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Glass Containers

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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 glass containers covers the period 1987 through 1991 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 and metals sector.

USITC publication number	*Publication date*	*Title*
2475	July 1992	Fluorspar and certain other mineral substances
2504	October 1992	Ceramic floor and wall tiles
2587	January 1993	Heavy structural steel shapes
2623	April 1993	Copper
2653	June 1993	Glass containers

[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

The U.S. glass container industry[1] faces intense competition from such alternative materials as plastic (especially in the PET[2] container market for large beverage containers), metal (in the beer packaging market), and paper. Environmental considerations are a major factor contributing to the success of glass containers in packaging applications because of their relatively easy recyclability and because of such other advantages as product visibility, design and size versatility, inertness, and an image of product quality and purity among consumers.

The U.S. industry has actively capitalized on these qualities, and on recycling in particular, as technology advancements boosted recycling rates to 31 percent in 1991. Reduced raw materials consumption by the container industry is considered essential to maintaining a competitive cost stance vis-a-vis alternative materials in the packaging market. Lightweighting[3] advancements resulting from technology improvements have also reduced material and energy consumption and solid waste disposal. This summary profiles the glass container industry and analyzes the competitive factors influencing the industry, U.S. industry performance in foreign and domestic markets during 1987-91, and tariff and nontariff measures.

U.S. glass container production is concentrated in three areas—beer bottles, beverage bottles (such as sodas, fruit juices, waters), and food and dairy products containers (such as fruit jars, jelly glasses, packers' tumblers); these areas accounted for 86 percent of U.S. shipments in 1991. Thirty-three percent of U.S. imports of glass containers compete with U.S. production most often in the category of narrow neck containers used, for example, in beer and beverage bottling and having a capacity of 118 to 473 milliliters each. The largest U.S. import category, however, was toilet preparation containers produced by automatic machine, representing 38 percent of total imports in 1991; these containers account for a relatively small segment of U.S. production.[4]

The U.S. industry dominates the domestic glass container market principally because of the wide variety of containers offered, the prohibitive transportation costs incurred by imported goods, and the long-term customer relationships developed by suppliers. The large size of the U.S. market and significant shipping costs, however, have also tended to limit the U.S. industry's interest and prospects in overseas markets. Foreign investment in the U.S. industry is currently limited to the Mexican producer Vitro's purchase of Anchor Glass Container Corporation. A trend toward globalization of the industry through mergers, acquisitions, licensing, and joint ventures is likely, however, because future sourcing requirements of international packaging customers may necessitate suppliers to be near their overseas packaging operations.

The basic types of containers are bottles, jugs, jars, vials, and carboys, the capacity of which ranges from drams or drops to 13-gallon carboys. Bottles are the most widely used type of glass container, especially for beverages. Jugs are large, narrow-necked bottles with carrying handles. Jars are similar to wide-mouth bottles, but lack the prominent shoulder section evident in bottles. Vials are small tubular containers with flat bottoms and tapered necks used principally for serums and medicines. Carboys are heavy-duty bottles packed in cushioned crates or boxes and designed to transport large volumes of corrosive materials. Glass containers can be refillable or nonrefillable and are sealed with a variety of closures, such as resealable twist-off caps and corks.

The primary raw materials used in the production of glass containers are silica sand, soda ash, and limestone, with silica sand accounting for approximately 70 percent of the total raw material volume. Secondary raw materials include potash, lead oxide, boric oxide, oxidizing or reducing agents, and agents that provide specific properties or colors. Most glass containers are manufactured from clear glass, but colored glass is used in some applications. Cullet[5] has become an increasingly large proportion of the glass batch (up to 25 percent and increasing) because of a growing emphasis on energy and material conservation and solid waste recycling.

The manufacture of glass containers is a continuous operation with most furnaces fueled by natural gas. Primary and selected secondary raw materials are melted in furnaces and fed to continuous, automatic processing machines that press and blow,[6] or blow and blow,[7] the molten glass into glass container molds. The containers can then be decorated, sandblasted, polished, and/or annealed in post-forming secondary treatments (figure 1). Although the

[1] The glass container industry produces vessels for food (including preserving jars); beverages (e.g., soda, juice); beer and other alcoholic beverages (liquor and wine); medicinal and health products; chemical, household, and industrial products; and toiletries and cosmetics; as well as glass stoppers, lids, and closures.

[2] Polyethylene terephthalate.

[3] The process by which more containers with thinner walls are manufactured from the same amount of glass because of improved production technologies that have increased container strength and durability.

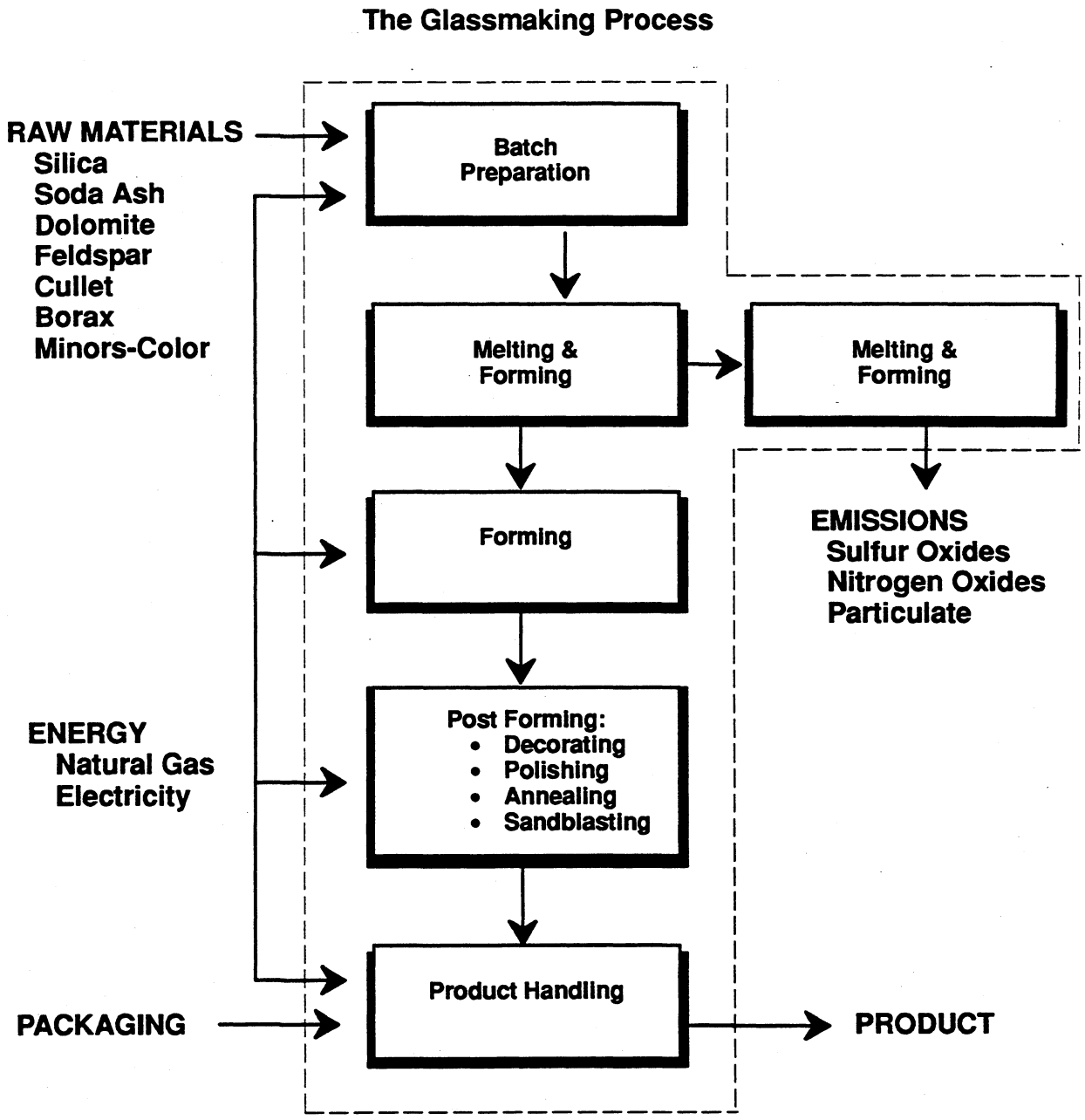
[4] Direct comparisons between U.S. shipment and import composition are not feasible because of differences in data reporting methodologies (U.S. imports are generally reported in terms of quantity, whereas U.S. production is measured by end-use and bottle neck size).

