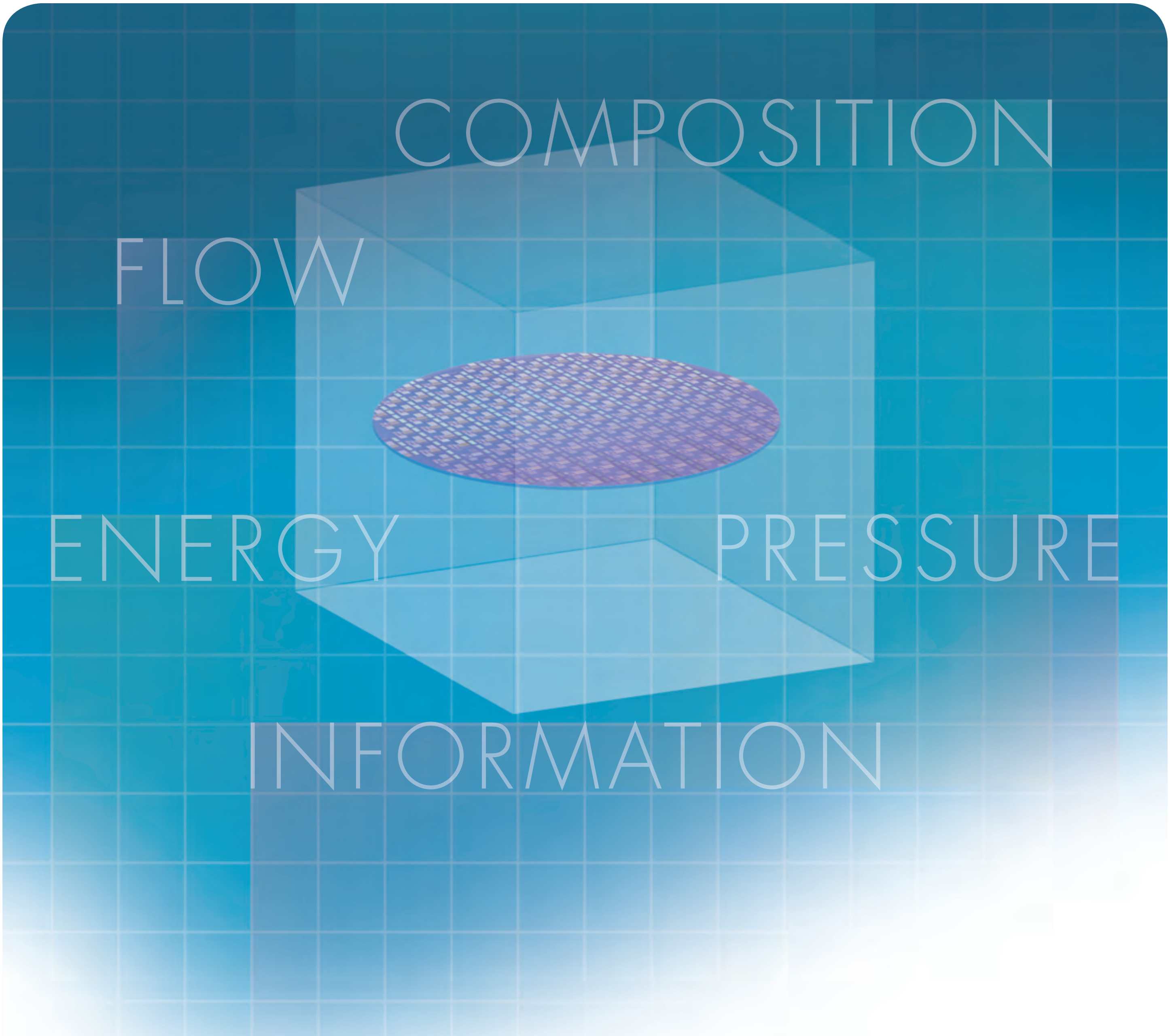


STRATEGICALLY POSITIONED FOR GROWTH

mks
Technology for Productivity

2004 ANNUAL REPORT

Corporate Profile

MKS Instruments, Inc. is a leading worldwide provider of instruments, components, subsystems, and process control solutions that measure, control, power, and monitor critical parameters of semiconductor and other advanced manufacturing processes.

Financial Highlights

SELECTED CONSOLIDATED FINANCIAL DATA

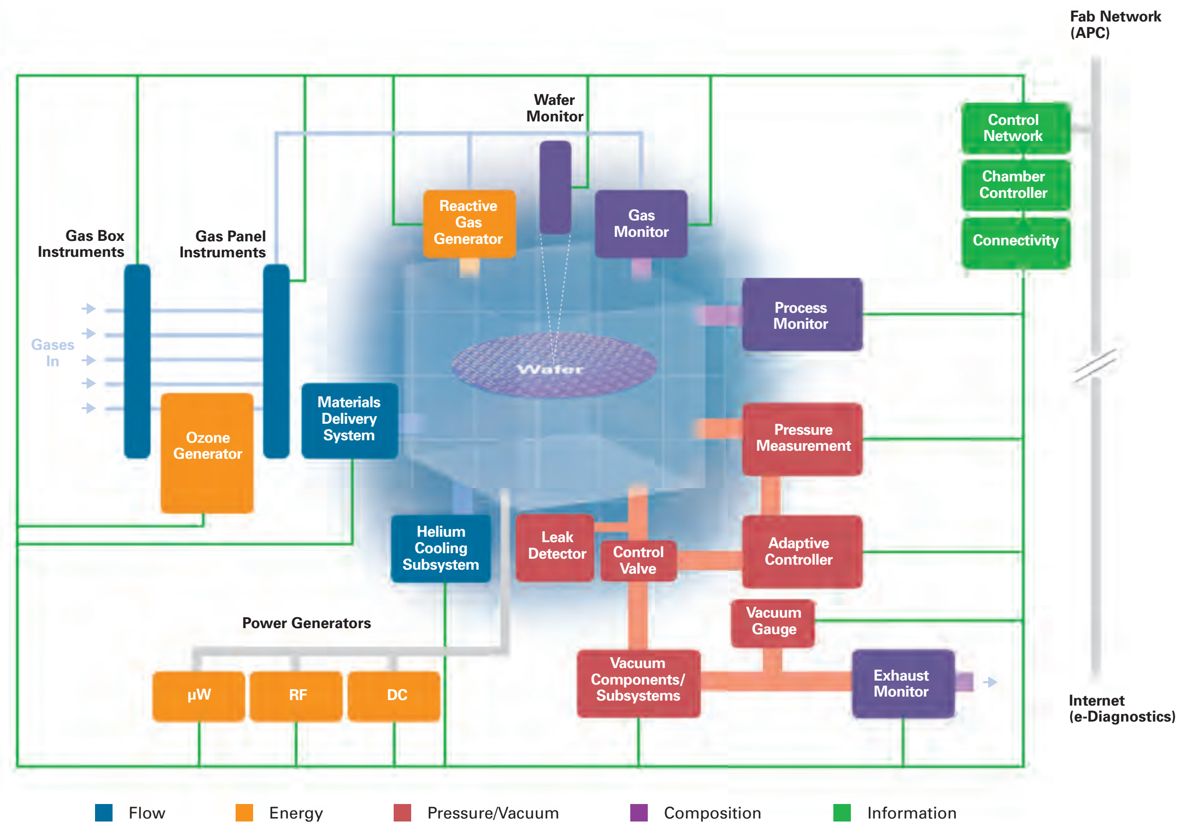
(in thousands, except per share data)

Year Ended December 31,	**2000**	**2001**	**2002**	**2003**	**2004**
Statement of Operations Data					
Net sales	$ 466,852	$ 286,808	$ 314,773	$ 337,291	$ 555,080
Gross profit	205,396	85,583	105,795	118,109	219,371
GAAP net income (loss)	60,260	(31,043)	(39,537)	(16,385)	69,839
GAAP net income (loss) per diluted share	1.67	(0.83)	(0.79)	(0.32)	1.28
Non-GAAP net income (loss)	64,512	668	(7,372)	(1,027)	62,909
Non-GAAP net income (loss) per diluted share	1.78	0.02	(0.15)	(0.02)	1.15
Balance Sheet Data					
Cash and cash equivalents	$ 123,082	$ 120,869	$ 88,820	$ 74,660	$ 138,389
Short-term investments	17,904	16,625	39,894	54,518	97,511
Working capital	237,321	216,855	192,008	210,468	347,700
Long-term investments	17,100	11,029	15,980	13,625	4,775
Total assets	454,403	411,189	685,623	692,032	828,677
Short-term obligations	19,134	14,815	18,472	20,196	24,509
Long-term obligations, less current portion	12,386	11,257	11,726	8,810	6,667
Stockholders' equity	357,522	352,871	610,690	608,310	726,634

The financial results that exclude certain charges and special items are not in accordance with accounting principles generally accepted in the United States of America. See page 8 for a Reconciliation of GAAP (Generally Accepted Accounting Principles) to Non-GAAP Financial Results. MKS has historically been acquisitive, and management believes the presentation of non-GAAP financial measures, which exclude the costs associated with acquisitions and other special items, is useful to investors for comparing prior periods and analyzing ongoing business trends and operating results. See MKS' Annual Report on Form 10-K for the fiscal year ended December 31, 2004 for detail regarding Selected Consolidated Financial Data.

SAFE HARBOR STATEMENT – MKS' management believes that this Annual Report to Shareholders contains "forward-looking statements" within the meaning of the Private Securities Reform Act of 1995. When used herein, "believe," "anticipate," "estimate," "expect," "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 Instruments, Inc. assumes no obligation to update this information. Risks and uncertainties include but are not limited to those discussed in the sections entitled "Management's Discussion and Analysis of Financial Condition and Results of Operations – Factors That May Affect Future Results."

Surrounding the Chamber



Our instruments, components, and subsystems control critical processes – gas pressure and flow rates, consistent power delivery, gas composition monitoring, contamination reduction, and information management – around the wafer processing chamber where semiconductor devices are manufactured.

MKS is primarily focused in markets where gas-based technologies are used in advanced manufacturing processes to create some of the world's most complex products, such as semiconductor devices and flat panel displays.

Semiconductor devices are the building blocks of the global electronics industry. Devices with new materials, thinner layers of material, and smaller dimensions are being fabricated on larger wafers to increase device performance and reduce cost. Higher value devices drive demand for next-generation commercial and consumer electronics products.

Higher value devices also require more capital investment and more manufacturing process steps per wafer. Investment at the leading edge of device manufacturing technology – where production yields are low – creates an opportunity for more precise process control, which can improve yields. We are strategically positioned to take advantage of this growth opportunity. With a broad portfolio of process control technologies, we provide solutions that enable precise control and optimization of advanced manufacturing processes, and enhance our customers' uptime, yield, throughput, and return on invested capital.

To Our Shareholders

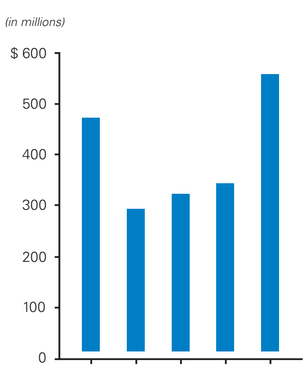
John R. Bertucci
Chairman and Chief Executive Officer

Our strategy to gain share is to enhance the performance and productivity of process tools by developing best-in-class products, acquiring leading-edge technologies, and integrating those technologies into higher value subsystems.

MKS achieved significant successes in 2004.

We continued to introduce new process control products to solidify our strong market share positions and improve our market position in other areas. As a result, I'm pleased to report that in 2004 we increased our share of a larger served market. Based on industry research, we estimate that our market share increased to 23% from 21% in a served market that grew by 50% to $2.4 billion in 2004 from $1.6 billion in 2003.

NET SALES GROWTH



We strengthened relationships with customers by helping to shorten their time to market in 2004. Our global operations responded effectively as semiconductor capital equipment customers rapidly raised their production rates and continued the transition to 300mm wafer production.

We delivered profitable growth for our shareholders. Sales grew by 65% to $555 million in 2004 from $337 million in 2003. GAAP net earnings were $70 million, or $1.28 per diluted share, in 2004 compared to a net loss of $16 million, or $0.32 per basic share, in 2003. Non-GAAP net earnings from ongoing operations, which exclude amortization of acquired intangible assets and special items, grew to $63 million, or $1.15 per diluted share, in 2004 from a loss of $1 million, or $0.02 per basic share, in 2003.

We positioned MKS for future growth. Our expanded information management capability enhanced our technology portfolio in 2004 to support the growing requirement for real-time process control and yield management.

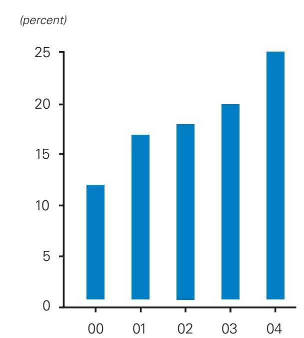
Year in Review

A prolonged period of underinvestment in new semiconductor production capacity ended in the last half of 2003. A rapid upturn in semiconductor capital equipment spending continued through the first half of 2004, before turning down in the second half of the year.

Device manufacturers continued to transition to larger 300mm wafer production in 2004. We were well positioned for this transition. Through product development and acquisitions over the past five years, we have expanded our control of the process environment in the chamber where wafers are made. At the same time, our participation has increased in leading-edge semiconductor process applications, such as atomic layer deposition (ALD), which typically grow at above-industry rates.

Our strategy to gain share is to enhance the performance and productivity of process tools by developing best-in-class products, acquiring leading-edge technologies, and integrating those technologies into higher value subsystems. We are developing application-specific integrated subsystems that are designed to provide optimized process performance while reducing manufacturing complexity. This strategy differentiates MKS with our customers, because these subsystems combine technologies and process expertise, which single-product suppliers cannot duplicate. Integrated subsystems sales increased to 25% of total sales in 2004, bringing us closer to our goal of 30% of total sales from these highly differentiated products.

INTEGRATED SUBSYSTEMS GROWTH



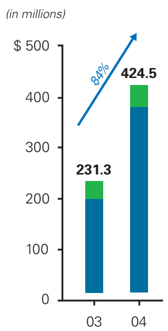
Percent of Annual Sales

MKS is well positioned with a broad process control technology portfolio that is fundamental to semiconductor manufacturing and other advanced manufacturing applications. Unlike companies that have only one or two application-specific technologies, we have the breadth and expertise to solve a range of process control challenges. We have invested in technologies that are essential for improving manufacturing productivity as the semiconductor industry migrates to new materials, thinner layers of material, and smaller device dimensions on larger wafers.

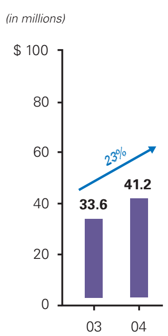
Semiconductor device fabrication processes are becoming so complex and wafers so valuable that standard process sensors are insufficient for advanced process control. To help meet this challenge, we introduced a number of web-enabled sensors and instruments in 2004. We also launched TOOLweb,™ an open architecture framework for collecting and synchronizing data in real time from web-enabled sensors.

In 2004, we expanded our information management capabilities to include process fault detection and classification through a strategic partnership with a worldwide leader in multivariate analysis software. As device manufacturers strive to make next-generation processes run faster, they need fast, actionable process information to improve yield management. By incorporating fault detection and classification capabilities into TOOLweb, we enable in-depth process monitoring, data collection, and real-time advanced process control. We see opportunity ahead for our information and control systems as wafers continue to increase in value.

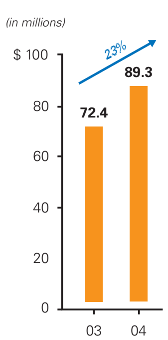
GROWTH IN KEY MARKETS



Semiconductor



Thin Film



Other

Strong Financial Results

With our strategic positioning and strong operational performance, we turned increased orders from our customers into profitable financial results for our shareholders in 2004.

Our sales grew by 65% to $555 million in 2004 from $337 million in 2003. Sales to the semiconductor industry – our major market – represented approximately $425 million, or 77% of total 2004 sales. Within this market, semiconductor equipment manufacturers accounted for 69% of total sales, and device manufacturers accounted for 8%.

Despite the strength of the semiconductor market in 2004, we maintained market diversity. We leveraged our expertise in critical process technologies to increase sales in other markets. I'm pleased to report that sales increased in each of our three market areas, with an 84% year-over-year increase in the semiconductor market and a 23% year-over-year increase in both the thin film market and in other non-semiconductor markets.

Sales to thin film customers represented approximately $41 million, or 7% of 2004 sales. Thin film applications include flat panel displays used in the latest generation of television sets, computers and hand-held devices; data storage media such as DVDs; and energy efficient coatings for architectural glass. Thin film transistor applications for flat panel displays deposit materials onto glass panels instead of silicon wafers by using complex deposition and etch processes that are similar to semiconductor manufacturing.

Sales to other non-semiconductor markets represented approximately $89 million, or 16% of total 2004 sales, and represented diverse markets such as government and environmental markets, as well as a variety of applications including high-energy physics and medical equipment.

Cash and investments increased to approximately $241 million in 2004 from approximately $143 million in 2003.

In this environment of strengthening demand, we delivered profitable growth.

Gross profit margin increased to 39.5% in 2004 from 35.0% in 2003. We are targeting to continue to improve gross margin by continuing to source materials and transition products selectively to lower cost regions in 2005. We are also targeting higher sales of differentiated application-specific integrated subsystems.

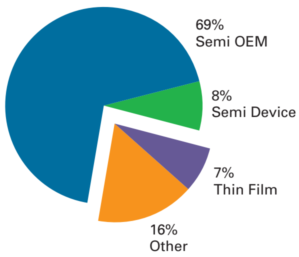
In 2004, we continued to invest in research and development programs in an effort to enhance the performance and productivity of process tools in higher growth applications.

For the year 2004, earnings increased to $1.28 per diluted share from a loss of $0.32 per basic share in 2003. On an operating or non-GAAP basis, which excludes the effect of amortization of acquired intangible assets and special items, earnings totaled $1.15 per diluted share in 2004 compared to a loss of $0.02 per basic share in 2003.

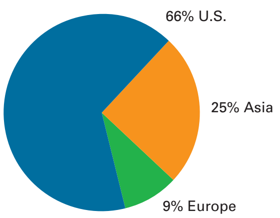
Stockholder's equity increased to approximately $727 million from approximately $608 million in 2003.

Cash from operations increased to approximately $66 million in 2004 from breakeven in 2003. This significant improvement, along with $33 million in net proceeds from our January 2004 stock offering, provided us with a record level of cash and investments in 2004. Cash and investments increased to approximately $241 million in 2004 from approximately $143 million in 2003. Cash and investments, net of debt, totaled approximately $210 million in 2004, which provides us with flexibility and further strengthens our balance sheet.

MARKET MIX



2004 Sales by Market



2004 Sales by Geography

We are ready with technologies for improving manufacturing productivity, and we intend to continue to gain share as semiconductor process complexity continues to increase.

