on historical experience. The Company makes estimates evaluating its allowance for doubtful accounts. The Company continuously monitors collections and payments from its customers and maintains a provision for estimated credit losses based upon its historical experience and any specific customer collection issues that it has identified.

**Research and Development**

Research and development costs are expensed as incurred and consist mainly of compensation related expenses and project materials. The Company's research and development efforts include numerous projects, which generally have duration of 12 to 30 months.

**In-Process Research and Development**

The Company values tangible and intangible assets acquired through its business acquisitions at fair value including in-process research and development ("IPR&D"). The Company determines IPR&D through established valuation techniques for various projects for the development of new products and technologies and expenses IPR&D when technical feasibility is not reached.

**Advertising Costs**

Advertising costs are expensed as incurred and were immaterial in 2008, 2007 and 2006.

**Stock-Based Compensation**

The Company accounts for share-based compensation expense in accordance with SFAS 123R, which requires the measurement and recognition of compensation expense for all share-based payment awards made to employees and directors based on estimated fair values. The Company has estimated the fair value of share-based options on the date of grant using the Black Scholes pricing model, which is affected by the Company's stock price as well as assumptions regarding a number of complex and subjective variables. These variables include the Company's expected stock price volatility over the term of the awards, actual and projected employee option exercise behaviors, risk free interest rate and expected dividends. The Company is also required to estimate forfeitures at the time of grant and revise those estimates in subsequent periods if actual forfeitures differ from those estimates.

Management determined that blended volatility, a combination of historical and implied volatility, is more reflective of market conditions and a better indicator of expected volatility than historical or implied volatility. The assumptions used in calculating the fair value of share-based payment awards represent management's best estimates, but these estimates involve inherent uncertainties and the application of management judgment. As a result, if factors change and the Company uses different assumptions, its stock-based compensation expense could be materially different in the future.

**Net Income Per Share**

Basic earnings per share is based on the weighted average number of common shares outstanding, and diluted earnings per share 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 when the effect of their inclusion would be dilutive.

## MKS INSTRUMENTS, INC.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS — (CONTINUED)  
(Tables in thousands, except share and per share data)**Cash and Cash Equivalents and Investments**

All highly liquid investments with a maturity date of three months or less at the date of purchase are considered to be cash equivalents. The appropriate classification of investments in securities is determined at the time of purchase. Debt securities that the Company does not have the intent and ability to hold to maturity are classified as “available-for-sale” and are carried at fair value. Unrealized gains and losses on securities classified as available-for-sale are included in accumulated other comprehensive income in consolidated stockholders’ equity.

The Company reviews its investment portfolio on a monthly basis to identify and evaluate individual investments that have indications of possible impairment. The factors considered in determining whether a loss is other-than-temporary include: the length of time and extent to which fair market value has been below the cost basis, the financial condition and near-term prospects of the issuer, credit quality, and the Company’s ability to hold the investment for a period of time sufficient to allow for any anticipated recovery in fair value.

**Inventories**

The Company values its inventory at the lower of cost (first-in, first-out method) or market. The Company regularly reviews inventory quantities on hand and records a provision to write down excess and obsolete inventory to its estimated net realizable value, if less than cost, based primarily on its estimated forecast of product demand.

**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 twenty to thirty-one and one-half years for buildings and three to seven years for machinery and equipment and furniture and fixtures and office equipment, which includes ERP software. Leasehold improvements are amortized over the shorter of the lease term or the estimated useful life of the leased asset.

**Intangible Assets**

Intangible assets resulting from the acquisitions of entities accounted for using the purchase method of accounting are estimated by management based on the fair value of assets acquired. These include acquired customer lists, technology, patents, trade name and covenants not to compete. Intangible assets are amortized from two to eight years on a straight-line basis which represents the estimated periods of benefit.

**Goodwill**

Goodwill is the amount by which the cost of acquired net assets exceeded the fair value of those net assets on the date of acquisition. The Company allocates goodwill to reporting units at the time of acquisition and base that allocation on which reporting units will benefit from the acquired assets and liabilities. Reporting units are defined as operating segments or one level below an operating segment, referred to as a component. The Company has determined that its reporting units are components of its one operating segment. The Company assesses goodwill for impairment on an annual basis as required under FAS 142 on October 31 or more frequently when events and circumstances occur indicating that the recorded goodwill may be impaired. If the book value of a reporting unit exceeds its fair value, the implied fair value of goodwill is compared with the carrying amount of goodwill. If the carrying amount of goodwill exceeds the implied fair value, an impairment loss is recorded equal to that excess.

## MKS INSTRUMENTS, INC.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS — (CONTINUED)  
(Tables in thousands, except share and per share data)**Impairment of Long-Lived Assets**

The Company evaluates the recoverability of its long-lived assets, in accordance with Statement of Financial Accounting Standards No. 144, "Accounting for the Impairment or Disposal of Long-Lived Assets" ("SFAS 144") whenever events and changes in circumstances indicate that the carrying amount of an asset may not be fully recoverable. This periodic review may result in an adjustment of estimated depreciable lives or asset impairment. When indicators of impairment are present, the carrying values of the asset are evaluated in relation to their operating performance and future undiscounted cash flows of the underlying business. If the future undiscounted cash flows are less than their book value, impairment exists. The impairment is measured as the difference between the book value and the fair value of the underlying asset. Fair values are based on estimates of market prices and assumptions concerning the amount and timing of estimated future cash flows and assumed discount rates, reflecting varying degrees of perceived risk.

**Foreign Exchange**

The functional currency of the majority 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 during the year. The resulting translation adjustments are included in accumulated other comprehensive income in consolidated stockholders' equity. Foreign exchange transaction gains and losses, which arise from transaction activity, are reflected in the statement of operations.

**Income Taxes**

The Company records income taxes using the asset and liability method. Deferred income tax assets and liabilities are recognized for the future tax consequences attributable to differences between the financial statement carrying amounts of existing assets and liabilities and their respective income tax bases, and operating loss and tax credit carryforwards. On a quarterly basis, the Company evaluates both the positive and negative evidence that bears on the realizability of net deferred tax assets and assesses the need for valuation allowance. The future benefit to be derived from its deferred tax assets is dependent upon its ability to generate sufficient future taxable income to realize the assets. The Company records a valuation allowance to reduce its net deferred tax assets to the amount that is more likely than not to be realized. To the extent the Company establishes a valuation allowance, an expense will be recorded within the provision for income taxes line on the statement of operations. The valuation allowance at December 31, 2006 was \$317,000, relating to the remaining state tax credits acquired with the purchase of Ion. During 2007, the Company increased the valuation allowance for the state tax loss carryforwards and state tax credits acquired in the purchase of Yield Dynamics ("YDI"). Thus, the valuation allowance was \$534,000 at December 31, 2007. During 2008, the Company increased the valuation allowance by \$3,303,000 for state tax credit carryforwards and \$816,000 for federal capital loss carryforwards, as the Company has determined it is more likely than not that both of these tax attributes will not be realized. As a result, the valuation allowance is \$4,653,000 at December 31, 2008.

The Company adopted the provisions of FASB Interpretation No. 48, "Accounting for Uncertainty in Income Taxes" ("FIN 48") as of January 1, 2007. FIN 48 contains a two-step approach to recognizing and measuring uncertain tax positions accounted for in accordance with SFAS No. 109, "Accounting for Income Taxes." The first step is to evaluate the tax position for recognition by determining if the weight of available evidence indicates that it is more likely than not that the position will be sustained upon audit, including resolutions of related appeals or litigation processes, if any. The second step is to measure the tax benefit as the largest amount that is more than 50% likely of being realized upon ultimate settlement. The Company reevaluates these uncertain tax positions on a quarterly basis. This evaluation is based on factors including, but not limited to, changes in facts or circumstances, changes in tax law, effectively settled issues under audit and new audit activity. Any change in these factors could result in the recognition of a tax benefit or an additional charge to the tax provision.

## MKS INSTRUMENTS, INC.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS — (CONTINUED)  
(Tables in thousands, except share and per share data)**New Accounting Pronouncements**

In December 2007, the Financial Accounting Standards Board (“FASB”) issued SFAS No. 141(R), “Business Combinations” (“SFAS 141R”), which replaces SFAS No. 141. This revised standard requires assets, liabilities and non-controlling interests acquired to be measured at fair value and requires that costs incurred to effect the acquisition be recognized separately from the business combination. In addition, this statement expands the scope to include all transactions and other events in which one entity obtains control over one or more businesses. This statement is effective for all business combinations for which the acquisition date is on or after the beginning of the first annual reporting period beginning on or after December 15, 2008. The Company is in the process of evaluating whether the adoption of this standard will have a material effect on its consolidated financial statements.

In December 2007, the FASB issued SFAS No. 160, “Noncontrolling Interests in Consolidated Financial Statements, an Amendment of ARB No. 51”. This statement establishes accounting and reporting standards for the non-controlling interest in a subsidiary and for the deconsolidation of a subsidiary. This statement is effective for fiscal years beginning on or after December 15, 2008. This statement does not have a material impact on the Company’s consolidated financial statements, as it does not have any minority interests.

In March 2008, the FASB issued SFAS No. 161, “Disclosures about Derivative Instruments and Hedging Activities, an amendment of FASB Statement No. 133” (“SFAS 161”). This statement is intended to improve transparency in financial reporting by requiring enhanced disclosures of an entity’s derivative instruments and hedging activities and their effects on the entity’s financial position, financial performance, and cash flows. SFAS 161 applies to all derivative instruments within the scope of SFAS 133, “Accounting for Derivative Instruments and Hedging Activities” (“SFAS 133”). Entities with instruments subject to SFAS 161 must provide more robust qualitative disclosures and expanded quantitative disclosures. SFAS 161 is effective prospectively for financial statements issued for fiscal years and interim periods beginning after November 15, 2008, with early application permitted. The Company is currently evaluating the disclosure implications of this statement.

In April 2008, the FASB issued FASB Staff Position (“FSP”) No. 142-3, “Determination of the Useful Life of Intangible Assets” (“FSP 142-3”). FSP 142-3 amends the factors an entity should consider in developing renewal or extension assumptions used in determining the useful life of recognized intangible assets under FASB Statement No. 142, “Goodwill and Other Intangible Assets.” This new guidance applies prospectively to intangible assets that are acquired individually or with a group of other assets in business combinations and asset acquisitions. FSP 142-3 is effective for financial statements issued for fiscal years and interim periods beginning after December 15, 2008. Early adoption is prohibited. The Company is evaluating the potential impact of the implementation of FSP 142-3 on its financial position and results of operations.

**3) Cash and Cash Equivalents and Investments**

The Company reviews its investment portfolio on a monthly basis to identify and evaluate individual investments that have indications of possible impairment. The factors considered in determining whether a loss is other-than-temporary include: the length of time and extent to which fair market value has been below the cost basis, the financial condition and near-term prospects of the issuer, credit quality, and the Company’s ability to hold the investment for a period of time sufficient to allow for any anticipated recovery in fair value. During this review, as of December 31, 2007, the Company determined that declines in the fair value of two of its investments in certain commercial paper were other-than-temporary. This commercial paper was issued by two structured investment vehicles (SIVs) that entered into receivership during the fourth quarter of 2007 and failed to make payment at maturity. Due to the mortgage-related assets held by these issuers, they were exposed to adverse market conditions that affected the value of their collateral and their ability to access short-term funding. These investments were not trading on active markets, and therefore, had no readily determinable market value. As a result of the Company’s evaluation as of December 31, 2007, it recorded a \$1,457,000 impairment charge to earnings based upon the Company receiving contemporaneous quotes from established third-party pricing services. This resulted in a new cost basis for the securities of \$4,275,000 at December 31, 2007.

MKS INSTRUMENTS, INC.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS — (CONTINUED)  
(Tables in thousands, except share and per share data)

For the year ended December 31, 2008, the Company recorded additional net impairment charges of \$906,000 related to these two investments. The Company liquidated its position in these two impaired investments during the third quarter of 2008, one by sale and the other by a structured payment. The Company received a combined total of \$3,369,000 from the settlement of these investments during 2008.

The fair value of short-term available-for-sale investments with maturities or estimated lives of less than one year consists of the following:

	December 31,	
	2008	2007
Federal Government and Government Agency Obligations	\$ 137,981	\$ 46,813
Commercial Paper and Corporate Obligations	21,627	52,984
	<u>\$ 159,608</u>	<u>\$ 99,797</u>

The following table shows the gross unrealized gains and losses aggregated by investment category:

	Cost	Gross Unrealized Gains	Gross Unrealized Losses	Estimated Fair Value
<b>As of December 31, 2008:</b>				
Federal Government and Government Agency Obligations	\$ 126,106	\$ 373	\$ 2	\$ 126,477
Commercial Paper and Corporate Obligations	2,993	87	783	2,297
Total	<u>\$ 129,099</u>	<u>\$ 460</u>	<u>\$ 785</u>	<u>\$ 128,774</u>
<b>As of December 31, 2007:</b>				
Federal Government and Government Agency Obligations	\$ 13,554	\$ 15	\$ —	\$ 13,569
Commercial Paper and Corporate Obligations	13,853	39	64	13,828
Total	<u>\$ 27,407</u>	<u>\$ 54</u>	<u>\$ 64</u>	<u>\$ 27,397</u>

Interest income is accrued as earned. Dividend income is recognized as income on the date the stock trades “ex-dividend.” The cost of marketable securities sold is determined by the specific identification method and realized gains or losses are reflected in income and were not material in 2008, 2007 and 2006.

**4) Fair Value Measurements**

In February 2007, the FASB issued SFAS No. 159, “The Fair Value Option for Financial Assets and Financial Liabilities — Including an amendment of FASB Statement No. 115,” (“SFAS 159”) which is effective for fiscal years beginning after November 15, 2007. This statement permits entities to choose to measure many financial instruments and certain other items at fair value. This statement also establishes presentation and disclosure requirements designed to facilitate comparisons between entities that choose different measurement attributes for similar types of assets and liabilities. Unrealized gains and losses on items for which the fair value option is elected would be reported in earnings. On January 1, 2008, the Company adopted SFAS 159 and has elected not to measure any additional financial instruments and other items at fair value.

In September 2006, the FASB issued SFAS No. 157, “Fair Value Measurements,” (“SFAS 157”), which is effective for fiscal years beginning after November 15, 2007. This statement defines fair value, establishes a framework for measuring fair value and expands the related disclosure requirements. This statement applies under other accounting pronouncements that require or permit fair value measurements. The statement indicates, among other things, that a fair value measurement assumes that the transaction to sell an asset or transfer a liability occurs

MKS INSTRUMENTS, INC.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS — (CONTINUED)  
(Tables in thousands, except share and per share data)

in the principal market for the asset or liability or, in the absence of a principal market, the most advantageous market for the asset or liability. SFAS 157 defines fair value based upon an exit price model.

Relative to SFAS 157, the FASB issued FASB Staff Positions (“FSP”) 157-1 and 157-2. FSP 157-1 amends SFAS 157 to exclude SFAS No. 13, “Accounting for Leases,” (“SFAS 13”) and its related interpretive accounting pronouncements that address leasing transactions, while FSP 157-2 delays the effective date of the application of SFAS 157 to fiscal years beginning after November 15, 2008 for all nonfinancial assets and nonfinancial liabilities that are recognized or disclosed at fair value in the financial statements on a nonrecurring basis.

The Company adopted SFAS 157 as of January 1, 2008, with the exception of the application of the statement to non-recurring nonfinancial assets and nonfinancial liabilities. The adoption of SFAS 157 did not have a material impact on the consolidated financial statements. Non-recurring nonfinancial assets and nonfinancial liabilities for which the Company has not applied the provisions of SFAS 157 include those measured at fair value in goodwill impairment testing, indefinite lived intangible assets measured at fair value for impairment testing, asset retirement obligations initially measured at fair value, and those initially measured at fair value in a business combination.

SFAS 157 also establishes a fair value hierarchy which requires an entity to maximize the use of observable inputs and minimize the use of unobservable inputs when measuring fair value. The standard describes three levels of inputs that may be used to measure fair value:

- Level 1 Quoted prices in active markets for identical assets or liabilities as of the reporting date. Active markets are those in which transactions for the asset and liability occur in sufficient frequency and volume to provide pricing information on an ongoing basis. Level 1 assets and liabilities include debt and equity securities and derivative contracts that are traded in an active exchange market.
- Level 2 Observable inputs other than Level 1 prices, such as quoted prices for similar assets or liabilities; quoted prices in markets that are not active; or other inputs that are observable or can be corroborated by observable market data for substantially the full term of the assets or liabilities. Level 2 assets and liabilities include debt securities with quoted prices that are traded less frequently than exchange-traded instruments and derivative contracts whose value is determined using a pricing model with inputs that are observable in the market or can be derived principally from or corroborated by observable market data. This category generally includes certain U.S. Government and agency mortgage-backed debt securities, corporate debt securities, and non-exchange traded derivative contracts.
- Level 3 Unobservable inputs that are supported by little or no market activity and that are significant to the fair value of the assets or liabilities. Level 3 assets and liabilities include financial instruments whose value is determined using pricing models, discounted cash flow methodologies, or similar techniques, as well as instruments for which the determination of fair value requires significant management judgment or estimation.

Assets and liabilities of the Company measured at fair value on a recurring basis as of December 31, 2008, are summarized as follows:

Description	12/31/08	Fair Value Measurements at Reporting Date Using		
		Quoted Prices in Active Markets for Identical Assets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)
<b>Assets</b>				
Cash equivalents	\$ 13,550	\$ 13,550	\$ —	\$ —
Available-for-sale securities	159,608	159,608	—	—
Derivatives — currency forward contracts	508	—	508	—
<b>Total assets</b>	<b>\$ 173,666</b>	<b>\$ 173,158</b>	<b>\$ 508</b>	<b>\$ —</b>

MKS INSTRUMENTS, INC.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS — (CONTINUED)  
(Tables in thousands, except share and per share data)

**Cash Equivalents**

Cash equivalents of \$13,550,000, consisting of Federal Government and Government Agency Obligations, Commercial Paper, and Other Corporate Obligations, are classified within Level 1 of the fair value hierarchy because they are valued using quoted market prices in active markets.

**Available-For-Sale Securities**

Available-for-sale securities of \$159,608,000, consisting of Federal Government and Government Agency Obligations, Commercial Paper, and Other Corporate Obligations, are classified within Level 1 of the fair value hierarchy because they are valued using quoted market prices in active markets.

**Derivatives**

As a result of the Company's global operating activities, the Company is exposed to market risks from changes in foreign currency exchange rates, which may adversely affect its operating results and financial position. When deemed appropriate, the Company minimizes its risks from foreign currency exchange rate fluctuations through the use of derivative financial instruments. The forward foreign currency exchange contracts are valued using broker quotations, or market transactions in either the listed or over-the-counter markets. As such, these derivative instruments are classified within Level 2.

The table below presents a reconciliation for all assets and liabilities measured at fair value on a recurring basis using significant unobservable inputs within Level 3 for the period from January 1, 2008 to December 31, 2008. There were no Level 3 investments at December 31, 2008.

	Fair Value Measurements Using Significant Unobservable Inputs (Level 3) Available-for-sale Securities	
Beginning balance at January 1, 2008	\$	4,275
Total losses (realized)		
Included in earnings (or changes in net assets)		(1,412)
Included in other comprehensive income		—
Settlements		(490)
Transfers out of Level 3 during the second quarter of 2008		(2,373)
Ending balance at December 31, 2008	\$	—
The amount of total gains or losses for the period included in earnings (or changes in net assets) attributable to the change in unrealized gains or losses relating to assets still held at the reporting date	\$	—

**5) Inventories**

Inventories consist of the following:

	December 31,	
	2008	2007
Raw material	\$ 58,542	\$ 73,529
Work in process	22,072	26,171
Finished goods	50,905	51,031
	\$ 131,519	\$ 150,731

MKS INSTRUMENTS, INC.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS — (CONTINUED)  
(Tables in thousands, except share and per share data)

6) **Property, Plant and Equipment**

Property, plant and equipment consist of the following:

	December 31,	
	2008	2007
Land	\$ 12,308	\$ 11,566
Buildings	65,926	64,991
Machinery and equipment	90,215	86,747
Furniture and fixtures and office equipment	51,574	47,165
Leasehold improvements	16,016	13,750
Construction in progress	5,455	3,239
	<u>241,494</u>	<u>227,458</u>
Less: accumulated depreciation and amortization	159,477	146,093
	<u>\$ 82,017</u>	<u>\$ 81,365</u>

Depreciation and amortization of property, plant and equipment totaled \$14,523,000, \$14,476,000 and \$13,972,000 for the years ended December 31, 2008, 2007 and 2006, respectively.

7) **Goodwill and Intangible Assets**

The Company elected to perform its annual goodwill impairment testing as required under SFAS 142 on October 31 of each fiscal year, or more often if events or circumstances indicate that there may be impairment. Reporting units are defined as operating segments or one level below an operating segment, referred to as a component. The Company has determined that its reporting units are components of its one operating segment. The Company allocates goodwill to reporting units at the time of acquisition and base that allocation on which reporting units will benefit from the acquired assets and liabilities. The estimated fair values of its reporting units were based on discounted cash flow models derived from internal earnings and external market forecasts and are compared to its recorded book value. An excess of book value over fair value indicates that an impairment of goodwill exists. The Company completed its annual impairment test for 2008 and 2007 and concluded that no impairment of goodwill existed.

The changes in the carrying amount of goodwill during the years ended December 31, 2008 and 2007 were as follows:

	December 31,	
	2008	2007
Balance, beginning of year	\$ 337,473	\$ 323,973
Goodwill acquired during the year	—	15,407
Adjustments to previously recorded goodwill	292	(1,907)
Balance, end of year	<u>\$ 337,765</u>	<u>\$ 337,473</u>

The adjustments to previously recorded goodwill for 2008 relate mainly to various tax adjustments for previous acquisitions.

MKS INSTRUMENTS, INC.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS — (CONTINUED)  
 (Tables in thousands, except share and per share data)

Components of the Company's acquired intangible assets are comprised of the following:

	Year Ended December 31, 2008			
	Gross	Impairment Charges	Accumulated Amortization	Net
Completed technology	\$ 93,204	\$ (4,349)	\$ (80,685)	\$ 8,170
Customer relationships	23,542	(1,663)	(12,152)	9,727
Patents, trademarks, trade names and other	29,729	(57)	(26,500)	3,172
	<u>\$ 146,475</u>	<u>\$ (6,069)</u>	<u>\$ (119,337)</u>	<u>\$ 21,069</u>

The Company determined that the adverse economic and business climate experienced during the end of the fiscal year ended December 31, 2008 was a significant event that indicated that the carrying amount of certain long-lived asset groups might not be recoverable. A review of future cash flows identified asset groups within YDI which had carrying values in excess of future cash flows. The Company reviewed the fair value of the long-lived assets for these asset groups and determined that intangible assets related to customer technologies, relationships, and patents and trademarks had carrying values that exceeded their estimated fair values. As a result, an impairment charge of \$6,069,000 was recorded. The fair value was based on the income approach, whereby the Company used the projected undiscounted cash flow method to determine whether impairment exists, and then measured the impairment using discounted cash flows.

	Year Ended December 31, 2007			
	Gross	Impairment Charges	Accumulated Amortization	Net
Completed technology	\$ 93,204	\$ —	\$ (75,681)	\$ 17,523
Customer relationships	23,542	—	(9,644)	13,898
Patents, trademarks, trade names and other	29,729	—	(25,009)	4,720
	<u>\$ 146,475</u>	<u>\$ —</u>	<u>\$ (110,334)</u>	<u>\$ 36,141</u>

Aggregate amortization expense related to acquired intangibles for the years ended December 31, 2008, 2007 and 2006 were \$9,001,000, \$16,183,000 and \$17,376,000, respectively. Estimated amortization expense related to acquired intangibles for each of the five succeeding years is as follows:

Year	Amount
2009	\$ 6,915
2010	5,099
2011	4,541
2012	2,337
2013	2,177

MKS INSTRUMENTS, INC.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS — (CONTINUED)  
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8) Other Balance Sheet Information

	December 31,	
	2008	2007
Other Assets:		
Deferred tax assets, net	\$ 12,743	\$ 8,760
Other	2,617	2,541
Total other assets	<u>\$ 15,360</u>	<u>\$ 11,301</u>
Other Accrued Expenses:		
Product warranties	\$ 8,334	\$ 9,497
Deferred revenue	4,631	5,084
Other	11,204	10,787
Total other accrued expenses	<u>\$ 24,169</u>	<u>\$ 25,368</u>
Other Liabilities:		
Income tax payable	\$ 11,756	\$ 12,782
Accrued compensation	9,567	7,621
Other	587	232
Total other liabilities	<u>\$ 21,910</u>	<u>\$ 20,635</u>

9) Product Warranties

The Company provides for the estimated costs to fulfill customer warranty obligations upon the recognition of the related revenue. While the Company engages in extensive product quality programs and processes, including actively monitoring and evaluating the quality of its component suppliers, the Company's warranty obligation is affected by product failure rates, utilization levels, material usage, and supplier warranties on parts delivered to the Company. Should actual product failure rates, utilization levels, material usage, or supplier warranties on parts differ from the Company's estimates, revisions to the estimated warranty liability would be required.

Product warranty activity for the years ended December 31, were as follows:

	December 31,	
	2008	2007
Balance at beginning of year	\$ 9,497	\$ 11,549
Provisions for product warranties	5,345	5,992
Direct charges to the warranty liability	(6,508)	(8,044)
Balance at end of year	<u>\$ 8,334</u>	<u>\$ 9,497</u>

10) Debt

Credit Agreements and Short-Term Borrowings

On July 31, 2008, the Company renewed an unsecured short-term LIBOR based loan agreement with a bank to be utilized primarily by its Japanese subsidiary for short-term liquidity purposes. The credit line, which expires on July 31, 2009, provides for the Company to borrow in multiple currencies of up to an equivalent of \$35,000,000 U.S. dollars. At December 31, 2008, the Company had outstanding borrowings of \$1,101,000 U.S. dollars, payable on demand, at an interest rate of 1.65%.

Additionally, the Company's Japanese subsidiary has lines of credit and short-term borrowing arrangements with two financial institutions which provide for aggregate borrowings as of December 31, 2008 of up to

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NOTES TO CONSOLIDATED FINANCIAL STATEMENTS — (CONTINUED)  
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an equivalent of \$27,536,000 U.S. dollars, which generally expire and are renewed at three month intervals. At December 31, 2008 and 2007, total borrowings outstanding under these arrangements were \$16,707,000 and \$10,015,000, respectively, at interest rates ranging from 1.20% to 1.68% at December 31, 2008 and at an interest rate ranging from 1.24% to 1.88% at December 31, 2007.

**Long-Term Debt**

Long-term debt consists of the following:

	December 31,	
	2008	2007
Mortgage notes	\$ —	\$ 5,000
Less: current portion	—	—
Long-term debt less current portion	<u>\$ —</u>	<u>\$ 5,000</u>

The Company had a long-term debt agreement with the County of Monroe Industrial Development Agency (COMIDA) for a manufacturing facility located in Rochester, New York. The terms were the same as that of the underlying Industrial Development Revenue Bond which called for payments of interest only through July 1, 2014, at which time the Bond was repayable in a lump sum of \$5,000,000. Interest was reset annually based on bond remarketing, with an option by the Company to elect a fixed rate, subject to a maximum rate of 13.00% per annum. On July 1, 2008, the Company repaid the entire debt agreement.

**11) Financial Instruments and Risk Management**

**Foreign Exchange Risk Management**

The Company hedges a portion of its forecasted foreign currency denominated intercompany sales of inventory, over a maximum period of fifteen months, using forward exchange contracts primarily related to Japanese, Korean and European currencies. These derivatives are designated as cash-flow hedges, and changes in their fair value are carried in accumulated other comprehensive income until the hedged transaction affects earnings. When the hedged transaction affects earnings, the appropriate gain or loss from the derivative designated as a hedge of the transaction is reclassified from accumulated other comprehensive income to cost of sales. As of December 31, 2008, the amount that will be reclassified from accumulated other comprehensive income to cost of sales over the next twelve months is \$732,000. The ineffective portion of the derivatives is recorded in cost of sales and was immaterial in 2008, 2007 and 2006.

The Company hedges certain intercompany and other payables with forward foreign exchange contracts. Since these derivatives hedge existing amounts that are denominated in foreign currencies, the derivatives do not qualify for hedge accounting under SFAS No. 133. The foreign exchange gain or loss on these derivatives was a gain of \$2,669,000 in 2008 and was immaterial in 2007 and 2006.

Realized and unrealized gains and losses on forward exchange contracts that do not qualify for hedge accounting are recognized immediately in earnings. The cash flows resulting from forward exchange contracts that qualify for hedge accounting are classified in the consolidated statement of cash flows as part of cash flows from operating activities. Cash flows resulting from forward exchange contracts that do not qualify for hedge accounting are classified in the consolidated statement of cash flows as investing activities. The Company does not hold or issue derivative financial instruments for trading purposes.

There were forward exchange contracts with notional amounts totaling \$30,556,000 outstanding at December 31, 2008 of which \$17,348,000 were outstanding to exchange Japanese yen for U.S. dollars. There were forward exchange contracts with notional amounts totaling \$66,660,000 outstanding at December 31, 2007 of which

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NOTES TO CONSOLIDATED FINANCIAL STATEMENTS — (CONTINUED)  
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\$39,925,000 were outstanding to exchange Japanese Yen for U.S. dollars. There were forward exchange contracts with notional amounts totaling \$20,324,000 outstanding at December 31, 2006 of which \$14,619,000 were outstanding to exchange Japanese yen for U.S. dollars.

Gains and losses on forward exchange contracts that qualify for hedge accounting are classified in cost of goods sold and totaled a loss of \$1,176,000, and gains of \$1,312,000 and \$1,932,000 for the years ended December 31, 2008, 2007 and 2006 respectively.

