Industry & Trade Summary

Industrial Food-Processing Machinery and Related Equipment

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PREFACE

In 1991 the United States International Trade Commission initiated its current *Industry and Trade Summary* series of informational reports on the thousands of products imported into and exported from the United States. Each summary addresses a different commodity/industry area and contains information on product uses, U.S. and foreign producers, and customs treatment. Also included is an analysis of the basic factors affecting trends in consumption, production, and trade of the commodity, as well as those bearing on the competitiveness of U.S. industries in domestic and foreign markets.[1]

This report on industrial food-processing machinery and related equipment covers the period 1989 through 1993 and represents one of approximately 250 to 300 individual reports to be produced in this series during the first half of the 1990s. Listed below are the individual summary reports published to date on the minerals, metals, and miscellaneous manufactures sector.

USITC publication number	*Publication date*	*Title*
2426	November 1991	Toys and models
2475	July 1992	Fluorspar and certain other mineral substances
2476	January 1992	Lamps and lighting fittings
2504	November 1992	Ceramic floor and wall tiles
2523	June 1992	Prefabricated buildings
2546	August 1992	Agricultural and Horticultural Machinery
2570	November 1992	Electric Household Appliances and Certain Heating Equipment
2587	January 1993	Heavy structural steel shapes
2623	April 1993	Copper
2633	June 1993	Textile Machinery and Parts
2653	June 1993	Glass containers
2692	November 1993	Refractory ceramic products
2694	November 1993	Flat glass and certain flat glass products
2706	April 1994	Aluminum
2738	February 1994	Structural ceramic products
2742	March 1994	Fiberglass products
2748	March 1994	Brooms, brushes, and hair-grooming articles
2756	March 1994	Air-Conditioning Equipment and Parts
2757	March 1994	Builders hardware
2758	March 1994	Semifinished steel
2765	April 1994	Metalworking Machine Tools and Accessories Machinery and Related Equipment
2872	May 1995	Abrasives
2857	May 1995	Industrial Food-Processing machinery and related equipment

[1] The information and analysis provided in this report are for the purpose of this report only. Nothing in this report should be construed to indicate how the Commission would find in an investigation conducted under statutory authority covering the same or similar subject matter.

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INTRODUCTION

This summary of industry and trade information on industrial food-processing machinery and related equipment[1] covers the period 1989 through 1993. The report is organized into three major sections: U.S. and foreign industry profiles; trade measures; and U.S. industry performance in domestic and foreign markets. In addition, appendixes provide an explanation of tariff and trade agreement terms, further statistical information on the industry, and detailed descriptions of the specific machinery covered.

Industrial food-processing machinery and related equipment include a heterogeneous group of industrial machines used for preparing and manufacturing food and beverages. The important types of machines covered are meat- and poultry-packing plant machinery; sugar mill machinery; baking machinery; dairy product manufacturing equipment; brewing and distilling equipment; soft drinks, flavoring extracts, and syrups equipment; chocolate and confectionery machinery; fish- and shellfish-processing machinery; fruit- and vegetable-processing and preparation machinery; vegetable oil and oilseed processing machinery; and parts of the foregoing. This machinery includes peelers, cutters/slicers, dryers, extruders, concentrators, hydrostatic cookers, ovens, pressure cookers, freezing equipment, and other equipment used to prepare food prior to packaging. The different types of machinery are used to crush, cut, grind, chop, shape, churn, press, roll, crumble, peel, shell, hull, clean, pulverize, sort, grade, granulate, polish, screen, strain, mix, knead, ferment, and perform innumerable other processes in the preparation and manufacturing of food and beverages.

These types of industrial machinery are ordinarily power-operated and include all such machinery, whether electrical, gas powered, or otherwise. The U.S. food-processing machinery industry produces almost all of the types of food-processing machinery and equipment mentioned.

U.S. INDUSTRY PROFILE

Industry Structure

Industrial food-processing machinery and related equipment is classified under Standard Industrial Classification number (SIC) 3556, food products machinery.[2] The principal components, producer types, major products, and principal customers of the U.S. food-processing machinery and related equipment industry are shown in figure 1. The United States has traditionally been one of the leading manufacturers of food-processing machinery and the second largest single market for these products. The industry is the principal supplier of specialized machinery for fruit, vegetable, and nut processing; meat and poultry packing and processing; the dairy industry; the egg industry; the baking and confectionery industries; grains and cereal processing; and the beverage industry.

In 1991, the U.S. industry producing industrial food-processing machinery consisted of approximately 512 establishments, with about 75 percent of these plants having 49 employees or less.[3] The industry is highly fragmented with no one company believed to be holding more than a 6-percent share of the market. Establishments manufacturing food-processing machines are located throughout the country, with heaviest concentration in seven states (California, Illinois, New York, Wisconsin, Ohio, Texas, and New Jersey), accounting for nearly 60 percent of all establishments. Companies having manufacturing plants producing food and beverage machinery range from several large, highly diversified multi-product companies with annual sales of over $1.0 billion, to numerous small companies with annual sales of about $250,000. Although a number of domestic food-processing machinery manufacturers produce a variety of different products (mostly stock items) for most segments of the food-processing industry, original-equipment manufacturers tend to specialize in one or two segments of the industry because of the expertise required to give technical assistance to their customers.

Total employment in the industry, as shown in the tabulation on the following page, dropped to an estimated 18,000 in 1992-93 from an estimated 19,000 in 1989-90, whereas hourly earnings of production workers increased by nearly 12 percent since 1989.[4]

The primary factors influencing the decline in employment were company mergers and plant consolidations, improved manufacturing technology, and increased labor productivity. Productivity, as measured by output per employee, increased by 17 percent during 1989-91, compared with 13 percent for

[1] This summary does not contain information on packaging machinery and harvesting machinery, which are covered in separate summaries on wrapping, packaging, and can-sealing machinery and farm and garden machinery and equipment, respectively.

[2] Data in this summary include some commercial equipment in addition to industrial equipment.

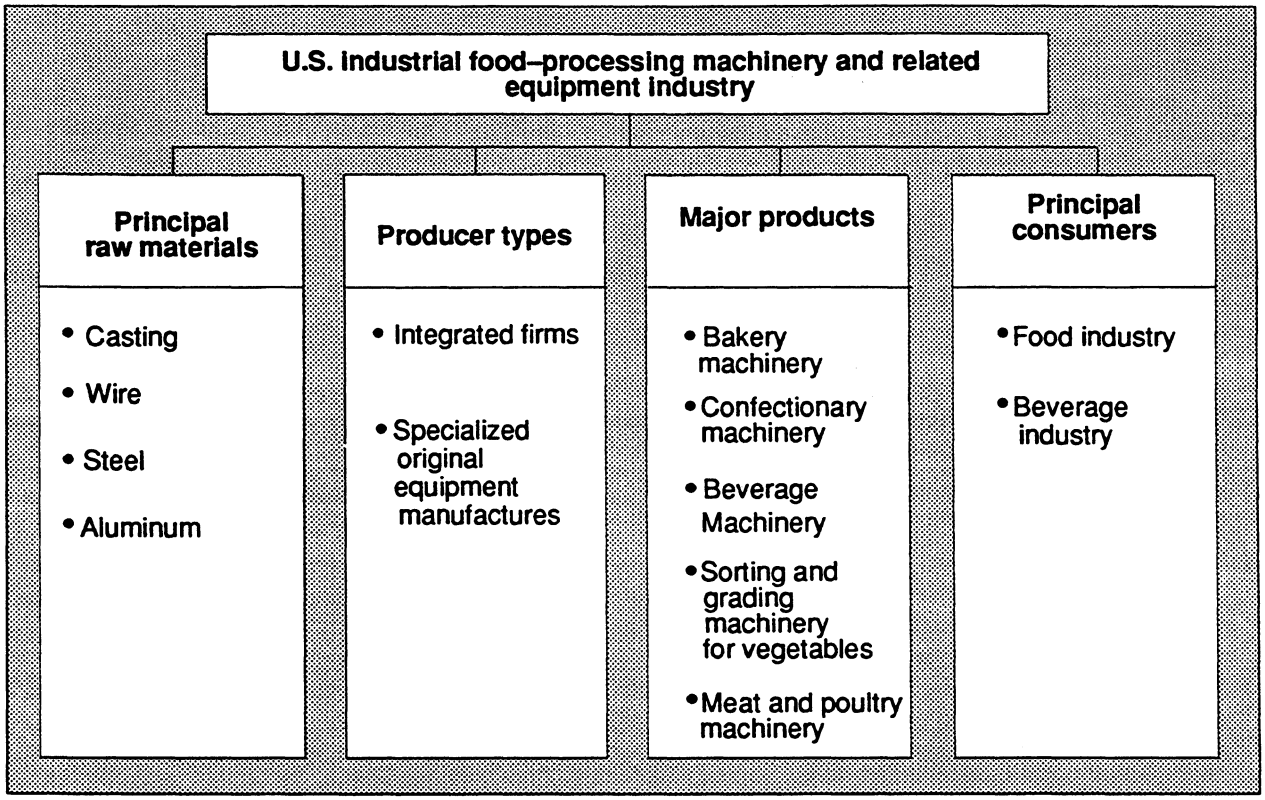
[3] U.S. Bureau of the Census, *County Business Patterns*, 1991.

[4] U.S. Department of Commerce, *U.S. Industrial Outlook, 1994*, p. 17-16.

Year	Total employees	Production workers	Average hourly earnings of production workers[1]
	(1,000 employees)		
1989	19.0	11.1	$11.46
1990	19.0	11.2	$11.72
1991	17.9	10.5	$12.14
1992	18.0	10.6	$12.54
1993	18.0	10.7	$12.83

[1] Bureau of Labor Statistics, *Labstat System.*

Figure 1
U.S. industrial food-processing machinery and related equipment industry: Principal materials, producer types, major products, and principal consumers



Source: Compiled by the staff of the U.S. International Trade Commission.

all manufacturing.[5] The industry labor intensity in 1991, as measured by the ratio of production payroll to value added by manufacture, averaged 48 percent for industrial food-processing machinery, 8 percent higher than the ratio for total domestic manufacturing.[6] The average industrial food- and beverage- processing machinery manufacturer relies heavily on skilled labor and expensive sophisticated equipment. The full production capacity utilization rate in the food-processing industry was 79 percent in 1992, compared to 73 percent for the nonelectric machinery manufacturing sector SIC 35 (table B-2).

