

MKS products enable the global manufacture  
of the world's most advanced chips.



MKS Instruments, Inc.

Annual Report

1999

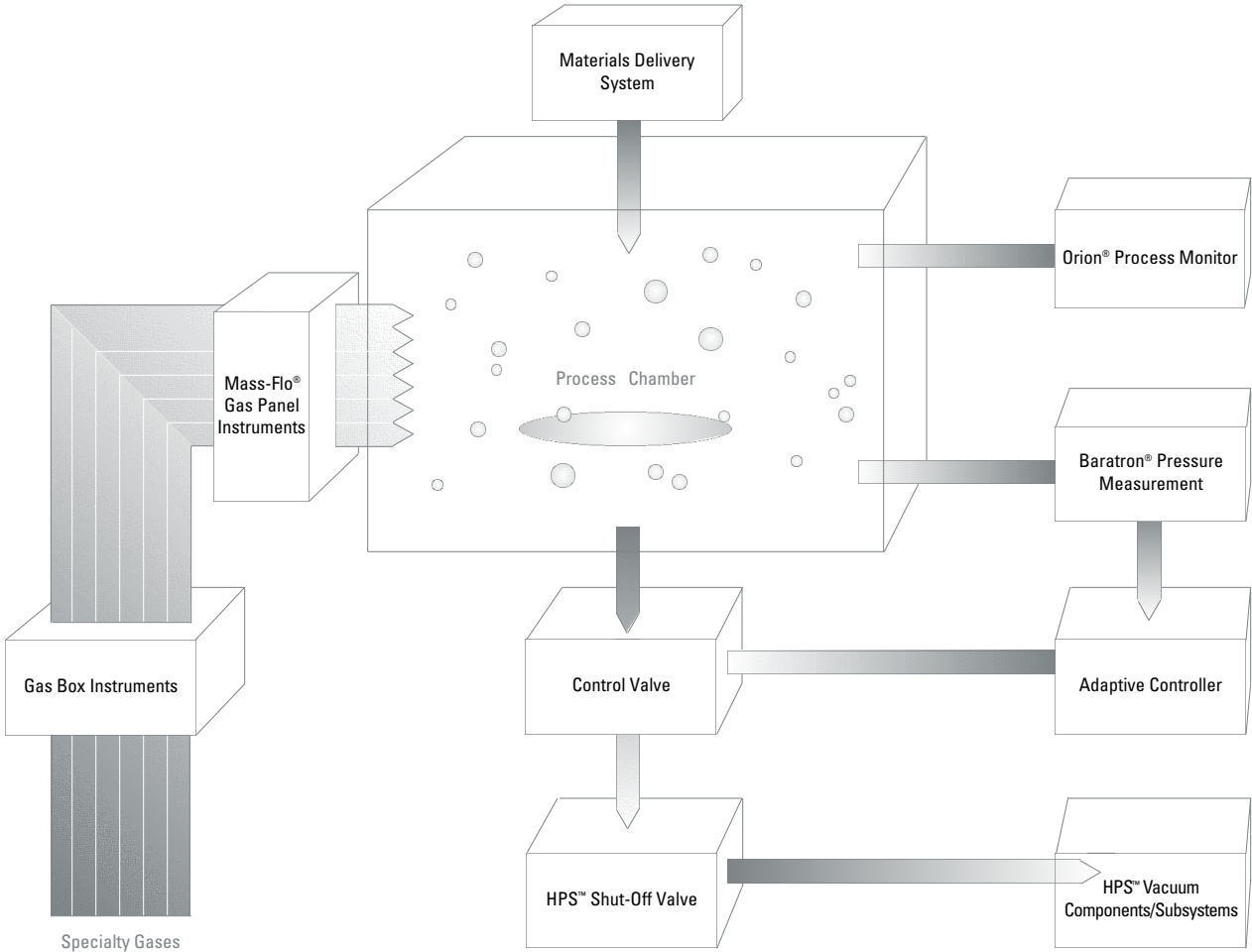
Around the Process, Around the World.

Technologically complex, gas-related manufacturing processes are used to create such products as semiconductor devices, flat panel displays, fiber optic cables, architectural glass, magnetic and optical storage media, and pharmaceuticals. These processes build up very thin layers of materials, step by step, through the interaction of specific gases and materials inside tightly controlled process chambers. Maintaining control of these complex steps throughout the entire manufacturing process is critical to maximizing uptime, yield and throughput.

MKS is a leading developer, manufacturer and supplier of process control instruments that are integrated into many gas-related processes – managing the flow rates of gases entering and exiting the process chamber; controlling the gas composition and pressure inside the chamber; analyzing and monitoring the composition of the gases; and isolating the gases from the outside environment. MKS supports its broad product portfolio with a global infrastructure designed to meet the needs of its 4000+ customers worldwide.

With the manufacture of advanced technology products becoming more complex, exemplified by semiconductor wafers growing in size from 200mm to 300mm diameter while the device dimensions shrink below 0.18 micrometers, the need to precisely control processes becomes even more critical.

MKS products are respected around the world for their accuracy, stability and repeatability. These characteristics enable MKS' customers to replicate their processes from process chamber to process chamber, from factory to factory and from country to country.



MKS products control the processes that make the world's most advanced products.

Wafers increasing in size to 300mm and chip device dimensions shrinking below 0.18 micrometers provide increasing demands on process control instrumentation.

MKS products meet the challenge and enable the continued realization of Moore's Law.

Orion® Process Monitors  
for Copper CVD

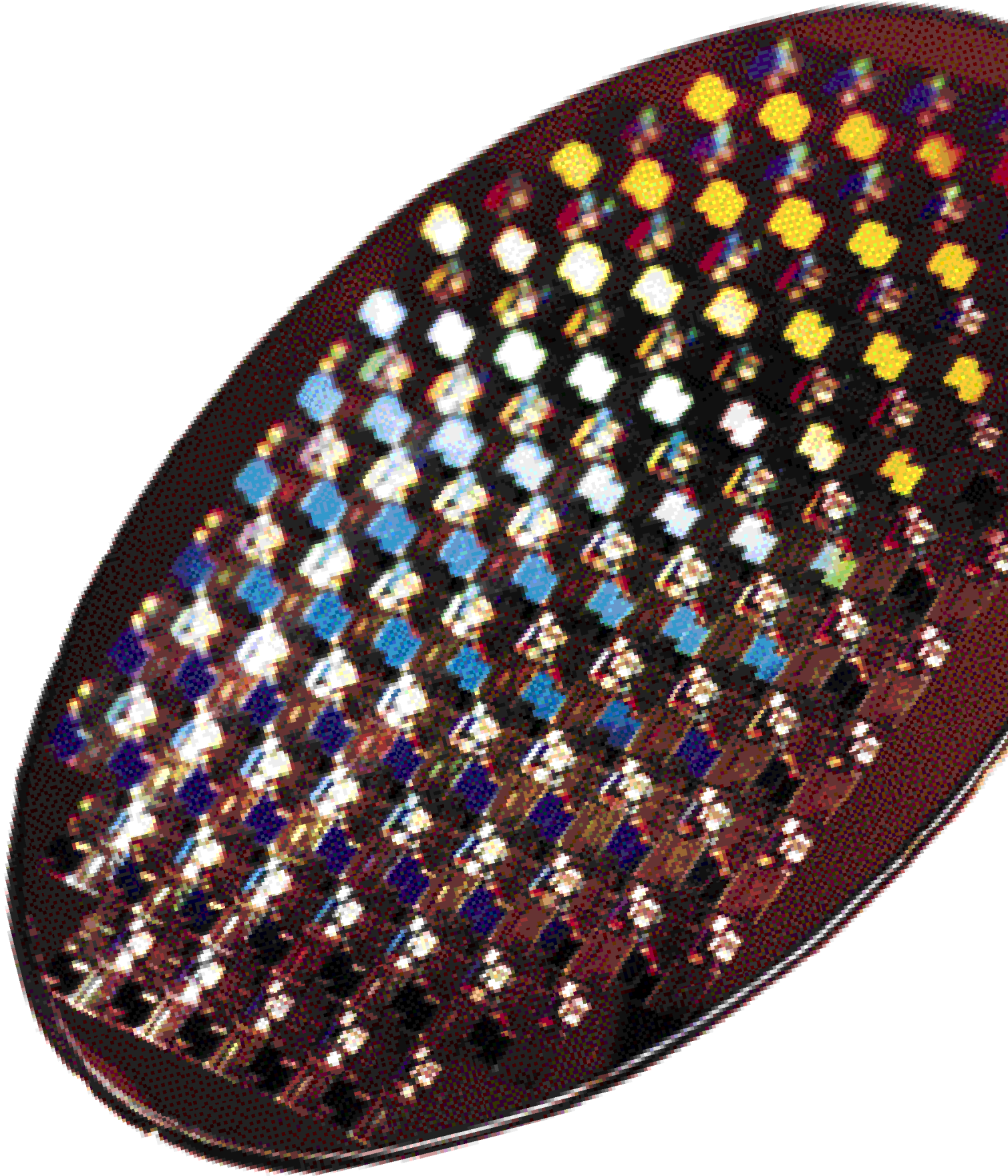
Baratron® Low Pressure  
Manometers for HDP-CVD

DeviceNet™ Digital Mass-  
Flo® Controllers for 300mm

HPS™ Process Enhancement  
Subsystems for TEOS

Wafer Backside Cooling for  
Low-K Etch

SDS® Mass Flow  
Controllers for Ion Implant



Our goals are to enhance productivity and to enable repeatable global manufacturing for our customers in the semiconductor and other advanced process industries, by being the market technological leader in gas measurement, control and analysis products.



The growth of the Internet and multimedia has created an enormous demand for low cost data storage.

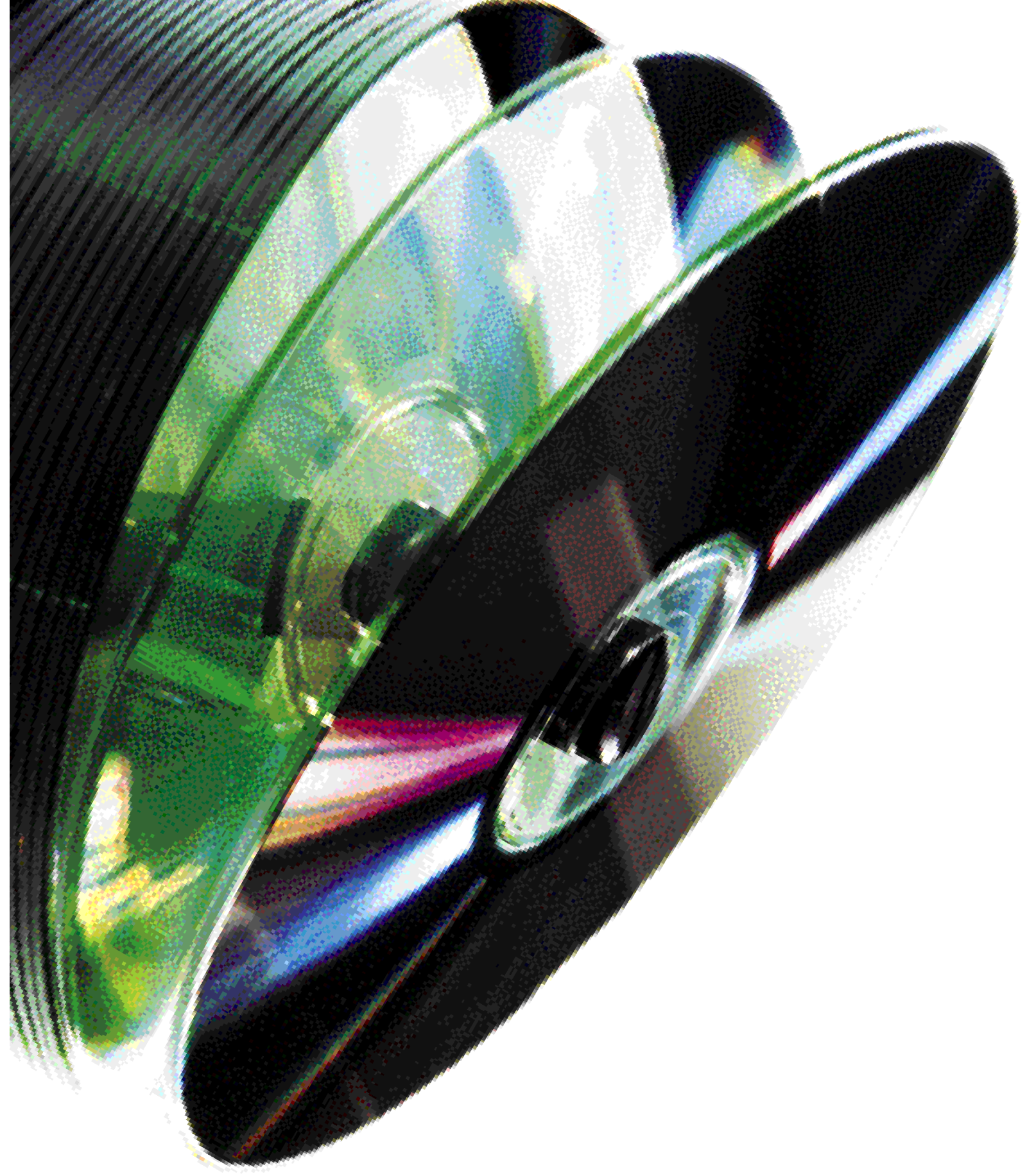
MKS products enable the low cost manufacture of storage media and drive heads by maximizing the consistency and productivity of manufacturing equipment.