The fair values of forward exchange contracts at December 31, 2008 and 2007, determined by applying period end currency exchange rates to the notional contract amounts, amounted to an unrealized gain of \$732,000 and \$43,000 for the years ended December 31, 2008 and 2007, respectively.

Foreign exchange transaction gains and losses, which arise from transaction activity unrelated to the Company's derivatives, are reflected in the statement of operations. These foreign exchange transaction gains and losses were immaterial in 2008, 2007 and 2006.

**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 marketable securities is based on quoted market prices. For all other balance sheet financial instruments, the carrying amount approximates fair value because of the short period to maturity of these instruments.

**Concentrations of Credit Risk**

The Company's significant concentrations of credit risk consist principally of cash and cash equivalents, investments, forward exchange contracts and trade accounts receivable. The Company maintains cash and cash equivalents with financial institutions including some banks with which it has borrowings. The Company maintains investments primarily in U.S. Treasury and government agency securities and corporate debt securities, with minimum rating of A1-P1 or AAA. The Company enters into forward currency contracts with high credit-quality financial institutions in order to minimize credit risk exposure. The Company's customers are primarily concentrated in the semiconductor industry, and a limited number of customers account for a significant portion of the Company's revenues. The Company regularly monitors the creditworthiness of its customers and believes it has adequately provided for potential credit loss exposures. Credit is extended for all customers based primarily on financial condition and collateral is not required.

**12) Income Taxes**

A reconciliation of the Company's 2008, 2007 and 2006 effective tax rate to the U.S. federal statutory rate follows:

	<u>2008</u>	<u>2007</u>	<u>2006</u>
U.S. Federal income tax statutory rate	35.0%	35.0%	35.0%
Federal and state tax credits	(5.5)	(4.3)	(1.7)
State income taxes, net of federal benefit	1.3	1.7	2.3
Effect of foreign operations taxed at various rates	(11.0)	(4.9)	(7.1)
Extraterritorial income and qualified production activity tax benefit	(3.9)	(0.7)	(0.9)
Deferred tax asset valuation allowance	8.4	—	(2.1)
Other	2.3	1.2	2.5
	<u>26.6%</u>	<u>28.0%</u>	<u>28.0%</u>

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NOTES TO CONSOLIDATED FINANCIAL STATEMENTS — (CONTINUED)  
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The components of income before income taxes and the related provision (benefit) for income taxes consist of the following:

	Year Ended December 31,		
	2008	2007	2006
Income before income taxes:			
United States	\$ (8,201)	\$ 64,228	\$ 72,276
Foreign	49,253	55,788	58,665
	<u>\$ 41,052</u>	<u>\$ 120,016</u>	<u>\$ 130,941</u>
Current taxes:			
United States Federal	\$ 7,098	\$ 29,663	\$ 36,056
State	1,367	1,682	3,252
Foreign	11,529	12,594	8,916
	<u>19,994</u>	<u>43,939</u>	<u>48,224</u>
Deferred taxes:			
United States Federal	(11,304)	(7,741)	(9,219)
State and Foreign	2,245	(2,542)	(2,299)
	<u>(9,059)</u>	<u>(10,283)</u>	<u>(11,518)</u>
Provision for income taxes	<u>\$ 10,935</u>	<u>\$ 33,656</u>	<u>\$ 36,706</u>

At December 31, 2008 and 2007, the significant components of the deferred tax assets and deferred tax liabilities were as follows:

	2008	2007
Deferred tax assets:		
Net operating losses and credits	\$ 7,087	\$ 7,604
Inventory and warranty reserves	16,842	14,632
Accounts receivable and other accruals	1,815	2,310
Depreciation and amortization	5,105	6,030
Stock-based compensation	8,976	8,424
Other	7,461	6,346
Total deferred tax assets	<u>\$ 47,286</u>	<u>\$ 45,346</u>
Deferred tax liabilities:		
Acquired intangible assets	(10,717)	(17,560)
Other	(115)	(508)
Total deferred tax liabilities	<u>(10,832)</u>	<u>(18,068)</u>
Valuation allowance	(4,653)	(534)
Net deferred tax assets	<u>\$ 31,801</u>	<u>\$ 26,744</u>

At December 31, 2008 and 2007, the Company had gross Massachusetts research credit carryforwards of \$6,353,000 and \$4,477,000, respectively. These credit carryforwards will expire at various dates through 2023. In addition, at December 31, 2008, the Company has a federal capital loss carryforward of \$2,332,000 that will expire in 2013.

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At December 31, 2008, as a result of the acquisition of Yield Dynamics in 2007, the Company has a federal net operating loss carryforward of \$7,170,000 and a federal general business credit carryforward of \$810,000. The Company's intention is to carryforward both these tax attributes, subject to the limitations of the Internal Revenue Code. The loss and credit carryforwards expire at various dates through 2027.

At December 31, 2006, as a result of the acquisition of Ion Systems, Inc., the Company had a federal net operating loss carryforward of \$1,216,000 and a federal general business credit carryforward of \$71,000. The Company carried both of these tax attributes to previous Ion tax years and recovered \$497,000 of previously paid taxes.

Although the Company believes that its tax positions are consistent with applicable U.S. federal, state and international laws, certain tax reserves are maintained at December 31, 2008 should these positions be challenged by the applicable tax authority and additional tax assessed on audit.

The Company has adopted FASB Interpretation 48, Accounting for Uncertainty in Income Taxes ("FIN 48"), as of January 1, 2007. A reconciliation of the beginning and ending amount of gross unrecognized tax benefits is as follows:

	2008	2007
Balance at beginning of year	\$ 16,123	\$ 11,637
Increases for prior years	49	1,264
Increases for the current year	1,680	3,240
Reductions related to settlements with taxing authorities	(1,533)	—
Reductions related to expiration of statute of limitations	(1,641)	(18)
Balance at end of year	<u>\$ 14,678</u>	<u>\$ 16,123</u>

At December 31, 2008, if these benefits were recognized in a future period, the timing of which is not estimable, the net unrecognized tax benefit of approximately \$11,784,000, excluding penalties and interest, would impact the Company's effective tax rate.

MKS and its subsidiaries are subject to U.S. federal income tax as well as the income tax of multiple state and foreign jurisdictions. The Company has concluded all U.S. federal income tax matters for years through 2002. While the U.S. 2004 federal tax year is closed, the 2003 federal tax year remains open to the extent of the loss carryforward to 2005. As of December 31, 2008 and currently, we are under a federal audit for the 2005 and 2006 tax years, as well as other ongoing audits in various other tax jurisdictions for various years.

Over the next 12 months it is reasonably possible that the Company may recognize \$8,000,000 to \$8,500,000 of previously unrecognized tax benefits related to various federal, state and foreign tax positions as a result of the conclusion of various audits and the expiration of the statute of limitations. The following tax years, in the major tax jurisdictions noted, are open for assessment or refund: U.S. Federal: 2003, 2005 to 2007, Germany: 2001 to 2007, Korea: 2006 to 2007, Japan: 2001 to 2007 and the United Kingdom: 2006 and 2007.

The Company accrues interest and penalties, if applicable, for any uncertain tax positions. Any interest and penalty expense is a component of income tax expense. At December 31, 2008 and at December 31, 2007, the Company had \$1,730,000 and \$1,500,000, respectively, accrued for interest on unrecognized tax benefits.

On a quarterly basis, the Company evaluates both positive and negative evidence that bears on the realizability of net deferred tax assets and assesses the need for a valuation allowance. The future benefit to be derived from its deferred tax assets is dependent upon its ability to generate sufficient future taxable income to realize the assets. During the year ended December 31, 2008, the Company increased its valuation allowance by \$3,303,000 for state tax credit carryforwards and \$816,000 for federal capital loss carryforwards, as the Company has determined it is more likely than not that the deferred tax assets related to these attributes will not be realized. In addition, the

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Company recorded a benefit to income tax expense of \$3,067,000, due to discrete reserve releases primarily related to the close of statute of limitations.

For the year ended December 31, 2007, the Company amended prior federal tax returns to reflect revised estimates for qualifying research and development costs that allowed the company to claim additional research tax credits. As a result of this claim, the Company recorded a benefit to income tax expense of \$1,800,000.

During the year ended December 31, 2006, the Company received a notification letter from the Israeli Ministry of Industry Trade and Labor (“MITL”) indicating that its Israeli operations were in compliance with requirements relating to the tax holiday granted to its manufacturing operations in Israel in 2001. This tax holiday is anticipated to expire in 2011 and is subject to meeting continued investment, employment and other requirements under the guidelines of the MITL. This tax holiday resulted in income tax savings of \$217,000, \$3,393,000 and \$5,125,000 for the years ended December 31, 2008, 2007 and 2006, respectively.

Additionally, for the year ended December 31, 2006, the Company recorded the impact of both a change in German tax rules allowing interest deductions on certain loans and adjustments relating to transfer pricing. As a result of these items the Company recorded additional income tax benefits of \$1,565,000 for the year ended December 31, 2006. The net reduction in the valuation allowance for the year ended December 31, 2006 resulted from the utilization of tax credit carryovers of \$2,706,000 and the expiration of credits of \$474,000 on a merged subsidiary.

Through December 31, 2008, the Company has not provided deferred income taxes on the undistributed earnings of its foreign subsidiaries because such earnings were intended to be permanently reinvested outside the U.S. Determination of the potential deferred income tax liability on these undistributed earnings is not practicable because such liability, if any, is dependent on circumstances existing if and when remittance occurs. At December 31, 2008, the Company had \$237,209,000 of undistributed earnings in its foreign subsidiaries.

**13) Net Income Per Share**

Basic earnings per share is based on the weighted average number of common shares outstanding, and diluted earnings per share 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 when the effect of their inclusion would be dilutive.

The following is a reconciliation of basic to diluted net income per share:

	For The Year Ended December 31,		
	2008	2007	2006
Net income	\$ 30,117	\$ 86,360	\$ 94,235
Shares used in net income per common share — basic	49,717,000	56,349,000	55,395,000
Effect of dilutive securities:			
Stock options, restricted stock and employee stock purchase plan	1,037,000	824,000	566,000
Shares used in net income per common share — diluted	50,754,000	57,173,000	55,961,000
Net income per common share — basic	\$ 0.61	\$ 1.53	\$ 1.70
Net income per common share — diluted	\$ 0.59	\$ 1.51	\$ 1.68

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Options and restricted stock outstanding of 3,152,261, 3,684,435 and 4,789,894 during the years ended December 31, 2008, 2007 and 2006, respectively, are excluded from the calculation of diluted net income per common share because their inclusion would be anti-dilutive.

**14) Stockholders' Equity****Stock Repurchase Program**

On February 12, 2007, MKS' Board of Directors approved a share repurchase program (the "Program") for the repurchase of up to \$300,000,000 of its outstanding stock over the subsequent two years. The repurchases were made from time to time on the open market or through privately negotiated transactions. The timing and amount of any shares repurchased under the Program was dependent upon a variety of factors, including price, corporate and regulatory requirements, capital availability, and other market conditions. During the year ended December 31, 2008, the Company repurchased 5,667,000 shares of common stock for \$115,723,000 for an average price of \$20.42 per share. There were no shares repurchased in 2009 and the Program ended effective February 11, 2009.

**Stock Purchase Plans**

The Company's Third Amended and Restated 1999 Employee Stock Purchase Plan (the "Purchase Plan") authorizes the issuance of up to an aggregate of 1,250,000 shares of Common Stock to participating employees. Offerings under the Purchase Plan commence on June 1 and December 1 and terminate, respectively, on November 30 and May 31. Under the Purchase Plan, eligible employees may purchase shares of Common Stock through payroll deductions of up to 10% of their compensation. 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 Global Market on the day that each offering commences or (2) 85% of the closing price on the day that each offering terminates. During 2008 and 2007, the Company issued 201,341 and 166,127 shares, respectively, of Common Stock to employees who participated in the Purchase Plan at exercise prices of \$15.28 and \$12.16 per share in 2008 and \$17.64 and \$15.44 per share in 2007, respectively. As of December 31, 2008, there were 104,104 shares reserved for future issuance under the Purchase Plan.

The Company's Second Amended and Restated International Employee Stock Purchase Plan (the "Foreign Purchase Plan") authorizes the issuance of up to an aggregate of 250,000 shares of Common Stock to participating employees. Offerings under the Foreign Purchase Plan commence on June 1 and December 1 and terminate, respectively, on November 30 and May 31. Under the Foreign Purchase Plan, eligible employees may purchase shares of Common Stock through payroll deductions of up to 10% of their compensation. 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 Global Market on the day that each offering commences or (2) 85% of the closing price on the day that each offering terminates. During 2008 and 2007, the Company issued 41,391 and 32,803, respectively, shares of Common Stock to employees who participated in the Foreign Purchase Plan at exercise prices of \$15.28 and \$12.16 per share in 2008 and \$17.64 and \$15.44 per share in 2007, respectively. As of December 31, 2008, there were 41,026 shares reserved for future issuance under the Foreign Purchase Plan.

**Equity Incentive Plans**

The Company has granted options to employees under the 2004 Stock Incentive Plan (the "2004 Plan"), the Second Restated 1995 Stock Incentive Plan (the "1995 Plan"), to directors under the 1997 Director Stock Plan (the "1997 Director Plan") and the 1996 Director Stock Option Plan (collectively, the "Plans"). The Plans are administered by the compensation committee of the Company's board of directors.

The Company's equity incentive Plans are intended to attract and retain employees and to provide an incentive for them to assist the Company to achieve long-range performance goals and to enable them to participate in the

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long-term growth of the Company. Employees may be granted restricted stock and restricted stock units (collectively, “restricted stock”), options to purchase shares of the Company’s stock and other equity incentives under the Plans.

The Company’s 2004 Plan was adopted by the board of directors on March 4, 2004 and approved by the stockholders on May 13, 2004. As of December 31, 2008 there were 10,958,496 shares authorized for issuance under the 2004 Plan, which amount shall increase each year by an amount equal to 5% of the total outstanding shares of the Company’s common stock outstanding on January 1 of such year, provided that the maximum aggregate number of shares of common stock which may be issued under the 2004 Plan is 15,000,000 shares (subject to adjustment for certain changes in MKS’ capitalization). The Company may grant options, restricted stock awards, stock appreciation rights and other stock-based awards to employees, officers, directors, consultants and advisors under the 2004 Plan. As of December 31, 2008 there were 9,097,938 shares available for future grant under the 2004 Plan.

The Company’s 1995 Plan expired in November 2005 and no further awards may be granted under the 1995 Plan, although there are still outstanding options available for exercise under this plan.

The Company’s 1997 Director Plan expired in February 2007 and no further awards may be granted under the 1997 Director Plan, although there are still outstanding options available for exercise under this plan.

At December 31, 2008, 9,097,938 shares of the Company’s common stock were available for future grants under the Plans. Stock options are granted at an exercise price equal to 100% of the fair value of the Company’s common stock at the date of grant. Generally, stock options granted to employees under the Plans in 2001 and after, vest 25% after one year and 6.25% per quarter thereafter, and expire 10 years after the grant date. Generally, stock options granted under the Plans prior to 2000 vest 20% after one year and 5% per quarter thereafter, and expire 10 years after the grant date. Options granted to directors generally vest at the earliest of (1) one day prior to the next annual meeting, (2) 13 months from date of grant, or (3) the effective date of an acquisition. Restricted stock awards generally vest three years from the date of grant.

The following table presents the activity for options under the Plans:

	Year Ended December 31,					
	2008		2007		2006	
	Options	Weighted Average Exercise Price	Options	Weighted Average Exercise Price	Options	Weighted Average Exercise Price
Outstanding — beginning of period	5,123,056	\$ 22.74	7,614,655	\$ 21.62	9,459,271	\$ 20.36
Granted	—	—	—	—	102,000	\$ 22.94
Exercised	(425,256)	\$ 14.32	(2,233,303)	\$ 18.58	(1,563,706)	\$ 13.33
Forfeited or Expired	(138,962)	\$ 25.58	(258,296)	\$ 25.59	(382,910)	\$ 24.64
Outstanding — end of period	<u>4,558,838</u>	<u>\$ 23.44</u>	<u>5,123,056</u>	<u>\$ 22.74</u>	<u>7,614,655</u>	<u>\$ 21.62</u>
Exercisable at end of period	<u>4,535,282</u>	<u>\$ 23.46</u>	<u>4,810,516</u>	<u>\$ 23.22</u>	<u>6,720,395</u>	<u>\$ 22.36</u>

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The following table presents the activity for restricted stock under the Plans:

	Years Ended December 31,			
	2008		2007	
	Non-vested Restricted Stock	Weighted Average Grant Date Fair Value	Non-vested Restricted Stock	Weighted Average Grant Date Fair Value
Non-vested restricted stock — beginning of period	1,349,350	\$ 21.98	714,125	\$ 22.00
Granted	709,313	\$ 21.51	775,353	\$ 22.06
Vested	(110,640)	\$ 22.45	(4,527)	\$ 23.39
Forfeited or Expired	(123,033)	\$ 20.43	(135,601)	\$ 22.53
Non-vested restricted stock — end of period	<u>1,824,990</u>	<u>\$ 21.87</u>	<u>1,349,350</u>	<u>\$ 21.98</u>

The following table summarizes information with respect to options outstanding and exercisable under the Plans at December 31, 2008:

	Options Outstanding				Options Exercisable			
	Number of Shares	Weighted Average Exercise Price	Weighted Average Remaining Contractual Life (In Years)	Aggregate Intrinsic Value (In Thousands)	Number of Shares	Weighted Average Exercise Price	Aggregate Intrinsic Value (In Thousands)	
\$11.15 – \$13.87	24,311	\$ 12.89	3.65	\$ 46	24,311	\$ 12.89	\$ 46	
\$14.00 – \$19.00	1,375,584	\$ 16.14	4.22	179	1,357,028	\$ 16.12	179	
\$20.02 – \$29.50	2,438,113	\$ 25.00	3.79	—	2,433,113	\$ 25.01	—	
\$29.93 – \$61.50	720,830	\$ 32.45	3.10	—	720,830	\$ 32.45	—	
	<u>4,558,838</u>	<u>\$ 23.44</u>	<u>3.81</u>	<u>\$ 225</u>	<u>4,535,282</u>	<u>\$ 23.46</u>	<u>\$ 225</u>	

The weighted average remaining contractual life of options exercisable was 3.79 years at December 31, 2008.

The aggregate intrinsic value in the table above represents the total pretax intrinsic value, based on the Company's closing stock price of \$14.79 as of December 31, 2008, which would have been received by the option holders had all option holders exercised their options as of that date. The total number of in-the-money options exercisable as of December 31, 2008 was 543,400.

The total cash received from employees as a result of employee stock option exercises during the years ended December 31, 2008 and 2007 was approximately \$6,088,000 and \$42,005,000, respectively. In connection with these exercises, the net tax benefits realized by the Company for the years ended December 31, 2008 and 2007 were approximately \$226,000 and \$5,712,000, respectively.

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The Company settles employee stock option exercises with newly issued common shares.

**Accumulated Other Comprehensive Income**

The balance of accumulated other comprehensive income (loss) was comprised of the following:

	Cumulative Translation Adjustments	Financial Instruments Designated as Cash Flow Hedges	Unrealized Gain (Loss) on Investments	Accumulated Other Comprehensive Income (Loss)
Balance at December 31, 2006	\$ 9,466	\$ 445	\$ 154	\$ 10,065
Foreign currency translation adjustment, net of taxes of \$0	3,744	—	—	3,744
Changes in value of financial instruments designated as cash flow hedges, net of tax benefit of \$423	—	(532)	—	(532)
Change in unrealized (loss) on investments, net of tax benefit of \$71	—	—	(90)	(90)
Balance at December 31, 2007	\$ 13,210	\$ (87)	\$ 64	\$ 13,187
Foreign currency translation adjustment, net of taxes of \$0	(6,171)	—	—	(6,171)
Changes in value of financial instruments designated as cash flow hedges, net of tax of \$299	—	390	—	390
Change in unrealized (loss) on investments, net of tax benefit of \$143	—	—	(187)	(187)
Balance at December 31, 2008	<u>\$ 7,039</u>	<u>\$ 303</u>	<u>\$ (123)</u>	<u>\$ 7,219</u>

**15) Stock-Based Compensation**

As of January 1, 2006, the Company adopted SFAS 123R using the modified prospective method. SFAS 123R requires companies to recognize compensation cost for all stock-based awards based upon the grant-date fair value of those awards and to recognize the expense over the requisite service period for awards expected to vest. Using the modified prospective method of adopting SFAS 123R, MKS began recognizing compensation expense for equity-based awards granted after January 1, 2006 plus unvested awards granted prior to January 1, 2006. Under this method of implementation, prior periods were not restated. The Company elected to adopt the alternative transition method for calculating the tax effects of equity-based compensation. The alternative transition method included simplified methods to establish the beginning balance of the additional paid-in capital pool (APIC pool) related to the tax effects of employee stock-based compensation, and to determine the subsequent impact on the APIC pool and consolidated statement of cash flows of the tax effects of employee equity-based compensation awards that were outstanding upon the implementation of SFAS 123R. Subsequent to the initial adoption of SFAS 123R, the Company calculates potential windfall or shortfall tax benefits under the treasury stock method by excluding the impact of pro forma deferred tax assets.

The Company recognized the full impact of its share-based payment plans in the consolidated statements of operations for the years ended December 31, 2008, 2007 and 2006 under SFAS 123R. As of December 31, 2008, the Company capitalized \$471,000 of such cost on its consolidated balance sheet. As of December 31, 2007, the Company capitalized \$570,000 of such cost on its consolidated balance sheet. The following table reflects the effect

MKS INSTRUMENTS, INC.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS — (CONTINUED)  
(Tables in thousands, except share and per share data)

of recording stock-based compensation for the years ended December 31, 2008 and 2007 in accordance with SFAS 123R:

	Year Ended December 31, 2008	Year Ended December 31, 2007	Year Ended December 31, 2006
Stock-based compensation expense by type of award:			
Employee stock options	\$ 1,936	\$ 3,516	\$ 8,521
Restricted stock	12,210	8,481	3,862
Employee stock purchase plan	1,128	921	760
Total stock-based compensation	15,274	12,918	13,143
Tax effect on stock-based compensation	(226)	(5,712)	(4,614)
Net effect on net income	<u>\$ 15,048</u>	<u>\$ 7,206</u>	<u>\$ 8,529</u>
Effect on earnings per share:			
Basic	<u>\$ 0.30</u>	<u>\$ 0.13</u>	<u>\$ 0.15</u>
Diluted	<u>\$ 0.30</u>	<u>\$ 0.13</u>	<u>\$ 0.15</u>

The pre-tax effect within the Statement of Operations of recording stock-based compensation for the years ended December 31, 2008, 2007 and 2006 was as follows:

	Year Ended December 31, 2008	Year Ended December 31, 2007	Year Ended December 31, 2006
Cost of sales	\$ 2,272	\$ 1,564	\$ 2,204
Research and development expense	3,698	3,275	3,348
Selling, general and administrative expense	9,304	8,079	7,591
Total pre-tax stock-based compensation expense	<u>\$ 15,274</u>	<u>\$ 12,918</u>	<u>\$ 13,143</u>

**Valuation Assumptions**

In connection with the adoption of SFAS 123R, the Company reassessed its valuation technique and related assumptions. The Company determines the fair value of restricted stock based on the number of shares granted and the closing market price of the Company's common stock on the date of the award, and estimates the fair value of stock options and employee stock purchase rights using the Black-Scholes valuation model. Such values are recognized as expense on a straight-line basis over the requisite service periods, net of estimated forfeitures. The estimation of stock-based awards that will ultimately vest requires significant judgment. The Company considers many factors when estimating expected forfeitures, including types of awards and historical experience. Actual results, and future changes in estimates, may differ substantially from the Company's current estimates.

There were no options granted during the years ended December 31, 2008 and 2007. The weighted average grant date fair value of options granted during the year ended December 31, 2006, as determined under SFAS 123R, was \$12.00 per share. The total intrinsic value of options exercised during the years ended December 31, 2008, 2007 and 2006 was approximately \$3,802,000, \$16,462,000 and \$14,252,000, respectively. The fair values of options at

MKS INSTRUMENTS, INC.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS — (CONTINUED)  
(Tables in thousands, except share and per share data)

the date of grant were estimated using the Black-Scholes option-pricing model with the following weighted average assumptions:

	2008	2007	2006
<b>Stock option plans:</b>			
Expected life (years)	—	—	5.0
Risk-free interest rate	—	—	4.9%
Expected Volatility	—	—	52.0%
Dividend yield	—	—	0.0%

The weighted average fair value of employee stock purchase rights granted in 2008, 2007 and 2006 was \$4.62, \$4.88 and \$5.18, respectively. The fair value of the employees' purchase rights was estimated using the Black-Scholes option-pricing model with the following weighted average assumptions:

	2008	2007	2006
<b>Employee stock purchase rights:</b>			
Expected life (years)	0.5	0.5	0.5
Risk-free interest rate	2.6%	5.0%	4.8%
Expected volatility	47.3%	33.0%	34.6%
Dividend yield	0.0%	0.0%	0.0%

Expected volatilities for 2008 and 2007 are based on a combination of implied and historical volatilities of the Company's common stock and based on historical volatilities for 2006; the expected life represents the weighted average period of time that options granted are expected to be outstanding giving consideration to vesting schedules and the Company's historical exercise patterns; and the risk-free interest rate is based on the U.S. Treasury yield curve in effect at the time of grant for periods corresponding with the expected life of the option.

The fair value of stock options and restricted stock awards that vested during the year ended December 31, 2008, 2007 and 2006 was approximately \$2,387,000, \$4,876,000 and \$8,111,000, respectively. As of December 31, 2008, the unrecognized compensation cost related to non-vested stock options and the unrecognized compensation cost related to restricted stock was approximately \$183,000 and \$18,276,000, respectively, and will be recognized over an estimated weighted average amortization period of 0.9 years and 1.8 years, respectively.

**16) 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 between 1% and 50% of their annual compensation to this plan, and, with respect to employees who are age 50 and older, certain specified additional amounts, limited by an annual maximum amount determined by the IRS. 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 were \$2,755,000, \$2,516,000 and \$2,385,000 for 2008, 2007 and 2006, respectively.

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. The bonus expense was \$0 in 2008, \$3,713,000 in 2007 and was \$10,300,000 in 2006.

The Company provides supplemental retirement benefits for certain of its officers and executive officers. The total cost of these benefits was \$2,054,000, \$1,867,000 and \$1,853,000 for the years ended December 31, 2008,

MKS INSTRUMENTS, INC.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS — (CONTINUED)  
(Tables in thousands, except share and per share data)

2007 and 2006, respectively. The accumulated benefit obligation was \$7,813,000 and \$5,765,000 at December 31, 2008 and 2007, respectively.

17) **Segment and Geographical Information and Significant Customer**

The Company operates in one segment for the development, manufacturing, sales and servicing of products that measure, control, power and monitor critical parameters of advanced manufacturing processes. The Company's chief decision-maker reviews consolidated operating results to make decisions about allocating resources and assessing performance for the entire Company.

Information about the Company's operations in different geographic regions is presented in the tables below. 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.

	Year Ended December 31,		
	2008	2007	2006
<b>Geographic net sales</b>			
United States	\$ 365,657	\$ 477,801	\$ 515,896
Japan	94,843	103,474	96,936
Europe	95,673	88,279	70,648
Asia	90,821	110,933	99,321
	<u>\$ 646,994</u>	<u>\$ 780,487</u>	<u>\$ 782,801</u>

	December 31,	
	2008	2007
<b>Long — lived assets</b>		
United States	\$ 60,942	\$ 63,731
Japan	11,527	6,520
Europe	3,353	4,386
Asia	8,812	9,269
	<u>\$ 84,634</u>	<u>\$ 83,906</u>

The Company groups its products into three product groups. Net sales for these product groups are as follows:

	December 31,		
	2008	2007	2006
Instruments and Control Systems	\$ 336,340	\$ 377,992	\$ 371,919
Power and Reactive Gas Products	246,107	319,403	328,810
Vacuum and Other Products	65,547	83,092	82,072
	<u>\$ 646,994</u>	<u>\$ 780,487</u>	<u>\$ 782,801</u>

The Company had one customer comprising 19%, 20% and 21% of net sales for the years ended December 31, 2008, 2007 and 2006, respectively. During the years ended December 31, 2008, 2007 and 2006, the Company estimates that approximately 57%, 68% and 70% of its net sales, respectively, were to semiconductor capital equipment manufacturers and semiconductor device manufacturers.

MKS INSTRUMENTS, INC.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS — (CONTINUED)  
(Tables in thousands, except share and per share data)

18) Acquisitions

On November 7, 2007, the Company acquired Yield Dynamics, Inc. (“YDI”), a provider of yield management technology located in Sunnyvale, California. YDI’s data and yield management software, along with MKS’ portfolio of sensors that control critical processes, data collection and integration hardware, and real-time fault detection and classification software, provides a comprehensive offering for generating, collecting and analyzing process sensor data and correlating the data to wafers, chambers and tools across the semiconductor fab as well as other thin film manufacturing processes. The purchase price consisted of \$23,659,000 in cash, net of \$651,000 in cash acquired and \$363,000 in acquisition related costs. The purchase agreement includes contingent payments of up to \$10,000,000 based upon achieving specific annual and cumulative revenue targets between 2008 and 2010.

The following table summarizes the estimated fair value of the assets acquired and liabilities assumed at the date of the acquisition:

Current assets	\$ 693
Intangible assets	9,010
Other assets	4,039
Goodwill	15,407
Total assets acquired	<u>29,149</u>
Current liabilities	(844)
Deferred tax liabilities	(3,632)
Total liabilities assumed	<u>(4,476)</u>
Total purchase price including acquisition costs	<u>\$ 24,673</u>

The goodwill and other intangible assets associated with the acquisition are not deductible for tax purposes. Of the \$9,010,000 of acquired intangible assets, the following table reflects the allocation of the acquired intangible assets and related estimates of useful lives:

Customer relationships	\$ 2,300	8-year useful life
Completed technology	5,500	6-year useful life
Others	310	2-5-year useful life
In-process research and development	900	
	<u>\$ 9,010</u>	

This transaction resulted in an amount of purchase price that exceeded the estimated fair values of tangible and intangible assets, which was allocated to goodwill. The Company believes that the amount of goodwill relative to identifiable intangible assets relates to several factors including: (1) being a provider of yield management software technology which will be increasingly important to solution providers for semiconductor and other industrial customers and (2) enhanced ability to combine YDI’s software products with MKS’ multivariate software and traditional hardware products.