[5] Excess or waste glass from an earlier melt or recycled glass articles that can be charged to the glass furnace.

[6] A production process in which the parison (glass given approximate shape in a preliminary forming process and ready for final shaping) is pressed with a plunger and then blown to the final shape of the ware by mechanical means.

[7] A production process in which the parison is blown and then blown again to produce the final shape of the ware by mechanical means.

Figure 1
A six-step process common to all glass manufacturing



Source: "Advances in Glassmelting Furnace Technology," *Ceramic Industry*, Mar. 1991, p. 49.

industry's production process worldwide is generally capital intensive, labor and materials represent the most significant production factors. These elements account for 35 and 28 percent, respectively, of production costs in the United States, with labor costs being concentrated in the inspection and handling process of manufacture.

U.S. INDUSTRY PROFILE

Industry Structure

The U.S. glass container industry[8] has undergone restructuring and significant plant upgrades in recent years as alternative materials have been capturing a larger share of a slow-growth market. The resulting industry overcapacity encouraged mergers and buyouts. Four container firms dominated U.S. production in 1992—Owens-Brockway Glass Containers,[9] Anchor Glass Container Corp., Ball-Incon Glass Packaging Corp., and the Foster-Forbes Glass Division of American National Can Company. These firms serve about 85 percent of the U.S. market (valued at about $5 billion in 1991) with plants nationwide. The industry is highly concentrated, as Owens-Brockway has an estimated 42 percent of the U.S. market, followed by Anchor (26 percent), Ball-Incon (12 percent), and Foster-Forbes (5 percent). Most container plants are located near dense population regions for better access to major end-use markets, with marketing ranges of about 250 miles. California and New Jersey are sites for 19 and 12 plants, respectively, and Illinois and Pennsylvania for another 17 plants each (figure 2).

As a result of ongoing industry restructuring, capacity utilization improved to 90 percent in 1990. In contrast with 1987, seven firms—the four previously mentioned as well as Kerr, Diamond-Bathurst, and Brockway—accounted for 85 percent of the U.S. market and operated at about 75 percent of capacity. Consolidations and buyouts, as shown in the following tabulation, were arranged to reduce industry overcapacity, expand company product lines and markets, rationalize production, and lower production costs:

Purchaser	Company purchased (year)
Ball-Incon	Kerr (1991)
Owens-Illinois	Brockway (1988)
Anchor Glass	Diamond-Bathurst (1987)

[8] Standard Industrial Classification 3221, Glass Containers, which also includes glass ampoules not covered in this summary.

[9] Owens-Illinois, parent of Owens-Brockway, announced plans to go public with the issuance of $960 million of common stock in an effort to reduce the debt from its leveraged buyout by Kohlberg Kravis Roberts & Co. (KKR) in 1987. "Owens-Illinois Plans Initial Public Offer That Could Raise as Much as $960 Million," *Wall Street Journal*, Oct. 16, 1991, p. A2. On December 11, 1991, KKR took Owens-Illinois public with the sale of 60 million shares of stock. "A New Play for An Old-Timer," *Business Week*, Mar. 30, 1992, p. 72.

The larger glass container firms generally manufacture a broad range of containers in a variety of colors and sizes to supply their large customer bases. The remaining smaller companies emphasize regional or specialty commercial markets, such as Madera Glass (wine bottles) and Hillsboro Glass (liquor bottles). They may also be captive operations, producing glass containers to package their primary manufactures (e.g., beer packaged by Coors in Colorado and orange juice by Tropicana in Florida).

Industry firms exhibit both horizontal and vertical integration patterns. One of the larger glass container producers, Owens-Brockway, is unit of a diversified concern that manufactures other glass products such as tableware and lighting glassware and is the largest plastics packaging supplier in the United States. Several firms also produce other packaging items, such as plastics or cans, to insulate their positions in the packaging market from fluctuating market conditions. For example, Ball-Incon produces metal cans, and Foster-Forbes is a subsidiary of a diversified packaging company. Several firms exhibit a degree of vertical integration, often manufacturing and licensing glass-making machinery and technology services developed during the course of the firm's machinery adaptation or plant upgrades and operating container mold facilities that produce forms for glass container shapes. Other related activities in which container manufacturers are engaged include bottle decorating and closure manufacturing.

Employment

Approximately 76 glass container plants currently operate in the United States,[10] with an average employment of 38,300 workers in 1991,[11] compared to 106 establishments in 1987, with employment of about 41,100 workers.[12] To improve cost competitiveness with alternative packaging materials, the industry would like to attain further labor cost reductions and to increase productivity levels. Currently, 35 percent of the production cost for glass containers is still represented by labor, compared with 9 percent for cans and 13 percent for plastic containers, the major competitive packaging materials.[13]

The most labor intensive aspect of glass container production—inspection and quality control, which accounts for about 17 percent of employees—is a key area in which the industry anticipates increasing the application of automated inspection systems, container-handling procedures,[14] and integrated

[10] "Glass Container Plants—Fewer But Stronger," *Glass Industry*, May 10, 1992, p. 54.

