

SALT

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Salt, also known as sodium chloride, is composed of the elements sodium and chlorine. Sodium is a silver-colored metal that is so unstable that it reacts violently in the presence of water, and chlorine is a greenish-colored gas that is dangerous and may be lethal. Yet the combination of these two elements forms sodium chloride that is a white-colored compound essential to life itself. Virtually every person in the world has some direct or indirect contact with salt daily. People routinely add salt to their food as a flavor enhancer or apply rock salt to walkways to remove ice in the winter. Salt is used as feedstock for chlorine and caustic soda manufacture; these two inorganic chemicals are used to make many consumer-related end-use products, such as polyvinyl chloride (PVC), a plastic made from chlorine and paper-pulping chemicals manufactured from sodium hydroxide (caustic soda).

Production

U.S. production data for salt are developed by the U.S. Geological Survey (USGS) from an annual voluntary survey of U.S. salt-producing sites and company operations. The four types of salt that are surveyed are classified according to the method of recovery as follows: rock salt, from the surface or underground mining of halite deposits; solar salt, from the solar evaporation of seawater, landlocked bodies of saline water, or primary or byproduct brines; vacuum pan salt, from the mechanical evaporation of a purified brine feedstock; and brine, from the solution mining of underground halite deposits. Data for brine production and consumption represent the anhydrous salt content only and not the weight of the water.

The structure of the U.S. salt industry has changed throughout the years. In 1970, 50 companies operated 95 salt-producing plants in the United States. Market competition, energy and labor costs, less expensive imports, currency exchange rates, and an excess of production capacity (resulting in the downsizing of the industry through mergers and acquisitions) reduced the number of operations in the industry to 30 companies and 68 plants by 2001. The information and data collected from these facilities are fundamental resources for analysis both within and outside the Government. The salt data and information are needed by the public and private sectors to better understand minerals and materials use and the ultimate disposition of materials in the economy and in the environment. The data are also used to develop public and private sector policies and practices that better use our mineral and material resources. Some of the customers that use the salt data and information are financial institutions, State and Federal agencies, salt-consuming industries (e.g., agricultural, chemical, and food processing), educational institutions, and the general public.

Of the 30 companies to which a survey request was sent, all but 3 responded, representing 97% of the total production

shown in this report. Data for nonrespondents were estimated based on their prior responses to previous annual surveys, the 2001 production estimate survey, or brine production capabilities for chloralkali manufacture based upon published chlorine production capacities [1.75 metric tons (t) of salt required per ton of chlorine capacity].

Total U.S. salt production decreased by nearly 2% in 2001 to 44.8 million metric tons (Mt) compared with that of 2000. According to the USGS canvass for 2001, 30 companies operated 68 salt-producing plants in 15 States. Of these, 9 companies and 15 plants produced more than 1 Mt each and accounted for 89% and 65%, respectively, of total U.S. production and 90% and 33%, respectively, of total value. Several companies and plants produced more than one type of salt. In 2001, 11 companies (15 operations) produced solar-evaporated salt; 6 companies (18 operations), vacuum pan salt; 11 companies (15 operations), rock salt; and 13 companies (32 operations), salt brine (tables 1-3).

The five leading States, in terms of total salt sold or used, were Louisiana, 31%; Texas, 22%; New York, 13%; Kansas, 7%; and Utah, 6% (table 4). Other Eastern States (Alabama, Michigan, Ohio, Tennessee, and West Virginia) accounted for 18% of the domestic total salt sold or used. Other Western States (Arizona, California, Nevada, New Mexico, and Oklahoma) represented 3%.

In February, IMC Global Inc. announced it was interested in divesting its salt company, IMC Salt Company, to refocus on its core crop-nutrient businesses. This divestment would include the rock salt operations in Louisiana, Canada, and the United Kingdom, a vacuum pan salt plant in Kansas, and the solar salt facility in Utah. In October, the salt assets were sold to Apollo Management L.P., a New York-based private investment firm, for \$640 million, including \$600 million in cash (North American Minerals News, 2001). The salt businesses were renamed Compass Minerals Group, Inc., of which Apollo Management will own 80% and IMC Global the remaining 20%. The United States salt operations will be known as North American Salt Co., the Canadian plants as Sifto Canada, Inc., and the United Kingdom facilities as Salt Union Ltd. (Chemical Week, 2001b).

Consumption

In 2001, apparent consumption (salt sold or used plus imports minus exports) was 54 Mt, whereas reported consumption (sales or use as reported by the salt companies, including their imports and exports) was 48.7 Mt. Although these two measures of consumption are not necessarily expected to be identical, they normally are similar. Apparent consumption normally is greater than reported consumption because apparent consumption includes additional quantities of salt imported and exported by nonsalt producing companies, such as some chloralkali

operations and salt distributors. Reported consumption statistics are reported only by the domestic salt producing companies.

The direct and indirect uses of salt number about 14,000 according to industry sources. The USGS annually surveys 8 major categories comprising 29 end uses. The 2001 reported percentage distribution of salt by major end use was chemicals, 41%; ice control, 34%; distributors (grocery and other wholesalers and retailers, etc.), 8%; general industrial, 6%; agricultural, 4%; food processing, 4%; other uses combined with exports, 2%; and primary water treatment, 1%. Distributors represented a substantial share of salt sales by the salt industry; all this salt is ultimately resold to many different end users. For a more complete analysis of end-use markets, specific sectors of distribution in table 5 can be combined, such as agricultural and water treatment with agricultural and water conditioning distribution, respectively.

Aside from the different types of salt, there are various distinctions in the packaging and applications of salt. Salt for human consumption is packaged in different sized containers for several specialized purposes. Table salt may contain 0.01% potassium iodide as an additive, which provides a source of iodine that is essential to the oxidation processes in the body. Kosher salt, sea salt, condiment salt, and salt tablets are special varieties of salt.

Water conditioning and animal feed salt are made into 22.7-kilogram (50-pound) pressed blocks. Sulfur, iodine, trace elements, and vitamins are occasionally added to salt blocks to provide nutrients not found naturally in the diet of certain livestock. Salt is also compressed into pellets that are used for water conditioning.