On January 3, 2006, the Company completed its acquisition of Ion Systems, Inc. (“Ion”), a leading provider of electrostatic management solutions located in Alameda, California, pursuant to an Agreement and Plan of Merger dated November 25, 2005. Ion’s ionization technology monitors electrostatic charge to reduce process contamination and improve yields, which complements the Company’s process monitoring and control technologies. The aggregate purchase price consisted of \$68,073,000 in cash, net of \$5,056,000 in cash acquired, and \$807,000 in acquisition related costs.

MKS INSTRUMENTS, INC.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS — (CONTINUED)  
 (Tables in thousands, except share and per share data)

The following table summarizes the estimated fair value of the assets acquired and liabilities assumed at the date of the acquisition:

Current assets	\$	17,310
Intangible assets		25,947
Other assets		3,066
Goodwill		45,017
Total assets acquired		91,340
Current liabilities		(7,245)
Deferred tax liabilities		(10,159)
Total liabilities assumed		(17,404)
Total purchase price including acquisition costs	\$	<u>73,936</u>

The goodwill and other intangible assets associated with the acquisition are not deductible for tax purposes. Of the \$25,947,000 of acquired intangible assets, the following table reflects the allocation of the acquired intangible assets and related estimates of useful lives:

Customer relationships	\$	11,992	8-year useful life
Completed technology		10,255	6-year useful life
Trade names		2,300	8-year useful life
Order backlog		1,000	3 months
In-process research and development		400	
	\$	<u>25,947</u>	

This transaction resulted in an amount of purchase price that exceeded the estimated fair values of tangible and intangible assets, which was allocated to goodwill. The Company believes that the amount of goodwill relative to identifiable intangible assets relates to several factors including: (1) potential buyer-specific synergies related to market opportunities for a combined product offering and (2) potential to leverage the Company's sales force and intellectual property to attract new customers and revenue.

On January 3, 2006, the Company completed its acquisition of Umetrics, AB ("Umetrics"), a leader in multivariate data analysis and modeling software located in Umea, Sweden, pursuant to a Sale and Purchase Agreement dated December 15, 2005. Umetrics' multivariate data analysis and modeling software converts process data into useable information for yield improvement when linked with the Company's open and modular platform of process sensors and data collection, integration, data storage, and visualization capabilities. The purchase price consisted of \$27,400,000 in cash, net of \$2,602,000 in cash acquired, and \$392,000 in acquisition related costs.

MKS INSTRUMENTS, INC.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS — (CONTINUED)  
(Tables in thousands, except share and per share data)

The following table summarizes the estimated fair value of the assets acquired and liabilities assumed at the date of the acquisition:

Current assets	\$ 4,243
Intangible assets	7,650
Other assets	400
Goodwill	<u>22,060</u>
Total assets acquired	34,353
Current liabilities	(1,929)
Deferred tax liabilities	<u>(2,030)</u>
Total liabilities assumed	(3,959)
Total purchase price including acquisition costs	<u>\$ 30,394</u>

The goodwill and other intangible assets associated with the acquisition are not deductible for tax purposes. Of the \$7,650,000 of acquired intangible assets, the following table reflects the allocation of the acquired intangible assets and related estimates of useful lives:

Customer relationships	\$ 2,300	8-year useful life
Completed technology	4,150	4-6-year useful life
Trade names	800	8-year useful life
In-process research and development	<u>400</u>	
	<u>\$ 7,650</u>	

This transaction resulted in an amount of purchase price that exceeded the estimated fair values of tangible and intangible assets, which was allocated to goodwill. The Company believes that the amount of goodwill relative to identifiable intangible assets relates to several factors including: (1) being a provider of multivariate software technology which will be increasingly important to solution providers for semiconductor and other industrial customers and (2) enhanced ability to combine Umetrics' software products with MKS' traditional hardware products.

Ion's ionization technology and Umetrics' multivariate data analysis technology both complement the Company's process control and monitoring technologies and will support the Company's mission to improve process performance and productivity.

On October 11, 2006, the Company completed its acquisition of Novx Corp. ("Novx"), a provider of electrostatic charge monitoring technology for semiconductor, data storage, telecommunication, medical device and other markets. Novx's technology expands the Company's capability to monitor, detect and control electrostatic charge in advanced process environments, such as semiconductor and hard disk drive manufacturing. The total purchase price for Novx was \$2,552,000.

The results of these acquisitions were included in the Company's consolidated operations beginning on the date of acquisition. The pro forma consolidated statements reflecting the operating results of YDI, had it been acquired as of January 1, 2007, would not differ materially from the operating results of the Company as reported for the twelve months ended December 31, 2007. The pro forma consolidated statements reflecting the operating results of Ion, Umetrics and Novx, had they been acquired as of January 1, 2006, would not differ materially from the operating results of the Company for the twelve months ended December 31, 2006.

MKS INSTRUMENTS, INC.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS — (CONTINUED)  
(Tables in thousands, except share and per share data)

19) Commitments and Contingencies

The Company filed suit against Celerity, Inc. in federal district court in Texas on September 8, 2008 for infringement of two of MKS' patents relating to the Company's PiMFC technology. The complaint was amended on September 9, 2008 to include a claim of infringement for one additional related MKS patent, which had issued earlier that day. MKS dismissed the suit without prejudice on February 6, 2009.

The Company is also subject to various other legal proceedings and claims, which have arisen in the ordinary course of business. In the opinion of management, the ultimate disposition of these matters will not have a material adverse effect on the results of operations, financial condition or cash flows.

The Company leases certain of its facilities and machinery and equipment under capital and operating leases expiring in various years through 2013 and thereafter. Generally, the facility leases require the Company to pay maintenance, insurance and real estate taxes. Rental expense under operating leases totaled \$9,952,000, \$8,257,000 and \$7,443,000, for the years ended December 31, 2008, 2007 and 2006, respectively.

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

	<u>Operating Leases</u>	<u>Capital Leases</u>
Year ending December 31,		
2009	\$ 8,652	\$ 919
2010	7,649	336
2011	5,176	74
2012	4,468	—
2013	4,124	—
Thereafter	8,125	—
Total minimum lease payments	<u>\$ 38,194</u>	<u>1,329</u>
Less: amounts representing interest		<u>63</u>
Present value of minimum lease payments		1,266
Less: current portion		<u>870</u>
Long-term portion		<u>\$ 396</u>

As of December 31, 2008, the Company has entered into purchase commitments for certain inventory components and other equipment and services used in its normal operations. The majority of these purchase commitments covered by these arrangements are for periods of less than one year and aggregate to approximately \$81,000,000. Additionally, the Company has engaged a third party to provide certain computer equipment, IT network services and IT support. This contract is for a period of approximately six years beginning in September 2004 and has a significant penalty for early termination. The obligation at December 31, 2008 of approximately \$14,857,000, excluding capital lease and interest payments of \$1,329,000, will be paid over the term of the arrangement. Average annual payments are expected to be approximately \$7,429,000.

To the extent permitted by Massachusetts law, the Company's Restated Articles of Organization, as amended, require the Company to indemnify any of its current or former officers or directors or any person who has served or is serving in any capacity with respect to any of the Company's employee benefit plans. Because no claim for indemnification has been pursued by any person covered by the relevant provisions of the Company's Restated Articles of Organization, the Company believes that the estimated exposure for these indemnification obligations is currently minimal. Accordingly, the Company has no liabilities recorded for these requirements as of December 31, 2008.

MKS INSTRUMENTS, INC.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS — (CONTINUED)  
(Tables in thousands, except share and per share data)

The Company also enters into agreements in the ordinary course of business which include indemnification provisions. Pursuant to these agreements, the Company indemnifies, holds harmless and agrees to reimburse the indemnified party, generally its customers, for losses suffered or incurred by the indemnified party in connection with certain patent or other intellectual property infringement claims, and, in some instances, other claims, by any third party with respect to the Company's products. The term of these indemnification obligations is generally perpetual after execution of the agreement. The maximum potential amount of future payments the Company could be required to make under these indemnification agreements is, in some instances, not contractually limited. The Company has never incurred costs to defend lawsuits or settle claims related to these indemnification obligations. As a result, the Company believes the estimated fair value of these obligations is minimal. Accordingly, the Company has no liabilities recorded for these obligations as of December 31, 2008.

When, as part of an acquisition, the Company acquires all of the stock or all of the assets and liabilities of another company, the Company assumes liability for certain events or occurrences that took place prior to the date of acquisition. The maximum potential amount of future payments the Company could be required to make for such obligations is undeterminable at this time. Other than obligations recorded as liabilities at the time of the acquisitions, historically the Company has not made significant payments for these indemnifications. Accordingly, no liabilities have been recorded for these obligations.

In conjunction with certain asset sales, the Company may provide routine indemnifications whose terms range in duration and often are not explicitly defined. Where appropriate, an obligation for such indemnifications is recorded as a liability. Because the amounts of liability under these types of indemnifications are not explicitly stated, the overall maximum amount of the obligation under such indemnifications cannot be reasonably estimated. Other than obligations recorded as liabilities at the time of the asset sale, historically the Company has not made significant payments for these indemnifications.

**20) Related Party Transactions**

The Vice President and General Manager of the Company's Vacuum Products Group is the general partner of two real estate entities (the "Aspen Entities"). The Company leased from the Aspen Entities certain facilities occupied by the Company's Vacuum Products Group in Boulder, Colorado until the Aspen Entities sold those facilities to a third party on March 30, 2007. The Company paid the Aspen Entities \$0, \$191,000 and \$751,000 in 2008, 2007 and 2006, respectively, to lease such facilities.

**21) Subsequent Event**

On January 26, 2009, the Company committed to a plan of termination with respect to approximately 10% of its workforce. This decision was based on the overall economic slowdown, particularly in the semiconductor capital equipment industry. As a result, the Company expects to incur approximately \$2,500,000 in cash expenditures for severance and related costs, which the Company expects to record in the quarter ending March 31, 2009.

**MKS INSTRUMENTS, INC.**  
**SUPPLEMENTAL FINANCIAL DATA**

	Quarter Ended			
	March 31	June 30	Sept. 30	Dec. 31
	(Table in thousands, except per share data) (Unaudited)			
<b>2008</b>				
Statement of Operations Data				
Net sales	\$ 193,448	\$ 171,002	\$ 157,364	\$ 125,180
Gross profit	81,907	70,488	62,939	44,609
Income (expense) from operations(1)	27,844	12,905	7,988	(13,204)
Net income (loss)(2)(3)	\$ 20,382	\$ 9,234	\$ 6,791	\$ (6,290)
Net income (loss) per share:				
Basic	\$ 0.39	\$ 0.19	\$ 0.14	\$ (0.13)
Diluted	\$ 0.39	\$ 0.18	\$ 0.14	\$ (0.13)
<b>2007</b>				
Statement of Operations Data				
Net sales	\$ 211,432	\$ 203,978	\$ 181,014	\$ 184,063
Gross profit	92,862	86,030	76,598	75,997
Income from operations	35,880	27,643	23,068	20,394
Net income(4)	\$ 27,290	\$ 22,527	\$ 21,382	\$ 15,161
Net income per share:				
Basic	\$ 0.48	\$ 0.40	\$ 0.38	\$ 0.27
Diluted	\$ 0.48	\$ 0.39	\$ 0.37	\$ 0.27

- (1) Income (expense) from operations for the quarter ended December 31, 2008 includes a write down of intangible assets of \$6.1 million.
- (2) Net income for the quarter ended September 30, 2008 includes a net tax expense for discrete items of \$0.8 million attributable to the booking of a valuation allowance on state tax credits of \$2.7 million partially offset by a benefit of \$1.8 million for discrete items related to the reversal of FIN 48 reserve items as a result of a statute of limitations expiration.
- (3) Net income for the quarter ended December 31, 2008 includes a benefit of \$1.8 million attributable to discrete tax matters related to the reinstatement of the U.S. research and development tax credits and other adjustments.
- (4) Net income for the quarter ended September 30, 2007 includes a net tax benefit of \$1.8 million attributable to a discrete tax matter related to our research and development tax credits.

**Item 9. Changes in and Disagreements with Accountants on Accounting and Financial Disclosure**

None

**Item 9A. Controls and Procedures**

**Evaluation of Disclosure Controls and Procedures**

Our management, with the participation of our Chief Executive Officer and Chief Financial Officer, evaluated the effectiveness of our disclosure controls and procedures as of December 31, 2008. The term “disclosure controls and procedures,” as defined in Rules 13a-15(e) and 15d-15(e) under the Securities Exchange Act of 1934, as amended (the “Exchange Act”), means controls and other procedures of a company that are designed to ensure that information required to be disclosed by a company in the reports that it files or submits under the Exchange Act is recorded, processed, summarized and reported, within the time periods specified in the SEC’s rules and forms. Disclosure controls and procedures include, without limitation, controls and procedures designed to ensure that information required to be disclosed by a company in the reports that it files or submits under the Exchange Act is accumulated and communicated to the company’s management, including its principal executive and principal financial officers, as appropriate to allow timely decisions regarding required disclosure. Management recognizes that any controls and procedures, no matter how well designed and operated, can provide only reasonable assurance of achieving their objectives and management necessarily applies its judgment in evaluating the cost-benefit relationship of possible controls and procedures. Based on the evaluation of our disclosure controls and procedures as of December 31, 2008, our Chief Executive Officer and Chief Financial Officer concluded that, as of such date, our disclosure controls and procedures were effective at the reasonable assurance level to ensure that information required to be disclosed by us in reports that we file or submit under the Exchange Act is recorded, processed, summarized and reported within the time periods specified in Securities and Exchange Commission rules and forms and is accumulated and communicated to our management, including our Chief Executive Officer and Chief Financial Officer as appropriate to allow timely decisions regarding required disclosure.

**Management’s Report on Internal Control over Financial Reporting**

Our management is responsible for establishing and maintaining adequate internal control over financial reporting. Internal control over financial reporting is defined in Rules 13a-15(f) and 15d-15(f) promulgated under the Securities Exchange Act as a process designed by, or under the supervision of, the Company’s Chief Executive Officer and Chief Financial Officer and effected by the Company’s Board of Directors, management and other personnel, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles and includes those policies and procedures that:

- Pertain to the maintenance of records that in reasonable detail accurately and fairly reflect the transactions and dispositions of the assets of the Company;
- Provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and that receipts and expenditures of the Company are being made only in accordance with authorizations of management and directors of the Company; and
- Provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use or disposition of the Company’s assets that could have a material effect on the financial statements.

Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

Our management assessed the effectiveness of our internal control over financial reporting as of December 31, 2008. In making this assessment, our management used the criteria set forth by the Committee of Sponsoring Organizations of the Treadway Commission (COSO) in *Internal Control — Integrated Framework*.

Based on our assessment, management concluded that, as of December 31, 2008, our internal control over financial reporting was effective based on those criteria.

Our internal controls over financial reporting as of December 31, 2008 have been audited by PricewaterhouseCoopers LLP, an independent registered public accounting firm, as stated in their attestation report which appears on page 37.

**Changes in Internal Control over Financial Reporting**

There was no change in our internal control over financial reporting (as defined in Rules 13a-15(f) and 15d-15(f) under the Exchange Act) during our fourth fiscal quarter that has materially affected, or is reasonably likely to materially affect, our internal control over financial reporting.

**Item 9B. Other Information**

None.

**PART III**

**Item 10. Directors, Executive Officers and Corporate Governance**

The information required by this item will be set forth under the captions “Election of Directors,” “Executive Officers,” “Code of Ethics,” “Directors — Audit Committee Financial Expert” and “Corporate Governance” in our definitive proxy statement for the 2009 Annual Meeting of Stockholders to be filed with the Securities and Exchange Commission no later than 120 days after the end of our fiscal year, and is incorporated herein by reference.

We are also required under Item 405 of Regulation S-K to provide information concerning delinquent filers of reports under Section 16 of the Securities and Exchange Act of 1934, as amended. This information is listed under the caption “Section 16(a) Beneficial Ownership Reporting Compliance” in our definitive proxy statement for the 2009 Annual Meeting of Stockholders to be filed with the Securities and Exchange Commission no later than 120 days after the end of our fiscal year. This information is incorporated herein by reference.

**Item 11. Executive Compensation**

The information required by this item will be set forth under the captions “Executive Officers — Executive Compensation” and “Executive Officers — Compensation Discussion and Analysis” in our definitive proxy statement for the 2009 Annual Meeting of Stockholders to be filed with the Securities and Exchange Commission no later than 120 days after the end of our fiscal year. This information is incorporated herein by reference.

**Item 12. Security Ownership of Certain Beneficial Owners and Management and Related Stockholder Matters**

The information required by Item 403 of Regulation S-K will be set forth under the caption “Security Ownership of Certain Beneficial Owners and Management” in our definitive proxy statement for the 2009 Annual Meeting of Stockholders to be filed with the Securities and Exchange Commission no later than 120 days after the end of our fiscal year. This information is incorporated herein by reference.

The information required by Item 201(d) of Regulation S-K will be set forth under the caption “Executive Officers — Equity Compensation Plan Information” in our definitive proxy statement for the 2009 Annual Meeting of Stockholders to be filed with the Securities and Exchange Commission no later than 120 days after the end of our fiscal year. This information is incorporated herein by reference.

**Item 13. Certain Relationships and Related Transactions, and Director Independence**

The information required by this item will be set forth under the caption “Executive Officers — Certain Relationships and Related Transactions” and “Corporate Governance” in our definitive proxy statement for the

2009 Annual Meeting of Stockholders to be filed with the Securities and Exchange Commission no later than 120 days after the end of our fiscal year. This information is incorporated herein by reference.

**Item 14. Principal Accountant Fees and Services**

The information required by this item will be set forth under the caption "Independent Registered Public Accounting Firm" in our definitive proxy statement for the 2009 Annual Meeting of Stockholders to be filed with the Securities and Exchange Commission no later than 120 days after the end of our fiscal year. This information is incorporated herein by reference.

**PART IV**

**Item 15. Exhibits and Financial Statement Schedules**

(a) The following documents are filed as a part of this Report:

1. *Financial Statements*. The following Consolidated Financial Statements are included under Item 8 on this Annual Report on Form 10-K.

**INDEX TO CONSOLIDATED FINANCIAL STATEMENTS**

**Financial Statements:**

<a href="#">Report of Independent Registered Public Accounting Firm</a>	37
<a href="#">Consolidated Balance Sheets at December 31, 2008 and 2007</a>	38
<a href="#">Consolidated Statements of Operations for the years ended December 31, 2008, 2007 and 2006</a>	39
<a href="#">Consolidated Statements of Stockholders' Equity for the years ended December 31, 2008, 2007 and 2006</a>	40
<a href="#">Consolidated Statements of Cash Flows for the years ended December 31, 2008, 2007 and 2006</a>	41
<a href="#">Notes to Consolidated Financial Statements</a>	42

2. *Financial Statement Schedules*

The following consolidated financial statement schedule is included in this Annual Report on Form 10-K:

Schedule II — Valuation and Qualifying Accounts

Schedules other than those listed above have been omitted since they are either not required or information is otherwise included.

3. *Exhibits*. The following exhibits are filed as part of this Annual Report on Form 10-K pursuant to Item 15(b).

<u>Exhibit No.</u>	<u>Title</u>
+3.1(1)	Restated Articles of Organization
+3.2(2)	Articles of Amendment, as filed with the Secretary of State of Massachusetts on May 18, 2001
+3.3(3)	Articles of Amendment, as filed with the Secretary of State of Massachusetts on May 16, 2002
+3.4(4)	Amended and Restated By-Laws
+4.1(4)	Specimen certificate representing the common stock
+10.1(5)*	Applied Science and Technology, Inc. 1994 Formula Stock Option Plan
+10.2(4)*	1996 Amended and Restated Director Stock Option Plan
+10.3(6)*	Second Amended and Restated 1997 Director Stock Option Plan, and forms of option agreements thereto
+10.4(7)*	2004 Stock Incentive Plan, as amended (the "2004 Plan")
+10.5(8)*	Form of Nonstatutory Stock Option Agreement to be granted under the 2004 Plan

<u>Exhibit No.</u>	<u>Title</u>
+10.6(9)*	Form of Performance Stock Award under the 2004 Plan
+10.7(10)*	Form of Restricted Stock Award under the 2004 Plan
+10.8(11)*	Form of Restricted Stock Unit Agreement (cliff vesting) under the 2004 Plan
+10.9(12)*	Form of Restricted Stock Unit Agreement for Initial Grant to Non-Employee Directors under the 2004 Plan
+10.10(12)*	Form of Restricted Stock Unit Agreement for Annual Grant to Non-Employee Directors under the 2004 Plan
+10.11(12)*	Form of Performance-Based Restricted Stock Unit Agreement under the 2004 Plan
+10.12(12)*	Form of Time-Based Restricted Stock Unit Agreement under the 2004 Plan
+10.13(16)*	Form of Restricted Stock Unit Agreement under the 2004 Plan
+10.14(13)*	Second Restated 1995 Stock Incentive Plan (the "1995 Plan")
+10.15(14)*	Form of Nonstatutory Stock Option Agreement under the 1995 Plan
+10.16(9)*	Form of Performance Stock Award under Registrant's 1995 Plan
+10.17(14)*	Third Restated 1999 Employee Stock Purchase Plan
+10.18(14)*	Second Restated International Employee Stock Purchase Plan
+10.19(15)*	Employment Agreement dated as of July 1, 2005 between John Bertucci and the Registrant
+10.20(16)*	Employment Agreement dated July 1, 2005 between Leo Berlinghieri and the Registrant, as amended on November 13, 2007
10.21*	Amendment, dated November 10, 2008, to Employment Agreement between Leo Berlinghieri and the Registrant, dated July 1, 2005, as amended on November 13, 2007
+10.22(15)*	Employment Agreement dated as of July 1, 2005 between Ronald C. Weigner and the Registrant
10.23*	Amendment, dated November 10, 2008, to Employment Agreement between Ronald C. Weigner and the Registrant, dated July 1, 2005
+10.24(15)*	Employment Agreement dated as of July 1, 2005 between William D. Stewart and the Registrant
+10.25(14)*	Employment Agreement dated as of July 30, 2004 between John Smith and the Registrant
10.26*	Amendment, dated November 10, 2008, to Employment Agreement between John Smith and the Registrant, dated July 30, 2004
+10.27(17)*	Employment Agreement dated as of April 25, 2005 between Gerald Colella and the Registrant
10.28*	Amendment, dated November 10, 2008, to Employment Agreement between Gerald Colella and the Registrant, dated April 25, 2005
+10.29(18)*	Summary of 2009 Salaries of Named Executive Officers
+10.30*	Summary of Compensatory Arrangements with Non-Employee Directors
+10.31(19)	Optional Advanced Demand Grid Note dated August 3, 2004 in favor of HSBC Bank USA ("HSBC Note"), and Amendment thereto dated as of July 29, 2005
+10.32(20)	Second Amendment, dated July 31, 2006, to HSBC Note
+10.33(16)	Third Amendment, dated July 31, 2007, to HSBC Note
+10.34	Fourth Amendment, dated July 31, 2008, to HSBC Note
+10.35(21)	Global Supply Agreement dated April 12, 2005 by and between the Registrant and Applied Materials, Inc.
+10.36(22)	Settlement Agreement dated as of October 3, 2005 by and between the Registrant, Applied Science and Technology, Inc. and Advanced Energy, Inc.
21.1	Subsidiaries of the Registrant
23.1	Consent of PricewaterhouseCoopers LLP
31.1	Certification of Principal Executive Officer pursuant to Rule 13a-14(a)/Rule 15d-14(a) of the Securities Exchange Act of 1934, as amended

<u>Exhibit No.</u>	<u>Title</u>
31.2	Certification of Principal Financial Officer pursuant to Rule 13a-14(a)/Rule 15d-14(a) of the Securities Exchange Act of 1934, as amended
32.1	Certification of Chief Executive Officer and Chief Financial Officer pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002

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+ Previously filed

- \* Management contract or compensatory plan arrangement filed as an Exhibit to this Form 10-K pursuant to Item 15(b) of this report.
- (1) Incorporated by reference to the Registration Statement on Form S-4 (File No. 333-49738) filed with the Securities and Exchange Commission on November 13, 2000.
- (2) Incorporated by reference to the Registrant's Quarterly Report on Form 10-Q for the quarter ended June 30, 2001.
- (3) Incorporated by reference to the Registrant's Quarterly Report on Form 10-Q for the quarter ended June 30, 2002.
- (4) Incorporated by reference to the Registration Statement on Form S-1/A filed with the Securities and Exchange Commission on March 2, 1999.
- (5) Incorporated by reference to the Registration Statement on Form S-8 filed with the Securities and Exchange Commission on January 29, 2001.
- (6) Incorporated by reference to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2004.
- (7) Incorporated by reference to the Registrant's Quarterly Report on Form 10-Q for the quarter ended September 30, 2006.
- (8) Incorporated by reference to the Registrant's Quarterly Report on Form 10-Q for the quarter ended September 30, 2004.
- (9) Incorporated by reference to the Registrant's Quarterly Report on Form 10-Q for the quarter ended June 30, 2005.
- (10) Incorporated by reference to the Registrant's Current Report on Form 8-K filed with the Securities and Exchange Commission on February 17, 2006.
- (11) Incorporated by reference to the Registrant's Quarterly Report on Form 10-Q for the quarter ended March 31, 2006.
- (12) Incorporated by reference to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2006.
- (13) Incorporated by reference to the Registrant's Quarterly Report on Form 10-Q for the quarter ended September 30, 2002.
- (14) Incorporated by reference to the Registrant's Quarterly Report on Form 10-Q for the quarter ended June 30, 2004.
- (15) Incorporated by reference to the Registrant's Current Report on Form 8-K filed with the Securities and Exchange Commission on July 5, 2005.
- (16) Incorporated by reference to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2007.
- (17) Incorporated by reference to the Registrant's Current Report on Form 8-K filed with the Securities and Exchange Commission on April 27, 2005.
- (18) Incorporated by reference to the Registrant's Current Report on Form 8-K filed with the Securities and Exchange Commission on January 15, 2009.
- (19) Incorporated by reference to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2005.

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- (20) Incorporated by reference to the Registrant's Current Report on Form 8-K filed with the Securities and Exchange Commission on August 3, 2006.
- (21) Incorporated by reference to the Registrant's Current Report on Form 8-K filed with the Securities and Exchange Commission on April 27, 2005.
- (22) Incorporated by reference to the Registrant's Current Report on Form 8-K filed with the Securities and Exchange Commission on October 7, 2005.

(b) Exhibits

MKS hereby files as exhibits to our Annual Report on Form 10-K those exhibits listed in Item 15(a) above.

(c) Financial Statement Schedules

MKS INSTRUMENTS, INC.  
SCHEDULE II — VALUATION AND QUALIFYING ACCOUNTS

Description	Balance at Beginning of Year	Additions		Deductions & Write-offs	Balance at End of Year
		Charged to Costs and Expenses	Charged to Other Accounts (Dollars in thousands)		
Accounts receivable allowance					
Year ended December 31,					
2008	\$ 2,379	\$ 4,612	\$ —	\$ 4,843	\$ 2,148
2007	\$ 4,533	\$ 1,721	\$ —	\$ 3,875	\$ 2,379
2006	\$ 3,178	\$ 5,607	\$ —	\$ 4,252	\$ 4,533

**SIGNATURES**

Pursuant to the requirements of Section 13 or 15(d) of the Securities Exchange Act of 1934, the registrant has duly caused this report to be signed on its behalf by the undersigned, thereunto duly authorized.

MKS INSTRUMENTS, INC.

By: /s/ LEO BERLINGHIERI

LEO BERLINGHIERI  
*Chief Executive Officer, President and Director  
 (Principal Executive Officer)*

Pursuant to the requirements of the Securities Exchange Act of 1934, this report has been signed below by the following persons on behalf of the registrant and in the capacities and on the date indicated.

<u>Signatures</u>	<u>Title</u>	<u>Date</u>
<u>/s/ JOHN R. BERTUCCI</u> John R. Bertucci	Chairman of the Board of Directors	February 26, 2009
<u>/s/ LEO BERLINGHIERI</u> Leo Berlinghieri	Chief Executive Officer, President and Director (Principal Executive Officer)	February 26, 2009
<u>/s/ RONALD C. WEIGNER</u> Ronald C. Weigner	Vice President, Chief Financial Officer and Treasurer (Principal Financial and Accounting Officer)	February 26, 2009
<u>/s/ CRISTINA H. AMON</u> Cristina H. Amon	Director	February 21, 2009
<u>/s/ ROBERT R. ANDERSON</u> Robert R. Anderson	Director	February 26, 2009
<u>/s/ GREGORY R. BEECHER</u> Gregory R. Beecher	Director	February 26, 2009
<u>/s/ RICHARD S. CHUTE</u> Richard S. Chute	Director	February 26, 2009
<u>/s/ PETER R. HANLEY</u> Peter R. Hanley	Director	February 23, 2009
<u>/s/ HANS-JOCHEN KAHL</u> Hans-Jochen Kahl	Director	February 26, 2009
<u>/s/ LOUIS P. VALENTE</u> Louis P. Valente	Director	February 26, 2009

Whereas, MKS Instruments, Inc. ("the "Company") and Leo Berlinghieri ("Employee") have entered into an employment agreement dated July 1, 2005, Appendix A of which includes deferred compensation benefits, and

Whereas, such deferred compensation benefits are subject to the provisions of Internal Revenue Code Section 409A, and

Whereas Appendix A has been administered in accordance with the provisions of Section 409A as of January 1, 2005, and

Whereas, Appendix A must be formally amended in writing on or before December 31, 2008, to incorporate applicable provisions of Section 409A in order to avoid potentially adverse tax consequences to Employee,

Now, therefore, in accordance with Section 16 of Appendix A, the Company and Employee hereby agree that Appendix A of the Agreement is amended in its entirety to read as follows, effective as of November 10, 2008:

**APPENDIX A**  
**Supplemental Retirement Benefits**

1. **Purpose.** (a) **General:** The purpose of this Appendix A is to provide Employee with supplemental retirement benefits to encourage his continued employment with the Corporation. Benefits will be payable only if Employee fully complies with all of the requirements of this Appendix A.