Profibus Digital Mass-Flo®  
Controllers

Ultra-Stable Baratron®  
Pressure Instruments for Thin  
Film Sputtering

Orion® Compact Residual  
Gas Analyzers

Rugged HPS™ Cold Cathode Based  
Vacuum Gauges



Advances in manufacturing technology have made affordable, defect-free large LCD monitors a reality for home and business users.

MKS products assist the LCD manufacturers to maximize yields in production by minimizing defect-inducing particles.

Baratron® Pressure  
Switches for Precise  
Load-Lock Operation

HPS™ Heated Vacuum Lines  
for Particle Reduction

Self-Tuning Pressure  
Controllers and Valves to  
Minimize Turbulence

Orion® Process Monitors for Detection  
of Particle-Inducing Leaks



Pharmaceutical manufacturers use advanced vacuum technology to produce safe, reliable products for the consumer.

MKS' ultra-clean instruments enable the consistent manufacture of high quality products.

High Temperature Baratron®  
Pressure Measurement for  
Steam Sterilization

Advanced Pressure Control  
for Faster Freeze-Drying

Orion® Wafer Vapor  
Monitors for Freeze-Drying

Ultra-clean Mass-Flo®  
Controllers for Bio-Reactors





We are delighted to report that 1999, our first year as a public company, was an outstanding year for MKS Instruments. The Company’s record financial performance marked our 30th consecutive year of profitability. In addition to generating strong financial results, we were able to strategically capitalize on the resurgence in the semiconductor equipment industry. MKS is well positioned to continue to participate in the continuing upswing in the semiconductor equipment industry, whose compounded annual growth rate for the next several years is forecasted by industry analysts to exceed its 18% long-term annual growth rate.

As demand for our products and core technologies has heightened, MKS has successfully leveraged competitive strengths into new product releases and new design-wins. Our technology innovation and leadership strengths, our aggressive investments in customer responsiveness, broad product offerings, global infrastructure and depth of management, have served us well. Each of these strengths helped to drive our 1999 performance and, combined, enhanced our position as a leading supplier of gas measurement, control and analysis products used in semiconductor and other advanced thin-film manufacturing processes.

1999: Strong Growth In Sales and Net Income

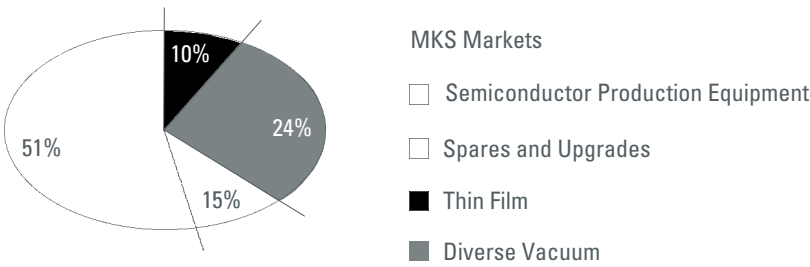
For the year ended December 31, 1999, sales increased 34% to \$187.1 million, versus \$139.8 million in 1998. This top line growth was due primarily to increased sales to semiconductor OEM customers, semiconductor fab customers and sales to other markets. Sales to thin film market customers increased slightly.

Operating income for 1999 increased 202% to \$27.6million, compared to \$9.1 million in 1998. Pro forma net income for 1999 increased 265% to \$18.4 million, compared to 1998 pro forma net income of \$5.0 million. Pro forma diluted earnings per share for 1999 were \$0.77per share compared to \$ 0.27 for 1998. 1999 earnings per share reflect the additional dilutive effect of shares issued in the initial public offering.

For each quarter of 1999, MKS posted sequential growth in both sales and earnings, and MKS achieved record sales and earnings in the fourth quarter. These record results reflect not only the strength of the semiconductor industry and other thin film and vacuum technology related markets, but also our ongoing commitment to research and development, the introduction of new, innovative products, and a strong focus on cost containment.

Strengthened Financial Position

With the successful completion of our IPO, MKS’ balance sheet strengthened. As of December 31, 1999, cash and short-term investments were \$63.8 million and total debt outstanding was \$26.5 million. MKS has a 47% debt to equity ratio and a 2.8 current ratio. The Company also has a combined \$30.0 million line of credit with two banks, which is unused. Given our financial position, proven business model and strong competitive position, MKS has the resources to effectively respond to favorable market dynamics.



A Word About MKS

We are a leading developer, manufacturer and supplier of gas and vacuum measurement and control instrumentation. Many modern manufacturing processes consist of applying and removing thin layers of materials onto or from a base substrate. Critical to the process is creating the appropriate gas atmosphere in the process chamber by introducing precise quantities and mixtures of gases, and continuously adjusting the total pressure in the chamber by controlling the flow of gases out of the chamber. Our instruments are used to measure and control these critical process gas flow rates and pressures. As device geometries get smaller and wafer sizes get larger, the value of the wafers and the cost of capital equipment required to make them increases. Tighter process control is required to improve product yield and increase equipment uptime and throughput, thereby minimizing device production costs. MKS is well positioned to benefit from these key market drivers.

Highly Committed To Innovation Since our inception, the Company has built its reputation on technological innovation and the quality of our gas and vacuum instrumentation products. Our products have continuously advanced as our customers’ needs have evolved. We have introduced technological innovations including corrosion-resistant pressure and vacuum sensors, automatic pressure and vacuum control systems, and compact single unit gas composition analyzers to replace bulky multi-component systems. Also, MKS continues to develop new products to address emerging industry trends such as the transition from the use of 200mm wafers to 300mm wafers, the shrinking of integrated circuit line-widths from 0.25 micron to 0.18 micron and smaller, and the transition from aluminum to copper interconnects.

Our aggressive technology efforts are aimed at expanding our comprehensive portfolio of new, innovative products and advancing our technology leadership. In 1999, we developed several new products and were issued 8 new patents. At the end of 1999, we held 55 active patents, with a further 13 pending. As a result of these and other efforts, the Company continued to maintain its leading-edge position in the industry.

Around the Process and Around the World

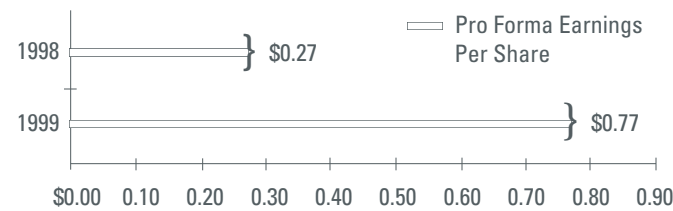
Almost all advanced semiconductor chips made in the world today are processed using our instruments at some point in the process. Our worldwide infrastructure makes us a supplier of choice to leaders in the semiconductor equipment and semiconductor manufacturing markets, as well as to 4,000 other customers worldwide. Additionally, our broad product portfolio comprising vacuum, pressure, flow and analysis products enables us to sell complete solutions, increasing the yield, uptime and throughput of vacuum and gas-related semiconductor manufacturing equipment worldwide.

Expanded Management Capabilities

In May 1999, Dr. Peter Younger joined MKS as President and Chief Operating Officer. Dr. Younger headed the semiconductor operations of Eaton Corporation, and is an industry veteran and recognized leader in the semiconductor equipment market.

In December 1999, the Company announced the reorganization of its Measurement and Control Products Group into two product groups: Pressure Measurement & Control Products and Materials Delivery & Analysis Products. The creation of these two new product groups reflects the industry’s growth and underscores the Company’s ongoing commitment to managing the growth of its product offerings in these significant product areas.





Importantly, as the semiconductor industry continues to show renewed vigor, MKS has demonstrated a sustained ability to attract top quality management, specifically from within the semiconductor equipment industry. We are delighted that Robert L. Klimm has joined MKS Instruments as Vice President and General Manager of Materials Delivery & Analysis Products. He joins us from PRI Automation, where he held the position of Vice President and General Manager of the Factory Systems Division. Bob brings to MKS extensive experience in marketing, engineering and operations, as well as a proven track record of building team commitment and rapidly introducing new products to markets, resulting in profitable growth and increased customer loyalty.

In addition to attracting new talent to the Company, we were delighted to be able to draw upon the experience and operational knowledge of a key MKS executive. Joe Maher, who formerly led the Measurement and Control Products Group, was appointed Vice President and General Manager of Pressure Measurement & Control Products. Both Bob and Joe report directly to Dr. Peter Younger, President and Chief Operating Officer of MKS Instruments.

#### Our Strategy For Growth

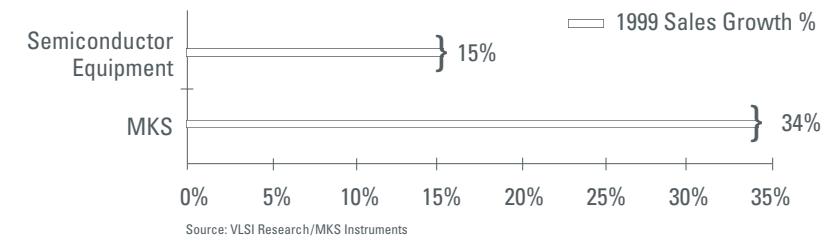
Our growth strategy includes developing new products to expand our broad product portfolio, providing technology innovation, and working closely with our customers in order to expand the penetration of new and existing products in our current markets. Additionally, we are leveraging our accumulated expertise in the semiconductor industry by developing products for applications in related markets. We also have developed and continue to enhance a global sales and service infrastructure and global world class manufacturing capabilities to meet market requirements. Lastly, to supplement internal development efforts and to enhance our product offering, we are seeking to acquire businesses with complementary products.

Each of our new products developed in 1999 addressed customers' needs for improved yield, throughput and uptime. New breakthrough product lines include the Orion® Copper CVD process monitor, the Orion Compact, and the HPS™ process enhancement subsystem. Recently, we have experienced significant growth in the process enhancement subsystems, a product line that received the prestigious Editor's Choice Award for Best Products of 1999 from Semiconductor International.

During 1999, we continued to invest aggressively in technology, to ensure that MKS Instruments continues its position as a technology leader. Spending on R&D reached \$13.2 million, a 9% increase over 1998 levels. We also continued our strategy of establishing and tapping into relationships with leading universities. And, we continued to leverage our long-term relationships with customers, which allow us to anticipate and capitalize upon technological advances.

Our strong customer focus and commitment to technological innovation is evidenced by the design-wins we achieved during the year. Recent design-wins among our semiconductor and thin-film coating customers have included our integrated backside cooling instruments, digital flow controllers, and low-pressure measurement and control instruments.

Outside the semiconductor industry, applications served by MKS include vacuum freeze-drying of pharmaceuticals, sterilization of medical instruments, and applications that involve advanced thin-film manufacturing such as flat panel displays, magnetic and optical storage media, solar cells, fiber optic cables, optical coatings, and architectural glass coatings.



We continue to devote significant resources to expanding and maintaining our worldwide production and service capabilities to meet the global demand for gas measurement control and analysis instruments and vacuum technology components. In 1999, we added manufacturing capabilities to our Austin, Texas facility and further equipped our cleanroom facilities in Andover and Methuen, Massachusetts. These actions followed our opening of sales and support facilities in Singapore and Taiwan in late 1998.

#### The Future: Continued Growth and Profitability

We are encouraged by ongoing signs of strength in the semiconductor device market and positive forecasts for the semiconductor equipment industry, both of which bode well for our prospects for growth and profitability. Major semiconductor companies have recently announced robust capital spending plans for 2000, and current analysts' estimates for capital equipment growth for 2000 range from 25% to 40%. This is well above the historical compound annual growth rate for the industry of approximately 18%.

We are also encouraged by our design-wins during 1999 and over the past several years, which we anticipate will support our growth and serve to increase our market share. We expect incremental sales growth from our recently introduced integrated solution products. To extend our technology leadership, we plan to increase our research and development staffing, in order to develop additional innovative products and integrated solutions.

Looking forward to 2000, we have high expectations for continued growth and profitability. Our proven growth strategy is well defined and is supported by an unwavering commitment to R&D, technology innovation and customer responsiveness. We are fortunate to have a seasoned management team that combines many years of industry experience with years of service with MKS.

I would like to express my appreciation to the MKS worldwide team for their outstanding work and dedication. I would also like to thank our customers, shareholders and suppliers, whose contributions were vital to our success. We at MKS Instruments are very enthusiastic about the coming year, and we look forward to sharing with you our future successes as we capitalize on the opportunities ahead.