Chemical.—The largest consumer of salt, primarily salt brine, is the chemical industry. Salt brine is obtained from extraction of natural underground saline sources, solution-mined halite deposits (salt beds or salt domes), or the dissolution of solar salt supplies. Within this industry, the chloralkali sector remains the major consumer of salt for manufacturing chlorine, coproduct sodium hydroxide, and synthetic soda ash. Since 1986, when the last synthetic soda ash plant closed because of high production costs and competition with less expensive natural soda ash, no synthetic soda ash has been manufactured in the United States; many countries, however, still produce synthetic soda ash and use vast quantities of salt brine as feedstock.

Salt is used as the primary raw material in chlorine manufacture because it is an inexpensive and widely available source of chlorine ions. For sodium hydroxide production, salt is the main source of the sodium ions. About 98% of the domestic chlorine and sodium hydroxide produced is obtained from the electrolysis of salt brine feedstock by using three-cell technologies. The types of cells and the percentages of chlorine manufactured by them are diaphragm, 78%; mercury, 14%; and membrane, 6%. The remaining 2% of chlorine and caustic soda production is recovered as a byproduct from magnesium and sodium metal manufacture.

It takes about 1.75 t of salt to make 1.0 t of chlorine and 1.1 t of coproduct caustic soda. The electrolytic process ionizes the sodium chloride compound and selectively allows the ions to migrate through special membranes. Chlorine gas forms at the anode while sodium ions bond with water molecules at the cathode to form sodium hydroxide with hydrogen gas evolving.

Chlorine and caustic soda are considered to be the first generation of products made from salt. These two chemicals are

further used to manufacture other materials, which are considered to be the second generation of products from salt. Although most salt brine is produced by the same companies that use it, many chloralkali manufacturers now purchase brine from independent brine supply companies. In certain cases, brine is produced by a chemical company that uses some of it and sells the excess to neighboring competitors. According to a survey of domestic salt-based chlorine facilities, about 48% of the salt used to manufacture chlorine was produced by manufacturing companies, and 31% was purchased brine. Solar salt, rock salt, and vacuum pan salt are also used to manufacture many chemicals (tables 5, 6).

In 2001, according to U.S. Census Bureau data, 10.9 Mt of chlorine and 9.7 Mt of sodium hydroxide (caustic soda or lye) were produced. Based on the industry average ratio of 1.75 t of salt required to produce 1.0 t of chlorine and 1.1 t of coproduct sodium hydroxide, the chlorine and caustic soda industry consumed about 19.1 Mt of salt for feedstock. Reported consumption of total domestic and imported salt for chlorine manufacture was 18.9 Mt (table 5). The difference between the calculated and reported quantities was the amount of salt not reported to the USGS from imports or captive brine production of chloralkali producers.

Salt is also used as a feedstock in chemical establishments that make sodium chlorate (by the electrolysis of an acidified salt brine using hydrochloric acid adjusted to a pH of 6.5), metallic sodium (by the electrolysis of a molten salt mixture containing 33.2% sodium chloride and 66.8% calcium chloride, which is added to reduce the melting temperature of salt), and other downstream chemical operations. In powdered soaps and detergents, salt is used as a bulking agent and a coagulant for colloidal dispersion after saponification. In pharmaceuticals, salt is a chemical reagent and is used as the electrolyte in saline solutions. It is also used with sulfuric acid to produce sodium sulfate and hydrochloric acid. This subsector is relatively small, representing only 5% of domestic salt sales for the entire chemical sector and only 2% of total domestic salt consumption.

The consumption of salt for metallic sodium has declined during the past several years. Since the 1970s, the number of producers has decreased from three to one; Ethyl Corp. and RMI Titanium Corp. exited the market in 1985 and 1992, respectively, leaving E.I. du Pont de Nemours & Co., Inc., the sole manufacturer of metallic sodium in the United States. In 1998, the domestic market was less than 30,000 t, having decreased from about 126,000 t in 1978. The phasing out of tetraethyl lead and tetramethyl lead gasoline additives was the main reason for the decline in consumption. In 1978, sodium usage in gasoline represented about 80% of the domestic market. Although there is no information about sodium consumption in 2001, the largest use of sodium in 1998 was for sodium borohydride production, which is the feedstock for sodium dithionite that is used as a reductive bleaching agent by the pulp and paper industry; sodium for sodium borohydride manufacture accounted for about 38% of metallic sodium consumption. Sodium metal also is used to manufacture sodium azide, which is used in automotive air bags. Other promising uses of sodium metal are in the remediation of chemical weapons, pesticides, polychlorinated biphenyls, and chlorofluorocarbons.

Ice Control and Road Stabilization.—The second largest end use of salt is for highway deicing. The developer of the

Fahrenheit temperature scale discovered that salt mixed with ice at a temperature below the freezing point of water creates a solution (brine) with a lower freezing point than water alone. The brine forms below the surface of the ice and snow and prevents the water from freezing into ice and bonding with the road surface, thus causing the snow and ice to melt. Salt is an inexpensive, widely available, and effective ice control agent. It does, however, become less effective as the temperature decreases below about -9.5°C to -6.5°C (15°F to 20°F). At lower temperatures, more salt would have to be applied to maintain higher brine concentrations to provide the same degree of melting. Most winter snowstorms and ice storms occur when temperatures are between -4°C and 0°C (25°F and 32°F), the range in which salt is most effective. An anticaking agent, such as ferric ferrocyanide (Prussian Blue) or sodium ferrocyanide (Yellow Prussiate of Soda), is used to prevent the salt from agglomerating. Both additives are nontoxic and harmless to humans. In fact, sodium ferrocyanide is approved for use in food-grade salt by the U.S. Food and Drug Administration (Food and Nutrition Board, 1966).

In highway deicing, salt has been associated with corrosion of motor vehicles, bridge decks, unprotected steel structures, and reinforcement bar and wire used in road construction. Surface runoff, vehicle spraying, and windblown actions also affect roadside vegetation, soil, and local surface- and ground-water supplies. Although evidence of environmental loading of salt has been found during peak usage, the spring rains and thaws usually dilute the concentrations of sodium in the area where salt was applied.

Salt is also added to stabilize the soil and to provide firmness to the foundation on which highways are built. The salt acts to minimize the effects of shifting caused in the subsurface by changes in humidity and traffic load.