(b) **For Benefit of Employee Only:** Benefits under this Appendix A are provided for the benefit of Employee only. No other employee shall accrue any rights of any kind as a result of the existence of the arrangement described in this Appendix A. Supplemental retirement benefits may be provided to an employee only as specifically authorized by the Board of Directors of the Corporation.

(c) **Internal Revenue Code Section 409A:** The provisions of this Appendix A shall be interpreted in a manner consistent with the requirements of Section 409A of the Internal Revenue Code.

2. **Definitions.** As used in this Appendix A, the following terms have the meanings set forth below, unless a different meaning is required by the context:

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2.1. "Actuarially Equivalent" means a benefit of equivalent value to another benefit, determined on the following basis:

Interest Rate: The average annual interest rate on 10-year Treasury securities as published by the Federal Reserve for the calendar quarter immediately preceding the calendar quarter in which the actuarially equivalent benefit is being determined plus 25 basis points; and

Mortality: The most recent "applicable mortality table" prescribed by Section 417(e)(3)(A)(ii) of the Internal Revenue Code (or a successor provision as determined by the Corporation).

2.2. "Base salary" means base salary as defined in the Employment Agreement, before any pre-tax salary reductions for participation in any benefits plan of the Corporation.

2.3. "Beneficiary" means one or more persons, trusts, estates or other entities, designated by Employee to receive death benefits under Section 6.1(b) of this Appendix A upon Employee's death. If Employee fails to designate a Beneficiary or if all designated Beneficiaries predecease Employee, then such death benefits shall be payable to the executor or personal representative of Employee's estate.

Employee shall designate his Beneficiary by completing and signing a beneficiary designation form prescribed by the Corporation, and returning it to the Corporation or its designated agent. Employee shall have the right to change a Beneficiary by completing, signing and otherwise complying with the terms of the beneficiary designation form and the Corporation's rules and procedures, as in effect from time to time. Upon the acceptance by the Corporation of a new beneficiary designation form, all Beneficiary designations previously filed shall be canceled. The Corporation shall be entitled to rely on the last beneficiary designation form filed by Employee and accepted by the Corporation prior to his or her death. No designation or change in designation of a Beneficiary shall be effective until received and acknowledged in writing by the Corporation or its designated agent. If the Corporation has any doubt as to the proper Beneficiary to receive payments pursuant to this Appendix A, the Corporation shall have the right, exercisable in its discretion, to withhold such payments until this matter is resolved to the Corporation's satisfaction.

2.4. "Bonus" means a bonus paid under the Corporation's Management Incentive Program.

2.5. "Change in Control" means the first to occur of any of the following events:

- (a) Any "person" (as that term is used in Section 13 and 14(d)(2) of the Securities Exchange Act of 1934 ("Exchange Act")) becomes the beneficial owner (as that term is used in Section 13(d) of the Exchange Act), directly or indirectly, of fifty percent (50%) or more of the Company's capital stock entitled to vote in the election of directors;
- (b) The shareholders of the Company approve any consolidation or merger of the Company, other than a consolidation or merger of the Company in which the holders of the common stock of the Company immediately prior to the consolidation or merger hold more than fifty percent (50%) of the common stock of the surviving corporation immediately after the consolidation or merger;
- (c) The shareholders of the Company approve any plan or proposal for the liquidation or dissolution of the Company; or
- (d) The shareholders of the Company approve the sale or transfer of all or substantially all of the assets of the Company to parties that are not within a "controlled group of corporations" (as defined in Code Section 1563) in which the Company is a member.

2.6. "Corporation" means MKS Instruments, Inc. (the "Company") and any corporation, trust, association or enterprise which is required to be considered, together with the Corporation, as one employer pursuant to the provisions of Sections 414(b), 414(c), 414(m) or 414(o) of the Code. For purposes of applying Code sections 1563(a)(1), (2), and (3) and regulation section 1.414(c)-2 to the determination of companies under common control for purposes of this Appendix A, 80% shall be used instead of "at least 80%" each place it appears in such sections.

2.7. "Compensation" for any calendar year means the sum of Employee's Base Salary for such year plus any Bonus paid in such year.

2.8. "Early Retirement Benefit" means the Retirement benefit determined under Section 5.2 of this Appendix A upon Employee's Retirement prior to his Normal Retirement Date.

- 2.9. "Employment Agreement" means the Employment Agreement between Employee and the Corporation that contains this Appendix A.
- 2.10. "Final Average Pay" means, for purposes of Section 5 the average of Employee's three (3) highest years of Compensation during the ten (10) calendar year period immediately preceding the calendar year in which Employee Retires, and for purposes of determining death benefits under Section 6 the average of Employee's three (3) highest years of Compensation during the ten (10) calendar year period immediately preceding the calendar year containing Employee's date of death. The foregoing notwithstanding, any calendar year in which Employee has no Compensation from the Corporation shall be ignored in determining such ten calendar year period.
- 2.11. "Normal Retirement Age" means Employee's 65th birthday or, if earlier, the date Employee is deemed to have Retired in accordance with Section 2.15(b).
- 2.12. "Normal Retirement Benefit" means the Retirement benefit determined under Section 5.1 of this Appendix A upon Employee's Retirement on or after his Normal Retirement Date.
- 2.13. "Normal Retirement Date" means the first day of the month in which Employee attains Normal Retirement Age.
- 2.14. "Permanent and Total Disability" means (a) Employee is unable to engage in any substantial gainful activity by reason of any medically determinable physical or mental impairment that can be expected to result in death or can be expected to last for a continuous period of not less than 12 months, or (b) Employee is, by reason of any medically determinable physical or mental impairment that can be expected to result in death or can be expected to last for a continuous period of not less than 12 months, receiving income replacement benefits for a period of not less than three months under an accident and health plan covering employees of the Corporation. Employee shall be conclusively presumed to be Permanently and Totally Disabled upon determination that he is disabled by the Social Security Administration.
- 2.15. "Retirement" or "Retires" or "Retired" means the earlier of:
- (a) Employee's Separation from Service with the Corporation upon or after satisfying the vesting requirements of Section 4.1, or

(b) Employee's deemed Retirement. Employee shall be deemed to have Retired with a fully vested Normal Retirement Benefit on the earliest of (i) the date he becomes Permanently and Totally Disabled, (ii) the date of Employee's Separation from Service as a result of the Corporation's termination of Employee's employment with the Corporation for any reason other than Termination for Cause as defined in Section 2.21 of this Appendix A, (iii) the date of Employee's death while employed by the Corporation, or (iv) the date of Employee's qualifying Separation from Service following a Change in Control in accordance with the provisions of Section 7 of this Appendix A.

2.16. "Retirement Date" means the date Employee Retires or is deemed to have Retired in accordance with Section 2.15 of this Appendix A. The term "Retirement Date" shall include Employee's Early Retirement Date as defined in Section 5.2 of this Appendix A.

2.17. "Section 409A" means Section 409A of the Internal Revenue Code, as the same may be amended from time to time, and any successor statute thereto. References in this Appendix A to Section 409A shall be deemed to mean and include any published guidance, regulations, notices, rulings and similar announcements issued by the Internal Revenue Service or by the Secretary of the Treasury under or interpreting Section 409A, decisions by any court of competent jurisdiction involving a Participant or a beneficiary and any closing agreement made under section 7121 of the Code that is approved by the Internal Revenue Service and involves a Participant, all as determined by the Corporation in good faith, which determination may (but shall not be required to) be made in reliance on the advice of such tax counsel or other tax professional(s) with whom the Corporation from time to time may elect to consult with respect to any such matter.

2.18. "Separates from Service" or "Separation from Service" means Employee's separation from service with the Corporation as a result of death retirement, or any other reason, except that for purposes of this section 2.18 the employment relationship is treated as continuing intact while Employee is on military leave, sick leave, or other bona fide leave of absence if the period of such leave does not exceed six months, or if longer, so long as Employee retains a right to reemployment with the Corporation under an applicable statute or by contract. For purposes of this Section 2.18 a leave of absence constitutes a bona fide leave of absence only if there is a reasonable expectation that the employee will return to perform services for the employer. If the period of leave exceeds six months and the individual does not retain a right

to reemployment under an applicable statute or by contract, the employment relationship is deemed to terminate on the first date immediately following such six-month period. Whether an Employee has a Separation from Service shall be determined in accordance with the provisions of Section 409A, and regulations thereunder, and any other applicable guidance.

2.19. "Specified Employee" means, at any time when stock of the Corporation is publicly traded on an established securities market or otherwise (as determined in accordance with Section 409A), an employee who is a "specified employee" within the meaning of Section 409A. The Corporation shall have the discretion to use any alternative permitted under Section 409A to determine whether Employee is a Specified Employee, and to take any action necessary to make such alternative binding.

2.20. "Termination of Employment" means, for purposes of Section 4.6 of this Appendix A, Termination for Cause, or Employee's voluntary severance from employment with the Corporation (within the meaning of the Corporation's normal policies and procedures) for any reason other than Retirement.

2.21. "Termination for Cause" means, solely for purposes of this Appendix A, termination of Employee's employment by the Corporation as a result of Employee's conviction for the commission of a felony, material breach of any employment or other agreements between Employee and the Corporation, or willful failure to perform the material responsibilities of his position with the Corporation.

2.22. "Trust" means a Trust established pursuant to Section 10 of this Appendix A.

### **3. Eligibility for Retirement Benefits**

3.1. General: Subject to Sections 4.2, 4.3, 4.4, and 4.5 the Corporation shall pay the retirement benefits described in this Appendix A only if Employee Retires from employment with the Corporation upon or after satisfying the vesting requirements set forth in Section 4.1, or upon Employee's deemed Retirement pursuant to Section 2.15(b).

### **4. Vesting**

4.1 General: Except as provided in Sections 4.2, 4.3, 4.4, and 4.5, and subject to Section 10.1, Employee's benefits under this Appendix A shall be fully vested and nonforfeitable if Employee satisfies both (a) and (b) while employed with the Corporation:

(a) attains age 60, and

(b) has 25 years of service with the Corporation. Employee shall have 25 years of service on the 25<sup>th</sup> anniversary of Employee's original hire date.

The foregoing notwithstanding, Employee shall be fully vested in his benefit under this Appendix A upon Employee's deemed Retirement pursuant to Section 2.15(b) of this Appendix A.

4.2. Termination for Cause: All benefits shall be forfeited, and no amount shall be payable under this Appendix A, in the event of Employee's Termination for Cause.

4.3. Compliance with Noncompete, Nondisclosure, and Nonsolicitation Agreements. All benefits under this Appendix A are expressly conditioned upon Employee's compliance with the terms of any noncompetition, nondisclosure, or nonsolicitation provisions contained in the Employment Agreement, or in any other agreement between Employee and the Corporation. All benefits payable under this Appendix A shall be forfeited, and no amount shall be payable, in the event Employee violates the terms of any such provisions. If Employee violates the terms of any such provisions, and benefit payments have commenced to Employee, any such payments shall cease, and Employee shall repay all previously paid benefits to the Corporation upon demand. If Employee fails to repay such amounts upon demand, the Corporation shall have the right to take any action necessary to recover such payments from Employee.

4.4. Notice of Intent to Retire. Benefits payable under this Appendix A are specifically conditioned upon Employee providing to the Corporation written notice of Employee's intent to Retire at least six months prior to Employee's Retirement date. In the event Employee fails to satisfy the notice requirements of this Section 4.4, all benefits shall be forfeited, and no amount shall be payable under this Appendix A. The foregoing notwithstanding, the Corporation, in its sole and absolute discretion, may elect to waive the notice requirement of this Section 4.4. The foregoing notwithstanding, this Section 4.4 shall not apply to death

benefits payable under Section 6 of this Appendix A, or to Retirement benefits payable under Section 5 as a result of Employee's deemed Retirement pursuant to Section 2.15(b).

4.5. Release. Benefits payable under this Appendix A (other than death benefits payable under Section 6) are specifically conditioned upon and provided in exchange for Employee signing a separation agreement that releases the Corporation from any liabilities that may have arisen as a result of Employee's employment and/or termination of employment with the Corporation. In the event Employee terminates employment with the Corporation for any reason other than death (including Retirement) without satisfying the requirements of this Section 4.5 all benefits shall be forfeited, and no amount shall be payable under this Appendix A.

4.6. Termination of Employment Prior to Satisfying Vesting Requirements. No benefits are payable under this Appendix A upon Employee's Termination of Employment with the Corporation prior to satisfying the vesting requirements set forth in Section 4.1.

**5. Retirement Benefits.**

5.1. Normal Retirement Benefit. This Section 5.1 describes the Retirement benefit payable by the Corporation in the event Employee Retires on or after his Normal Retirement Date. Employee's Normal Retirement Benefit shall be paid in the form of an Actuarially Equivalent lump sum, as set forth in Section 5.3.

(a) Married on Retirement Date: If Employee is married on his Retirement Date, Employee's Normal Retirement Benefit shall be:

50% times Final Average Pay

payable annually for the life of Employee with 50% of such amount continuing after Employee's death to his spouse for her life, with payments commencing on Employee's Normal Retirement Date, and subsequent payments made as of each anniversary thereof. Solely for purposes of this Section 5.1, "Spouse" shall mean the spouse to whom Employee is married on his Retirement Date (regardless of whether that is the same spouse to whom he is married on his date of death), unless the Corporation is directed by a court of competent jurisdiction to treat someone else as Employee's "spouse."

(b) Not Married on Retirement Date: If Employee is not married on his Retirement Date, Employee's Normal Retirement Benefit shall be:

50% times Final Average Pay

payable annually for the life of Employee with a ten year certain guarantee, with payments commencing on Employee's Normal Retirement Date, and subsequent payments made on each anniversary thereof.

5.2. Early Retirement Benefit. This Section 5.2 describes the Retirement benefit payable by the Corporation in the event Employee Retires prior to his Normal Retirement Date. Employee may Retire from employment with the Corporation prior to his Normal Retirement Date on the first day of any month coincident with or next following the date he satisfies the vesting requirements of section 4.1. The date on which Employee Retires under this Section 5.2 shall be his Early Retirement Date. Employee's Early Retirement Benefit shall be paid in the form of an Actuarially Equivalent lump sum, as set forth in Section 5.3.

(a) Married on Early Retirement Date: If Employee is married on his Early Retirement Date, Employee's Early Retirement Benefit shall be:

50% times Final Average Pay

multiplied by the applicable percentage as set forth in the following schedule:

Age at which Early Retirement Benefits Commence	62	61	60
Applicable Percentage	100%	90	80

payable annually for the life of Employee with 50% of such amount continuing after Employee's death to his spouse for her life, with payments commencing on Employee's Early Retirement Date, and subsequent payments made on each anniversary thereof. Solely for purposes of this Section 5.2, "Spouse" shall mean the spouse to whom Employee is married on his Early Retirement Date (regardless of whether that is the same spouse to whom he is married on his date of death), unless the Corporation is directed by a court of competent jurisdiction to treat someone else as Employee's "spouse"

(b) Not Married on Early Retirement Date: If Employee is not married on his Early Retirement Date, Employee's Early Retirement Benefit shall be:

50% times Final Average Pay

multiplied by the applicable percentage as set forth in the following schedule:

Age at which Early Retirement Benefits Commence	62	61	60
Applicable Percentage	100%	90	80

payable annually for the life of Employee with a ten year certain guarantee, with payments commencing on Employee's Early Retirement Date, and subsequent payments made on each anniversary thereof.

5.3. Form of Payment:

Employee's Normal Retirement Benefit or Early Retirement Benefit, determined in accordance with section 5.1 or 5.2 as applicable, shall be paid in the form of a single lump sum that is Actuarially Equivalent to such Normal Retirement Benefit or Early Retirement Benefit. Such lump sum shall be paid on Employee's Retirement Date (or, if later, the earliest date permitted by Section 409A). No benefits shall be payable in the form of an annuity or in installments.

5.4. Delay of Payment to Specified Employee. Sections 5.1 through 5.3 of this Appendix A notwithstanding, in the event Employee is a Specified Employee on the date Employee Separates from Service, then any amount payable under this Appendix A as a result of such Separation from Service, other than amounts payable as a result of Employee's Permanent and Total Disability, shall not be made earlier than (a) the date that is six months after the date of such Employee's Retirement or, if earlier, (b) the date of the Employee's death. Employee's Retirement benefit shall be actuarially increased, in the manner determined by the Corporation, to account for such delayed commencement date.

5.5. Time of Payment: Where the provisions of this Appendix A require that a payment be made on a designated date, (for example, under Sections 5.1, 5.2, 5.3, and 5.4) such payment shall be deemed to have been made on such date if it is made as soon as administratively practicable following such date. In no event, however, shall payment be made later than the end of the calendar year containing such designated date or, if later, the 15<sup>th</sup> day of the third calendar month following such designated date. No adjustment shall be made to Employee's Retirement benefit as a result of any delay between the specified payment date and the actual payment date. In no event shall Employee be permitted to designate, directly or indirectly, the taxable year in which payment will be made.

5.6. Death While Employed by the Corporation. In the event Employee dies while employed by the Corporation, any benefits payable under this Appendix A shall be determined in accordance with Section 6.

5.7. Domestic Relations Orders. The payment of all or part of Employee's Retirement benefit may, in the sole discretion of the Corporation, be accelerated and paid to a person other than Employee if Corporation determines that such payment is necessary to fulfill a valid domestic relations order as defined in Section 414(p)(1)(B) of the Internal Revenue Code.

**6. Death While Employed by the Corporation**

6.1. General. In the event Employee dies while employed by the Corporation the death benefit payable under this Appendix A shall be as follows:

- (a) if Employee is married on his date of death, 50% of the lump sum that is Actuarially Equivalent to the Normal Retirement Benefit determined under Section 5.1(a) of this Appendix A, such lump sum benefit to be determined as if Employee Retired on his date of death after reaching Normal Retirement Age; or
- (b) if Employee is not married on his date of death, 50% of the lump sum that is Actuarially Equivalent to the Normal Retirement Benefit determined under Section 5.1(b) of this Appendix A, such lump sum benefit to be determined as if Employee Retired on his date of death after reaching Normal Retirement Age.

The death benefit shall be payable in a lump sum as soon as administratively practicable following Employee's date of death.

6.2. Payee. This death benefit shall be payable to Employee's (a) surviving spouse if Employee is married on his date of death, or (b) Beneficiary if Employee is not married on his date of death. "Surviving spouse" for purposes of this Section 6.2 means the spouse to whom Employee is married on his date of death.

7. Effect of a Change in Control of the Corporation. Anything in this Appendix A to the contrary notwithstanding, this Section 7 shall apply in the event of a Change in Control. If, within three years after the date of a Change in Control, Employee voluntarily Separates from Service with the Corporation for Good Reason, and employee is not otherwise eligible for Retirement, then Employee shall be deemed to have Retired with a fully vested Normal Retirement Benefit on the date of such Separation from Service.

Solely for purposes of this Section 7, "Good Reason" shall mean Employee's voluntary Separation from Service within 90 days following (i) a material diminution in Employee's positions, duties and responsibilities from those described in this Employment Agreement (ii) a reduction in Employee's Base Salary (other than a reduction which is part of a general salary reduction program affecting senior executives of the Corporation) (iii) a material reduction in the aggregate value of the pension and welfare benefits provided to Employee from those in effect prior to the Change in Control (other than a reduction which is proportionate to the reductions applicable to other senior executives pursuant to a cost-saving plan that includes all senior executives), (iv) a material breach of any provision of this Employment Agreement by the Corporation, (v) the Corporation's requiring Employee to be based at a location that creates for Employee a one way commute in excess of 60 miles from his primary residence, except for required travel on the Corporation's business to an extent substantially consistent with the business travel obligations of Employee under this Employment Agreement. Notwithstanding the foregoing, a termination shall not be treated as a termination for Good Reason (i) if Employee shall have consented in writing to the occurrence of the event giving rise to the claim of termination for Good Reason or (ii) unless Employee shall have delivered a written notice to the Corporation within 30 days of his having actual knowledge of the occurrence of one of such events stating that he intends to terminate his employment for Good Reason and specifying the factual basis for such termination, and such event, if capable of being cured, shall not have been cured within 30 days of the receipt of such notice.

8. Effect of termination of employment and rehire. Upon Employee's Retirement, the benefit payable under this Appendix A, if any, shall be determined by the Corporation and such

determination shall be conclusive and binding (subject to Section 14). If Employee is subsequently reemployed by the Corporation such reemployment, additional service, and additional compensation shall not result in a re-determination of the benefits due under this Appendix A.

**9. Administration.**

9.1. Powers of the Corporation: The Board of Directors of the Company (the "Board") shall have the sole authority to act on behalf of the Corporation under this Appendix A (subject to Section 9.3), and shall have all the powers necessary to administer the benefits under this Appendix A, including, without limitation, the power to interpret the provisions of this Appendix A and to establish rules and prescribe any forms required to administer benefits under this Appendix A

9.2. Actions of the Board: All determinations, interpretations, rules, and decisions of the Board shall be conclusive and binding upon all persons having or claiming to have any interest or right under this Appendix A.

9.3. Delegation: The Board shall have the power to delegate specific duties and responsibilities to officers or other employees of the Corporation or other individuals or entities. Any delegation by the Board may allow further delegations by the individual or entity to whom the delegation is made. Any delegation may be rescinded by the Board at any time. Each person or entity to whom a duty or responsibility has been delegated shall be responsible for the exercise of such duty or responsibility and shall not be responsible for any act or failure to act of any other person or entity.

9.4. Reports and Records: The Board and those to whom the Board has delegated duties under Section 9.3 shall keep records of all their proceedings and actions and shall maintain books of account, records, and other data as shall be necessary for the proper administration of this Appendix A and for compliance with applicable law.

9.5. Costs: The costs of providing and administering the benefits under this Appendix A shall be borne by the Corporation.

**10. Unfunded Benefits; Establishment of Trust.**

10.1. Unfunded Status. This Appendix A shall be unfunded for tax purposes and for purposes of Title 1 of ERISA.

10.2. Establishment of Trust. The Corporation shall not be required to set aside any funds to discharge its obligations hereunder, but may set aside such funds to informally fund all or part of its obligations hereunder if it chooses to do so, including without limitation the contribution of assets to a "rabbi trust" (the Trust). Any setting aside of amounts, or acquisition of any insurance policy or any other asset, by the Corporation with which to discharge its obligations hereunder in trust or otherwise, shall not be deemed to create any beneficial ownership interest in Employee, his surviving spouse, or Beneficiary, and legal and equitable title to any funds so set aside shall remain in the Corporation, and any recipient of benefits hereunder shall have no security or other interest in such funds. The rights of Employee and his surviving spouse and Beneficiary(ies) under this Appendix A shall be no greater than the rights of a general unsecured creditor of the Corporation. Any and all funds so set aside by the Corporation shall remain the general assets of the Corporation, and subject to the claims of its general creditors, present and future.

10.3. Interrelationship of this Appendix A and the Trust. The provisions of this Appendix A shall govern the rights of Employee to receive distributions pursuant to the provisions of this Appendix A. The provisions of the Trust shall govern the rights of the Corporation, Employee, and creditors of the Corporation to the assets transferred to the Trust. The Corporation shall at all times remain liable to carry out its obligations under this Appendix A.

10.4. Distributions from the Trust. The Corporation's obligations under this Appendix A may be satisfied with Trust assets distributed pursuant to the terms of the Trust, and any such distribution shall reduce the Corporation's obligation under this Appendix A.

**11. Payment of Benefit for Disabled or Incapacitated Person.** If the Corporation determines, in its discretion, that Employee or Employee's Beneficiary or surviving spouse is under a legal disability or is incapacitated in any way so as to be unable to manage his financial affairs, the Corporation may make any payment otherwise due under the terms of this Appendix A to such person or to his legal representative or to a friend or relative of such person as the Corporation considers advisable. Any payment under this Section 11 shall be a complete discharge of any liability for the making of such payment under this Appendix A. Nothing contained in this Section 11, however, should be deemed to impose upon the Corporation any liability for paying a benefit to any person who is under such a legal

disability or is so incapacitated unless it has received notice of such disability or incapacity from a competent source.

**12. Nonassignability.** Neither Employee nor any other person shall have any right to commute, sell, assign, transfer, pledge, anticipate, mortgage or otherwise encumber, transfer, hypothecate, alienate or convey in advance of actual receipt, the amounts, if any, payable hereunder, or any part thereof, which are, and all rights to which are expressly declared to be, unassignable and non-transferable. No part of the amounts payable shall, prior to actual payment, be subject to seizure, attachment, garnishment or sequestration for the payment of any debts, judgments, alimony or separate maintenance owed by Employee or any other person, be transferable by operation of law in the event of Employee's or any other person's bankruptcy or insolvency or be transferable to a spouse as a result of a property settlement or otherwise. The Corporation is authorized to make any payments directed by court order.

**13. Claim Procedure.**

13.1. Presentation of Claim. Employee, or the surviving spouse of Employee after Employee's death, or Employee's Beneficiary (such Employee, surviving spouse, or Beneficiary being referred to below as a "Claimant") may deliver to the Corporation a written claim for a determination with respect to the amounts distributable to such Claimant under this Appendix A. If such a claim relates to the contents of a notice received by the Claimant, the claim must be made within sixty (60) days after such notice was received by the Claimant. All other claims must be made within 180 days of the date on which the event that caused the claim to arise occurred. The claim must state with particularity the determination desired by the Claimant.

13.2. Notification of Decision.

(a) Claim for benefits other than Disability benefits. The Corporation shall consider a Claimant's claim within a reasonable time, but no later than ninety (90) days after receiving the claim. If the Corporation determines that special circumstances require an extension of time for processing the claim, written notice of the extension shall be furnished to the Claimant prior to the termination of the initial ninety (90) day period. In no event shall such extension exceed a period of ninety (90) days from the end of the initial period. The extension notice shall indicate the special circumstances requiring an extension of time and the date by which the Corporation expects to render the benefit determination.

(b) Claim for Disability benefits. If the claim relates to benefits in connection with Disability, the Corporation shall consider a Claimant's claim within a reasonable time, but no later than forty-five (45) days after receiving the claim. If the Corporation determines that, due to matters beyond the control of the Plan, the Corporation will not be able to respond to the claim within such 45-day period, the Corporation may extend the response period for one or two additional periods of up to 30 days each by providing the Claimant with notice describing the circumstances that necessitate the extension and the date as of which the Corporation anticipates that it will render its decision. Each such notice must be conveyed to the Claimant prior to the commencement of an extension.

(c) Notification. The Corporation shall notify the Claimant, in writing, within the time periods specified in Section 13.2(a) or (b), as applicable:

- (1) that the Claimant's requested determination has been made, and that the claim has been allowed in full; or
  - (2) that the Corporation has reached a conclusion contrary, in whole or in part, to the Claimant's requested determination, and such notice must set forth in a manner calculated to be understood by the Claimant:
    - (A) the specific reason(s) for the denial of the claim, or any part of it;
    - (B) specific reference(s) to pertinent provisions of this Appendix A upon which such denial was based;
    - (C) a description of any additional material or information necessary for the Claimant to perfect the claim, and an explanation of why such material or information is necessary;
    - (D) an explanation of the claim review procedure set forth in Section 13.3 below; and
    - (E) a statement of the Claimant's right to bring a civil action under ERISA Section 502(a) following an adverse benefit determination on review.
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13.3. Review of a Denied Claim.

(a) Claim for benefits other than Disability benefits. On or before sixty (60) days after receiving a notice from the Corporation that a claim has been denied, in whole or in part, a Claimant (or the Claimant's duly authorized representative) may file with the Corporation a written request for a review of the denial of the claim. The Claimant (or the Claimant's duly authorized representative):

- (a) may, upon request and free of charge, have reasonable access to, and copies of, all documents, records and other information relevant to the claim for benefits;
- (b) may submit written comments or other documents; and/or
- (c) may request a hearing, which the Corporation, in its sole discretion, may grant.

The Corporation shall render its decision on review promptly, and no later than sixty (60) days after the Corporation receives the Claimant's written request for a review of the denial of the claim. If the Corporation determines that special circumstances require an extension of time for processing the claim, written notice of the extension shall be furnished to the Claimant prior to the termination of the initial sixty (60) day period. In no event shall such extension exceed a period of sixty (60) days from the end of the initial period. The extension notice shall indicate the special circumstances requiring an extension of time and the date by which the Corporation expects to render the benefit determination. In rendering its decision, the Corporation shall take into account all comments, documents, records and other information submitted by the Claimant relating to the claim, without regard to whether such information was submitted or considered in the initial benefit determination. The decision must be written in a manner calculated to be understood by the Claimant, and it must contain:

- (1) specific reasons for the decision;
- (2) specific reference(s) to the pertinent provisions of this Appendix A upon which the decision was based;
- (3) a statement that the Claimant is entitled to receive, upon request and free of charge, reasonable access to and copies of, all documents, records and other information relevant (as defined in applicable ERISA regulations) to the Claimant's claim for

benefits; and

(4) a statement of the Claimant's right to bring a civil action under ERISA Section 502(a).

(b) Claim for Disability benefits. If the claim relates to benefits in connection with Disability, the procedure described in Section 13.3(a) above shall apply, modified as follows:

(1) All references to 60 days shall be changed to 45 days, except that a Claimant shall have 180 days to file an appeal.

