

No.26

**March
1999**

JETRO

**Japanese Market
Report** –Regulations & Practices–

Environmental Measurement and Analysis Instruments

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Yen-Dollar Exchange Rates

<u>Year</u>	<u>Yen/US\$</u>
1994	102
1995	94
1996	109
1997	121
1998	131

Source: International Financial Statistics, IMF

Introduction

A variety of environmental measurement and analysis instruments are in use. They range from those manufactured expressly for observing and analyzing the environment to modified laboratory types, and roughly can be classified into the two groups: single-purpose instruments designed for the specific aspects of observation and analysis, such as assessment of atmospheric pollution and water quality inspection, and multi-purpose instruments used mainly by laboratories with or without alteration. The latter type includes separators and analyzers, such as GC-MS, LC-MS, ICP-MS and NMR, and can be applied in wide areas of research on gas (air pollution analysis), liquids (water quality inspection), and other substances.

Table 1: *groups these environmental instruments and gives specific examples.*

	Classification	Specific examples
Single-purpose instruments	Air measurement instruments	Harmful gas meters
		Dust and aerosol meters
		Harmful metal meters
		Other environmental measurement instruments and materials related to the atmosphere
	Automobile exhaust gas analyzers	Gas density meters(CO, CO ₂ , N, NO _x , SO _x , etc.)
		Gas analyzers(fuel gas, exhaust gas, etc.)
		Gas detection tubes
		Other related instruments
	Water pollution analyzers	Turbidity meters
		Suspended particle meters
		Conductivity meters(portable)
		pH meters and recorders(portable)
		DO meters and recorders(portable)
		BOD/COD/TOD meters
TOC(total organic carbon)meters		
Residual chlorine meters		
Dissolved harmful substance meters		
Other water quality-related environmental measurement instruments and materials		
Noise and vibration measurement instruments	Sound level meters	
	Vibration meters	
Multi-purpose instruments	Separators and analyzers ¹	Gas chromatographs applied equipment(GC-MS, etc.), and attachments
		Liquid chromatographs, applied equipment (LC-MS, etc.),and attachments
		Paper and thin layer chromatographs and attachment
		Electrophoresis equipment
		NMR(nuclear magnetic resonance) spectroscopy equipment
		Mass spectrometry equipment
		Inductively coupled plasma mass spectrometer (ICP-MS)
		Other ultra-trace element analysis equipment

¹ While separators and analyzers basically are designed for laboratory use, we have included types often applied for environmental observation and analysis among environmental measurement and analysis instruments. This research treats the measurement and analysis instruments shown in the five categories of Table 1.

I. Market Trends

A. Environmental Issue Countermeasures and Their Influence on Demands for Measurement and Analysis Instruments

1. The Present Status of Coping with Global Environmental Issues and Trends in Japan

The structure of environmental problems has changed from pollution caused by specific emission to the global type which cover more time and space, such as global warming, acid rain and depletion of the ozone layer. To cope with these woes, the entire social system -- mass production, mass consumption and mass disposal -- is undergoing review. The new global trend in countermeasures is to transform society into one geared to resource recycling.

As ways to achieve a recycling oriented society, LCA (Life Cycle Assessment) and PRTR (Pollutant Release and Transfer Register) are drawing attention.

LCA analyzes and evaluates how products affect the environment at each stage from production to disposal, and uses the data to take steps to reduce the environmental burden. LCA is being practiced by Volvo of Sweden and Migro, a Swiss cooperative. In Japan, the study of LCA was less advanced until the Environment Agency compiled a proposal titled "1994 Report on Considering LCA as a Means to Reduce the Burden on the Environment" and advocated the introduction of LCA. ISO (International Organization for Standardization) is studying the standardization of LCA.

PRTR requires enterprises to know the extent of harmful substances released to each environmental medium (air, water, soil) and those transferred as waste, and to collate and disclose such information based on the objective systems.

The introduction of PRTR was recommended by Agenda 21, and OECD compiled the manual for PRTR. As a result, PRTR was introduced in the United States with respect to some 650 substances. In Netherlands it concerned approximately 170 substances; Canada, about 180; in the UK, around 500. On the other hand, in Japan, PRTR has not been introduced, though pilot projects are observed in a few regions and its introduction is under study.

As for environmental assessment, while other OECD countries had legislated for it, Japan in 1997 finally enacted the Environmental Effect Evaluation Law, which is expected to stimulate and promote environment-related business.

2. The Current Status of the Environment by Area and Coping with Environmental Issues in Japan

a. Atmosphere

One way to reduce and control the emission of CO₂, a major greenhouse effect gas, is to make energy conversion and use more efficient, simply put, to practice energy conservation. Since the cost of buying energy in Japan is higher than in most other countries, Japan has grown adept at energy conservation. In fact, Japan conserves forty

percent more energy than the US. But Japan has not yet resolved the NO_x problem caused mainly by motor vehicle emissions, hence the reduction of NO_x has become a major issue. Dioxin presents another nationwide social problem. About ninety percent of Japan's dioxin comes from incineration. In Japan a very large amount of waste is incinerated and flue gas controls are looser than in developed Occidental countries. Accordingly, dioxin regulations are expected to become more stringent and the focus on related analysis is rapidly intensifying.

b. Water quality

In view of Japan's present water pollution issue, which concerns mainly cadmium and total-CN, both regarded as harmful to human health, environmental quality standards have just about been satisfied throughout the nation. But with respect to environmental controls, the standard values of BOD and COD, the representative indicators of organic pollution, are far from being met. Specifically, the low ratio of achieving the standard values is obvious in closed waters such as lakes and Japan's inland sea. Taking stock of the situation, authorities are contemplating the regulation of small-scale enterprises, which heretofore have not been subject to controls as sources of industrial drainage, as well.

The huge amount of agricultural chemicals used on golf courses is another problem unique to Japan. Herbicide to control weeds, which grow fast under the Japan's weather conditions, has created anxiety regarding pollution of nearby water sources.

c. Soil

Unlike in developed Occidental countries, which suffered soil pollution caused by mishaps, Japan has no enforceable law concerning soil, which puts the nation a step behind them with respect to the soil regulation. Pollution from haphazard waste disposal and groundwater contamination from decrepit waste disposal facilities have been uncovered as problems. Thus, to rectify the problem, regulations are being tightened.