Sincerely,

John R. Bertucci  
Chairman of the Board and Chief Executive Officer  
March 24, 2000



# Global



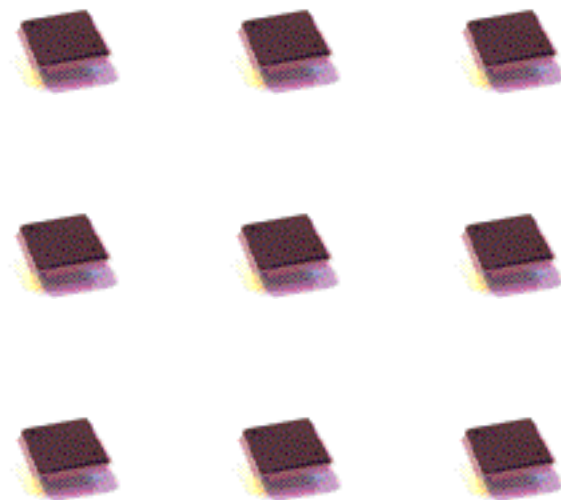
MKS Instruments has long realized that its customers require global support. From our first European operations in the 1970's to Japan in the '80's and the Pacific Rim in the '90's, we have expanded our technical support capabilities to meet the needs of our customers as they have expanded their global manufacturing.

# Leadership



MKS is a technological leader in its field. We continually push our technology forward, keeping our eyes on the industry roadmaps to make sure we have the most advanced products available at the time our customers need them.

# Consistent



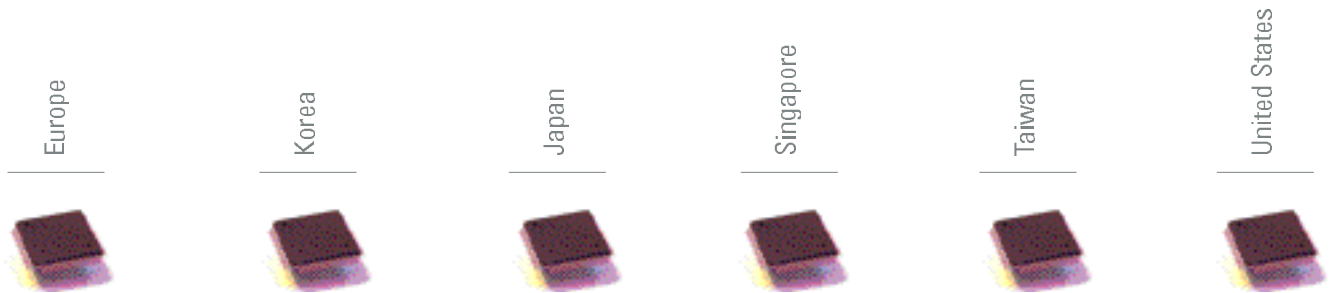
Global manufacturing of advanced products requires consistent, precise process control. MKS products are manufactured to the highest standards in ISO registered facilities worldwide. Our world class manufacturing facilities utilize the most advanced lean manufacturing technologies to ensure that our customers get what they need, when they need it.

# Diverse



A diverse array of advanced technology products are linked by similar manufacturing processes, measured, controlled and analyzed by MKS products. From makers of advanced microprocessors to freeze-dried pharmaceuticals, over 4000 customers around the world rely on the broad range of products in the MKS portfolio.

# Enabling



Making the products for the Internet world is global business. Products are developed in one country, and manufactured in another. The accuracy, stability and repeatability of MKS' products enable the world's leading manufacturers to make the most challenging products the same way, everyday, anywhere.



# 1999 Review

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## Selected Consolidated Financial Data

(in thousands, except per share data)

	Year Ended December 31				
	1999	1998	1997	1996	1995
<b>Statement of Income Data</b>					
Net sales	\$187,083	\$139,763	\$188,080	\$170,862	\$157,164
Gross profit	79,855	55,979	80,474	68,854	69,461
Income from operations	27,611	9,135	23,963	16,068	24,106
Net income	\$ 24,037	\$ 7,186	\$ 20,290	\$ 12,503	\$ 21,658
Historical net income per share - Diluted	\$ 1.00	\$ 0.38	\$ 1.10	\$ 0.69	\$ 1.20
<b>Pro Forma Statement of Income Data (1)</b>					
Pro forma net income	\$ 18,412	\$ 5,044	\$ 13,806	\$ 8,248	\$ 13,821
Pro forma net income per share - Diluted	\$ 0.77	\$ 0.27	\$ 0.76	\$ 0.46	\$ 0.77
<b>Balance Sheet Data</b>					
Cash and cash equivalents	\$ 35,714	\$ 11,188	\$ 2,511	\$ 3,815	\$ 3,650
Working capital	87,088	31,493	30,321	22,404	32,202
Total assets	174,605	96,232	106,536	95,000	104,511
Short-term obligations	20,828	12,819	13,852	16,124	15,192
Long-term obligations, less current portion	5,662	13,786	15,624	18,899	20,462
Stockholders' equity	119,169	54,826	52,848	45,498	48,392

	Quarter Ended			
	Mar 31	Jun 30	Sep 30	Dec 31
<b>1998</b>				
<b>Statement of Income Data</b>				
Net sales	\$ 46,163	\$ 34,026	\$ 28,834	\$ 30,740
Gross profit	19,406	13,761	10,694	12,118
Income from operations	5,500	1,609	318	1,708
Net income	4,279	1,232	142	1,533
Historical net income per share - Diluted	\$ 0.23	\$ 0.07	\$ 0.01	\$ 0.08
<b>Pro Forma Statement of Income Data (1)</b>				
Pro forma net income	\$ 3,003	\$ 865	\$ 100	\$ 1,076
Pro forma net income per share - Diluted	\$ 0.16	\$ 0.05	\$ 0.01	\$ 0.06
<b>1999</b>				
<b>Statement of Income Data</b>				
Net sales	\$ 37,910	\$ 44,209	\$ 50,621	\$ 54,343
Gross profit	15,353	18,659	21,745	24,098
Income from operations	3,541	5,907	7,999	10,164
Net income	3,129	7,576	6,037	7,295
Historical net income per share - Diluted	\$ 0.16	\$ 0.30	\$ 0.24	\$ 0.28
<b>Pro Forma Statement of Income Data (1)</b>				
Pro forma net income	\$ 2,150	\$ 3,806	\$ 5,677	\$ 6,779
Pro forma net income per share - Diluted	\$ 0.11	\$ 0.15	\$ 0.22	\$ 0.26

(1) Data is computed on the same basis as Note 2 of Notes to Consolidated Financial Statements. The historical net income per share data does not include provisions for federal income taxes because prior to its initial public offering in 1999, MKS was treated as an S corporation for federal income tax purposes. The Pro Forma Statement of Income Data presents net income and net income per share data as if MKS had been subject to federal income taxes as a C corporation during the periods presented.

## Management's Discussion and Analysis of Financial Condition and Results of Operations

When used in this Annual Report, including this Management's Discussion and Analysis, the words "believes," "anticipates," "plans," "expects" 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. (the "Company" or "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 – Trends, Risks and Uncertainties."

### Overview

MKS was founded in 1961. MKS develops, manufactures and supplies instruments and components used to measure, control and analyze gases in semiconductor manufacturing and similar industrial manufacturing processes. During 1999, MKS estimates that approximately 66% of its net sales were to semiconductor capital equipment manufacturers and semiconductor device manufacturers. MKS expects that sales to such customers will continue to account for a substantial majority of its sales. MKS's customers include semiconductor capital equipment manufacturers, semiconductor device manufacturers, industrial manufacturing companies and university, government and industrial research laboratories. In 1999, 1998 and 1997, sales to MKS's top five customers accounted for approximately 33%, 24% and 32%, respectively, of MKS's net sales. During 1999, Applied Materials, Inc. accounted for approximately 22% of MKS's net sales. MKS typically enters into contracts with its semiconductor equipment manufacturer customers that provide for quantity discounts. MKS recognizes revenue, and accrues for anticipated returns and warranty costs, upon completion of delivery obligations.

A significant portion of MKS's sales are to operations in international markets. International sales by MKS's foreign operations, located in Japan, Korea, Europe, Singapore and Taiwan, were 31.3% and 32.4% of net sales for 1999 and 1998, respectively. Sales by MKS's Japan subsidiary comprised 16.4% and 15.1% of net sales in 1999 and 1998, respectively. MKS does not classify export sales made directly by MKS as international sales. Such export sales have generally been less than 10% of net sales. MKS currently uses, and plans to continue to use, forward exchange contracts and local currency purchased options to reduce currency exposure arising from foreign currency denominated intercompany sales of inventory. Gains and losses on derivative financial instruments that qualify for hedge accounting are classified in cost of sales. Gains and losses on derivative financial instruments that do not qualify for hedge accounting are marked-to-market and recognized immediately in other income. See Note 3 of Notes to Consolidated Financial Statements.

MKS was treated as an S corporation for federal income tax purposes prior to its initial public offering in 1999. MKS's S corporation status terminated upon the closing of the offering, at which time MKS became subject to federal, and certain state, income taxation as a C corporation. The pro forma net income reflects a pro forma effective tax rate of 38.0% in 1997 and 1998, and 37.1% in 1999 to reflect federal and state income taxes which would have been payable had MKS been taxed as a C corporation for each period.

On April 5, 1999 MKS closed the initial public offering of its Common Stock. In connection with this offering and the exercise of an over-allotment option by the underwriters, the Company sold 6,375,000 shares of Common Stock at a price of \$14.00 per share. The net proceeds to the Company were approximately \$82,000,000. Offering costs were approximately \$1,000,000.

On April 5, 1999 MKS distributed \$40,000,000, which was the estimated amount of the Company's undistributed S Corporation earnings as of the day prior to the closing of the offering.

### Results of Operations

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

	Year Ended December 31		
	1999	1998	1997
Net sales	100.0%	100.0%	100.0%
Cost of sales	57.3	59.9	57.2
Gross profit	42.7	40.1	42.8
Research and development	7.1	8.7	7.8
Selling, general and administrative	20.8	24.9	22.3
Income from operations	14.8	6.5	12.7
Interest income (expense), net	0.4	(0.8)	(1.0)
Other income, net	0.4	0.1	0.1
Income before income taxes	15.6	5.8	11.8
Provision for income taxes	2.8	0.7	1.0
Net income	12.8%	5.1%	10.8%
Pro forma data:			
Historical income before income taxes	15.6%	5.8%	11.8%
Pro forma provision for income taxes	5.8	2.2	4.5
Pro forma net income	9.8%	3.6%	7.3%

#### Year Ended 1999 Compared to 1998

**Net Sales** Net sales increased 33.9% to \$187.1 million for 1999 from \$139.8 million for 1998. International net sales were approximately \$58.5 million in 1999 or 31.3% of net sales and \$45.3 million in 1998 or 32.4% of net sales. The increase in net sales was primarily due to increased sales volume of MKS's existing products in the United States and in Asia which resulted primarily from increased sales to the Company's semiconductor capital equipment manufacturing and semiconductor device manufacturer customers.

**Gross Profit** Gross profit as a percentage of net sales increased to 42.7% for 1999 from 40.1% in 1998. The increase was primarily due to fuller utilization of existing manufacturing capacity as a result of increased net sales.

**Research and Development** Research and development expenses increased 9.0% to \$13.2 million or 7.1% of net sales for 1999 from \$12.1 million or 8.7% of net sales for 1998. The increase was due to increased spending for development materials.

**Selling, General and Administrative** Selling, general and administrative expenses increased 12.4% to \$39.0 million or 20.8% of net sales from \$34.7 million or 24.9% of net sales for 1998. The increase was due primarily to increased incentive compensation expense of \$3.3 million, professional fees, and other selling expenses.

**Interest Income (Expense), Net** During 1999, the Company generated net interest income of \$0.8 million primarily from the invested net proceeds of the initial public offering, offset by interest expense on outstanding debt. Net interest expense of \$1.2 million for 1998 represents interest on outstanding loans, offset by interest income earned on cash and cash equivalents and short-term investments.

**Other Income (Expense), Net** Other income of \$0.8 million for 1999 includes a distribution of \$0.7 million from one of MKS's mutual insurance carriers upon the initial public offering of the insurance carrier, and also includes gains recorded from foreign exchange contracts which did not qualify for hedge accounting. Other income of \$0.2 million in 1998 primarily represents foreign exchange translation gains on intercompany payables of \$1.0 million offset by \$0.7 million for costs associated with MKS's planned initial public offering in early 1998.