(2) The Corporation shall designate an individual to conduct the review who is not the individual who made the initial adverse determination, and is not a subordinate of such individual.

(3) The notice of extension shall describe the circumstances that require the extension; must include the date as of which the Corporation anticipates that it will render its decision; and must be communicated to the Claimant prior to the commencement of the extension.

(4) The review shall not afford deference to the initial adverse benefit determination.

(5) When the appeal is based on a medical judgment, the Corporation shall consult with a health care professional who has appropriate experience and training in the field involved in determining the Claimant's Disability and shall identify all medical and vocational experts whose advice was obtained in connection with the appeal. A health care professional may not be consulted under this Section 7.10(b)(3)(ii)(E) if the health care professional (or a subordinate of such individual) was consulted in connection with the initial claim for benefits.

(6) If the Corporation makes an adverse benefit determination on review, the Corporation shall provide the Claimant with a statement that the Claimant is entitled to receive or request reasonable access to, and copies of, all information relevant to the claim for benefits, including internal rules, guidelines, and protocols (to the extent relied upon) and a statement regarding voluntary alternative dispute resolution options.

13.4. Disability Benefits. For purposes of this Article 13, "Disability benefits" means a benefit payable under this Appendix A that is conditioned upon the Corporation's determination that Employee is Permanently and Totally Disabled. If the Corporation does not make such determination, but instead relies solely upon the determination of the Social Security Administration's determination that Employee is disabled, then Sections 13.2(b) and 13.3(b) shall not apply, and any claims by Employee shall instead be reviewed under the provisions of this Article 13 for benefits other than Disability benefits.

13.5. Legal Action. A Claimant's compliance with the foregoing provisions of this Article 13 is a mandatory prerequisite to a Claimant's right to commence any legal action with respect to any claim for benefits under this Appendix A.

**14. Tax Withholding and Reporting; Section 280G Excise Taxes.**

(a) General. The Corporation shall have the right to deduct any required withholding taxes from any payment made under this Appendix A. Except as provided in Section 14(b), the Corporation shall not be obligated to pay or reimburse Employee, or his surviving spouse or Beneficiary, for any income or other taxes or penalties that may be imposed on such person by the Internal Revenue Service or any state or other taxing authority as a result of benefits paid under this Appendix A.

(b) Excise Tax Payment. In the event that any payment or benefit (within the meaning of Section 280G(b)(2) of the Internal Revenue Code of 1986, as amended (the "Code")), to Employee or for his benefit paid or payable or distributed or distributable pursuant to the terms of this Employment Agreement (including this Appendix A) or otherwise in connection with, or arising out of, his employment with the Corporation or a Change in Control of the Corporation (a "Payment" or "Payments"), would be subject to the excise tax imposed by Section 4999 of the Code or any interest or penalties are incurred by the Employee with respect to such excise tax (such excise tax, together with any such interest and penalties, are hereinafter collectively referred to as the "Excise Tax"), then Employee will be entitled to immediately receive an additional payment (a "Gross-Up Payment") from the Corporation in an amount such that after payment by Employee of all taxes (including any interest or penalties, other than interest and penalties imposed by reason of Employee's failure to file timely a tax return or pay taxes shown due on his return, imposed with respect to such taxes and the Excise Tax), including any Excise Tax imposed upon the Gross-Up Payment,

Employee retains an amount of the Gross-Up Payment equal to the Excise Tax imposed upon the Payments.

15. **Successors.** The provisions of this Appendix A shall bind and inure to the benefit of the Corporation and its successors and assigns and Employee and Employee's surviving spouse and designated beneficiaries.

16. **Amendment.** This Appendix A may be amended only by written agreement between Employee and the Corporation.

Agreed to and executed this 10th day of November, 2008.

MKS Instruments, Inc.

By: /s/ Phil Zucchi  
Phil Zucchi, Vice President of Global HR

/s/ Leo Berlinghieri  
Leo Berlinghieri

Whereas, MKS Instruments, Inc. ("the "Company") and Ronald C. Weigner ("Employee") have entered into an employment agreement dated July 1, 2005, Appendix A of which includes deferred compensation benefits, and

Whereas, such deferred compensation benefits are subject to the provisions of Internal Revenue Code Section 409A, and

Whereas Appendix A has been administered in accordance with the provisions of Section 409A as of January 1, 2005, and

Whereas, Appendix A must be formally amended in writing on or before December 31, 2008, to incorporate applicable provisions of Section 409A in order to avoid potentially adverse tax consequences to Employee,

Now, therefore, in accordance with Section 16 of Appendix A, the Company and Employee hereby agree that Appendix A of the Agreement is amended in its entirety to read as follows, effective as of November 10, 2008:

**APPENDIX A**  
**Supplemental Retirement Benefits**

1. **Purpose.** (a) **General:** The purpose of this Appendix A is to provide Employee with supplemental retirement benefits to encourage his continued employment with the Corporation. Benefits will be payable only if Employee fully complies with all of the requirements of this Appendix A.

(b) **For Benefit of Employee Only:** Benefits under this Appendix A are provided for the benefit of Employee only. No other employee shall accrue any rights of any kind as a result of the existence of the arrangement described in this Appendix A. Supplemental retirement benefits may be provided to an employee only as specifically authorized by the Board of Directors of the Corporation.

(c) **Internal Revenue Code Section 409A:** The provisions of this Appendix A shall be interpreted in a manner consistent with the requirements of Section 409A of the Internal Revenue Code.

2. **Definitions.** As used in this Appendix A, the following terms have the meanings set forth below, unless a different meaning is required by the context:

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2.1. "Actuarially Equivalent" means a benefit of equivalent value to another benefit, determined on the following basis:

Interest Rate: The average annual interest rate on 10-year Treasury securities as published by the Federal Reserve for the calendar quarter immediately preceding the calendar quarter in which the actuarially equivalent benefit is being determined plus 25 basis points; and

Mortality: The most recent "applicable mortality table" prescribed by Section 417(e)(3)(A)(ii) of the Internal Revenue Code (or a successor provision as determined by the Corporation).

2.2. "Base salary:" means base salary as defined in the Employment Agreement, before any pre-tax salary reductions for participation in any benefits plan of the Corporation.

2.3. "Beneficiary:" means one or more persons, trusts, estates or other entities, designated by Employee to receive death benefits under Section 6.1(b) of this Appendix A upon Employee's death. If Employee fails to designate a Beneficiary or if all designated Beneficiaries predecease Employee, then such death benefits shall be payable to the executor or personal representative of Employee's estate.

Employee shall designate his Beneficiary by completing and signing a beneficiary designation form prescribed by the Corporation, and returning it to the Corporation or its designated agent. Employee shall have the right to change a Beneficiary by completing, signing and otherwise complying with the terms of the beneficiary designation form and the Corporation's rules and procedures, as in effect from time to time. Upon the acceptance by the Corporation of a new beneficiary designation form, all Beneficiary designations previously filed shall be canceled. The Corporation shall be entitled to rely on the last beneficiary designation form filed by Employee and accepted by the Corporation prior to his or her death. No designation or change in designation of a Beneficiary shall be effective until received and acknowledged in writing by the Corporation or its designated agent. If the Corporation has any doubt as to the proper Beneficiary to receive payments pursuant to this Appendix A, the Corporation shall have the right, exercisable in its discretion, to withhold such payments until this matter is resolved to the Corporation's satisfaction.

2.4. "Bonus" means a bonus paid under the Corporation's Management Incentive Program.

2.5. "Change in Control" means the first to occur of any of the following events:

- (a) Any "person" (as that term is used in Section 13 and 14(d)(2) of the Securities Exchange Act of 1934 ("Exchange Act")) becomes the beneficial owner (as that term is used in Section 13(d) of the Exchange Act), directly or indirectly, of fifty percent (50%) or more of the Company's capital stock entitled to vote in the election of directors;
- (b) The shareholders of the Company approve any consolidation or merger of the Company, other than a consolidation or merger of the Company in which the holders of the common stock of the Company immediately prior to the consolidation or merger hold more than fifty percent (50%) of the common stock of the surviving corporation immediately after the consolidation or merger;
- (c) The shareholders of the Company approve any plan or proposal for the liquidation or dissolution of the Company; or
- (d) The shareholders of the Company approve the sale or transfer of all or substantially all of the assets of the Company to parties that are not within a "controlled group of corporations" (as defined in Code Section 1563) in which the Company is a member.

2.6. "Corporation" means MKS Instruments, Inc. (the "Company") and any corporation, trust, association or enterprise which is required to be considered, together with the Corporation, as one employer pursuant to the provisions of Sections 414(b), 414(c), 414(m) or 414(o) of the Code. For purposes of applying Code sections 1563(a)(1), (2), and (3) and regulation section 1.414(c)-2 to the determination of companies under common control for purposes of this Appendix A, 80% shall be used instead of "at least 80%" each place it appears in such sections.

2.7. "Compensation" for any calendar year means the sum of Employee's Base Salary for such year plus any Bonus paid in such year.

2.8. "Early Retirement Benefit" means the Retirement benefit determined under Section 5.2 of this Appendix A upon Employee's Retirement prior to his Normal Retirement Date.

- 2.9. "Employment Agreement" means the Employment Agreement between Employee and the Corporation that contains this Appendix A.
- 2.10. "Final Average Pay" means, for purposes of Section 5 the average of Employee's three (3) highest years of Compensation during the ten (10) calendar year period immediately preceding the calendar year in which Employee Retires, and for purposes of determining death benefits under Section 6 the average of Employee's three (3) highest years of Compensation during the ten (10) calendar year period immediately preceding the calendar year containing Employee's date of death. The foregoing notwithstanding, any calendar year in which Employee has no Compensation from the Corporation shall be ignored in determining such ten calendar year period.
- 2.11. "Normal Retirement Age" means Employee's 65th birthday or, if earlier, the date Employee is deemed to have Retired in accordance with Section 2.15(b).
- 2.12. "Normal Retirement Benefit" means the Retirement benefit determined under Section 5.1 of this Appendix A upon Employee's Retirement on or after his Normal Retirement Date.
- 2.13. "Normal Retirement Date" means the first day of the month in which Employee attains Normal Retirement Age.
- 2.14. "Permanent and Total Disability" means (a) Employee is unable to engage in any substantial gainful activity by reason of any medically determinable physical or mental impairment that can be expected to result in death or can be expected to last for a continuous period of not less than 12 months, or (b) Employee is, by reason of any medically determinable physical or mental impairment that can be expected to result in death or can be expected to last for a continuous period of not less than 12 months, receiving income replacement benefits for a period of not less than three months under an accident and health plan covering employees of the Corporation. Employee shall be conclusively presumed to be Permanently and Totally Disabled upon determination that he is disabled by the Social Security Administration.
- 2.15. "Retirement" or "Retires" or "Retired" means the earlier of:
- (a) Employee's Separation from Service with the Corporation upon or after satisfying the vesting requirements of Section 4.1, or

(b) Employee's deemed Retirement. Employee shall be deemed to have Retired with a fully vested Normal Retirement Benefit on the earliest of (i) the date he becomes Permanently and Totally Disabled, (ii) the date of Employee's Separation from Service as a result of the Corporation's termination of Employee's employment with the Corporation for any reason other than Termination for Cause as defined in Section 2.21 of this Appendix A, (iii) the date of Employee's death while employed by the Corporation, or (iv) the date of Employee's qualifying Separation from Service following a Change in Control in accordance with the provisions of Section 7 of this Appendix A.

2.16. "Retirement Date" means the date Employee Retires or is deemed to have Retired in accordance with Section 2.15 of this Appendix A. The term "Retirement Date" shall include Employee's Early Retirement Date as defined in Section 5.2 of this Appendix A.

2.17. "Section 409A" means Section 409A of the Internal Revenue Code, as the same may be amended from time to time, and any successor statute thereto. References in this Appendix A to Section 409A shall be deemed to mean and include any published guidance, regulations, notices, rulings and similar announcements issued by the Internal Revenue Service or by the Secretary of the Treasury under or interpreting Section 409A, decisions by any court of competent jurisdiction involving a Participant or a beneficiary and any closing agreement made under section 7121 of the Code that is approved by the Internal Revenue Service and involves a Participant, all as determined by the Corporation in good faith, which determination may (but shall not be required to) be made in reliance on the advice of such tax counsel or other tax professional(s) with whom the Corporation from time to time may elect to consult with respect to any such matter.

2.18. "Separates from Service" or "Separation from Service" means Employee's separation from service with the Corporation as a result of death retirement, or any other reason, except that for purposes of this section 2.18 the employment relationship is treated as continuing intact while Employee is on military leave, sick leave, or other bona fide leave of absence if the period of such leave does not exceed six months, or if longer, so long as Employee retains a right to reemployment with the Corporation under an applicable statute or by contract. For purposes of this Section 2.18 a leave of absence constitutes a bona fide leave of absence only if there is a reasonable expectation that the employee will return to perform services for the employer. If the period of leave exceeds six months and the individual does not retain a right

to reemployment under an applicable statute or by contract, the employment relationship is deemed to terminate on the first date immediately following such six-month period. Whether an Employee has a Separation from Service shall be determined in accordance with the provisions of Section 409A, and regulations thereunder, and any other applicable guidance.

2.19. "Specified Employee" means, at any time when stock of the Corporation is publicly traded on an established securities market or otherwise (as determined in accordance with Section 409A), an employee who is a "specified employee" within the meaning of Section 409A. The Corporation shall have the discretion to use any alternative permitted under Section 409A to determine whether Employee is a Specified Employee, and to take any action necessary to make such alternative binding.

2.20. "Termination of Employment" means, for purposes of Section 4.6 of this Appendix A, Termination for Cause, or Employee's voluntary severance from employment with the Corporation (within the meaning of the Corporation's normal policies and procedures) for any reason other than Retirement.

2.21. "Termination for Cause" means, solely for purposes of this Appendix A, termination of Employee's employment by the Corporation as a result of Employee's conviction for the commission of a felony, material breach of any employment or other agreements between Employee and the Corporation, or willful failure to perform the material responsibilities of his position with the Corporation.

2.22. "Trust" means a Trust established pursuant to Section 10 of this Appendix A.

### **3. Eligibility for Retirement Benefits.**

3.1. General: Subject to Sections 4.2, 4.3, 4.4, and 4.5 the Corporation shall pay the retirement benefits described in this Appendix A only if Employee Retires from employment with the Corporation upon or after satisfying the vesting requirements set forth in Section 4.1, or upon Employee's deemed Retirement pursuant to Section 2.15(b).

### **4. Vesting.**

4.1 General: Except as provided in Sections 4.2, 4.3, 4.4, and 4.5, and subject to Section 10.1, Employee's benefits under this Appendix A shall be fully vested and nonforfeitable if Employee satisfies both (a) and (b) while employed with the Corporation:

(a) attains age 60, and

(b) has 25 years of service with the Corporation. Employee shall have 25 years of service on the 25<sup>th</sup> anniversary of Employee's original hire date.

The foregoing notwithstanding, Employee shall be fully vested in his benefit under this Appendix A upon Employee's deemed Retirement pursuant to Section 2.15(b) of this Appendix A.

4.2. Termination for Cause: All benefits shall be forfeited, and no amount shall be payable under this Appendix A, in the event of Employee's Termination for Cause.

4.3. Compliance with Noncompete, Nondisclosure, and Nonsolicitation Agreements. All benefits under this Appendix A are expressly conditioned upon Employee's compliance with the terms of any noncompetition, nondisclosure, or nonsolicitation provisions contained in the Employment Agreement, or in any other agreement between Employee and the Corporation. All benefits payable under this Appendix A shall be forfeited, and no amount shall be payable, in the event Employee violates the terms of any such provisions. If Employee violates the terms of any such provisions, and benefit payments have commenced to Employee, any such payments shall cease, and Employee shall repay all previously paid benefits to the Corporation upon demand. If Employee fails to repay such amounts upon demand, the Corporation shall have the right to take any action necessary to recover such payments from Employee.

4.4. Notice of Intent to Retire. Benefits payable under this Appendix A are specifically conditioned upon Employee providing to the Corporation written notice of Employee's intent to Retire at least six months prior to Employee's Retirement date. In the event Employee fails to satisfy the notice requirements of this Section 4.4, all benefits shall be forfeited, and no amount shall be payable under this Appendix A. The foregoing notwithstanding, the Corporation, in its sole and absolute discretion, may elect to waive the notice requirement of this Section 4.4. The foregoing notwithstanding, this Section 4.4 shall not apply to death

benefits payable under Section 6 of this Appendix A, or to Retirement benefits payable under Section 5 as a result of Employee's deemed Retirement pursuant to Section 2.15(b).

4.5. Release. Benefits payable under this Appendix A (other than death benefits payable under Section 6) are specifically conditioned upon and provided in exchange for Employee signing a separation agreement that releases the Corporation from any liabilities that may have arisen as a result of Employee's employment and/or termination of employment with the Corporation. In the event Employee terminates employment with the Corporation for any reason other than death (including Retirement) without satisfying the requirements of this Section 4.5 all benefits shall be forfeited, and no amount shall be payable under this Appendix A.

4.6. Termination of Employment Prior to Satisfying Vesting Requirements. No benefits are payable under this Appendix A upon Employee's Termination of Employment with the Corporation prior to satisfying the vesting requirements set forth in Section 4.1.

**5. Retirement Benefits.**

5.1. Normal Retirement Benefit. This Section 5.1 describes the Retirement benefit payable by the Corporation in the event Employee Retires on or after his Normal Retirement Date. Employee's Normal Retirement Benefit shall be paid in the form of an Actuarially Equivalent lump sum, as set forth in Section 5.3.

(a) Married on Retirement Date: If Employee is married on his Retirement Date, Employee's Normal Retirement Benefit shall be:

50% times Final Average Pay

payable annually for the life of Employee with 50% of such amount continuing after Employee's death to his spouse for her life, with payments commencing on Employee's Normal Retirement Date, and subsequent payments made as of each anniversary thereof. Solely for purposes of this Section 5.1, "Spouse" shall mean the spouse to whom Employee is married on his Retirement Date (regardless of whether that is the same spouse to whom he is married on his date of death), unless the Corporation is directed by a court of competent jurisdiction to treat someone else as Employee's "spouse."

(b) Not Married on Retirement Date: If Employee is not married on his Retirement Date, Employee's Normal Retirement Benefit shall be:

50% times Final Average Pay

payable annually for the life of Employee with a ten year certain guarantee, with payments commencing on Employee's Normal Retirement Date, and subsequent payments made on each anniversary thereof.

5.2. Early Retirement Benefit. This Section 5.2 describes the Retirement benefit payable by the Corporation in the event Employee Retires prior to his Normal Retirement Date. Employee may Retire from employment with the Corporation prior to his Normal Retirement Date on the first day of any month coincident with or next following the date he satisfies the vesting requirements of section 4.1. The date on which Employee Retires under this Section 5.2 shall be his Early Retirement Date. Employee's Early Retirement Benefit shall be paid in the form of an Actuarially Equivalent lump sum, as set forth in Section 5.3.

(a) Married on Early Retirement Date: If Employee is married on his Early Retirement Date, Employee's Early Retirement Benefit shall be:

50% times Final Average Pay

multiplied by the applicable percentage as set forth in the following schedule:

Age at which Early Retirement Benefits Commence	64	63	62	61	60
Applicable Percentage	90%	80	60	40	20

payable annually for the life of Employee with 50% of such amount continuing after Employee's death to his spouse for her life, with payments commencing on Employee's Early Retirement Date, and subsequent payments made on each anniversary thereof. Solely for purposes of this Section 5.2, "Spouse" shall mean the spouse to whom Employee is married on his Early Retirement Date (regardless of whether that is the same spouse to whom he is married on his date of death), unless the Corporation is directed by a court of competent jurisdiction to treat someone else as Employee's "spouse"

(b) Not Married on Early Retirement Date: If Employee is not married on his Early Retirement Date, Employee's Early Retirement Benefit shall be:

50% times Final Average Pay

multiplied by the applicable percentage as set forth in the following schedule:

Age at which Early Retirement Benefits Commence	64	63	62	61	60
Applicable Percentage	90%	80	60	40	20

payable annually for the life of Employee with a ten year certain guarantee, with payments commencing on Employee's Early Retirement Date, and subsequent payments made on each anniversary thereof.

5.3. Form of Payment:

Employee's Normal Retirement Benefit or Early Retirement Benefit, determined in accordance with section 5.1 or 5.2 as applicable, shall be paid in the form of a single lump sum that is Actuarially Equivalent to such Normal Retirement Benefit or Early Retirement Benefit. Such lump sum shall be paid on Employee's Retirement Date (or, if later, the earliest date permitted by Section 409A). No benefits shall be payable in the form of an annuity or in installments.

5.4. Delay of Payment to Specified Employee. Sections 5.1 through 5.3 of this Appendix A notwithstanding, in the event Employee is a Specified Employee on the date Employee Separates from Service, then any amount payable under this Appendix A as a result of such Separation from Service, other than amounts payable as a result of Employee's Permanent and Total Disability, shall not be made earlier than (a) the date that is six months after the date of such Employee's Retirement or, if earlier, (b) the date of the Employee's death. Employee's Retirement benefit shall be actuarially increased, in the manner determined by the Corporation, to account for such delayed commencement date.

5.5. Time of Payment: Where the provisions of this Appendix A require that a payment be made on a designated date, (for example, under Sections 5.1, 5.2, 5.3, and 5.4) such payment shall be deemed to have been made on such date if it is made as soon as administratively practicable following such date. In no event, however, shall payment be made later than the end of the calendar year containing such designated date or, if later, the 15<sup>th</sup> day of the third calendar month following such designated date. No adjustment shall be made to Employee's Retirement benefit as a result of any delay between the specified payment date and the actual payment date. In no event shall Employee be permitted to designate, directly or indirectly, the taxable year in which payment will be made.

5.6. Death While Employed by the Corporation. In the event Employee dies while employed by the Corporation, any benefits payable under this Appendix A shall be determined in accordance with Section 6.

5.7. Domestic Relations Orders. The payment of all or part of Employee's Retirement benefit may, in the sole discretion of the Corporation, be accelerated and paid to a person other than Employee if Corporation determines that such payment is necessary to fulfill a valid domestic relations order as defined in Section 414(p)(1)(B) of the Internal Revenue Code.

**6. Death While Employed by the Corporation.**

6.1. General. In the event Employee dies while employed by the Corporation the death benefit payable under this Appendix A shall be as follows:

- (a) if Employee is married on his date of death, 50% of the lump sum that is Actuarially Equivalent to the Normal Retirement Benefit determined under Section 5.1(a) of this Appendix A, such lump sum benefit to be determined as if Employee Retired on his date of death after reaching Normal Retirement Age; or
- (b) if Employee is not married on his date of death, 50% of the lump sum that is Actuarially Equivalent to the Normal Retirement Benefit determined under Section 5.1(b) of this Appendix A, such lump sum benefit to be determined as if Employee Retired on his date of death after reaching Normal Retirement Age.

The death benefit shall be payable in a lump sum as soon as administratively practicable following Employee's date of death.

6.2. Payee. This death benefit shall be payable to Employee's (a) surviving spouse if Employee is married on his date of death, or (b) Beneficiary if Employee is not married on his date of death. "Surviving spouse" for purposes of this Section 6.2 means the spouse to whom Employee is married on his date of death.

7. Effect of a Change in Control of the Corporation. Anything in this Appendix A to the contrary notwithstanding, this Section 7 shall apply in the event of a Change in Control. If, within three years after the date of a Change in Control, Employee voluntarily Separates from Service with the Corporation for Good Reason, and employee is not otherwise eligible for Retirement, then Employee shall be deemed to have Retired with a fully vested Normal Retirement Benefit on the date of such Separation from Service.

Solely for purposes of this Section 7, "Good Reason" shall mean Employee's voluntary Separation from Service within 90 days following (i) a material diminution in Employee's positions, duties and responsibilities from those described in this Employment Agreement (ii) a reduction in Employee's Base Salary (other than a reduction which is part of a general salary reduction program affecting senior executives of the Corporation) (iii) a material reduction in the aggregate value of the pension and welfare benefits provided to Employee from those in effect prior to the Change in Control (other than a reduction which is proportionate to the reductions applicable to other senior executives pursuant to a cost-saving plan that includes all senior executives), (iv) a material breach of any provision of this Employment Agreement by the Corporation, (v) the Corporation's requiring Employee to be based at a location that creates for Employee a one way commute in excess of 60 miles from his primary residence, except for required travel on the Corporation's business to an extent substantially consistent with the business travel obligations of Employee under this Employment Agreement. Notwithstanding the foregoing, a termination shall not be treated as a termination for Good Reason (i) if Employee shall have consented in writing to the occurrence of the event giving rise to the claim of termination for Good Reason or (ii) unless Employee shall have delivered a written notice to the Corporation within 30 days of his having actual knowledge of the occurrence of one of such events stating that he intends to terminate his employment for Good Reason and specifying the factual basis for such termination, and such event, if capable of being cured, shall not have been cured within 30 days of the receipt of such notice.

8. Effect of termination of employment and rehire. Upon Employee's Retirement, the benefit payable under this Appendix A, if any, shall be determined by the Corporation and such

determination shall be conclusive and binding (subject to Section 14). If Employee is subsequently reemployed by the Corporation such reemployment, additional service, and additional compensation shall not result in a re-determination of the benefits due under this Appendix A.

**9. Administration.**

9.1. Powers of the Corporation: The Board of Directors of the Company (the "Board") shall have the sole authority to act on behalf of the Corporation under this Appendix A (subject to Section 9.3), and shall have all the powers necessary to administer the benefits under this Appendix A, including, without limitation, the power to interpret the provisions of this Appendix A and to establish rules and prescribe any forms required to administer benefits under this Appendix A

9.2. Actions of the Board: All determinations, interpretations, rules, and decisions of the Board shall be conclusive and binding upon all persons having or claiming to have any interest or right under this Appendix A.

9.3. Delegation: The Board shall have the power to delegate specific duties and responsibilities to officers or other employees of the Corporation or other individuals or entities. Any delegation by the Board may allow further delegations by the individual or entity to whom the delegation is made. Any delegation may be rescinded by the Board at any time. Each person or entity to whom a duty or responsibility has been delegated shall be responsible for the exercise of such duty or responsibility and shall not be responsible for any act or failure to act of any other person or entity.

9.4. Reports and Records: The Board and those to whom the Board has delegated duties under Section 9.3 shall keep records of all their proceedings and actions and shall maintain books of account, records, and other data as shall be necessary for the proper administration of this Appendix A and for compliance with applicable law.

9.5. Costs: The costs of providing and administering the benefits under this Appendix A shall be borne by the Corporation.

**10. Unfunded Benefits; Establishment of Trust.**

10.1. Unfunded Status. This Appendix A shall be unfunded for tax purposes and for purposes of Title 1 of ERISA.

10.2. Establishment of Trust. The Corporation shall not be required to set aside any funds to discharge its obligations hereunder, but may set aside such funds to informally fund all or part of its obligations hereunder if it chooses to do so, including without limitation the contribution of assets to a "rabbi trust" (the Trust). Any setting aside of amounts, or acquisition of any insurance policy or any other asset, by the Corporation with which to discharge its obligations hereunder in trust or otherwise, shall not be deemed to create any beneficial ownership interest in Employee, his surviving spouse, or Beneficiary, and legal and equitable title to any funds so set aside shall remain in the Corporation, and any recipient of benefits hereunder shall have no security or other interest in such funds. The rights of Employee and his surviving spouse and Beneficiary(ies) under this Appendix A shall be no greater than the rights of a general unsecured creditor of the Corporation. Any and all funds so set aside by the Corporation shall remain the general assets of the Corporation, and subject to the claims of its general creditors, present and future.

10.3. Interrelationship of this Appendix A and the Trust. The provisions of this Appendix A shall govern the rights of Employee to receive distributions pursuant to the provisions of this Appendix A. The provisions of the Trust shall govern the rights of the Corporation, Employee, and creditors of the Corporation to the assets transferred to the Trust. The Corporation shall at all times remain liable to carry out its obligations under this Appendix A.

10.4. Distributions from the Trust. The Corporation's obligations under this Appendix A may be satisfied with Trust assets distributed pursuant to the terms of the Trust, and any such distribution shall reduce the Corporation's obligation under this Appendix A.

**11. Payment of Benefit for Disabled or Incapacitated Person.** If the Corporation determines, in its discretion, that Employee or Employee's Beneficiary or surviving spouse is under a legal disability or is incapacitated in any way so as to be unable to manage his financial affairs, the Corporation may make any payment otherwise due under the terms of this Appendix A to such person or to his legal representative or to a friend or relative of such person as the Corporation considers advisable. Any payment under this Section 11 shall be a complete discharge of any liability for the making of such payment under this Appendix A. Nothing contained in this Section 11, however, should be deemed to impose upon the Corporation any liability for paying a benefit to any person who is under such a legal

disability or is so incapacitated unless it has received notice of such disability or incapacity from a competent source.

**12. Nonassignability.** Neither Employee nor any other person shall have any right to commute, sell, assign, transfer, pledge, anticipate, mortgage or otherwise encumber, transfer, hypothecate, alienate or convey in advance of actual receipt, the amounts, if any, payable hereunder, or any part thereof, which are, and all rights to which are expressly declared to be, unassignable and non-transferable. No part of the amounts payable shall, prior to actual payment, be subject to seizure, attachment, garnishment or sequestration for the payment of any debts, judgments, alimony or separate maintenance owed by Employee or any other person, be transferable by operation of law in the event of Employee's or any other person's bankruptcy or insolvency or be transferable to a spouse as a result of a property settlement or otherwise. The Corporation is authorized to make any payments directed by court order.

**13. Claim Procedure.**

13.1. Presentation of Claim. Employee, or the surviving spouse of Employee after Employee's death, or Employee's Beneficiary (such Employee, surviving spouse, or Beneficiary being referred to below as a "Claimant") may deliver to the Corporation a written claim for a determination with respect to the amounts distributable to such Claimant under this Appendix A. If such a claim relates to the contents of a notice received by the Claimant, the claim must be made within sixty (60) days after such notice was received by the Claimant. All other claims must be made within 180 days of the date on which the event that caused the claim to arise occurred. The claim must state with particularity the determination desired by the Claimant.