The government's White Paper on the Environment for 1997 describes the difference in recognition of environmental risks between Japan and other countries. According to the text, surveys were conducted in Japan and major developed Occidental nations to identify how well residents appreciate aggravation of the environment as a threat to their health. An analysis of survey results showed a big difference between Japan and other countries. While only half of the Japanese respondents saw the danger, sixty percent the British, Canadian and Swiss, seventy percent of the American and German, and eighty percent of the Portuguese recognize the peril. The Japanese have been less aware of the environmental hazard, which is considered to underlie the nation's slow movement toward environmental protection.

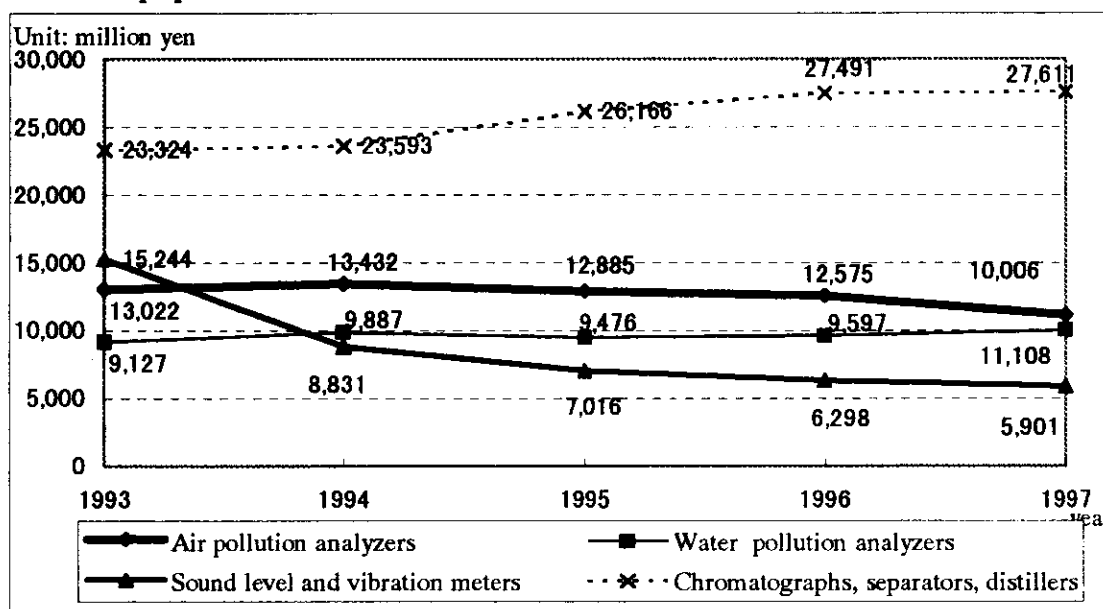
However, backed by enactment of the Environmental Effect Evaluation Law, introduction of the ISO 14000 Series, and the diffusion of LCA and PRTR, further development is expected among the environmental measurement industries. In particular, the need to measure and analyze dioxins and soil pollution is fast increasing.

B. Domestic Market Size

Figs. 1 and 2 show the transition in the production and sales values of environmental measurement and analysis equipment in recent years². As a general market trend, specialized equipment like water and air pollution analyzers are in decline, while chromatographs, separators and distillers, which are capable of analyzing trace elements, have described an upswing. The strengthening of environmental regulations by raising the standard values and expanding the coverage of contaminants required identifying trace pollutants. Thus, conventional specialty equipment is not enough to satisfy the need, and trace element analysis equipment, as generally used in laboratories, is now in demand. This presents a salient factor in the recent market trend. For instance, with respect to atmospheric contamination, Japan's Air Pollution Control Law was amended in 1997, making more pollutants subject to the regulations. The statute is likely to be amended this year, too. Similarly, controls on NO_x, SO_x and SPM produced by motor vehicle exhausts have been toughened. Accordingly, the need for trace element analysis equipment is foreseen to grow even more in the future.

While the tolerable amount of pollutant emission is being reduced by the regulations, an increasing number of firms in the chemical and other industries tend to assume responsibility for the control of their emission. This points to mounting demands for environmental measurement and analysis equipment by various business entities in the future.

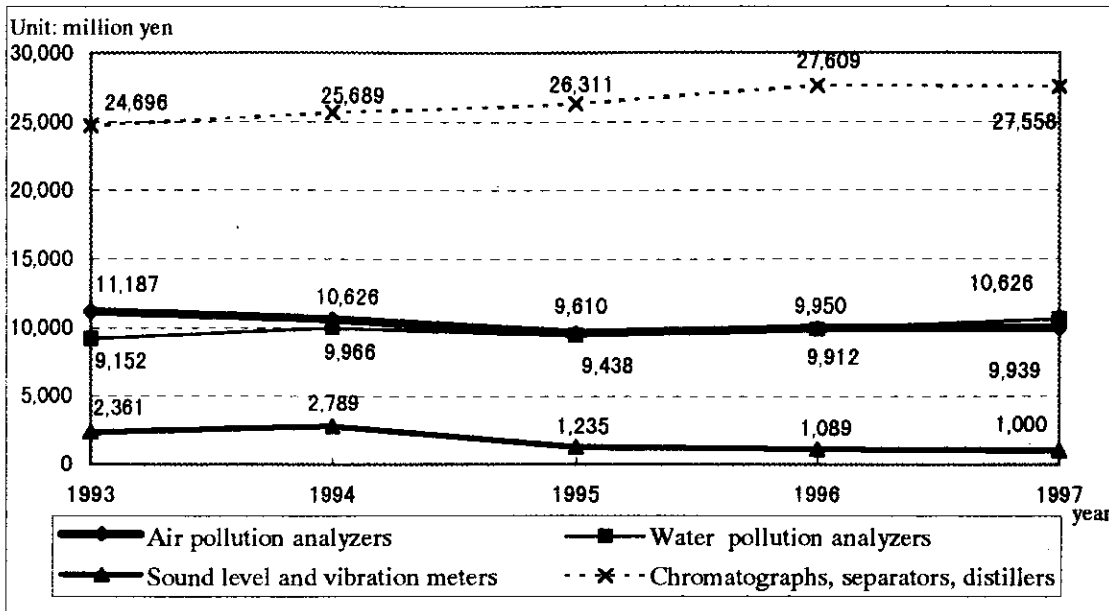
Fig. 1: *Transition in production value of environmental measurement and analysis equipment*



Source: "Annual Report on Machinery Statistics in 1998", Ministry of International Trade and Industry

² The presence of a variety of environmental measurement and analysis equipment makes it extremely difficult to grasp the overall market size and its details. The market trend of typical environmental measurement and analysis equipment can be determined by the Annual Report on Machinery Statistics by the Ministry of International Trade and Industry.