[5] Calculations derived from U.S. Bureau of the Census, *Census of Manufactures* and *Annual Survey of Manufactures.*

[6] U.S. Bureau of the Census, *Annual Survey of Manufactures*, 1991, p. 1-6.

Marketing methods

Nearly all domestic manufacturers of food- and beverage-processing machinery sell directly to their customers, but the marketing and selling methods employed are generally determined by the end user, the food and beverage processors. In some cases, processing companies may ask several manufacturers for design recommendations and price quotations, after which competitive bidding takes place. In other cases, processing companies may develop their own specifications for a processing line that could consist of components produced by several different machinery manufacturers. These practices usually necessitate machinery manufacturers to custom build to order.

Because selling food-processing machinery requires a high level of product and food-processing knowledge, as well as machine design and control practices, it tends to be a "team" effort involving the sales representative and manufacturing personnel, particularly in the larger machine companies that employ factory engineers. In smaller companies, the owners or corporate officers, are more likely to be members of the selling team.

Most advertising of food- and beverage-processing equipment is done in trade and technical journals. In addition, participation in regional, national, and international trade shows, or exhibitions, provides valuable exposure, and accounts for a sizable portion of advertising expenditures. Direct mailing of product literature to important and prospective customers is also an important aspect of advertising.

Technology trends

Significant changes in food consumption levels have influenced the demand for more technologically advanced food-processing machinery. Some segments of the industry upgraded their machinery to incorporate the latest advances in computerized systems and high-technology process controls. This technology has increased operating speeds and the versatility and precision of food-processing machinery, while requiring little personnel to operate. Large parts of the dairy and brewery industries are highly automated, and this trend is spreading to most other segments of the food-processing industries.

With current technology, automated continuous measurement of the quality of processed foods is being implemented in most large processing plants. For instance, new technologies in sorting are making it possible to obtain better quality and more uniform distribution of raw materials for specific production operations. Sorting-by-color technology, a method used in the confectionery industry, is now being applied in other areas, such as sorting fruits and vegetables by shades of colors, such as green, yellow, etc. In another example, the meat-processing industry is using new high technology machinery to measure the proportion of fat in meat, making it possible to sort the raw material for different types of products (e.g., fresh meat packed for retail, or meat for sausages).

New innovations in equipment in coming years will likely add to the quality control capability incorporated in food-processing machinery and include new means to measure and control bacteriological levels, temperature, fat, salt content, etc.

Because companies producing food-processing machinery and related equipment are generally either subsidiaries of large diversified corporations or small closely held companies whose research and development (R&D) expenditures are not published, information on R&D outlays are not readily available. However, it is known that the special demands of the market and the high cost of R&D have caused many machinery manufacturers and food processors to enter into joint R&D programs.[7] These arrangements not only reduce costs, but also speed new product development, facilitate machinery testing under actual operating conditions, and reduce the time for bringing new machines on-line.

Governmental regulations

Standards for food quality and sanitation in the U.S. food industry, regarded as the best in the world, are set and regulated in cooperation with food processors, industry trade associations, professional societies, state agencies, the U.S. Department of Agriculture (USDA), the U.S. Food and Drug Administration (FDA), and the U.S. Department of Commerce. Meat and poultry processing machinery is subject to USDA inspection and approval. In addition, the USDA operates a similar voluntary program for egg and dairy industry machinery. The FDA has oversight of food-processing machinery parts made of plastics, rubber, and similar materials.[8]

Consumer Characteristics and Factors Affecting Demand

The market for the products covered in this summary consists of an estimated 1,300 industrial food- and beverage-processing establishments nationwide. The processing industry is the single largest U.S. manufacturing sector, accounting for more than 13 percent of the total value of U.S. manufacturing output in 1991.[9]

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[7] U.S. Department of Commerce, U.S. Industrial Outlook, 1994, p. 17-14.

[8] Ibid.

[9] Compiled from official statistics of the U.S. Bureau of the Census, *Annual Survey of Manufactures,* 1991, p. 1-6..

Consumption patterns for these articles are determined in large part by the economic vitality of the different segments in this industry (e.g., poultry packing, dairy processing, and processing of fruit and vegetables). Important determinants of the machinery purchaser's financial situation are the trend in agricultural commodity prices, changing consumer preferences and buying habits, and general business conditions. Rapid changes in food consumption patterns are having a significant impact on the food-processing sectors and the industries supplying machinery and equipment for the food-marketing system. The degree of demand for processing machinery varies from machine to machine. For example, some segments of this industry are still highly labor intensive; therefore, the demand for more labor-saving machinery will most likely increase. Other segments, such as dairy processing, face declining demand in processing machinery, attributable in large part to changes in consumer diets.

FOREIGN INDUSTRY PROFILE

The bulk of the worldwide demand for food-processing machinery is found in the industrialized nations, where the food and beverage industries (the end-users of these products) are sizable and mature. Manufacturers in industrialized countries also constitute the world's principal producers and exporters of such machinery. Historically, Germany, Italy, the United Kingdom, the Netherlands, and Switzerland have been the major food-processing machinery producers outside of the United States. These countries (particularly Germany and Italy) manufacture some of the world's most technologically sophisticated food-processing equipment, employing the latest technical advances. In 1990, the world's export market for these products was dominated by Germany with 35 percent market share; Italy followed with nearly 18 percent.[10] During the late 1980s, many manufacturers in the countries that served the U.S. market responded to high shipping costs by establishing sales, distribution, and service centers, as well as wholly-owned manufacturing facilities in the United States.

Although not yet significant, there is an increasing demand for food-processing machinery in many developing countries, brought about by greater industrialization and urbanization. For instance, some developing countries are experiencing growth in frozen and convenience food consumption. This demand is expected to stimulate growth in the construction of new processing plants and the modernization of existing plants, especially in the tropical and subtropical countries where rapid spoilage and pest infestation are serious problems. Most of these countries lack the facilities and local demand to manufacture the highly technical and specialized machinery required for these plants; thus, the demand is met by imports.

Canada

In 1990, there were approximately 120 establishments manufacturing food-processing machinery in Canada, employing an estimated 1,650 workers. Shipments were valued at $79 million, of which exports accounted for nearly $59 million. The United States and the European Union (EU) are the two primary sources of Canadian imports, accounting for about 60 and 34 percent, respectively. Manufacturers in the Canadian industry are small, with an average of 14 employees. Of the 120 establishments, about 90 were Canadian-owned. Approximately 74 percent of the establishments are located in Ontario and Quebec, 16 percent in the Western provinces, and the balance in the Atlantic provinces.[11]

Most Canadian firms produce one or two products for niche markets. The industry's strongest manufacturing capability is in the bakery-, meat-, poultry-, and fish-processing equipment sectors. Generally, there are few imported components in the equipment manufactured in Canada.

Western Europe

The food-processing machinery industry is one of the EU's most export- oriented industrial sectors. EU manufacturers produced approximately 75 percent of their machinery for export (exports include intra-EU trade) during 1990.[12] In 1990, the EU accounted for approximately 60 percent of the world's total exports (table B-3). Important foreign markets for EU food-processing machinery manufacturers include the United States, the newly industrialized nations, and certain developing countries. Leading EU manufacturers have established wholly-owned production facilities and joint ventures in the United

[10] Economic Commission for Europe, Food-Processing Machinery, 1990-91, p. 79 (reference table B-3).

[11] Industry, Science and Technology Canada, *Industry Profile, Food Processing Equipment*, 1990-91.

[12] Economic Commission for Europe, *Food-Processing Machinery*, 1990-91, p. 17.

States to serve the North American and Latin American markets. In recent years, these same European manufacturers have also entered into similar arrangements in the Far East in order to serve that region better.

Germany and Italy are the EU's leading food-processing machinery manufacturing countries. In 1990, German food-processing machinery shipments totalled an estimated $6 billion.[13] More than two-thirds of all German production of food-processing machinery were destined for export markets. The top export markets for food-processing machinery produced in Germany in 1990 were the United States, France, the United Kingdom, the Netherlands, Switzerland, China, Austria, Italy, Belgium, and Japan. A large share of German trade is with neighboring countries. The percentages of total exports from Germany, by region, in 1990, were as follows:[14]

Region	Percent
Europe:	
EU	37
EFTA	14
Central Europe and Russia	6
Other Europe	3
Total Europe	60
Africa	2
North America	17
Asia	14
All other	7
Total	100

Italy was the leading supplier of food-processing machinery and equipment to Germany, with 25 percent of the import market in 1990. Switzerland was the second ranking supplier with 17 percent, followed by the Netherlands with 13 percent. EU products collectively had the largest regional share of the German import market with over 37 percent.