Effective April 1, 1999 MKS adopted Statement of Financial Accounting Standards (SFAS) No. 133, "Accounting for Derivative Instruments and Hedging Activities." SFAS No. 133 requires that all derivative instruments be recorded on the balance sheet at their fair value. Changes in the fair value of derivatives are recorded each period in current earnings or other comprehensive income, depending on whether a derivative is designated as part of a hedge transaction and, if it is, the type of hedge transaction. The adoption of SFAS No. 133 did not have a material impact on MKS's financial position or results of operations. The derivative instruments currently held by MKS which have been designated as hedges, including forward exchange contracts, local currency purchased options, and an interest rate swap, qualify for hedge accounting under SFAS No. 133, and changes in their fair value will be recorded as a component of other comprehensive income until the hedged transaction occurs.

**Pro Forma Provision for Income Taxes** Prior to the closing of its initial public offering in April, 1999 MKS was treated as an S corporation for tax purposes. As an S corporation, MKS was not subject to federal, and certain state, income taxes. Upon the closing of its initial public offering on April 5, 1999, MKS's status as an S corporation was terminated and it became subject to taxes as a C corporation. The pro forma provision for income taxes reflects the estimated tax expense MKS would have incurred had it been subject to federal and state income taxes as a C corporation. The pro forma provision differs from the federal statutory rate due primarily to the effects of state and foreign taxes and certain tax credits. The pro forma provision for 1999 reflects a pro forma tax rate of 37.1%. This rate differs from the pro forma tax rate of 38% for 1998 due to increased tax credits and lower nondeductable expenses in 1999.

#### Year Ended 1998 Compared to 1997

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

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

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

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

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



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

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

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

MKS has financed its operations and capital requirements through a combination of cash provided by operations, long-term real estate financing, capital lease financing and short-term lines of credit. On April 5, 1999 the Company completed the initial public offering of its Common Stock. In connection with this offering and the exercise of an over-allotment option by the underwriters, the Company sold 6,375,000 shares of Common Stock at a price of \$14.00 per share. The net proceeds to the Company were approximately \$82,000,000 and were received in the second quarter of 1999. Underwriting discounts and commissions were approximately \$6,200,000, and other offering costs were approximately \$1,000,000. On April 5, 1999 MKS distributed \$40,000,000, which was the estimated amount of its undistributed S Corporation earnings as of the day prior to the closing of the offering.

Operations provided cash of \$17.1 million for 1999 primarily from generating net income. This cash flow was impacted by depreciation and changes in the levels of accounts payable, accrued expenses, accounts receivable and a non-cash deferred tax credit. Investing activities utilized cash of \$33.4 million for 1999 primarily from purchasing short-term investments with the net proceeds from the initial public offering and for the purchase of property and equipment. Financing activities provided cash of \$41.2 million, with net proceeds from the initial public offering of \$82.1 million offset by the distribution to stockholders of \$40.0 million.

Working capital was \$87.1 million as of December 31, 1999, an increase of \$55.6 million from December 31, 1998. MKS has a combined \$30.0 million line of credit with two banks, expiring December 31, 2000, all of which is available.

Prior to its initial public offering, the Company entered into a Tax Indemnification and S Corporation Distribution Agreement with its then existing stockholders (the "Pre-IPO stockholders"). The agreement includes provisions for the payment, with interest, by the Pre-IPO stockholders or MKS, as the case may be, for the difference between the \$40,000,000 distributed as an estimate of the amount of the accumulated adjustments account as of April 4, 1999, which is the date the Company's S Corporation status was terminated, and the actual amount of the accumulated adjustments account on that day. The actual amount of the accumulated adjustments account cannot be determined until MKS calculates the amount of its taxable income for the year ending December 31, 1999. Based on the Company's estimate of the taxable income for the year ending December 31, 1999, MKS believes that an additional distribution to the Pre-IPO stockholders will be required under this agreement. The amount of the additional distribution, prior to interest, is currently estimated to be \$3,350,000. The amount of the additional distribution payable has been charged directly to retained earnings and had no impact on net income or earnings per share. No shareholders, other than the Pre-IPO stockholders, are parties to the Tax Indemnification and S Corporation Distribution Agreement.

**Recently Issued Accounting Pronouncements** See Note 2 of Notes to Consolidated Financial Statements for a discussion of the impact of recently issued accounting pronouncements.

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

#### **Trends, Risks and Uncertainties**

##### **Year 2000 Compliance**

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

During the past few years, MKS designed and implemented a multi-phase Year 2000 project. MKS believes it has taken steps in its multi-phase Year 2000 project to identify and remediate material Year 2000 related issues. MKS has not experienced any significant disruption to normal business activities or product noncompliance related to the Year 2000 problem. However, there can be no assurance that MKS has identified and remediated all material Year 2000 related issues. Additionally, there can be no assurance that unexpected delays or problems will not occur that would have a material adverse effect on the Company's financial condition or results of operations.

MKS's multi-phase Year 2000 project consisted of:

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

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

- internal computer software and hardware
- product compliance
- facilities and manufacturing equipment
- third-party compliance

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

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

MKS's personal computer based systems were assessed in early 1998. MKS believes that all non-compliant hardware and software was identified by March 1998, at which time it made a list prioritizing databases to be remedied. Critical databases were identified and were scheduled for remediation prior to other databases. Remediation plans to convert the databases were initiated in November 1998. MKS believes its critical and non-critical personal computer based systems are Year 2000 compliant.

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

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

**Facilities and Manufacturing Equipment** Some aspects of MKS's facilities and manufacturing equipment may include embedded technology, such as microcontrollers. The Year 2000 problem could cause a system failure or miscalculation in such facilities or manufacturing equipment which could disrupt MKS's operations. Affected areas include security systems, elevator controls, voice mail and phone systems, cleanroom environmental controls, numerically controlled production machinery and computer based production equipment. MKS organized a team of experienced managers in November 1998 to assess the potential problems in these areas. An assessment of all facilities and manufacturing equipment was conducted through December 1998, and a remediation plan was developed in January 1999. MKS believes its facilities and manufacturing equipment are Year 2000 compliant.

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

- adversely affect MKS's ability to obtain components in a timely manner
- cause a reduction in the quality of components obtained by MKS
- cause a reduction, delay or cancellation of customer orders received by MKS or a delay in payments by its customers for products shipped
- result in the loss of services that would be necessary for MKS to operate in the normal course of business

MKS assessed which of these third-party goods, services and interfaces were critical to its operations and developed and mailed a standard survey to each third-party deemed critical in January 1998. Based on this survey and its review of survey data, MKS believes all critical third-parties have achieved satisfactory compliance.

### Costs

MKS's costs to date associated with assessment, remediation and testing activities concerning the Year 2000 problem have been approximately \$3.1 million. MKS has funded these activities principally through cash provided by operations and existing leasing lines of credit. It is not possible for MKS to completely estimate the costs incurred in its remediation effort as many of its employees have focused significant efforts in evaluating MKS's Year 2000 state of readiness and in remediating problems that have arisen from such evaluation.

### Contingency Plan

MKS has not formulated contingency plans related to the failure of its or a third-party's Year 2000 remediation efforts. Contingency plans for the failure to implement compliance procedures have not been completed because MKS believes it completed all required modifications and tested the modifications thoroughly prior to December 31, 1999.

MKS believes it has taken steps in its multi-phase Year 2000 project to identify and remediate material Year 2000 related issues. MKS has not experienced any significant disruption to normal business activities or product noncompliance related to the Year 2000 problem. However, there can be no assurance that MKS has identified and remediated all material Year 2000 related issues. Additionally, there can be no assurance that unexpected delays or problems will not occur that would have a material adverse effect on the Company's financial condition or results of operations.

### Factors That May Affect Future Results

#### Cyclicality of the Semiconductor Industry

MKS estimates that approximately 66% of its sales during 1999 were to semiconductor capital equipment manufacturers and semiconductor device manufacturers, and MKS expects that sales to such customers will continue to account for a substantial majority of its sales. MKS's business depends substantially upon the capital expenditures of semiconductor device manufacturers, which in turn depend upon the demand for semiconductors and other products utilizing semiconductors. Periodic reductions in demand for the products manufactured by semiconductor capital equipment manufacturers and semiconductor device manufacturers may adversely affect MKS's business, financial condition and results of operations. Historically, the semiconductor market has been highly cyclical and has experienced periods of overcapacity, resulting in significantly reduced demand for capital equipment. For example, in 1996 and 1998 the semiconductor industry experienced a significant decline, which caused a number of MKS's customers to reduce their orders. MKS cannot be certain that semiconductor downturns will not recur. A decline in the level of orders as a result of any future downturn or slowdown in the semiconductor industry could have a material adverse effect on MKS's business, financial condition and results of operations.

#### Fluctuations in Operating Results

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

A significant percentage of MKS's 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 MKS's results of operations. Factors that could cause fluctuations in MKS's net sales include:

- The timing of the receipt of orders from major customers
- Shipment delays
- Disruption in sources of supply
- Seasonal variations of capital spending by customers
- Production capacity constraints
- Specific features requested by customers

For example, MKS was in the process of increasing production capacity when the semiconductor capital equipment market began to experience a significant downturn in 1996. This downturn had a material adverse effect on MKS's operating results in the second half of 1996 and the first half of 1997. After an increase in business in the latter half of 1997, the market experienced another downturn in 1998, which had a material adverse effect on MKS's 1998 and first quarter 1999 operating results. As a result of the factors discussed above, it is likely that MKS will in the future experience quarterly or annual fluctuations and that, in one or more future quarters, MKS's operating results will fall below the expectations of public market analysts or investors. In any such event, the price of MKS's common stock could decline significantly.

#### Customer Concentration

MKS's five largest customers in 1999 and 1998 accounted for approximately 33% and 24%, respectively, of its net sales. The loss of a major customer or any reduction in orders by such customers, including reductions due to market or competitive conditions, would likely have a material adverse effect on MKS's business, financial condition and results of operations. During 1999, one customer, Applied Materials, Inc., accounted for approximately 22% of MKS's net sales. While the Company has entered into a purchase contract with Applied Materials, Inc. that expires in 2000 unless it is extended by mutual agreement, none of MKS's significant customers, including Applied Materials, Inc., has entered into an agreement requiring it to purchase any minimum quantity of MKS's products. The demand for MKS's products from its semiconductor capital equipment customers depends in part on orders received by them from their semiconductor device manufacturer customers.

Attempts to lessen the adverse effect of any loss or reduction through the rapid addition of new customers could be difficult because prospective customers typically require lengthy qualification periods prior to placing volume orders with a new supplier. The Company's future success will continue to depend upon MKS's ability to maintain relationships with existing key customers, MKS's ability to attract new customers, and the success of MKS's customers in creating demand for their capital equipment products which incorporate MKS's products.

#### Competition

The markets for MKS's products are highly competitive. The Company's competitive success often depends upon factors outside of its 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, the Company's success will depend in part on its ability to have semiconductor device manufacturers specify that the Company's products be used at their semiconductor fabrication facilities. In addition, MKS may encounter difficulties in changing established relationships of competitors that already have a large installed base of products within such semiconductor fabrication facilities.

#### Technological Changes

New products designed by semiconductor capital equipment manufacturers typically have a lifespan of five to ten years. MKS's success depends on its products being designed into new generations of equipment for the semiconductor industry. The Company must develop products that are technologically current so that they are positioned to be chosen for use in each successive new generation of semiconductor equipment. If its products are not chosen by its customers, the Company's net sales may be reduced during the lifespan of its customers' products.

#### Expansion into New Markets

MKS plans to build upon its experience in manufacturing and selling gas measurement, control and analysis products used by the semiconductor industry by designing and selling such products for applications in other industries which use production processes similar to those used in the semiconductor industry. For example, MKS plans to expand its business to the manufacture of, among other things, hard coatings to minimize wear on cutting tools. Any failure by the Company to penetrate additional markets would limit its ability to reduce its vulnerability to downturns in the semiconductor industry and could have a material adverse effect on MKS's business, financial condition and results of operations.

MKS has limited experience selling its products in certain markets outside the semiconductor industry. The Company cannot be certain that it will be successful in the expansion of its business outside the semiconductor industry. MKS's future success will depend in part on its ability to:

- identify new applications for MKS's products
- adapt MKS's products for such applications
- market and sell such products to customers

#### Expansion of Manufacturing Capacity

MKS's ability to increase sales of certain products depends in part upon its ability to expand manufacturing capacity for such products in a timely manner. If the Company is unable to expand manufacturing capacity on a timely basis or to manage such expansion effectively, its customers could seek such products from others and its market share could be reduced. Because the semiconductor industry is subject to rapid demand shifts which are difficult to foresee, MKS may not be able to increase capacity quickly enough to respond to a rapid increase in demand in the semiconductor industry. Additionally, capacity expansion could increase the Company's fixed operating expenses and if sales levels do not increase to offset the additional expense levels associated with any such expansion, the Company's business, financial condition and results of operations could be materially adversely affected.

#### International Operations and Sales

International sales, which include sales by MKS's foreign subsidiaries, but exclude direct export sales which were less than 10% of total net sales, accounted for approximately 31% of net sales in 1999, and 32% of net sales in 1998. MKS anticipates that international sales will continue to account for a significant portion of net sales. In addition, certain of MKS's key domestic customers derive a significant portion of their revenues from sales in international markets. Therefore, MKS's sales and results of operations could be adversely affected by economic slowdowns and other risks associated with international sales.