Fig. 2: *Transition in sales value of environmental measurement and analysis equipment*



Source: "Annual Report on Machinery Statistics in 1998", Ministry of International Trade and Industry

1. Air Pollution Analyzers

For the past five years sales of air pollution analyzers has hovered around 10,000 million yen. It recorded 9,900 million in 1997. Conversely, production value decreased every year from 1994 through 1997, when it fell to 10,000 million yen, some 3,000 million below the 1993 figure.

2. Water Pollution Analyzers

Both sales and production values of water pollution analyzers had remained flat at around 10000 million yen, just about the same levels as for air pollution analyzers. In 1997 sales and production values of water pollution analyzers stood at 10,600 million and 11,100 million yen, respectively.

3. Sound Level and Vibration Meters

The production and sales values of sound level and vibration meters decreased for the past five years. 1997 sales amounted to 1,000 million yen, less than half that of 1993. The 1997 production value totaled 5,900 million yen, 9,300 million below the 1993 figure. This downturn is viewed as seeming from the 1998 amendment to the Noise Regulation Law, which prompted manufacturers to cut production to tool for new equipment satisfying the demands of the amended law, with users reluctant to buy existing products. In this context, demands are expected to intensify.

4. Chromatographs, Separators, Distillers

These three types of equipment, capable of trace element analysis, command the lion's share of aggregate sales and production values in the environmental measurement and analysis sector, and both values are mounting. 1997 sales amounted to 27,600 million yen, 2,900 million up from 1993. Production value was recorded as 4,300 million yen higher at 27,600 million.

C. Trend of Import

Table 2 lists the HS codes and names of environmental measurement and analysis equipment correlating to the equipment shown in Table 1³

Table 2: *HS codes concerning environmental measurement and analysis equipment*

HS codes	Equipment	Typical corresponding environmental measurement and analysis equipment
9018.13-090	Magnetic resonance imaging apparatus, n.e.s.	NMR(nuclear magnetic resonance)
9027.10-000	Gas or smoke analysis apparatus	Harmful gas meters, Dust and aerosol meters, Harmful metal meters, Gas density meters(CO,CO ₂ ,N,NO _x ,SO _x , etc.), Gas analyzers(fuel gas, exhaust gas, etc.), Gas detection tubes
9027.20-000	Chromatographs and electrophoresis instruments	Gas chromatographs, applied equipment, Liquid chromatographs, Paper and thin layer chromatographs, Electrophoresis equipment
9027.30-010	Spectrometers, spectrophotometers and spectrographs using optical radiations (UV, visible, IR), of electrical type	Fourier transform infrared spectrophotometers, Ultraviolet spectrophotometer
9027.30-090	Spectrometers, spectrophotometers and spectrographs using optical radiations (UV, visible, IR), n.e.s.	Photospectroscope
9027.50-000	Other instruments and apparatus using optical radiations (UV, visible, IR)	Turbidity meters, Suspended particle meters
9027.80-011	Other instruments apparatus, of electrical type, for analysis	pH meters and recorders(portable), DO meters and recorders (portable), BOD/COD/TOD meters, TOC(total organic carbon)meters, Residual chlorine meters, Dissolved harmful substance meter, Mass spectrometry equipment, Other ultra-trace element analysis equipment
9027.80-090	Other instruments and apparatus, not of electrical type	Sound level meters
9031.80-013	Vibration measuring and testing apparatus, of electrical type	Vibration meters

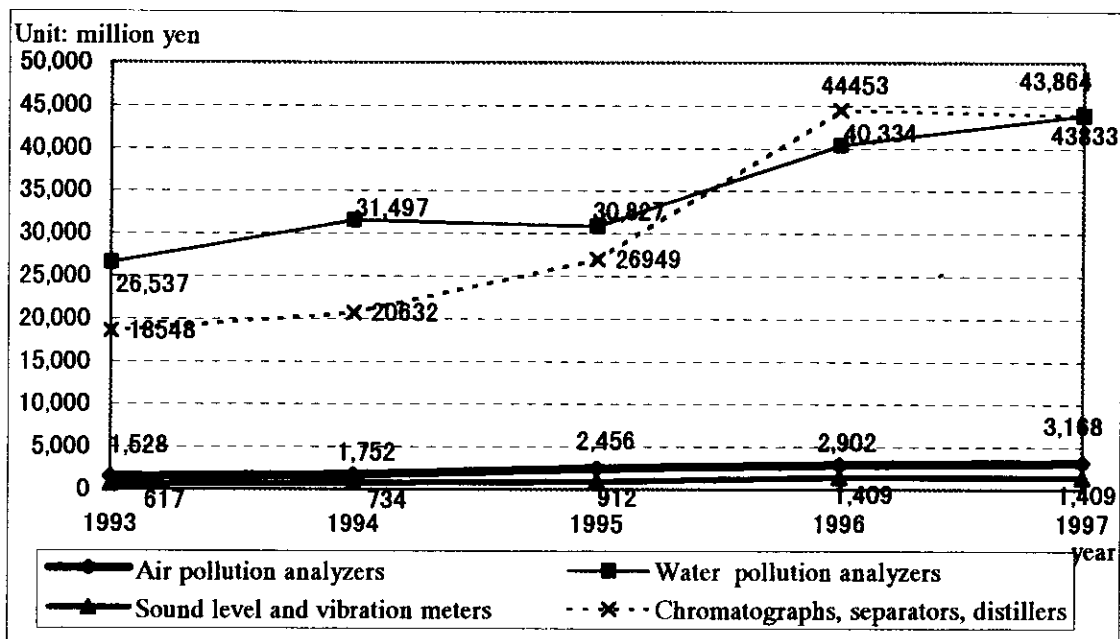
³ HS codes do not specifically indicate the export trend of environmental measurement and analysis equipment, but classify it according to measurement principles or methods analysis. As many codes as possible have been listed corresponding to environmental measurement and analysis equipment.