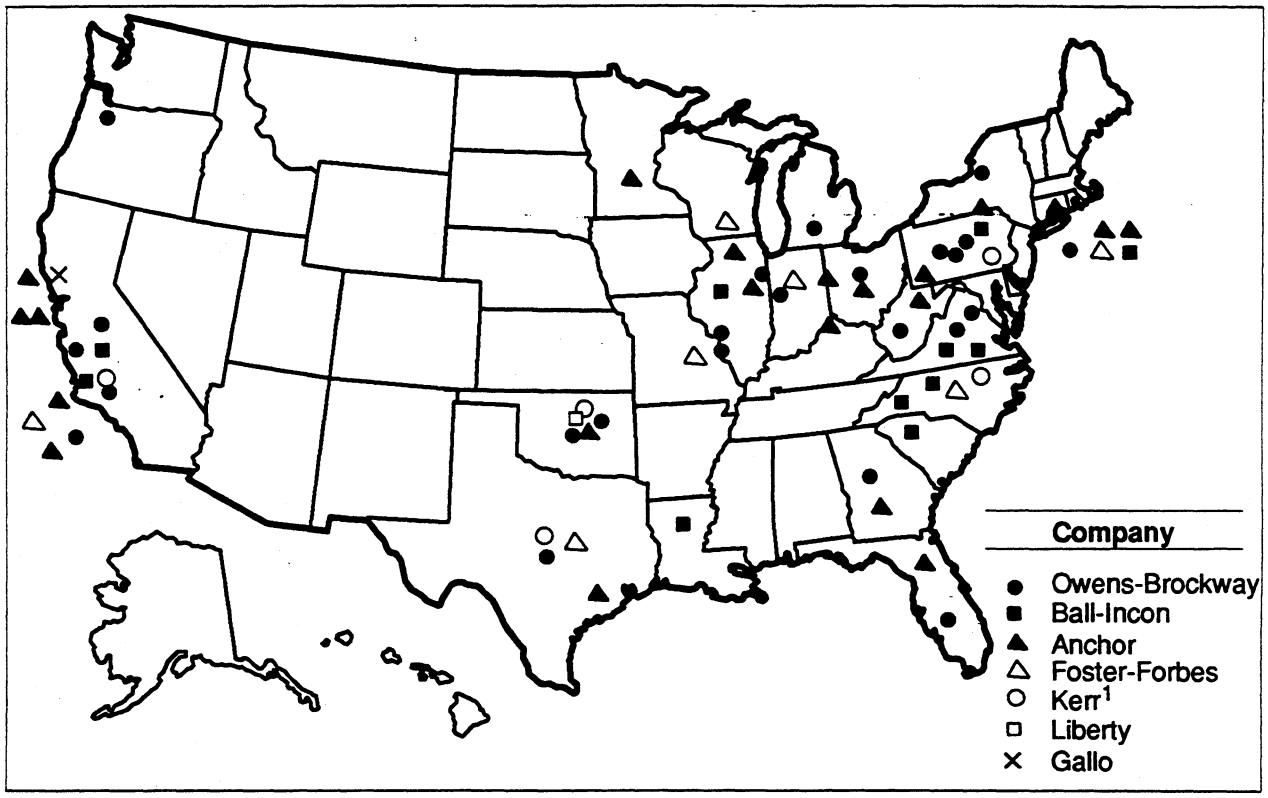
[11] U.S. Department of Labor, Bureau of Labor Statistics, *Employment and Earnings*, Mar. 1992, p. 99.

[12] According to the *Census of Manufactures*, in 1987 the U.S. glass container industry consisted of 35 companies operating 106 establishments, a decline from 1982 figures of 41 companies operating 128 establishments. During this period, employment in the U.S. industry declined from 59,000 workers in 1982 to 41,100 workers in 1987. Employment declined further during 1988-89 to 39,300 employees.

[13] "Glass Problems Conference Features an Industry Status Report," *Glass Industry*, Jan. 1991, p. 19.

[14] "Ball-Incon's Ray Looney Sizes Up the Glass Container Industry," *Glass Industry*, Dec. 1990, p. 9.

Figure 2
Location of major U.S. glass container producers, 1991



[1] Purchased by Ball-Incon.

Source: "Glass Raw Materials: Aspects of Quality, Quantity, and Prices," *Industrial Minerals*, July 1991.

information and process control. These systems will detect variations in wall thickness and glass and mold imperfections, for example.[15] With the movement to the incorporation of more complex manufacturing systems, however, the industry also sees the necessity to invest resources in the development of more skilled employees to maintain and operate these systems; these skills are often acquired through in-house training programs.

Employee payroll as a percentage of industry shipment value fell from 25 percent in 1982 to 22 percent in 1989 because of declining employment, and increased automation and worker productivity. The hourly earning for production workers in the glass container industry averaged $13.54 in February 1992, compared with $11.90 for durable goods-manufacturing workers.[16]

Research and development

Capital expenditures in the industry exceeded $200 million in both 1988 and 1989, with 90 to 95 percent of this amount directed toward machinery and equipment purchases. These capital expenditures represented about 20 percent of the entire glass industry's capital expenditures in 1989.[17] The industry has become increasingly capital intensive with the introduction of new production technology and machinery. Examples include forming machines ranging up to 18 sections that increase production rates by 80 percent, and vertiflow cooling of molds and blanks that allow machine speeds to increase by 20 percent.[18] Since such productivity increases can contribute to higher production levels, these advancements are not always an industry advantage. Overcapacity is a continuing industry concern partly because of the associated price suppression effect that limits U.S. manufacturers' profit margins.

U.S. firms, such as Ball-Incon and Owens-Brockway, also have derived financial benefits from their technological expertise through licensing agreements with U.S. and foreign firms and/or foreign glass-making equipment manufacturers. As a result, many foreign operations, such as those in Europe, have similar layouts and technology levels as their U.S. counterparts. Because of the smaller volume runs generated by the more diversified European market,

[15] "The Future Lies in Quality Management Systems," *Glass Industry*, Nov. 1991, p. 16.
[16] *Employment and Earnings*, Apr. 1992.
[17] U.S. Department of Commerce, *1989 Annual Survey of Manufactures*.
[18] "U.S. Glass Industry: Over Capacity Shadows Strong Demand," *Industrial Minerals*, Feb. 1990, p. 34.

however, these companies generally do not require the large-volume machines (10 section and greater) employed by U.S. manufacturers.

Although direct material costs represent about 28 percent of the value of industry shipments compared with 75 percent for aluminum and 60 percent for plastics,[19] reduced materials cost is considered essential to maintaining a competitive stance in the packaging market. Two advancements resulting from technology improvements, lightweighting and a national average recycling rate of 30 to 35 percent industry-wide,[20] have reduced material and energy consumption and solid waste disposal. As a result of lightweighting, glass containers currently weigh about 20 percent less (an average of 219 grams) than a decade ago.[21] An increased emphasis on the environment and conservation boosted the recycling rate of domestically produced glass containers to 31 percent in 1991 (U.S. producers' 1991 purchases of cullet amounted to nearly 2.3 million tons), exceeding the Environmental Protection Agency's (EPA) 1992 recycling goal of 25 percent.

According to industry sources, future research and development expenditures should focus on ultralightweighting, increased strength (possibly through coatings, which also complement increased machine speeds by reducing friction), robotics applications, and processing and batch melting technology improvements. These goals are shared with U.S. firms by other international glass container manufacturers. The International Partners in Glass Research, a committee formed in 1985 by representatives of six U.S. and foreign glass container companies and a glass container equipment manufacturer, is researching new lightweighting and coating technologies, but no commercial applications have yet been derived.