The quantity of salt consumed for road deicing each year is directly related to the severity of the winter weather conditions. Long-range forecasting of salt consumption in this application is extremely difficult because of the complexities in long-range forecasting of the weather. Meteorologists, however, are becoming more aware of the dynamics of certain weather phenomena that influence the climate in various parts of the world. One of these phenomena is El Niño, an increase in sea-surface temperatures in the equatorial Pacific Ocean, which is now believed to be the largest single weather influence on Earth. The mild winters of 1997 and 1998 were attributed to El Niño effects. In 1998, highway deicing salt sales were the lowest since about 1992, which also was an El Niño year (National Broadcast Company, 1998¹). The winters of 1999 and 2000 were colder and produced more precipitation that required more salt for road deicing as shown in the rock salt production statistics in tables 1 and 2 and the rock salt consumption data in tables 5 and 6. In 2001, there was not as much cold weather and precipitation as compared with the winter of 2000, resulting in a 3 Mt decrease in salt consumption for highway deicing.

Distributors.—A tremendous amount of salt is marketed through various distributors, some of which specialize in markets such as agricultural and water treatment services, two sectors where the salt companies sell directly as well (table 5).

¹References that include a section twist (§) are found in the Internet References Cited section.

Distributor sales also include grocery wholesalers and/or retailers, institutional wholesalers, U.S. Government resale, and other wholesalers and retailers.

General Industrial.—The industrial uses of salt are diverse. They include, in descending order, oil and gas exploration, textiles and dyeing, other industrial applications, metal processing, pulp and paper, tanning and leather treatment, and rubber manufacture.

In oil and gas exploration, salt is an important component of drilling fluids in well drilling. It is used to flocculate and increase the density of the drilling fluid to overcome high down-well gas pressures. Whenever a drill hits a salt formation, salt is added to the drilling fluid to saturate the solution and to minimize the dissolution within the salt stratum. Salt is also used to increase the set rate of concrete in cemented casings.

In textiles and dyeing, salt is used as a brine rinse to separate organic contaminants, to promote “salting out” of dyestuff precipitates, and to blend with concentrated dyes to standardize them. One of its main roles is to provide the positive ion charge to promote the absorption of negatively charged ions of dyes.

In metal processing, salt is used in concentrating uranium ore into uranium oxide (yellow cake). It is also used in processing aluminum, beryllium, copper, steel, and vanadium.

In the pulp and paper industry, salt is used to bleach wood pulp. It also is used to make sodium chlorate, which is added along with sulfuric acid and water to manufacture chlorine dioxide, an excellent oxygen-based bleaching chemical. The chlorine dioxide process, which originated in Germany after World War I, is becoming more popular because of environmental pressures to reduce or eliminate chlorinated bleaching compounds.

In tanning and leather treatment, salt is added to animal hides to inhibit microbial activity on the underside of the hides and to replace some of the moisture in the hides. In rubber manufacture, salt is used to make buna, neoprene, and white types. Salt brine and sulfuric acid are used to coagulate an emulsified latex made from chlorinated butadiene.

Agricultural Industry.—Since prehistoric times, humankind has noticed that animals satisfied their salt hunger by locating salt springs, salt licks, or playa lake salt crusts. Barnyard and grazing livestock need supplementary salt rations to maintain proper nutrition. Veterinarians advocate adding loose salt in commercially mixed feeds or in block forms sold to farmers and ranchers because salt acts as an excellent carrier for trace elements not found in the vegetation consumed by grazing livestock; selenium, sulfur, and other essential elements are commonly added to salt licks, or salt blocks, for free-choice feeding.

Food Processing.—Every person uses some quantity of salt in their food. The salt is added to the food by the food processor or by the consumer through free choice, as a flavor enhancer, preservative, binder, fermentation-control additive, texture-control agent, and color developer. This major category is subdivided, in descending order of salt consumption, into meat packers, canning, other food processing, grain mill products, baking, and dairy.

In meat packing, salt is added to processed meats to promote color development in bacon, ham, and other processed meat products. As a preservative, salt inhibits the growth of bacteria, which would lead to spoilage of the product. Early pioneers stored their perishable food in salt barrels for protection and

preservation. Salt acts as a binder in sausages to form a binding gel composed of meat, fat, and moisture. Salt also acts as a flavor enhancer and a tenderizer.

In the dairy industry, salt is added to cheese as a fermentation-control agent and as a color- and texture-control agent. The dairy subsector includes companies that manufacture creamery butter, natural and processed cheese, condensed and evaporated milk, ice cream, frozen desserts, and specialty dairy products.

In canning, salt is primarily added as a flavor enhancer and preservative. It also is used as a dehydrating agent, tenderizer, enzyme inhibitor, and carrier for other ingredients.

In baking, salt is added to control the rate of fermentation in bread dough. It also is used to strengthen the gluten (the elastic protein-water complex in certain doughs) and as a flavor enhancer, such as a topping on baked goods.

The food-processing category also contains grain mill products, which consist of milling flour and rice and manufacturing cereal breakfast food and blended or prepared flour.

In the “other food processing” category, salt is used mainly as a seasoning agent. Other food processing includes miscellaneous establishments that make food for human consumption (e.g., potato chips and pretzels) and for domestic pet consumption (e.g., cat and dog food).

Water Treatment.—Many areas of the United States have hard water, which contains excessive calcium and magnesium ions that contribute to the buildup of a scale or film of alkaline mineral deposits in household and industrial equipment. Commercial and residential water-softening units use salt to remove the ions causing the hardness. The sodium ions captured on a resin bed are exchanged for the calcium and magnesium ions. Periodically, the water-softening units must be recharged because the sodium ions become depleted. Salt is added and dissolved, and the brine replenishes the lost sodium ions.

Stocks

Because bulk salt is stored at many different locations, such as at the plants, warehouses, ports, and terminals, data on the quantity of salt stockpiled by the salt industry are not reliable enough to formulate accurate inventory totals; however, yearend stocks of producers were estimated to be 2 Mt, and consumer inventories were also estimated to be high. Most of these inventories were imported rock salt and solar salt. Many salt producers, States, municipalities, distributors, and road deicing contractors stockpiled additional quantities of salt in anticipation of adverse weather conditions. Deicing salt inventories were extremely large by yearend because the mild winter in the domestic snow belt did not require as much salt as had been stockpiled. For the reasons discussed above, salt stocks are assumed to be the difference between salt production and salt sold or used in calculating apparent consumption.

Transportation

Because the locations of the salt supplies are not often near consumers, transportation can become an important cost. Pumping salt brine through pipelines is an economic means of transportation but cannot be used for dry salt. Large bulk

shipments of dry salt in ocean freighters or river barges are low in cost but are restricted in points of origin and consumption. River and lake movement of salt in winter is often severely curtailed because of frozen waterways. As salt is packaged, handled, and shipped in smaller units, the costs increase and are reflected in higher selling prices.