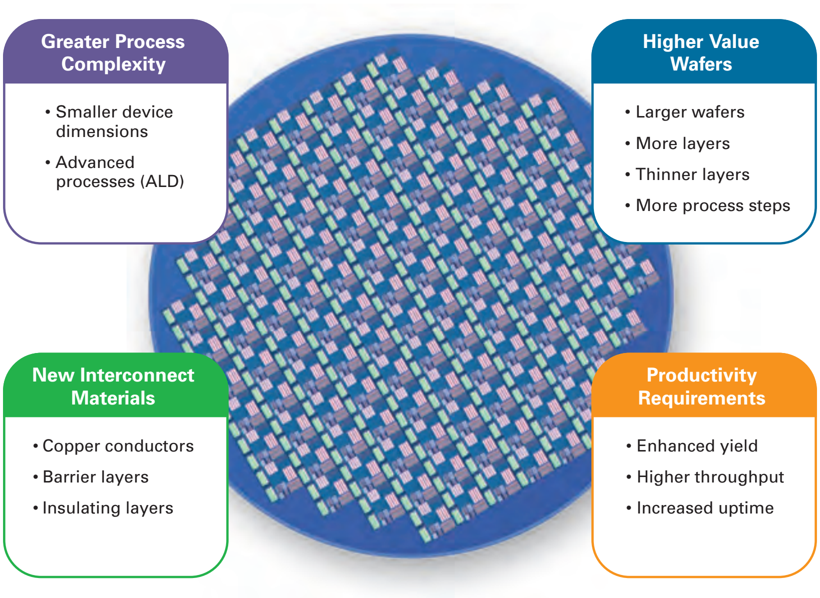
Outlook

Looking forward, our visibility is limited because of our short lead times. However, we expect that world-class device manufacturers will continue to invest in leading-edge technology. We believe that an increasing percentage of the capital spending dollar will be invested in process control, as device manufacturers strive to improve the uptime, yield, and throughput of more complex processes. Semiconductor devices with smaller dimensions, new interconnect materials, and thinner layers of material on 300mm wafers are more challenging to manufacture. With each technology transition, more process steps are required, which increase the value of individual wafers. Device manufacturers require more data to track individual wafers instead of batches of wafers. They require more digital connectivity to make better use of that data, and they require more precise process control in the chamber to anticipate process deviations and prevent wafer yield loss.

We believe we are well positioned to address these requirements. While near-term challenges may continue in the semiconductor market, we see good momentum in many of our process control solutions targeted at this growing process control opportunity.

Looking longer term, we expect that new commercial and consumer electronics applications will continue to emerge and drive demand for semiconductor devices and investment in semiconductor capital equipment. We anticipate that device manufacturers will need to add capacity and upgrade technology to stay competitive as they support the growth of new and emerging electronic applications. We are ready with technologies for improving manufacturing productivity, and we intend to continue to gain share as semiconductor process complexity continues to increase.

PROCESS COMPLEXITY AND WAFER VALUE DRIVE EQUIPMENT GROWTH



We are also well positioned with management depth and human resource talent. In July, Leo Berlinghieri was named President in addition to his responsibilities as Chief Operating Officer. Leo brings strong operations experience and a comprehensive understanding of the industry – combined with exceptional customer focus – to his expanded leadership role.

I particularly want to thank our global team members for their contributions in 2004. Our significant growth resulted from satisfying current customers and pursuing new opportunities. With our team's continued commitment to the success of our customers and MKS, the strength of our customer relationships, and the confidence of our valued investors, we enter 2005 strategically positioned for growth.

John R. Bertucci

Chairman and Chief Executive Officer

Reconciliation of GAAP to Non-GAAP Financial Results

(in thousands, except per share data)

Year Ended December 31,	2000	2001	2002	2003	2004
GAAP net income (loss) [1]	$ 60,260	$ (31,043)	$ (39,537)	$ (16,385)	$ 69,839
Adjustments:[2]					
Amortization of acquired intangible assets	5,023	11,026	13,897	14,692	14,764
Restructuring, asset impairment and other charges	-	-	2,726	1,593	437
Loss (gain) from note related to disposition	-	-	4,121	-	(5,402)
Income from litigation settlement	-	-	(4,200)	-	-
Purchase of in-process technology	310	2,340	8,390	-	-
Goodwill impairment charge	-	3,720	-	-	-
Merger expenses	-	7,708	-	-	-
Disposition of product groups and investment	-	2,379	-	-	-
Significant inventory charge	-	16,608	-	-	-
Other unusual items	-	-	-	(927)	-
Tax effect of adjustments	(1,081)	(12,070)	(6,147)	-	-
Special deferred tax charge (benefit)	-	-	13,378	-	(16,729)
Non-GAAP net income (loss) [2]	$ 64,512	$ 668	$ (7,372)	$ (1,027)	$ 62,909
Non-GAAP net income (loss) per share [2], [3]	$ 1.78	$ 0.02	$ (0.15)	$ (0.02)	$ 1.15
Weighted average shares outstanding [3]	36,170	38,792	50,000	51,581	54,656

(1) Amounts for the years ended December 31, 2001 and 2000, have been restated to reflect the acquisition of Applied Science and Technology, Inc. ("ASTeX") in a pooling of interests transaction effective January 26, 2001.

(2) The non-GAAP net income (loss) and non-GAAP net income (loss) per share amounts exclude amortization of acquired intangible assets, acquisition and disposition related charges, and other significant or special items, net of income taxes.

(3) Due to a non-GAAP net loss in the years ended December 31, 2003 and 2002, non-GAAP net loss per share is based upon the basic number of weighted average shares outstanding. For the years ended December 31, 2004, 2001 and 2000, MKS had non-GAAP net income; therefore, non-GAAP net income per share is based upon the fully diluted number of weighted average shares outstanding.

2004 Form 10-K

MKS Instruments, Inc.

FORM 10-K

For the Fiscal Year Ended December 31, 2004

PART I

PART II

PART III

PART IV

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

Form 10-K
FOR ANNUAL AND TRANSITION REPORTS 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, 2004

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)*	**04-2277512** *(IRS Employer Identification No.)*
90 Industrial Way, Wilmington Massachusetts *(Address of Principal Executive Offices)*	**01887** *(Zip Code)*

Registrant's Telephone Number, including area code:
(978) 284-4000

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

Securities registered pursuant to Section 12(g) of the Act:
Common Stock, no par value

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 is not contained herein, and will not be contained, to the best of the registrant's knowledge, in definitive proxy or information statement 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 an accelerated filer (as defined in the Exchange Act Rule 12b-2). Yes ☑ No ☐

Aggregate market value of the voting and non-voting common equity held by nonaffiliates of the registrant as of June 30, 2004 based on the closing price of the registrant's Common Stock on such date as reported by the Nasdaq National Market: $441,475,286; Number of shares outstanding of the issuer's Common Stock, no par value, as of February 25, 2005: 53,874,518.

DOCUMENTS INCORPORATED BY REFERENCE

Portions of the definitive Proxy Statement for MKS' Annual Meeting of Stockholders to be held on May 9, 2005 are incorporated by reference into Part III of this Form 10-K.

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. 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 "Management's Discussion and Analysis of Financial Condition and Results of Operations — Factors that May Affect Future Results."

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, components, subsystems and process control solutions that measure, control, power and monitor critical parameters of semiconductor and other advanced manufacturing processes.

We are managed as one operating segment which is organized around 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 and thin-film composition analysis, control and information management, power and reactive gas generation and vacuum technology.

Our products are used in diverse markets and applications including the manufacture of, among other things:

- semiconductor devices for diverse electronics applications;
- flat panel displays for hand-held devices, laptop computers, desktop computer monitors and television sets;
- magnetic and optical storage media;
- optical filters and fiber optic cables for data and telecommunications;
- optical coatings for eyeglasses, architectural glass and solar panels; and
- magnetic resonance imaging (MRI) medical equipment.

For over 40 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 include manufacturers of semiconductor capital equipment, semiconductor devices, data storage equipment, medical equipment and flat panel displays, as well as industrial and biopharmaceutical manufacturing companies, and university, government and industrial research laboratories. During the years ended December 31, 2004, 2003 and 2002, we estimate that approximately 77%, 69%, and 70% of our net sales, respectively, were to semiconductor capital equipment manufacturers and semiconductor device manufacturers. Our top 10 customers for the year ended December 31, 2004 were Applied Materials, ASM International, Celerity Group, ESCO, Lam Research, Novellus Systems, Phillips, PSK Tech, Tokyo Electron and Ulvac.

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's public reference room at Judiciary Plaza Building, 450 Fifth Street, N.W., Room 1024, 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. 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 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 productivity by controlling advanced manufacturing processes in semiconductor, thin-film and other non-semiconductor market sectors. We estimate that approximately 77%, 69%, and 70% of our net sales for the years ended December 31, 2004, 2003 and 2002, respectively, were to semiconductor capital equipment manufacturers and semiconductor device manufacturers. Approximately 7%, 10%, and 8% of our net sales in the years ended December 31, 2004, 2003 and 2002, respectively, were for thin-film processing equipment applications, including compact disks, digital video disks (DVDs) and other digital storage media; flat panel displays for computer and television screens; and thin-film coatings for architectural glass and optics. Approximately 16%, 21%, and 22% of our net sales in the years ended December 31, 2004, 2003 and 2002, respectively, were for other non-semiconductor manufacturing applications. These include, but are not limited to, industrial manufacturing, magnetic resonance imaging (MRI) medical equipment, biopharmaceutical manufacturing, and university, government and industrial research laboratories.

We estimate that approximately 34%, 41%, and 36% of our net sales for the years ended December 31, 2004, 2003 and 2002, respectively, were to customers located in international markets. International sales include sales by our foreign subsidiaries, but exclude direct export sales. Please refer to Note 11 in the Notes to Consolidated Financial Statements for further information.

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 materials onto substrates and etching and cleaning circuit patterns.

Our products are also used for process facility applications such as gas distribution, pressure control and vacuum distribution in clean rooms where semiconductor manufacturing takes place. In addition, we provide specialized instruments that monitor the performance of manufacturing equipment and products that distribute and manage process control information. 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 Europe, Japan and the United States.

Thin-Film Manufacturing Applications

Flat Panel Display Manufacturing.

Our products are used in the manufacture of flat panel displays, which require the same or similar fabrication processes as semiconductor manufacturing. Flat panel displays are used in electronic hand-held devices, laptop computers, desktop computer monitors, and television sets. Flat panel display technology is designed to replace bulkier cathode ray tube (CRT) technology in computer monitors and television sets. We sell products to flat panel display equipment manufacturers and to end-users in the flat panel display market. The transition to larger panel sizes and higher display resolution is driving the need for tighter process controls to reduce defects. The major manufacturers of flat panel displays are concentrated in Japan, Korea and Taiwan, and the major manufacturers of flat panel display equipment are concentrated in Japan and the United States.

Magnetic and Optical Storage Media.

Our products are used to manufacture:

- magnetic storage media which store and read data magnetically;
- optical storage media which store and read data using laser technology;
- compact disks;
- hard disks;
- data storage devices; and
- digital video or versatile disks (DVDs).

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

Optical Filters, Optical Fibers and Other Coating Processes

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

Other Non-Semiconductor Manufacturing Applications

Our products are used in vacuum freeze drying of pharmaceuticals, foods and beverages and in vacuum processes involved in light bulb and gas laser manufacturing. Our power delivery products are also incorporated into other end-market products such as MRI medical 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. The 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. Also, please refer to Note 11 in the Notes to Consolidated Financial Statements for further information.

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

This product group includes pressure measurement and control products, material delivery products, gas and thin film composition analysis products, 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, vapor and liquid 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. Our thermal-based mass flow controllers control gas flow based on the molecular weight of gases and our pressure-based mass flow controllers, based on Baratron pressure instrument measurement and control technology, restrict flow in the gas line to transform pressure control into mass flow control.

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

Gas and Thin-Film Composition Analysis Products. Gas and thin-film 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 quadruple 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 and Thin-Film Composition Analysis Products. FTIR-based products provide information about the composition of gases and thin-films 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.

Optical Monitoring Instruments. We manufacture a range of optical monitoring instruments that are sold primarily for thin-film coating applications such as the manufacture of optical filters. The optical monitors measure the thickness and optical properties of a film being deposited, allowing the user to better control the process.

Control and Information Technology Products. We design and manufacture a suite of products that allows semiconductor manufacturing customers to better control their processes through computer-controlled automation. The products include digital control network products, process chamber and system controllers and connectivity 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 including DeviceNet, Profibus, ethernet and conventional discrete digital and analog signals. Chamber and system control computers process these signals in real time and allow the customer to precisely manage the process conditions. 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).

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

This product group includes power delivery products and reactive gas generation products.

Power Delivery Products. Our power delivery products are used in the semiconductor, flat panel display, data storage and medical markets. In the semiconductor, flat panel and data storage markets, our microwave, RF and DC power supplies are used to provide energy to various etching, stripping and deposition processes. In the medical market, our power delivery products are used to provide power for MRI equipment. A range of impedance matching units transfer power from the power supplies to the customer's process. Our power amplifiers are also used in MRI medical equipment including the most advanced 3T (three Tesla) machines.

Reactive Gas Generation Products. Reactive gases are used to etch, strip and deposit films on wafers, to clean wafers during processing, 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. The resulting dissociated gas produces rapid chemical reactions when it comes into contact with other matter. Our reactive gas products include ozone generators and subsystems used for deposition of insulators on to semiconductor devices, ozonated water delivery systems for advanced semiconductor wafer and flat panel display cleaning, atomic fluorine generators for process chamber cleaning, and microwave plasma based products for photo resist removal.

3. ***Vacuum Products***

This product group consists of vacuum technology products, including vacuum gauges, valves and components.

Vacuum Gauging Products. We offer a wide range of vacuum instruments consisting of vacuum measurement sensors and associated power supply and readout units. These vacuum gauges measure phenomena that are related to the level of pressure in the process chamber and downstream of the process chamber between the chamber and the pump. These gauges are used to measure vacuum at pressures lower than those measurable with a Baratron instrument or to measure vacuum in the Baratron instrument range where less accuracy is required. Our indirect pressure gauges use thermal conductivity and ionization gauge technologies to measure pressure from atmospheric pressure to one trillionth of atmospheric pressure.

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

Application-Specific Integrated Subsystems

We also combine products and technologies into application-specific integrated subsystems. Integrated subsystems are made by each product group, and typically provide higher functionality in a smaller footprint, depending upon the application. Integrated subsystems represented approximately 25% of revenues for the year ended December 31, 2004 compared to approximately 20% of revenues for the year ended December 31, 2003.

For example, we have a line of integrated flow and pressure control subsystems that combine two or more of our products and technologies into products for specific process applications. We have developed a range of Back-Side Wafer Cooling Subsystems which are needed to control the flow and pressure of the helium used to effect the cooling of wafers in semiconductor manufacturing. By combining the functions of our Baratron pressure measurement instruments, flow measurement instruments, control electronics and valves into a range of compact subsystems, this product line addresses the need for smaller components that save valuable clean room space.

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 49%, 42%, and 49% of net sales for the years ended December 31, 2004, 2003 and 2002, respectively. Applied Materials accounted for approximately 20%, 18%, and 23% of our net sales for the years ended December 31, 2004, 2003 and 2002, respectively.

Sales, Marketing and Support

Our worldwide sales, marketing 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, 2004, we had 157 sales employees worldwide, located in China, France, Germany, Japan, Korea, the Netherlands, Singapore, Taiwan, the United Kingdom and the United States. Sales representatives and agents in a number of countries including Canada, China, India, Israel, and Italy and in select U.S. cities 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 the semiconductor and other markets.

As semiconductor device manufacturers have become increasingly sensitive to the significant costs of system downtime, they have required that suppliers offer comprehensive local repair service and close customer support. Manufacturers require close support to enable them to repair, modify, upgrade and retrofit their equipment to improve yields and adapt new materials or processes. To meet these market requirements, we maintain a worldwide sales and support organization in 14 countries. Technical support is provided by applications engineers located at 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 32 service depots located worldwide. We 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 our customers' needs have evolved. We have developed, and continue to develop, new products to address emerging industry trends such as the transition from the use of 200mm wafers to 300mm wafers and the shrinking of integrated circuit line-widths from 0.18 micron to 0.13 micron and smaller. In addition, we have developed, and continue to develop, products that support the migration to new classes of materials, 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 customers' development personnel. These relationships help us 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. At December 31, 2004, we had 383 research and development employees, primarily located in the United States. Our research and development expense was $57.0 million, $47.7 million, and $46.0 million for the years ended December 31, 2004, 2003 and 2002, 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. In addition, we acquired in-process technology of $8.4 million in 2002.

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 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 ability to flexibly respond to customers' significantly fluctuating product demands by using lean manufacturing techniques to be a distinct 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 one 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. Mykrolis offers products that compete with our pressure and materials delivery products. Advanced Energy, Horiba/STEC and Celerity/Unit Instruments, each offer materials delivery products that compete with our product line of mass flow controllers. Nor-Cal Products, Inc. and MDC Vacuum Products, Inc., each offer products that compete with our vacuum components. Inficon offers products that compete with our vacuum measurement and gas analysis products. Helix Technology offers 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, 2004, we owned 221 U.S. patents, 156 foreign patents and had 91 pending U.S. patent applications. Foreign counterparts of certain of these applications have been filed or may be filed at the appropriate time. Although we believe that certain patents may be important for certain aspects of our business, we believe that our success also depends upon close customer contact, innovation, technological expertise, responsiveness and worldwide distribution.

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 "Item 3. Legal Proceedings."

Employees

As of December 31, 2004, we employed 2,319 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.

Item 2. *Properties*

As of December 31, 2004, the following table provides information concerning MKS' principal and certain other owned and leased facilities:

Location	Sq. Ft.	Activity	Products Manufactured	Lease Expires
Andover, Massachusetts	82,000	Manufacturing, and Research & Development	Pressure Measurement and Control Products	(1)
Austin, Texas	20,880	Manufacturing, Sales, Customer Support, Service and Research & Development	Control & Information Management Products	May 31, 2012
Berlin, Germany	18,250	Manufacturing, Customer Support, Service and Research & Development	Reactive Gas Generation Products	March 31, 2006
Bloomfield, CT	22,500	Vacated	Not applicable	January 31, 2008
Boulder, Colorado	119,000	Manufacturing, Customer Support, Service and Research & Development	Vacuum Products	(2)
Carmiel, Israel	7,000	Manufacturing and Research & Development	Control & Information Management Products	December 31, 2005
Cheshire, U.K.	13,000	Manufacturing, Sales, Customer Support and Service	Materials Delivery Products	(3)
Colorado Springs, Colorado	32,200	Manufacturing, Customer Support, Service and Research & Development	Power Delivery Products	(4)
Fremont, California	13,600	Vacated	Not applicable	August 31, 2005
Lawrence, Massachusetts	40,000	Manufacturing	Pressure Measurement and Control Products	(1)
Le Bourget, France	5,000	Sales, Customer Support and Service	Not applicable	April 5, 2013
Lod, Israel	5,175	Research & Development and Administration	Not applicable	May 14, 2007
Methuen, Massachusetts	85,000	Manufacturing, Customer Support, Service and Research & Development	Pressure Measurement and Control Products; Materials Delivery Products	(1)
Morgan Hill, California	27,600	Vacated	Not applicable	(5)

Location	Sq. Ft.	Activity	Products Manufactured	Lease Expires
Munich, Germany	14,000	Manufacturing, Sales, Customer Support, Service and Research & Development	Pressure Measurement and Control Products; Materials Delivery Products	(1)
Nogales, Mexico	36,700	Manufacturing	Pressure Measurement and Control Products; Reactive Gas Generation Products	March 31, 2009
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	(6)
San Jose, California	32,000	Sales, Customer Support and Service	Not applicable	April 30, 2009
Santa Clara, California . .	9,000	Manufacturing, Sales, Customer Support, Service and Research & Development	Control & Information Management Products	(7)
Seoul, Korea	10,000	Sales, Customer Support and Service	Not applicable	May 31, 2005
Shanghai, China	6,000	Sales & Service	Not Applicable	February 1, 2008
Shenzhen, China	63,000	Manufacturing	Power Delivery Products	January 31, 2007
Shropshire, U.K.	25,000	Manufacturing	Vacuum Products	October 18, 2010
Singapore	4,000	Sales, Customer Support and Service	Not applicable	July 31, 2006
Taiwan	19,300	Sales, Customer Support and Service	Not applicable	August 25, 2007
Tokyo, Japan	31,600	Manufacturing, Sales, Customer Support, Service and Research & Development	Materials Delivery Products	(8)
Wilmington, Massachusetts	118,000	Headquarters, Manufacturing, Customer Support, Service and Research & Development	Reactive Gas Generation Products; Power Delivery Products	(9)

(1) This facility is owned by MKS.