13.2. Notification of Decision.

(a) Claim for benefits other than Disability benefits. The Corporation shall consider a Claimant's claim within a reasonable time, but no later than ninety (90) days after receiving the claim. If the Corporation determines that special circumstances require an extension of time for processing the claim, written notice of the extension shall be furnished to the Claimant prior to the termination of the initial ninety (90) day period. In no event shall such extension exceed a period of ninety (90) days from the end of the initial period. The extension notice shall indicate the special circumstances requiring an extension of time and the date by which the Corporation expects to render the benefit determination.

(b) Claim for Disability benefits. If the claim relates to benefits in connection with Disability, the Corporation shall consider a Claimant's claim within a reasonable time, but no later than forty-five (45) days after receiving the claim. If the Corporation determines that, due to matters beyond the control of the Plan, the Corporation will not be able to respond to the claim within such 45-day period, the Corporation may extend the response period for one or two additional periods of up to 30 days each by providing the Claimant with notice describing the circumstances that necessitate the extension and the date as of which the Corporation anticipates that it will render its decision. Each such notice must be conveyed to the Claimant prior to the commencement of an extension.

(c) Notification. The Corporation shall notify the Claimant, in writing, within the time periods specified in Section 13.2(a) or (b), as applicable:

- (1) that the Claimant's requested determination has been made, and that the claim has been allowed in full; or
  - (2) that the Corporation has reached a conclusion contrary, in whole or in part, to the Claimant's requested determination, and such notice must set forth in a manner calculated to be understood by the Claimant:
    - (A) the specific reason(s) for the denial of the claim, or any part of it;
    - (B) specific reference(s) to pertinent provisions of this Appendix A upon which such denial was based;
    - (C) a description of any additional material or information necessary for the Claimant to perfect the claim, and an explanation of why such material or information is necessary;
    - (D) an explanation of the claim review procedure set forth in Section 13.3 below; and
    - (E) a statement of the Claimant's right to bring a civil action under ERISA Section 502(a) following an adverse benefit determination on review.
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13.3. Review of a Denied Claim.

(a) Claim for benefits other than Disability benefits. On or before sixty (60) days after receiving a notice from the Corporation that a claim has been denied, in whole or in part, a Claimant (or the Claimant's duly authorized representative) may file with the Corporation a written request for a review of the denial of the claim. The Claimant (or the Claimant's duly authorized representative):

- (a) may, upon request and free of charge, have reasonable access to, and copies of, all documents, records and other information relevant to the claim for benefits;
- (b) may submit written comments or other documents; and/or
- (c) may request a hearing, which the Corporation, in its sole discretion, may grant.

The Corporation shall render its decision on review promptly, and no later than sixty (60) days after the Corporation receives the Claimant's written request for a review of the denial of the claim. If the Corporation determines that special circumstances require an extension of time for processing the claim, written notice of the extension shall be furnished to the Claimant prior to the termination of the initial sixty (60) day period. In no event shall such extension exceed a period of sixty (60) days from the end of the initial period. The extension notice shall indicate the special circumstances requiring an extension of time and the date by which the Corporation expects to render the benefit determination. In rendering its decision, the Corporation shall take into account all comments, documents, records and other information submitted by the Claimant relating to the claim, without regard to whether such information was submitted or considered in the initial benefit determination. The decision must be written in a manner calculated to be understood by the Claimant, and it must contain:

- (1) specific reasons for the decision;
- (2) specific reference(s) to the pertinent provisions of this Appendix A upon which the decision was based;
- (3) a statement that the Claimant is entitled to receive, upon request and free of charge, reasonable access to and copies of, all documents, records and other information relevant (as defined in applicable ERISA regulations) to the Claimant's claim for

benefits; and

(4) a statement of the Claimant's right to bring a civil action under ERISA Section 502(a).

(b) Claim for Disability benefits. If the claim relates to benefits in connection with Disability, the procedure described in Section 13.3(a) above shall apply, modified as follows:

(1) All references to 60 days shall be changed to 45 days, except that a Claimant shall have 180 days to file an appeal.

(2) The Corporation shall designate an individual to conduct the review who is not the individual who made the initial adverse determination, and is not a subordinate of such individual.

(3) The notice of extension shall describe the circumstances that require the extension; must include the date as of which the Corporation anticipates that it will render its decision; and must be communicated to the Claimant prior to the commencement of the extension.

(4) The review shall not afford deference to the initial adverse benefit determination.

(5) When the appeal is based on a medical judgment, the Corporation shall consult with a health care professional who has appropriate experience and training in the field involved in determining the Claimant's Disability and shall identify all medical and vocational experts whose advice was obtained in connection with the appeal. A health care professional may not be consulted under this Section 7.10(b)(3)(ii)(E) if the health care professional (or a subordinate of such individual) was consulted in connection with the initial claim for benefits.

(6) If the Corporation makes an adverse benefit determination on review, the Corporation shall provide the Claimant with a statement that the Claimant is entitled to receive or request reasonable access to, and copies of, all information relevant to the claim for benefits, including internal rules, guidelines, and protocols (to the extent relied upon) and a statement regarding voluntary alternative dispute resolution options.

13.4. Disability Benefits. For purposes of this Article 13, "Disability benefits" means a benefit payable under this Appendix A that is conditioned upon the Corporation's determination that Employee is Permanently and Totally Disabled. If the Corporation does not make such determination, but instead relies solely upon the determination of the Social Security Administration's determination that Employee is disabled, then Sections 13.2(b) and 13.3(b) shall not apply, and any claims by Employee shall instead be reviewed under the provisions of this Article 13 for benefits other than Disability benefits.

13.5. Legal Action. A Claimant's compliance with the foregoing provisions of this Article 13 is a mandatory prerequisite to a Claimant's right to commence any legal action with respect to any claim for benefits under this Appendix A.

**14. Tax Withholding and Reporting; Section 280G Excise Taxes.**

(a) General. The Corporation shall have the right to deduct any required withholding taxes from any payment made under this Appendix A. Except as provided in Section 14(b), the Corporation shall not be obligated to pay or reimburse Employee, or his surviving spouse or Beneficiary, for any income or other taxes or penalties that may be imposed on such person by the Internal Revenue Service or any state or other taxing authority as a result of benefits paid under this Appendix A.

(b) Excise Tax Payment. In the event that any payment or benefit (within the meaning of Section 280G(b)(2) of the Internal Revenue Code of 1986, as amended (the "Code")), to Employee or for his benefit paid or payable or distributed or distributable pursuant to the terms of this Employment Agreement (including this Appendix A) or otherwise in connection with, or arising out of, his employment with the Corporation or a Change in Control of the Corporation (a "Payment" or "Payments"), would be subject to the excise tax imposed by Section 4999 of the Code or any interest or penalties are incurred by the Employee with respect to such excise tax (such excise tax, together with any such interest and penalties, are hereinafter collectively referred to as the "Excise Tax"), then Employee will be entitled to immediately receive an additional payment (a "Gross-Up Payment") from the Corporation in an amount such that after payment by Employee of all taxes (including any interest or penalties, other than interest and penalties imposed by reason of Employee's failure to file timely a tax return or pay taxes shown due on his return, imposed with respect to such taxes and the Excise Tax), including any Excise Tax imposed upon the Gross-Up Payment,

Employee retains an amount of the Gross-Up Payment equal to the Excise Tax imposed upon the Payments.

15. **Successors.** The provisions of this Appendix A shall bind and inure to the benefit of the Corporation and its successors and assigns and Employee and Employee's surviving spouse and designated beneficiaries.

16. **Amendment.** This Appendix A may be amended only by written agreement between Employee and the Corporation.

Agreed to and executed this 10th day of November, 2008.

MKS Instruments, Inc.

By: /s/ Leo Berlinghieri

Leo Berlinghieri, CEO & President

/s/ Ronald C. Weigner

Ronald C. Weigner

Whereas, MKS Instruments, Inc. (the "Company") and John A. Smith ("Employee") have entered into an employment agreement dated July 30, 2004, Appendix A of which includes deferred compensation benefits, and

Whereas, such deferred compensation benefits are subject to the provisions of Internal Revenue Code Section 409A, and

Whereas Appendix A has been administered in accordance with the provisions of Section 409A as of January 1, 2005, and

Whereas, Appendix A must be formally amended in writing on or before December 31, 2008, to incorporate applicable provisions of Section 409A in order to avoid potentially adverse tax consequences to Employee,

Now, therefore, in accordance with Section 16 of Appendix A, the Company and Employee hereby agree that Appendix A of the Agreement is amended in its entirety to read as follows, effective as of November 10, 2008:

**APPENDIX A**  
**Supplemental Retirement Benefits**

**1. Purpose.** (a) General. The purpose of this Appendix A is to provide Employee with supplemental retirement benefits to encourage his continued employment with the Corporation. Benefits will be payable only if Employee fully complies with all of the requirements of this Appendix A.

(b) For Benefit of Employee Only. Benefits under this Appendix A are provided for the benefit of Employee only. No other employee shall accrue any rights of any kind as a result of the existence of the arrangement described in this Appendix A. Supplemental retirement benefits may be provided to an employee only as specifically authorized by the Board of Directors of the Corporation.

(c) Internal Revenue Code Section 409A. The provisions of this Appendix A shall be interpreted in a manner consistent with the requirements of Section 409A of the Internal Revenue Code.

**2. Definitions.** Whenever used herein the following terms shall have the meanings hereinafter set forth:

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- 2.1 “Account” or “Deferred Compensation Account” means the account established in Employee’s name pursuant to Section 5.1 of this Appendix A which reflects Employee’s entire interest in this Appendix A, and which includes Employee’s Company Contribution Subaccount, Retirement Subaccount, and In-Service Distribution Subaccount(s).
- 2.2 “Base Salary” means base salary as defined in the Employment Agreement, before any pre-tax salary reductions for participation in any benefit plan of the Corporation. Solely for purposes of Section 4.1 of this Agreement, if Employee becomes disabled, then during such period of disability “base salary” means base salary as defined in the Employment Agreement for the calendar year in which such disability commenced, or the immediately preceding calendar year, whichever is greater. “Disability” for purposes of this Section 2.2 means Employee is receiving benefits under any short term or long term disability plan maintained by the Corporation.
- 2.3 “Beneficiary” means one or more persons, trusts, estates or other entities, designated by Employee to receive death benefits under this Appendix A upon Employee’s death. If Employee fails to designate a Beneficiary or if all designated Beneficiaries predecease Employee then death benefits under this Appendix A shall be payable to Employee’s surviving spouse, if any, and if not to the executor or personal representative of Employee’s estate.

Employee shall designate his Beneficiary by completing and signing a beneficiary designation form prescribed by the Corporation, and returning it to the Corporation or its designated agent. Employee shall have the right to change a Beneficiary by completing, signing and otherwise complying with the terms of the beneficiary designation form and the Corporation’s rules and procedures, as in effect from time to time. Upon the acceptance by the Corporation of a new beneficiary designation form, all Beneficiary designations previously filed shall be canceled. The Corporation shall be entitled to rely on the last beneficiary designation form filed by Employee and accepted by the Corporation prior to his or her death. No designation or change in designation of a Beneficiary shall be

effective until received and acknowledged in writing by the Corporation or its designated agent. If the Corporation has any doubt as to the proper Beneficiary to receive payments pursuant to this Appendix A, the Corporation shall have the right, exercisable in its discretion, to withhold such payments until this matter is resolved to the Corporation's satisfaction.

2.4 "Bonus" means a bonus payable under the Corporation's Management Incentive Plan.

2.5 "Change in Control" means the first to occur of any of the following events:

(a) Any "person" (as that term is used in Section 13 and 14(d)(2) of the Securities Exchange Act of 1934 ("Exchange Act")) becomes the beneficial owner (as that term is used in Section 13(d) of the Exchange Act), directly or indirectly, of fifty percent (50%) or more of the Company's capital stock entitled to vote in the election of directors;

(b) The shareholders of the Company approve any consolidation or merger of the Company, other than a consolidation or merger of the Company in which the holders of the common stock of the Company immediately prior to the consolidation or merger hold more than fifty percent (50%) of the common stock of the surviving corporation immediately after the consolidation or merger;

(c) The shareholders of the Company approve any plan or proposal for the liquidation or dissolution of the Company; or

(d) The shareholders of the Company approve the sale or transfer of all or substantially all of the assets of the Company to parties that are not within a "controlled group of corporations" (as defined in Code Section 1563) in which the Company is a member.

2.6 "Company Contribution Subaccount" means the portion of Employee's Account established in accordance with Section 4.3 of this Appendix A which is credited with the Corporation's hypothetical contributions, and any earnings thereon.

- 2.7 “Compensation” means, for any calendar year, the sum of Employee’s Base Salary for such calendar year plus any Bonus payable in such calendar year.
- 2.8 “Corporation” means MKS Instruments, Inc. (the “Company”) and any corporation, trust, association or enterprise which is required to be considered, together with the Corporation, as one employer pursuant to the provisions of Sections 414(b), 414(c), 414(m) or 414(o) of the Code. For purposes of applying Code sections 1563(a)(1), (2), and (3) and regulation section 1.414(c)-2 to the determination of companies under common control for purposes of this Appendix A, 80% shall be used instead of “at least 80%” each place it appears in such sections.
- 2.9 “Deferred Compensation Agreement” means a written compensation deferral agreement entered into between Employee and the Corporation pursuant Section 3 of this Appendix A.
- 2.10 “Employment Agreement” means the Employment Agreement between Employee and the Corporation that contains this Appendix A.
- 2.11 “In-Service Distribution Subaccount” means the portion of Employee’s Account established in accordance with Section 3.4(c) of the Plan which is credited with Employee’s hypothetical deferrals, and earnings thereon, deferred to an in-service distribution date.
- 2.12 “Permanent and Total Disability” means (a) Employee is unable to engage in any substantial gainful activity by reason of any medically determinable physical or mental impairment that can be expected to result in death or can be expected to last for a continuous period of not less than 12 months, or (b) Employee is, by reason of any medically determinable physical or mental impairment that can be expected to result in death or can be expected to last for a continuous period of not less than 12 months, receiving income replacement benefits for a period of not less than three months under an accident and health plan covering employees of the Corporation. Employee shall be conclusively presumed to be

Permanently and Totally Disabled upon determination that he is disabled by the Social Security Administration.

2.13. "Retirement" or "Retired" or "Retires" means the earlier of:

(a) Employee's Separation from Service with the Corporation upon or after attaining age 61, or

(b) Employee's deemed Retirement: Employee shall be deemed to have Retired on the earliest of (i) the date he becomes Permanently and Totally Disabled, (ii) the date of Employee's Separation from Service as a result of the Corporation's termination of Employee's employment with the Corporation for any reason other than Termination for Cause as defined in Section 2.19 of this Appendix A, (iii) the date of Employee's death while employed by the Corporation, or (iv) the date of Employee's qualifying Separation from Service following a Change in Control in accordance with the provisions of Section 8 of this Appendix A.

2.14. "Retirement Subaccount" means the portion of Employee's Account established in accordance with Section 3.4(b) of the Plan which is credited with Employee's hypothetical contributions, and earnings thereon, deferred to Retirement.

2.15. "Section 409A" means Section 409A of the Internal Revenue Code, as the same may be amended from time to time, and any successor statute thereto. References in this Appendix A to Section 409A shall be deemed to mean and include any published guidance, regulations, notices, rulings and similar announcements issued by the Internal Revenue Service or by the Secretary of the Treasury under or interpreting Section 409A, decisions by any court of competent jurisdiction involving a Participant or a beneficiary and any closing agreement made under section 7121 of the Code that is approved by the Internal Revenue Service and involves a Participant, all as determined by the Corporation in good faith, which determination may (but shall not be required to) be made in reliance on the advice of such tax counsel or other tax professional(s) with whom the Corporation from time to time may elect to consult with respect to any such matter.

- 2.16. "Separates from Service" or "Separation from Service" means Employee's separation from service with the Corporation as a result of death, retirement, or any other reason, except that for purposes of this Section 2.16 the employment relationship is treated as continuing intact while Employee is on military leave, sick leave, or other bona fide leave of absence if the period of such leave does not exceed six months, or if longer, so long as Employee retains a right to reemployment with the Corporation under an applicable statute or by contract. For purposes of this Section 2.16 a leave of absence constitutes a bona fide leave of absence only if there is a reasonable expectation that Employee will return to perform services for the Corporation. If the period of leave exceeds six months and Employee does not retain a right to reemployment under an applicable statute or by contract, the employment relationship is deemed to terminate on the first date immediately following such six-month period. Notwithstanding the foregoing, where a leave of absence is due to any medically determinable physical or mental impairment that can be expected to result in death or can be expected to last for a continuous period of not less than six months, where such impairment causes Employee to be unable to perform the duties of his position of employment or any substantially similar position of employment, a 29-month period of absence shall be substituted for such six-month period. Whether an Employee has a Separation from Service shall be determined in accordance with the provisions of Section 409A, any regulations thereunder, and any other applicable guidance.
- 2.17. "Specified Employee" means, at any time when stock of the Corporation is publicly traded on an established securities market or otherwise (as determined in accordance with Section 409A), an employee who is a "specified employee" within the meaning of Section 409A. The Corporation shall have the discretion to use any alternative permitted under Section 409A to determine whether Employee is a Specified Employee, and to take any action necessary to make such alternative binding.
- 2.18. "Termination of Employment" means, for purposes of Section 4.4 of this Appendix A, Employee's Termination for Cause, or Employee's voluntary

severance from employment with the Corporation (within the meaning of the Corporation's normal policies and procedures) for any reason other than Retirement.

- 2.19 "Termination for Cause" means, solely for purposes of this Appendix A, termination of Employee's employment by the Corporation as a result of Employee's conviction for the commission of a felony, material breach of any employment or other agreements between Employee and the Corporation, or willful failure to perform the material responsibilities of his position with the Corporation.
- 2.20 "Trust" means a Trust established pursuant to Section 11 of this Appendix A.
- 2.21 "Gender and Number". Words in the masculine gender shall include the feminine and the singular shall include the plural, and vice versa, unless qualified by the context. Any headings used herein are included for ease of reference only, and are not to be construed so as to alter the terms hereof.

**3. Deferral Elections.**

- 3.1 Deferred Compensation Agreement. Employee may elect to defer a portion of his Compensation by entering into a Deferred Compensation Agreement with the Corporation pursuant to the rules set forth in this Section 3. The Deferred Compensation Agreement shall be made on a form supplied by the Corporation and shall become effective only if the Corporation accepts and approves the Agreement.

- 3.2 Timing of Deferred Compensation Agreement.

(a) Deferrals of Base Salary. (i) Employee may enter into a Deferred Compensation Agreement with respect to his Base Salary prior to January 1 of each calendar year. The Deferred Compensation Agreement shall apply to Base Salary earned in the immediately following calendar year, and shall be irrevocable for such calendar year, except as provided in Section 3.3(c) of this

Appendix A.

(ii) The foregoing notwithstanding, Employee may enter into a Deferred Compensation Agreement within 30 days of the date Employee first becomes eligible to participate in the deferred compensation arrangement set forth in this Appendix A. Such Deferred Compensation Agreement shall apply to Base Salary earned after the date such Deferred Compensation Agreement is executed, and shall be irrevocable for the balance of the calendar year, except as provided in Section 3.3(c). This subparagraph (ii) shall not apply (that is, no mid-year deferral election shall be permitted) in the event Employee, on the date Employee first becomes eligible to participate in this arrangement, is covered under any other account-based nonqualified deferred compensation plan required to be aggregated with this arrangement under the definition of "plan" contained in Section 409A.

(b) Deferrals of Bonus. Employee may enter into a Deferred Compensation Agreement with respect to a Bonus no later than September 30 of the calendar year prior to the calendar year in which such Bonus is earned. Such deferral elections shall be irrevocable, except as provided in Section 3.3(c). Subsequent deferrals of Bonus shall be made only pursuant to a new Deferred Compensation Agreement.

The foregoing notwithstanding, if a Bonus constitutes "performance based compensation" as defined in Section 409A, Employee may enter into a Deferred Compensation Agreement with respect to such Bonus at any time up until June 30 of the year prior to the year in which the applicable performance period ends.

(c) Cancellation of Deferral. The foregoing notwithstanding, in the event Employee receives a hardship distribution (as defined in Treasury Regulation 1.401(k)-1(d)(3)) from a section 401(k) plan maintained by the Corporation, Employee's existing Deferred Compensation Agreements shall be terminated prospectively (that is, upon receipt of such hardship distribution, no further deferrals of Base Salary or Bonus shall be made under an existing Deferred Compensation Agreement). Employee may, however, enter into a new Deferred

Compensation Agreement that satisfies the requirements of Sections 3.1 through 3.3 of this Appendix A.

3.3 Amount of Deferrals.

(a) From Base Salary. Employee may elect to defer up to 25% of his or her Base Salary, in increments of 1%.

(b) From Bonus. Employee may elect to defer up to 100% of his Bonus, in increments of 5%.

The 25% and 100% maximum deferral limits described above may be reduced by the Corporation in any year if the Corporation determines, in its sole discretion, that such action is necessary to meet Federal or State tax withholding obligations.

3.4 Deferral Period.

(a) General. At the time Employee defers Compensation pursuant to a Deferred Compensation Agreement for a calendar year, he may specify an In-Service Distribution Date applicable to all or a portion of the deferrals for such calendar year, and earnings thereon. Any deferrals of Compensation not deferred to an In-Service Distribution Date shall be deemed deferred to Retirement.

(b) Retirement Subaccount. The Corporation shall establish a Retirement Subaccount on Employee's behalf representing Compensation Employee has deferred to Retirement, and earnings thereon. Payments from Employee's Retirement Subaccount shall be made at such time and in such manner as provided in Section 6.3.

(c) Deferrals to an In-Service Distribution Date. Deferrals to an In-Service Distribution Date shall be subject to the following requirements:

(i) In-Service Distribution Date. The In-Service Distribution Date must be a date at least three full calendar years after the date of such Deferred

Compensation Agreement.

(ii) In-Service Distribution Subaccount. The Corporation shall establish an In-Service Distribution Subaccount on Employee's behalf to which Employee's deferrals relating to a particular In-Service Distribution Date, and earnings thereon, shall be credited.

(iii) Limits. There are no limits on the number of In-Service Distribution Subaccounts Employee may establish.

(iv) Payments. Payments from In-Service Distribution Subaccounts shall be made at such time and in such manner as provided in Section 6.2.

(d) Postponing In-Service Distributions. Employee may elect to postpone payment of an In-Service Distribution Subaccount, and instead have such amount paid out on an allowable alternative In-Service Distribution Date, by submitting a new In-Service Distribution Election Form to the Corporation, subject to the following:

(i) Such Election Form must be submitted to and accepted by the Corporation in its sole discretion no later than the end of the 13th month prior to the month containing Employee's previously elected In-Service Distribution Date; and

(ii) The new In-Service Distribution Date selected by Employee must be the first day of any calendar year that is at least five full calendar years after the end of the calendar year in which the previously elected In-Service Distribution would otherwise have been paid to Employee, and

(iii) Such election shall not take effect until 12 months has elapsed from the date such election is made.

3.5 Vesting of Retirement and In-Service Distribution Subaccounts. Subject to Section 11.2, Employee's Retirement Subaccount and In-Service Distribution

Subaccount(s) shall be fully vested and nonforfeitable.

**4. Company Contributions.**

- 4.1 Required Company Contribution. The Corporation shall make an annual hypothetical contribution on Employee's behalf equal to 15% of Employee's Compensation. Such hypothetical contribution shall commence with the calendar year the Employment Agreement is executed by the Corporation and Employee, and shall continue each calendar year up to and including the year in which Employee Retires. Except as provided in Section 2.2, and solely for purposes of this Section 4.1, "Compensation" in the calendar year Employee Retires shall mean only Base Salary and Bonus actually paid to Employee in such calendar year.
- 4.2 Discretionary Company Contribution. The Corporation may, in its absolute discretion, make an additional hypothetical contribution on Employee's behalf with respect to any calendar year. The fact that the Corporation makes a discretionary contribution with respect to a particular calendar year shall not obligate the Corporation to make a discretionary contribution with respect to any other calendar year.
- 4.3 Company Contribution Subaccount. The Corporation shall establish a Company Contribution Subaccount on behalf of Employee to which hypothetical required company contributions and discretionary company contributions, and earnings thereon, shall be allocated.
- 4.4 Vesting of Company Contribution Subaccount. Subject to Sections 4.5, 4.6, 4.7, and Section 11.2 of this Appendix A, Employee's Company Contribution Subaccount shall vest upon the earlier of (a) or (b), where (a) is the following vesting schedule:

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65	100%
64	90%
63	80%

and (b) is the date of Employee's deemed Retirement under Section 2.13(b). Employee's Company Contribution Subaccount shall be forfeited upon Employee's Termination of Employment. The Company may, in its sole and absolute discretion, waive the vesting schedule and fully vest Employee at any time.

- 4.5. Compliance with Noncompete, Nondisclosure, and Nonsolicitation Agreements. Employee's Company Contribution Subaccount shall be forfeited, and no amount attributable to such Subaccount shall be payable under this Appendix A, in the event the Corporation determines that Employee has failed to comply with the terms of any noncompetition, nondisclosure, or nonsolicitation provision contained in the Employment Agreement, or in any other agreement between Employee and the Corporation.
- 4.6. Notice of Intent to Retire. Benefits payable under Section 6.1 of this Appendix A attributable to Employee's Company Contribution Subaccount are specifically conditioned upon Employee providing to the Corporation written notice of Employee's intent to Retire at least six months prior to Employee's Retirement date. In the event Employee fails to satisfy the notice requirements of this Section 4.6, Employee's Company Contribution Subaccount shall be forfeited, and no amount attributable to such Subaccount shall be payable under this Appendix A. The foregoing notwithstanding, this section 4.6 shall not apply to benefits payable under Section 6.1 as a result of Employee's deemed Retirement under Section 2.13(b) of this Appendix A. The Corporation, in its sole and absolute discretion, may elect to waive the notice requirement of this Section 4.6.
- 4.7. Release. Benefits payable under Section 6.1 of this Appendix A attributable to Employee's Company Contribution Subaccount are specifically conditioned upon and provided in exchange for Employee signing a separation agreement that releases the Corporation from any liabilities that may have arisen as a result

of Employee's employment and/or termination of employment with the Corporation. In the event Employee terminates employment with the Corporation for any reason other than death (including Retirement) without satisfying the requirements of this Section 4.7 Employee's Company Contribution Subaccount shall be forfeited, and no amount attributable to such Subaccount shall be payable under this Appendix A.

4.8 Payment of Company Contribution Subaccount. Employee's vested Company Contribution Subaccount shall be paid at such time and in such manner as provided in Section 6.

**5. Employee's Deferred Compensation Account.**

5.1 Establishment of Deferred Compensation Accounts and Subaccounts. The Corporation shall establish and maintain a hypothetical account for Employee called the Deferred Compensation Account. Such Account shall be segregated from the other accounts on the books and records of the Corporation as an unfunded and unsecured liability of the Corporation to Employee. Subaccounts (including Employee's Company Contribution Subaccount, In-Service Distribution Subaccount(s), and Retirement Subaccount) shall be maintained as determined necessary by the Corporation. Accounts and subaccounts are maintained solely as a device for the measurement and determination of the amounts to be paid to Employee or his Beneficiary pursuant to this Appendix A. Any reference to "contributions to" or "payments from" Employee's Accounts or subaccounts, or similar phrases, are for convenience only.

5.2 Timing of Contributions to and Distributions From Employee's Deferred Compensation Account. The Corporation shall credit to Employee's Deferred Compensation Account an amount equal to the percentage of Employee's Base Salary and Bonus which he has elected to defer in accordance with Section 3.3, as of the last day of the calendar month in which Employee would have received such amount if not for Employee's deferral election.

The Corporation shall credit to Employee's Deferred Compensation Account an

amount equal to the Company Contribution(s) to which he is entitled under Sections 4.1 and 4.2 as soon as administratively practicable after the end of each calendar year.

Any distribution with respect to Employee's Deferred Compensation Account shall be charged to such Account as of the date the distribution is made by the Corporation or from the Trust established in accordance with this Appendix A.

- 5.3 Selection of Investment Vehicle. Employee shall specify, in the manner prescribed by the Corporation, the allocation of his Account among investment indices available under this Appendix A. An individual's selection of an investment index will have no bearing on the actual investment or segregation of Corporation assets, but will be used as the basis for making adjustments to such individual's Account as described in Section Article 5.4 below. Employee can change his or her investment index or indices at such time, and in such manner, as determined by the Corporation. The Corporation may change the investment indices available under this Appendix A at any time in its absolute discretion.
- 5.4 Adjustment of Deferred Compensation Account. As of the last day of each calendar month, or more frequently as determined in the sole discretion of the Corporation, Employee's Deferred Compensation Account shall be credited with hypothetical net income, gain and loss, including hypothetical net unrealized gain and loss, based on the hypothetical investment directions made by the Participant in accordance with Section 5.3 of this Appendix A.

**6. Benefit Payments.**

- 6.1 Payment of Company Contribution Subaccount.

The vested portion of Employee's Company Contribution Subaccount shall be paid in a lump sum on Employee's Retirement date, and the nonvested portion shall be forfeited.

- 6.2 Payment of In-Service Distribution Subaccount. Employee's In-Service

Distribution Subaccount(s) shall be paid in a single lump sum on the earlier of (a) the Participant's In-Service Distribution Date, or (b) the date Employee Separates from Service for any reason.