Other research efforts may be hindered by fund limitations at highly leveraged container companies involved in buyouts and mergers. Glass container companies generally receive less favorable bond ratings (indicating a less desirable investment prospect) than packaging companies in the paper, aluminum, and plastics industries,[22] which generally have a more diversified product structure. Future reinvestment in the industry will likely hinge in part on maintaining a balanced supply-demand situation that means little or no excess capacity and that will support price increases and adequate profit margins.

Foreign investment

The U.S. industry has made some limited investments in foreign container facilities. Because of the cost disincentives associated with shipping empty glass containers for long distances,[23] Owens-Brockway (then operating as Owens-Illinois) established worldwide affiliates and subsidiaries in countries, such as Brazil and Venezuela, that serve only their domestic market. The company's foreign operations are concentrated in Latin America, where significant market potential exists for volume production and new product introductions. In the United States, foreign investment in the glass container industry is a relatively recent occurrence. A 50-50 joint venture between Ball Corp. and TBG Europe nv (Netherlands) formed in 1987 was purchased in February 1991 by Ball Corp. TBG retains a 51-percent interest with Hueblein, Inc. in Madera Glass, a manufacturer of wine, brandy, and champagne bottles.

The most significant foreign purchase in the U.S. industry, however, was the 1989 acquisition of Anchor Glass Container Corp., located in Tampa, Florida, by Vitro S.A., the major Mexican glass and glassware producer, through a Vitro subsidiary, THR Corp.[24] With such factors as market globalization, economic alliances, and industry consolidation influencing industry development, Vitro pursued the acquisition of Anchor Glass Container Corp. "to protect its domestic market and expand its presence internationally."[25] With this purchase, Vitro acquired 100-percent ownership of Anchor and an estimated 26 percent of the U.S. market through Anchor's established producer/customer relationships. Vitro has upgraded the purchased facilities with state-of-the-art production processes and increased productivity and efficiency by idling several plants. In addition, Vitro has improved information systems (for instance, billing, inventory) with computerization and introduced Total Quality Management to enhance employee productivity and product quality.

Continued globalization by packaging consumers (e.g., beverage producers) and their likely need for suppliers near their overseas packaging operations suggest that U.S. and foreign industries could benefit from an expanded presence in each other's markets.[26]

Consumer Characteristics and Factors Affecting Demand

Demand for most types of packaging materials generally reflects the level of consumer demand for the goods to be packaged, and can be influenced by overall economic conditions, population level and age distribution, income changes, health and environmental considerations, and the acceptance of new products. However, consumers often choose to purchase products packaged in glass containers over competing articles for several reasons. Glass containers can display their contents, can be resealable, and are often a less

[19] "Glass Problems Conference Features an Industry Status Report," *Glass Industry*, Jan. 1991.

[20] "Glass Raw Materials: Aspects of Quality, Quantity, and Prices," *Industrial Minerals*, July 1991, p. 32.

[21] "The Future Lies in Quality Management Systems," *Glass Industry*, Nov. 1991, p. 27.

[22] Based on bond ratings in *Moody's Industrial 1991*.

[23] Transportation costs average about 10 percent of import value.

[24] This purchase of 22 plants for over $900 million also included the facilities of Latchford Glass Co. (Huntingdon Park, CA), which Vitro acquired in a separate transaction.

[25] *Annual Report 1989*, Vitro Sociedad Anonima.

[26] "Where Goeth the Glass Industry?," *Glass Industry*, Feb. 1989, p. 14.

expensive packaging material than other substitutes; can be microwaved, and reused in the home or recycled for conservation purposes; maintain product freshness and prevent food spoilage; project an image of product quality and purity to many consumers; and have a high degree of design and size versatility. These issues—particularly recycling, microwavability, and inertness—receive particular emphasis in marketing strategies. As a result of these characteristics, packagers/manufacturers of foods and beverages (beer, soft drinks, wine, and liquor) consumed 86 percent of all glass containers produced in 1991. The remaining 14 percent were consumed by chemical, toiletry/cosmetic, and medicinal/health concerns and private households. The majority of glass containers are used in the retail take-home market or in the vending market.

Competition among the various packaging materials is strong, especially in the food and beverage sectors of the packaging market. In the U.S. beverage market, metal (steel and aluminum) cans average a 52-percent share, followed by plastics, 30 percent, and glass, 18 percent. Cans dominate the domestic beer market with an estimated 60-percent share, with glass attaining about 30 percent. One factor contributing to the dominance of the metal can in these markets has been the significant packaging industry investment in highspeed can-filling machinery and equipment that improve productivity and lower production costs.[27]

Although glass container shipments are expected to increase, the overall share of the packaging market accounted for by glass containers is expected to decline (figure 3). Other packaging materials, particularly paperboard and plastics, are likely to generate significant growth (an estimated 3.6 percent annually) in the U.S. packaging market because of paperboard's wide range of applications and because of plastic containers' characteristics of lighter weight and ability to withstand carbonation pressure.[28] Government environmental policies, however, could boost glass usage if mandatory recycling levels, which generally are considered to be detrimental to less easily recyclable plastic packaging, are imposed by amendments to the reauthorization of the Resource Conservation and Recovery Act.[29]

Glass recycling received greater emphasis in Europe than in the United States during the 1980s, principally because of the significant differences in energy costs. The European recycling rate for glass containers averaged about 33 percent in 1988, with Switzerland, the Netherlands, Belgium, and Austria in the forefront of European glass recycling, with rates of 55 percent, 53 percent, 50 percent, and 50 percent, respectively. In contrast, European can recycling has yet to attain the rate achieved in the United States, where aluminum beverage can recycling exceeds 60 percent. In the United Kingdom, for example, the aluminum can recycling rate is about 10 percent.[30] The significant difference in recycling rates can be explained partly by the greater use of glass containers in the European market and by the predominance of steel, rather than aluminum, in can fabrication.

Although recycling is generally considered an advantage for glass containers, certain drawbacks exist. High transportation costs are common for recycled containers that must be shipped to glass container plants that are often located far from collection sites. The quality of the recycled containers is also critical. The containers must be sorted by color, and such impurities as metal and plastic must be removed to reduce contamination of the glass batch; in addition, nonrecyclable glass (e.g., laminated automotive windshields with plastic interlayer) must be separated from recyclables to prevent furnace destruction. Increasing amounts of colored glass are reaching collection sites, primarily resulting from imported beers that are packaged in green and amber bottles. The U.S. industry uses only limited amounts of these colored glasses since their inclusion in white or flint glass, which is the predominant glass manufactured in the United States, imparts unacceptable color characteristics.

Anticipated market saturation, price differentials among alternative packaging materials, and low-growth opportunities during the decade will likely increase competition among packaging producers as each industry strives to convert products to its means of packaging, to develop new applications for its respective packaging material, and to maintain or lower production cost levels to keep a cap on price increases to consumers. During 1982-91, prices charged to glass container purchasers rose about 24 percent, whereas prices for metallic containers (steel and aluminum) rose an average of 19 percent during 1981-91.[31] This difference reflects in part the fluctuating prices of aluminum metal during the period and the related pressure to maintain competitive pricing in the metal can market. Significant price increases are not anticipated in either the glass or metal packaging segment because of the soft U.S. economy, increased production capacity in the glass sector as a result of technological improvements, competitive pricing of alternative materials, and relatively low metal prices.