Italy is the largest grower of fruits and vegetables in Europe, with yearly production of about 30 million tons, over 5 million of which are then processed. The food-processing machinery industry in Italy is large and technologically advanced, with exports accounting for approximately 70 percent of total production. In 1989, Italian exports of food-processing machinery amounted to approximately $600 million. Imports from the United States and France each were estimated to be 25 percent of the Italian import market, while Germany accounted for 15 percent of total imports during 1989. Nearly 85 percent of Italy's demand for machinery is met by the domestic industry, which has developed a reputation for excellence, particularly in the fruits and vegetables processing-equipment segment. However, foreign equipment is often incorporated into the food-processing lines of Italian suppliers.[15]

Central Europe and Russia

Industrial food-processing machinery produced in Central Europe and Russia, as a general rule, is less sophisticated. The age of food-processing plants and the installed equipment in these regions varies widely. Machines that are obsolete by Western standard are still employed in most factories in the dairy, milling, baking, beverage, and vegetable-oil processing industries in these countries. The meat- and poultry-processing industry, as well as some factories in the dairy- and vegetable oil-processing industries in most of these countries have undertaken modernization efforts, but these projects, for the most part, have not yet been completed. The U.S. Department of Commerce has stated that studies done on the food-processing industry in Central Europe and Russia indicate that productivity in these countries is low compared with that in Western countries and could be increased not only by more efficient management methods, but also by larger capital investments.[16]

Japan

The traditional Japanese diet has undergone recent changes and, as a result, the Japanese population now eats more meat and dines out more often. In order to meet the demand generated by such changes, the volume and variety of food-processing machinery produced in Japan have increased. Nevertheless, Japan's food-processing machinery industry in the past has depended a great deal upon imports of technology from North America and Western Europe. The industry still lags technically behind many Western countries, except in specialized areas such as rice-cleaning machines and instant ramen-(Chinese noodles) making machines. In response to Japan's technological deficiency, the Japan Food Machinery Manufacturers Association and the Basic Technology Study and Promotion Center established a Food Machinery Basic Technology Development Company in 1989 for the purpose of studying basic technology for the food machinery industry.[17]

In 1993, the Japanese industry producing food-processing machinery consisted of approximately 1,049 manufacturers, according to the Japanese Census

[13] Data include food packaging machinery.

[14] Economic Commission for Europe, Food-Processing Machinery, 1990-91, p. 17.

[15] U.S. Department of Commerce, *Market Research Reports*, Italy - Fruits & Vegetables, Oct. 27, 1993, and Germany, West - Food Processing/Packaging Machinery, Oct. 28, 1992.

[16] U.S. Department of Commerce, *Market Research Reports*, Hungary - Food Processing Machinery, Aug. 28, 1992, and Russia - Meat & Poultry Industry, Oct. 27, 1993.

[17] U.S. Department of Commerce, *Market Research Reports*, Japan - Food Processing Machinery, Oct. 27, 1993.

of Manufacturers. Of these companies, approximately 500 were specialized manufacturers of food-processing machinery. Of the total manufacturing firms, 80 percent employed between 4 and 19 workers; while 19 percent employed between 20 and 199 workers. Shipments of these products were valued at $3.9 million in 1993.[18]

Japanese producers of industrial food-processing machinery rely heavily on subcontractors for many production processes, such as casting, mechanical manufacturing, painting, plating, pressing, and forging. According to the Japanese National Federation of Small Business Association, over 43 percent of all food-processing machinery manufacturing inputs in Japan are provided by subcontractors. Japanese manufacturers not only believe that the use of outside subcontractors is the most cost-efficient way to produce food-processing machinery, but that it also acts as a buffer against fluctuations in the business cycle.[19]

U.S. TRADE MEASURES

The provisions of the Harmonized Tariff Schedule of the United States (HTS) applicable to industrial food-processing machinery and related equipment are shown in table 1. Table 1 provides the 1994 column 1-General rates of duty, special rates of duty, and U.S. exports and imports for 1993 for each 8-digit HTS subheading covering food-processing machinery and related equipment. The aggregate trade-weighted-average rate of duty for these products, based on 1993 data, was 3.2 percent ad valorem, including U.S. imports entering free of duty under preferential tariff programs. Imports of food-processing machinery and related equipment entered free of duty during 1989-93 from eligible countries under the Generalized System of Preferences (GSP) and the Caribbean Basin Economic Recovery Act (CBERA), and under the United States-Israel Free-Trade Area Implementation Act (ITL), and the United States-Canada Free-Trade Agreement (CA).[20] There are no significant nontariff barriers to U.S. imports of food-processing machinery and related equipment.

All of the food-processing machinery classified in the HTS subheadings covered by this summary, which qualify under the rules of origin, are eligible for tariff preferences under the North American Free Trade Agreement (NAFTA). The NAFTA incorporates and expands, on a trilateral basis, most of the provisions of the now-suspended U.S.-Canada FTA. The NAFTA, as implemented by the North American Free Trade Agreement Implementation Act (Public Law 103-182, approved Dec. 8, 1993), provided for the elimination of U.S. duties on eligible food-processing machinery and related equipment imported from Mexico. The effective date of implementation for both the United States and Mexico was January 1, 1994. The United States, which is the leading supplier of food-processing machinery to Mexico, is expected to retain this position in the foreseeable future. The recently completed (December 1993) GATT Uruguay Round of trade negotiations may result in further reductions in U.S. and foreign duties on the articles covered by this summary. The Uruguay Round schedule of U.S. concessions was not available when this summary was prepared.

FOREIGN TRADE MEASURES

U.S. tariff rates on food-processing machinery are comparable to those in other developed countries to which U.S. firms export, but are considerably lower than those in many developing county markets. The U.S. tariff rate on such machinery averages 3.2 percent ad valorem, compared with an average rate of 3.9 percent ad valorem, for the EU (table B-4). Since January 1, 1994, all of the goods covered in this summary, when they comply with NAFTA's rules of preference, have entered Canada and Mexico from the United States free of duty pursuant to the North American Free Trade Agreement.

In some nations, tariffs can be as high as 200 percent ad valorem. Many of these countries reduced tariff rates on certain imported items during the late 1980s in order to promote more internationally competitive industries at home. High tariffs and taxes were the principal elements that limited U.S. the access of U.S. food-processing machinery to many South American and Asian countries. However, during 1989-92, many of these countries began to liberalize their trade regimes to permit the importation of newer, more advanced machinery.

Other countries actually increased import duties, however. In October 1992, the Government of Argentina issued Resolution 432/91 that increased the top tariff rate on imported capital goods including food processing machinery from 22 to 35 percent ad valorem for machinery similar to that produced domestically, and from free to 5 percent for machinery not produced in Argentina. This was a reversal of prior measures. In 1989, under Resolution 324, the Argentine Government had previously eliminated the import duties on certain food-processing machinery not produced in Argentina. At the same time, the Government also had waived duties under Decrees 571 and 515 on certain machinery imported for Government-sponsored projects.[21]

[18] U.S. Department of Commerce, Market Research Reports, Japan-Food Processing Machinery, Dec. 26, 1994.

[19] Japan External Trade Organization, Your Market in Japan, Food Processing Machinary, 1985, p. 11.

[20] Superceded by NAFTA as of January 1, 1994.

[21] U.S. Department of Commerce, U.S. Embassy, Buenos Aires, Argentina-Commercial Activities Reports 1990-92.

Table 1
Industrial food-processing machinery and related equipment: Harmonized Tariff Schedule subheading; description; U.S. col. 1 rate of duty as of Jan. 1, 1994; U.S. domestic exports, 1993; and U.S. imports for consumption, 1993

HTS & Export subheading	Description	Col. 1 rate of duty As of Jan. 1, 1994 General	Special[1]	U.S. exports, 1993	U.S. imports, 1993
				1,000 dollars	
8417.20.00	Bakery ovens, including biscuit ovens	5.7%	Free (A,CA,E,IL,J,MX)	16,805	10,397
8421.11.00	Cream separators	3.7%	Free (A,CA,E,IL,J,MX)	1,190	4,098
8435.10.00	Presses, crushers, and similar machinery used in the manufacture of wine, cider, fruit juices, or similar beverages	4.2%	Free (A,CA,E,IL,J,MX)	14,007	4,530
8435.90.00	Parts of presses, crushers, and similar machinery used in the manufacture of wine, cider, fruit juices, or similar beverages	4.2%	Free (A,CA,E,IL,J,MX)	6,980	1,557
8437.10.00	Machines for cleaning, sorting, or grading seed, grain, or dried leguminous vegetables	3.5%	Free (A,CA,E,IL,J,MX)	15,170	5,606
8437.80.00	Machinery used in the milling industry or for the working of cereals or dried leguminous vegetables, other than farm type	3.5%	Free (A,CA,E,IL,J,MX)	36,288	15,219
8437.90.00	Parts for machinery used in the milling industry or for cleaning, sorting, grading, or working of cereals or dried leguminous vegetables	3.5%	Free (A,CA,E,IL,J,MX)	23,366	12,031
8438.10.00	Bakery machinery and machinery for the manufacture of macaroni, spaghetti, or similar products	3.5%	Free (A,CA,E,IL,J,MX)	49,003	85,548
8438.20.00	Machinery for the manufacture of confectionery, cocoa, or chocolate	3.5%	Free (A,CA,E,IL,J,MX)	11,805	36,248
8438.30.00	Machinery for sugar manufacture, nesi	Free	Free	12,506	1,426
8438.40.00	Brewery machinery	3.5%	Free (A,CA,E,IL,J,MX)	11,752	9,589
8438.50.00	Machinery for the preparation of meat or poultry	3.5%	Free (A,CA,E,IL,J,MX)	91,782	55,275
8438.60.00	Machinery for the preparation of fruits, nuts, or vegetables.	3.5%	Free	36,369	11,205

See footnotes at end of table.

Table 1—Continued
Industrial food-processing machinery and related equipment: Harmonized Tariff Schedule subheading; description; U.S. col. 1 rate of duty as of Jan. 1, 1994; U.S. domestic exports, 1993; and U.S. imports for consumption, 1993

HTS & Export subheading	Description	Col. 1 rate of duty As of Jan. 1, 1994 General	Special[1]	U.S. exports, 1993	U.S. imports, 1993
				1,000 dollars	
8438.80.00	Machinery for the industrial preparation or manufacture of food or drink	4%	Free (A,CA,E,IL,J,MX)	115,288	47,618
8438.90.10	Parts of machinery for sugar manufacture	Free	Free	([2])	7,889
8438.90.90	Parts of machinery for industrial preparation or manufacture of food or drink, other than sugar manufacturing	3.5%	Free (A,CA,E,IL,J,MX)	166,774	102,321

[1] Programs under which special tariff treatment may be provided, and the corresponding symbols for such programs as they are indicated in the "Special" subcolumn, are as follows: Generalized System of Preferences (A); North American Free-Trade Agreement (MX); Caribbean Basin Economic Recovery Act (B); United States-Israel Free Trade Area (IL); and Andean Trade Preference Act (J).
[2] Data included in 8438.90.90

Source: U.S. exports and imports compiled from official statistics of the U.S. Department of Commerce.