Transportation costs significantly add to the price of salt. In some cases, shipping costs are higher than the actual value of the salt. Ocean vessels can transport greater quantities of salt than barge, rail or truck shipments. Transoceanic imports of salt have been increasing in some areas of the United States because they are more cost competitive than salt purchased from domestic suppliers using barge, rail or truck transportation. One important factor that often determines the quantity of imported salt that can be delivered is the depth of the channels and the ports; many ports are not deep enough to accommodate the larger ships.

Prices

The four types of salt that are produced have unique production, processing, and packaging factors that determine the selling prices. Generally, salt sold in bulk is less expensive than salt that has been packaged, pelletized, or pressed into blocks. Salt in brine is the least expensive salt sold because mining and processing costs are less. Vacuum pan salt is the most expensive because of the higher energy costs involved in processing and the purity of the product.

Price quotations are not synonymous with average values reported to the USGS. The quotations do not necessarily represent prices at which transactions actually took place or bid and asked prices. Yearend prices for salt are no longer quoted in Chemical Market Reporter; this information was last available for 1997. The average annual values, as collected by the USGS and listed in table 7, represent a national average value for each of the types of salt and the various product forms.

Foreign Trade

Under Harmonized Tariff Schedule of the United States (HTS) nomenclature, imports are aggregated under one category named “Salt (including table and denatured salt) and pure sodium chloride, whether or not in aqueous solution, seawater.” The same classification also applies to exports. The HTS code for salt is 2501.00.0000. The trade tables in this report list the previous and current identification codes for salt. Although several other HTS codes pertain to various salt classifications, the United States aggregates shipments under one code because the sums of individual subclassifications fail to meet the minimum dollar requirements necessary for individual listings.

Based on U.S. Census Bureau data for 2001, the United States exported 1.12 Mt; this was a 75% increase compared with that of 2000 (table 8). Salt was shipped to 72 countries through 38 U.S. customs districts; the Cleveland, OH, district exported the most and represented 53% of the U.S. total (table 9). In 2001, the majority of exports, or 88% of the total, was to Canada.

Based on U.S. Census Bureau statistics, the United States imported 8.96 Mt of salt from 39 countries in 2001, which was 44% more than was imported during 2000 (table 10). Table 11 lists the imports of salt by customs districts. The quantity of imported salt was about 11 times more than that of exports.

This indicates the magnitude of the United States' reliance on salt imports. The majority of imported salt was brought into the country by foreign subsidiaries of major U.S. salt producers. Generally, imported salt can be purchased and delivered to many customers at costs lower than the comparable domestic product because production costs are lower abroad, currency exchange rates are more favorable, and ocean freight rates are less expensive than overland rail or truck rates.

World Review

Table 12 lists world salt production statistics for 115 nations based on reported and estimated information. In 2001, the total estimated world production was virtually identical with that of 2000. The United States remained the world's leading salt-producing country, representing 20% of total world output.

Most countries possess some form of salt production capability with production levels set to meet their own domestic demand requirements and with additional quantities available for export. Many developing nations tend to develop their agricultural resources to feed their population first. Development of easily extractable mineral resources follows, and salt is one of the first commodities to be mined. Some countries, such as the United States, import a substantial amount of salt to meet total demand requirements because of economic factors.

European Salt Co. (ESCO) [a joint venture between Kali und Salz Aktiengesellschaft of Kassel, Germany (62%), and Solvay S.A. of Brussels, Belgium (38%)] was formed in 2001. The new company, based in Hanover, Germany, was organized for producing and marketing salt in Europe. ESCO will have a combined production of about 5 million metric tons per year (Mt/yr) valued at about \$272 million from salt operations in Belgium, France, Germany, the Netherlands, Portugal, and Spain. The venture will be operational by January 2002 (Industrial Minerals, 2001).

Australia.—In August, Dampier Salt Ltd. [owned by Rio Tinto PLC (64.9%), Marubeni Corp. (20.5%), Nissho Iwai Corp. (10.1%), and Itochu Corp. (4.5%)] purchased Cargill Inc.'s solar salt facility operated by Cargill Australia Ltd. at Port Hedland, Western Australia. The purchase price was \$95 million plus contingent performance-based payments payable over several years and not exceeding \$15 million. Dampier also has solar salt plants at Dampier and Lake MacLeod. The addition of the Port Hedland facility made the company the world's largest salt exporter (Rio Tinto PLC, 2001§).

Onslow Salt Company (an affiliate of Akzo Nobel, Inc.) commissioned its solar salt facility at Onslow, Western Australia. The operation has a capacity of 2.5 Mt/yr and cost \$51 to construct (Chemical Week, 2001c).

Netherlands.—Akzo Nobel announced plans to close its salt packaging plant at Hengelo by the end of 2002 citing overcapacity and weak prices for packaged salt as the reasons for the closure. About 200 jobs will be affected. The company will continue to operate packaging plants in Dordrecht, Netherlands; Mariager, Denmark; and Stade, Germany (Chemical Week, 2001a).

Outlook

Although the severity of winter weather is virtually impossible to forecast far in advance, the supplies of salt, from

either domestic or imported sources, are more than adequate to meet any anticipated increase in demand. Salt imports have grown steadily for the past 4 consecutive years. However, the growing reliance on imports should not be interpreted as an indication that domestic production capacity cannot meet demand requirements. Foreign salt suppliers seeking to enter the domestic market should be aware that the majority of salt imports are under the direct control of the primary U.S. salt companies that operate subsidiaries in near proximity to the United States.

The outlook for salt is very favorable for the foreseeable future. Excluding deicing salt, domestic salt consumption may fluctuate but will continue to grow parallel to population growth trends. U.S. production of total salt for 2002 is estimated to be 45 Mt.