FOREIGN INDUSTRY PROFILE

Because of the high costs associated with the shipping of empty glass containers and the general abundance of raw materials for their manufacture, many countries have efficient, high-technology glass container industries that principally serve their

[27] "Packaging To Stay on the Growth Track," *Modern Metals*, Dec. 1991, pp. 34H-34M.

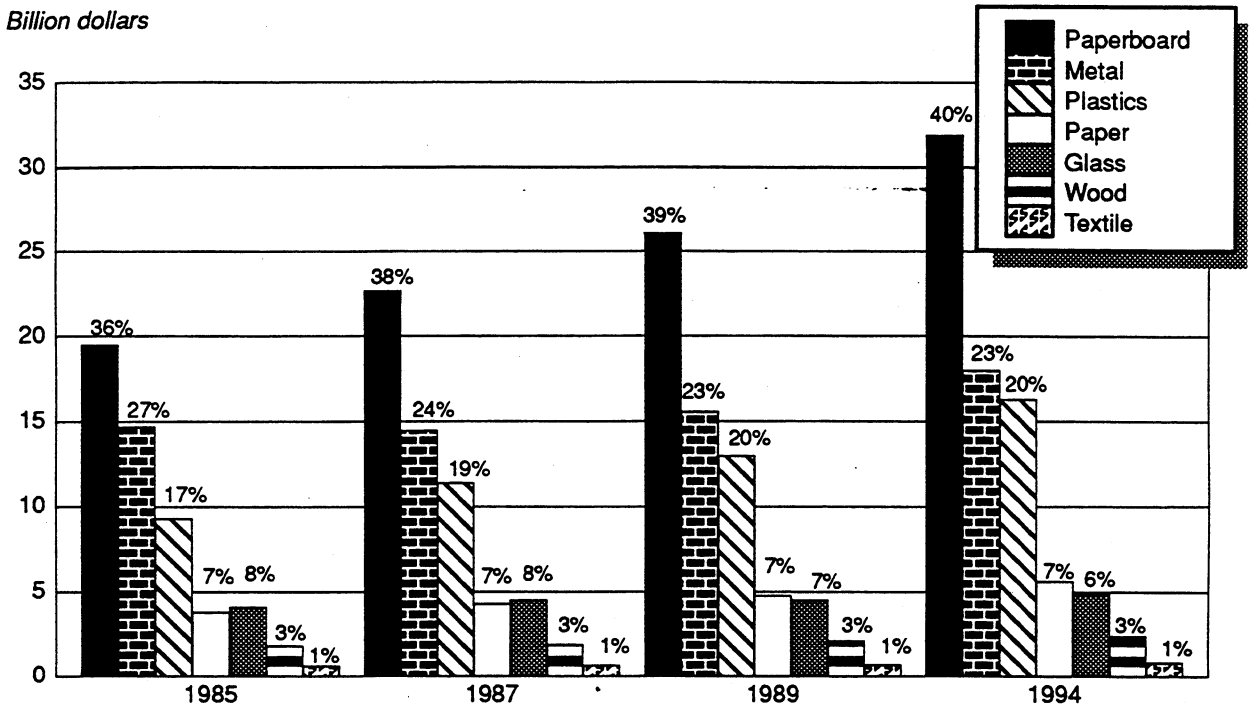
[28] "Packaging Industry Growth to Slow in the Near Future," *Glass Industry*, Nov. 1990, p. 21.

[29] New recycling technologies that break down the plastic resin could contribute to continued inroads in the packaging market by plastic containers.

[30] "UBC Prices Dive, Recyclers Struggle" and "British Can Recyclers Set Ambitious Goals," *American Metal Market* supp., Feb. 4, 1992, pp. 6A-7A.

[31] U.S. Department of Labor, Bureau of Labor Statistics, *Producer Price Indexes Data for November 1991*.

Figure 3
U.S. shipments and market share (percent), by major packaging materials, 1985, 1987, 1989, and 1994 (estimated)



Note.—Because of rounding, figures may not add to 100 percent.

Source: Compiled from data of the *Rauch Guide to the U.S. Packaging Industry* as presented in "Packaging Industry Growth to Slow in the Near Future," *Glass Industry*, Nov. 1990.

domestic markets and other markets in proximity. Some of the more sophisticated industries have developed in the more industrialized countries, such as in Europe, Japan, Australia, and Canada, and in Mexico, where a fully integrated and diversified manufacturer dominates glass production. In some cases, industries in Africa, Asia, and Latin America have emerged as the result of financial and/or technological assistance from major world glass container producers, such as Owens-Brockway (United States) or Saint Gobain (France). These foreign industries face many of the same competitive pressures from alternative materials, recycling, overcapacity, and stagnant or low-growth markets as does the U.S. industry and have approached these issues in a similar fashion, such as industry/company restructuring and technology improvements.

Canada

The Canadian industry is influenced in part by the implementation of the United States-Canada Free-Trade Agreement (CFTA), provincial recycling provisions, and container standardization. The Canadian industry is dominated by one producer, Consumers Glass Co., a division of Consumers Packaging, Inc., which also produces plastic containers.[32] Consumers Packaging, which produces a complete line of containers in flint, amber, and green glass, had 1990 sales of $573.8 million and employment of 5,200 workers. Consumers Glass merged with the only other Canadian glass container producer, Domglas, Inc., a unit of CB Pak, Inc., in early 1989, capturing an estimated 90 to 95 percent of the Canadian market. Consumers Glass has eight plants in the provinces of British Columbia, New Brunswick, Ontario, and Quebec.

Because of competitive pressures from U.S. counterparts as a result of reduced tariffs under the CFTA, Consumers Glass is currently restructuring its operations to increase industry efficiency and volume, to improve technology, and to reduce costs.[33] In March 1992 the company announced the closure of its Candiac, Quebec, facility in an effort to improve capacity utilization levels. In response, the government of the province of Quebec indicated that the province might establish its own plant to supply the liquor board and to compete with Consumers' operations in Ontario and New Brunswick.[34] Despite this restructuring, Consumers has incurred losses since the 1989 purchase

[32] In addition, Wheaton Industries (United States) has a container plant in Brampton, Ontario.

[33] "Consumers-Domglas Merger in the Works," *Glass Industry*, Dec. 1988, p. 7.

[34] "Newsletter," *Glass Industry*, Jan. 1992, p. 5.

of Domglas and recently hired a consulting firm to provide financial and restructuring advice.[35] Consumers has recently expressed interest in a partnership with another glass container manufacturer, possibly from the United States, to provide financial assistance and to improve container manufacturing efficiencies.[36]

A major factor that affects the Canadian industry and market is the recent institution of a refillable soft drink container system.[37] Ontario currently requires that 30 percent of all soda sold in the province be bottled in refillable containers (a policy that effectively reduces glass container production levels since the containers are collected and refilled). This requirement has weakened consumer demand for bottled sodas—and therefore glass containers—in favor of canned sodas, in part because of the requirement to return the bottles. Consumers Glass has indicated that the expansion of this policy to include liquor and wine containers would likely result in the closure of the company's largest plant, the Etobicoke facility, and its recycling plant, which processes 80 percent of Ontario's recycled glass.