By contrast, until 1990, local manufacturers of all equipment in Brazil maintained a virtual monopoly in the Brazilian market because of legislation banning imports. Imports were restricted by the 'Law of Similars' that prohibited the importation of machinery similar to that produced in Brazil. Effective January 30, 1990, however, the Brazilian Government (Executive Secretary or the Brazilian Customs Policy Commission) reduced import duties on certain categories of food-processing machinery from an average of 40 percent ad valorem to about 5 percent ad valorem. The tariff reduction applied only to machinery and parts not produced in Brazil and included a number of automated and advanced-technology equipment. Duties on equipment not included under the January 1990 tariff-reduction measure have recently been reduced from 40 percent to 20 to 25 percent ad valorem.

U.S. MARKET

Consumption

Apparent U.S. consumption of industrial food-processing machinery and related equipment increased irregularly from an estimated $2.0 billion in 1989 to $2.3 billion in 1993, representing an increase of 12 percent during this period (table 2). The food-processing industry, the primary consumer of these machines, enjoyed record levels of production and sales during the period.[22] Consequently, demand for new and replacement machinery increased. The increase in apparent consumption during this period can also be related to more aggressive marketing by U.S. manufacturers and to efforts by U.S. machinery manufacturers to produce technologically competitive machinery. The ratio of U.S. imports to consumption increased from 17 percent in 1989 to 20 percent in 1992, before declining to 18 percent in 1993.

According to major food-processing manufacturers, demand for new food-processing machinery in the United States accelerated in all food-processing sectors in 1990-91.[23] Capital expenditures by food processors during this period for new plant construction and modernization of older plants reached record levels (table B-5). Older plants dedicated to the production of narrow product lines are being replaced by new 'Hyperplants,' which are large, low-cost, state-of-the-art plants capable of multi-product runs of varying duration.

U.S. Producers' Shipments

The value of U.S. producers' shipments of industrial food-processing machinery and related equipment rose steadily from an estimated $2.1 billion in 1989 to $2.5 billion in 1993, or by 16 percent (table 2). About 24 percent of total shipments throughout this period were accounted for by exports to over 150 countries.

Although most industrial food-processing machinery are generic products that compete principally on the basis of price and technological sophistication, certain special-application machinery can be costly to develop and produce. A slight decline in price in the former category of machinery can shift purchases away from one source to another. To remain competitive in the U.S. and foreign markets, many U.S. producers have become more aggressive in marketing their products. To become more price-competitive with imports, domestic manufacturers have increased funding for research and development, moved toward producing machinery for special niches, adopted such programs as just-in-time manufacturing, and increased productivity and efficiency while reducing production costs.

Imports

U.S. imports of the industrial food-processing machinery and related equipment covered in this summary increased irregularly from $340 million in 1989 to $411 million in 1993, or by 21 percent (table 3). This represents an average annual growth rate of nearly 5 percent during this period. However, among the product classes, the trend in imports differed. Compared to 1992, imports in 1993 declined by 38 percent for sugar-processing machinery and parts, 6 percent for flour and grain mill machinery and parts, 13 percent for brewery machinery and parts, 24 percent for fruit-, nut-, and vegetable-processing machinery, and 24 percent for all other industrial food-processing machinery. In contrast, compared to 1992, imports in 1993 grew by nearly 200 percent for brewery machinery, 14 percent for machinery for preparing meats and poultry, and 11 percent for chocolate and confectionery machinery and parts (figure 2 and table B-6).

There were no significant changes in the top U.S. import suppliers during 1989-93 and the order of importance changed only slightly. Germany has traditionally been the chief source of U.S. imports, accounting for 25 percent of total U.S. imports in 1989 and 29 percent in 1993 (figure 3). Imports from Germany consisted principally of baking machinery, chocolate and confectionery machinery, and beverage machinery. Imports from Italy and the Netherlands (the second and third largest suppliers in 1993, respectively) consisted primarily of machinery used in the manufacture of macaroni and similar products and machinery used in the manufacture of beverages, wines, and juices. Imports from Japan were principally vegetable sorting and grading machinery. Replacement parts for the operations of U.S.-based affiliates of

[22] U.S. Department of Commerce, *U.S. Industrial Outlook*, 1994, p. 17-14.

[23] Telephone interveiws with industry officials.

Table 2
Industrial food-processing machinery and related equipment: U.S. producers' shipments, exports of domestic merchandise, imports for consumption, apparent U.S. consumption, and ratio of imports to consumption, 1989-93

Year	U.S. producers' shipments[1]	U.S. exports	U.S. imports	Apparent U.S consumption[1]	Ratio of imports to consumption[1]
	Million dollars				*Percent*
1989	2,126	452	340	2,014	16.9
1990	2,261	480	405	2,186	18.5
1991	2,193	537	395	2,051	19.3
1992	2,338	595	445	2,188	20.3
1993	2,456	609	411	2,258	18.2

[1] Estimated by the staff of the U.S. International Trade Commission.

Source: Compiled from official statistics of the U.S. Department of Commerce, except as noted.

Table 3
Industrial food-processing machinery and related equipment: U.S. imports for consumption, by principal sources, 1989-93

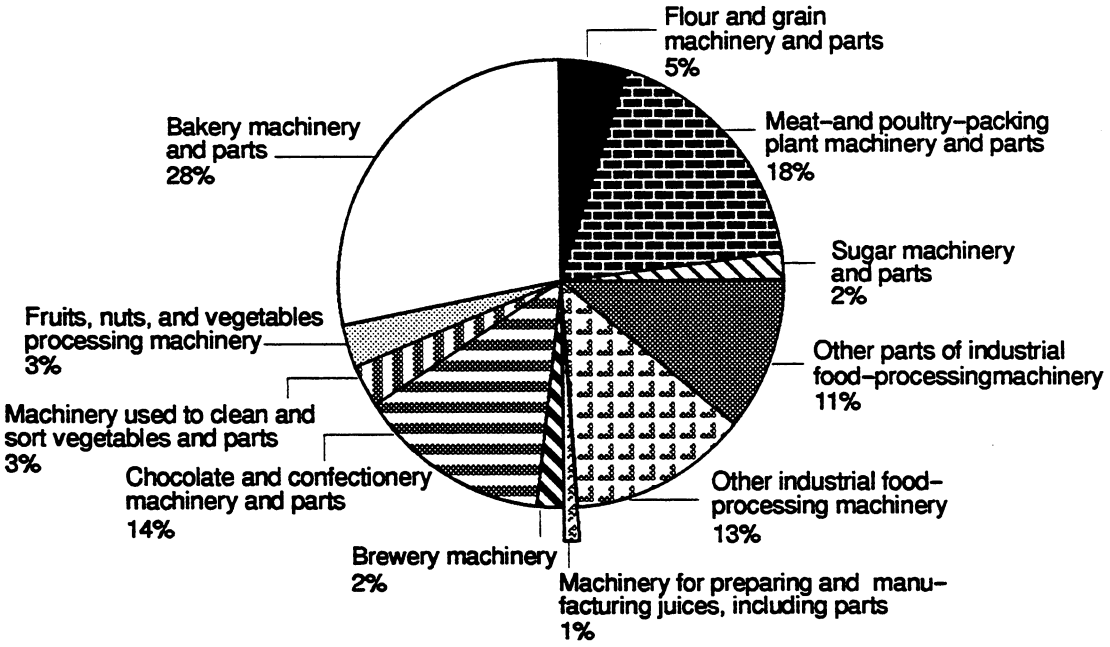
(In 1,000 dollars)

Source	1989	1990	1991	1992	1993
Germany	84,402	105,837	110,216	131,664	119,004
Italy	43,127	54,376	63,828	55,861	58,800
Netherlands	27,971	39,477	35,168	34,760	38,035
Japan	48,226	46,584	40,836	35,017	33,302
United Kingdom	23,130	32,485	23,484	28,492	23,681
Switzerland	15,489	22,919	20,049	37,305	23,266
Denmark	11,843	18,522	18,259	18,161	21,224
Canada	19,851	15,086	16,039	16,138	20,691
France	11,945	17,121	18,425	31,129	18,915
All other	53,553	53,050	48,536	56,005	53,640
Total	339,539	405,457	394,840	444,532	410,558

Note.—Because of rounding, figures may not add to the totals shown.

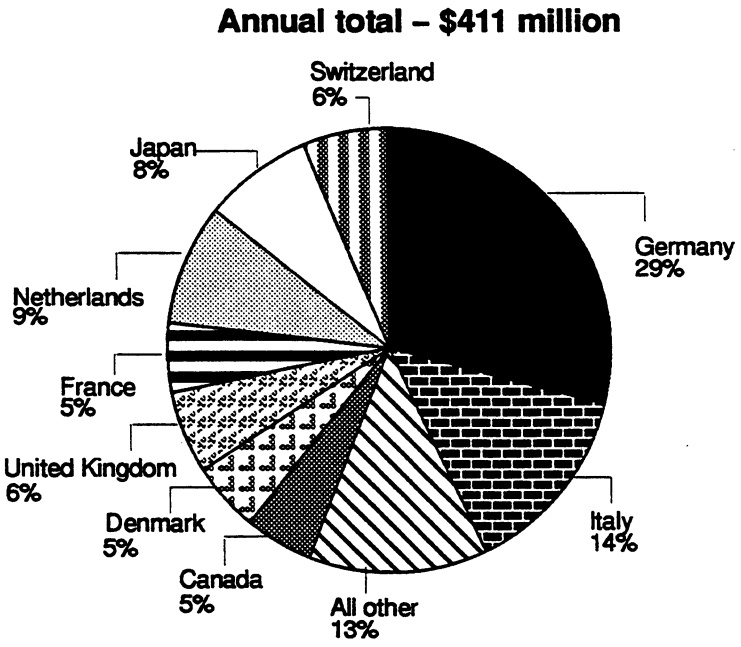
Source: Compiled from official statistics of the U.S. Department of Commerce.

Figure 2
Industrial food-processing machinery and related equipment: U.S. imports for consumption, by selected product classes, 1993



Source: Compiled from official statistics of the U.S. Department of Commerce.