- 6.3 Payment of Retirement Subaccount. Employee's Retirement Subaccount(s) shall be paid in a single lump sum on the date Employee Separates from Service for any reason.
- 6.4 Delay of Payment to Specified Employee. Sections 6.1 through 6.3 of this Appendix A notwithstanding, in the event Employee is a Specified Employee on the date Employee Separates from Service then any amount payable under this Appendix A as a result of such Separation from Service, other than amounts payable as a result of Employee's Permanent and Total Disability, shall not be made earlier than (a) the date that is six months after the date of Employee's Separation from Service or, if earlier, (b) the date of the Employee's death.
- 6.5 Payment upon Death. The vested portion of Employee's Deferred Compensation Account shall be paid to Employee's Beneficiary upon Employee's death.
- 6.6 Time and amount of Payment. Where the provisions of this Appendix A require that a payment be made on a designated date, (for example, under Sections 6.1, 6.2, 6.3, 6.4, 6.5, or 8) such payment shall be deemed to have been made on such date if it is made as soon as administratively practicable following such date. In no event, however, shall payment be made later than the end of the calendar year containing such designated date or, if later, the 15th day of the third calendar month following such designated date. The amount payable, if any, to Employee (or Employee's beneficiary) under Sections 6.1 through 6.5 shall be determined as of the valuation date (pursuant to Section 5.4) immediately preceding Employee's (or Employee's beneficiary's) distribution date. In no event shall Employee be permitted to designate, directly or indirectly, the taxable year in which payment will be made.
- 6.7 Distribution of Taxable Amounts. Anything in this Appendix A to the contrary notwithstanding, in the event Employee is determined to be subject to federal

income tax on any amount credited to Employee's Deferred Compensation Account due to the failure of this arrangement to meet the requirements of Section 409A, Corporation shall distribute to Employee, as soon as administratively practicable, an amount equal to the amount Employee is required to include in income as a result of such failure.

6.8 **Domestic Relations Orders.** The payment of all or part of Employee's Retirement benefit may, in the sole discretion of the Corporation, be accelerated and paid to a person other than Employee if Corporation determines that such payment is necessary to fulfill a valid domestic relations order as defined in Section 414(p)(1)(B) of the Internal Revenue Code.

7. **Limitations On Liability.** Notwithstanding any of the preceding provisions of this Appendix A, neither the Corporation, nor any individual acting as employee or agent of the Corporation, shall be liable to Employee or other person for any claim, loss, liability or expense incurred in connection with this Appendix A.

The Corporation does not in any way guarantee Employee's Deferred Compensation Account against loss or depreciation, whether caused by poor investment performance, insolvency of a deemed investment or by any other event or occurrence. In no event shall the employees, officers, directors, or stockholders of the Corporation be liable to any individual or entity on account of any claim arising by reason of the provisions of this Appendix A or any instrument or instruments implementing its provisions, or for the failure of any Employee, Beneficiary or other individual or entity to be entitled to any particular tax consequences with respect to this Appendix A, or any credit or payment hereunder.

Nothing contained in this Appendix A shall constitute a guarantee by the Corporation or any other person or entity that the assets of the Corporation will be sufficient to pay any benefits hereunder.

Any payment made in good faith in accordance with provisions of this Appendix A shall be a complete discharge of any liability for the making of such payment under the provisions of this Appendix A.

**8. Effect of a Change In Control of the Corporation.** Anything in this Appendix A to the contrary notwithstanding, this Section 8 shall apply in the event of a Change in Control. If, within three years after the date of a Change in Control Employee voluntarily Separates from Service with the Corporation for Good Reason, and employee is not otherwise eligible for Retirement, then Employee shall be deemed to have Retired with a fully vested benefit on the date of such Separation from Service.

Solely for purposes of this Section 8, "Good Reason" shall mean Employee's voluntary Separation from Service within 90 days following (i) a material diminution in Employee's positions, duties and responsibilities from those described in this Employment Agreement (ii) if Employee is a member of the Board of Directors, the removal of Employee from, or the failure to re-elect Employee as a member of, the Board, (iii) a reduction in Employee's Base Salary (other than a reduction which is part of a general salary reduction program affecting senior executives of the Corporation) (iv) a material reduction in the aggregate value of the pension and welfare benefits provided to Employee from those in effect prior to the Change in Control (other than a reduction which is proportionate to the reductions applicable to other senior executives pursuant to a cost-saving plan that includes all senior executives), (v) a material breach of any provision of this Employment Agreement by the Corporation, (vi) the Corporation's requiring Employee to be based at a location that creates a one-way commute for Employee in excess of 60 miles from his primary residence, except for required travel on the Corporation's business to an extent substantially consistent with the business travel obligations of Employee under this Employment Agreement. Notwithstanding the foregoing, a termination shall not be treated as a termination for Good Reason (i) if Employee shall have consented in writing to the occurrence of the event giving rise to the claim of termination for Good Reason or (ii) unless Employee shall have delivered a written notice to the Corporation within 30 days of his having actual knowledge of the occurrence of one of such events stating that he intends to terminate his employment for Good Reason and specifying the factual basis for such termination, and such event, if capable of being cured, shall not have been cured within 30 days of the receipt of such notice.

**9. Effect Of Termination Of Employment And Rehire.** Upon Employee's Retirement or other Separation from Service with the Corporation the benefit payable under this Appendix A, if any, shall be determined by the Corporation and such determination shall be conclusive and binding (subject to Section 14). This Appendix A shall not apply to any subsequent period of reemployment of Employee by the Corporation.

**10. Administration.**

- 10.1. **Powers of the Corporation.** The Board of Directors of the Company (the "Board") shall have the sole authority to act on behalf of the Corporation under this Appendix A (subject to Section 10.3), and shall have all the powers necessary to administer the benefits under this Appendix A, including, without limitation, the power to interpret the provisions of this Appendix A and to establish rules and prescribe any forms required to administer benefits under this Appendix A
- 10.2. **Actions of the Board.** All determinations, interpretations, rules, and decisions of the Board shall be conclusive and binding upon all persons having or claiming to have any interest or right under this Appendix A.
- 10.3. **Delegation.** The Board shall have the power to delegate specific duties and responsibilities to officers or other employees of the Corporation or other individuals or entities. Any delegation by the Board may allow further delegations by the individual or entity to whom the delegation is made. Any delegation may be rescinded by the Board at any time. Each person or entity to whom a duty or responsibility has been delegated shall be responsible for the exercise of such duty or responsibility and shall not be responsible for any act or failure to act of any other person or entity.
- 10.4. **Reports and Records.** The Board and those to whom the Board has delegated duties under Section 10.3 shall keep records of all their proceedings and actions and shall maintain books of account, records, and other data as shall be necessary for the proper administration of this Appendix A and for compliance with applicable law.

10.5. Costs. The costs of providing and administering the benefits under this Appendix A shall be borne by the Corporation.

**11. Unfunded Benefits; Establishment Of Trust**

11.1. Unfunded Status. This Appendix A shall be unfunded for tax purposes and for purposes of Title 1 of ERISA.

11.2. Establishment of Trust. The Corporation shall not be required to set aside any funds to discharge its obligations hereunder, but may set aside such funds to informally fund all or part of its obligations hereunder if it chooses to do so, including without limitation the contribution of assets to a "rabbi trust" (the Trust). Any setting aside of amounts, or acquisition of any insurance policy or any other asset, by the Corporation with which to discharge its obligations hereunder in trust or otherwise, shall not be deemed to create any beneficial ownership interest in Employee, his surviving spouse, or Beneficiary, and legal and equitable title to any funds so set aside shall remain in the Corporation, and any recipient of benefits hereunder shall have no security or other interest in such funds. The rights of Employee and his surviving spouse and Beneficiary(ies) under this Appendix A shall be no greater than the rights of a general unsecured creditor of the Corporation. Any and all funds so set aside by the Corporation shall remain the general assets of the Corporation, and subject to the claims of its general creditors, present and future.

11.3. Interrelationship of this Appendix A and the Trust. The provisions of this Appendix A shall govern the rights of Employee to receive distributions pursuant to the provisions of this Appendix A. The provisions of the Trust shall govern the rights of the Corporation, Employee, and creditors of the Corporation to the assets transferred to the Trust. The Corporation shall at all times remain liable to carry out its obligations under this Appendix A.

11.4. Distributions from the Trust. The Corporation's obligations under this Appendix A may be satisfied with Trust assets distributed pursuant to the terms of the Trust, and any such distribution shall reduce the Corporation's obligation under this Appendix A.

**12. Payment Of Benefit For Disabled Or Incapacitated Person.** If the Corporation determines, in its discretion, that Employee or Employee's Beneficiary is under a legal disability or is incapacitated in any way so as to be unable to manage his financial affairs, the Corporation may make any payment otherwise due under the terms of this Appendix A to such person or to his legal representative or to a friend or relative of such person as the Corporation considers advisable. Any payment under this Section 12 shall be a complete discharge of any liability for the making of such payment under this Appendix A. Nothing contained in this Section 12 however, should be deemed to impose upon the Corporation any liability for paying a benefit to any person who is under such a legal disability or is so incapacitated unless it has received notice of such disability or incapacity from a competent source.

**13. Nonassignability.** Neither Employee nor any other person shall have any right to commute, sell, assign, transfer, pledge, anticipate, mortgage or otherwise encumber, transfer, hypothecate, alienate or convey in advance of actual receipt, the amounts, if any, payable hereunder, or any part thereof, which are, and all rights to which are expressly declared to be, unassignable and non-transferable. No part of the amounts payable shall, prior to actual payment, be subject to seizure, attachment, garnishment or sequestration for the payment of any debts, judgments, alimony or separate maintenance owed by Employee or any other person, be transferable by operation of law in the event of Employee's or any other person's bankruptcy or insolvency or be transferable to a spouse as a result of a property settlement or otherwise. The Corporation is authorized to make any payments directed by court order.

**14. Claim Procedure.**

14.1. **Presentation of Claim.** Employee, or Employee's Beneficiary after Employee's death (such Employee or Beneficiary being referred to below as a "Claimant") may deliver to the Corporation a written claim for a determination with respect to the amounts distributable to such Claimant under this Appendix A. If such a claim relates to the contents of a notice received by the Claimant, the claim must be made within sixty (60) days after such notice was received by the Claimant. All other claims must be made within 180 days of the date on which the event that caused the claim to arise occurred. The claim must state with particularity

the determination desired by the Claimant.

14.2. Notification of Decision.

(a) Claim for benefits other than Disability Benefits. The Corporation shall consider a Claimant's claim within a reasonable time, but no later than ninety (90) days after receiving the claim. If the Corporation determines that special circumstances require an extension of time for processing the claim, written notice of the extension shall be furnished to the Claimant prior to the termination of the initial ninety (90) day period. In no event shall such extension exceed a period of ninety (90) days from the end of the initial period. The extension notice shall indicate the special circumstances requiring an extension of time and the date by which the Corporation expects to render the benefit determination.

(b) Claim for disability benefits. If the claim relates to benefits in connection with disability (as defined in Section 4.4), the Corporation shall consider a Claimant's claim within a reasonable time, but no later than forty-five (45) days after receiving the claim. If the Corporation determines that, due to matters beyond the control of the Plan, the Corporation will not be able to respond to the claim within such 45-day period, the Corporation may extend the response period for one or two additional periods of up to 30 days each by providing the Claimant with notice describing the circumstances that necessitate the extension and the date as of which the Corporation anticipates that it will render its decision. Each such notice must be conveyed to the Claimant prior to the commencement of an extension.

(c) Notification. The Corporation shall notify the Claimant in writing, within the time periods specified in Section 14.2(a) or (b) as applicable:

- (1) that the Claimant's requested determination has been made, and that the claim has been allowed in full; or
- (2) that the Corporation has reached a conclusion contrary, in whole or in part, to the Claimant's requested determination, and such notice must set forth in a manner calculated to be understood by the Claimant:

- (A) the specific reason(s) for the denial of the claim, or any part of it;
- (B) specific reference(s) to pertinent provisions of this Appendix A upon which such denial was based;
- (C) a description of any additional material or information necessary for the Claimant to perfect the claim, and an explanation of why such material or information is necessary;
- (D) an explanation of the claim review procedure set forth in Section 14.3 below; and
- (E) a statement of the Claimant's right to bring a civil action under ERISA Section 502(a) following an adverse benefit determination on review.

14.3 Review of a Denied Claim.

(a) Claim for benefits other than disability benefits. On or before sixty (60) days after receiving a notice from the Corporation that a claim has been denied, in whole or in part, a Claimant (or the Claimant's duly authorized representative) may file with the Corporation a written request for a review of the denial of the claim. The Claimant (or the Claimant's duly authorized representative):

- (1) may, upon request and free of charge, have reasonable access to, and copies of, all documents, records and other information relevant to the claim for benefits;
- (2) may submit written comments or other documents; and/or
- (3) may request a hearing, which the Corporation, in its sole discretion, may grant.

The Corporation shall render its decision on review promptly, and no later than

sixty (60) days after the Corporation receives the Claimant's written request for a review of the denial of the claim. If the Corporation determines that special circumstances require an extension of time for processing the claim, written notice of the extension shall be furnished to the Claimant prior to the termination of the initial sixty (60) day period. In no event shall such extension exceed a period of sixty (60) days from the end of the initial period. The extension notice shall indicate the special circumstances requiring an extension of time and the date by which the Corporation expects to render the benefit determination. In rendering its decision, the Corporation shall take into account all comments, documents, records and other information submitted by the Claimant relating to the claim, without regard to whether such information was submitted or considered in the initial benefit determination. The decision must be written in a manner calculated to be understood by the Claimant, and it must contain:

- (1) specific reasons for the decision;
  - (2) specific reference(s) to the pertinent provisions of this Appendix A upon which the decision was based;
  - (3) a statement that the Claimant is entitled to receive, upon request and free of charge, reasonable access to and copies of, all documents, records and other information relevant (as defined in applicable ERISA regulations) to the Claimant's claim for benefits; and
  - (4) a statement of the Claimant's right to bring a civil action under ERISA Section 502(a).
- (b) Claim for disability benefits. If the claim relates to benefits in connection with disability (as defined in Section 4.4), the procedure described in Section 14.3(a) above shall apply, modified as follows:
- (1) All references to 60 days shall be changed to 45 days, except that a Claimant shall have 180 days to file an appeal.

- (2) The Corporation shall designate an individual to conduct the review who is not the individual who made the initial adverse determination, and is not a subordinate of such individual.
- (3) The notice of extension shall describe the circumstances that require the extension; must include the date as of which the Corporation anticipates that it will render its decision; and must be communicated to the Claimant prior to the commencement of the extension.
- (4) The review shall not afford deference to the initial adverse benefit determination.
- (5) When the appeal is based on a medical judgment, the Corporation shall consult with a health care professional who has appropriate experience and training in the field involved in determining the Claimant's disability and shall identify all medical and vocational experts whose advice was obtained in connection with the appeal. A health care professional may not be consulted under this Section 7.10(b)(3)(ii)(E) if the health care professional (or a subordinate of such individual) was consulted in connection with the initial claim for benefits.
- (6) If the Corporation makes an adverse benefit determination on review, the Corporation shall provide the Claimant with a statement that the Claimant is entitled to receive or request reasonable access to, and copies of, all information relevant to the claim for benefits, including internal rules, guidelines, and protocols (to the extent relied upon) and a statement regarding voluntary alternative dispute resolution options.

14.4. Disability Benefits. For purposes of this Article 14, "disability benefits" means a benefit payable under this Appendix A that is conditioned upon the Corporation's determination that Employee is Permanently and Totally Disabled. If the Corporation does not make such determination, but instead relies solely upon the determination of the Social Security Administration's determination that Employee is disabled, then Sections 14.2(b) and 14.3(b) shall not apply, and

any claims by Employee shall instead be reviewed under the provisions of this Article 14 for benefits other than Disability benefits.

14.5. **Legal Action.** A Claimant's compliance with the foregoing provisions of this Article 14 is a mandatory prerequisite to a Claimant's right to commence any legal action with respect to any claim for benefits under this Appendix A.

**15. Tax Withholding And Reporting.**

(a) **General:** The Corporation shall have the right to deduct any required withholding taxes from any payment made under this Appendix A. Except as provided in Section 15(b), the Corporation shall not be obligated to pay or reimburse Employee, or his surviving spouse or Beneficiary, for any income or other taxes or penalties that may be imposed on such person by the Internal Revenue Service or any state or other taxing authority as a result of benefits paid under this Appendix A.

(b) **Excise Tax Payment.** In the event that any payment or benefit (within the meaning of Section 280G(b)(2) of the Internal Revenue Code of 1986, as amended (the "Code")), to Employee or for his benefit paid or payable or distributed or distributable pursuant to the terms of this Employment Agreement (including this Appendix A) or otherwise in connection with, or arising out of, his employment with the Corporation or a Change in Control of the Corporation (a "Payment" or "Payments"), would be subject to the excise tax imposed by Section 4999 of the Code or any interest or penalties are incurred by the Employee with respect to such excise tax (such excise tax, together with any such interest and penalties, are hereinafter collectively referred to as the "Excise Tax"), then Employee will be entitled to immediately receive an additional payment (a "Gross-Up Payment") from the Corporation in an amount such that after payment by Employee of all taxes (including any interest or penalties, other than interest and penalties imposed by reason of Employee's failure to file timely a tax return or pay taxes shown due on his return, imposed with respect to such taxes and the Excise Tax), including any Excise Tax imposed upon the Gross-Up Payment, Employee retains an amount of the Gross-Up Payment equal to the Excise Tax imposed upon the Payments.

16. **Successors.** The provisions of this Appendix A shall bind and inure to the benefit of the Corporation and its successors and assigns and Employee and Employee's surviving spouse and designated beneficiaries.

17. **Amendment.** This Appendix A may be amended only by written agreement between Employee and the Corporation.

Agreed to and executed this 10th day of November, 2008.

MKS Instruments, Inc.

By: /s/ Leo Berlinghieri  
Leo Berlinghieri, CEO & President

/s/ John Smith  
John A. Smith

Whereas, MKS Instruments, Inc. ("the "Company") and Gerald G. Colella ("Employee") have entered into an employment agreement dated April 25, 2005, Appendix A of which includes deferred compensation benefits, and

Whereas, such deferred compensation benefits are subject to the provisions of Internal Revenue Code Section 409A, and

Whereas Appendix A has been administered in accordance with the provisions of Section 409A as of January 1, 2005, and

Whereas, Appendix A must be formally amended in writing on or before December 31, 2008, to incorporate applicable provisions of Section 409A in order to avoid potentially adverse tax consequences to Employee,

Now, therefore, in accordance with Section 16 of Appendix A, the Company and Employee hereby agree that Appendix A of the Agreement is amended in its entirety to read as follows, effective as of November 10, 2008:

**APPENDIX A**  
**Supplemental Retirement Benefits**

1. **Purpose.** (a) **General:** The purpose of this Appendix A is to provide Employee with supplemental retirement benefits to encourage his continued employment with the Corporation. Benefits will be payable only if Employee fully complies with all of the requirements of this Appendix A.

(b) **For Benefit of Employee Only:** Benefits under this Appendix A are provided for the benefit of Employee only. No other employee shall accrue any rights of any kind as a result of the existence of the arrangement described in this Appendix A. Supplemental retirement benefits may be provided to an employee only as specifically authorized by the Board of Directors of the Corporation.

(c) **Internal Revenue Code Section 409A:** The provisions of this Appendix A shall be interpreted in a manner consistent with the requirements of Section 409A of the Internal Revenue Code.

2. **Definitions.** As used in this Appendix A, the following terms have the meanings set forth below, unless a different meaning is required by the context:

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2.1. "Actuarially Equivalent" means a benefit of equivalent value to another benefit, determined on the following basis:

Interest Rate: The average annual interest rate on 10-year Treasury securities as published by the Federal Reserve for the calendar quarter immediately preceding the calendar quarter in which the actuarially equivalent benefit is being determined plus 25 basis points; and

Mortality: The most recent "applicable mortality table" prescribed by Section 417(e)(3)(A)(ii) of the Internal Revenue Code (or a successor provision as determined by the Corporation).

2.2. "Base salary" means base salary as defined in the Employment Agreement, before any pre-tax salary reductions for participation in any benefits plan of the Corporation.

2.3. "Beneficiary" means one or more persons, trusts, estates or other entities, designated by Employee to receive death benefits under Section 6.1(b) of this Appendix A upon Employee's death. If Employee fails to designate a Beneficiary or if all designated Beneficiaries predecease Employee, then such death benefits shall be payable to the executor or personal representative of Employee's estate.

Employee shall designate his Beneficiary by completing and signing a beneficiary designation form prescribed by the Corporation, and returning it to the Corporation or its designated agent. Employee shall have the right to change a Beneficiary by completing, signing and otherwise complying with the terms of the beneficiary designation form and the Corporation's rules and procedures, as in effect from time to time. Upon the acceptance by the Corporation of a new beneficiary designation form, all Beneficiary designations previously filed shall be canceled. The Corporation shall be entitled to rely on the last beneficiary designation form filed by Employee and accepted by the Corporation prior to his or her death. No designation or change in designation of a Beneficiary shall be effective until received and acknowledged in writing by the Corporation or its designated agent. If the Corporation has any doubt as to the proper Beneficiary to receive payments pursuant to this Appendix A, the Corporation shall have the right, exercisable in its discretion, to withhold such payments until this matter is resolved to the Corporation's satisfaction.

2.4. "Bonus" means a bonus paid under the Corporation's Management Incentive Program.

2.5. "Change in Control" means the first to occur of any of the following events:

- (a) Any "person" (as that term is used in Section 13 and 14(d)(2) of the Securities Exchange Act of 1934 ("Exchange Act")) becomes the beneficial owner (as that term is used in Section 13(d) of the Exchange Act), directly or indirectly, of fifty percent (50%) or more of the Company's capital stock entitled to vote in the election of directors;
- (b) The shareholders of the Company approve any consolidation or merger of the Company, other than a consolidation or merger of the Company in which the holders of the common stock of the Company immediately prior to the consolidation or merger hold more than fifty percent (50%) of the common stock of the surviving corporation immediately after the consolidation or merger;
- (c) The shareholders of the Company approve any plan or proposal for the liquidation or dissolution of the Company; or
- (d) The shareholders of the Company approve the sale or transfer of all or substantially all of the assets of the Company to parties that are not within a "controlled group of corporations" (as defined in Code Section 1563) in which the Company is a member.

2.6. "Corporation" means MKS Instruments, Inc. (the "Company") and any corporation, trust, association or enterprise which is required to be considered, together with the Corporation, as one employer pursuant to the provisions of Sections 414(b), 414(c), 414(m) or 414(o) of the Code. For purposes of applying Code sections 1563(a)(1), (2), and (3) and regulation section 1.414(c)-2 to the determination of companies under common control for purposes of this Appendix A, 80% shall be used instead of "at least 80%" each place it appears in such sections.

2.7. "Compensation" for any calendar year means the sum of Employee's Base Salary for such year plus any Bonus paid in such year.

2.8. "Early Retirement Benefit" means the Retirement benefit determined under Section 5.2 of this Appendix A upon Employee's Retirement prior to his Normal Retirement Date.

2.9. "Employment Agreement" means the Employment Agreement between Employee and the Corporation that contains this Appendix A.

2.10. "Final Average Pay" means, for purposes of Section 5 the average of Employee's three (3) highest years of Compensation during the ten (10) calendar year period immediately preceding the calendar year in which Employee Retires, and for purposes of determining death benefits under Section 6 the average of Employee's three (3) highest years of Compensation during the ten (10) calendar year period immediately preceding the calendar year containing Employee's date of death. The foregoing notwithstanding, any calendar year in which Employee has no Compensation from the Corporation shall be ignored in determining such ten calendar year period.

2.11. "Normal Retirement Age" means Employee's 65th birthday or, if earlier, the date Employee is deemed to have Retired in accordance with Section 2.15(b).

2.12. "Normal Retirement Benefit" means the Retirement benefit determined under Section 5.1 of this Appendix A upon Employee's Retirement on or after his Normal Retirement Date.

2.13. "Normal Retirement Date" means the first day of the month in which Employee attains Normal Retirement Age.

2.14. "Permanent and Total Disability" means (a) Employee is unable to engage in any substantial gainful activity by reason of any medically determinable physical or mental impairment that can be expected to result in death or can be expected to last for a continuous period of not less than 12 months, or (b) Employee is, by reason of any medically determinable physical or mental impairment that can be expected to result in death or can be expected to last for a continuous period of not less than 12 months, receiving income replacement benefits for a period of not less than three months under an accident and health plan covering employees of the Corporation. Employee shall be conclusively presumed to be Permanently and Totally Disabled upon determination that he is disabled by the Social Security Administration.

2.15. "Retirement" or "Retires" or "Retired" means the earlier of:

- (a) Employee's Separation from Service with the Corporation upon or after satisfying the vesting requirements of Section 4.1, or

(b) Employee's deemed Retirement. Employee shall be deemed to have Retired with a fully vested Normal Retirement Benefit on the earliest of (i) the date he becomes Permanently and Totally Disabled, (ii) the date of Employee's Separation from Service as a result of the Corporation's termination of Employee's employment with the Corporation for any reason other than Termination for Cause as defined in Section 2.21 of this Appendix A, (iii) the date of Employee's death while employed by the Corporation, or (iv) the date of Employee's qualifying Separation from Service following a Change in Control in accordance with the provisions of Section 7 of this Appendix A.

2.16. "Retirement Date" means the date Employee Retires or is deemed to have Retired in accordance with Section 2.15 of this Appendix A. The term "Retirement Date" shall include Employee's Early Retirement Date as defined in Section 5.2 of this Appendix A.

2.17. "Section 409A" means Section 409A of the Internal Revenue Code, as the same may be amended from time to time, and any successor statute thereto. References in this Appendix A to Section 409A shall be deemed to mean and include any published guidance, regulations, notices, rulings and similar announcements issued by the Internal Revenue Service or by the Secretary of the Treasury under or interpreting Section 409A, decisions by any court of competent jurisdiction involving a Participant or a beneficiary and any closing agreement made under section 7121 of the Code that is approved by the Internal Revenue Service and involves a Participant, all as determined by the Corporation in good faith, which determination may (but shall not be required to) be made in reliance on the advice of such tax counsel or other tax professional(s) with whom the Corporation from time to time may elect to consult with respect to any such matter.

2.18. "Separates from Service" or "Separation from Service" means Employee's separation from service with the Corporation as a result of death retirement, or any other reason, except that for purposes of this section 2.18 the employment relationship is treated as continuing intact while Employee is on military leave, sick leave, or other bona fide leave of absence if the period of such leave does not exceed six months, or if longer, so long as Employee retains a right to reemployment with the Corporation under an applicable statute or by contract. For purposes of this Section 2.18 a leave of absence constitutes a bona fide leave of absence only if there is a reasonable expectation that the employee will return to perform services for the employer. If the period of leave exceeds six months and the individual does not retain a right

to reemployment under an applicable statute or by contract, the employment relationship is deemed to terminate on the first date immediately following such six-month period. Whether an Employee has a Separation from Service shall be determined in accordance with the provisions of Section 409A, and regulations thereunder, and any other applicable guidance.

2.19. "Specified Employee" means, at any time when stock of the Corporation is publicly traded on an established securities market or otherwise (as determined in accordance with Section 409A), an employee who is a "specified employee" within the meaning of Section 409A. The Corporation shall have the discretion to use any alternative permitted under Section 409A to determine whether Employee is a Specified Employee, and to take any action necessary to make such alternative binding.

2.20. "Termination of Employment" means, for purposes of Section 4.6 of this Appendix A, Termination for Cause, or Employee's voluntary severance from employment with the Corporation (within the meaning of the Corporation's normal policies and procedures) for any reason other than Retirement.

2.21. "Termination for Cause" means, solely for purposes of this Appendix A, termination of Employee's employment by the Corporation as a result of Employee's conviction for the commission of a felony, material breach of any employment or other agreements between Employee and the Corporation, or willful failure to perform the material responsibilities of his position with the Corporation.

2.22. "Trust" means a Trust established pursuant to Section 10 of this Appendix A.

### **3. Eligibility for Retirement Benefits.**

3.1. General: Subject to Sections 4.2, 4.3, 4.4, and 4.5 the Corporation shall pay the retirement benefits described in this Appendix A only if Employee Retires from employment with the Corporation upon or after satisfying the vesting requirements set forth in Section 4.1, or upon Employee's deemed Retirement pursuant to Section 2.15(b).

### **4. Vesting.**

4.1 General: Except as provided in Sections 4.2, 4.3, 4.4, and 4.5, and subject to Section 10.1, Employee's benefits under this Appendix A shall be fully vested and nonforfeitable if Employee satisfies both (a) and (b) while employed with the Corporation:

(a) attains age 60, and

(b) has 25 years of service with the Corporation. Employee shall have 25 years of service on the 25<sup>th</sup> anniversary of Employee's original hire date.

The foregoing notwithstanding, Employee shall be fully vested in his benefit under this Appendix A upon Employee's deemed Retirement pursuant to Section 2.15(b) of this Appendix A.

4.2. Termination for Cause: All benefits shall be forfeited, and no amount shall be payable under this Appendix A, in the event of Employee's Termination for Cause.

4.3. Compliance with Noncompete, Nondisclosure, and Nonsolicitation Agreements. All benefits under this Appendix A are expressly conditioned upon Employee's compliance with the terms of any noncompetition, nondisclosure, or nonsolicitation provisions contained in the Employment Agreement, or in any other agreement between Employee and the Corporation. All benefits payable under this Appendix A shall be forfeited, and no amount shall be payable, in the event Employee violates the terms of any such provisions. If Employee violates the terms of any such provisions, and benefit payments have commenced to Employee, any such payments shall cease, and Employee shall repay all previously paid benefits to the Corporation upon demand. If Employee fails to repay such amounts upon demand, the Corporation shall have the right to take any action necessary to recover such payments from Employee.

4.4. Notice of Intent to Retire. Benefits payable under this Appendix A are specifically conditioned upon Employee providing to the Corporation written notice of Employee's intent to Retire at least six months prior to Employee's Retirement date. In the event Employee fails to satisfy the notice requirements of this Section 4.4, all benefits shall be forfeited, and no amount shall be payable under this Appendix A. The foregoing notwithstanding, the Corporation, in its sole and absolute discretion, may elect to waive the notice requirement of this Section 4.4. The foregoing notwithstanding, this Section 4.4 shall not apply to death

benefits payable under Section 6 of this Appendix A, or to Retirement benefits payable under Section 5 as a result of Employee's deemed Retirement pursuant to Section 2.15(b).