Another factor influencing the Canadian glass container industry is the move toward container standardization by two major Canadian breweries. The use of standard long-neck glass containers for bottling will likely cut demand for a variety of container sizes and shapes and so will likely lead to lower production costs for Consumers Glass because of the fewer number of container sizes and shapes that will be necessary for the firm to produce; however, this shift could lead to the elimination of the unique, shorter run bottles used by smaller breweries and bottlers.

Mexico

The Mexican industry is dominated by Vitro S.A. and its container unit, Vitro Envases, which uses some of the world's most advanced container-forming equipment and is considered to be one of the global industry's technological leaders. Vitro views its technological capability as a key to its international competitive success in glass container cost, quality, and service; in addition, Vitro has focused on new product introductions and design innovation to realize foreign market expansion. Vitro Envases benefits from its parent company's vertical integration that ranges from raw materials to glass-making machinery. For example, Vitro's Basic Industries Division includes silica sand and feldspar beneficiation and soda ash processing, and its Fabricacion de Maquinas, S.A. de C.V. produces castings for glass/plastic molds, glass-forming machinery, and mold equipment.

Vitro Envases operates six plants producing a wide range of glass and plastic containers. Over 3 billion containers were manufactured by the Vitro facilities in 1989, accounting for 37 percent of Vitro's 1989 sales of $1.3 billion. Container exports accounted for 12 percent of the division's production, with major markets being the United States, Latin America, and the Caribbean countries.

Other Mexican companies producing glass containers include Cerveceria Moctezuma, Cornejo, Fabrica Nacional de Vidrio, Nueva Fabrica Nacional de Vidrio, Panamericana de Vidrio, and Vidriera Oriental. These firms are believed to account for about one-quarter, or 1 billion containers, of Mexican glass container production.

European Community[38]

Glass container producers in the EC have responded to competitive pressures much like the U.S. industry, with cost-reduction efforts and mergers and acquisitions to reduce overcapacity and improve productivity. There are thirteen major glass container producers in the EC, located principally in Germany, France, the United Kingdom, and Italy. Production is estimated to have exceeded 1.4 million metric tons in 1990. Principal end-use applications are for packaging food and agricultural products (75 percent of production) and cosmetics and pharmaceuticals (25 percent).

Proximity plays an important role in EC trade flows, as extra-EC imports represented less than 2 percent of EC apparent consumption in 1988. About 50 percent of these imports were sourced from Eastern European producers. Intra-EC imports represented about 12 percent of apparent consumption in 1988; this also indicates that the majority of EC exports were destined for intra-EC markets.

The EC industry is expected to operate at levels exceeding 90 percent of capacity during the next few years[39] and will likely experience production growth rates of 2 to 3 percent in the medium term. This growth will stem from successful competition with alternative materials as a result of industry restructuring and cost reductions and of the favorable economic outlook arising from the impending merger of the European Community market.

U.S. MARKET

Consumption

The relatively stagnant U.S. consumption trend exhibited during 1987-91 reflects the maturity of the glass-packaging market, as well as strong competition with alternative materials. Apparent U.S. consumption of glass containers ranged between $4.9 billion and $5.0 billion during the period (table 1). Imports as a share of consumption rose from 3 percent to 5 percent during the period, but maintained a relatively small share of the market because of the prohibitive

[35] "Consumers To Get Help on Refinancing Strategy," *American Glass Review*, June 1992, p. 11.

[36] "Consumers Glass Look To Join the Competition, Not Beat It," *American Glass Review*, July 1992, p. 28.

[37] "Refill Policy Could Close Plant," *Glass Industry*, July 1991, p. 6.

[38] Much of the information for this section is derived from the *Panorama of EC Industry 1991-92*, Commission of the European Communities, 1991.

[39] Capacity utilization ran at 92 percent in 1988.

Table 1
Glass containers: U.S. producers' shipments, exports of domestic merchandise, imports for consumption, and apparent consumption, 1987-91

Year	Producers' shipments[1]	Exports	Imports	Apparent consumption	Ratio of imports to consumption
	Million dollars				Percent
1987	4,778	29	135	4,884	2.8
1988	4,738	36	156	4,858	3.2
1989	4,883	45	175	5,013	3.5
1990	4,878	98	214	4,994	4.3
1991	4,888	119	234	5,003	4.7

[1] Estimated and forecast by the International Trade Administration, U.S. Department of Commerce.

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

transportation costs (averaging about 10 percent of import value) that often contribute to significant price differentials between U.S. and foreign merchandise. U.S. imports of perfume/toilet preparation containers are believed to have captured a greater share of this market segment since U.S. production of these containers is comparatively small.

Production

Glass container shipments are expected to increase at an average rate of only 1 percent annually during 1991-1995,[40] reflecting maturing markets, increased competition with alternative materials, and fluctuations in consumer consumption of packaged goods (i.e., beer, alcoholic beverages, soft drinks).

U.S. shipments of glass containers fluctuated between $4.7 billion and $4.9 billion during 1987-91. As shown in figure 4, the composition of industry shipments remained relatively static during 1987-91, with food and beer containers representing 65 percent (182 million gross) of industry shipments in 1991. Beverage containers represented another 21 percent (60 million gross) of 1991 shipments.

The U.S. industry has aggressively pursued new market opportunities for its containers, such as those for newly introduced gourmet and regional foodstuffs, bottled water, fruit juices, and microwavable foods. Glass container companies are placing greater emphasis on their product's recyclability to attract environmentally conscious consumers and on the microwavability of glass for quick food preparation. Industry observers indicate that glass packaging will likely become increasingly concentrated in product sectors that require a quality or premium image (such as bottled waters and premium beers), and will remain the dominant packaging material for foods because of visibility, purity, and microwavability characteristics.[41]

[40] "Glass Container Outlook—Shipments to Rise Slightly in 1991," *Glass Industry*, Jan. 1991, p. 9.

[41] "U.S. Glass Industry: Overcapacity Shadows Strong Demand," *Industrial Minerals*, Feb. 1990, p. 49.

Imports

U.S. imports generally fall into two categories: those shipped from foreign sources in proximity to the United States (e.g., Mexico and Canada), and those that fill a market niche, such as specialty or novelty items not produced in large volumes by the U.S. industry. Mexico and Canada accounted for 54 percent of the value of total imports in 1991, most of which were containers that competed with those of U.S. producers in the beer, wine, food, and soft drink markets. France and Italy accounted for 32 percent of the value of total U.S. imports, most of which were perfume bottles constituting 78 percent of total imports of perfume bottles in 1991. France and Italy also accounted for 85 percent of the imports from the EC, which amounted to $88 million in 1991. The EC was the second largest source of imports after Mexico.