According to Table 2, HS codes classifying environmental measurement and analysis equipment can be shown in Table 3.

Table 3: *HS codes classifying environmental measurement and analysis equipment*

Classification	Corresponding HS codes
Air measurement instruments Automobile exhaust gas analyzers	9027.10-000
Water pollution analyzers	9027.50-000, 9027.80-011
Noise and vibration measurement instruments	9027.80-090, 9031.80-013
Separators and analyzers	9018.13-090, 9027.20-000 9027.30-010, 9027.30-090

Fig. 3: *Transition in import value of environmental measurement and analysis equipment*



The import of environmental measurement and analysis equipment grew with respect to all types. In particular, the numbers of water pollution analyzers and separators was high and they are still growing.

The import value of water pollution analyzers in 1997 stood at 43,900 million yen, 17,400 million more than 1993.

The 1997 import value of separators was 43,800 million yen, 25,300 million above the 18,500 million for 1993.

D. Market Trend

1. A Trio of Equipment Needs

Japan's current market requires three distinct types of equipment to satisfy functional needs: ①trace element analysis and general-purpose equipment, ②the portable equipment and ③the automated equipment.

①Trace element analysis and general-purpose equipment

As people become more active in their efforts to resolve global environmental woes and regulations concerning it tighten, the standard limits to pollutants grow stricter. The controls on dioxins and other endocrine disrupting chemicals, which can seriously harm living organisms and the ecology, even if their quantity is very small, are also being strengthened. A series of food poisoning cases last year urged the building of a system capable of quick, accurate analysis of various toxic substances. Consequently, demands for ultra trace element analysis equipment able to detect and analyze trace elements and have seen mostly laboratory use, are fast increasing and include things like mass spectrometers (MS), combined equipment (GC-MS, LC-MS, ICP-MS, and NMR), and optical measurement devices.

Owing to the stiffer environmental controls and mounting concern over dioxins, more and more substances are being regulated. For instance, under the Air Pollution Control Law, in 1997 three more contaminants became subject to control, as were dioxins.

Thus the dire need for general-purpose equipment which with a single unit can detect and analyze multiple substances.

②Portable equipment

The ever-increasing aggravation of ecological problems has necessitated monitoring the environment not only at specified sites but also at such places as roadsides and rivers. To do this, portable analysis and measurement equipment which can be used anywhere, anytime have become essential.

③Automated equipment

With environmental analysis and measurement having taken the spotlight, quite a few more persons are engaged in the work, but many lack the required skill and experience. For less than experts to carry out measurement and analysis easily, automated equipment capable of multiple tasks with little more than the flip of a switch is needed. At the same time, methods of operation and analysis must be defined and standardized by manuals so that accuracy of analytical results can be maintained. In other words, practically anyone who conducts an analysis will produce the same results as the next person.

2. Post-sales Service

Environmental measurement and analysis equipment by nature must provide consistent accuracy; no wrong answers can be tolerated. When buying it, in addition to performance, users want post-sales service too, which should include a stable supply of expendables and periodic maintenance. Thus post-sales service presents a highly

important selection criterion, and can be discussed in terms of ①continuity and ②quick response.

①Continuity

In Japan, when a product malfunctions, the user expects not only a replacement or repairs but an explanation of what has gone wrong and why. This kind of manufacturer-consumer relationship and communication is highly valued and it should continue. For example, some companies have their personnel visit clients once a month and provide services like periodic equipment inspection and maintenance, consultation and advice concerning methods of analysis and usage. A few provide customers with information about new technologies online.

②Quick response

In Japan, customers insist that a supply of expendables necessary for using the equipment and repair in the event of breakdown must be available at the earliest. In particular, as for the supply of parts and expendables, if it takes time to have them delivered from abroad, effective inventory management and domestic procurement should be considered.

In many cases, users conduct environmental analysis and measurement periodically. In environmental measurement monitoring, the user collects data twenty-four hours a day and makes chronological comparisons. So if the product used for monitoring malfunctions, incomplete data results hence cannot be compared properly. Thus the equipment must be repaired quickly and, of necessity, be continuously maintained to assure constant high performance.

Another reason to maintain continuous communication lies in the nation's cultural background. In Japan customers tend to trade with the suppliers based not only on product performance but also on mutual trust as nurtured by daily communication. So to keep one's customers demands this sort of continuous communication.

Such post-sales service helps differentiate one's products from others and can be provided either gratis or for fees based on agreements concluded with customers.

II. Distribution

A. Channels

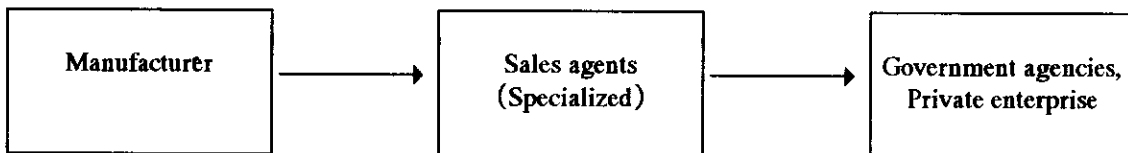
Looking at distribution channels for the entire scientific equipment market, which includes both domestic and imported environmental measurement and analysis devices and other products, 1997 manufacturer sales via agents had the highest percentage: 41.0%, followed by direct manufacturer sales to users, at 29.8%, then by sales through wholesalers like trading firms and subsidiaries of manufacturers, for 19.3%⁴.