Figure 3
Industrial food-processing machinery and related equipment: U.S. imports from major sources, 1993



Source: Compiled from official statistics of the U.S. Department of Commerce.

foreign companies accounted for about 19 percent of total imports during this period.[24]

About 8 percent ($32 million) of total U.S. imports entered free of duty in 1993, up from $17 million (5 percent) in 1989. Articles imported under the GSP accounted for nearly 39 percent of total duty-free imports in 1993 and were predominantly food-processing machinery from Mexico. Articles imported from CBERA countries accounted for less than 1 percent of total imports in 1992. Less than 1 percent of the total value of U.S. imports in 1993 were articles entered under HTS subheading 9802.00.80.[25] The principal importers of food-processing machinery are U.S. food-processing manufacturers looking to supplement their product lines, U.S.-based subsidiaries of foreign producers of food processing machinery, independent distributors, and privately held importing companies.[26]

FOREIGN MARKETS

Foreign Market Profile

According to the U.S. Department of Commerce, U.S. producers of industrial food-processing machinery exported machinery to nearly 150 markets, accounting for over 25 percent of total product shipments in 1993. The leading U.S. export markets for these products were Canada, Mexico, and the United Kingdom. Exports to Canada and Mexico together grew at a faster rate than total exports primarily because of the lowering of tariff barriers between the United States and Canada, and of the unilateral duty reduction implemented in Mexico during 1990-91. Mexico's recent strong growth in agribusiness was also a factor in influencing the demand for more U.S.-made state-of-the-art food-processing machinery. U.S. manufacturers are also making inroads into markets of Central Europe, Russia, and Ukraine as a result of aggressive marketing efforts and the establishment of operations in these countries by U.S. food-processing companies.[27] Favorable exchange rates coupled with competitive low-interest rates by the Export-Import Bank, have made U.S. machinery more price competitive throughout the world market.[28] A variety of machines were exported in 1993, including baking equipment, pasta machinery, meat and poultry processing machinery, fruit and vegetable processing machinery, and cereal and grain machinery. Parts accounted for about 32 percent of exports.

U.S. Exports

U.S. exports of industrial food-processing machinery increased from $452 million in 1989 to $609 million in 1993, or by 35 percent, representing an annual gain of nearly 8 percent (table 4). U.S. exports to Canada declined to $80 million in 1993 from $92 million in 1990. However, Korea, China, and other developing countries emerged as important export markets (figure 4). All but one product category showed healthy increases during the 5-year period. Exports of fruit-, nut-, and vegetable-processing machinery, declined during 1990-93 (figure 5 and table B-7). Exports of bakery machinery and ovens, one of the significant product classes in terms of value, exhibited sharp but erratic increases during this period, from $49 million in 1989 to $78 million in 1992, before dropping to $65 million in 1993. A large share of the growth in this category can be attributed to an increase in shipments to Mexico.

U.S. TRADE BALANCE

The U.S. trade surplus in food-processing machinery (table 5 and figure 6) increased irregularly from $112 million in 1989 to $199 million in 1993. The improvement in the trade surplus was affected by the relatively low value of the U.S. dollar in major foreign exchange markets, compared with its value during the mid-1980s.[29] However, the most significant factor affecting the trade surplus was the increasing demand in Canada and Mexico for U.S. products, although demand for U.S. machinery has also been increasing worldwide. The U.S. trade surplus with Canada and Mexico during this period rose from $70 million in 1989 to $95 million in 1993, offsetting the increased trade deficit with Germany, which grew from $68 million in 1989 to $101 million in 1993 (table 5). Nonetheless, the U.S. industry continued to experience trade deficits with its major rivals in the EU and Switzerland. Conversely, the U.S. trade deficit with Japan for food-processing machinery decreased to $11 million in 1993, from $18 million in 1989. In 1993, U.S. imports increased by nearly 21 percent over 1989 to $411 million and exports rose by 35 percent to $609 million (figures 7 and 8).

[24] U.S. Department of Commerce, *U.S. Industrial Outlook*, 1994, p. 17-14.

[25] This provision is set forth in Chapter 98 of the HTS. For an analysis, see Production Sharing: U.S. Imports under Harmonized Tariff Schedule subheadings 9802.00.60 and 9802.00.80 1989-1992, USITC Publication 2729 (February 1994).

[26] Compiled from official statistics of the U.S. Department of Commerce, 1993.

[27] U.S. Department of Commerce, U.S. Industrial Outlook, 1993, p. 17-14.

[28] U.S. Department of Commerce, U.S. Industrial Outlook, 1994, p. 17-1.

[29] Ibid.

Table 4
Industrial food-processing machinery and related equipment: U.S. exports of domestic merchandise, by principal markets, 1989-93

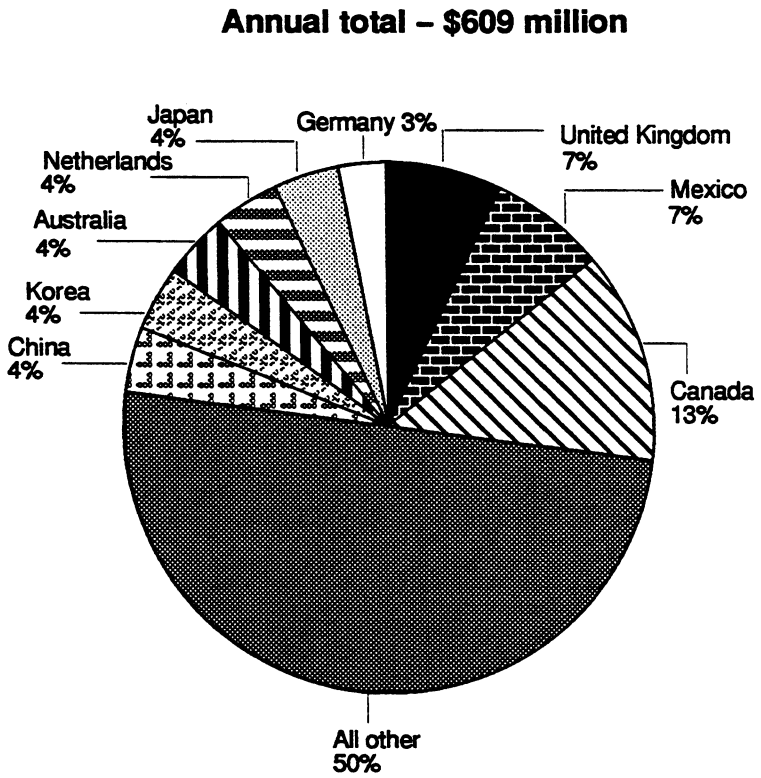
(In 1,000 dollars)

Market	1989	1990	1991	1992	1993
Canada	60,950	91,637	76,237	81,733	80,417
Mexico	29,931	47,118	51,306	56,294	44,307
United Kingdom	31,748	28,421	36,241	41,490	40,833
Korea	12,143	16,110	18,751	18,729	25,709
Netherlands	19,857	24,247	27,848	23,152	25,015
China	8,316	2,383	6,928	14,060	24,916
Japan	30,704	29,526	30,374	25,390	22,529
Australia	19,020	16,163	16,677	18,954	21,916
Germany	16,433	17,508	19,387	24,204	18,096
All other	222,461	206,853	253,573	291,182	305,347
Total	451,572	479,965	537,262	595,188	609,085

Note.—Because of rounding, figures may not add to the totals shown.

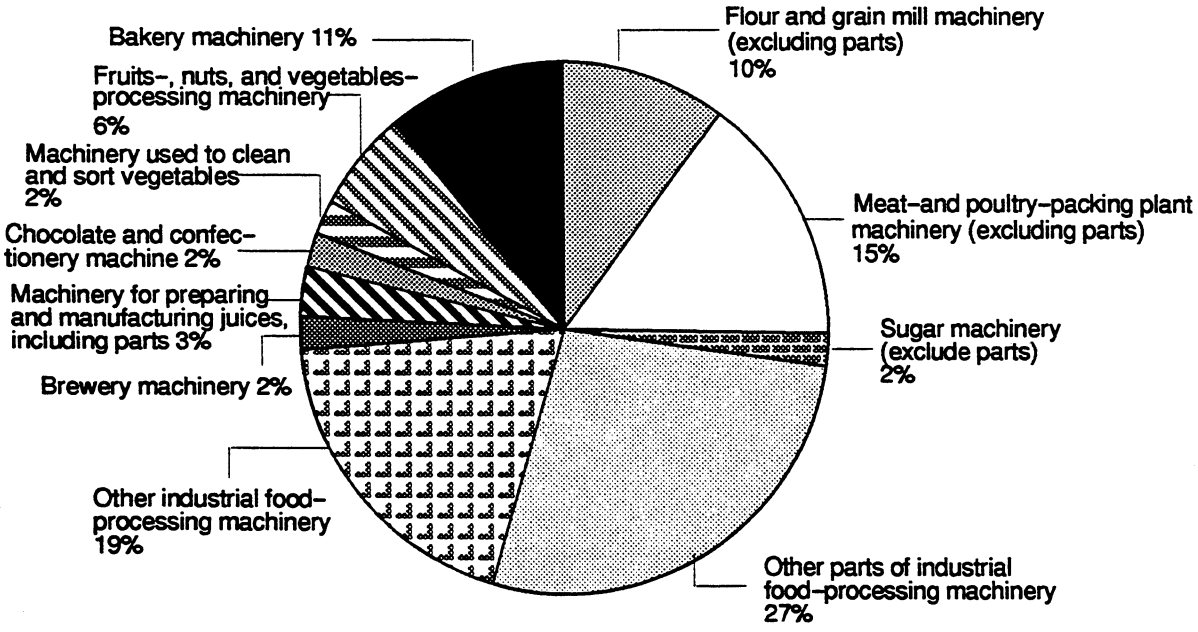
Source: Compiled from official statistics of the U.S. Department of Commerce.

Figure 4
Industrial food-processing machinery and related equipment: U.S. exports to major markets, 1993



Source: Compiled from official statistics of the U.S. Department of Commerce.