(2) MKS leases two facilities, one has 39,000 square feet of space with a lease term which expired on October 31, 2004 and is currently leased on a month to month basis. The second has 33,000 square feet of space and a lease term which expires August 31, 2005. 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 2,000 square feet of space and a lease term which expires October 5, 2009 and the second has 11,000 square feet of space and a lease term which expires November 30, 2009.

(4) MKS leases one facility with 8,200 square feet of space and a lease term which expires on April 30, 2006. MKS owns another facility with 24,000 square feet.

(5) This facility is entirely subleased. The lease term expires on June 30, 2007.

(6) MKS owns this facility and has an Industrial Development Revenue Bond of $5.0 million, due in 2014, that is collateralized by the building.

(7) MKS leases 4,000 square feet of space with a lease term which expires April 30, 2005. MKS owns another facility with 5,000 square feet of space.

(8) MKS leases two facilities, one has 14,500 square feet of space and a lease term which expires April 30, 2005 and the second has 10,500 square feet of space and a lease term which expires on September 30, 2006. MKS owns a third facility of 6,600 square feet.

(9) MKS owns this facility and has a mortgage note payable of approximately $3.1 million outstanding at December 31, 2004 which is payable in monthly installments with final payment due in March 2007.

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***

On July 12, 2004, Advanced Energy Industries, Inc. ("Advanced Energy") filed suit against us in federal district court in Delaware, seeking injunctive relief and damages for alleged infringement of a patent held by Advanced Energy. On August 30, 2004, we filed our answer to the complaint, denying Advanced Energy's claims and stating a counterclaim seeking a declaratory judgment that the claims of the patent are invalid, unenforceable and not infringed by us or our products. On March 1, 2005, the parties agreed to dismiss the case, without prejudice. Accordingly, the court dismissed the case on March 11, 2005.

On January 12, 2004, Gas Research Institute ("GRI") brought suit in federal district court in Illinois against us, On-Line Technologies, Inc. ("On-Line") which we acquired in 2001, and another defendant, Advanced Fuel Research, Inc. ("AFR"), for breach of contract, misappropriation of trade secrets and related claims relating to certain infra-red gas analysis technology allegedly developed under a January 1995 Contract for Research between GRI and AFR. The technology was alleged to have been incorporated into certain of our products. GRI made claims for damages, exemplary damages, attorney's fees and costs and injunctive relief. We filed an answer, denying liability and asserting various defenses to GRI's claims. We also asserted a cross-claim against co-defendant AFR, alleging misrepresentation, breach of contract and breach of various duties owed by AFR, and alleging that in the event we and On-Line are held liable to GRI, AFR would be required to reimburse, indemnify, and hold harmless On-Line and us for any such liability. On November 9, 2004, the parties entered into a settlement agreement and the court dismissed the case, including cross-claims, pursuant to the settlement.

On April 3, 2003, Advanced Energy filed suit against us in federal district court in Colorado ("Colorado Action"), seeking a declaratory judgment that Advanced Energy's Xstream product does not infringe three patents held by our subsidiary, Applied Science and Technology, Inc. ("ASTeX"). On May 14, 2003, we brought suit in federal district court in Delaware against Advanced Energy for infringement of five ASTeX patents, including the three patents at issue in the Colorado Action. We sought injunctive relief and damages for Advanced Energy's infringement. These lawsuits are unrelated to the Advanced Energy litigation described above. On December 24, 2003, the Colorado court granted our motion to transfer Advanced Energy's Colorado Action to Delaware. In connection with the jury trial, the parties agreed to present the jury with representative claims from three of the five ASTeX patents. On July 23, 2004, the jury found that Advanced Energy infringed all three patents. We have filed a motion for a permanent injunction, which is pending before the court and the parties are currently briefing post-trial motions in that case. The parties are also awaiting a trial with respect to damages and associated claims of MKS and certain remaining affirmative defenses and related claims of Advanced Energy. That trial date has not yet been scheduled.

On November 30, 2000, ASTeX, which was acquired by MKS in January 2001, brought suit in federal district court in Delaware against Advanced Energy for infringement of ASTeX's patent related to its Astron product. On May 17, 2002, a jury affirmed the validity of the Company's patent and found that Advanced Energy infringed the patent. On May 31, 2002, based on the jury's findings, the Court entered a judgment on the infringement claim in favor of the Company and against Advanced Energy, and awarded $4,200,000 in damages to compensate the Company for Advanced Energy's infringing activity. Advanced Energy filed motions to overturn the verdict. During August of 2002, the Company and Advanced Energy entered into an agreement whereby Advanced Energy agreed to pay the awarded damages amount to the Company and withdraw its motions to overturn the verdict. The Company received the $4,200,000 in September 2002, and recorded the amount as Income from litigation settlement.

On November 3, 1999, On-Line brought suit in federal district court in Connecticut against Perkin-Elmer, Inc. and certain other defendants for infringement of On-Line's patent related to its FTIR spectrometer product and related claims. The suit sought injunctive relief and damages for infringement. Perkin-Elmer, Inc. filed a counterclaim seeking invalidity of the patent, costs and attorneys' fees. In June 2002, the defendants filed a motion for summary judgment. In April 2003, the court granted the motion and dismissed the case. We appealed this decision to the federal circuit court of appeals. On October 13, 2004, the federal circuit court of appeals reversed the lower court's dismissal of certain claims in the case. Accordingly, the case has been remanded to the United States District Court in Connecticut for further proceedings on the merits of the remaining claims. On March 11, 2005, Perkin-Elmer, Inc. submitted to the court a stipulation agreeing that they have infringed a specified claim of On-Line's patent and filed a motion for summary judgment that such patent claim is invalid. We intend to file a reply to the summary judgment motion in the next few weeks. The parties will then await the court's response to the motion.

We are subject to 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 2004 through the solicitation of proxies or otherwise.

PART II

Item 5. *Market for the Registrant's Common Equity and Related Stockholder Matters*

Price Range of Common Stock

Our common stock is traded on the Nasdaq National Market under the symbol MKSI. On February 25, 2005, the closing price of our common stock, as reported on the Nasdaq National Market, was $18.74 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 National Market.

	2004		2003	
Price Range of Common Stock	High	Low	High	Low
First Quarter	$29.97	$21.08	$20.44	$10.68
Second Quarter	26.20	18.62	21.15	11.79
Third Quarter	22.79	12.44	27.55	17.22
Fourth Quarter	18.84	14.36	29.41	20.36

On February 25, 2005, we had approximately 184 stockholders of record.

Dividend Policy

We have never declared or paid any cash dividends. 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, current and anticipated cash needs, plans for expansion, and changes in tax and regulatory rulings.

Item 6. *Selected Financial Data*

Selected Consolidated Financial Data

	Year Ended December 31				
	2004	2003	2002	2001(1)	2000(1)
	(in thousands, except per share data)				
Statement of Operations Data					
Net sales	$555,080	$337,291	$314,773	$286,808	$466,852
Gross profit(2)	219,371	118,109	105,795	85,583	205,396
Income (loss) from operations(3)	59,913	(15,717)	(43,047)	(47,360)	91,535
Net income (loss)(3),(4)	$ 69,839	$(16,385)	$(39,537)	$(31,043)	$ 60,260
Net income (loss) per share:(3),(4)					
Basic	$ 1.30	$ (0.32)	$ (0.79)	$ (0.83)	$ 1.74
Diluted	$ 1.28	$ (0.32)	$ (0.79)	$ (0.83)	$ 1.67
Balance Sheet Data					
Cash and cash equivalents	$138,389	$ 74,660	$ 88,820	$120,869	$123,082
Short-term investments	97,511	54,518	39,894	16,625	17,904
Working capital	347,700	210,468	192,008	216,855	237,321
Long-term investments	4,775	13,625	15,980	11,029	17,100
Total assets	828,677	692,032	685,623	411,189	454,403
Short-term obligations	24,509	20,196	18,472	14,815	19,134
Long-term obligations, less current portion	6,667	8,810	11,726	11,257	12,386
Stockholders' equity	726,634	608,310	610,690	352,871	357,522

(1) Amounts have been restated to reflect the acquisition of Applied Science and Technology, Inc. ("ASTeX") in a pooling of interests transaction effective January 26, 2001.

(2) Gross profit for the year ended December 31, 2001 includes significant charges for excess and obsolete inventory of $16.6 million. These charges were primarily caused by a significant reduction in demand, including reduced demand for older technology products.

(3) Income from operations, net income and net income per share for the year ended December 31, 2004 include restructuring, asset impairment and other charges of $0.4 million. Loss from operations, net loss and net loss per share for the year ended December 31, 2003 include restructuring, asset impairment and other charges of $1.6 million. Loss from operations, net loss and net loss per share for the year ended December 31, 2002 include restructuring and asset impairment charges of $2.7 million and purchase of in-process technology of $8.4 million. Loss from operations, net loss and net loss per share for the year ended December 31, 2001 include restructuring and asset impairment charges of $3.7 million, merger expenses of $7.7 million and purchase of in-process technology of $2.3 million.

(4) Net income and net income per share for the year ended December 31, 2004 include a gain from the collection of a note receivable of $5.0 million which had been written off in 2002. During the year ended December 31, 2002 and 2003, a valuation allowance against net deferred tax assets was maintained. Net income and net income per share for the year ended December 31, 2002 and 2003 include tax expense which is comprised primarily of state and foreign taxes. During 2004, the valuation allowance was reduced against the net deferred tax assets and net income and net income per share for the year ended December 31, 2004 include a deferred tax benefit of $10.2 million. See Note 9 of the Notes to the Consolidated Financial Statements.

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

Overview

We are a leading worldwide provider of instruments, components, subsystems and process control solutions that measure, control, power and monitor critical parameters of semiconductor and other advanced manufacturing processes.

We are managed as one operating segment which is organized around 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 and thin-film composition analysis, control and information management, power and reactive gas generation and vacuum technology. Our products are used to manufacture semiconductors and thin film coatings for diverse markets such as flat panel displays, optical and magnetic storage media, architectural glass and electro-optical products. We also provide technologies for medical imaging equipment.

We have a diverse base of customers that include semiconductor capital equipment manufacturers, semiconductor device manufacturers, industrial manufacturing companies, medical equipment manufacturers and university, government and industrial research laboratories. During the years ended December 31, 2004, 2003 and 2002, we estimate that approximately 77%, 69%, 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 majority of our sales.

During the latter half of 2003 and continuing into the first half of 2004, the semiconductor capital equipment market experienced a market upturn after a downturn of almost three years. Starting in the fourth quarter of 2003, we experienced an increase in orders and sales. Beginning in the third quarter of 2004 and continuing through the fourth quarter of 2004, our orders and sales declined from the level achieved in the second quarter of 2004. We currently expect our first quarter 2005 sales to be lower than the fourth quarter of 2004. The semiconductor capital equipment industry is subject to rapid demand shifts which are difficult to predict.

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 34%, 41% and 36% of net sales for the years ended December 31, 2004, 2003 and 2002, 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 net sales.

Recent Acquisitions

On September 30, 2003, we acquired Wenzel Instruments, a privately held developer of solid state MicroElectroMechanical System (MEMS) based vacuum sensor technology for advanced manufacturing processes.

On January 31, 2002, we completed the acquisition of the ENI Business ("ENI") of Emerson Electric Co. ("Emerson"), a supplier of solid-state radio frequency (RF) and direct current (DC) plasma power supplies, matching networks and instrumentation to the semiconductor and thin-film processing industries. We acquired ENI in order to offer higher value and more integrated application solutions by combining ENI's solid-state power conversion technology with our core competency in plasma and reactive gas solutions. The acquisition has been accounted for under the purchase method of accounting.

Also in 2002, we acquired three companies that expanded our position in distributed computer-based process control and data management. On March 13, 2002, we acquired Tenta Technology Ltd. ("Tenta"), a privately held company that designs and supplies modular, computer-based process control systems for 300mm semiconductor process tool applications. On April 5, 2002, we acquired IPC Fab Automation GmbH ("IPC"), a privately held developer and provider of web-based hardware and software that enables e-diagnostics and advanced process control for advanced manufacturing applications. On October 1, 2002, we acquired EquipNet Ltd., a privately held company that develops web-based connectivity equipment for the semiconductor industry.

The results of operations of these acquired companies are included in our consolidated statement of operations as of and since the respective dates of purchase.

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, inventory, warranty costs, 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 our more significant judgments and estimates used in the preparation of our consolidated financial statements:

Revenue recognition. 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 and training to customers after the product has been shipped. We defer the fair value of any undelivered elements until the installation or training is complete. 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 from 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.

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.

Intangible assets, goodwill and other long-lived assets. We review intangible assets and other long-lived assets for impairment whenever events or changes in circumstances indicate that the carrying amount of these assets may not be recoverable. Factors we consider important which could indicate an impairment include significant under performance relative to expected historical or projected future operating results, significant changes in the manner of our use of the asset or the strategy for our overall business and significant and negative industry or economic trends. When we determine that the carrying value of the asset may not be recoverable based upon the existence of one or more of the above indicators of impairment, we compare the undiscounted cash flows to the carrying value of the asset. If an impairment is indicated, the asset is written down to its estimated fair value. Intangible assets, such as purchased technology, are generally recorded in connection with a business acquisition. The value assigned to intangible assets is determined based on estimates and judgment regarding expectations for the success and life cycle of products and technology acquired. If actual product acceptance differs significantly from the estimates, we may be required to record an impairment charge to write down the asset to its net realizable value.

We assess goodwill for impairment at least annually, or more frequently when events and circumstances occur indicating that the recorded goodwill at the reporting unit level may be impaired. 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. 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 in an amount equal to that excess. The fair value of a reporting unit is estimated using the discounted cash flow approach, and is dependent on estimates and judgments related to future cash flows and discount rates. If actual cash flows differ significantly from the estimates used by management, we may be required to record an impairment charge to write down the goodwill to its net realizable value.

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; 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. During 2002, we expensed approximately $8.4 million in IPR&D charges primarily related to the ENI acquisition because the technological feasibility of certain products under development had not been established and no future alternative uses existed. 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 on the statement of operations. During the year ended December 31, 2002, we established a full valuation allowance for our net deferred tax assets. During the fourth quarter of 2004, after examining a number of factors, including historical results and near term earnings projections, we determined that it was more likely than not that we would realize all of our net deferred tax assets, except for those relating to certain state tax credits. An adjustment to the valuation allowance was recorded as a reduction to income tax expense. 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.

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		
	2004	**2003**	**2002**
Net sales	100.0%	100.0%	100.0%
Cost of sales	60.5	65.0	66.4
Gross profit	39.5	35.0	33.6
Research and development	10.3	14.1	14.6
Selling, general and administrative	15.7	20.7	24.7
Amortization of acquired intangible assets	2.6	4.4	4.4
Restructuring and asset impairment charges	0.1	0.5	0.9
Purchase of in-process technology	—	—	2.7
Income (loss) from operations	10.8	(4.7)	(13.7)
Interest income, net	0.3	0.3	0.5
Income from litigation settlement	—	—	1.3
Other income (expense), net	1.0	0.3	(1.3)
Income (loss) before income taxes	12.1	(4.1)	(13.2)
Provision (benefit) for income taxes	(0.5)	0.8	(0.6)
Net income (loss)	12.6%	(4.9)%	(12.6)%

Year Ended 2004 Compared to 2003

Net Sales. Net sales increased $217.8 million or 64.6% to $555.1 million for the year ended December 31, 2004 from $337.3 million for the year ended December 31, 2003. International net sales were approximately $187.8 million for the year ended December 31, 2004 or 33.8% of net sales and $138.1 million for the year ended December 31, 2003 or 41.0% of net sales. The increase in 2004 sales was primarily driven by stronger worldwide demand for our products from our semiconductor capital equipment manufacturer and semiconductor device manufacturer customers, which increased $193.2 million or 83.5% to $424.6 million.

Gross Profit. Gross profit as a percentage of net sales increased to 39.5% for the year ended December 31, 2004 from 35.0% for the year ended December 31, 2003. Of the 4.5 increase in percentage points, 3.4 percentage points of gross margin improvement were mainly related to overhead costs becoming a lower percentage of a higher sales volume. The additional 1.1 percentage points of gross margin improvement primarily reflected the net effect of a gradual transition to lower cost material and manufacturing sources, offset by unfavorable changes in warranty cost and product mix.

Research and Development. Our research and development is primarily focused on developing and improving our instruments, components, subsystems and process control solutions that measure, control, power and monitor critical parameters of semiconductor and other advanced manufacturing processes.

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 in and of itself 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 expense 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.

Research and development expense increased $9.3 million or 19.6% to $57.0 million or 10.3% of net sales for the year ended December 31, 2004 from $47.7 million or 14.1% of net sales for the year ended December 31, 2003. The increase was primarily due to increased compensation expense of $5.9 million as a result of higher staffing levels, restored compensation levels, salary increases and incentive compensation, $2.1 million of higher project material expenses, mainly related to our power and reactive gas products, and $1.3 million of increased consulting costs. At December 31, 2004, we had 383 research and development employees as compared to 326 research and development employees at December 31, 2003.

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. Selling, general and administrative expenses increased $17.4 million or 24.9% to $87.3 million or 15.7% of net sales for the year ended December 31, 2004 from $69.9 million or 20.7% of net sales for the year ended December 31, 2003. The increase was due primarily to increased compensation expense of $8.4 million, as a result of restored compensation levels, salary increases, incentive compensation and higher sales commissions, $2.8 million in higher legal fees related mainly to our patent infringement litigation against Advanced Energy, $2.0 million in increased consulting fees primarily for IT related services, and $2.0 million in increased professional fees primarily related to compliance with the Sarbanes Oxley Act of 2002 ("Sarbanes Oxley").

Amortization of Acquired Intangible Assets. For the year ended December 31, 2004, amortization expense resulting from identified intangibles acquired from our completed acquisitions was $14.8 million compared to $14.7 million for the year ended December 31, 2003. We did not acquire any new entities in 2004.

Restructuring, Asset Impairment and Other Charges. As a result of our various acquisitions from 2000 through 2002 and the downturn in the semiconductor capital equipment market which began in 2000, we had redundant activities and excess manufacturing capacity and office space. Therefore in 2002, and continuing through the first quarter of 2004, we implemented restructuring activities to rationalize manufacturing operations and reduce operating expenses. As a result, in 2002 we took a restructuring charge of $2.7 million which consisted of $1.2 million related to exiting leased facilities, $0.6 million of severance cost related to 225 terminated employees and an asset impairment charge of $0.9 million.

During 2003, we recorded restructuring, asset impairment and other charges of $1.6 million related to our restructuring activities. The charges consisted of $0.4 million of severance costs related to workforce reductions, $1.1 million of lease cost, professional fees and other costs related to facility consolidations and an asset impairment charge of $0.1 million. The workforce reduction was across all functional groups.

During the three months ended March 31, 2004, we completed our restructuring activities related to the consolidation of operations from acquired companies when we exited an additional leased facility and recorded a restructuring charge of $0.4 million.

The combined restructuring initiatives are expected to generate annual savings of approximately $12.6 million mainly through reduced payroll and facility related costs. We began to realize savings related to the restructuring initiatives in the fourth quarter of 2002. For the year ended December 31, 2004, we realized approximately $11.8 million of annualized savings. The remaining expected annualized savings should be realized in 2005. We continue to explore other cost savings programs which may lead to additional restructuring initiatives in future periods.

A summary of the restructuring charges, asset impairments and other charges during 2003 and 2004, and the related accrual balance is outlined as follows:

	Workforce Reductions	Asset Impairment	Facility Consolidations	Total
		(in thousands)		
Reserve balance as of December 31, 2002	$ 326	$ —	$1,164	$ 1,490
Restructuring provision in 2003	356	92	1,145	1,593
Charges utilized in 2003	(483)	(92)	(478)	(1,053)
Reserve balance as of December 31, 2003	199	—	1,831	2,030
Restructuring provision in 2004	—	—	437	437
Charges utilized in 2004	(110)	—	(736)	(846)
Reserve balance as of December 31, 2004	$ 89	$ —	$1,532	$ 1,621

The remaining cash outlays at December 31, 2004 of $1.6 million consist primarily of terminated lease obligations, the latest term of which expires in 2008. These payments will be made out of current working capital. The accrual for workforce reductions and lease payments is recorded in Other accrued expenses and Other liabilities.