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



#### Need to Retain and Attract Key Employees

MKS's 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 and adverse effect on MKS's business, financial condition and results of operations. MKS believes that its future success will depend in part on its ability to attract and retain highly skilled technical, financial, managerial and marketing personnel. Competition for such personnel is intense, and MKS cannot be certain that it will be successful in attracting and retaining such personnel.

#### Intellectual Property Matters

Although MKS seeks to protect its intellectual property rights through patents, copyrights, trade secrets and other measures, MKS cannot be certain that:

- it will be able to protect its technology adequately
- competitors will not be able to develop similar technology independently
- any of its pending patent applications will be issued
- intellectual property laws will protect its intellectual property rights
- third parties will not assert that MKS's products infringe patent, copyright or trade secrets of such parties

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

#### Market Risk and Sensitivity Analysis

##### Foreign Exchange Rate Risk

MKS enters into forward exchange contracts and local currency purchased options to reduce currency exposure arising from intercompany sales of inventory. The potential fair value loss for a hypothetical 10% adverse change in forward currency exchange rates on MKS's forward exchange contracts at December 31, 1999 would be \$502,000. The potential loss was estimated by calculating the fair value of the forward exchange contracts at December 31, 1999 and comparing that with those calculated using the hypothetical forward currency exchange rates.

The value of the local currency purchased options at December 31, 1999 was immaterial.

At December 31, 1999, MKS had \$12,423,000 related to short-term borrowings denominated in Japanese yen. The carrying value of these short-term borrowings approximates fair value due to their short period to maturity. Assuming a hypothetical 10% adverse change in the Japanese yen to U.S. dollar year end exchange rate, the fair value of these short-term borrowings would increase by \$1,381,000. The potential increase in fair value was estimated by calculating the fair value of the short-term borrowings at December 31, 1999 and comparing that with the fair value using the hypothetical year end exchange rate.

##### Interest Rate Risk

MKS is exposed to fluctuations in interest rates in connection with its variable rate term loans. In order to minimize the effect of changes in interest rates on earnings, MKS entered into an interest rate swap that fixed the interest rate on its variable rate term loans. Under the swap agreement, MKS pays a fixed rate of 5.85% on the notional amount and receives LIBOR. At December 31, 1999, the notional amount of the interest rate swap was equal to the principal amount of the variable rate term loans. The potential increase in the fair value of term loans when adjusting for the interest rate swap paying at a fixed rate resulting from a hypothetical 10% decrease in interest rates was not material.

Due to its short-term duration the fair value of the Company's cash and investment portfolio at December 31, 1999 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 value.

## Supplemental Stockholder Information

### Price Range of Common Stock

The Common Stock of MKS is traded on the Nasdaq National Market under the symbol MKSI. On February 11, 2000, the closing price of the Company's Common Stock, as reported on the Nasdaq National Market, was \$38.00 per share. The following table sets forth for the periods indicated the high and low closing sales prices per share of the Common Stock as reported by the Nasdaq National Market.

1999	High	Low
First Quarter	14.0625	13.3750
Second Quarter	19.3750	12.0000
Third Quarter	22.2500	18.1250
Fourth Quarter	36.1250	19.3750

On February 11, 2000, MKS had approximately 1800 stockholders of record.

### Dividend Policy

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

## Report of Independent Accountants

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

In our opinion, the accompanying consolidated balance sheets and related consolidated statements of income, stockholders' equity and cash flows present fairly, in all material respects, the financial position of MKS Instruments, Inc. and its subsidiaries at December 31, 1999 and 1998, and the results of their operations and their cash flows for each of the three years in the period ended December 31, 1999 in conformity with accounting principles generally accepted in the United States. These financial statements are the responsibility of the Company's management; our responsibility is to express an opinion on these financial statements based on our audits. We conducted our audits of these statements in accordance with auditing standards generally accepted in the United States which require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement. An audit includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements, assessing the accounting principles used and significant estimates made by management, and evaluating the overall financial statement presentation. We believe that our audits provide a reasonable basis for the opinion expressed above.

As discussed in Note 2 to the consolidated financial statements, the Company adopted Statement of Financial Accounting Standards No.133, "Accounting for Derivative Instruments and Hedging Activities" in 1999.

PRICEWATERHOUSECOOPERS LLP

Boston, Massachusetts  
January 28, 2000

## Consolidated Balance Sheets

(in thousands, except share data)	December 31	
	1999	1998
<b>A s s e t s</b>		
Current assets:		
Cash and cash equivalents	\$ 35,714	\$11,188
Short-term investments	28,132	538
Trade accounts receivable, net of allowance for doubtful accounts of \$934 and \$656 at December 31, 1999 and 1998, respectively	36,857	20,674
Inventories	27,650	24,464
Deferred tax asset	4,119	698
Other current assets	3,378	971
Total current assets	135,850	58,533
Property, plant and equipment, net	32,826	32,725
Long-term investments	1,063	—
Other assets	4,866	4,974
Total assets	<u>\$174,605</u>	<u>\$96,232</u>
<b>Liabilities and Stockholders' Equity</b>		
Current liabilities:		
Short-term borrowings	\$ 12,423	\$ 9,687
Current portion of long-term debt	7,346	2,058
Current portion of capital lease obligations	1,059	1,074
Accounts payable	7,683	3,677
Accrued compensation	9,202	3,985
Other accrued expenses	6,314	5,280
Income taxes payable	1,385	1,279
Distribution payable	3,350	—
Total current liabilities	48,762	27,040
Long-term debt	4,340	12,042
Long-term portion of capital lease obligations	1,322	1,744
Deferred tax liability	522	117
Other liabilities	490	463
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, 50,000,000 shares authorized; 24,632,849 shares issued and outstanding at December 31, 1999	113	—
Common Stock, Class A, no par value; 11,250,000 shares authorized; 7,766,910 shares issued and outstanding at December 31, 1998	—	40
Common Stock, Class B (non voting) no par value; 18,750,000 shares authorized; 10,286,257 shares issued and outstanding at December 31, 1998	—	73
Additional paid-in capital	84,713	48
Retained earnings	33,166	52,479
Shareholder receivable	(856)	—
Accumulated other comprehensive income	2,033	2,186
Total stockholders' equity	119,169	54,826
Total liabilities and stockholders' equity	<u>\$174,605</u>	<u>\$96,232</u>

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



## Consolidated Statements of Income

	Year Ended December 31		
	1999	1998	1997
(in thousands, except per share data)			
Net sales	\$187,083	\$139,763	\$188,080
Cost of sales	107,228	83,784	107,606
Gross profit	79,855	55,979	80,474
Research and development	13,230	12,137	14,673
Selling, general and administrative	39,014	34,707	41,838
Income from operations	27,611	9,135	23,963
Interest expense	1,346	1,483	2,132
Interest income	2,154	296	271
Other income, net	849	187	166
Income before income taxes	29,268	8,135	22,268
Provision for income taxes (Note 9)	5,231	949	1,978
Net income	\$ 24,037	\$ 7,186	\$ 20,290
Historical net income per share:			
Basic	\$ 1.05	\$ 0.40	\$ 1.12
Diluted	\$ 1.00	\$ 0.38	\$ 1.10
Historical weighted average common shares outstanding:			
Basic	22,784	18,053	18,053
Diluted	23,954	18,720	18,388
Pro forma data (unaudited):			
Historical income before income taxes	\$ 29,268	\$ 8,135	\$ 22,268
Pro forma provision for income taxes assuming C corporation tax	10,856	3,091	8,462
Pro forma net income	\$ 18,412	\$ 5,044	\$ 13,806
Pro forma net income per share:			
Basic	\$ 0.81	\$ 0.28	\$ 0.76
Diluted	\$ 0.77	\$ 0.27	\$ 0.76
Pro forma weighted average common shares outstanding:			
Basic	22,784	18,053	18,053
Diluted	23,786	18,538	18,262

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

# Consolidated Statements of Stockholders' Equity

For the years ended December 31, 1999, 1998 and 1997

(in thousands, except share data)

	Common Stock				Common Stock		Additional Paid-In Capital	Retained Earnings	Shareholder Receivable	Accumulated		Total Stockholders' Equity
	Class A		Class B							Other Comprehensive Income	Comprehensive Income	
	Shares	Amount	Shares	Amount	Shares	Amount						
Balance at December 31, 1996	7,766,910	\$ 40	10,286,255	\$ 73			\$ 48	\$ 43,553		\$ 1,784		\$ 45,498
Distributions to stockholders								(12,400)				(12,400)
Comprehensive income												
Net income								20,290			20,290	20,290
Other comprehensive income, net of taxes:												
Foreign currency translation adjustment										(786)	(786)	(786)
Unrealized gain on investments										246	246	246
Comprehensive income											\$ 19,750	
Balance at December 31, 1997	7,766,910	40	10,286,255	73			48	51,443		1,244		52,848
Distributions to stockholders								(6,150)				(6,150)
Issuance of common stock			2									
Comprehensive income												
Net income								7,186			7,186	7,186
Other comprehensive income, net of taxes:												
Foreign currency translation adjustment										992	992	992
Unrealized loss on investments										(50)	(50)	(50)
Comprehensive income											\$ 8,128	
Balance at December 31, 1998	7,766,910	40	10,286,257	73			48	52,479		2,186		54,826
Distributions to stockholders								(40,000)				(40,000)
Distributions payable to stockholders								(3,350)				(3,350)
Conversion to Common Stock	(7,766,910)	(40)	(10,286,257)	(73)	18,053,167	113						
Issuance of common stock from Initial Public Offering					6,375,000		82,062					82,062
Issuance of common stock from exercise of stock options and Employee Stock Purchase Plan					204,682		1,230					1,230
Tax benefit from exercise of stock options							1,112					1,112
Stock option compensation							261					261
Shareholder receivable									(856)			(856)
Comprehensive income:												
Net income								24,037			24,037	24,037
Other comprehensive income, net of taxes:												
Non-recurring deferred tax charge to comprehensive income (Note 9)										(660)	(660)	(660)
Impact of adopting SFAS No. 133										(16)	(16)	(16)
Changes in value of financial instruments designated as cash flow hedges										(212)	(212)	(212)
Foreign currency translation adjustment										(80)	(80)	(80)
Unrealized gain (loss) on investments										815	815	815
Comprehensive income											\$ 23,884	
Balance at December 31, 1999	—	\$ —	—	\$ —	24,632,849	\$ 113	\$ 84,713	\$ 33,166	\$ (856)	\$ 2,033		\$ 119,169

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

## Consolidated Statements of Cash Flows

(in thousands)	Year Ended December 31		
	1999	1998	1997
Cash flows from operating activities:			
Net income	\$ 24,037	\$ 7,186	\$ 20,290
Adjustments to reconcile net income to net cash provided by operating activities:			
Depreciation and amortization of property, plant, and equipment	6,209	6,242	5,712
(Gain) loss on disposal of property, plant and equipment	(181)	48	552
Deferred taxes	(266)	(32)	(145)
Non-recurring deferred tax credit	(3,770)	—	—
Provision for doubtful accounts	257	253	258
Forward exchange contract loss (gain) realized	9	(1,211)	132
Stock option compensation	261	—	95
Changes in operating assets and liabilities:			
Trade accounts receivable	(15,922)	12,908	(12,509)
Inventories	(2,908)	6,479	(5,930)
Other current assets	(1,000)	554	(1,261)
Accrued compensation	5,217	(3,516)	2,386
Accrued expenses	1,019	(1,602)	3,312
Accounts payable	4,022	(3,682)	2,638
Income taxes payable	106	(647)	1,283
Net cash provided by operating activities	17,090	22,980	16,813
Cash flows from investing activities:			
Purchases of short-term and long-term investments	(45,999)	—	—
Maturities and sales of short-term and long-term investments	18,654	—	—
Purchases of property, plant and equipment	(5,505)	(3,137)	(3,269)
Proceeds from sale of property, plant and equipment	318	60	203
Increase in other assets	(853)	(270)	(123)
Cash received (used) to settle forward exchange contracts	(9)	1,211	(132)
Net cash used in investing activities	(33,394)	(2,136)	(3,321)
Cash flows from financing activities:			
Net payments on demand notes payable	—	—	(1,875)
Proceeds from short-term borrowings	11,250	15,242	24,110
Payments on short-term borrowings	(9,825)	(17,569)	(22,938)
Principal payments on long-term debt	(2,424)	(2,057)	(2,217)
Proceeds from issuance of common stock, net of issuance costs	82,062	—	—
Proceeds from exercise of stock options and Employee Stock Purchase Plan	1,230	—	—
Cash distributions to stockholders	(40,000)	(6,150)	(12,400)
Principal payments under capital lease obligations	(1,050)	(1,257)	(870)
Net cash provided by (used in) financing activities	41,243	(11,791)	(16,190)
Effect of exchange rate changes on cash and cash equivalents	(413)	(376)	1,394
Increase (decrease) in cash and cash equivalents	24,526	8,677	(1,304)
Cash and cash equivalents at beginning of period	11,188	2,511	3,815
Cash and cash equivalents at end of period	\$ 35,714	\$ 11,188	\$ 2,511
Supplemental disclosure of cash flow information:			
Cash paid during the period for:			
Interest	\$ 1,377	\$ 1,526	\$ 2,030
Income taxes	\$ 10,017	\$ 1,608	\$ 1,078
Noncash transactions during the period:			
Equipment acquired under capital leases	\$ 762	\$ 1,138	\$ 145

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

Notes to Consolidated Financial Statements  
(Tables in thousands, except per share data)

1} Description of Business

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

2} Summary of Significant Accounting Policies

Basis of Presentation

The consolidated financial statements include the accounts of the Company and its subsidiaries. All significant intercompany accounts and transactions have been eliminated in consolidation.