Figure 5
Industrial food-processing machinery and related equipment: U.S. exports of domestic merchandise, by selected product classes, 1993



Source: Compiled from official statistics of the U.S. Department of Commerce.

Table 5
Industrial food-processing machinery and related equipment: U.S. exports of domestic merchandise, imports for consumption, and merchandise trade balance, by selected countries and country groups, 1989-93[1]

Item	1989	1990	1991	1992	1993
U.S. exports of domestic merchandise:					
Germany	16	18	19	24	18
Canada	61	92	76	82	80
Italy	7	10	11	8	9
United Kingdom	32	28	36	41	41
Netherlands	20	24	28	23	25
Japan	31	30	30	25	23
Mexico	30	47	51	56	44
France	10	18	21	14	17
Australia	19	16	17	19	22
Switzerland	3	4	4	1	4
All other	222	193	243	300	327
Total	452	480	537	595	609
EU-12	112	123	137	137	135
OPEC	19	17	24	31	29
ASEAN	21	24	24	34	32
CBERA	48	38	55	43	43
Central Europe	4	3	4	18	9
U.S. imports for consumption:					
Germany	84	106	110	132	119
Canada	20	15	16	16	21
Italy	43	54	64	56	59
United Kingdom	23	32	23	28	24
Netherlands	28	39	35	35	38
Japan	48	47	41	35	33
Mexico	1	6	4	13	9
France	12	17	18	31	19
Australia	8	4	3	4	6
Switzerland	15	23	20	37	23
All other	56	61	59	57	61
Total	340	405	395	445	411
EU-12	211	277	281	308	288
OPEC	(2)	(2)	(2)	(2)	(2)
ASEAN	(2)	1	(2)	1	1
CBERA	1	1	(2)	1	1
Central Europe	1	1	(2)	1	1
U.S. merchandise trade balance:					
Germany	-68	-88	-91	-107	-101
Canada	41	77	60	66	60
Italy	-36	-45	-53	-47	-50
United Kingdom	9	-4	13	13	17
Netherlands	-8	-15	-7	-12	-13
Japan	-18	-17	-10	-10	-11
Mexico	29	41	47	44	36
France	-2	1	3	-17	-2
Australia	11	12	13	15	16
Switzerland	-12	-19	-16	-36	-20
All other	167	132	184	243	266
Total	112	75	142	151	199
EU-12	-99	-154	-143	-171	-152
OPEC	19	17	24	31	29
ASEAN	21	24	24	34	31
CBERA	48	37	55	41	43
Central Europe	4	2	3	18	8

[1] Import values are based on customs value; export values are based on f.a.s. value, U.S. port of export. U.S. trade with East Germany is included in "Germany" but not "Central Europe."

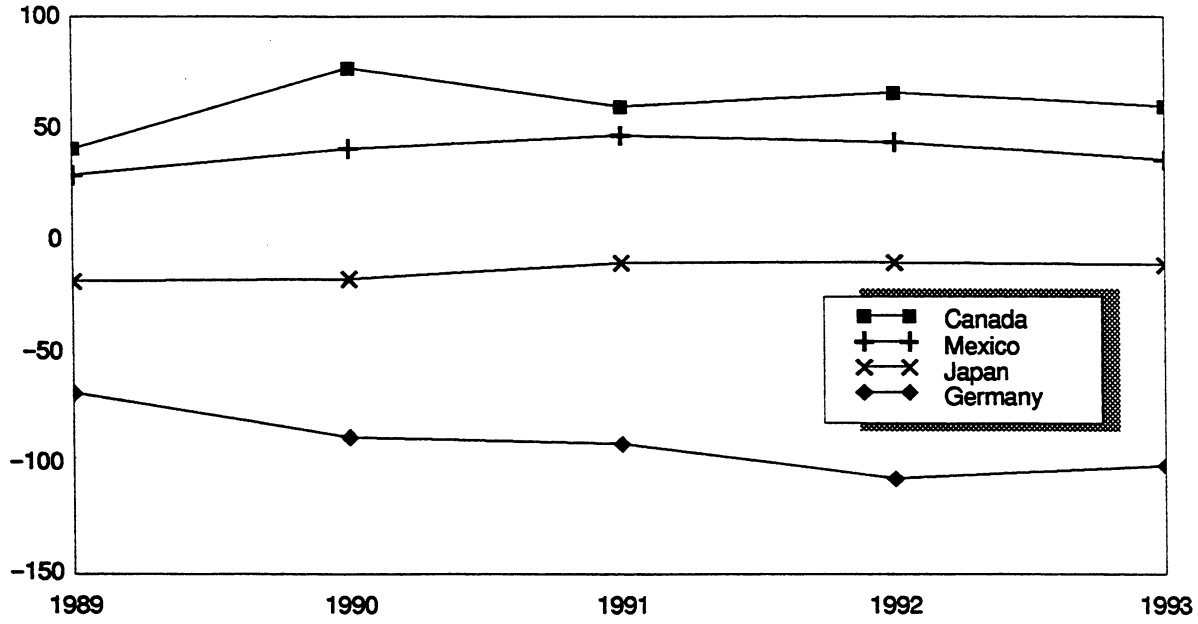
[2] Less than $500,000.

Note.—Because of rounding, figures may not add to the totals shown.

Source: Compiled from official statistics of the U.S. Department of Commerce.

Figure 6
Industrial food-processing machinery and related equipment: U.S. bilaterial trade balance with major trading partners, 1989-93

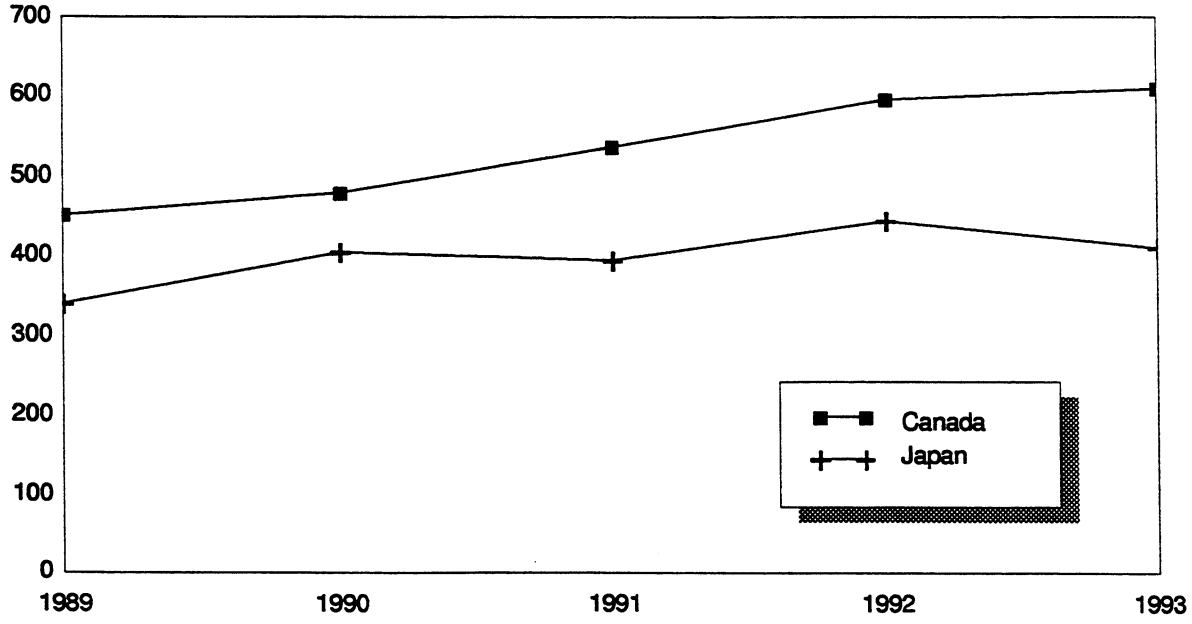
$ Millions



Source: Compiled from official statistics of the U.S. Department of Commerce.

Figure 7
Industrial food-processing machinery and related equipment: U.S. imports and exports, 1989-93

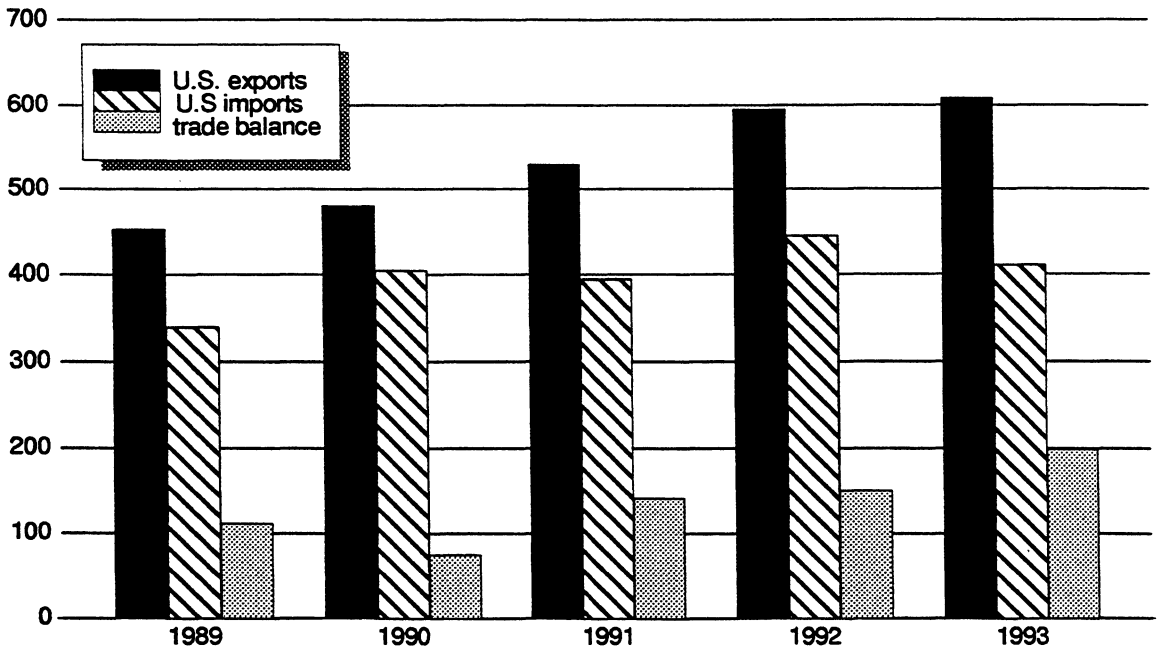
$ Millions



Source: Compiled from official statistics of the U.S. Department of Commerce.