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TABLE 3
SALT SOLD OR USED IN THE UNITED STATES, BY TYPE AND PRODUCT FORM 1/ 2/

(Thousand metric tons and thousand dollars)

Product form	Vacuum and open pans		Solar		Rock		Brine		Total	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
2000:										
Bulk	773	39,100	1,440	30,500	13,100	252,000	22,500	128,000	37,800	450,000
Compressed pellets	1,260	166,000	320	35,900	XX	XX	XX	XX	1,580	202,000
Packaged:										
Less-than-5-pound units	234	NA	4	NA	1	NA	XX	XX	239	XX
More-than-5-pound units	1,710	NA	1,060	NA	434	NA	XX	XX	3,210	XX
Total	1,950	249,000	1,070	76,200	435	27,100	XX	XX	3,450	353,000
Pressed blocks:										
For livestock	86	NA	119	NA	75	NA	XX	XX	280	XX
For water treatment	120	NA	7	NA	6	NA	XX	XX	133	XX
Total	207	20,900	126	11,800	81	7,360	XX	XX	414	40,100
Grand total	4,190	475,000	2,950	154,000	13,600	286,000	22,500	128,000	43,300	1,040,000
2001:										
Bulk	732	40,200	1,570	37,200	14,100	288,000	20,400	128,000	36,800	493,000
Compressed pellets	1,250	167,000	340	39,100	XX	XX	XX	XX	1,590	206,000
Packaged:										
Less-than-5-pound units	232	NA	13	NA	1	NA	XX	XX	246	XX
More-than-5-pound units	1,680	NA	1,070	NA	433	NA	XX	XX	3,180	XX
Total	1,910	260,000	1,090	80,700	434	29,600	XX	XX	3,430	371,000
Pressed blocks:										
For livestock	126	NA	113	NA	79	NA	XX	XX	318	XX
For water treatment	69	NA	7	NA	5	NA	XX	XX	81	XX
Total	195	20,600	120	11,500	84	8,770	XX	XX	398	40,900
Grand total	4,090	488,000	3,120	168,000	14,600	326,000	20,400	128,000	42,200	1,110,000

NA Not available. XX Not applicable.

1/ Data are rounded to no more than three significant digits; may not add to totals shown.

2/ As reported at salt production locations, the term "sold or used" indicates that some salt, usually salt brine, is not sold but is used for captive purposes by plant or company. Because data do not include salt imported, purchased, and/or sold from inventory from regional distribution centers, salt sold or used by type may differ from totals shown in tables 5 and 6, which are derived from company totals.

TABLE 4
SALT SOLD OR USED BY PRODUCERS IN THE UNITED STATES,
BY STATE 1/ 2/

(Thousand metric tons and thousand dollars)

State	2000		2001	
	Quantity	Value	Quantity	Value
Kansas	2,770	114,000	3,130	122,000
Louisiana	13,400	124,000	13,100	139,000
New York	5,440	218,000	5,570	215,000
Texas	10,800	104,000	9,370	104,000
Utah	2,110	108,000	2,300	121,000
Other Eastern States 3/	7,480	311,000	7,360	341,000
Other Western States 4/	1,240	64,500	1,390	68,000
Total	43,300	1,040,000	42,200	1,110,000
Puerto Rico e/	45	1,500	45	1,500

e/ Estimated.

1/ Data are rounded to no more than three significant digits; may not add to totals shown.

2/ The term "sold or used" indicates that some salt, usually salt brine, is not sold but is used for captive purposes by plant or company.

3/ Includes Alabama, Michigan, Ohio, Tennessee, and West Virginia.

4/ Includes Arizona, California, Nevada, New Mexico, and Oklahoma.

TABLE 5
DISTRIBUTION OF DOMESTIC AND IMPORTED SALT BY PRODUCERS IN THE UNITED STATES BY END USE AND TYPE 1/ 2/

(Thousand metric tons)

End use	Standard industrial classification	Vacuum and open pans		Solar		Rock		Brine		Grand total 3/	
		2000	2001	2000	2001	2000	2001	2000	2001	2000	2001
Chemical:											
Chloralkali producers	2812	31	29	442	313	230	511	20,600	18,100	21,300	18,900
Other chemical	28 (excludes 2812, 2899)	257	253	168	183	654	722	2	2	1,080	1,160
Total		288	282	610	496	885	1,230	20,600	18,100	22,400	20,100
Food-processing industry:											
Meat packers	201	268	261	54	53	81	97	--	--	402	411
Dairy	202	120	118	7	7	2	3	--	--	129	128
Canning	2091, 203	149	135	40	40	30	38	(4/)	1	220	213
Baking	205	214	223	7	6	13	13	--	--	234	242
Grain mill products	204 (excludes 2047)	93	92	11	9	30	24	--	--	133	125
Other food processing	206-208, 2047, 2099	505	521	84	75	47	65	1	1	638	663
Total		1,350	1,350	202	192	203	241	2	2	1,760	1,780
General industrial:											
Textiles and dyeing	22	138	114	52	44	11	10	8	4	209	172
Metal processing	33, 34, 35, 37	6	5	24	30	82	89	--	--	112	124
Rubber	2822, 30 (excludes 3079)	3	3	1	1	1	1	66	56	71	61
Oil	13, 29	28	32	186	184	49	50	2,250	2,000	2,510	2,260
Pulp and paper	26	16	13	45	45	26	26	19	16	106	100
Tanning and/or leather	311	16	17	30	27	36	43	--	--	82	87
Other industrial	--	89	94	50	66	62	81	(4/)	1	202	242
Total		295	278	388	397	268	300	2,340	2,080	3,290	3,050
Agricultural:											
Feed retailers and/or dealers mixers	5159	385	356	385	363	469	454	--	(4/)	1,240	1,170
Feed manufacturers	2048	55	52	126	129	359	352	--	--	540	533
Direct-buying end user	02	5	5	20	17	63	63	--	--	88	85
Total		445	413	531	510	891	869	--	(4/)	1,870	1,790
Water treatment:											
Government (Federal, State, local)	2899	17	17	82	74	128	73	4	3	231	168
Commercial or other	2899	142	134	184	140	30	68	3	2	358	344
Total		159	151	266	215	157	141	6	5	589	512
Ice control and/or stabilization:											
Government (Federal, State, local)	9621	2	2	515	818	16,900	13,900	--	--	17,400	14,800
Commercial or other	--	7	7	122	226	2,240	1,790	--	--	2,370	2,030
Total		10	8	637	1,040	19,100	15,700	--	--	19,700	16,800
Distributors:											
Agricultural distribution	5191	90	95	121	126	51	60	--	--	262	280
Grocery wholesalers and/or retailers	514, 54	528	531	238	240	56	53	--	--	823	824
Institutional wholesalers and end users	58, 70	113	107	47	51	45	37	(4/)	(4/)	206	195
Water-conditioning distribution	7399	152	150	391	388	24	22	--	1	568	560
U.S. Government resale	9199	(4/)	(4/)	1	(4/)	1	1	--	--	2	2
Other wholesalers and/or retailers	5251	796	795	755	831	401	388	(4/)	1	1,950	2,020
Total		1,680	1,680	1,550	1,640	578	561	1	2	3,810	3,880
Other 5/		105	77	65	75	341	539	58	151	570	842
Grand total		4,330	4,230	4,250	4,570	22,400	19,600	23,000	20,300	54,000	48,700

See footnotes at end of table.