4.5. **Release.** Benefits payable under this Appendix A (other than death benefits payable under Section 6) are specifically conditioned upon and provided in exchange for Employee signing a separation agreement that releases the Corporation from any liabilities that may have arisen as a result of Employee's employment and/or termination of employment with the Corporation. In the event Employee terminates employment with the Corporation for any reason other than death (including Retirement) without satisfying the requirements of this Section 4.5 all benefits shall be forfeited, and no amount shall be payable under this Appendix A.

4.6. **Termination of Employment Prior to Satisfying Vesting Requirements.** No benefits are payable under this Appendix A upon Employee's Termination of Employment with the Corporation prior to satisfying the vesting requirements set forth in Section 4.1.

**5. Retirement Benefits.**

5.1. **Normal Retirement Benefit.** This Section 5.1 describes the Retirement benefit payable by the Corporation in the event Employee Retires on or after his Normal Retirement Date. Employee's Normal Retirement Benefit shall be paid in the form of an Actuarially Equivalent lump sum, as set forth in Section 5.3.

(a) **Married on Retirement Date:** If Employee is married on his Retirement Date, Employee's Normal Retirement Benefit shall be:

50% times Final Average Pay

payable annually for the life of Employee with 50% of such amount continuing after Employee's death to his spouse for her life, with payments commencing on Employee's Normal Retirement Date, and subsequent payments made as of each anniversary thereof. Solely for purposes of this Section 5.1, "Spouse" shall mean the spouse to whom Employee is married on his Retirement Date (regardless of whether that is the same spouse to whom he is married on his date of death), unless the Corporation is directed by a court of competent jurisdiction to treat someone else as Employee's "spouse."

(b) Not Married on Retirement Date: If Employee is not married on his Retirement Date, Employee's Normal Retirement Benefit shall be:

50% times Final Average Pay

payable annually for the life of Employee with a ten year certain guarantee, with payments commencing on Employee's Normal Retirement Date, and subsequent payments made on each anniversary thereof.

5.2. Early Retirement Benefit. This Section 5.2 describes the Retirement benefit payable by the Corporation in the event Employee Retires prior to his Normal Retirement Date. Employee may Retire from employment with the Corporation prior to his Normal Retirement Date on the first day of any month coincident with or next following the date he satisfies the vesting requirements of section 4.1. The date on which Employee Retires under this Section 5.2 shall be his Early Retirement Date. Employee's Early Retirement Benefit shall be paid in the form of an Actuarially Equivalent lump sum, as set forth in Section 5.3.

(a) Married on Early Retirement Date: If Employee is married on his Early Retirement Date, Employee's Early Retirement Benefit shall be:

50% times Final Average Pay

multiplied by the applicable percentage as set forth in the following schedule:

Age at which Early Retirement Benefits Commence	62	61	60
Applicable Percentage	100%	90	80

payable annually for the life of Employee with 50% of such amount continuing after Employee's death to his spouse for her life, with payments commencing on Employee's Early Retirement Date, and subsequent payments made on each anniversary thereof. Solely for purposes of this Section 5.2, "Spouse" shall mean the spouse to whom Employee is married on his Early Retirement Date (regardless of whether that is the same spouse to whom he is married on his date of death), unless the Corporation is directed by a court of competent jurisdiction to treat someone else as Employee's "spouse"

(b) Not Married on Early Retirement Date: If Employee is not married on his Early Retirement Date, Employee's Early Retirement Benefit shall be:

50% times Final Average Pay

multiplied by the applicable percentage as set forth in the following schedule:

Age at which Early Retirement Benefits Commence	62	61	60
Applicable Percentage	100%	90	80

payable annually for the life of Employee with a ten year certain guarantee, with payments commencing on Employee's Early Retirement Date, and subsequent payments made on each anniversary thereof.

5.3. Form of Payment:

Employee's Normal Retirement Benefit or Early Retirement Benefit, determined in accordance with section 5.1 or 5.2 as applicable, shall be paid in the form of a single lump sum that is Actuarially Equivalent to such Normal Retirement Benefit or Early Retirement Benefit. Such lump sum shall be paid on Employee's Retirement Date (or, if later, the earliest date permitted by Section 409A). No benefits shall be payable in the form of an annuity or in installments.

5.4. Delay of Payment to Specified Employee. Sections 5.1 through 5.3 of this Appendix A notwithstanding, in the event Employee is a Specified Employee on the date Employee Separates from Service, then any amount payable under this Appendix A as a result of such Separation from Service, other than amounts payable as a result of Employee's Permanent and Total Disability, shall not be made earlier than (a) the date that is six months after the date of such Employee's Retirement or, if earlier, (b) the date of the Employee's death. Employee's Retirement benefit shall be actuarially increased, in the manner determined by the Corporation, to account for such delayed commencement date.

5.5. Time of Payment: Where the provisions of this Appendix A require that a payment be made on a designated date, (for example, under Sections 5.1, 5.2, 5.3, and 5.4) such payment shall be deemed to have been made on such date if it is made as soon as administratively practicable following such date. In no event, however, shall payment be made later than the end of the calendar year containing such designated date or, if later, the 15<sup>th</sup> day of the third calendar month following such designated date. No adjustment shall be made to Employee's Retirement benefit as a result of any delay between the specified payment date and the actual payment date. In no event shall Employee be permitted to designate, directly or indirectly, the taxable year in which payment will be made.

5.6. Death While Employed by the Corporation. In the event Employee dies while employed by the Corporation, any benefits payable under this Appendix A shall be determined in accordance with Section 6.

5.7. Domestic Relations Orders. The payment of all or part of Employee's Retirement benefit may, in the sole discretion of the Corporation, be accelerated and paid to a person other than Employee if Corporation determines that such payment is necessary to fulfill a valid domestic relations order as defined in Section 414(p)(1)(B) of the Internal Revenue Code.

**6. Death While Employed by the Corporation.**

6.1. General. In the event Employee dies while employed by the Corporation the death benefit payable under this Appendix A shall be as follows:

- (a) if Employee is married on his date of death, 50% of the lump sum that is Actuarially Equivalent to the Normal Retirement Benefit determined under Section 5.1(a) of this Appendix A, such lump sum benefit to be determined as if Employee Retired on his date of death after reaching Normal Retirement Age; or
- (b) if Employee is not married on his date of death, 50% of the lump sum that is Actuarially Equivalent to the Normal Retirement Benefit determined under Section 5.1(b) of this Appendix A, such lump sum benefit to be determined as if Employee Retired on his date of death after reaching Normal Retirement Age.

The death benefit shall be payable in a lump sum as soon as administratively practicable following Employee's date of death.

6.2. Payee. This death benefit shall be payable to Employee's (a) surviving spouse if Employee is married on his date of death, or (b) Beneficiary if Employee is not married on his date of death. "Surviving spouse" for purposes of this Section 6.2 means the spouse to whom Employee is married on his date of death.

7. Effect of a Change in Control of the Corporation. Anything in this Appendix A to the contrary notwithstanding, this Section 7 shall apply in the event of a Change in Control. If, within three years after the date of a Change in Control, Employee voluntarily Separates from Service with the Corporation for Good Reason, and employee is not otherwise eligible for Retirement, then Employee shall be deemed to have Retired with a fully vested Normal Retirement Benefit on the date of such Separation from Service.

Solely for purposes of this Section 7, "Good Reason" shall mean Employee's voluntary Separation from Service within 90 days following (i) a material diminution in Employee's positions, duties and responsibilities from those described in this Employment Agreement (ii) a reduction in Employee's Base Salary (other than a reduction which is part of a general salary reduction program affecting senior executives of the Corporation) (iii) a material reduction in the aggregate value of the pension and welfare benefits provided to Employee from those in effect prior to the Change in Control (other than a reduction which is proportionate to the reductions applicable to other senior executives pursuant to a cost-saving plan that includes all senior executives), (iv) a material breach of any provision of this Employment Agreement by the Corporation, (v) the Corporation's requiring Employee to be based at a location that creates for Employee a one way commute in excess of 60 miles from his primary residence, except for required travel on the Corporation's business to an extent substantially consistent with the business travel obligations of Employee under this Employment Agreement. Notwithstanding the foregoing, a termination shall not be treated as a termination for Good Reason (i) if Employee shall have consented in writing to the occurrence of the event giving rise to the claim of termination for Good Reason or (ii) unless Employee shall have delivered a written notice to the Corporation within 30 days of his having actual knowledge of the occurrence of one of such events stating that he intends to terminate his employment for Good Reason and specifying the factual basis for such termination, and such event, if capable of being cured, shall not have been cured within 30 days of the receipt of such notice.

8. Effect of termination of employment and rehire. Upon Employee's Retirement, the benefit payable under this Appendix A, if any, shall be determined by the Corporation and such

determination shall be conclusive and binding (subject to Section 14). If Employee is subsequently reemployed by the Corporation such reemployment, additional service, and additional compensation shall not result in a re-determination of the benefits due under this Appendix A.

**9. Administration.**

9.1. Powers of the Corporation: The Board of Directors of the Company (the "Board") shall have the sole authority to act on behalf of the Corporation under this Appendix A (subject to Section 9.3), and shall have all the powers necessary to administer the benefits under this Appendix A, including, without limitation, the power to interpret the provisions of this Appendix A and to establish rules and prescribe any forms required to administer benefits under this Appendix A

9.2. Actions of the Board: All determinations, interpretations, rules, and decisions of the Board shall be conclusive and binding upon all persons having or claiming to have any interest or right under this Appendix A.

9.3. Delegation: The Board shall have the power to delegate specific duties and responsibilities to officers or other employees of the Corporation or other individuals or entities. Any delegation by the Board may allow further delegations by the individual or entity to whom the delegation is made. Any delegation may be rescinded by the Board at any time. Each person or entity to whom a duty or responsibility has been delegated shall be responsible for the exercise of such duty or responsibility and shall not be responsible for any act or failure to act of any other person or entity.

9.4. Reports and Records: The Board and those to whom the Board has delegated duties under Section 9.3 shall keep records of all their proceedings and actions and shall maintain books of account, records, and other data as shall be necessary for the proper administration of this Appendix A and for compliance with applicable law.

9.5. Costs: The costs of providing and administering the benefits under this Appendix A shall be borne by the Corporation.

**10. Unfunded Benefits; Establishment of Trust.**

10.1. Unfunded Status. This Appendix A shall be unfunded for tax purposes and for purposes of Title 1 of ERISA.

10.2. Establishment of Trust. The Corporation shall not be required to set aside any funds to discharge its obligations hereunder, but may set aside such funds to informally fund all or part of its obligations hereunder if it chooses to do so, including without limitation the contribution of assets to a "rabbi trust" (the Trust). Any setting aside of amounts, or acquisition of any insurance policy or any other asset, by the Corporation with which to discharge its obligations hereunder in trust or otherwise, shall not be deemed to create any beneficial ownership interest in Employee, his surviving spouse, or Beneficiary, and legal and equitable title to any funds so set aside shall remain in the Corporation, and any recipient of benefits hereunder shall have no security or other interest in such funds. The rights of Employee and his surviving spouse and Beneficiary(ies) under this Appendix A shall be no greater than the rights of a general unsecured creditor of the Corporation. Any and all funds so set aside by the Corporation shall remain the general assets of the Corporation, and subject to the claims of its general creditors, present and future.

10.3. Interrelationship of this Appendix A and the Trust. The provisions of this Appendix A shall govern the rights of Employee to receive distributions pursuant to the provisions of this Appendix A. The provisions of the Trust shall govern the rights of the Corporation, Employee, and creditors of the Corporation to the assets transferred to the Trust. The Corporation shall at all times remain liable to carry out its obligations under this Appendix A.

10.4. Distributions from the Trust. The Corporation's obligations under this Appendix A may be satisfied with Trust assets distributed pursuant to the terms of the Trust, and any such distribution shall reduce the Corporation's obligation under this Appendix A.

**11. Payment of Benefit for Disabled or Incapacitated Person.** If the Corporation determines, in its discretion, that Employee or Employee's Beneficiary or surviving spouse is under a legal disability or is incapacitated in any way so as to be unable to manage his financial affairs, the Corporation may make any payment otherwise due under the terms of this Appendix A to such person or to his legal representative or to a friend or relative of such person as the Corporation considers advisable. Any payment under this Section 11 shall be a complete discharge of any liability for the making of such payment under this Appendix A. Nothing contained in this Section 11, however, should be deemed to impose upon the Corporation any liability for paying a benefit to any person who is under such a legal

disability or is so incapacitated unless it has received notice of such disability or incapacity from a competent source.

**12. Nonassignability.** Neither Employee nor any other person shall have any right to commute, sell, assign, transfer, pledge, anticipate, mortgage or otherwise encumber, transfer, hypothecate, alienate or convey in advance of actual receipt, the amounts, if any, payable hereunder, or any part thereof, which are, and all rights to which are expressly declared to be, unassignable and non-transferable. No part of the amounts payable shall, prior to actual payment, be subject to seizure, attachment, garnishment or sequestration for the payment of any debts, judgments, alimony or separate maintenance owed by Employee or any other person, be transferable by operation of law in the event of Employee's or any other person's bankruptcy or insolvency or be transferable to a spouse as a result of a property settlement or otherwise. The Corporation is authorized to make any payments directed by court order.

**13. Claim Procedure.**

13.1. Presentation of Claim. Employee, or the surviving spouse of Employee after Employee's death, or Employee's Beneficiary (such Employee, surviving spouse, or Beneficiary being referred to below as a "Claimant") may deliver to the Corporation a written claim for a determination with respect to the amounts distributable to such Claimant under this Appendix A. If such a claim relates to the contents of a notice received by the Claimant, the claim must be made within sixty (60) days after such notice was received by the Claimant. All other claims must be made within 180 days of the date on which the event that caused the claim to arise occurred. The claim must state with particularity the determination desired by the Claimant.

13.2. Notification of Decision.

(a) Claim for benefits other than Disability benefits. The Corporation shall consider a Claimant's claim within a reasonable time, but no later than ninety (90) days after receiving the claim. If the Corporation determines that special circumstances require an extension of time for processing the claim, written notice of the extension shall be furnished to the Claimant prior to the termination of the initial ninety (90) day period. In no event shall such extension exceed a period of ninety (90) days from the end of the initial period. The extension notice shall indicate the special circumstances requiring an extension of time and the date by which the Corporation expects to render the benefit determination.

(b) Claim for Disability benefits. If the claim relates to benefits in connection with Disability, the Corporation shall consider a Claimant's claim within a reasonable time, but no later than forty-five (45) days after receiving the claim. If the Corporation determines that, due to matters beyond the control of the Plan, the Corporation will not be able to respond to the claim within such 45-day period, the Corporation may extend the response period for one or two additional periods of up to 30 days each by providing the Claimant with notice describing the circumstances that necessitate the extension and the date as of which the Corporation anticipates that it will render its decision. Each such notice must be conveyed to the Claimant prior to the commencement of an extension.

(c) Notification. The Corporation shall notify the Claimant, in writing, within the time periods specified in Section 13.2(a) or (b), as applicable:

- (1) that the Claimant's requested determination has been made, and that the claim has been allowed in full; or
- (2) that the Corporation has reached a conclusion contrary, in whole or in part, to the Claimant's requested determination, and such notice must set forth in a manner calculated to be understood by the Claimant:
  - (A) the specific reason(s) for the denial of the claim, or any part of it;
  - (B) specific reference(s) to pertinent provisions of this Appendix A upon which such denial was based;
  - (C) a description of any additional material or information necessary for the Claimant to perfect the claim, and an explanation of why such material or information is necessary;
  - (D) an explanation of the claim review procedure set forth in Section 13.3 below; and
  - (E) a statement of the Claimant's right to bring a civil action under ERISA Section 502(a) following an adverse benefit determination on review.

13.3. Review of a Denied Claim.

(a) Claim for benefits other than Disability benefits. On or before sixty (60) days after receiving a notice from the Corporation that a claim has been denied, in whole or in part, a Claimant (or the Claimant's duly authorized representative) may file with the Corporation a written request for a review of the denial of the claim. The Claimant (or the Claimant's duly authorized representative):

- (a) may, upon request and free of charge, have reasonable access to, and copies of, all documents, records and other information relevant to the claim for benefits;
- (b) may submit written comments or other documents; and/or
- (c) may request a hearing, which the Corporation, in its sole discretion, may grant.

The Corporation shall render its decision on review promptly, and no later than sixty (60) days after the Corporation receives the Claimant's written request for a review of the denial of the claim. If the Corporation determines that special circumstances require an extension of time for processing the claim, written notice of the extension shall be furnished to the Claimant prior to the termination of the initial sixty (60) day period. In no event shall such extension exceed a period of sixty (60) days from the end of the initial period. The extension notice shall indicate the special circumstances requiring an extension of time and the date by which the Corporation expects to render the benefit determination. In rendering its decision, the Corporation shall take into account all comments, documents, records and other information submitted by the Claimant relating to the claim, without regard to whether such information was submitted or considered in the initial benefit determination. The decision must be written in a manner calculated to be understood by the Claimant, and it must contain:

- (1) specific reasons for the decision;
- (2) specific reference(s) to the pertinent provisions of this Appendix A upon which the decision was based;
- (3) a statement that the Claimant is entitled to receive, upon request and free of charge, reasonable access to and copies of, all documents, records and other information relevant (as defined in applicable ERISA regulations) to the Claimant's claim for

benefits; and

(4) a statement of the Claimant's right to bring a civil action under ERISA Section 502(a).

(b) Claim for Disability benefits. If the claim relates to benefits in connection with Disability, the procedure described in Section 13.3(a) above shall apply, modified as follows:

(1) All references to 60 days shall be changed to 45 days, except that a Claimant shall have 180 days to file an appeal.

(2) The Corporation shall designate an individual to conduct the review who is not the individual who made the initial adverse determination, and is not a subordinate of such individual.

(3) The notice of extension shall describe the circumstances that require the extension; must include the date as of which the Corporation anticipates that it will render its decision; and must be communicated to the Claimant prior to the commencement of the extension.

(4) The review shall not afford deference to the initial adverse benefit determination.

(5) When the appeal is based on a medical judgment, the Corporation shall consult with a health care professional who has appropriate experience and training in the field involved in determining the Claimant's Disability and shall identify all medical and vocational experts whose advice was obtained in connection with the appeal. A health care professional may not be consulted under this Section 7.10(b)(3)(ii)(E) if the health care professional (or a subordinate of such individual) was consulted in connection with the initial claim for benefits.

(6) If the Corporation makes an adverse benefit determination on review, the Corporation shall provide the Claimant with a statement that the Claimant is entitled to receive or request reasonable access to, and copies of, all information relevant to the claim for benefits, including internal rules, guidelines, and protocols (to the extent relied upon) and a statement regarding voluntary alternative dispute resolution options.

13.4. Disability Benefits. For purposes of this Article 13, "Disability benefits" means a benefit payable under this Appendix A that is conditioned upon the Corporation's determination that Employee is Permanently and Totally Disabled. If the Corporation does not make such determination, but instead relies solely upon the determination of the Social Security Administration's determination that Employee is disabled, then Sections 13.2(b) and 13.3(b) shall not apply, and any claims by Employee shall instead be reviewed under the provisions of this Article 13 for benefits other than Disability benefits.

13.5. Legal Action. A Claimant's compliance with the foregoing provisions of this Article 13 is a mandatory prerequisite to a Claimant's right to commence any legal action with respect to any claim for benefits under this Appendix A.

**14. Tax Withholding and Reporting; Section 280G Excise Taxes.**

(a) General. The Corporation shall have the right to deduct any required withholding taxes from any payment made under this Appendix A. Except as provided in Section 14(b), the Corporation shall not be obligated to pay or reimburse Employee, or his surviving spouse or Beneficiary, for any income or other taxes or penalties that may be imposed on such person by the Internal Revenue Service or any state or other taxing authority as a result of benefits paid under this Appendix A.

(b) Excise Tax Payment. In the event that any payment or benefit (within the meaning of Section 280G(b)(2) of the Internal Revenue Code of 1986, as amended (the "Code")), to Employee or for his benefit paid or payable or distributed or distributable pursuant to the terms of this Employment Agreement (including this Appendix A) or otherwise in connection with, or arising out of, his employment with the Corporation or a Change in Control of the Corporation (a "Payment" or "Payments"), would be subject to the excise tax imposed by Section 4999 of the Code or any interest or penalties are incurred by the Employee with respect to such excise tax (such excise tax, together with any such interest and penalties, are hereinafter collectively referred to as the "Excise Tax"), then Employee will be entitled to immediately receive an additional payment (a "Gross-Up Payment") from the Corporation in an amount such that after payment by Employee of all taxes (including any interest or penalties, other than interest and penalties imposed by reason of Employee's failure to file timely a tax return or pay taxes shown due on his return, imposed with respect to such taxes and the Excise Tax), including any Excise Tax imposed upon the Gross-Up Payment,

Employee retains an amount of the Gross-Up Payment equal to the Excise Tax imposed upon the Payments.

15. **Successors.** The provisions of this Appendix A shall bind and inure to the benefit of the Corporation and its successors and assigns and Employee and Employee's surviving spouse and designated beneficiaries.

16. **Amendment.** This Appendix A may be amended only by written agreement between Employee and the Corporation.

Agreed to and executed this 10th day of November, 2008.

MKS Instruments, Inc.

By: /s/ Leo Berlinghieri  
Leo Berlinghieri, CEO & President

/s/ Gerald G. Colella  
Gerald G. Colella

**MKS Instruments, Inc.**  
**Compensatory Arrangements with non-Employee Directors**  
**Effective January 20, 2009**

**Cash Compensation<sup>1</sup>**

Directors who are not employees of the Company are paid cash compensation as follows:

		Annual Retainer (Paid in Quarterly Installments)	Meeting Fees
Chairman		\$60,000.00	\$1,600.00
Board Member		\$28,800.00	\$1,800.00
Lead Director		\$14,400.00	
Audit Committee	Chair	\$10,800.00	\$1,350.00
	Member		\$1,350.00
Compensation Committee	Chair	\$ 9,000.00	\$1,350.00
	Member		\$1,350.00
Nominating & Corporate Governance Committee	Chair	\$ 5,400.00	\$1,350.00
	Member		\$1,350.00

Directors of MKS are reimbursed for expenses incurred in connection with their attendance at board meetings and committee meetings.

**Stock Compensation**

Non-employee directors participate in the Company's 2004 Stock Incentive Plan. Under this plan, non-employee directors receive restricted stock units of the Company's common stock as follows:

Type of Award	Date of Award	Number of Restricted Stock Units	Vesting Schedule
Initial Award	Date of initial election to board	6,666	vests in 12 equal quarterly installments over a three-year period
Annual*	Date of each Annual Meeting of Shareholders	4,000	Fully vests on the day prior to the first annual meeting of shareholders

Type of Award	Date of Award	Number of Restricted Stock Units	Vesting Schedule 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)
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\* A Non-Employee Director is eligible to receive annual awards if the director has been in office for at least six months prior to the date of the respective annual meeting of shareholders.

1 Reflects temporary reductions in cash compensation in effect as of January 20, 2009.

FOURTH AMENDMENT DATED JULY 31, 2008  
TO  
OPTIONAL ADVANCE DEMAND GRID NOTE

This Fourth Amendment dated as of July 31, 2008 amends the Optional Advance Demand Grid Note dated August 3, 2004, made by MKS Instruments, Inc. and MKS Japan, Inc. in favor of HSBC Bank USA, National Association, as amended by the First Amendment, dated July 29, 2005 and the Second Amendment, dated July 31, 2006, and the Third Amendment, dated as of July 31, 2007 (the "Note"). Terms defined in the Note shall have the same meanings in this Amendment.

1. The date of "July 31, 2008", wherever it appears in the Note, is hereby deleted and replaced with: "July 31, 2009". After July 31, 2009, the termination date of "July 31, 2009" (and any subsequent termination date), wherever it appears in the note, shall be deleted and replaced by such later date as may be agreed to in writing by the Bank and the Borrower as the new termination date of the Note.
2. The definition of **Adjusted LIBOR Rate**. The LIBOR Rate plus .75%, shall be deleted and replaced with **Adjusted LIBOR Rate**: The LIBOR Rate plus .50%.
3. Except as amended hereby, the Note remains unchanged and in full force and effect.

MKS INSTRUMENTS, INC.

By: /s/ Joseph M. Tocci  
Name: Joseph M. Tocci  
Title: Treasurer

HSBC BANK USA, NATIONAL ASSOCIATION

By: /s/ Elise M. Russo  
Name: Elise M. Russo  
Title: First Vice President

MKS JAPAN, INC.

By: /s/ Ronald Weigner  
Name: Ronald Weigner  
Title: Director

## SUBSIDIARIES OF THE REGISTRANT

SUBSIDIARY	JURISDICTION OF INCORPORATION
ASTeX GmbH	Germany
Ion Systems, Inc.	California
MKS (Bermuda) Ltd.	Bermuda
MKS Denmark APS	Denmark
MKS Germany Holding GmbH	Germany
MKS Instruments (Asia) Ltd.	Bermuda
MKS Instruments (China) Company Ltd.	China
MKS Instruments Deutschland GmbH	Germany
MKS Instruments France S.A.S.	France
MKS Instruments (Hong Kong) Ltd.	Hong Kong
MKS Instruments (Shanghai) Ltd.	Shanghai
MKS Instruments U.K. Limited	United Kingdom
MKS Japan, Inc.	Japan
MKS Korea Co., Ltd.	Korea
MKS Luxembourg S.A.R.L.	Luxembourg
MKS MSC, Inc.	Massachusetts
MKS Taiwan Technology Ltd.	Taiwan
MKS Technology Limited	United Kingdom
MKS Tega Ltd.	Israel
MKS Tenta Products Ltd.	Israel
MKS Umetrics AB	Sweden
Spectra Sortech, Ltd.	United Kingdom
Telvac Engineering Limited	United Kingdom
Tianjin Yield Co, Ltd.	China
Umetrics, Inc.	New Jersey
Umetrics (UK) Ltd.	UK
Yield Dynamics, Inc.	California

CONSENT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

We hereby consent to the incorporation by reference in the Registration Statements on Form S-8 (No. 333-78069, 333-78071, 333-78073, 333-31224, 333-54486, 333-54488, 333-54490, 333-90498, 333-90500, 333-90502, 333-116385, 333-116387, 333-116389, and 333-127221) and Form S-3 (No. 333-34450 and 333-109753) of MKS Instruments, Inc. of our report dated February 27, 2009 relating to the financial statements, financial statement schedule and the effectiveness of internal control over financial reporting, which appears in this Form 10-K.

/s/ PricewaterhouseCoopers LLP

Boston, Massachusetts  
February 27, 2009

CERTIFICATION OF PRINCIPAL EXECUTIVE OFFICER  
PURSUANT TO RULE 13a-14(a)/RULE 15d-14(a) OF THE  
SECURITIES EXCHANGE ACT OF 1934, AS AMENDED

I, Leo Berlinghieri, certify that:

1. I have reviewed this annual report on Form 10-K of MKS Instruments, Inc.;
2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;
3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;
4. The registrant's other certifying officer and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15(d)-15(f)) for the registrant and have:
  - a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this annual report is being prepared;
  - b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;
  - c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this annual report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and
  - d) Disclosed in this report any changes in the registrant's internal control over financial reporting that occurred during the registrant's fourth fiscal quarter that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and
5. The registrant's other certifying officer and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of registrant's board of directors (or persons performing the equivalent functions):
  - a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and
  - b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control and financial reporting.

Dated: February 26, 2009

/s/ Leo Berlinghieri

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Leo Berlinghieri  
Chief Executive Officer and President  
(Principal Executive Officer)

CERTIFICATION OF PRINCIPAL FINANCIAL OFFICER  
PURSUANT TO RULE 13a-14(a)/RULE 15d-14(a) OF THE  
SECURITIES EXCHANGE ACT OF 1934, AS AMENDED

I, Ronald C. Weigner, certify that:

1. I have reviewed this annual report on Form 10-K of MKS Instruments, Inc.;
2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;
3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;
4. The registrant's other certifying officer and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15(d)-15(f)) for the registrant and have:
  - a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this annual report is being prepared;
  - b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;
  - c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this annual report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and
  - d) Disclosed in this report any changes in the registrant's internal control over financial reporting that occurred during the registrant's fourth fiscal quarter that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and
5. The registrant's other certifying officer and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of registrant's board of directors (or persons performing the equivalent functions):
  - a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and
  - b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control and financial reporting.

Dated: February 26, 2009

/s/ Ronald C. Weigner

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Ronald C. Weigner  
Vice President, Chief Financial Officer and Treasurer  
(Principal Financial Officer)

## CERTIFICATION OF CHIEF EXECUTIVE OFFICER AND CHIEF FINANCIAL OFFICER

PURSUANT TO 18 U.S.C. SECTION 1350,

AS ADOPTED PURSUANT TO

SECTION 906 OF THE SARBANES-OXLEY ACT OF 2002

In connection with the Annual Report on Form 10-K of MKS Instruments, Inc. (the "Company") for the period ended December 31, 2008 as filed with the Securities and Exchange Commission on the date hereof (the "Report"), the undersigned, Leo Berlinghieri, Chief Executive Officer and President of the Company, and Ronald C. Weigner, Vice President, Chief Financial Officer and Treasurer of the Company, each hereby certifies, pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, that, based on his knowledge:

- (1) The Report fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934; and
- (2) The information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

Dated: February 26, 2009

/s/ Leo Berlinghieri  
Leo Berlinghieri  
Chief Executive Officer and President

Dated: February 26, 2009

/s/ Ronald C. Weigner  
Ronald C. Weigner  
Vice President, Chief Financial Officer and Treasurer