U.S. imports increased by 74 percent during 1987-91, with Mexico and France accounting for most of this increase (table 2). Mexico, with $96 million, emerged as the leading U.S. supplier during the period, and imports from France reached $61 million, nearly all of which were perfume bottles. U.S. imports of glass containers increased to $261 million in 1992. The composition of imports has remained relatively stable during 1987-91. Perfume bottles represented 34 percent of imports in 1991, down from 39 percent in 1987, with other containers (e.g., beer and beverage containers) accounting for the remainder.

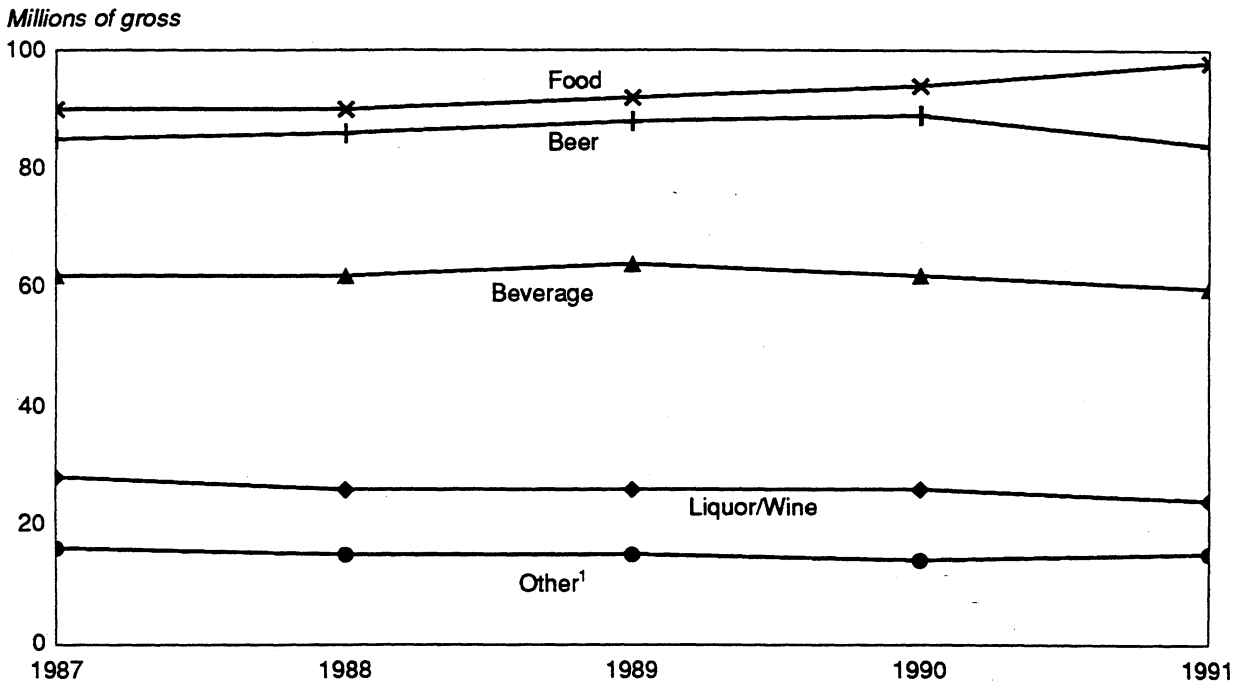
U.S. importers are generally manufacturers and bottlers of foods, beverages, toiletries, cosmetics, and other household goods that require packaging. Their purchases are often of low volume and/or specialty containers.

U.S. TRADE MEASURES

The rates of duty for column 1 countries and special rates of duty[42] appear in table 3. The majority of U.S. imports enter duty free under column 1; imports of perfume and toilet preparation containers from eligible GSP and CBERA countries and Israel are also duty free. With the proposed NAFTA duty

[42] See appendix A for an explanation of tariff and trade agreement terms.

Figure 4
U.S. glass container shipments, by types, 1987-91



[1] Includes medicinal and health; chemical, household, and industrial; and toiletries and cosmetic containers.

Source: Official statistics of the U.S. Department of Commerce, Bureau of the Census.

Table 2
Glass containers: Value of U.S. imports for consumption, by principal sources, 1987-91

(1,000 dollars)

Source	1987	1988	1989	1990	1991
Mexico	(1)	(1)	43,702	72,039	95,979
France	(1)	(1)	50,024	57,565	60,945
Canada	(1)	(1)	41,089	41,676	29,513
Italy	(1)	(1)	15,508	15,130	14,484
Taiwan	(1)	(1)	3,652	3,890	6,539
Switzerland	(1)	(1)	2,575	4,737	4,491
United Kingdom	(1)	(1)	2,112	3,458	3,721
Belgium	(1)	(1)	1,937	2,095	3,251
Germany	(1)	(1)	3,162	3,345	3,233
Austria	(1)	(1)	2,094	2,120	2,855
All other	(1)	(1)	8,830	7,685	9,286
Total	134,714	156,461	174,686	213,739	234,298

[1] Country-level detail is provided only for years in which there are actual trade data under the *Harmonized Tariff Schedule of the United States* (HTS).

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

Table 3
Glass containers: Harmonized Tariff Schedule subheading; description; U.S. col. 1 rate of duty as of Jan. 1, 1992; U.S. exports, 1991; and U.S. imports, 1991

HTS subheading	Description	Col. 1 rate of duty as of Jan. 1, 1992		U.S. exports, 1991	U.S. imports, 1991
		General	Special[1]	*Million dollars*	
7010.90.05	Serum bottles, vials, and other pharmaceutical containers	Free		3	11
7010.90.20	Closures imported separately; containers (with or without their closures) of a kind used for the conveyance or packing of perfume or other toilet preparations and other containers if fitted with or designed for use with ground glass stoppers, produced by automatic machine	3.7%	Free (A, E, IL) 2.5% (CA)	[2]9	78
7010.90.30	Closures imported separately; containers (with or without their closures) of a kind used for the conveyance or packing of perfume or other toilet preparations and other containers if fitted with or designed for use with ground glass stoppers, produced by other than automatic machine	7.5%	Free (A, E, IL) 5.2% (CA)	([3])	2
7010.90.50	Other containers (with or without their closures)	Free		106	143

[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); Automotive Products Trade Act (B); Agreement on Trade in Civil Aircraft (C); United States-Canada Free-Trade Agreement (CA); Caribbean Basin Economic Recovery Act (E); and United States-Israel Free-Trade Area (IL).
[2] Estimated by the staff of the U.S. International Trade Commission.
[3] Estimated by the staff of the U.S. International Trade Commission to total less than $500,000.

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

eliminations, U.S. imports from Mexico and Canada under HTS subheadings 7010.90.20 and 7010.90.30 would receive immediate duty-free status. There are no known U.S. nontariff measures affecting imports of glass containers.

Glass containers are also subject to an HTS provision under the General Rules of Interpretation that provides for packing materials and containers. These materials and containers, entered with the goods therein, are classified with the goods if the containers are of a kind normally used for packing such goods. This provision does not apply when such packing materials and containers are suitable for repetitive use.[43]

FOREIGN MARKETS

Foreign Market Profile

U.S. growth prospects in export markets are constrained by prohibitive transportation costs and by the competitive strength of the local container industries. The major foreign market for U.S. glass container exports is Canada, principally because of its market's proximity and structural similarity to that of the United States. The CFTA has also been an influential factor contributing to U.S. firms' increased penetration of the Canadian market; the sole Canadian manufacturer is currently exploring partnership possibilities with U.S. manufacturers. Canadian imports of glass containers from the United States are believed to represent less than 10 percent of the Canadian market.