TABLE 5--Continued
DISTRIBUTION OF DOMESTIC AND IMPORTED SALT BY PRODUCERS IN THE UNITED STATES BY END USE AND TYPE 1/ 2/

-- Zero.

1/ Data are rounded to no more than three significant digits; may not add to totals shown.

2/ The quality of imports included in the total for each type of salt is the amount reported by the U.S. salt industry, not the quantity reported by the U.S. Census Bureau that appears in tables 1, 11, and 12.

3/ Because data include salt imported, produced, and/or sold from inventory from regional distribution centers, salt sold or used by type may differ from totals shown in tables 1, 3, and 4, which are derived from plant reports at salt production locations. Data may differ from totals shown in table 6 because of changes in inventory and/or incomplete data reporting.

4/ Less than 1/2 unit.

5/ Includes exports.

TABLE 6
DISTRIBUTION OF DOMESTIC AND IMPORTED EVAPORATED AND ROCK SALT IN THE UNITED STATES,
BY DESTINATION 1/ 2/

(Thousand metric tons)

Destination	2000				2001			
	Evaporated			Total	Evaporated			Total
	Vacuum and open pans	Solar	Rock		Vacuum and open pans	Solar	Rock	
Alabama	71	2	73	146	73	2	73	147
Alaska	3	4	(3/)	7	5	4	(3/)	9
Arizona	12	95	1	109	13	96	14	123
Arkansas	48	2	59	109	45	2	69	116
California	196	670	3	868	201	685	3	888
Colorado	13	82	133	228	13	93	142	248
Connecticut	15	119	176	310	17	170	118	304
Delaware	4	11	3	18	4	9	2	15
District of Columbia	1	1	21	23	1	7	(3/)	8
Florida	74	206	7	288	76	204	7	288
Georgia	95	55	63	212	81	56	58	195
Hawaii	(3/)	1	(3/)	2	(3/)	1	(3/)	1
Idaho	16	98	5	119	16	109	3	129
Illinois	343	120	2,320	2,780	345	113	1,820	2,280
Indiana	251	112	844	1,210	247	113	754	1,110
Iowa	152	89	533	774	146	104	600	850
Kansas	93	44	592	728	92	42	346	480
Kentucky	64	5	542	610	66	5	517	589
Louisiana	57	1	565	623	56	2	326	384
Maine	14	6	185	205	13	10	319	342
Maryland	64	82	161	307	65	82	54	201
Massachusetts	32	22	333	387	32	98	357	486
Michigan	308	38	2,180	2,520	303	36	2,030	2,370
Minnesota	138	203	624	965	129	227	734	1,090
Mississippi	32	(3/)	250	282	28	(3/)	252	281
Missouri	131	44	382	557	143	48	513	703
Montana	1	36	2	39	1	35	2	38
Nebraska	79	46	171	297	77	44	237	359
Nevada	3	276	12	290	3	290	15	309
New Hampshire	13	28	131	172	15	79	114	207
New Jersey	108	69	134	311	116	87	50	253
New Mexico	15	71	(3/)	87	15	73	6	94
New York	271	77	3,280	3,630	206	125	2,830	3,160
North Carolina	108	177	82	367	105	68	57	231
North Dakota	7	19	7	32	5	18	5	28
Ohio	415	56	3,330	3,800	415	51	2,470	2,940
Oklahoma	39	19	63	121	36	19	77	133
Oregon	19	137	2	157	19	109	1	129
Pennsylvania	173	104	1,840	2,110	166	125	1,520	1,810
Rhode Island	7	2	125	134	5	55	118	178

See footnotes at end of table.

TABLE 6--Continued
DISTRIBUTION OF DOMESTIC AND IMPORTED EVAPORATED AND ROCK SALT IN THE UNITED STATES,
BY DESTINATION 1/ 2/

(Thousand metric tons)

Destination	2000				2001			
	Evaporated		Rock	Total	Evaporated		Rock	Total
	Vacuum and open pans	Solar			Vacuum and open pans	Solar		
South Carolina	33	13	5	51	32	13	6	51
South Dakota	23	48	40	111	20	44	39	103
Tennessee	110	6	403	520	104	19	480	603
Texas	212	126	189	528	222	135	197	553
Utah	9	414	(3/)	423	13	461	121	595
Vermont	6	7	335	348	6	5	319	330
Virginia	75	81	147	303	71	58	76	206
Washington	22	124	3	149	24	111	9	144
West Virginia	15	5	204	223	12	6	159	178
Wisconsin	222	129	1,570	1,920	217	144	1,310	1,670
Wyoming	(3/)	24	2	26	(3/)	22	11	33
Other 4/	117	48	295	460	119	51	271	441
Total 5/	4,330	4,250	22,400	31,000	4,230	4,570	19,600	28,400

1/ Data are rounded to no more than three significant digits; may not add to totals shown.

2/ Each salt type includes domestic and imported quantities. Brine is excluded because brine is not shipped out of State.

3/ Less than 1/2 unit.

4/ Includes shipments to overseas areas administered by the United States, Puerto Rico, exports, and some shipments to unspecified destinations.

5/ Because data include salt imported, purchased, and/or sold from inventory from regional distribution centers, evaporated and rock salt distributed by State may differ from totals shown in tables 1 and 3, which are derived from plant reports at salt production locations. Data may differ from totals shown in table 5 because of changes in inventory and/or incomplete data reporting.

TABLE 7
AVERAGE VALUE OF SALT, BY PRODUCT FORM AND TYPE 1/

(Dollars per metric ton)

Product form	Vacuum and open pans			
	Solar	Rock	Brine	
2000:				
Bulk	\$50.58	\$21.16	\$19.28	\$5.70
Compressed pellets	130.97	112.28	XX	XX
Packaged	128.05	71.56	62.34	XX
Average 2/	113.95	50.46	20.67	5.70
Pressed blocks	101.18	93.52	91.14	XX
2001:				
Bulk	54.87	23.62	20.41	6.26
Compressed pellets	133.30	115.13	XX	XX
Packaged	136.30	74.32	68.29	XX
Average 2/	120.02	52.33	21.84	6.26
Pressed blocks	105.66	96.33	104.81	XX

XX Not applicable.