Interest Income (Expense), Net. For the year ended December 31, 2004, net interest income was $1.9 million, an increase of $0.8 million from the $1.1 million for the year ended December 31, 2003. The increase in net interest income in 2004 is mainly related to higher investment balances.

Other Income (Expense). During 2001, we sold certain assets for proceeds of approximately $9.0 million, including a note receivable of approximately $3.9 million and warrants of $0.2 million. During 2002, due to the downturn in the semiconductor industry and its result on the acquirer's operations, and the acquirer's inability to raise financing, we considered the value of the note and warrants to be impaired. Accordingly, during 2002, we recorded a charge of $4.1 million to other expense for our estimate of the impairment on the note receivable and warrants. During the second quarter of 2004, we received $5.0 million related to the collection of the note receivable and accrued interest and recorded a gain to other income.

During 2003, we recorded a gain of $0.9 million from the early repayment of premiums related to a split dollar life insurance policy covering our Chairman and CEO.

Provision (Benefit) for Income Taxes. We recorded a benefit for income taxes of $2.6 million for the year ended December 31, 2004, as compared to a tax provision of $2.7 million for the year ended December 31, 2003. During fourth quarter of 2004, after examining a number of factors, including historical results and near term earnings projections, we determined that it was more likely than not that we would realize all of our net deferred tax assets, except for those related to certain state tax credits. An adjustment was made to reduce the valuation allowance to reflect the amount of the realizable net deferred tax assets at December 31, 2004. The benefit for income taxes in 2004 is comprised of tax expense from foreign operations and state taxes, offset by a deferred tax benefit of approximately $10.2 million.

Year Ended 2003 Compared to 2002

Net Sales. Net sales increased $22.5 million or 7.2% to $337.3 million for the year ended December 31, 2003 from $314.8 million for the year ended December 31, 2002. International net sales were approximately $138.1 million for the year ended December 31, 2003 or 41.0% of net sales and $114.6 million for the year ended December 31, 2002 or 36.4% of net sales. During the year ended December 31, 2002, we acquired ENI, Tenta and IPC. These acquisitions increased our net sales by $9.9 million for the year ended December 31, 2003, as they were included in net sales for the full period in 2003 while net sales for the year ended December 31, 2002 includes their revenues only from the date of acquisition. The remaining increase in 2003 was the result of increased service revenues as well as increased demand for our products from our semiconductor capital equipment manufacturer customers, as compared to the year ended December 31, 2002. The increase in service revenues, which represents less than 10% of total net sales, has been driven by the prolonged slow-down in the semiconductor capital equipment market, as customers tried to maintain equipment rather than invest in new capital.

Gross Profit. Gross profit as a percentage of net sales increased to 35.0% for the year ended December 31, 2003 from 33.6% for the year ended December 31, 2002. The increase in gross profit percent was mainly due to a slight increase in volumes that increased our fixed cost absorption and a favorable foreign exchange impact, offset by higher materials costs of new products in initial production runs.

Research and Development. Research and development expense increased $1.7 million or 3.6% to $47.7 million or 14.1% of net sales for the year ended December 31, 2003 from $46.0 million or 14.6% of net sales for the year ended December 31, 2002. The increase was due mainly to increased compensation expense of $1.0 million, as a result of including a full year of costs in 2003 of the companies acquired during 2002 and an increase in project material costs of $0.7 million.

Selling, General and Administrative. Selling, general and administrative expenses decreased $7.9 million or 10.2% to $69.9 million or 20.7% of net sales for the year ended December 31, 2003 from $77.8 million or 24.7% of net sales for the year ended December 31, 2002. The decrease was due primarily to lower compensation expense, as a result of lower headcount, of $3.5 million resulting from cost savings initiatives and decreased professional fees of $2.5 million.

Amortization of Acquired Intangible Assets. For the year ended December 31, 2003, amortization expense was $14.7 million, an increase of $0.8 million or 5.7% from the $13.9 million for the year ended December 31, 2002. The increase in amortization was due to a full year of amortization of intangibles in 2003 from companies acquired in 2002.

Restructuring, Asset Impairment and Other Charges. As a result of our various acquisitions from 2000 through 2002 and the downturn in the semiconductor capital equipment market which began in 2000, we had redundant activities and excess manufacturing capacity and office space. Therefore in 2002, and continuing through the first quarter of 2004, we implemented restructuring activities to rationalize manufacturing operations and reduce operating expenses. As a result, in 2002 we took a restructuring charge of $2.7 million which consisted of $1.2 million related to exiting leased facilities, $0.6 million of severance cost related to 225 terminated employees and an asset impairment charge of $0.9 million.

During 2003, we recorded restructuring, asset impairment and other charges of $1.6 million related to our restructuring activities. The charges consisted of $0.4 million of severance costs related to workforce reductions, $1.1 million of lease cost, professional fees and other costs related to facility consolidations and an asset impairment charge of $0.1 million. The workforce reduction was across all functional groups.

A summary of the restructuring charges, asset impairments and other charges during 2002 and 2003, and the related accrual balance is outlined as follows:

	Workforce Reductions	Asset Impairment	Facility Consolidations	Total
		(in thousands)		
Restructuring provision in 2002	$ 631	$ 867	$1,228	$ 2,726
Charges utilized in 2002	(305)	(867)	(64)	(1,236)
Reserve balance as of December 31, 2002	326	—	1,164	1,490
Restructuring provision in 2003	356	92	1,145	1,593
Charges utilized in 2003	(483)	(92)	(478)	(1,053)
Reserve balance as of December 31, 2003	$ 199	$ —	$1,831	$ 2,030

The accruals for severance costs and lease payments are recorded in Other accrued expenses and Other liabilities.

Purchase of In-process Technology. There was no purchase of in-process research and development expenses in 2003. In-process research and development of $8.4 million for the year ended December 31, 2002 arose from the acquisitions we made in 2002.

In January 2002, we acquired ENI in a transaction accounted for under the purchase method. The purchase price was allocated to the assets acquired, including intangible assets, based on their estimated fair values. The intangible assets include approximately $7.5 million for acquired in-process technology for projects, generally expected to have durations of 12 months, that did not have future alternative uses. The value of the purchased in-process technology was determined using the income approach, which discounts expected future cash flows from projects under development to their net present value. Each project was analyzed to determine the technological innovations included; 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. The cash flows derived from the in-process technology projects were discounted at rates ranging from 25% to 30%. We believe these rates were appropriate given the risks associated with the technologies for which commercial feasibility had not been established. The percentage of completion for each in-process project was determined by identifying the cost incurred to date of the project as a ratio of the total cost required to bring the project to technical and commercial feasibility. The percentage completion for in-process projects acquired ranged from 65% to 80% complete, based on our estimates of tasks completed and the tasks to be completed to bring the projects to technological and commercial feasibility. At the date of the acquisition, the development of these projects had not yet reached technological feasibility, and the technology in progress had no alternative future uses. Accordingly, these costs were expensed in 2002. The significant projects were completed within their scheduled 12 month expected period.

Interest Income (Expense), Net. For the year ended December 31, 2003, net interest income was $1.1 million, a decrease of $0.4 million from the $1.5 million for the year ended December 31, 2002. The decrease in net interest income in 2003 was mainly related to slightly lower investment balances and lower interest rates in 2003.

Income from Litigation Settlement. On November 30, 2000, Applied Science and Technology, Inc. ("ASTeX"), which we acquired in January 2001, brought suit in federal district court in Delaware against Advanced Energy Industries, Inc. ("Advanced Energy") for infringement of ASTeX's patent related to its Astron product. On May 17, 2002, a jury affirmed the validity of our patent and found that Advanced Energy infringed the patent. On May 31, 2002, based on the jury's findings, the Court entered a judgment on the infringement claim in favor of us and against Advanced Energy, and awarded $4.2 million in damages to compensate us for Advanced Energy's infringing activity. Advanced Energy filed motions to overturn the verdict. During August of 2002, we entered into an agreement with Advanced Energy whereby Advanced Energy agreed to pay the awarded damages amount to us and withdraw its motions to overturn the verdict. We received the $4.2 million in September 2002, and recorded the amount as Income from litigation settlement.

Other Income (Expense). During 2003, we recorded a gain of $0.9 million from the early repayment of premiums related to a split dollar life insurance policy covering our Chairman and CEO.

During 2001, we sold certain assets for proceeds of approximately $9.0 million, including a note receivable of approximately $3.9 million and warrants of $0.2 million. During 2002, due to the downturn in the semiconductor industry and its result on the acquirer's operations, and the acquirer's inability to raise financing, we considered the value of the note and warrants to be impaired. Accordingly, during 2002, we recorded a charge of $4.1 million to other expense for our estimate of the impairment on the note receivable and warrants.

Provision (Benefit) for Income Taxes. We recorded a provision for income taxes of $2.7 million for the year ended December 31, 2003, as compared to a tax benefit of $2.0 million for the year ended December 31, 2002. As a result of incurring significant operating losses since 2001, we determined that it was more likely than not that our deferred tax assets may not be realized, and since the fourth quarter of 2002 have established a full valuation allowance for our net deferred tax assets. Accordingly, we did not record a deferred tax benefit from the net operating loss incurred in the year ended December 31, 2003. The provision for income taxes in 2003 was comprised of tax expense from foreign operations and state taxes.

Liquidity and Capital Resources

Cash, cash equivalents and short-term marketable securities totaled $235.9 million at December 31, 2004 compared to $129.2 million at December 31, 2003. This increase is mainly due to an increase of $66.4 million of cash generated from operations during 2004 and net proceeds of approximately $32.5 million from our public offering of common stock in the first quarter of 2004. Additionally, we collected approximately $5.0 million from a note receivable that had been previously written off in 2002. 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 of $66.4 million for the year ended December 31, 2004 resulted primarily from net income of $69.8 million, an increase in operating liabilities of $16.8 million, non-cash charges of $27.8 million for depreciation and amortization, offset by an increase in operating assets of $32.4 million, a deferred tax benefit of $10.2 million and a $5.0 million gain related to the collection of a previously written off note receivable. The increase in operating assets consisted mainly of an increase in accounts receivable of $15.2 million due to increased shipments resulting in increased sales of $29.1 million in the fourth quarter of 2004 as compared to the fourth quarter of 2003 and an increase in inventory of $15.9 million as a result of increased production volumes in 2004 to support higher revenues. The increase in operating liabilities consisted primarily of an increase in accounts payable and accrued expenses of $7.2 million resulting from increased accrued compensation, warranty reserves, accrued professional fees and non-income tax related tax accruals and a $9.6 million increase in income taxes payable. Net cash used in operating activities of $0.2 million for the year ended December 31, 2003 was impacted by the net loss of $16.4 million and an increase in operating assets of $22.8 million, offset by non-cash charges of $28.2 million for depreciation and amortization and an increase in operating liabilities of $9.9 million. The increase in operating assets consisted mainly of an increase in accounts receivable of $17.4 million due to the increased shipments in the fourth quarter of 2003 as compared to the fourth quarter of 2002, which contributed to a slight increase in our days sales outstanding from 53 days at the end of 2002 to 58 days in 2003, and an increase in inventory of $6.7 million as a result of increased production volumes in the fourth quarter of 2003. The increase in operating liabilities consisted primarily of an increase in accounts payable of $9.7 million resulting from increased production activity in the fourth quarter.

Net cash used in investing activities of $44.2 million for the year ended December 31, 2004 resulted primarily from the net purchases of $34.1 million of available for sale investments mainly from the net proceeds received from our stock offering, and the purchase of property, plant and equipment of $18.3 million for investments in manufacturing equipment and for the consolidation of our IT infrastructure, partially offset by the $5.0 million proceeds received from the collection of a note receivable previously written off. Net cash used in investing activities of $21.4 million for the year ended December 31, 2003 resulted mainly from the net purchases of $14.0 million of available for sale securities, the purchase of property, plant and equipment of $6.3 million, and the purchase of a small technology business for $2.2 million.

Net cash provided by financing activities of $39.7 million for the year ended December 31, 2004 consisted primarily of $32.5 million in net proceeds received from our common stock offering during 2004, $6.0 million in proceeds from the exercise of stock options and purchases under the employee stock purchase plan, net proceeds of $3.7 million from short-term borrowings, offset by $2.6 million of principal payments on long-term debt. Net cash provided by financing activities of $5.3 million for the year ended December 31, 2003 consisted of $8.6 million in proceeds from the exercise of stock options and purchases under the employee stock purchase plan, net proceeds of $2.2 million from short-term borrowings, offset by $5.5 million of principal payments on long-term debt.

On July 30, 2003, our $40.0 million unsecured credit facility with two domestic banks expired and we elected not to renew this facility. There had been no borrowings made under this line of credit.

On August 3, 2004, we entered into 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 August 1, 2005, provides for us to borrow in multiple currencies of up to an equivalent of $35.0 million U.S. dollars. At December 31, 2004, we had outstanding borrowings of $14.6 million U.S. dollars, payable on demand, at an interest rate of 1.30%.

Certain of our foreign subsidiaries have credit lines and short-term borrowing arrangements with various financial institutions which provide for aggregate borrowings as of December 31, 2004 of up to $30.2 million, which generally expire and are renewed in three month intervals. At December 31, 2004, total borrowings outstanding under these arrangements totaled $7.8 million with $22.4 million available for future borrowings.

We have provided financial guarantees for unsecured borrowings and have standby letters of credit and performance bonds, some of which do not have fixed expiration dates. At December 31, 2004, our maximum exposure as a result of these standby letters of credit and performance bonds was approximately $1.2 million.

Future payments due under debt, lease and purchase commitment obligations as of December 31, 2004 (in thousands) are as follows:

	Payment Due by Period				
Contractual Obligations	**Total**	**Less than 1 Year**	**1-3 Years**	**3-5 Years**	**After 5 Years**
Debt Obligations	$ 31,256	$ 24,509	$ 1,747	$ —	$ 5,000
Interest on Debt	1,393	277	381	226	509
Operating Lease Obligations	15,688	5,546	6,060	3,120	962
Purchase Obligations(1)	97,578	75,220	11,092	8,727	2,539
Other Long-Term Liabilities Reflected on the Registrant's Balance Sheet under GAAP(2)	2,115	123	350	63	1,579
Total	$148,030	$105,675	$19,630	$12,136	$10,589

(1) The majority of the outstanding inventory purchase commitments of approximately $63.6 million at December 31, 2004 are to be purchased within the next 12 months. Additionally, approximately $27.1 million represents a commitment 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 beginning 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 the Company's expected obligation based on anticipated deployment.

(2) Excluded from Other Long-Term Liabilities was $1.0 million of operating leases related to restructuring charges that have been accrued on our balance sheet as they are included in the Operating Leases amount above.

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.

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, 2004.

We also enter into standard indemnification agreements in the ordinary course of business. Pursuant to these agreements, we indemnify, hold harmless and agree to reimburse the indemnified party for losses suffered or incurred by the indemnified party, generally our customers, in connection with any patent, any other intellectual property infringement claim, or other specified claims, by any third party with respect to our products. The term of these indemnification agreements is generally perpetual any time after execution of the agreement. The maximum potential amount of future payments we could be required to make under these indemnification agreements is, in some instances, unlimited. We have never incurred costs to defend lawsuits or settle claims related to these indemnification agreements. As a result, we believe the estimated fair value of these agreements is minimal. Accordingly, we have no liabilities recorded for these agreements as of December 31, 2004.

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 amount 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 fifteen months, using forward exchange contracts and currency options primarily related to Japanese 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 the 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, 2004, the amount that will be reclassified from accumulated other comprehensive income to cost of sales over the next twelve months is an unrealized loss of $1.0 million, net of taxes. The ineffective portion of the derivatives is recorded in cost of sales and were immaterial in 2004, 2003 and 2002, respectively.

We hedge certain intercompany and other payables with foreign exchange contracts and currency options. Since 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 immaterial in 2004, 2003 and 2002.

Realized and unrealized gains and losses on forward exchange contracts and local currency purchased option contracts that do not qualify for hedge accounting are recognized immediately in earnings. The cash flows resulting from forward exchange contracts and local currency purchased options that qualify for hedge accounting are classified in the Consolidated Statements of Cash Flows as part of cash flows from operating activities. Cash flows resulting from forward exchange contracts and local currency purchased options that do not qualify for hedge accounting are classified in the Statements of Cash Flows as investing activities. We do not hold or issue derivative financial instruments for trading purposes.

There were forward exchange contracts with notional amounts totaling $26.3 million outstanding at December 31, 2004. Of such forward exchange contracts, $21.6 million were outstanding to exchange Japanese yen for US dollars. There were forward exchange contracts with notional amounts totaling $41.0 million outstanding at December 31, 2003 of which $32.5 million were outstanding to exchange Japanese yen for US dollars. There were forward exchange contracts with notional amounts totaling $23.3 million outstanding at December 31, 2002 of which $17.2 million were outstanding to exchange Japanese yen for US dollars. Local currency purchased options with notional amounts totaling $0, $0, and $5.1 million to exchange foreign currencies for U.S. dollars were outstanding at December 31, 2004, 2003 and 2002, respectively.

Foreign exchange gains and losses on forward exchange contracts and currency options which did not qualify for hedge accounting were immaterial during 2004, 2003 and 2002. Gains and losses on forward exchange contracts and local currency purchased options that qualify for hedge accounting are classified in cost of goods sold and totaled a loss of $1.7 million and $1.4 million for the years ended December 31, 2004 and 2003, respectively, and a gain of $0.5 million for the year ended December 31, 2002.

The fair values of local currency purchased options at December 31, 2002, which were obtained through dealer quotes, were immaterial. There were no purchased options outstanding at December 31, 2004 or 2003.

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 March 2004, the Financial Accounting Standards Board ("FASB") issued EITF Issue No. 03-1, "The Meaning of Other-Than-Temporary Impairment and Its Application to Certain Investments" ("EITF 03-1"), which provides new guidance for assessing impairment losses on debt and equity investments. Additionally, EITF 03-1 includes new disclosure requirements for investments that are deemed to be temporarily impaired. In September 2004, the FASB delayed the accounting provisions of EITF 03-1; however, the disclosure requirements remain effective and have been adopted for our fiscal year ended December 31, 2004. We will evaluate the effect, if any, of EITF 03-1 when final guidance is released.

In November 2004, the FASB issued Statement of Financial Accounting Standards No. 151, "Inventory Costs" ("SFAS 151"). SFAS 151 amends ARB No. 43, Chapter 4, "Inventory Pricing." This statement clarifies the accounting for abnormal amounts of idle facility expense, freight, handling costs, and wasted material, and requires those items be recognized as current period charges regardless of whether they meet the criterion of "so abnormal." In addition, this statement requires that allocation of fixed production overheads to the costs of conversion be based on the normal capacity of the production facilities. SFAS 151 is effective for inventory costs incurred during fiscal years beginning after June 15, 2005. We are currently assessing the potential impact of SFAS 151.

In December 2004, the FASB issued Statement of Financial Accounting Standards No. 123R, "Share-Based Payment" ("SFAS 123R"). SFAS 123R replaces SFAS 123 and supersedes APB 25. SFAS 123R focuses primarily on the accounting for transactions in which an entity obtains employee services in share-based payment transactions. SFAS 123R requires companies to recognize in the statement of operations the cost of employee services received in exchange for awards of equity instruments based on the grant-date fair value of those awards (with limited exceptions). This statement is effective as of the first reporting period that begins after June 15, 2005. Accordingly, we will adopt SFAS 123R in the third quarter of fiscal 2005 and expect to use the modified-prospective transition method and will not restate prior periods for the adoption of SFAS 123R. Although we are currently evaluating the provisions of SFAS 123R and its implications on our employee benefit plans, we believe that the adoption of this standard, based on the terms of our options outstanding at December 31, 2004, will have a material effect on net income in the second half of 2005.