Figure 8
Industrial food-processing machinery and related equipment: U.S. exports, imports, and trade balance, 1989-93

$ Millions



Source: Compile from official statistics of the U.S. Department of Commerce.

APPENDIX A
EXPLANATION OF TARIFF AND TRADE AGREEMENT TERMS

The ***Harmonized Tariff Schedule of the United States*** (HTS) replaced the ***Tariff Schedules of the United States*** (TSUS) effective January 1, 1989. Chapters 1 through 97 are based upon the internationally adopted Harmonized Commodity Description and Coding System through the 6-digit level of product description, with additional U.S. product subdivisions at the 8-digit level. Chapters 98 and 99 contain special U.S. classification provisions and temporary rate provisions, respectively.

Rates of duty in the ***general*** subcolumn of HTS column 1 are most-favored-nation (MFN) rates; for the most part, they represent the final concession rate from the Tokyo Round of Multilateral Trade Negotiations. Column 1-general duty rates are applicable to imported goods from all countries except (1) those enumerated in general note 3(b) to the HTS plus Serbia and Montenegro, whose products are dutied at the rates set forth in ***column 2***, and (2) countries whose goods are subject to embargo. Goods from Albania, Armenia, Belarus, Bulgaria, the People's Republic of China, the Czech Republic, Estonia, Georgia, Hungary, Kazakhstan, Kyrgyzstan, Latvia, Lithuania, Moldova, Mongolia, Poland, Romania, Russia, Slovakia, Turkmenistan, and the Ukraine are currently eligible for MFN treatment, as are the other republics of the former Socialist Federal Republic of Yugoslavia. Among articles dutiable at column 1-general rates, particular products of enumerated countries may be eligible for reduced rates of duty or for duty-free entry under one or more preferential tariff programs. Such tariff treatment is set forth in the ***special*** subcolumn of HTS column 1. Where eligibility for special tariff treatment is not claimed or established, goods are dutiable at column 1-general rates.

The ***Generalized System of Preferences*** (GSP) affords nonreciprocal tariff preferences to developing countries to aid their economic development and to diversify and expand their production and exports. The U.S. GSP, enacted in title V of the Trade Act of 1974 and renewed in the Trade and Tariff Act of 1984, applies to merchandise imported on or after January 1, 1976 and before September 30, 1994. Indicated by the symbol "A" or "A*" in the special subcolumn of column 1, the GSP provides duty-free entry to eligible articles the product of and imported directly from designated beneficiary developing countries, as set forth in general note 3(c)(ii) to the HTS.

The ***Caribbean Basin Economic Recovery Act*** (CBERA) affords nonreciprocal tariff preferences to developing countries in the Caribbean Basin area to aid their economic development and to diversify and expand their production and exports. The CBERA, enacted in title II of Public Law 98-67, implemented by Presidential Proclamation 5133 of November 30, 1983, and amended by the Customs and Trade Act of 1990, applies to merchandise entered, or withdrawn from warehouse for consumption, on or after January 1, 1984; this tariff preference program has no expiration date. Indicated by the symbol "E" or "E*" in the special subcolumn of column 1, the CBERA provides duty-free entry to eligible articles, and reduced-duty treatment to certain other articles, which are the product of and imported directly from designated countries, as set forth in general note 3(c)(v) to the HTS.

Preferential rates of duty in the special subcolumn of column 1 followed by the symbol "IL" are applicable to products of Israel under the ***United States-Israel Free Trade Area Implementation Act*** of 1985 (IFTA), as provided in general note 3(c)(vi) of the HTS. Where no rate of duty is provided for products of Israel in the special subcolumn for a particular provision, the rate of duty in the general subcolumn of column 1 applies.

Preferential rates of duty in the special subcolumn of column 1 followed by the symbol "CA" are applicable to eligible goods originating in the territory of Canada under the ***United States-Canada Free-Trade Agreement*** (CFTA), as provided in general note 3(c)(vii) to the HTS.

Preferential nonreciprocal duty-free or reduced-duty treatment in the special subcolumn of column 1 followed by the symbol "J" or "J*" in parentheses is afforded to eligible articles the product of designated beneficiary countries under the ***Andean Trade Preference Act*** (ATPA), enacted in title II of Public Law 102-182 and implemented by Presidential Proclamation 6455 of July 2, 1992 (effective July 22, 1992), as set forth in general note 3(c)(ix) to the HTS.

Other special tariff treatment applies to particular ***products of insular possessions*** (general note 3(a)(iv)), goods covered by the ***Automotive Products Trade Act*** (APTA) (general note 3(c)(iii)) and the ***Agreement on Trade in Civil Aircraft*** (ATCA) (general note 3(c)(iv)), and ***articles imported from freely associated states*** (general note 3(c)(viii)).

The ***General Agreement on Tariffs and Trade*** (GATT) (61 Stat. (pt. 5) A58; 8 UST (pt. 2) 1786) is the multilateral agreement setting forth basic principles governing international trade among its

111 signatories. The GATT's main obligations relate to most-favored-nation treatment, the maintenance of scheduled concession rates of duty, and national (nondiscriminatory) treatment for imported products; the GATT also provides the legal framework for customs valuation standards, "escape clause" (emergency) actions, antidumping and countervailing duties, and other measures. Results of GATT-sponsored multilateral tariff negotiations are set forth by way of separate schedules of concessions for each participating contracting party, with the U.S. schedule designated as Schedule XX.

Officially known as "The Arrangement Regarding International Trade in Textiles," the ***Multifiber Arrangement*** (MFA) provides a framework for the negotiation of bilateral agreements between importing and producing countries, or for unilateral action by importing countries in the absence of an agreement. These bilateral agreements establish quantitative limits on imports of textiles and apparel, of cotton and other vegetable fibers, wool, man-made fibers and silk blends, in order to prevent market disruption in the importing countries—restrictions that would otherwise be a departure from GATT provisions. The United States has bilateral agreements with many supplying countries, including the four largest suppliers: China, Hong Kong, the Republic of Korea, and Taiwan.

APPENDIX B
STATISTICAL TABLES

Table B-1
U.S. industrial food-processing machinery industry: U.S. producers' shipments, production worker man-hours, and value of shipments compared with production worker man-hours, 1989-92

Year	U.S. producers' shipments	Production worker man-hours	Value of shipments/ production worker man-hours
	(million dollars)	*(million dollars)*	
1989	2,126.0	22.0	96.6
1990	2,260.9	22.0	102.8
1991	2,193.1	21.0	104.4
1992	[1]2,338.0	([2])	([2])

[1] Estimated by the staff of the U.S. International Trade Commission.
[2] Not available.

Source: U.S. Bureau of the Census, *Census of Manufactures,* 1991 and *Annual Survey of Manufactures,* 1991, except as noted.

Table B-2
U.S. industrial food-processing machinery and selected industries: Capacity utilization, fourth quarter 1989-92

Year	Full production rate		Nat'l emergency production rate			
	Machinery except electrical	Special industrial machinery	Food-processing machinery	Machinery except electrical	Special industrial machinery	Food-processing machinery
	(Percentage)					
1989	73	77	79	66	65	72
1990	71	74	78	64	67	72
1991	74	79	86	57	55	53
1992	73	79	79	54	53	51

Source: U.S. Bureau of the Census, *Current Industrial Reports,* Survey of Plant Capacity, 1992.

Table B-3
Exports of food-processing machinery of selected countries, 1988-90

Country	1988	1989	1990
		1,000 dollars	
EU:			
Belgium	73,738	53,867	79,082
Denmark	192,818	253,308	271,436
France	181,103	196,005	225,406
Germany	788,377	800,832	920,955
Italy	474,043	575,478	877,048
Netherlands	411,479	433,793	558,399
Spain	58,272	64,904	87,593
United Kingdom	238,657	227,748	261,910
EFTA:			
Sweden	47,212	42,497	57,840
Switzerland	258,688	259,681	364,092
North America:			
Canada	61,400	59,400	58,800
United States	408,018	451,572	479,965
Other:			
Australia	27,123	34,644	39,841
Japan	118,237	158,655	182,453

Source: Economic Commission for Europe, *Food-Processing Machinery*, 1990-91, p. 79.

Table B-4
Industrial food-processing machinery and related equipment: Harmonized Tariff Schedule subheading; description; tariff treatment in primary U.S. export markets, 1993

HTS subheading	Description	Canada MFN	GPT[1]	US	Japan[2] (General)	EU[3] (MFN)	Mexico[4] (General)	U.S.
					Percent ad valorem			
8417.20.00	Bakery ovens, including biscuit ovens	11.8	7.5	Free	Free	4.1	10	Free
8421.11.00	Cream separators	Free	Free	Free	Free	3.8	10	Free
8435.10.00	Presses, crushers, and similar machinery used in the manufacture of wine, cider, fruit juices or similar beverages	11.8	7.5	Free	Free	4.0	10	Free
8435.90.00	Parts of presses, crushers, and similar machinery used in the manufacture of wine, cider, fruit juices, or similar beverages	11.8	7.5	Free	Free	4.0	10	Free
8437.10.00	Machinery for cleaning, sorting, or grading seed, grain, or dried leguminous vegetables	11.8	7.5	Free	Free	3.7	10	Free
8437.80.00	Machinery used in the milling industry or for working of cereals or dried leguminous vegetables, other than farm type	11.8	7.5	Free	Free	4.6	10	Free
8437.90.00	Parts for machinery used in the milling industry or for cleaning, sorting, grading, or working of cereals or dried leguminous vegetables	11.8	7.5	Free	Free	3.7	10	Free
8438.10.00	Bakery machinery and machinery for the manufacture of macaroni, spaghetti, or similar products	11.8	7.5	Free	Free	3.8	10	Free
8438.20.00	Machinery for the manufacture of confectionery, cocoa, or chocolate	11.8	7.5	Free	Free	3.8	10	Free
8438.30.00	Machinery for sugar manufacture	11.8	7.5	Free	Free	3.8	10	Free
8438.40.00	Brewery machinery	11.8	7.5	Free	Free	3.8	10	Free
8438.50.00	Machinery for the preparation of meat or poultry	11.8	7.5	Free	Free	3.8	10	Free
8438.60.00	Machinery for the preparation of fruits, nuts, or vegetables	11.8	7.5	Free	Free	3.8	10	Free
8438.80.00	Machinery for the industrial preparation or manufacture of food or drink	11.8	7.5	Free	Free	3.8	10	Free
8438.90.10	Parts of machinery for sugar manufacture	6.8	Free	Free	Free	3.8	10	Free

Footnotes are at the end of the table.