1/ Net selling value, free on board plant, excluding container costs.

2/ Salt value data reported prior to 1984 were an aggregate value per metric ton of bulk, compressed pellets, and packaged salt. For time series continuity, an average of these three types of product forms is presented that is based on the aggregated values and quantities of the product form for each type of salt shown in table 3.

TABLE 8
U.S. EXPORTS OF SALT, BY COUNTRY 1/

(Thousand metric tons and thousand dollars)

Country	2000		2001	
	Quantity	Value 2/	Quantity	Value 2/
Bahamas, The	2	222	1	150
Bahrain	1	221	1	412
Belgium	(3/)	30	2	48
Canada	500	22,800	984	31,400
Chile	1	84	1	189
China	(3/)	447	1	135
Colombia	2	413	2	388
Costa Rica	(3/)	67	1	107
Dominican Republic	(3/)	141	1	132
El Salvador	1	175	1	156
France	(3/)	64	3	127
Haiti	5	1,370	6	1,690
Honduras	4	469	3	404
Israel	(3/)	6	1	38
Jamaica	(3/)	84	1	42
Japan	3	575	2	575
Korea, Republic of	1	55	(3/)	87
Kuwait	(3/)	75	1	190
Lebanon	(3/)	93	1	153
Mexico	82	5,270	68	3,870
Netherlands	(3/)	159	1	180
Nicaragua	1	91	(3/)	50
Oman	(3/)	59	1	157
Panama	1	156	3	325
Philippines	(3/)	23	1	59
Saudi Arabia	11	1,360	24	2,290
Singapore	13	490	(3/)	142
Taiwan	3	269	1	192
United Arab Emirates	1	319	2	456
United Kingdom	3	617	6	587
Venezuela	2	346	1	533
Other	5	1,220 r/	1	2,790
Total	642	37,800	1,120	48,000

r/ Revised.

1/ Data are rounded to no more than three significant digits; may not add to totals shown.

2/ Free alongside ship value at U.S. ports.

3/ Less than 1/2 unit; included with "Other."

Source: U.S. Census Bureau.

TABLE 9
U.S. EXPORTS OF SALT, BY CUSTOMS DISTRICT 1/

(Thousand metric tons and thousand dollars)

District	2000		2001	
	Quantity	Value 2/	Quantity	Value 2/
Anchorage, AK	--	--	16	368
Baltimore, MD	(3/)	36	1	141
Boston, MA	--	--	(3/)	3
Buffalo, NY	27	2,970	33	2,840
Charleston, SC	1	56	(3/)	39
Chicago, IL	45	1,310	1	47
Cleveland, OH	2	255	592	12,900
Columbia-Snake River, OR	--	--	1	77
Dallas-Fort Worth, TX	--	--	(3/)	5
Detroit, MI	226	7,060	148	5,540
Duluth, MN	(3/)	14	(3/)	7
El Paso, TX	2	116	6	305
Great Falls, MT	17	1,450	8	504
Honolulu, HI	--	--	(3/)	21
Houston, TX	14	2,400	31	4,150
Laredo, TX	73	4,500	55	2,830
Los Angeles, CA	17	1,640	3	898
Miami, FL	4	539	2	1,630
Mobile, AL	1	82	1	138
New Orleans, LA	4	637	3	646
New York, NY	4	1,100	10	1,430
Nogales, AZ	3	158	5	232
Norfolk, VA	2	480	5	703
Ogdensburg, NY	4	370	8	512
Pembina, ND	17	1,290	4	369
Philadelphia, PA	(3/)	123	3	134
Port Arthur, TX	6	1,580	7	1,910
Portland, ME	2	127	2	172
St. Albans, VT	(3/) r/	30	(3/)	9
St. Louis, MO	(3/) r/	79	(3/)	74
San Diego, CA	4 r/	494	2	495
San Francisco, CA	12 r/	538	1	371
San Juan, PR	(3/)	12	(3/)	4
Savannah, GA	(3/)	206	1	53
Seattle, WA	31	969	44	1,320
Tampa, FL	(3/)	35	(3/)	19
Washington, DC	--	--	(3/)	144
Wilmington, NC	(3/)	23	(3/)	24
Other 4/	123	7,080	129	6,950
Total	642	37,800	1,120	48,000

r/ Revised. -- Zero.

1/ Data are rounded to no more than three significant digits; may not add to totals shown.

2/ Free alongside ship value at U.S. ports.

3/ Less than 1/2 unit.

4/ Unknown but assumed to be rail and/or truck shipments to Canada through various departure points.

Source: U.S. Census Bureau.

TABLE 10
U.S. IMPORTS FOR CONSUMPTION OF SALT, BY COUNTRY 1/

(Thousand metric tons and thousand dollars)

Country	2000		2001	
	Quantity	Value 2/	Quantity	Value 2/
Australia	(3/)	6	67	599
Bahamas, The	858	9,770	1,010	11,600
Brazil	217	2,290	308	3,030
Canada	3,470	58,000	4,610	74,300
Chile	2,050	19,500	3,480	37,300
China	(3/)	695	1	709
Dominican Republic	167	1,790	162	1,750
Egypt	313	2,500	332	3,040
France	6	1,370	5	1,370
Germany	10	983	1	766
Ireland	42	295	32	224
Israel	1	455	1	530
Italy	2	353	4	482
Japan	1	149	(3/)	69
Jordan	--	--	168	2,020
Korea, Republic of	1	679	1	579
Mexico	1,180	17,900	1,460	22,900
Namibia	17	283	--	--
Netherlands	187	4,460	135	4,250
Netherlands Antilles	132	2,190	239	4,050
Peru	291	2,260	709	5,160
Spain	(3/)	106	2	624
Sweden	(3/)	139	(3/)	75
Tunisia	--	--	147	3,170
United Kingdom	15	187	16	224
Other	(3/)	385	3	423
Total	8,960	127,000	12,900	179,000

-- Zero.

1/ Data are rounded to no more than three significant digits; may not add to totals shown.

2/ Customs value only.

3/ Less than 1/2 unit.

Source: U.S. Census Bureau.