Factors That May Affect Future Results

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 77%, 69%, and 70% of our net sales for the years ended December 31, 2004, 2003 and 2002, 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 majority of our sales. Our business depends upon the capital expenditures of semiconductor device manufacturers, which in turn depend upon the demand for semiconductors. Periodic reductions in demand for the products manufactured by semiconductor capital equipment manufacturers and semiconductor device manufacturers may adversely affect our business, financial condition and results of operations.

Historically, the semiconductor market has been highly cyclical and has experienced periods of overcapacity, resulting in significantly reduced demand for capital equipment. In 2001, 2002 and the first half of 2003, we experienced a significant reduction in demand from OEM customers, and 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 recent years has experienced serious economic problems including currency devaluations, debt defaults, lack of liquidity and recessions. We cannot be certain that semiconductor downturns will not continue or recur. 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.

Our quarterly operating results have varied, and are likely to continue to vary significantly. This 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 are relatively fixed and based in part on expectations of future net sales. The inability to adjust spending quickly enough to compensate for any shortfall would magnify the adverse impact of a shortfall in net sales on our results of operations. Factors that could cause fluctuations in our net sales include:

- the timing of the receipt of orders from major customers;
- shipment delays;
- disruption in sources of supply;

- seasonal variations of capital spending by customers;
- production capacity constraints; 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, bad debt 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 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 49%, 42%, and 49% of our net sales for the years ended December 31, 2004, 2003 and 2002, 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, 2004, 2003 and 2002, one customer, Applied Materials, accounted for approximately 20%, 18%, and 23%, 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 success of our customers in creating demand for their capital equipment products which 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, disrupt our business, dilute stockholder value or divert management attention.

We made several acquisitions in the years 2000 through 2002. 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 and personnel of the acquired companies, the potential disruption of our ongoing business and distraction of management, 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. 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 expect that 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 in the planning and design phase of implementing a new worldwide Enterprise Resource Planning ("ERP") system. We expect to implement the ERP system by converting our operations in phases over the next few years, beginning in the second half of 2005. Although we have a detailed plan to accomplish the ERP implementation, we may risk potential disruption of our operations during the conversion periods, the implementation could require significantly more management time than currently estimated and we could incur significantly 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.

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, there can be no assurance that we will 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. There can be no assurance that competitors will not develop products that offer price or performance features superior to those of our products.

Sales to foreign markets constitute a substantial portion of our net sales; therefore, our net sales and results of operations could be adversely affected by downturns in economic conditions in countries outside of the United States.

International sales include sales by our foreign subsidiaries, but exclude direct export sales. International sales accounted for approximately 34%, 41%, and 36% of net sales for the years ended December 31, 2004, 2003 and 2002, respectively, a significant portion of which were sales to Japan.

We anticipate that international sales will continue to account for a significant portion of our net sales. In addition, certain of our key domestic customers derive a significant portion of their revenues from sales in international markets. Therefore, our sales and results of operations could be adversely affected by economic slowdowns and other risks associated with international sales.

Risks relating to our international operations could adversely affect our operating results.

We have substantial international sales, service and manufacturing operations in Europe and Asia, which expose us to foreign operational and political risks that may harm our business. Our international operations are subject to inherent risks, which may adversely affect us, including:

- political and economic instability in countries where we have sales, service and manufacturing operations;
- 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;
- 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;
- 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 exchange contracts and 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.

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, 2004, we owned 221 U.S. patents, 156 foreign patents and had 91 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;
- 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 have been in the past, and currently are, involved in lawsuits enforcing and 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 future regulation of recycling and hazardous substances, which may be applicable to our products, or which some customers may voluntarily elect to adhere to. We must comply with any applicable directive in order to ship affected products into countries that are members of the European Union. 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 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.

Certain stockholders have a substantial interest in us and may be able to exert substantial influence over our actions.

As of December 31, 2004, John R. Bertucci, our Chairman and Chief Executive Officer and certain members of his family, in the aggregate, beneficially owned approximately 18% of our outstanding common stock. As a result, these stockholders, acting together, are able to exert substantial influence over our actions. Pursuant to the acquisition of the ENI Business of Emerson Electric Co. ("Emerson"), we issued approximately 12,000,000 shares of common stock to Emerson and its wholly owned subsidiary, Astec America, Inc. Emerson owned approximately 19% of our outstanding common stock as of December 31, 2004, and James G. Berges, the President and a director of Emerson, is a member of our board of directors. Accordingly, Emerson is able to exert substantial influence over our actions.

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 us.

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 local currency purchased options and forward exchange contracts to reduce currency exposure arising from intercompany sales of inventory. There were no local currency purchased options outstanding at December 31, 2004 or 2003.

There were forward exchange contracts with notional amounts totaling $26.3 million and $41.0 million outstanding at December 31, 2004 and 2003, respectively. Of such forward exchange contracts, $21.6 million and $32.5 million, respectively, were outstanding to exchange Japanese yen for US dollars with the remaining amounts relating to contracts to exchange the British pound and Euro for US dollars. The potential fair value loss for a hypothetical 10% adverse change in the forward currency exchange rate on our forward exchange contracts at December 31, 2004 and 2003 would be $3.1 million and $4.8 million, respectively. The potential losses in 2004 and 2003 were estimated by calculating the fair value of the forward exchange contracts at December 31, 2004 and 2003 and comparing that with those calculated using the hypothetical forward currency exchange rates.

At December 31, 2004, MKS had $22.4 million 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 $2.5 million. The potential increase in fair value was estimated by calculating the fair value of the short-term borrowings at December 31, 2004 and comparing that with the fair value using the hypothetical year end exchange rate.

At December 31, 2003, MKS had $18.7 million 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 $2.1 million. The potential increase in fair value was estimated by calculating the fair value of the short-term borrowings at December 31, 2003 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, 2004 and 2003 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.

Our total long-term debt outstanding, including the current portion, at December 31, 2004 and 2003, was $8.7 million and $11.2 million, respectively, and consisted mainly of a mortgage note and industrial development revenue bond. The interest rates on these debt instruments are primarily variable and range from 1.8% to 4.0% at December 31, 2004 and 1.2% to 4.0% at December 31, 2003. Due to the immaterial amounts of the outstanding 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.

From time to time, MKS has outstanding short-term borrowings with variable interest rates, primarily denominated in Japanese yen. At December 31, 2004 and 2003, we had $22.4 million and $17.7 million, respectively, outstanding related to these short-term borrowings at interest rates ranging from 1.13% to 1.50%. 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 the Directors and Shareholders of
MKS Instruments, Inc.:

We have completed an integrated audit of MKS Instruments, Inc.'s 2004 consolidated financial statements and of its internal control over financial reporting as of December 31, 2004 and audits of its 2003 and 2002 consolidated financial statements in accordance with the standards of the Public Company Accounting Oversight Board (United States). Our opinions, based on our audits, are presented below.

Consolidated financial statements and financial statement schedule

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, 2004 and 2003, and the results of their operations and their cash flows for each of the three years in the period ended December 31, 2004 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. These financial statements and financial statement schedule are the responsibility of the Company's management. Our responsibility is to express an opinion on these financial statements and financial statement schedule based on our audits. We conducted our audits of these statements in accordance with the standards of the Public Company Accounting Oversight Board (United States). Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement. An audit of financial statements includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements, assessing the accounting principles used and significant estimates made by management, and evaluating the overall financial statement presentation. We believe that our audits provide a reasonable basis for our opinion.

Internal control over financial reporting

Also, in our opinion, management's assessment, included in Management's Annual Report on Internal Control Over Financial Reporting appearing under Item 9A, that the Company maintained effective internal control over financial reporting as of December 31, 2004 based on criteria established in *Internal Control — Integrated Framework* issued by the Committee of Sponsoring Organizations of the Treadway Commission (COSO), is fairly stated, in all material respects, based on those criteria. Furthermore, in our opinion, the Company maintained, in all material respects, effective internal control over financial reporting as of December 31, 2004, based on criteria established in *Internal Control — Integrated Framework* issued by the COSO. The Company's management is responsible for maintaining effective internal control over financial reporting and for its assessment of the effectiveness of internal control over financial reporting. Our responsibility is to express opinions on management's assessment and on the effectiveness of the Company's internal control over financial reporting based on our audit. We conducted our audit of internal control over financial reporting in accordance with the standards of the Public Company Accounting Oversight Board (United States). Those standards require that we plan and perform the audit to obtain reasonable assurance about whether effective internal control over financial reporting was maintained in all material respects. An audit of internal control over financial reporting includes obtaining an understanding of internal control over financial reporting, evaluating management's assessment, testing and evaluating the design and operating effectiveness of internal control, and performing such other procedures as we consider necessary in the circumstances. We believe that our audit provides a reasonable basis for our opinions.

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.

PricewaterhouseCoopers LLP

Boston, Massachusetts
March 14, 2005

MKS INSTRUMENTS, INC.

CONSOLIDATED BALANCE SHEETS

	December 31	
	2004	2003
	(In thousands, except share data)	
ASSETS		
Current assets:		
Cash and cash equivalents	$138,389	$ 74,660
Short-term investments	97,511	54,518
Trade accounts receivable, net of allowances of $3,238 and $2,415 at December 31, 2004 and 2003, respectively	82,315	64,624
Inventories	99,633	82,013
Deferred income taxes	12,129	—
Other current assets	9,908	5,631
Total current assets	439,885	281,446
Property, plant and equipment, net	80,917	76,121
Long-term investments	4,775	13,625
Goodwill, net	255,740	259,924
Acquired intangible assets, net	41,604	56,192
Deferred income taxes	2,184	—
Other assets	3,572	4,724
Total assets	$828,677	$692,032
LIABILITIES AND STOCKHOLDERS' EQUITY		
Current liabilities:		
Short-term borrowings	$ 22,440	$ 17,773
Current portion of long-term debt	2,069	2,423
Accounts payable	23,338	25,302
Accrued compensation	13,767	7,711
Income taxes payable	9,133	—
Other accrued expenses	21,438	17,769
Total current liabilities	92,185	70,978
Long-term debt	6,667	8,810
Other liabilities	3,191	3,934
Commitments and contingencies (Note 7)		
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; 53,839,098 and 52,040,019 shares issued and outstanding at December 31, 2004 and 2003, respectively	113	113
Additional paid-in capital	631,760	587,910
Retained earnings	82,077	12,238
Accumulated other comprehensive income	12,684	8,049
Total stockholders' equity	726,634	608,310
Total liabilities and stockholders' equity	$828,677	$692,032

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

MKS INSTRUMENTS, INC.

CONSOLIDATED STATEMENTS OF OPERATIONS

	Year Ended December 31		
	2004	2003	2002
	(In thousands, except per share data)		
Net sales	$555,080	$337,291	$314,773
Cost of sales	335,709	219,182	208,978
Gross profit	219,371	118,109	105,795
Research and development	56,973	47,650	45,999
Selling, general and administrative	87,284	69,891	77,830
Amortization of acquired intangible assets	14,764	14,692	13,897
Restructuring and asset impairment charges	437	1,593	2,726
Purchase of in-process technology	—	—	8,390
Income (loss) from operations	59,913	(15,717)	(43,047)
Interest expense	510	689	1,231
Interest income	2,423	1,745	2,681
Income from litigation settlement	—	—	4,200
Other income (expense), net	5,402	927	(4,121)
Income (loss) before income taxes	67,228	(13,734)	(41,518)
Provision (benefit) for income taxes	(2,611)	2,651	(1,981)
Net income (loss)	$ 69,839	$(16,385)	$(39,537)
Net income (loss) per share:			
Basic	$ 1.30	$ (0.32)	$ (0.79)
Diluted	$ 1.28	$ (0.32)	$ (0.79)
Weighted average common shares outstanding:			
Basic	53,519	51,581	50,000
Diluted	54,656	51,581	50,000

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

MKS INSTRUMENTS, INC.

CONSOLIDATED STATEMENTS OF STOCKHOLDERS' EQUITY

For the Years Ended December 31, 2004, 2003 and 2002

	Common Stock Shares	Common Stock Amount	Additional Paid-in Capital	Retained Earnings	Accumulated Other Comprehensive Income (loss)	Comprehensive Income (loss)	Total Stockholders' Equity
	(In thousands, except share data)						
Balance at December 31, 2001	37,998,699	$113	$ 285,252	$ 68,160	$ (654)		$ 352,871
Issuance of common stock from exercise of stock options and Employee Stock Purchase Plan	661,054		8,920				8,920
Tax benefit from exercise of stock options			1,648				1,648
Issuance of common stock for acquisition of businesses	12,700,000		282,341				282,341
Stock option compensation			1,014				1,014
Comprehensive loss (net of tax):							
Net loss				(39,537)		$(39,537)	(39,537)
Other comprehensive income:							
Changes in value of financial instruments designated as cash flow hedges and unrealized gain (loss) on investment					(693)	(693)	(693)
Foreign currency translation adjustment					4,126	4,126	4,126
Comprehensive loss						(36,104)	
Balance at December 31, 2002	51,359,753	113	579,175	28,623	2,779		610,690
Issuance of common stock from exercise of stock options and Employee Stock Purchase Plan	680,266		8,603				8,603
Other			132				132
Comprehensive loss (net of tax):							
Net loss				(16,385)		(16,385)	(16,385)
Other comprehensive income:							
Changes in value of financial instruments designated as cash flow hedges and unrealized gain (loss) on investment					(1,780)	(1,780)	(1,780)
Foreign currency translation adjustment					7,050	7,050	7,050
Comprehensive loss						(11,115)	
Balance at December 31, 2003	52,040,019	113	587,910	12,238	8,049		608,310
Issuance of common stock from exercise of stock options and Employee Stock Purchase Plan	484,793		6,030				6,030
Issuance of common stock through public offering, net of issuance costs of $399	1,314,286		32,549				32,549
Tax benefit from exercise of stock options			5,271				5,271
Comprehensive income (net of tax):							
Net income				69,839		69,839	69,839
Other comprehensive income:							
Changes in value of financial instruments designated as cash flow hedges and unrealized gain (loss) on investment					973	973	973
Foreign currency translation adjustment					3,662	3,662	3,662
Comprehensive income						$ 74,474	
Balance at December 31, 2004	53,839,098	$113	$ 631,760	$ 82,077	$12,684		$ 726,634

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

MKS INSTRUMENTS, INC.

CONSOLIDATED STATEMENTS OF CASH FLOWS

	Year Ended December 31		
	2004	2003	2002
	(In thousands)		
Cash flows from operating activities:			
Net income (loss)	$ 69,839	$(16,385)	$ (39,537)
Adjustments to reconcile net loss to net cash provided by operating activities:			
Depreciation and amortization	27,838	28,198	28,727
Purchase of in-process technology	—	—	8,390
Asset impairment charges	—	—	4,988
Deferred taxes	(10,229)	716	250
Gain on collection of note receivable	(5,042)	—	—
Other	(426)	151	1,424
Changes in operating assets and liabilities, net of effects of businesses acquired:			
Trade accounts receivable	(15,197)	(17,426)	(874)
Inventories	(15,919)	(6,656)	6,600
Other current assets	(1,244)	1,328	12,263
Accrued expenses	10,790	169	(7,271)
Accounts payable	(3,632)	9,720	(1,111)
Income taxes payable	9,621	—	—
Net cash provided by (used in) operating activities	66,399	(185)	13,849
Cash flows from investing activities:			
Purchases of short-term and long-term available-for-sale investments	(218,478)	(93,999)	(102,283)
Maturities and sales of short-term and long-term available-for-sale investments	184,422	80,046	73,568
Purchases of property, plant and equipment	(18,270)	(6,348)	(7,948)
Proceeds from sale of assets and investment	1,619	—	2,500
Business combinations, net of cash acquired	—	(2,150)	(17,696)
Proceeds from collection of note receivable	5,042	—	—
Other	1,422	1,100	(68)
Net cash used in investing activities	(44,243)	(21,351)	(51,927)
Cash flows from financing activities:			
Proceeds from short-term borrowings	67,844	69,791	12,771
Payments on short-term borrowings	(64,127)	(67,619)	(9,905)
Payments on long-term debt	(2,578)	(5,485)	(6,327)
Proceeds from exercise of stock options and employee stock purchase plan	6,030	8,603	8,920
Proceeds from the sale of common stock, net	32,549	—	—
Net cash provided by financing activities	39,718	5,290	5,459
Effect of exchange rate changes on cash and cash equivalents	1,855	2,086	570
Increase (decrease) in cash and cash equivalents	63,729	(14,160)	(32,049)
Cash and cash equivalents at beginning of period	74,660	88,820	120,869
Cash and cash equivalents at end of period	$ 138,389	$ 74,660	$ 88,820
Supplemental disclosure of cash flow information:			
Cash paid during the period for:			
Interest	$ 447	$ 664	$ 1,141
Income taxes	$ 4,923	$ 512	$ 1,101
Supplemental schedule of noncash investing and financing activities:			
Stock and stock options issued for acquisitions	$ —	$ —	$ 282,341

The accompanying notes are an integral part of the 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, components, subsystems and process control solutions that measure, control, power and monitor critical parameters of semiconductor and other 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 and thin-film composition analysis, control and information management, 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 (the "Company"). All significant intercompany accounts and transactions have been eliminated in consolidation.

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,		
	2004	2003	2002
Net income (loss)	$ 69,839	$ (16,385)	$ (39,537)
Shares used in net income (loss) per common share — basic	53,519,000	51,581,000	50,000,000
Effect of dilutive securities:			
Stock options	1,137,000	—	—
Shares used in net income (loss) per common share — diluted	54,656,000	51,581,000	50,000,000
Net income (loss) per common share — basic	$ 1.30	$ (0.32)	$ (0.79)
Net income (loss) per common share — diluted	$ 1.28	$ (0.32)	$ (0.79)

Options outstanding of 5,513,054, 8,897,899 and 8,284,693 during the years ended December 31, 2004, 2003 and 2002, respectively, are excluded from the calculation of diluted net income (loss) per common share because their inclusion would be anti-dilutive.

Stock-based Compensation

The Company has several stock-based employee compensation plans. The Company accounts for stock-based awards to employees using the intrinsic value method as prescribed by Accounting Principles Board ("APB") Opinion No. 25, "Accounting for Stock Issued to Employees," and related interpretations.

(Tables in thousands, except share and per share data)

Accordingly, no compensation expense is recorded for options issued to employees in fixed amounts with fixed exercise prices at least equal to the fair market value of the Company's common stock at the date of grant. The Company has adopted the provisions of SFAS No. 123, "Accounting for Stock-Based Compensation," as amended by SFAS No. 148, "Accounting for Stock-Based Compensation-Transition and Disclosure," ("SFAS 123") through disclosure only.

The following table illustrates the effect on net income and net income per share if the Company had applied the fair value recognition provisions of SFAS 123 to stock-based employee awards:

	2004	2003	2002
Net income (loss)			
Net income (loss) as reported	$ 69,839	$(16,385)	$(39,537)
Add: Stock-based employee compensation expense included in reported net income (loss), net of tax	—	—	1,014
Deduct: Total stock-based employee compensation expense determined under the fair-value-based method for all awards, net of tax	(15,933)	(21,820)	(18,245)
Pro forma net income (loss)	$ 53,906	$(38,205)	$(56,768)
Basic and diluted net income (loss) per share:			
Basic — as reported	$ 1.30	$ (0.32)	$ (0.79)
Basic — Pro forma	$ 1.01	$ (0.74)	$ (1.14)
Diluted — as reported	$ 1.28	$ (0.32)	$ (0.79)
Diluted — Pro forma	$ 0.99	$ (0.74)	$ (1.14)

There is no tax benefit included in the stock-based employee compensation expense determined under the fair-value-based method for the years ended December 31, 2003 and 2002, as the Company had a full valuation allowance for its net deferred tax assets during 2002 and 2003. For 2004, stock-based employee compensation expense included a tax benefit.