B. Domestic Manufacturer Sales Channels

1. User Channel Patterns

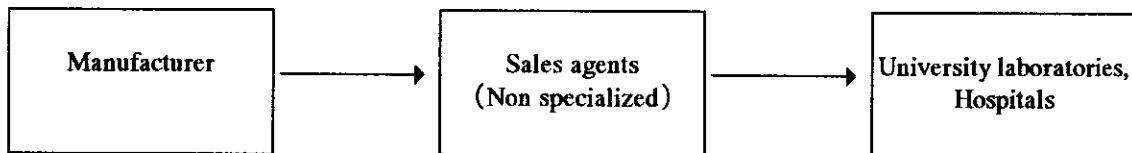
The major users of equipment are research institutions and government-affiliated measurement organizations, private sector environmental measurement and analysis contractees, university laboratories, and manufacturers and other business entities that own factories. Sales channels vary depending on the type of user.

a. Sales to government agencies and private enterprise



Certain sales agents excel at doing at business with governmental agencies, while others feel more at home dealing with the private sector. Accordingly, products move through the most suitable sales agent depending on the type of buyer.

b. Sales to university labs and hospitals



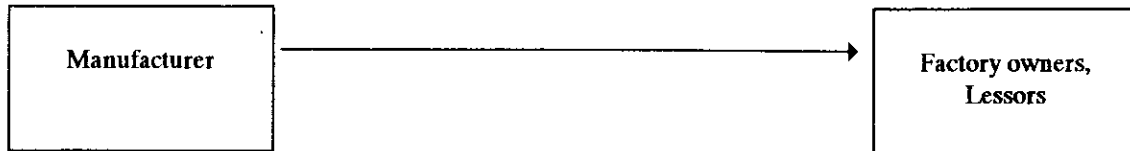
Some sales agents specialize in scientific equipment, and others handle scientific equipment together with chemical reagents and medical supplies. The latter type may be better when aiming at university laboratories and hospitals.

In case of sales channels utilizing agents as in a. and b., general equipment manufacturers usually market their goods only through agents with which they maintain

⁴ "Scientific Equipment Almanac 1988," R&D Co., Ltd.

an exclusive sales agreement. Conversely, manufacturers specializing in certain kinds of equipment sometimes do not have exclusive sales agents, and a few agents handle the products of more than one manufacturers at the same time.

c. Sales to factory owners and lessors



Manufacturers often sell equipment directly to factory owners and general contractors, which built plants, and their related firms, when it is hard for sales agents to meet their demands.

In some cases, equipment can be procured by leasing. The use of leased equipment remains fairly insignificant, but users of only a few units of equipment are likely to lease. While most of the lessees have been in the private sector, leasing equipment has begun spread to public organizations. For purposes of leasing, equipment is sold directly from the manufacturers to the lessors.

With giant projects wherein the cost of equipment may top 100 million yen, the equipment is made according to client specifications. Here, direct sales are the most likely.

C. Sales Channels for Imports

When foreign manufacturers join the Japan market, they usually ship their products to Japan through trading firms for trial purposes. If the merchandise proves to be successful, the manufacturers usually establish a subsidiary in Japan.

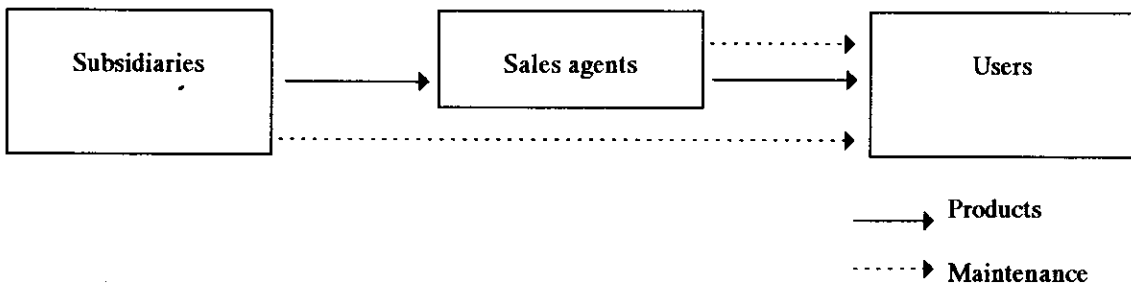
1. Foreign Manufacturer Subsidiaries

a. Use of sales agents

In many instances where foreign manufacturers have formed a subsidiary, their products are sold through agents, although their channels may depend on policy and the nature of their merchandise. Such sales agents may deliver not only scientific equipment but also the related expendables and chemical reagents.

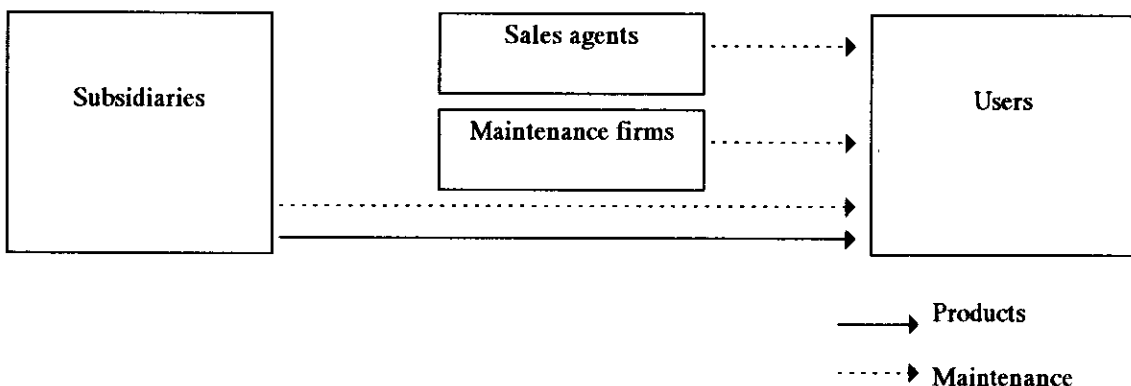
Even when the subsidiary engages in direct sales, to streamline settlement between the manufacturer and its clients, the subsidiary sometimes has dealers, who constantly trade with the users, collect the money.

Manufacturers that stress post-sales service and have sufficient management resources in Japan tend to provide users with their own maintenance services. But if sales agents have the necessary technology and satisfy manufacturer policy, the agents can be commissioned to provide maintenance.



b. Direct sales

When a subsidiary sells directly, it usually provides users with its own maintenance service. If the manufacturer lacks management resources in Japan and it suits manufacturer policy, a sales agent or maintenance firm may be contracted to provide the service.