Historical and Pro Forma (Unaudited) Net Income Per Share

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

Historical net income per share is not meaningful because of the Company's conversion from an S corporation to a C corporation upon the closing of its initial public offering. Historical net income has been adjusted for the pro forma provision for income taxes calculated assuming the Company was subject to income taxation as a C corporation, at a pro forma tax rate of 38.0% in 1998 and 1997, and at a pro forma tax rate of 37.1% in 1999.

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

	For the Year Ended December 31					
	1999		1998		1997	
	Pro forma	Historical	Pro forma	Historical	Pro forma	Historical
Net income	\$18,412	\$24,037	\$ 5,044	\$ 7,186	\$13,806	\$20,290
Shares used in net income per common share — basic	22,784	22,784	18,053	18,053	18,053	18,053
Effect of dilutive securities:						
Employee and director stock options	1,002	1,170	485	667	209	335
Shares used in net income per common share — diluted	23,786	23,954	18,538	18,720	18,262	18,388
Net income per common share — basic	\$ 0.81	\$ 1.05	\$ 0.28	\$ 0.40	\$ 0.76	\$ 1.12
Net income per common share — diluted	\$ 0.77	\$ 1.00	\$ 0.27	\$ 0.38	\$ 0.76	\$ 1.10

For purposes of computing diluted earnings per share, weighted average common share equivalents do not include stock options with an exercise price greater than the average market price of the common shares during the period. Options to purchase 33,500, 24,643 and zero shares of common stock were outstanding during 1999, 1998, and 1997, respectively, but were not included in the calculation of diluted net income per common share because the option price was greater than the average market price of the common shares during the period.

Foreign Exchange

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

Revenue Recognition

The Company recognizes revenue, and accrues for anticipated returns and warranty costs, upon completion of delivery obligations.

### Cash and Cash Equivalents and Investments

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

	December 31,	
	1999	1998
Cash and Money Market Instruments	\$22,156	\$ 11,188
Commercial Paper	5,558	—
Federal Government and Government Agency Obligations	6,000	—
Corporate Obligations	2,000	—
	<u>\$35,714</u>	<u>\$ 11,118</u>

Short-term available-for-sale investments maturing within one year consist of the following:

	December 31,	
	1999	1998
Federal Government and Government Agency Obligations	\$16,245	
Corporate Obligations	5,501	
Commercial Paper	4,641	
Equity Securities	1,745	\$ 538
	<u>\$28,132</u>	<u>\$ 538</u>

Long-term available-for-sale investments maturing within two years consist of the following at December 31, 1999:

Federal Government and Government Agency Obligations	<u>\$ 1,063</u>
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The appropriate classification of investments in debt and equity securities is determined at the time of purchase. Debt securities that the Company has both the intent and ability to hold to maturity are carried at amortized cost. Debt securities that the Company does not have the intent and ability to hold to maturity or equity securities are classified either as "available-for-sale" or as "trading" and are carried at fair value. Marketable equity securities are carried at fair value and classified either as available-for-sale or trading. Unrealized gains and losses on securities classified as available-for-sale are included in accumulated other comprehensive income in consolidated stockholders' equity. Unrealized gains and losses on securities classified as trading are reported in earnings. The cost of securities sold is based on the specific identification method.

### Inventories

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

### Property, Plant and Equipment

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

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

### Research and Development

Research and development costs are expensed as incurred.

### New Accounting Pronouncements

In June 1998, the Financial Accounting Standards Board issued Statement of Financial Accounting Standards (SFAS) No.133, "Accounting for Derivative Instruments and Hedging Activities." SFAS No.133 requires that all derivative instruments be recorded on the balance sheet at their fair value. Changes in the fair value of derivatives are recorded each period in current earnings or other comprehensive income, depending on whether a derivative is designated as part of a hedge transaction and, if it is, the type of hedge transaction. The Company adopted the provisions of SFAS No.133 effective April 1,1999. The impact of adopting SFAS No.133 was the recording of an unrealized loss of \$16,000, net of taxes, in other comprehensive income.

In December 1999, the Securities and Exchange Commission issued Staff Accounting Bulletin No 101 ("SAB 101"), "Revenue Recognition". SAB 101 summarizes the staff's view in applying generally accepted accounting principles to revenue recognition. The application of the guidance in SAB 101 will be required in the Company's first quarter of the fiscal year 2000. Any effect of applying this guidance will be reported as a cumulative effect adjustment resulting from a change in accounting principle. The Company does not expect the application to have a material effect on its financial statements..

### Use of Estimates

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

### 3} Financial Instruments and Risk Management

#### Foreign Exchange Risk Management

The Company adopted the provisions of SFAS No.133 effective April 1,1999. 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 underlying forecasted transaction occurs. Once the underlying forecasted transaction is realized, 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. The Company utilizes an interest rate swap to fix the interest rate on certain variable term loans in order to minimize the effect of changes in interest rates on earnings. Since the adoption of SFAS No.133 on April 1, 1999, net realized losses recorded in earnings were \$104,000. As of December 31, 1999 the amount that will be reclassified from accumulated other comprehensive income to earnings over the next twelve months is an unrealized loss of \$228,000, net of taxes. The ineffective portion of the derivatives is primarily related to option premiums, and was \$307,000 in 1999.

Prior to the adoption of SFAS No. 133, the Company entered into forward exchange contracts and local currency purchased options to hedge a portion of its probable anticipated, but not firmly committed transactions. The anticipated transactions whose risks were being hedged were the intercompany sales of inventory by the U.S. parent to the foreign subsidiary payable in the foreign subsidiary's local currency. The time period of the anticipated transactions that were hedged generally approximated one year. The Company also used forward exchange contracts to hedge firm commitments. Market value gains and losses on forward exchange contracts were recognized immediately in earnings unless a firm commitment existed. Market value gains and premiums on local currency purchased options on probable anticipated transactions and market value gains and losses on forward exchange contracts hedging firm commitments were recognized when the hedged transaction occurred. These contracts, which related primarily to Japanese and European currencies generally had terms of twelve months or less. Forward exchange contracts received hedge accounting on firmly committed transactions when they were designated as a hedge of the designated currency exposure and were effective in minimizing such exposure. Options received hedge accounting on probable anticipated transactions when they were designated as a hedge of the currency exposure and were effective in minimizing such exposure.

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.

Forward exchange contracts with notional amounts totaling \$4,000,000, \$8,000,000, and \$9,800,000 to exchange foreign currencies for U.S. dollars were outstanding at December 31, 1999, 1998, and 1997, respectively. Of such forward exchange contracts, \$4,000,000, \$7,800,000 and \$6,900,000 to exchange Japanese yen for U.S. dollars, were outstanding at December 31, 1999, 1998, and 1997, respectively. Local currency purchased options with notional amounts totaling \$11,800,000, \$10,221,000, and \$12,738,000 to exchange foreign currencies for U.S. dollars were outstanding at December 31, 1999, 1998, and 1997, respectively.

Foreign exchange gains of \$415,000, foreign exchange losses of \$168,000, and foreign exchange gains of \$1,166,000 on forward exchange contracts which did not qualify for hedge accounting were recognized in earnings during 1999, 1998, and 1997, respectively, and are classified in Other income, net. 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 \$104,000 and gains of \$310,000 and \$1,178,000 for the years ended December 31, 1999, 1998, and 1997, respectively.

The fair values of forward exchange contracts at December 31, 1999 and 1998, determined by applying period end currency exchange rates to the notional contract amounts, amounted to an unrealized loss of \$547,000 and \$349,000, respectively. The fair values of local currency purchased options at December 31, 1999 and 1998, which were obtained through dealer quotes were immaterial.

The Company recorded a foreign exchange translation gain on intercompany payables of \$1,000,000 and a foreign exchange translation loss on intercompany payables of \$1,000,000 in Other income, net in 1998 and 1997, respectively. During 1999 the Company has hedged certain intercompany payables with currency options. Since these derivatives hedge existing amounts that are denominated in foreign currencies, the options do not qualify for hedge accounting under SFAS No.133.



The market risk exposure from forward exchange contracts is assessed in light of the underlying currency exposures and is controlled by the initiation of additional or offsetting foreign currency contracts. The market risk exposure from options is limited to the cost of such investments.

#### Interest Rate Risk Management

The Company utilizes an interest rate swap to fix the interest rate on certain variable rate term loans in order to minimize the effect of changes in interest rates on earnings. In 1998, the Company entered into a four-year interest rate swap agreement on a declining notional amount basis which coincides with the scheduled principal payments with a major financial institution for the notional amount of \$10,528,000 equal to the term loans described in Note 6. Under the agreement, the Company pays a fixed rate of 5.85% on the notional amount and receives LIBOR. The interest differential payable or accruable on the swap agreement is recognized on an accrual basis as an adjustment to interest expense. The criteria used to apply hedge accounting for this interest rate swap is based upon management designating the swap as a hedge against the variable rate debt combined with the terms of the swap matching the underlying debt including the notional amount, the timing of the interest reset dates, the indices used and the paydates. At December 31, 1999, the fair value of this interest rate swap, which represents the amount the Company would receive or pay to terminate the agreement, is a net receivable of \$49,000, based on dealer quotes. The variable rate received on the swap at December 31, 1999 was 6.48%.

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

#### Concentrations of Credit Risk

The Company's significant concentrations of credit risk consist principally of cash and cash investments, forward exchange contracts, and trade accounts receivable. The Company maintains cash and cash equivalents with financial institutions including the bank it has borrowings with. The Company maintains cash investments primarily in U.S. Treasury and government agency securities and corporate debt securities, rated AA or higher, which have minimal credit risk. The Company places forward currency contracts with high credit-quality financial institutions in order to minimize credit risk exposure. Concentrations of credit risk with respect to accounts receivable are limited due to the large number of diverse and geographically dispersed customers. 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	
	1999	1998
Raw material	\$ 6,644	\$ 7,544
Work in process	7,026	5,718
Finished goods	13,980	11,202
	<u>\$27,650</u>	<u>\$ 24,464</u>

#### 5) Property, Plant and Equipment

Property, plant and equipment consist of the following:

	December 31	
	1999	1998
Land	\$ 9,100	\$ 8,834
Buildings	26,081	26,020
Machinery and equipment	30,175	27,394
Furniture and fixtures	12,968	10,578
Leasehold improvements	1,966	1,814
	<u>80,290</u>	<u>74,640</u>
Less: accumulated depreciation and amortization	<u>47,464</u>	<u>41,915</u>
	<u>\$32,826</u>	<u>\$ 32,725</u>

#### 6) Debt

##### Credit Agreements and Short-Term Borrowings

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

Effective January 1, 2000, the Company entered into a loan agreement with the same two banks, which provides access to a revolving credit facility. The revolving credit facility provides for uncollateralized borrowings up to \$30,000,000, and expires December 31, 2000. Interest on borrowings is payable quarterly at either the banks' base rate, or the LIBOR Rate, as defined in the agreement.

Additionally, certain of the Company's foreign subsidiaries have lines of credit and short-term borrowing arrangements with various financial institutions which provide for aggregate borrowings as of December 31, 1999 of up to \$17,289,000, which generally expire and are renewed at six month intervals. At December 31, 1999 and 1998, total borrowings outstanding under these arrangements were \$12,423,000, and \$9,687,000, respectively, at interest rates ranging from 1.2% to 1.7%, and 1.3% to 1.7%, respectively. Foreign short-term borrowings are generally collateralized by certain trade accounts receivable and are guaranteed by a domestic bank.

#### Long-Term Debt

Long-term debt consists of the following:

	December 31	
	1999	1998
Term loans	\$ 8,862	\$ 10,528
Mortgage notes	2,824	3,572
Total long-term debt	11,686	14,100
Less: current portion	7,346	2,058
Long-term debt less current portion	<u>\$ 4,340</u>	<u>\$ 12,042</u>

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

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

At December 31, 1999 and 1998, the interest rates in effect for the term loan borrowings were 7.40% and 7.131%, respectively.

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

The Company has loans outstanding from various foreign banks in the form of mortgage notes at interest rates ranging from 1.9% to 6.2%. Principal and interest are payable in monthly installments through 2010. The loans are collateralized by mortgages on certain of the Company's foreign properties.