The weighted average grant date fair value of options granted during 2004, 2003 and 2002 was $11.24, $15.91 and $14.22 per option, respectively. The fair value of options at the date of grant was estimated using the Black-Scholes option-pricing model with the following weighted average assumptions:

	2004	2003	2002
Expected life (years)	5.0	5.0	5.0
Interest rate	3.6%	3.3%	3.9%
Volatility	74.0%	78.0%	81.0%
Dividend yield	0.0%	0.0%	0.0%

The weighted average fair value of employee stock purchase rights granted in 2004, 2003 and 2002 was $7.05, $7.08 and $9.35, respectively. The fair value of the employees' purchase rights was estimated using the Black-Scholes option-pricing model with the following weighted average assumptions:

	2004	2003	2002
Expected life (years)	0.5	0.5	0.5
Interest rate	1.3%	1.2%	1.9%
Volatility	73.0%	78.0%	81.0%
Dividend yield	0.0%	0.0%	0.0%

(Tables in thousands, except share and per share data)

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 were immaterial in 2004, 2003 and 2002.

Revenue Recognition

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 and training to customers after the product has been shipped. In accordance with the Emerging Issues Task Force ("EITF") 00-21 "Accounting For Revenue Arrangements With Multiple Deliverables," the Company allocates the revenue between the multiple elements based upon fair value and defers the revenue related to the undelivered elements until the installation or training is complete. 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 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.

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 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,	
	2004	2003
Federal Government and Government Agency Obligations	$60,445	$41,566
Commercial Paper and Corporate Obligations	37,066	12,952
	$97,511	$54,518

(Tables in thousands, except share and per share data)

The fair value of long-term available-for-sale investments with maturities or estimated lives of 1 to 5 years consists of the following:

	December 31, 2004	December 31, 2003
Commercial Paper and Corporate Obligations	$3,989	$ 8,818
Mutual Funds	786	—
Federal Government and Government Agency Obligations	—	4,807
	$4,775	$13,625

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. Gross unrealized gains and gross unrealized losses on available-for-sale investments were not material at December 31, 2004 and 2003. Realized gains (losses) on securities were immaterial in 2004, 2003 and 2002. The cost of securities sold is based on the specific identification method.

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. 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 received. These include acquired customer lists, technology, patents, trade name, and covenants not to compete. Intangible assets are amortized from three 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. Through December 31, 2001, the Company amortized goodwill on a straight-line basis over its expected useful life of 5 to 7 years. As of January 1, 2002 the Company ceased amortizing goodwill in compliance with Statement of Financial Accounting Standards No. 142, "Goodwill and Other Intangible Assets" ("SFAS 142").

The Company assesses goodwill for impairment on an annual basis during the fourth quarter of each fiscal year, 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.

Impairment of Long-Lived Assets

The Company evaluates the recoverability of its long-lived assets which include acquired amortizable intangible assets, in accordance with Statement of Financial Accounting Standards No. 144, "Accounting for the Impairment or Disposal of Long-Lived Assets" ("SFAS 144"). SFAS 144 requires recognition of impairment of long-lived assets in the event the net book value of such assets exceeds the future undiscounted cash flows attributable to such assets. If an impairment is indicated, the assets are written down to their estimated fair value.

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 a 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. Advertising costs were immaterial in 2004, 2003 and 2002.

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. The Company evaluates the realizability of its net deferred tax assets and assesses the need for a valuation allowance on a quarterly basis. 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 may be 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 income. During the year ended December 31, 2002 the Company established a full valuation allowance for its net deferred tax assets. In periods subsequent to establishing a valuation allowance, if the Company were to determine that it would be able to realize its net deferred tax assets in excess of their net recorded amount, an adjustment to the valuation allowance would be recorded as a reduction to income tax expense in the period such determination was made. During the fourth quarter of 2004, after examining a number of factors, including historical results and near term earnings projections, the Company determined that it was more likely than not that it would realize all of its net deferred tax assets, except for those related to certain state tax credits and adjusted the valuation allowance at December 31, 2004.

On October 22, 2004, the American Jobs Creation Act of 2004 (the "Act") was signed into law. The Act contains a provision allowing U.S. multinational companies a one-time incentive to repatriate foreign earnings at an effective tax rate of 5.25%. The Company has started an evaluation of the effects of the repatriation provision but does not anticipate it will complete this evaluation until some time after Congress and Treasury issue further guidance. Through December 31, 2004, 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, 2004 the Company had $50,037,549 of undistributed earnings in its foreign subsidiaries.

New Accounting Pronouncements

In March 2004, the FASB issued EITF Issue No. 03-1, "The Meaning of Other-Than-Temporary Impairment and Its Application to Certain Investments" ("EITF 03-1"), which provides new guidance for assessing impairment losses on debt and equity investments. Additionally, EITF 03-1 includes new disclosure requirements for investments that are deemed to be temporarily impaired. In September 2004, the FASB delayed the accounting provisions of EITF 03-1; however, the disclosure requirements remain effective and have been adopted for the Company's fiscal year ended December 31, 2004. The Company will evaluate the effect, if any, of EITF 03-1 when final guidance is released.

In November 2004, the FASB issued Statement of Financial Accounting Standards No. 151, "Inventory Costs" ("SFAS 151"). SFAS 151 amends ARB No. 43, Chapter 4, "Inventory Pricing." This statement clarifies the accounting for abnormal amounts of idle facility expense, freight, handling costs, and wasted material, and requires those items be recognized as current period charges regardless of whether they meet the criterion of "so abnormal." In addition, this statement requires that allocation of fixed production overheads to the costs of conversion be based on the normal capacity of the production facilities. SFAS 151 is effective for inventory costs incurred during fiscal years beginning after June 15, 2005. The Company is currently assessing the potential impact of SFAS 151.

In December 2004, the FASB issued Statement of Financial Accounting Standards No. 123R, "Share-Based Payment" ("SFAS 123R"). SFAS 123R replaces SFAS 123 and supersedes APB 25. SFAS 123R focuses primarily on the accounting for transactions in which an entity obtains employee services in share-based payment transactions. SFAS 123R requires companies to recognize in the statement of operations the cost of employee services received in exchange for awards of equity instruments based on the grant-date fair value of those awards (with limited exceptions). This statement is effective as of the first reporting period that begins after June 15, 2005. Accordingly, the Company will adopt SFAS 123R in its third quarter of fiscal 2005 and expects to use the modified-prospective transition method and will not restate prior periods for the adoption of SFAS 123R. Although the Company is currently evaluating the provisions of SFAS 123R and its implications on its employee benefit plans, it believes that the adoption of this standard, based on the terms of the options outstanding at December 31, 2004, will have a material effect on net income in the second half of 2005.

Use of Estimates

The consolidated financial statements 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, management evaluates its estimates and judgments, including those related to revenue recognition, inventory, intangible assets, goodwill, and other long-lived assets, in-process research and development, merger expenses, 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

Certain prior year amounts have been reclassified to be consistent with the current year classifications.

3) 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 and currency options primarily related to Japanese 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, 2004, the amount that will be reclassified from accumulated other comprehensive income to cost of sales over the next twelve months is an unrealized loss of $991,000, net of taxes. The ineffective portion of the derivatives is recorded in cost of sales and was immaterial in 2004, 2003 and 2002.

The Company hedges certain intercompany and other payables with foreign exchange contracts and currency options. 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 on these derivatives was immaterial in 2004, 2003 and 2002.

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

There were forward exchange contracts with notional amounts totaling $26,301,000 outstanding at December 31, 2004. Of such forward exchange contracts, $21,550,000 were outstanding to exchange Japanese yen for U.S. dollars. There were forward exchange contracts with notional amounts totaling $41,018,000 outstanding at December 31, 2003 of which $32,488,000 were outstanding to exchange Japanese yen for US dollars. There were forward exchange contracts with notional amounts totaling $23,287,000 outstanding at December 31, 2002 of which $17,213,000 were outstanding to exchange Japanese yen for U.S. dollars. Local currency purchased options with notional amounts totaling $5,053,000 to exchange foreign currencies for U.S. dollars were outstanding at December 31, 2002. There were no local currency purchased options outstanding at December 31, 2004 and 2003.

(Tables in thousands, except share and per share data)

Foreign exchange gains on forward exchange contracts which did not qualify for hedge accounting were immaterial during 2004, 2003 and 2002. Gains and losses on forward exchange contracts and local currency purchased options that qualify for hedge accounting are classified in cost of goods sold and totaled a loss of $1,666,000 and $1,411,000 for the years ended December 31, 2004 and 2003 and a gain of $452,000 for the year ended December 31, 2002.

The fair values of forward exchange contracts at December 31, 2004 and 2003, determined by applying period end currency exchange rates to the notional contract amounts, amounted to an unrealized loss of $1,479,000 and $2,081,000, respectively. The fair values of local currency purchased options at December 31, 2002 were immaterial. There were no purchased options outstanding at December 31, 2004 or 2003.

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, rated AA or higher. The Company places 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 on financial condition and collateral is not required.

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. The fair value of mortgage notes is based on borrowing rates for similar instruments and approximates its carrying value. For all other balance sheet financial instruments, the carrying amount approximates fair value because of the short period to maturity of these instruments.

4) Inventories

Inventories consist of the following:

	December 31,	
	2004	**2003**
Raw material	$46,479	$36,834
Work in process	18,330	15,786
Finished goods	34,824	29,393
	$99,633	$82,013

(Tables in thousands, except share and per share data)

5) Property, Plant and Equipment

Property, plant and equipment consist of the following:

	December 31, 2004	December 31, 2003
Land	$ 11,820	$ 11,827
Buildings	62,608	62,151
Machinery and equipment	77,196	73,381
Furniture and fixtures	29,984	29,201
Leasehold improvements	5,413	5,170
Construction in progress	8,507	1,964
	195,528	183,694
Less: accumulated depreciation and amortization	114,611	107,573
	$ 80,917	$ 76,121

Depreciation and amortization of property, plant and equipment totaled $13,074,000, $13,508,000 and $14,830,000 for the years ended December 31, 2004, 2003 and 2002, respectively.

6) Debt

Credit Agreements and Short-Term Borrowings

On August 3, 2004, the Company entered into 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 August 1, 2005, provides for the Company to borrow in multiple currencies of up to an equivalent of $35,000,000 U.S. dollars. At December 31, 2004, the Company had outstanding borrowings of $14,608,000 U.S. dollars, payable on demand, at an interest rate of 1.30%.

Additionally, the Company's Japanese subsidiary has lines of credit and short-term borrowing arrangements with various financial institutions which provide for aggregate borrowings as of December 31, 2004 of up to $30,191,000, which generally expire and are renewed at three month intervals. At December 31, 2004 and 2003, total borrowings outstanding under these arrangements were $7,790,000 and $17,736,000, respectively, at interest rates of 1.24% at December 31, 2004 and ranging from 1.23% to 1.50% at December 31, 2003.

Long-Term Debt

Long-term debt consists of the following:

	December 31, 2004	December 31, 2003
Term loans	$ 640	$ 1,590
Mortgage notes	8,096	9,643
Total long-term debt	8,736	11,233
Less: current portion	2,069	2,423
Long-term debt less current portion	$6,667	$ 8,810

(Tables in thousands, except share and per share data)

In connection with the purchase of Telvac Engineering, Ltd., the Company issued term loans of $752,000. Principal payments of $61,000 were due on an annual basis through December 1, 2004 with the remaining principal due on May 1, 2005. Interest is payable semi-annually at the UK base rate. The fixed interest rate for the term loan is 4.0% and the remaining principal due as of December 31, 2004 was $640,000.

In connection with the acquisition of ENI, the Company assumed 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 are the same as that of the underlying Industrial Development Revenue Bond which calls for payments of interest only through July 1, 2014, at which time the Bond is repayable in a lump sum of $5,000,000. Interest is reset annually based on bond remarketing, with an option by the Company to elect a fixed rate, subject to a maximum rate of 13% per annum. At December 31, 2004 the interest rate was 1.80%. The bond is collateralized by the building. The remaining principal balance outstanding at December 31, 2004 was $5,000,000. The net book value of the building at December 31, 2004 was approximately $10,358,000.

On March 6, 2000, the Company entered into a mortgage note payable with a bank to borrow $10,000,000 to finance the purchase of land and a building. Principal and interest of $119,000 is being paid in monthly installments with final payments due in March 2007. The remaining principal as of December 31, 2004 was $3,096,000 with a variable interest rate of 3.97%. The net book value of the land and building at December 31, 2004 was approximately $18,128,000.

The Company had an outstanding term loan from a foreign bank, with principal due on April 2, 2004. This loan was paid in full in 2004.

The Company had a loan outstanding from a foreign bank in the form of a mortgage note at December 31, 2002 with a balance of $687,000 and an interest rate of 1.88%. Principal and interest were payable in monthly installments through 2005. The loan was collateralized by mortgages on certain of the Company's foreign properties. This remaining principal balance was repaid in full during 2003.

In connection with the purchase of On-Line Technologies, Inc., the Company assumed term loans of $4,728,000. The principal and interest accrued were due in two installments, the first installment on April 27, 2002, and the second installment on April 27, 2003. This loan was paid off in full in 2003.

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

	Aggregate Maturities
Year ending December 31,	
2005	$2,069
2006	1,429
2007	238
2008	—
2009	—
Thereafter	5,000
	$8,736

7) Commitments and Contingencies

On July 12, 2004, Advanced Energy Industries, Inc. ("Advanced Energy") filed suit against MKS in federal district court in Delaware, seeking injunctive relief and damages for alleged infringement of a patent held by Advanced Energy. On August 30, 2004, MKS filed its answer to the complaint, denying Advanced Energy's claims and stating a counterclaim seeking a declaratory judgment that the claims of the patent are invalid, unenforceable and not infringed by MKS or its products. On March 1, 2005, the parties agreed to dismiss the case, without prejudice. Accordingly, the court dismissed the case on March 11, 2005.

On January 12, 2004, Gas Research Institute ("GRI") brought suit in federal district court in Illinois against MKS, On-Line Technologies, Inc. ("On-Line") which MKS acquired in 2001, and another defendant, Advanced Fuel Research, Inc. ("AFR"), for breach of contract, misappropriation of trade secrets and related claims relating to certain infra-red gas analysis technology allegedly developed under a January 1995 Contract for Research between GRI and AFR. The technology was alleged to have been incorporated into certain of MKS' products. GRI made claims for damages, exemplary damages, attorney's fees and costs and injunctive relief. MKS filed an answer, denying liability and asserting various defenses to GRI's claims. MKS also asserted a cross-claim against co-defendant AFR, alleging misrepresentation, breach of contract and breach of various duties owed by AFR, and alleging that in the event MKS and On-Line are held liable to GRI, AFR would be required to reimburse, indemnify, and hold harmless On-Line and us for any such liability. On November 9, 2004, the parties entered into a settlement agreement and the court dismissed the case, including cross-claims, pursuant to the settlement.

On April 3, 2003, Advanced Energy filed suit against MKS in federal district court in Colorado ("Colorado Action"), seeking a declaratory judgment that Advanced Energy's Xstream product does not infringe three patents held by MKS' subsidiary, Applied Science and Technology, Inc. ("ASTeX"). On May 14, 2003, MKS brought suit in federal district court in Delaware against Advanced Energy for infringement of five ASTeX patents, including the three patents at issue in the Colorado Action. MKS sought injunctive relief and damages for Advanced Energy's infringement. These lawsuits are unrelated to the Advanced Energy litigation described above. On December 24, 2003, the Colorado court granted our motion to transfer Advanced Energy's Colorado Action to Delaware. In connection with the jury trial, the parties agreed to present the jury with representative claims from three of the five ASTeX patents. On July 23, 2004, the jury found that Advanced Energy infringed all three patents. MKS has filed a motion for a permanent injunction, which is pending before the court and the parties are currently briefing post-trial motions in that case. The parties are also awaiting a trial with respect to damages and associated claims of MKS and certain remaining affirmative defenses and related claims of Advanced Energy. That trial date has not yet been scheduled.

On November 30, 2000, ASTeX, which was acquired by MKS in January 2001, brought suit in federal district court in Delaware against Advanced Energy for infringement of ASTeX's patent related to its Astron product. On May 17, 2002, a jury affirmed the validity of the Company's patent and found that Advanced Energy infringed the patent. On May 31, 2002, based on the jury's findings, the Court entered a judgment on the infringement claim in favor of the Company and against Advanced Energy, and awarded $4,200,000 in damages to compensate the Company for Advanced Energy's infringing activity. Advanced Energy filed motions to overturn the verdict. During August of 2002, the Company and Advanced Energy entered into an agreement whereby Advanced Energy agreed to pay the awarded damages amount to the Company and withdraw its motions to overturn the verdict. The Company received the $4,200,000 in September 2002, and recorded the amount as Income from litigation settlement.

On November 3, 1999, On-Line brought suit in federal district court in Connecticut against Perkin-Elmer, Inc. and certain other defendants for infringement of On-Line's patent related to its FTIR spectrometer product and related claims. The suit sought injunctive relief and damages for infringement. Perkin-Elmer, Inc. filed a counterclaim seeking invalidity of the patent, costs and attorneys' fees. In June 2002, the defendants filed a motion for summary judgment. In April 2003, the court granted the motion and dismissed the case. MKS appealed this decision to the federal circuit court of appeals. On October 13, 2004, the federal circuit court of appeals reversed the lower court's dismissal of certain claims in the case.

(Tables in thousands, except share and per share data)

Accordingly, the case has been remanded to the United States District Court in Connecticut for further proceedings on the merits of the remaining claims. On March 11, 2005, Perkin-Elmer, Inc. submitted to the court a stipulation agreeing that they have infringed a specified claim of On-Line's patent and filed a motion for summary judgment that such patent claim is invalid. On-Line intends to file a reply to the summary judgment motion in the next few weeks. The parties will then await the court's response to the motion.

The Company is subject to 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 Company's 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 2004 and thereafter. Generally, the facility leases require the Company to pay maintenance, insurance and real estate taxes. Rental expense under operating leases totaled $8,344,000, $7,253,000 and $6,278,000, for the years ended December 31, 2004, 2003 and 2002, respectively.

Minimum lease payments under operating leases are as follows:

	Operating Leases
Year ending December 31,	
2005	$ 5,546
2006	3,428
2007	2,632
2008	1,848
2009	1,272
Thereafter	962
Total minimum lease payments	$15,688

As of December 31, 2004, the Company has entered into non-cancelable 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 $63,563,000. 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 of approximately $27,100,000 will be paid over the term of the arrangement. Annualized payments are expected to be approximately $5,000,000.

To the extent permitted by Massachusetts law, the Company's Restated Articles of Organization, as amended, requires the Company to indemnify any current or former officer or director of the Company or any person who has served or is serving in any capacity with respect to any employee benefit plan of the Company. 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 its estimated exposure for these indemnification obligations is currently minimal. Accordingly, the Company has no liabilities recorded for these requirements as of December 31, 2004.

The Company enters into standard indemnification agreements in the ordinary course of business. Pursuant to these agreements, the Company indemnifies, holds harmless and agrees to reimburse the indemnified party for losses suffered or incurred by the indemnified party, generally the Company's customers, in connection with any patent, any other intellectual property infringement claim, or other specified claims, by any third party with respect to the Company's products. The term of these indemnification agreements is generally perpetual any time after execution of the agreement. The maximum potential amount of future payments the Company could be required to make under these indemnification agreements is unlimited. The

Company has never incurred costs to defend lawsuits or settle claims related to these indemnification agreements. As a result, the Company believes the estimated fair value of these agreements is minimal. Accordingly, the Company has no liabilities recorded for these agreements as of December 31, 2004.

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 acquisition, 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 amount of liability under these types of indemnifications is 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.

8) Stockholders' Equity

Issuance of Common Stock

On January 21, 2004, the Company issued 1,142,857 shares of its common stock at $26.25 per share through a public offering. Proceeds of the offering, net of underwriters discount and offering expenses, were $28,251,000. On January 23, 2004, the underwriters exercised their over-allotment option and therefore, the Company issued an additional 171,429 shares of its common stock, which generated net proceeds of $4,298,000.