Although the Mexican market is close to several U.S. production facilities (a contributing cost competitiveness factor), it is dominated by a world-class, low-cost glass container producer. This market is also smaller and less developed than the Canadian market. Mexican imports of glass containers from the United States are estimated to account for less than 1 percent of the Mexican market. The NAFTA agreement is not expected to have a major impact on the domestic glass container industry.[44]

[43] HTS General Rules of Interpretation 5(b).

[44] U.S. industry representative telephone conversation with Commission staff, Oct. 9, 1992.

Secondary markets include Japan and the CBERA and EC countries. Because of strong local industries and the proximity of other glass container suppliers, U.S. exports are believed to account for less than 2 percent of the Japanese and EC glass container markets.

U.S. Exports

U.S. exports of glass containers grew by nearly fourfold during 1987-91 to $118.8 million, representing 2 percent of producers' shipments (table 4). U.S. glass container exports rose to $152 million in 1992. This increase was due principally to greater exports to Canada during 1990-91 as a result of Canadian industry's labor strikes and disrupted production schedules stemming from contract expirations and the reduced duties implemented under the CFTA. Canada was the principal export market during the period, accounting for 70 percent of U.S. exports in 1991. Secondary exports markets were the EC and CBERA countries, with 14 and 7 percent, respectively, of U.S. exports in 1991. The majority of containers exported during the period were for packaging beer, liquor, and beverages.

FOREIGN TRADE MEASURES

The rates of duty imposed on U.S. exports of glass containers to Canada range from zero to 11.4 percent; duty elimination would be phased in over 5 years under NAFTA. The rate of duty for Mexico is 15 percent, and would be subject to 10-year staged elimination under NAFTA. There are no known nontariff barriers affecting the export of glass containers to these markets.

U.S. TRADE BALANCE

The United States has maintained a relatively stable deficit in glass container trade, fluctuating between $106 million and $130 million during the period (table 5) and amounting to $109 million in 1992. The United States had a trade deficit with three of its major trading partners—Mexico, France, and Italy—throughout the period, as well as with the EC-12 countries. The trade balance with Canada emerged as a surplus of $27 million in 1990, and increased to $53 million in 1991. The trade deficit with Mexico rose from $42 million in 1989 to $94 million in 1991.

Table 4
Glass containers: Value of U.S. exports of domestic merchandise, by principal markets, 1987-91

(1,000 dollars)

Market	1987	1988	1989	1990	1991
Canada	(1)	(1)	25,529	69,279	82,643
Germany	(1)	(1)	185	331	7,001
Netherlands	(1)	(1)	70	380	6,266
Mexico	(1)	(1)	1,961	2,255	2,465
Bahamas	(1)	(1)	731	1,953	1,600
Jamaica	(1)	(1)	1,715	1,608	1,506
Hong Kong	(1)	(1)	81	1,268	1,457
France	(1)	(1)	387	587	1,421
Argentina	(1)	(1)	19	23	1,336
United Kingdom	(1)	(1)	2,171	4,081	1,257
All other	(1)	(1)	12,178	16,279	11,819
Total	28,914	35,994	45,026	98,045	118,770

[1] Country-level detail is provided only for years in which there are actual trade data under the *Harmonized Tariff Schedule of the United States* (HTS).

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

Table 5
Glass containers: U.S. exports of domestic merchandise, imports for consumption, and merchandise trade balance, by selected countries and country groups, 1987-91[1]

(Million dollars)

Item	1987	1988	1989	1990	1991
U.S. exports of domestic merchandise:					
Canada	(2)	(2)	26	69	83
Mexico	(2)	(2)	2	2	2
France	(2)	(2)	0	1	1
Italy	(2)	(2)	0	0	0
Germany	(2)	(2)	0	0	7
Taiwan	(2)	(2)	0	1	1
Netherlands	(2)	(2)	0	0	6
United Kingdom	(2)	(2)	2	4	1
Switzerland	(2)	(2)	0	0	0
Japan	(2)	(2)	1	6	1
All other	(2)	(2)	13	14	15
Total	29	36	45	98	119
EC-12	(2)	(2)	4	7	17
OPEC	(2)	(2)	1	1	1
ASEAN	(2)	(2)	0	1	1
CBERA	(2)	(2)	8	8	8
Eastern Europe	(2)	(2)	0	0	0
U.S. imports for consumption:					
Canada	(2)	(2)	41	42	30
Mexico	(2)	(2)	44	72	96
France	(2)	(2)	50	58	61
Italy	(2)	(2)	16	15	14
Germany	(2)	(2)	3	3	3
Taiwan	(2)	(2)	4	4	7
Netherlands	(2)	(2)	0	0	0
United Kingdom	(2)	(2)	2	3	4
Switzerland	(2)	(2)	3	5	4
Japan	(2)	(2)	0	1	3
All other	(2)	(2)	12	11	12
Total	135	156	175	214	234
EC-12	(2)	(2)	77	85	88
OPEC	(2)	(2)	1	2	1
ASEAN	(2)	(2)	0	0	0
CBERA	(2)	(2)	2	1	1
Eastern Europe	(2)	(2)	0	0	0
U.S. merchandise trade balance:					
Canada	(2)	(2)	-15	27	53
Mexico	(2)	(2)	-42	-70	-94
France	(2)	(2)	-50	-57	-60
Italy	(2)	(2)	-16	-15	-14
Germany	(2)	(2)	-3	-3	4
Taiwan	(2)	(2)	-4	-3	-6
Netherlands	(2)	(2)	0	0	6
United Kingdom	(2)	(2)	0	1	-3
Switzerland	(2)	(2)	-3	-5	-4
Japan	(2)	(2)	1	5	-2
All other	(2)	(2)	1	3	3
Total	-106	-120	-130	-116	-115
EC-12	(2)	(2)	-73	-78	-71
OPEC	(2)	(2)	0	-1	0
ASEAN	(2)	(2)	0	1	1
CBERA	(2)	(2)	6	7	7
Eastern Europe	(2)	(2)	0	0	0

[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 in "Eastern Europe."

[2] Country-level detail is provided only for years in which there are actual trade data under the *Harmonized Tariff Schedule of the United States* (HTS).

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

APPENDIX A
EXPLANATION OF TARIFF AND TRADE AGREEMENT TERMS

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 those enumerated in general note 3(b) to the HTS, whose products are dutied at the rates set forth in ***column 2***. Goods from Albania, Armenia, Belarus, Bulgaria, the People's Republic of China, Czechoslovakia, Estonia, Hungary, Kazakhstan, Kyrgyzstan, Latvia, Lithuania, Moldova, Mongolia, Poland, Russia, and the Ukraine are currently eligible for MFN treatment. 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 July 4, 1993. 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 108 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.