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

Year ending December 31	Aggregate Maturities
2000	\$ 7,346
2001	1,406
2002	1,327
2003	414
2004	419
Thereafter	774
	<u>\$11,686</u>

#### 7} Commitments and Contingencies

The Company leases certain of its facilities and machinery and equipment under capital and operating leases expiring in various years through 2002 and thereafter. Generally, the facility leases require the Company to pay maintenance, insurance and real estate taxes. Rental expense under operating leases totaled \$2,950,000, \$2,388,000, and \$2,478,000 for the years ended December 31, 1999, 1998, and 1997, respectively.

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

Year ending December 31,	Operating Leases		Capital Leases
	Real Estate	Equipment	Equipment
2000	\$1,875	\$ 515	\$1,203
2001	1,062	329	684
2002	207	176	450
2003	130	78	234
2004	52	45	86
Thereafter	—	41	—
Total minimum lease payments	<u>\$3,326</u>	<u>\$1,184</u>	<u>\$2,657</u>
Less: amounts representing interest			276
Present value of minimum lease payments			2,381
Less: current portion			1,059
Long-term portion			<u>\$1,322</u>

Prior to its initial public offering, the Company entered into a Tax Indemnification and S Corporation Distribution Agreement with its then existing stockholders (the "Pre-IPO stockholders"). The agreement includes provisions for the payment, with interest, by the pre-IPO stockholders or MKS, as the case may be, for the difference between the \$40,000,000 distributed as an estimate of the amount of the accumulated adjustments account as of April 4, 1999, which is the date the Company's S Corporation status was terminated, and the actual amount of the accumulated adjustments account on that day. The actual amount of the accumulated adjustments account cannot be determined until MKS calculates the amount of its taxable income for the year ending December 31, 1999. Based on the Company's estimate of the taxable income for the year ending December 31, 1999, MKS believes that an additional future distribution to the Pre-IPO stockholders will be required under this agreement. The amount of the additional distribution, prior to interest, is currently estimated to be \$3,350,000. The amount of the additional distribution payable has been charged directly to retained earnings and had no impact on net income or earnings per share. No shareholders, other than the Pre-IPO stockholders, are parties to the Tax Indemnification and S Corporation Distribution Agreement.

#### 8) Stockholders' Equity

##### Common Stock

In March 1999, the Company amended its Articles of Organization to: i) eliminate the authorized shares of Class A Common Stock and Class B Common Stock; ii) increase the authorized number of shares of Common Stock to 50,000,000 shares; iii) authorize 2,000,000 shares of Preferred Stock, \$0.01 par value per share; and iv) provide that each outstanding share of Class A Common Stock and Class B Common Stock be converted into one share of Common Stock.

On April 5, 1999 the Company closed the initial public offering of its Common Stock. In connection with this offering and the exercise of an over-allotment option by the underwriters, the Company sold 6,375,000 shares of Common Stock at a price of \$14.00 per share. The net proceeds to the Company were approximately \$82,000,000. Underwriting discounts and commissions were approximately \$6,200,000 and other offering costs were approximately \$1,000,000.

On April 5, 1999 the Company distributed \$40,000,000, which was the estimated amount of the Company's undistributed S corporation earnings as of the day prior to the closing of the offering.

##### Stock Purchase Plan

The Company's Amended and Restated 1999 Employee Stock Purchase Plan (the "Purchase Plan") authorizes the issuance of up to an aggregate of 450,000 shares of Common Stock to participating employees. 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. On November 30, 1999 the Company issued 36,520 shares of Common Stock to employees who participated in the Purchase Plan, at an exercise price of \$12.94 per share. As of December 31, 1999 there were 413,480 shares reserved for issuance.

##### Stock Option Plans

On January 9, 1998, the stockholders of the Company approved the following: (1) an increase in the number of shares that may be granted under the 1995 Stock Incentive Plan to 3,750,000 shares of common stock; (2) the adoption of the 1997 Director Stock Option Plan pursuant to which options may be granted to purchase up to an aggregate of 300,000 shares of common stock; (3) the adoption of the 1997 Employee Stock Purchase Plan pursuant to which the Company may issue up to an aggregate of 450,000 shares of common stock; and (4) that 3,750,000 shares, 300,000 shares, and 450,000 shares of common stock be reserved for issuance under the 1995 Stock Incentive Plan, the 1997 Director Stock Option Plan, and the 1997 Employee Stock Purchase Plan, respectively. The 1997 Employee Stock Purchase Plan was amended and restated on April 22, 1999, and the Plan's name was changed to the Amended and Restated 1999 Employee Stock Purchase Plan.

The Company grants options to employees under the 1995 Stock Incentive Plan (the “Plan”) and to directors under the 1996 Director Stock Option Plan and the 1997 Director Stock Option Plan (the “Director Plans”).

At December 31, 1999, 1,029,613 options to purchase shares of the Company’s common stock were reserved for issuance under the Plan. At December 31, 1999, under the Director Plans, options to purchase 234,000 shares of common stock were reserved for issuance. Stock options are granted at 100% of the fair value of the Company’s common stock. Generally, stock options under the Plan vest 20% after one year and 5% per quarter thereafter, and expire 10 years after the grant date. Under the Director Plans, certain options granted in 1999 vest immediately. The remainder of the options granted in 1997 and later vest at the earlier of (1) the next annual meeting, (2) 13 months from date of grant, or (3) the effective date of an acquisition as defined in the Director Plans.

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

	Year Ended December 31					
	1999		1998		1997	
	Options	Weighted Average Exercise Price	Options	Weighted Average Exercise Price	Options	Weighted Average Exercise Price
Outstanding — beginning of period	2,098,207	\$ 5.20	1,564,449	\$4.50	810,442	\$4.43
Granted	678,971	16.40	629,969	6.80	785,657	4.57
Exercised	(168,162)	4.56	(2)	4.43	—	—
Forfeited or Expired	(56,793)	5.76	(96,209)	4.43	(31,650)	4.43
Outstanding — end of period	2,552,223	\$ 8.21	2,098,207	\$5.20	1,564,449	\$4.50
Exercisable at end of period	1,047,748	\$ 4.82	778,473	\$4.46	476,451	\$4.43

The following table summarizes information with respect to options outstanding and exercisable under the Plan at December 31, 1999:

	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
Range of Exercise Prices					
\$4.43 - \$8.00	1,881,152	\$ 5.27	7.45	1,047,748	\$4.82
\$13.56 - \$14.50	524,571	\$14.13	9.28	—	—
\$19.00 - \$27.25	146,500	\$24.63	9.81	—	—
	2,552,223	\$ 8.21	7.96	1,047,748	\$4.82

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

	Year Ended December 31					
	1999		1998		1997	
	Options	Weighted Average Exercise Price	Options	Weighted Average Exercise Price	Options	Weighted Average Exercise Price
Outstanding — beginning of period	34,368	\$ 4.81	30,748	\$4.43	27,128	\$4.43
Granted	66,000	14.15	3,620	8.00	3,620	4.43
Outstanding — end of period	100,368	\$10.95	34,368	\$4.81	30,748	\$4.43
Exercisable at end of period	76,368	\$ 9.86	26,228	\$4.43	13,564	\$4.43

The following table summarizes information with respect to options outstanding and exercisable under the Director Plans at December 31, 1999

	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
Range of Exercise Prices					
\$4.43 - \$8.00	34,368	\$ 4.81	6.86	34,368	\$ 4.81
\$14.00 - \$14.40	66,000	\$14.15	9.20	42,000	\$14.00
	100,368	\$10.95	8.40	76,368	\$ 9.86

The Company has adopted the disclosure-only provisions of Statement of Financial Accounting Standards No. 123 (SFAS No. 123), "Accounting for Stock-Based Compensation." The Company has chosen to continue to account for stock-based compensation using the intrinsic value method prescribed in Accounting Principles Board Opinion No. 25, "Accounting for Stock Issued to Employees" and related interpretations. The Company is required to disclose pro forma net income and net income per common share amounts had compensation cost for the Company's stock based compensation plans been determined based on the fair value at the grant date for awards under the plans. Had compensation expense for the stock based compensation plans been consistent with the method of SFAS No. 123, the amounts reported for 1999 would have been:

	As Reported	Pro forma for SFAS No. 123
Historical net income	\$24,037	\$23,098
Historical net income per share:		
Basic	\$ 1.05	\$ 1.01
Diluted	\$ 1.00	\$ 0.96
Pro forma net income	\$18,412	\$17,559
Pro forma net income per share:		
Basic	\$ 0.81	\$ 0.77
Diluted	\$ 0.77	\$ 0.74

The weighted average fair value of options at the date of grant was estimated using the Black-Scholes model and was \$9.54 with the following assumptions in 1999: expected life of 5 years, weighted average interest rate of 5.49%, expected volatility of 64%, and no dividend yield. Had the fair value based method prescribed in SFAS No. 123 been used to account for stock-based compensation cost in 1998 and 1997, there would have been no change in net income and net income per share from that reported based on the following assumptions: dividend yield of 8%, interest rate of 5.44% and an expected life of 8 years.

The fair value of purchase rights granted in 1999 under the Purchase Plan was \$5.11. The fair value of the employees' purchase rights was estimated using the Black-Scholes model with the following assumption in 1999: expected life of 6 months, interest rate of 4.87%, expected volatility of 64%, and no dividend yield.

#### Accumulated Other Comprehensive Income

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

	Cumulative Translation Adjustments	Unrealized Gain on Investments	Financial Instruments Designated as Cash Flow Hedges	Accumulated Other Comprehensive Income
Balance at December 31, 1998	\$1,875	\$ 311	—	\$2,186
Non-recurring deferred tax charge	(497)	(163)	—	(660)
Foreign currency translation adjustment, net of taxes of \$(55)	(80)	—	—	(80)
Unrealized gain on investments, net of taxes of \$377	—	815	—	815
Changes in value of financial instruments designated as cash flow hedges, net of taxes of \$(232)	—	—	(228)	(228)
Balance at December 31, 1999	\$1,298	\$ 963	\$(228)	\$2,033

#### Shareholder Receivable

The Company has an agreement with certain shareholders whereby the Company has paid the premiums for life insurance policies of the shareholders. The agreement provides for the reimbursement of the premiums to the Company upon receipt of proceeds from the policies. The present value discount related to the premiums is \$856,000.

#### 9) Income Taxes

Prior to its initial public offering, the Company was treated as an S corporation for federal income tax purposes. As an S corporation, the Company was not subject to federal, and certain state, income taxes. The Company terminated its S corporation status upon the closing of its initial public offering in 1999 and became subject to taxes at C corporation tax rates. This change in tax status and tax rates resulted in a non-recurring, non-cash deferred tax credit to net income of \$3,770,000 and a deferred tax charge to other comprehensive income of \$660,000.

The Pre-IPO stockholders are liable for individual Federal, and certain state, income taxes on their allocated portions of the Company's taxable income as an S corporation. For the tax year ending December 31, 1999, the Pre-IPO stockholders will be allocated a portion of the Company's 1999 taxable income. A reconciliation of the Company's 1999 effective tax rate to the U.S. federal statutory rate follows:

U.S. Federal income tax statutory rate	35.0%
Non-recurring deferred tax credit	(12.8)
Pre-IPO stockholder 1999 allocated taxable income	(6.8)
State income taxes, net of federal benefit	2.5
Effect of foreign operations taxed at various rates	2.1
Foreign sales corporation tax benefit	(1.6)
Other	(0.5)
	<u>17.9%</u>

As the Company was not subject to Federal income taxes in 1998 and 1997, a reconciliation of the effective tax rate to the Federal statutory rate is not meaningful for those years.

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

	Year Ended December 31		
	1999	1998	1997
Income before income taxes:			
United States	\$25,590	\$6,169	\$21,858
Foreign	3,678	1,966	410
	<u>29,268</u>	<u>8,135</u>	<u>22,268</u>
Current taxes:			
United States Federal	6,269	—	—
State	1,192	197	1,331
Foreign	1,806	784	792
	<u>9,267</u>	<u>981</u>	<u>2,123</u>
Deferred taxes:			
United States Federal	(4,025)	—	—
State	(27)	(39)	(72)
Foreign	16	7	(73)
	<u>(4,036)</u>	<u>(32)</u>	<u>(145)</u>
Provision for income taxes	<u>\$ 5,231</u>	<u>\$ 949</u>	<u>\$ 1,978</u>

At December 31, 1999, 1998, and 1997 the components of the deferred tax asset and deferred tax liability were as follows:

	1999	1998	1997
Deferred tax assets (liabilities):			
Inventories	\$1,434	\$ 265	\$344
Intercompany profits	1,362	152	214
Depreciable assets	746	(234)	(20)
Compensation	362	127	77
Investment booked under the equity method	(557)	(59)	(41)
Other	250	330	(25)
Total	<u>\$3,597</u>	<u>\$ 581</u>	<u>\$549</u>

#### 10} Employee Benefit Plans

The Company has a 401(k) profit-sharing plan for U.S. employees meeting certain requirements in which eligible employees may contribute from 1% up to 12% of their compensation. The Company, at its discretion, may provide a matching contribution which will generally match up to the first 2% of each participant's compensation, plus 25% of the next 4% of compensation. At the discretion of the Board of Directors, the Company may also make additional contributions for the benefit of all eligible employees. The Company's contributions are generally paid annually, and were \$1,182,000 and \$2,500,000 for the years ended December 31, 1998 and 1997. Approximately \$2,316,000 has been accrued as the estimated Company contribution for the year ended December 31, 1999 and is included in accrued compensation.