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 National Market on the day that each offering commences or (2) 85% of the closing price on the day that each offering terminates. During 2004 and 2003 the Company issued 100,867 and 101,102 shares, respectively, of Common Stock to employees who participated in the Purchase Plan at exercise prices of $19.86 and $14.44 in 2004, and $16.16 and $16.49 in 2003. On March 4, 2004, the board of directors approved, and on May 13, 2004 the shareholders approved, an increase in the number of shares available for issuance under the Purchase Plan from 700,000 shares to the current 1,250,000 shares. As of December 31, 2004 there were 705,612 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 National Market on the day that each offering commences or

(2) 85% of the closing price on the day that each offering terminates. During 2004 and 2003, the Company issued 21,786 and 25,809 shares of Common Stock to employees who participated in the Foreign Purchase Plan at exercise prices of $19.86 and $14.44, and $16.16 and $16.49 per share, respectively. On March 4, 2004, the board of directors approved, and on May 13, 2004 the shareholders approved, an increase in the number of shares available for issuance under the Purchase Plan from 75,000 shares to the current 250,000 shares. As of December 31, 2004 there were 163,389 shares reserved for future issuance under the Foreign Purchase Plan.

Stock Option Plans

The Company's 2004 Stock Incentive Plan (the "2004 Plan") was adopted by the board of directors on March 4, 2004 and approved by the shareholders on May 13, 2004. As of December 31, 2004, no shares were available for issuance under the 2004 Plan. As of January 1, 2005, there were 2,691,955 shares available for future 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. To date, no awards have been granted under the 2004 Plan.

The Company's Second Restated 1995 Stock Incentive Plan (the "1995 Plan") authorized, as of December 31, 2004, 14,347,091 shares of common stock for issuance thereunder. As of January 1, 2005, 15,000,000 shares of common stock were authorized for issuance thereunder. Pursuant to the terms of the 1995 Plan, the number of shares available for issuance under the 1995 Plan has increased annually 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 that the maximum aggregate number of common stock which may be issued under the 1995 Plan is 15,000,000 shares (subject to adjustment for certain changes in MKS' capitalization). Pursuant to the 1995 Plan, the Company may grant options, restricted stock or other stock-based awards to employees, officers, directors, consultants and advisors. In March 2002, the board of directors approved, and in May 2002, the shareholders approved an increase in the number of shares that may be granted under the 1995 Plan to the current 15,000,000 shares. The 1995 Plan will expire in November 2005. As of December 31, 2004 there were 2,879,864 shares reserved for future issuance under the 1995 Plan.

The Company's 1997 Director Stock Plan (the "1997 Director Plan") provides for (i) the initial grant of options to purchase 20,000 shares of common stock to each person who first becomes an outside director and (ii) annual grants of options to purchase 12,000 shares of common stock on the date of the annual meeting of shareholders. In December 2004, the board of directors amended the 1997 Director Plan to allow for all options granted on or after May 17, 2000 to be exercisable within the three year period from the date of the director's termination as director. On March 4, 2004, the board of directors approved, and on May 13, 2004, the shareholders approved, an increase in the number of shares available for issuance under the 1997 Director Plan from 300,000 shares to 750,000 shares. As of December 31, 2004 there were 475,500 shares reserved for future issuance under the 1997 Director Plan.

On January 7, 2005, the Company accelerated the vesting of outstanding options with an exercise price of $23.00 or greater. As a result of this action, options to purchase approximately 1.6 million shares became exercisable on January 7, 2005. No compensation expense will be recorded in 2005 related to this action as these options had no intrinsic value on January 7, 2005. Under the recently issued SFAS 123R, the Company will be required to apply the expense recognition provisions under SFAS 123R beginning July 1, 2005. The reason that the Company accelerated the vesting of the identified stock options was to reduce the Company's compensation charge in periods subsequent to June 30, 2005.

(Tables in thousands, except share and per share data)

The Company has granted options to employees under the 1995 Plan and the 1993 Stock Option Plan and to directors under the 1996 Director Stock Option Plan and the 1997 Director Plan (collectively, the "Plans"). The Plans are administered by the Company's board of directors.

At December 31, 2004, 3,355,364 shares of the Company's common stock were reserved for issuance under the Plans. Stock options are granted at 100% of the fair value of the Company's common stock. Generally, stock options granted to employees under the Plans in 2004, 2003 and 2002 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. Generally, options granted to directors vest at the earliest of (1) the next annual meeting, (2) 13 months from date of grant, or (3) the effective date of an acquisition.

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

	Year Ended December 31,					
	2004		2003		2002	
	Options	Weighted Average Exercise Price	Options	Weighted Average Exercise Price	Options	Weighted Average Exercise Price
Outstanding — beginning of period	8,897,899	$20.69	8,284,693	$19.33	5,958,735	$18.11
Granted	2,227,830	$17.87	1,603,552	$24.64	3,815,042	$21.37
Exercised	(362,140)	$10.66	(565,134)	$11.52	(531,672)	$12.68
Forfeited or Expired	(739,872)	$23.30	(425,212)	$21.27	(957,412)	$23.49
Outstanding — end of period	10,023,717	$20.25	8,897,899	$20.69	8,284,693	$19.33
Exercisable at end of period	5,763,521	$20.42	4,880,231	$19.73	3,774,382	$17.90

The following table summarizes information with respect to options outstanding and exercisable under the Plans at December 31, 2004:

	Options Outstanding			Options Exercisable	
	Number of Shares	Weighted Average Exercise Price	Weighted Average Remaining Contractual Life (In Years)	Number of Shares	Weighted Average Exercise Price
$ 4.43 - $ 8.92	749,688	$ 5.56	2.70	749,688	$ 5.56
$10.86 - $19.00	4,327,107	$15.78	7.97	1,870,729	$16.53
$19.18 - $29.50	3,873,336	$24.77	7.55	2,501,594	$24.40
$29.93 - $61.50	1,073,586	$32.19	7.11	641,510	$33.58
	10,023,717	$20.25	7.32	5,763,521	$20.42

(Tables in thousands, except share and per share data)

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, 2002	$ 2,993	$ (279)	$ 65	$ 2,779
Foreign currency translation adjustment, net of taxes of $0	7,050	—	—	7,050
Changes in value of financial instruments designated as cash flow hedges, net of taxes of $0	—	(1,671)	—	(1,671)
Change in unrealized gain (loss) on investments, net of tax of $0	—	—	(109)	(109)
Balance at December 31, 2003	10,043	(1,950)	(44)	8,049
Foreign currency translation adjustment, net of taxes of $0	3,662	—	—	3,662
Changes in value of financial instruments designated as cash flow hedges, net of taxes of $(244)	—	847	—	847
Change in unrealized gain (loss) on investments, net of tax of $(36)	—	—	126	126
Balance at December 31, 2004	$13,705	$(1,103)	$ 82	$12,684

9) Income Taxes

A reconciliation of the Company's 2004, 2003 and 2002 effective tax rate to the U.S. federal statutory rate follows:

	2004	2003	2002
U.S. Federal income tax statutory rate	35.0%	(35.0)%	(35.0)%
Nondeductible goodwill, merger expenses, and in-process Technology	—	—	7.1
State income taxes, net of federal benefit	0.7	2.3	(1.9)
Effect of foreign operations taxed at various rates	(6.9)	(11.1)	(4.6)
Foreign sales corporation tax benefit	(0.5)	(0.6)	(0.2)
Deferred tax asset valuation allowance	(30.7)	67.3	32.2
Other	(1.5)	(3.6)	(2.4)
	(3.9)%	19.3%	(4.8)%

(Tables in thousands, except share and per share data)

The components of income before income taxes and the related provision (benefit) for income taxes consist of the following:

	Year Ended December 31,		
	2004	2003	2002
Income (loss) before income taxes:			
United States	$ 37,098	$(23,737)	$(47,045)
Foreign	30,130	10,003	5,527
	67,228	(13,734)	(41,518)
Current taxes:			
United States Federal	841	—	(3,806)
State	716	477	237
Foreign	6,061	1,458	1,338
	7,618	1,935	(2,231)
Deferred taxes:			
United States Federal	(9,141)	—	(150)
State and Foreign	(1,088)	716	400
	(10,229)	716	250
Provision (benefit) for income taxes	$ (2,611)	$ 2,651	$ (1,981)

At December 31, 2004 and 2003 the significant components of the deferred tax assets and deferred tax liabilities were as follows:

	2004	2003
Deferred tax assets:		
Net operating losses and credits	$ 11,563	$ 22,072
Inventory and warranty reserves	11,304	10,986
Accounts receivable and other reserves	4,018	4,666
Depreciation and amortization	5,442	3,740
Other	2,458	363
Total deferred tax assets	34,785	41,827
Deferred tax liabilities:		
Acquired intangible assets	(17,066)	(18,726)
Other	(536)	(1,405)
Total deferred tax liabilities	(17,602)	(20,131)
Valuation allowance	(2,870)	(22,933)
Net deferred tax asset (liability)	$ 14,313	$ (1,237)

The Company incurred significant operating losses in fiscal 2003, 2002 and 2001. At December 31, 2003 a $22,933,000 valuation allowance was maintained against the Company's net deferred tax assets. This valuation allowance was maintained because the Company determined that it was more likely than not that all of the deferred tax assets may not be realized.

During the year ended December 31, 2004, after examining a number of factors, including historical results and near term earnings projections, the Company determined that it was more likely than not that it would realize all of its net deferred tax assets, except for those related to certain state tax credits.

As a result of this analysis the Company reduced its valuation allowance by $20,063,000 at December 31, 2004 resulting in a net deferred tax asset of $14,313,000. Of the total tax benefit from the reversal of the valuation allowance, $3,850,000 was recorded as a reduction of goodwill and $5,271,000 was recorded to additional paid-in capital for the tax benefit from the exercise of stock options during both the current and prior years. The remaining valuation allowance of $2,870,000 relates to state tax credits for which it is more likely than not that they will not be realized.

At December 31, 2004, the Company had federal net operating loss carryforwards of $4,681,000, including approximately $1,636,000 the utilization of which may be limited by the change in ownership rules under Section 382 of the Internal Revenue Code ("Section 382"). The Company also had federal general business and minimum tax credit carryforwards ("credit carryforwards") of $5,791,000 and $841,000 respectively. In addition, at December 31, 2004, the Company had approximately $9,624,000 of state net operating loss carryforwards. The federal net operating losses and general business credit carryforwards begin to expire in 2021 and 2012, respectively. The state net operating loss carryforwards begin to expire in 2008. Under the provisions of Section 382, certain substantial changes in the Company's ownership may result in a limitation on the amount of net operating loss and credit carryforwards that can be used in future periods.

On October 22, 2004, the American Jobs Creation Act of 2004 (the "Act") was signed into law. The Act contains a provision allowing U.S. multinational companies a one-time incentive to repatriate foreign earnings at an effective tax rate of 5.25%. The Company has started an evaluation of the effects of the repatriation provision but does not anticipate it will complete this evaluation until some time after Congress and Treasury issue further guidance. Through December 31, 2004, 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, 2004 the Company had $50,037,549 of undistributed earnings in its foreign subsidiaries.

10) Employee Benefit Plans

The Company has a 401(k) profit-sharing plan for U.S. employees meeting certain requirements in which eligible employees may contribute between 1% and 20% 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 Internal Revenue Service. 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 $1,685,000, $1,503,000 and $1,938,000 for 2004, 2003 and 2002, 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 $4,617,000 in 2004, was immaterial in 2003 and there was no bonus expense in 2002.

The Company provides supplemental retirement benefits for certain of its officers and executive officers. This obligation was not material at December 31, 2004.

(Tables in thousands, except share and per share data)

11) 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,		
	2004	2003	2002
Geographic net sales			
United States	$367,233	$199,118	$200,181
Japan	85,571	59,664	43,335
Europe	46,868	43,339	38,767
Asia	55,408	35,170	32,490
	$555,080	$337,291	$314,773

	December 31,	
	2004	2003
Long — lived assets		
United States	$68,719	$65,977
Japan	6,202	5,978
Europe	5,544	5,541
Asia	4,024	3,349
	$84,489	$80,845

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

	December 31,		
	2004	2003	2002
Instruments and Control Systems	$253,422	$163,410	$150,807
Power and Reactive Gas Products	234,230	132,263	121,283
Vacuum Products	67,428	41,618	42,683
	$555,080	$337,291	$314,773

The Company had one customer comprising 20%, 18% and 23% of net sales for the years ended December 31, 2004, 2003 and 2002, respectively. During the years ended December 31, 2004, 2003 and 2002, the Company estimates that approximately 77%, 69% and 70% of its net sales, respectively, were to semiconductor capital equipment manufacturers and semiconductor device manufacturers.

(Tables in thousands, except share and per share data)

12) Acquisitions

On September 30, 2003, the Company acquired Wenzel Instruments, a privately held developer of solid state MicroElectroMechanical System (MEMS) based vacuum sensor technology for advanced manufacturing processes. This acquisition expands our vacuum gauge product line offering to help meet current demand for process control sensors with higher accuracy and a faster response in a smaller footprint. The purchase price was $2,150,000 and was accounted for under the purchase method of accounting. The purchase price was primarily allocated to the assets acquired based upon their estimated fair values, with the full purchase price being allocated to intangible assets as completed technology. This intangible asset is being amortized over its estimated useful life of 5 years. The results of operations are included in the Company's consolidated statement of income as of and since the date of the purchase.

On January 31, 2002, MKS completed its acquisition of the ENI Business ("ENI") of Emerson Electric Co., a supplier of solid-state RF and DC plasma power supplies, matching networks and instrumentation to the semiconductor and thin-film processing industries. The reasons for the acquisition of ENI were based upon the ability to offer higher value and more integrated application solutions by combining ENI's solid-state power conversion technology with the Company's core competency in plasma and reactive gas solutions. The acquisition has been accounted for under the purchase method of accounting. The purchase price was approximately $266,530,000 and consisted of approximately 12,000,000 shares of MKS common stock valued at approximately $261,264,000 and transaction expenses of approximately $5,266,000. The value of MKS common stock was approximately $21.7720 per share based on the average closing price of MKS' common stock for the five-day period including the date of the announcement of the signing of the merger agreement and the two days preceding and succeeding such date.

The purchase price was allocated to the assets acquired based upon their estimated fair values and resulted in an allocation of approximately $197,123,000 to goodwill. The results of operations are included in the Company's consolidated statement of income as of and since the date of the purchase. The allocation of the purchase price is as follows:

Current assets	$ 31,038
Other assets	2,123
Fixed assets	18,882
Completed technology	39,600
Patents	6,500
Customer relationships	2,600
In-process research and development	7,500
Goodwill	197,123
Other current liabilities	(13,883)
Deferred tax liabilities	(19,480)
Other long term liabilities	(5,473)
	$266,530

The amounts allocated to acquired intangible assets are being amortized using the straight-line method over their respective estimated useful lives: six years for completed technology, eight years for patents, and eight years for customer relationships. The total weighted average amortizable life of the acquired intangible assets is six years. Approximately $9,700,000 of the goodwill is tax deductible.

In connection with the acquisition of ENI, the Company obtained an appraisal from an independent appraiser of the fair value of its intangible assets. This appraisal valued purchased in-process research and development ("IPR&D") of various projects for the development of new products and technologies at approximately $7,500,000. Because the technological feasibility of products under development had not been established and no future alternative uses existed, the purchased IPR&D was expensed during the six months ended June 30, 2002. The value of the purchased IPR&D was determined using the income approach, which discounts expected future cash flows from projects under development to their net present value. Each project was analyzed to determine the technological innovations included; 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. The cash flows derived from the IPR&D projects were discounted at rates ranging from 25% to 30%. The Company believes these rates were appropriate given the risks associated with the technologies for which commercial feasibility had not been established. The percentage of completion for each in-process project was determined by identifying the cost incurred to date of the project as a ratio of the total estimated cost required to bring the project to technical and commercial feasibility. The percentage of completion for in-process projects acquired ranged from 65% to 80%, based on management's estimates of tasks completed and the tasks to be completed to bring the projects to technological and commercial feasibility. The projects were generally expected to have durations of up to 12 months. The significant projects were completed within their scheduled 12-month timeframe.

(Tables in thousands, except share and per share data)

On March 13, 2002, MKS acquired Tenta Technology, Ltd. ("Tenta"), a privately held company that designs and supplies modular, computer-based process control systems for 300mm semiconductor process tool applications. The reasons for the acquisition were based upon the ability to offer higher value and more integrated application solutions by integrating Tenta's process controllers with MKS digital network products to provide a more complete process control solution. The acquisition has been accounted for under the purchase method of accounting. The purchase price was approximately $26,400,000 and consisted of 700,000 shares of MKS common stock valued at approximately $21,100,000, cash of $5,000,000 and transaction expenses of approximately $300,000. The value of MKS common stock was based on the average closing price of MKS' common stock for the five-day period including the date of the announcement of the signing of the merger agreement and the two days preceding and succeeding such date. The purchase price was allocated to the assets acquired based upon their estimated fair values. The results of operations are included in the Company's consolidated statement of income as of and since the date of the purchase. The allocation of the purchase price was as follows:

Current assets	$ 5,051
Completed technology	10,400
Other acquired intangibles	540
In-process research and development	180
Goodwill	18,899
Other net liabilities assumed	(8,670)
	$26,400

Completed technology and other acquired intangibles are being amortized on a straight-line basis over 6 to 8 years. None of the goodwill is tax deductible.

In 2002, the Company acquired two other privately held companies for a total purchase price of $12,200,000, including IPC Fab Automation GmbH, a developer and provider of web-based hardware and software that enable e-diagnostics and advanced process control for advanced manufacturing applications. There were no shares of MKS common stock issued for these acquisitions. Goodwill recognized in these transactions was approximately $11,000,000 and acquired intangible assets were approximately $2,800,000. Acquired intangibles are being amortized over a weighted average of six years.

(Tables in thousands, except share and per share data)

The following unaudited pro forma results of operations of the Company for 2002 give effect to the acquisitions made in 2002 as if the acquisitions had occurred at the beginning of 2002:

	Year Ended December 31, 2002
Net sales	$318,913
Net loss	(34,067)
Net loss per share:	
Basic and diluted	$ (0.67)

These unaudited pro forma results have been prepared for comparative purposes only and do not purport to be indicative of the results of operations which actually would have resulted had the acquisitions occurred at the beginning of the period, or which may result in the future. Additionally, the charges for purchased IPR&D were not included in the unaudited pro forma results, because they were non-recurring and directly related to the transactions.

13) Sale of Assets

In August 2001, the Company sold certain assets for proceeds of approximately $9,000,000, consisting of approximately $4,700,000 in cash, $3,900,000 in a note receivable, and $200,000 of warrants. The note receivable had an annual interest rate of 9.0% and was scheduled to mature on August 7, 2004. The loss on the transaction was $1,246,000 before taxes. During 2002, due to the downturn in the semiconductor industry and its result on the acquirer's operations, and the acquirer's inability to raise financing, the Company considered the value of the note and warrants to be impaired. Accordingly, during 2002, MKS recorded a charge of $4,121,000 to other expense for the Company's estimate of the impairment on the note receivable and warrants. During 2004, the Company received $5,042,000 related to the collection of the note receivable and accrued interest. This amount was recorded as a gain and included in other income.

During 2002, the Company sold an investment in a company for approximately $2,500,000. The gain on the transaction was not material.

14) Restructuring and Asset Impairment Charges

As a result of our various acquisitions from 2000 through 2002 and the downturn in the semiconductor capital equipment market which began in 2000, we had redundant activities and excess manufacturing capacity and office space. Therefore in 2002, and continuing through the first quarter of 2004, we implemented restructuring activities to rationalize manufacturing operations and reduce operating expenses. As a result of these actions, the Company recorded restructuring and asset impairment charges of $2,726,000 in 2002. The charges consisted of $631,000 of severance costs related to a workforce reduction, $1,228,000 related to consolidation of leased facilities, and an asset impairment charge of $867,000 primarily related to the impairment of an intangible asset from the discontinuance of certain product development activities. The fair value of the impaired intangible asset was determined using the expected present value of future cash flows. The workforce reduction was across all functional groups and consisted of 225 employees.