Table B-4—Continued
Industrial food-processing machinery and related equipment: Harmonized Tariff Schedule subheading; description; tariff treatment in primary U.S. export markets, 1993

HTS subheading	Description	Canada MFN	GPT[1]	US	Japan[2] (General)	EU[3] (MFN)	Mexico[4] (General)	U.S.
					Percent ad valorem			
8438.90.90	Parts of machinery for industrial preparation or manufacture of food or drink, other than sugar manufacturing	11.8	7.5	Free	Free	3.8	10	Free

[1] General Preference Tariff.
[2] All imports into Japan are subject to a consumption tax of 3 percent.
[3] All imports into the EU countries are subject to a value added tax. Value added tax is accessed at the following rates: Belgium, 19.5; Denmark, 25; France, 18.6; Germany, 15; Greece, 18; Ireland, 21; Italy, 19; Luxembourg, 15; Netherlands, 17.5; Portugal, 16; Spain, 15; United Kingdom, 17.5.
[4] All imports into Mexico, including those from the United States, are subject to what here have been called the "General" duties. The only exceptions are "special" duty rates applicable to members of the Latin American Integration Association (LAIA) Asociacion Latinamerica de Integracion (ALADI) countries (Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Mexico, Paraguay, Peru, Uruguay, and Venezuela). The LAIA/ALADI rates are not standardized for the group, rather they exhibit variance by country within a commodity classification.
Source: U.S. Department of Commerce Canada, Mexico, Japan, and EU country desk staff; relevant pages from Canadian, and Mexican tariff schedules provided by U.S. Department of Commerce staff.

Table B-5
U.S. food-processing industries: New capital expenditures, 1990-91

Food sector	1990 Machinery & equipment expenditures	1990 Percentage of total	1991 Machinery & equipment expenditures	1991 Percentage of total
	(million dollars)		*(million dollars)*	
Meat products	894.7	12.8	918.8	12.3
Dairy products	712.8	10.2	675.9	9.1
Preserved fruit and vegetables	1,148.5	16.4	1,259.9	16.9
Grain mill products	1,098.7	15.7	1,107.7	14.8
Bakery products	661.8	9.4	775.7	10.4
Sugar and confectionery	549.7	7.8	517.2	6.9
Fats and oils	277.0	4.0	306.9	4.1
Beverages	986.9	14.1	1,187.5	15.9
Miscellaneous foods	680.5	9.7	716.5	9.6
Total food-processing	7,010.6	100.0	7,466.1	100.0

Source: Compiled from U.S. Bureau of the Census, *Annual Survey of Manufacturers,* 1991.

Table B-6
Industrial food-processing machinery and related equipment: U.S. imports for consumption, by selected product classes, 1989-93

(1,000 dollars)

Product class	1989	1990	1991	1992	1993
Sugar machinery, including parts	9,851	9,206	12,075	15,109	9,315
Meat- and poultry-packing plant machinery, including parts	[1]56,879	64,692	57,476	64,567	73,335
Flour and grain mill machinery and parts	13,402	22,422	24,109	24,560	21,937
Bakery machinery, including parts	78,301	106,238	112,293	133,264	115,939
Fruit-, nut-, and vegetable-processing machinery	13,809	17,575	14,772	14,854	11,205
Machinery used to clean and sort vegetables and parts	9,701	10,189	11,945	10,107	10,919
Chocolate and confectionery machinery, including parts	[1]34,300	55,286	51,671	51,473	57,368
Brewery machinery	5,249	2,309	9,405	3,263	9,589
Machinery for preparing and manufacturing juices, including parts	10,948	8,761	8,301	8,028	6,087
Other industrial food-processing machinery	46,890	57,775	53,435	67,955	51,716
Other parts of industrial food-processing machinery	60,211	51,005	39,358	51,352	43,147
Total	339,539	405,457	394,840	444,532	410,558

[1] Estimated by the staff of the U.S. International Trade Commission.
Note.—Because of rounding, figures may not add to the totals shown.

Source: Compiled from official statistics of the U.S. Department of Commerce, except as noted.

Table B-7
Industrial food-processing machinery and related equipment: U.S. exports of domestic merchandise, by selected product classes, 1989-93

(1,000 dollars)

Product class	1989	1990	1991	1992	1993
Sugar machinery (excluding parts)	7,625	8,798	8,159	13,393	12,506
Meat- and poultry-packing plant machinery (excluding parts)	78,897	75,250	82,437	96,930	91,781
Flour and grain mill machinery (excluding parts)	35,239	40,032	38,979	49,970	59,654
Bakery machinery	48,638	77,272	62,817	77,924	64,808
Fruit-, nut-, and vegetable-processing machinery	38,143	32,206	35,920	34,476	36,369
Machinery used to clean and sort vegetables	12,161	10,093	17,347	15,660	15,170
Chocolate and confectionery machinery	7,344	7,629	16,718	14,947	11,805
Brewery machinery	8,824	6,571	8,697	11,458	11,752
Machinery for preparing and manufacturing juices including parts	10,874	10,174	11,878	12,268	20,987
Other industrial food-processing machinery	90,985	81,287	106,282	114,258	116,478
Other parts of industrial food-processing machinery	112,843	130,651	148,029	153,906	166,774
Total	451,572	479,965	537,262	595,188	609,085

Note.—Because of rounding, figures may not add to the totals shown.

Source: Compiled from official statistics of the U.S. Department of Commerce.

Table B-8
Industrial food-processing and packaging machinery and related equipment: Estimated world market, 1990

Country/Region	Estimated market
	(billion dollars)
North America	3.6 - 3.8
Western Europe	6.0 - 6.5
Russia	2.5 - 3.0
Central Europe	1.5 - 2.0
Japan	2.1 - 2.2
All other	2.0 - 3.0
Total world	17.7 - 20.3

Source: Economic Commission for Europe, *Food-Processing Machinery*, 1990-91, p. 79.

Table B-9
Food-processing machinery and related equipment: U.S. shipments, capital expenditures, and total employment, 1989-92

Item	1989	1990	1991	1992
Value of shipments (millions)	2,126	2,261	2,193	2,338
Capital expenditures (millions)	64	46	42	([1])
Total employment (1,000 employees)	19	19	18	18

[1] Not available.
Source: U.S. Bureau of the Census, *Annual Survey of Manufactures*, 1991.

APPENDIX C
INDUSTRIAL FOOD-PROCESSING MACHINERY AND RELATED EQUIPMENT, BY INDUSTRY SECTOR

Meat, poultry and egg processing equipment:

Tenderizers
Compactors
Disintegrators
Moulding machines/presses
Poultry equipment
Rendering equipment
Frozen meat flakers/slicers/cubers
Bone saws, choppers and machines
Power cleavers
Sausage stuffing machines
Slaughtering equipment

Dairy products manufacturing equipment:

Butter churns
Cream separators
Homogenizers
Pasteurizers
Sterilizers
Driers for powdered milk
Condensed/evaporated milk equipment
Milk clarifiers
Cheese-making machines
Ice cream equipment

Fruit and vegetable processing equipment:

Trimmers
Steamers
Snippers
Huskers, corn
Juice extractors
Peelers
Shelling machines
Pulpers
Separators
Graders
Continuous blancher/cooker cooler/sterilizer systems
Dehydrating equipment
Pit removing machines, destoners
Washing machines
Shredding/grinding/chopping machines
Strip/cutter/slicers

Grain mill products manufacturing equipment:

Flour mill disintegrators
Graders
Husking/hulling machines
Cereal rolling machines
Hoppers
Sifting machines
Flour or bran blending equipment
Cleaning machines
Flake-making machines
Grinders
Rice polishing machines

Bakery products manufacturing equipment:

Bread-making machines
Biscuit-filling machines
Dough mixing/kneading/dividing/ rounding/proofing machines
Enrobing machines
Biscuit/wafer/cracker machines
Cake depositing/icing machines
Continuous process ovens
Conventional ovens

Sugar and confectionery products manufacturing equipment:

Cane defibrators
Crystallizing apparatus
Juice extractors
Sawing and breaking machines
Roller mills
Dipping machines
Cocoa bean husking machines
Form presses
Tabletting machines
Pulverizers
Filter presses
Enrobing machines
Pulling machines
Chewing gum equipment

Fats and oils processing equipment:
Margarine-making churn
Oil-seed crushers/grinders

Brewing and distilling equipment:

Germination machines
Screening machines
Straining vats
Clarifiers
Homogenizers
Pasteurizers
Sterilizers
Mashing vats
Sprouting machines

Wine-making equipment:

Stemming machines
Presses
Crushing machines
Homogenizers
Pasteurizers
Sterilizers

Soft drinks, flavoring extracts and syrups equipment:

Filtering machinery
Carbonating equipment
Concentration control equipment

Fish and seafood processing equipment:

Filleting machines
Scaling machines
Shelling machines
Grinding machines
Opening machines

Miscellaneous food products manufacturing equipment:

Coffee mills/grinders/blenders/roasters
Pasta extruders/driers
Snack food extruders

Source: Economic Commission for Europe, *Food-Processing Machinery*, 1990-91, pp.13-14.