The Company maintains a bonus plan which provides cash awards to key employees, at the discretion of the Compensation Committee of the Board of Directors, based upon operating results and employee performance. Bonus expense to key employees was \$3,213,000, none and \$1,425,000, for the years ended December 31, 1999, 1998, and 1997, respectively.

#### 11} Geographic Financial Information and Significant Customer

See Note 1 for a brief description of the Company's business. The Company is organized around two similar product lines domestically and by geographic locations internationally and has three reportable segments: North America, Far East, and Europe. Net sales to unaffiliated



customers are based on the location in which the sale originated. Transfers between geographic areas are at negotiated transfer prices and have been eliminated from consolidated net sales. Income from operations consists of total net sales less operating expenses and does not include either interest income, interest expense or income taxes. The Company had one customer comprising 22%, 16% and 22% of net sales for the years ended December 31, 1999, 1998, and 1997, respectively. This data is presented in accordance with SFAS 131, "Disclosures About Segments of an Enterprise and Related Information," which the Company has retroactively adopted for all periods presented.

	Year Ended December 31, 1999			
	North America	Far East	Europe	Total
Net sales to unaffiliated customers	\$128,562	\$38,734	\$19,787	\$187,083
Intersegment net sales	36,884	706	986	38,576
Depreciation and amortization	5,543	252	414	6,209
Income from operations	24,608	1,413	1,590	27,611
Segment assets	132,971	31,272	10,362	174,605
Long-lived assets	29,656	6,524	2,575	38,755
Capital expenditures	5,013	241	251	5,505

	Year Ended December 31, 1998			
	North America	Far East	Europe	Total
Net sales to unaffiliated customers	\$95,607	\$23,902	\$20,254	\$139,763
Intersegment net sales	26,657	290	1,015	27,962
Depreciation and amortization	5,627	210	405	6,242
Income from operations	6,319	1,298	1,518	9,135
Segment assets	65,560	20,768	9,904	96,232
Long-lived assets	28,960	5,655	3,084	37,699
Capital expenditures	2,635	179	323	3,137

	Year Ended December 31, 1997			
	North America	Far East	Europe	Total
Net sales to unaffiliated customers	\$138,186	\$31,559	\$18,335	\$188,080
Intersegment net sales	35,429	225	749	36,403
Depreciation and amortization	5,096	259	357	5,712
Income from operations	22,847	886	230	23,963
Segment assets	77,302	19,906	9,328	106,536
Long-lived assets	30,738	4,904	3,015	38,657
Capital expenditures	2,899	128	242	3,269

Included in North America are the United States and Canada. Net sales to unaffiliated customers from the United States were \$128,560,000, \$94,449,000 and \$136,653,000 for the years ended December 31, 1999, 1998 and 1997, respectively. Long-lived assets within the United States amounted to \$28,729,000, \$28,902,000 and \$30,667,000 at December 31, 1999, 1998, and 1997, respectively.

Included in the Far East are Japan, Korea, Singapore and Taiwan. Included in Europe are Germany, France and the United Kingdom. Net sales to unaffiliated customers from Japan were \$30,696,000, \$21,153,000 and \$28,184,000 for the years ended December 31, 1999, 1998 and 1997, respectively. Long-lived assets within Japan amounted to \$6,266,000, \$5,431,000 and \$4,792,000 at December 31, 1999, 1998 and 1997, respectively.

## Corporate Information

### Board of Directors

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

Richard S. Chute, Esquire  
Hill & Barlow

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

Robert J. Therrien, President and Chief Executive Officer  
Brooks Automation, Inc.

Louis P. Valente, Chairman and Chief Executive Officer  
Palomar Medical Technologies, Inc.

### Management

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

Dr. Peter R. Younger, President and Chief Operating Officer

Ronald C. Weigner, Vice President and Chief Financial Officer

John J. Sullivan, Executive Vice President, Technology

William D. Stewart, Corporate Vice President and General  
Manager, Vacuum Products

Joseph A. Maher, Jr., Corporate Vice President and General  
Manager, Pressure Measurement and Control Products

Robert L. Klimm, Corporate Vice President and General Manager,  
Materials Delivery and Analysis Products

Leo Berlinghieri, Corporate Vice President,  
Customer Support Operations

Paul A. Blackborow, Corporate Vice President, Marketing

Gerald G. Colella, Corporate Vice President,  
Business Operations

George E. Manning, Corporate Vice President,  
Human Resources

William P. Donlan, Treasurer and Corporate Controller

### Business Operations

MKS Instruments, Inc.  
Pressure Measurement and Control Products Group  
Andover, Massachusetts

MKS Instruments, Inc.  
Materials Delivery and Analysis Products Group  
Methuen, Massachusetts

MKS Instruments, Inc.  
Vacuum Products Group  
Boulder, Colorado

MKS Instruments, Inc.  
Austin, Texas

MKS Instruments, Inc.  
Santa Clara, California

MKS Instruments France s.a.  
Le Bourget, France

MKS Instruments Deutschland GmbH  
Munich, Germany

MKS Instruments Benelux  
Delft, The Netherlands

MKS Instruments, U.K. Ltd.  
Altricham, England  
Livingston, Scotland  
Kildare, Republic of Ireland

MKS Japan, Inc.  
Tokyo, Japan

MKS Korea Co., Ltd.  
Seoul, Korea

MKS Instruments, Inc. Singapore  
Singapore

MKS Instruments, Inc. Taiwan  
Hsinchu, Taiwan

### Shareholder Information

Stock Listing  
NASDAQ National Market, Symbol: MKSI

Transfer Agent and Registrar  
BankBoston, N.A.  
Boston, Massachusetts

Independent Auditors  
PricewaterhouseCoopers LLP  
Boston, Massachusetts

### Outside Counsel

Hale and Dorr LLP  
Boston, Massachusetts

Hill and Barlow  
Boston, Massachusetts

### Inquiries Concerning the Company

Stockholder inquiries about MKS Instruments may be addressed to  
Ronald Weigner, Vice President and Chief Financial Officer, Six  
Shattuck Road, Andover, MA 01810; or inquiries may be sent through  
the MKS website at <http://www.mksinst.com>.

### Licensed Trademarks

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a trademark of MKS Instruments, Inc., Andover, MA and is used  
under license. DeviceNet™ is a trademark of the Open DeviceNet  
Vendor Association. SDS® is a registered trademark of Matheson  
Tri-Gas and ATMI, Inc.

### Annual Meeting

The Company's 2000 Annual Meeting of the shareholders will be held  
at 10:00 A.M. on May 17, 2000 at the Andover Country Club,  
60 Canterbury Street, Andover, Massachusetts 01810.

# MKS Products



**Baratron® Capacitance Manometers** The Baratron® capacitance manometer is the industry standard for process pressure measurement. This line features gas independent, direct pressure (vacuum) measurement products using MKS' patented capacitance diaphragm technology. MKS Baratron capacitance manometers cover full scale ranges from as low as 20 mTorr to as high as 25,000 Torr with three to five decades of dynamic range in absolute and differential measurements. Products range from metrology-grade premium instruments with 0.05% of Reading accuracy to general purpose process manometers. Both ambient temperature and temperature-controlled instruments (from 45°C to 200°C) are available.



**Baratron® Gas Pressure Transducers** This line of ultraclean pressure transducers for gas delivery systems utilizes the proven MKS capacitance diaphragm technology, which provides a **wider dynamic range** and **better stability** than conventional strain gauge devices. These robust transducers cover full scale ranges from 50 psi to 3000 psi with either single-ended or flow-through configurations. Used in gas delivery systems to ensure constant, repeatable delivery of gases to process tools, Baratron® pressure transducers feature all-metal wetted surfaces with finishes of less than 5µin Ra. The modular design allows these transducers to interface easily to most gas control systems.



**HPS™ Vacuum Components & Valves** The MKS Vacuum Products Group is a world leader in vacuum components and valves. HPS™ flanges and fittings are available in ISO-KF, ISO-Universal, metal-sealed CF, and butt weld versions. This group also manufactures HPS angle and in-line valves, soft-start valves, safety shut-off valves and compact valves, in heated or unheated configurations. Products are manufactured to the highest industry cleanliness standards in MKS' Boulder, Colorado facility. In addition to offering the **broadest line of standard components**, MKS can provide custom-designed chambers, manifolds, and components.



**HPS™ Heated Lines & Traps** MKS is the world leader in effluent management subsystems for vacuum processes. Minimizing the buildup of residues in vacuum pumping lines pays back in improved process yield and system uptime. MKS' range of HPS™ heaters keep reaction by-products in the vapor phase until they can be safely collected in an appropriate HPS trap. **Detailed process understanding** by MKS engineers, along with a choice of heater temperatures and trap designs, allows MKS to provide the optimum subsystem solution for the particular process.



**Orion® Process Monitors and RGAs** MKS Process Analysis Products Group offers mass spectrometry-based instruments and systems for process monitoring and residual gas analysis. Specializing in **real-time detection** of contaminants and active species with a variety of instrumentation, pumping packages, and data management, MKS is the **recognized leader in process monitoring** with their line of Orion® Process Monitors. Products manufactured are available based on quadrupole designs with open or closed ion sources, up to 300 amu mass range, and a broad selection of detection limits and discrimination capability.



**Mass-Flo® Measurement & Control** MKS Mass-Flo® meters and controllers set the highest standards for the electronic measurement and control of gas flow in ranges from 1 sccm to 200 slm. The MKS patented sensing techniques for both thermal and pressure-based flow control ensures **excellent accuracy, repeatability and reliability**. Mass flow controllers and meters are available in a broad range of configurations, including the latest digital and all-metal designs.



**Pressure Control** MKS introduced the world's first practical automatic pressure control system for vacuum processes, and is still the world leader. The broad line includes exhaust throttle valves and upstream proportioning control valves, and a range of controllers with advanced electronics and control algorithms. Exhaust throttle valves, both heated and unheated, come in sizes from 1" to 16" I.D. and are optionally configured with the control electronics integrated into the valve. These **smart valves** interface directly to the host computer. Also available are throttling isolation valves, which integrate soft-start, control and isolation functions into one valve.



**Vacuum Gauges** For vacuum measurement from 10<sup>-11</sup> to atmosphere, MKS offers a **broad range of gauges**, including Pirani, convection Pirani, hot cathode and cold cathode. **Easy-to-operate** gauge controllers are available with inexpensive analog or digital displays. MKS combination gauge controllers operate up to five gauges simultaneously with RS-232, RS-485 or IEEE-488 communication interfaces.



**Advanced Materials Delivery** New processes need new materials and MKS is in the **forefront** of advanced materials delivery. Reactants that are in solid, liquid or vapor form can be delivered to the process using MKS delivery technology. Using products that include MKS' patented direct liquid injection systems and pressure-based vapor flow controllers, our **applications specialists** are able to tailor a delivery system for the most challenging processes.



**Communicator® Digital Products** MKS leads in the development of digital versions of its Baratron capacitance manometer, Mass-Flo controller, ion gauge, convection gauge, and throttle valve instrumentation. The MKS Communicator® family greatly **simplifies** the task of combining these various instruments into an **integrated control system** by providing a common digital interface for all components. Communicator digital products support RS-485, DeviceNet™ and Profibus™ networks.



**CalStand® Calibration Systems** MKS calibration products range from simple carrying case-enclosed Transfer Standards to completely automated Primary Standard calibration systems. Based on the MKS Baratron capacitance manometer and the spinning rotor gauge, CalStand® pressure calibrators are designed for use from 10<sup>-7</sup> mmHg to 500 psia/g (20 psid to 10<sup>-5</sup> inH<sub>2</sub>O). CalStand gas flow rate calibrators are based on a variety of measurement technologies and are designed for use from under 1 sccm to 200 slm (425 scfh).



**Integrated Component Subsystems™** To help process, equipment and maintenance engineers optimize their process tools, MKS combines individual components and instruments into integrated modules to provide specific process functions that require multiple components working together. Our Integrated Component Subsystems™ are tailored for a variety of different applications and can **solve specific tool challenges**; from instruments that combine flow measurement and pressure control to complete vacuum foreline subsystems.

O R I O N ®

M A S S - F L O ®



B A R A T R O N ®

H P S ™

For further information on MKS product lines, please visit our web site at [www.mksinst.com](http://www.mksinst.com)

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