During 2003, the Company continued its consolidation of recent acquisitions that it initiated in 2002, and recorded restructuring, asset impairment and other charges of $1,593,000. The charges in 2003 consisted of $356,000 of severance costs related to workforce reductions, $1,145,000 of lease cost, professional fees and other costs related to facility consolidations and an asset impairment charge of $92,000. The workforce reduction was across all functional groups.

(Tables in thousands, except share and per share data)

During 2004, we completed our enacted restructuring activities related to the consolidation of operations from acquired companies when we exited an additional leased facility and recorded a restructuring charge of $437,000.

The following table sets forth the components of the restructuring activities initiated during 2004, 2003 and 2002, and the related accruals remaining at December 31, 2004:

	Workforce Reductions	Asset Impairment	Facility Consolidations	Total
Restructuring provision in 2002	$ 631	$ 867	$1,228	$ 2,726
Charges utilized in 2002	(305)	(867)	(64)	(1,236)
Reserve balance as of December 31, 2002	326	—	1,164	1,490
Restructuring provision in 2003	356	92	1,145	1,593
Charges utilized in 2003	(483)	(92)	(478)	(1,053)
Reserve balance as of December 31, 2003	199	—	1,831	2,030
Restructuring provision in 2004	—	—	437	437
Charges utilized in 2004	(110)	—	(736)	(846)
Reserve balance as of December 31, 2004	$ 89	$ —	$1,532	$ 1,621

The remaining accruals for workforce reductions are expected to be paid by September of 2005. The facilities consolidation charges will be paid over the respective lease terms, the latest of which ends in 2008. The accrual for severance costs and lease payments are recorded in Other accrued expenses and Other liabilities.

Inventory Writedown

During the second quarter and fourth quarter of 2001, the Company recorded significant charges to writedown excess and obsolete inventory to its estimated net realizable value. The following is a summary of the activity related to this writedown during 2001, 2002, 2003 and 2004:

	Balance
Initial charge in 2001	$16,608
Inventory scrapped and charged against the writedown during 2001	(978)
Balance at December 31, 2001	15,630
Inventory scrapped and charged against the writedown during 2002	(4,868)
Inventory sold during 2002, benefiting cost of sales	(1,413)
	(6,281)
Balance at December 31, 2002	9,349
Inventory scrapped and charged against the writedown during 2003	(1,994)
Inventory sold during 2003, benefiting cost of sales	(181)
	(2,175)
Balance at December 31, 2003	7,174
Inventory scrapped and charged against the writedown during 2004	(478)
Inventory sold during 2004, benefiting cost of sales	(1,638)
	(2,116)
Balance at December 31, 2004	$ 5,058

(Tables in thousands, except share and per share data)

15) Goodwill and Intangible Assets

The Company adopted the provisions of SFAS 142 on January 1, 2002. Accordingly, the Company ceased the ratable amortization of goodwill on that date. In addition, the Company reassessed the classification of its goodwill and intangible assets. This analysis, which was completed during the quarter ended March 31, 2002, resulted in the reclassification of workforce related intangible assets of $2,023,000 to goodwill. Also, in accordance with this statement, the Company reassessed the useful lives of its amortizable intangible assets and determined that the lives were appropriate.

The Company is required to perform an annual impairment test of its goodwill under the provisions of SFAS 142. SFAS 142 requires that companies identify and assess goodwill at the reporting unit level. 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 operating segment. The Company allocates goodwill to reporting units at the time of acquisition and bases that allocation on which reporting units will benefit from the acquired assets and liabilities. The fair value of each reporting unit with goodwill is compared to its recorded book value. An excess of book value over fair value indicates that an impairment of goodwill exists. Fair value is based on a discounted cash flow analysis of expectations of future earnings for each of the reporting units with goodwill. The Company completed its annual impairment for 2004 in the fourth quarter. No adjustment to goodwill was necessary.

The changes in the carrying amount of goodwill during the years ended December 31, 2004 and 2003 were as follows:

	Year Ended	
	December 31, 2004	December 31, 2003
Balance, beginning of year	$259,924	$259,781
Reduction for reversal of tax valuation allowance	(3,850)	—
Finalization of purchase price allocation and foreign currency translation	(334)	143
Balance, end of year	$255,740	$259,924

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

	December 31, 2004		December 31, 2003	
	Gross Carrying Amount	Accumulated Amortization	Gross Carrying Amount	Accumulated Amortization
Completed technology	$72,738	$(39,969)	$72,563	$(27,654)
Customer relationships	6,640	(3,581)	6,640	(2,663)
Patents, trademarks, tradenames and other	12,395	(6,619)	12,394	(5,088)
	$91,773	$(50,169)	$91,597	$(35,405)

(Tables in thousands, except share and per share data)

Aggregate amortization expense related to acquired intangibles for the years ended December 31, 2004, 2003 and 2002 were $14,764,000, $14,692,000 and $13,897,000, respectively. Estimated amortization expense related to acquired intangibles for each of the five succeeding years is as follows:

Year	Amount
2005	$13,864
2006	11,763
2007	11,129
2008	2,759
2009	1,205

16) 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:

	2004	2003
Balance at beginning of year	$ 5,804	$ 6,921
Provisions for product warranties	8,256	3,133
Direct charges to the warranty liability	(6,459)	(4,250)
Balance at end of year	$ 7,601	$ 5,804

17) Other Accrued Expenses

Other accrued expenses consist of:

	December 31	
	2004	2003
Product warranties	$ 7,601	$ 5,804
Accrued restructuring costs	625	881
Other	13,212	11,084
	$21,438	$17,769

18) Related Party Transactions

The Vice President and General Manager of the Vacuum Products Group is the general partner of Aspen Industrial Park Partnership, LLLP ("Aspen"). The Company leases from Aspen certain facilities occupied by the Company's' Vacuum Products Group in Boulder, Colorado. The Company paid Aspen $1,111,000, $1,106,000 and $866,000 in 2004, 2003 and 2002, respectively, to lease such facilities.

A director of the Company is also the president and a director of Emerson Electric Co. ("Emerson"). As of December 31, 2004, Emerson was the beneficial owner of approximately 19% of the outstanding shares of Common Stock. During 2004, 2003 and 2002, the Company purchased materials and administrative services from Emerson and its subsidiaries totaling approximately $1,854,000, $1,403,000 and $1,156,000, respectively. In addition, in accordance with the terms of a Shareholder's Agreement between the Company and Emerson, the Company paid the expenses of Emerson relating to the registration of shares in connection with a public offering of Common Stock that closed in January 2004. Such expenses were $176,000.

In 2003, the Company recorded a gain of $927,000 from the early repayment of premiums related to a split dollar life insurance policy covering the Chairman of the Company. This gain was recorded in other income (expense) in the consolidated statement of operations.

MKS INSTRUMENTS, INC.

SUPPLEMENTAL FINANCIAL DATA

	Quarter Ended			
	March 31	June 30	Sept. 30	Dec. 31
	(Table in thousands, except per share data) (Unaudited)			
2004				
Statement of Operations Data				
Net sales	$132,985	$151,585	$139,651	$130,859
Gross profit	54,229	61,393	55,606	48,143
Income from operations	15,611	20,421	14,745	9,136
Net income(1)	12,706	20,868	12,150	24,115
Net income per share:				
Basic	$ 0.24	$ 0.39	$ 0.23	$ 0.45
Diluted	$ 0.23	$ 0.38	$ 0.22	$ 0.44
2003				
Statement of Operations Data				
Net sales	$ 72,777	$ 81,168	$ 81,568	$101,778
Gross profit	25,406	27,445	27,722	37,536
Income (loss) from operations(2)	(7,423)	(5,388)	(5,344)	2,438
Net income (loss)(3)	(7,430)	(5,470)	(5,621)	2,136
Net income (loss) per share:				
Basic and diluted	$ (0.14)	$ (0.11)	$ (0.11)	$ 0.04

(1) Net income for the quarter ended June 30, 2004 includes a gain of $5.0 million on the collection of a note receivable which had been written off in 2002. During the year ended December 31, 2003 and for the quarters ended March 31, June 30 and September 30, 2004, a valuation allowance against net deferred tax assets was maintained. Net income and net income per share for those periods include tax expense which is comprised primarily of state and foreign taxes. During the quarter ended December 31, 2004, the valuation allowance was reduced against the net deferred tax assets. Net income and net income per share for the quarter ended December 31, 2004 include a net benefit for income taxes of $14.1 million, primarily from the benefit from the reduction of the valuation allowance.

(2) Income (loss) from operations for the quarter ended December 31, 2003 includes restructuring charges of $1.0 million and an adjustment of $0.8 million to reduce depreciation expense.

(3) Net income (loss) for the quarter ended December 31, 2003 includes a gain of $0.9 million from the early repayment of premiums related to a split dollar life insurance policy covering the Chairman and CEO of the Company.

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

None.

Item 9A. *Controls and Procedures*

Effectiveness of Disclosure Controls and Procedures

MKS' 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, 2004. 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 the 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, 2004, 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.

Management's Annual Report on Internal Control Over Financial Reporting

The management of MKS is responsible for establishing and maintaining adequate internal control over financial reporting. Internal control over financial reporting is defined in Rule 13a-15(f) and 15d-15(f) promulgated under the Exchange Act as a process designed by, or under the supervision of, the company's principal executive and principal financial officers 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, 2004. In making this assessment, MKS' 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, 2004, our internal control over financial reporting was effective based on those criteria.

Our management's assessment of the effectiveness of our internal control over financial reporting as of December 31, 2004 has been audited by PricewaterhouseCoopers LLP, an independent registered public accounting firm, as stated in their report which appears on pages 33 and 34.

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) that occurred during the quarter ended December 31, 2004 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 and Executive Officers of the Registrant***

The information required by this item is set forth under the captions "Election of Directors", "Executive Officers", "Code of Ethics" and "Directors — Audit Committee Financial Expert" in our definitive proxy statement for the 2005 Annual Meeting of Stockholders, 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 2005 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 is set forth under the caption "Executive Officers — Executive Compensation" in our definitive proxy statement for the 2005 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 is set forth under the caption "Security Ownership of Certain Beneficial Owners and Management" in our definitive proxy statement for the 2005 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 is set forth under the caption "Executive Officers — Equity Compensation Plan Information" in our definitive proxy statement for the 2005 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***

The information required by this item is set forth under the caption "Executive Officers — Certain Relationships and Related Transactions" in our definitive proxy statement for the 2005 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 Accounting Fees and Services***

The information required by this item is set forth under the caption "Independent Registered Public Accounting Firm" in our definitive proxy statement for the 2005 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 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:

2. *Financial Statement Schedules*

The following consolidated financial statement schedule is included in this Annual Report on Form 10-K of Item 15(d):

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(c).

Exhibit No.	Title
+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. 1993 Stock Option Plan, as amended
+10.2(6)*	Applied Science and Technology, Inc. 1994 Formula Stock Option Plan, as amended
+10.3(4)*	1996 Amended and Restated Director Stock Option Plan
10.4*	Second Amended and Restated 1997 Director Stock Option Plan, and forms of option agreements thereto
+10.5(7)*	2004 Stock Incentive Plan
+10.6(9)*	Form of Nonstatutory Stock Option Agreement to be granted under the 2004 Stock Incentive Plan
+10.7(10)*	Second Restated 1995 Stock Incentive Plan
+10.8(7)*	Form of Nonstatutory Stock Option Agreement under the Second Restated 1995 Stock Incentive Plan
+10.9(7)*	Third Restated 1999 Employee Stock Purchase Plan
+10.10(7)*	Second Restated International Employee Stock Purchase Plan
+10.11(11)*	Form of 2005 Management Incentive Bonus Program
+10.12(7)*	Employment Agreement dated as of July 30, 2004 between Leo Berlinghieri and the Registrant
+10.13(7)*	Employment Agreement dated as of July 30, 2004 between Ronald C. Weigner and the Registrant
+10.14(4)*	Amended and Restated Employment Agreement dated as of December 15, 1995 between William D. Stewart and the Registrant
+10.15(7)*	Employment Agreement dated as of July 30, 2004 between Robert Klimm and the Registrant
+10.16(8)	Employment Agreement dated as of March 10, 2000 between the Registrant and Donald Smith, as amended by an Amendment to Employment Agreement between the Registrant and Donald Smith, dated February 21, 2004
+10.17(7)*	Employment Agreement dated as of July 30, 2004 between John Smith and the Registrant
+10.18(7)*	Employment Agreement dated as of July 30, 2004 between Gerald Colella and the Registrant

Exhibit No.	Title
+10.19(4)	Lease Agreement dated as of October 12, 1989, as extended November 1, 1998, by and between Aspen Industrial Park Partnership, LLLP and the Registrant
+10.20(1)	Lease dated as of August 9, 2000 between Aspen Industrial Park Partnership, LLLP and the Registrant
+10.21(9)	Optional Advanced Demand Grid Note dated August 3, 2004 in favor of HSBC Bank USA
+10.22(12)	Loan Agreement between ASTeX Realty Corp. and Citizens Bank of Massachusetts, dated March 6, 2000 (the "Citizens Loan Agreement")
+10.23(12)	Exhibit A to the Citizens Loan Agreement
+10.24(13)	Shareholder Agreement dated as of January 31, 2002 among the Registrant and Emerson Electric Co.
10.25*	Summary of Compensatory Arrangements with Executive Officers
10.26*	Summary of Compensatory Arrangements with Non-Employee Directors
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
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

+ Previously filed

* Management contract or compensatory plan arrangement filed as an Exhibit to this Form 10-K pursuant to Item 15(c) 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 (File No. 000-23621) for the quarter ended June 30, 2001.

(3) Incorporated by reference to the Registrant's Quarterly Report on Form 10-Q (File No. 000-23621) for the quarter ended June 30, 2002.

(4) Incorporated by reference to the Registration Statement on Form S-1 (File No. 333-71363) filed with the Securities and Exchange Commission on January 28, 1999, as amended.

(5) Incorporated by reference to the Registration Statement on Form S-8 (File No. 333-54486) filed with the Securities and Exchange Commission on January 29, 2001.

(6) Incorporated by reference to the Registration Statement on Form S-8 (File No. 333-54488) filed with the Securities and Exchange Commission on January 29, 2001.

(7) Incorporated by reference to the Registrant's Quarterly Report on Form 10-Q (File No. 000-23621) for the quarter ended June 30, 2004.

(8) Incorporated by reference to the Registrant's Annual Report on Form 10-K (File No. 000-23621) for the year ended December 31, 2004.

(9) Incorporated by reference to the Registrant's Quarterly Report on Form 10-Q (File No. 000-23621) for the quarter ended September 30, 2004.

(10) Incorporated by reference to the Registrant's Quarterly Report on Form 10-Q (File No. 000-23621) for the quarter ended September 30, 2002.

(11) Incorporate by reference to Registrant's Current Report on Form 8-K filed with the Security and Exchange Commission on February 25, 2005.

(12) Incorporated by reference to Applied Science and Technology, Inc.'s Quarterly Report on Form 10-Q (File No. 333-71467) for the quarter ended March 25, 2000.

(13) Incorporated by reference to the Registrant's Report on Form 8-K (File No. 000-23621) filed with the Securities and Exchange Commission on February 12, 2002.

(c) Exhibits.

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

(d) Financial Statement Schedules

MKS INSTRUMENTS, INC.

SCHEDULE II — VALUATION AND QUALIFYING ACCOUNTS

Description	Balance at Beginning of Year	Additions: Charged to Costs and Expenses	Additions: Charged to Other Accounts	Deductions & Write-offs	Balance at End of Year
	(Dollars in thousands)				
Accounts receivable allowance					
Year ended December 31,					
2004	$2,415	$3,905	$—	$3,082	$3,238
2003	$4,679	$ 460	$—	$2,724	$2,415
2002	$3,282	$2,064	$—	$ 667	$4,679

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/ JOHN R. BERTUCCI

John R. Bertucci
Chairman of the Board of Directors
and Chief Executive Officer
(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.

Signatures	Title	Date
/s/ JOHN R. BERTUCCI John R. Bertucci	Chairman of the Board of Directors and Chief Executive Officer (Principal Executive Officer)	March 14, 2005
/s/ RONALD C. WEIGNER Ronald C. Weigner	Vice President and Chief Financial Officer (Principal Financial and Accounting Officer)	March 14, 2005
/s/ ROBERT R. ANDERSON Robert R. Anderson	Director	March 8, 2005
/s/ JAMES G. BERGES James G. Berges	Director	March 7, 2005
/s/ RICHARD S. CHUTE Richard S. Chute	Director	March 7, 2005
/s/ HANS-JOCHEN KAHL Hans-Jochen Kahl	Director	March 7, 2005
/s/ OWEN W. ROBBINS Owen W. Robbins	Director	March 7, 2005
/s/ LOUIS P. VALENTE Louis P. Valente	Director	March 7, 2005

EXHIBIT 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

I, John R. Bertucci, 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 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 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: March 14, 2005

/s/ JOHN R. BERTUCCI

John R. Bertucci
Chairman and Chief Executive Officer
(Principal Executive Officer)

EXHIBIT 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

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: March 14, 2005

/s/ RONALD C. WEIGNER

Ronald C. Weigner
Vice President and Chief Financial Officer
(Principal Financial Officer)

Corporate Information

Board of Directors

John R. Bertucci
Chairman and Chief Executive Officer
MKS Instruments, Inc.

Robert R. Anderson
Chairman and Chief Executive Officer (retired)
Yield Dynamics, Inc.

James G. Berges
President
Emerson Electric Company

Richard S. Chute, Esq.

Hans-Jochen Kahl
Managing Director (retired)
Leybold AG

Owen W. Robbins
Executive Vice President (retired)
Teradyne, Inc.

Louis P. Valente
Chairman
Palomar Medical Technologies, Inc.

Management

Executive Officers

John R. Bertucci
Chairman and Chief Executive Officer

Leo Berlinghieri
President and Chief Operating Officer

Gerald G. Colella
Vice President
Global Business and Service Operations

Ron Hadar
Vice President and General Manager
CIT Products

Robert L. Klimm
Vice President and General Manager
Power and Reactive Gas Products Group

John A. Smith
Vice President and Chief Technology Officer

William D. Stewart
Vice President and General Manager
Vacuum Products Group

Ronald C. Weigner
Vice President and Chief Financial Officer

Corporate Officers

Kathleen F. Burke
Assistant Secretary

Richard S. Chute, Esq.
Secretary

William P. Donlan
Vice President and Corporate Controller

George E. Manning
Vice President, Global Human Resources

Joseph M. Tocci
Treasurer

Shareholder Information

Corporate Headquarters

MKS Instruments, Inc.
90 Industrial Way
Wilmington, MA 01887-4610
Telephone: 978-284-4000

Outside Counsel

Wilmer Cutler Pickering Hale and Dorr LLP
Boston, MA

Independent Auditors

PricewaterhouseCoopers LLP
Boston, MA

Stock Listing

Nasdaq National Market
Symbol: MKSI

Transfer Agent

American Stock Transfer & Trust Company
59 Maiden Lane
New York, NY 10038
Telephone: 800-937-5449
Fax: 718-236-2641
www.amstock.com

Shareholders may also direct inquiries to:

Ronald C. Weigner
Vice President and Chief Financial Officer
MKS Instruments, Inc.
90 Industrial Way
Wilmington, MA 01887-4610
Telephone: 978-284-4000
www.mksinstruments.com

Annual Meeting of Shareholders

May 9, 2005
10:00 a.m.
Andover Country Club
60 Canterbury Street
Andover, MA 01810

MKS Instruments, Inc.

90 Industrial Way
Wilmington, MA 01887-4610

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