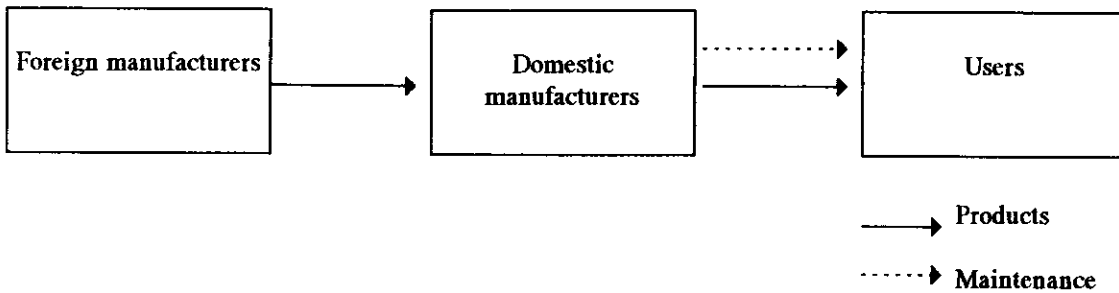


2. Foreign Manufacturers Without a Subsidiary

a. Sales through domestic manufacturers

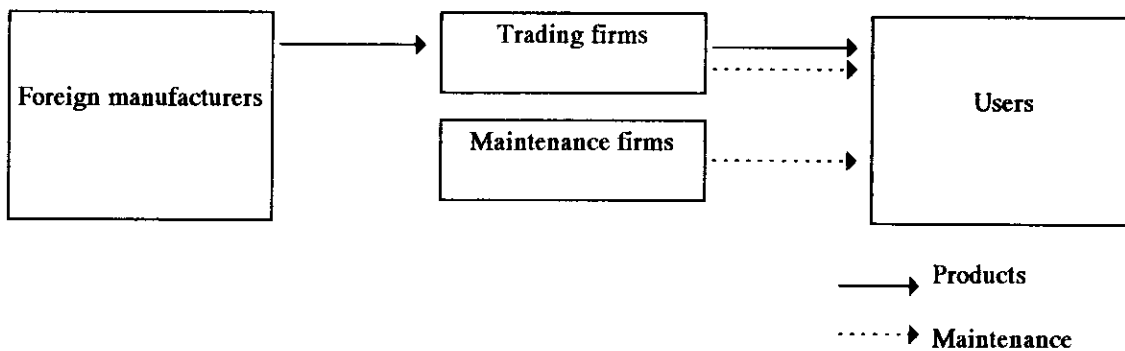
To secure sales channels for their goods, some foreign manufacturers form a partnership with a Japanese manufacturer. There are various types of partnerships, ranging from an exclusive sales agency agreement to forming a joint venture.

When the foreign manufacturer markets its products through a Japanese manufacturer, maintenance usually is consigned to the latter.



b. Sales through trading firms

In the main, trading firms deal in products easy to handle with respect to size and whose sales volume is not large. Some importers function not only as a trading firm but also serve as manufacturer and sales agent for their own products. Such importers deal in imported goods as well as their own. If the trading firms lack the infrastructure required for maintenance, a service company can be commissioned to do the job.



III. Business Practices

A. The Japanese Way

In certain sectors of the environmental measurement and analysis equipment industry, the following business practices reportedly apply.

In cases of large equipment purchases, environmental measurement and analysis equipment is sold as a package together with the computer used for data processing. Here, related products such as optional software are sometimes offered free.

Discount sales are common, with products going for less than the listed price. When manufacturers sell their goods through an agent, the former occasionally pays the latter a rebate according to the sales volume.

IV. Import Systems and Applicable Laws and Regulations

Japan has no import restriction on environmental measurement and analysis equipment.

A. Specifications on Methods of Analysis and Measurement

Japan's laws and regulations concerning environmental pollution are enforced according to types of environment: atmospheric pollution, water pollution, noise, etc. For instance, the Air Pollution Control Law and other basic laws impose limits on atmospheric pollution, define contaminants and specify standard values and the amounts of permissible emission. As such, methods for measuring the regulated substances are specified separately by laws, regulations for their enforcement and notifications by the authorities.

As for measurement methods, some are specifically described but most of them refer to JIS standards.

In areas of air pollution, according to the Offensive Odor Control Law, substances producing a stench are restricted. This is unique to the laws and regulations in Japan.

Table 4 presents the applicable laws and regulations.

Table 4: *Applicable laws and regulations*

<i>Category of pollution</i>		<i>Major applicable laws</i>	<i>Competent authorities</i>
Air pollution	Air in general	Air Pollution Control Law	Environment Agency
	Automotive exhaust	Automotive NO _x Law	Environment Agency/ Ministry of Transport
	Offensive odor	Offensive Odor Control Law	Environment Agency
Water pollution	Environment/ wastewater	Water Pollution Control Law	Environment Agency
	Tap water	Water Works Law	Ministry of Health and Welfare
Noise		Noise Regulation Law	Environment Agency
Vibration		Vibration Regulation Law	Environment Agency

Air Pollution

- The Air Pollution Control Law restricts atmospheric pollution, and methods for measuring the regulated substances are specified in the enforcement regulations, etc.
- As for automotive exhausts, according to the Air Pollution Control Law, allowable emission is specified by the Environment Agency and enforced by the Ministry of Transport in compliance with the safety standards of road transport vehicles. To limit nitrogen oxides, the Law for Special Measures for Total Emission Reduction of Nitrogen Oxides from Motor Vehicles in Specified Areas (Automotive NO_x Law) has been enacted.
- The Offensive Odor Control Law restricts malodor, and the Environment Agency specifies the methods of measuring the regulated substances in a notification known as the “Method of Measuring Offensive Odor Substances.”

Water Pollution

- The Water Pollution Control Law sets environmental and wastewater standards. The Environment Agency specifies the methods for measuring controlled substances in a notification called “Environmental Standards Concerning Water Pollution,” etc.
- As for tap water, The Water Works Law places limits on pollutants, and the Ministry of Health and Welfare specifies the methods for measuring the regulated substances in the enforcement regulations and in ministerial ordinances.

Noise and Vibration

- Noise and vibration are controlled, respectively, by the Noise Regulation Law and the Vibration Regulation Law, which specify standard values and measurement methods.

B. Measurement Law

1. The Law in Brief

The Measurement Law was passed to specify standards of measurement and enable proper, accurate measurement. To ensure this, the law defines specified measurement equipment. Once a product is deemed as conforming to specified measurement equipment, its manufacturers must ①file reports concerning their business with the authorities, ②have certain inspection facilities as stated by law, and ③pass an official examination (unless ordinance-exempted from the examination). Table 5 lists the specified environmental measurement equipment.

Table 5: *Specified environmental measurement equipment*

Glass electrode method hydrogen ion density detectors
Glass electrode method hydrogen ion density indicators
Non-dispersive infrared method sulfur dioxide density meters
Non-dispersive infrared method nitrogen oxide density meters
Non-dispersive infrared method carbon monoxide density meters
Chemiluminescence method nitrogen oxide density meters
Ultraviolet method sulfur dioxide density meters
Ultraviolet method nitrogen oxide density meters
Gas dissolution conductometric method sulfur dioxide density meters
Zirconium method oxygen density meters
Magnetism method oxygen density meters
Sound level meters
Vibration level meters

2. Examination System

Of the specified measurement equipment, density, sound level and vibration level meters are subject to official examinations. In order to pass them, the equipment must have ①a structure as specified by law and ②an instrumental error smaller than the tolerance provided in the examination.

As for the former, there is a system called “Approval of Type.” If a manufacturer takes the type examination of the Japan Quality Assurance Organization and obtains an “Approval of Type” for its products, they will be exempted from the structure examination and will merely need to pass the instrumental error test.

Measurement equipment subject to the examination, unless otherwise exempted, must undergo the test whenever it is repaired.

The valid term of certification is defined for each type of specified measurement equipment.

V. Advice on Market Entry

A. Product Proposal Meeting Buyer Needs

1. Analytical Methods

Since the laws specify analytical methods, it is necessary to confirm the appropriate way to measure substances, then produce equipment that satisfies the specifications.

2. Compatibility with Equipment in Use

Many types of recent analysis equipment only output the results. For instance, the output of MS spectral could be 2mg of arsenic and 10 mg of iron. But past data may include raw data (i.e., the spectral itself in the case of the preceding example). For the users to compare past and fresh data, the new equipment must provide not only data of the final results but also raw data.

3. Manual

If a product's operational manual is available only in English or languages other than Japanese, the users will feel using the equipment inconvenient. In fact, certain technical terms concerning the equipment cannot be found even in dictionaries, making the instructions highly difficult for Japanese to understand. Thus the need to publish a Japanese version of the manual.

4. Installation space

While the number of substances to be measured is increasing owing to expanded controls, space in which to install measurement and analysis equipment is limited. In some cases, it may be impossible to install large equipment, which necessitates reducing the size of equipment to enable its use within limited space.

5. Precision

The most important factor for deciding what equipment to buy is precision, which includes sensitivity and repeatability. So that prospective buyers can verify these features, equipment demonstrations are commonly given. In some cases, potential buyers ask the sellers to analyze standard substances, which the buyers provide, using the equipment they are considering to purchase. In other cases, the manufacturer demonstrates analysis utilizing the applicable equipment in the presence of prospective buyers at its own analysis center or some other place. This two points to the need for foreign manufacturers to set up facilities to demonstrate their products. If arranging such facilities unassisted proves difficult, alternatives must be considered, such as partnership with a Japanese manufacturer, etc.

B. Measures for Market Entry

1. Securing Distribution

As explained, environmental measurement and analysis equipment requires not only top performance of the product itself but also attractive post-sales service. Among post-sales services, considering the nature of equipment, users stress maintenance. When securing a distribution channel, it is necessary at the same time to establish a system to furnish adequate maintenance.

a. When hard to develop one's own maintenance system

A new entrant to the Japan market from abroad may find it extremely hard to develop maintenance infrastructure unassisted for one reason or another. This would demand securing a maintenance system in the process of choosing a distribution channel. There are two options: ①commission a sales agent or trading firm with the technology to provide maintenance, or ②enter into a partnership with Japanese manufacturer.

As for the former, since many agents already represent major domestic manufacturers, it may be hard to find one.

With respect to the latter option, foreign manufacturers often form a partnership with a domestic manufacturer to use their sales channel and have them provide maintenance services. When seeking a partnership with a Japanese firm, joining trade fairs held in Japan and abroad can help. Not a few Japanese manufacturers wish form partnerships with companies that have excellent technology, and to find potential partners they send their staffs to exhibitions, including those held overseas. While it is possible to start partnership negotiations at trade fairs, even small manufacturers may have a chance to enter the Japan market by demonstrating excellent technology at exhibitions and developing relationships with Japanese companies.

b. Securing sales channels

As described with respect to distribution channels, many sales agents are handling the products of major domestic manufacturers, and they take on only merchandise that does not compete with their principal clients. This makes it necessary when choosing a sales channel to review a wide variety of potential partners, ranging from wholesalers of equipment to those of expendables and related products.

2. Partnerships

a. Supply of system components

Owing to their nature, environmental analysis and measurement equipment is sold as a package rather than as individual detectors. Such packages may include detectors, personal computers for data processing, light sources, etc., and are offered to users as systems.

As for peripheral equipment, some manufacturers procure it from other firms, if they are not geared for in-house production and buying it from outside sources is feasible.

When Japanese manufacturers include as peripheral equipment the products of

other firms, they care little if they are made in Japan or imported and tend to buy from companies that have excellent technology and are competitive in the world market. For example, in areas of water quality related equipment, biotechnology, and software for computers and data processing, it is said that foreign companies are more advanced than those in Japan. Accordingly, it is a good strategy for foreign firms to demonstrate their superior technological levels and supply products as components of systems to Japanese manufacturers eager to introduce the products of other companies. Taking part in trade shows and exhibitions can help greatly in finding a potential partner.

b. Sales promotion to general contractors

Environmental measurement and analysis equipment is often used in factories and when building them, measurement and analysis equipment is sometimes preinstalled.

Consideration of chemical hazards is diffusing. When handling poisons like dioxins and sarin, their analysis facilities must be isolated to forestall environmental contamination. Thus, in certain cases analysis equipment and facilities are introduced as packages. So, if analysis equipment can be preinstalled during plant or facility construction, it can be effective to offer one's products to general contractors that are awarded such work.

C. Post-sales Service

1. Quality

As mentioned, Japanese users expect superior post-sales services. Foreign manufacturers that succeeded in the Japan market regard post-sales service as an integral part of their trade and provide it basically with their own staff. A number of these foreign manufacturers, unable to set up a maintenance plan by themselves owing to a manpower shortage, etc., commission sales agents, trading firms or Japanese manufacturers to provide maintenance service. Even then, some of them train the personnel of their contracted service providers so that a certain level of post-sales service can be met.

The quality of post-sales service varies depending on types of equipment. Some equipment requires high-level service, while examples of portable equipment may be closer to expendables and require little or no service. But for users to operate equipment to their full satisfaction demands ensuring quality post-sales service suited to each type of equipment, even when the services is outsourced.

2. Post-sales service featuring variety

Users come in many types. Some think it better to prevent malfunction by periodic maintenance even if it costs more, rather than suffer a sudden equipment breakdown and having to foot an unexpected repair bill. Others are willing to maintain equipment by themselves and request the suppliers to provide the minimal post-sales service free of charge.

To meet the diverse demands of users, manufacturers are required to prepare various post-sales service plans, ranging from the gratis type to periodic pay maintenance services.

Appendix 1. Trade Fair and Exhibitions

JAIMA Show

Next show dates: 1 (Wed.)-3 (Fri.) September 1999
Venue: Japan Convention Center , Makuhari Messe(Chiba Pref.)
Frequency: Annual
Number of exhibitors in the last show: 112
Number of visitors at the last show: 30,637
Exhibitor qualifications: Members of JAIMA
Application must be filed by January of the year in which one wishes to exhibit.
Exhibition fee (1998): 270,000 yen per unit (3m x 3m)
Application period: Information materials available from mid- February
Contact: Japan Analytical Instruments Manufacturers Association
Taimei Bldg., 22, Ogawa-machi 3-chome, Kanda
Chiyoda-ku, Tokyo 101-0052, Japan
Tel: +81-3-3292-0642 Fax: +81-3-3292-7157

Scientific Instruments Show

Next show dates: 28 (Tue.)-1 (Fri.) November 2000
Venue: Tokyo Big Sight (Tokyo Int'l Exhibition Center)
Frequency: Biannual
Number of exhibitors in the last show: 374
Number of visitors at the last show: 61,299
Exhibitor qualifications: Must show physical, chemical or other scientific instruments.
Exhibition fee (1998): 300,000 yen per unit (3m x 3m) for members; 360,000 yen per unit (3m x 3m) for non-members
Application period: Information materials available from March of the year in which the show is held.
Contact: Tokyo Scientific Instrument Association
8-5, Honcho 3-chome, Nihonbashi
Chuo-ku, Tokyo 103-8125, Japan
Tel: +81-3-3661-5131 Fax: +81-3-3668-+81-324

Appendix 2. Organizations

<Government Offices>

- **Environment Agency, Air Quality Bureau, Water Quality Bureau**
1-2-2 Kasumigaseki, Chiyoda-ku, Tokyo 100-8975
TEL:+81-3-3581-3351
Home Page : <http://www.eic.or.jp/eanet/>

- **National Institute for Environmental Studies**
16-2 Onogawa, Tsukuba-shi, Ibaraki 305-0053
TEL:+81-298-51-6111
Home Page : <http://www.nies.go.jp/>

- **Ministry of Health and Welfare, Water Supply and Environmental Sanitation Department**
1-2-2 Kasumigaseki, Chiyoda-ku, Tokyo 100-8045
TEL:+81-3-3507-1711
Home Page : <http://www.mhw.go.jp/>

- **Ministry of Transport, Road Transport Bureau**
2-1-3 Kasumigaseki, Chiyodaku, Tokyo 100
TEL:+81-3-3580-3111
Home Page : <http://www.motnet.go.jp/>

- **Ministry of International Trade and Industry, Machinery and Information Industries Bureau**
1-3-1 Kasumigaseki, Chiyoda-ku, Tokyo 100
TEL:+81-3-3501-1511
Home Page : <http://www.miti.go.jp/>

<Industry association>

- **Japan Quality Assurance Organization**
1-9-15 Akasaka, Minato-ku, Tokyo 107-0052
TEL:+81-3-3583-9001
Home Page : <http://www.jqa.or.jp/>

- **Japan Analytical Instruments Manufacturers Association**
Taimei Bldg., 22, Ogawa-machi 3-chome, Kanda
Chiyoda-ku, Tokyo 101-0052, Japan
TEL: +81-3-3292-0642
Home Page : <http://www.jaima.or.jp/>

•Tokyo Scientific Instrument Association
8-5, Honcho 3-chome, Nihonbashi
Chuo-ku, Tokyo 103-8125, Japan
TEL:+81-3-3661-5131
Home Page : <http://www.sia-tokyo.gr.jp/>

<manufacturer>

•SHIMADZU corporation Tokyo office
1-3 Kanda-Nishikicho, Chiyoda-ku, Tokyo 101-8448
TEL:+81-3-3219-5633
Home Page : <http://www.shimadzu.co.jp/>

•HORIBA, Ltd.
2, Miyano Higashi-cho, Kisshoin, Minami-ku, Kyoto 601-8510
TEL:+81-75-313-8121
Home Page : <http://www.horiba.co.jp/>

•JEOL Ltd.
3-1-2 Musashino, Akishima-shi, Tokyo 196-8558
TEL:+81-42-542-2297
Home Page : <http://www.jeol.co.jp/>

•Hitachi, Ltd.
Shinnmaru Bldg., 1-5-1 Marunouchi, Chiyoda-ku, Tokyo 100-8220
TEL:+81-3-3212-1111
Home Page : <http://www.hitachi.co.jp/>

•JASCO Corporation
2967-5 Ishikawacho, Hachioji-shi, Tokyo 192-8537
TEL:+81-426-46-4111
Home Page : <http://www.jasco.co.jp/>

•SHIBATA SCIENTIFIC TECHNOLOGY, Ltd.
3-1-25 Ikenohata, Taitou-ku, Tokyo 110-8701
TEL:+81-3-3822-2111
Home Page : <http://www.sibata.co.jp/>

<Trading company>

•Nissei Sangyou Co., Ltd.

1-24-14 Nishishinbashi, Minato-ku, Tokyo 105-8717

TEL:+81-3-3504-7211

Home Page : <http://www.nisseisg.co.jp/>

•Nagase & Co., Ltd.

1-1-17 Shinmachi, Nishi-ku, Osaka-shi, Osaka 550-8668

TEL:+81-6-6535-2114

Home Page : <http://www.nagase.co.jp/>