TABLE 11
U.S. IMPORTS OF SALT, BY CUSTOM DISTRICTS 1/

(Thousand metric tons and thousand dollars)

District	2000		2001	
	Quantity	Value 2/	Quantity	Value 2/
Anchorage, AK	14	398	16	407
Baltimore, MD	766	11,600	1,190	14,600
Boston, MA	703	6,480	815	9,630
Buffalo, NY	344	7,050	232	4,940
Charleston, SC	179	3,630	176	4,530
Chicago, IL	391	5,380	822	10,500
Cleveland, OH	154	2,470	247	4,500
Columbia-Snake, OR	280	3,580	33	419
Dallas-Fort Worth, TX	(3/)	53	(3/)	39
Detroit, MI	824	14,900	1,280	22,700
Duluth, MN	146	1,950	306	5,100
El Paso, TX	(3/)	99	(3/)	17
Great Falls, MT	(3/)	35	1	160
Houston-Galveston, TX	1	256	5	431
Laredo, TX	1	241	3	320
Los Angeles, CA	114	2,640	115	2,520
Miami, FL	1	380	(3/)	229
Milwaukee, WI	808	16,300	1,260	18,500
Minneapolis, MN	(3/)	3	(3/)	3
Mobile, AL	(3/)	4	--	--
New Orleans, LA	32	459	374	5,270
New York, NY	1,400	15,400	2,570	30,600
Nogales, AZ	(3/)	78	--	--
Norfolk, VA	227	2,570	38	384
Ogdensburg, NY	138	2,910	168	3,330
Pembina, ND	1	101	4	386
Philadelphia, PA	705	7,850	1,100	13,100
Portland, ME	510	4,880	1,080	10,500
Providence, RI	358	3,290	459	6,860
St. Albans, VT	3	294	4	444
St. Louis, MO	(3/)	10	(3/)	17
San Diego, CA	(3/)	22	(3/)	5
San Francisco, CA	(3/)	120	(3/)	84
San Juan, PR	8	156	7	188
Savannah, GA	62	1,030	41	702
Seattle, WA	297	4,150	146	2,150
Tampa, FL	305	4,130	325	4,650
Wilmington, NC	179	1,960	80	1,190
Total	8,960	127,000	12,900	179,000

-- Zero.

1/ Data are rounded to no more than three significant digits; may not add to totals shown.

2/ Customs value only.

3/ Less than 1/2 unit.

Source: U.S. Census Bureau.

TABLE 12
SALT: WORLD PRODUCTION, BY COUNTRY 1/ 2/

(Thousand metric tons)

Country 3/	1997	1998	1999	2000	2001 e/
Afghanistan (rock salt) e/	13	13	13	13	13
Albania e/	10	10	10	10	10
Algeria (brine and sea salt)	137	172	164	182 r/ e/	185
Angola e/	30	30	30	30	30
Argentina	858 r/	872 r/	1,263	1,000 e/	1,000
Armenia	26 e/	25	27	30	30
Australia (brine and marine salt)	8,883 r/	9,033 r/	9,888 r/	8,778 r/	9,536 4/
Austria: e/					
Brine salt	400	500	400	400	400
Rock salt	1	1	1	1	1
Total	401	501	401	401	401
Azerbaijan	3	4 r/	3 r/	4 r/	4
Bahamas, The e/	900	900	900	900	900
Bangladesh (marine salt) e/ 5/	350	350	350	350	350
Belarus	297	355	344 r/	311 r/	300
Benin (marine salt) e/	--	--	15	15	15
Bolivia	1	1 r/	1	(6/)	(6/)
Bosnia and Herzegovina e/	50	50	50	50	50
Botswana 7/	185	215	233	185	200
Brazil:					
Brine salt	5,064	5,353	4,528	4,626 r/	4,500
Rock salt	1,452	1,484	1,430	1,448 r/	1,500
Total	6,516	6,837	5,958	6,074 r/	6,000
Bulgaria	1,600	2,400	1,300 r/ e/	1,700 r/ e/	1,500
Burkina Faso e/	5	5	5	5	5
Burma e/ 8/	35	35	35	35	35
Cambodia e/	40	40	40	40	40
Canada	13,264	13,296	12,686	12,164 r/	12,548 4/
Cape Verde e/	6	7	2	2	2
Chile	5,488	6,207	6,074	5,083 r/	5,100
China	30,830	22,420	28,124	31,280	31,086 4/
Colombia:					
Marine salt	142	166	157	178 r/	180
Rock salt	232	330	304	282 r/	300
Total	374	496	461	460	480
Costa Rica (marine salt) e/	37	37	37	37	35
Croatia	17	24 r/	18	34 r/	30
Cuba	164 r/	135 r/	159 r/	160 r/	160
Denmark (sales) e/	600	600	600	605	605
Djibouti	272	83	127	136	136
Dominican Republic:					
Marine salt e/	50	50	50	50	50
Rock salt	10 r/	6 r/	5 r/	12	12
Total	60 r/	56 r/	55 r/	62	62
Ecuador e/	100	100	95	90	90
Egypt	2,024	2,387	2,400 e/	2,400 e/	2,400
El Salvador (marine salt)	95	89	90 e/	90 e/	90
Eritrea (marine salt)	252	114	10 r/	47 r/	50
Ethiopia (rock salt) e/ 5/	1	1	56 r/ 4/	56 r/	61
France: e/					
Brine salt	1,475 4/	1,500	1,500	1,500	1,500
Marine salt	1,188 4/	1,200	1,200	1,200	1,200
Rock salt e/	371 4/	300	300	300	300
Salt in solution	4,051 4/	4,000	4,000	4,000	4,000
Total	7,085 4/	7,000	7,000	7,000	7,000
Germany: e/					
Marine salt	700	700	700	700	700
Rock salt and other	15,087 4/	15,000	15,000	15,000	15,000
Total	15,787 4/	15,700	15,700	15,700	15,700
Ghana e/	50	50	50	50	50
Greece e/	150 4/	150	150	150	150
Guadeloupe e/	200	200	200	200	200
Guatemala e/	48	48	50	50 r/	50

See footnotes at end of table.

TABLE 12--Continued
SALT: WORLD PRODUCTION, BY COUNTRY 1/ 2/

(Thousand metric tons)

Country 3/	1997	1998	1999	2000	2001 e/
Guinea	--	--	15 e/	15 e/	15
Honduras e/	25	25	25	25	25
Iceland e/	4	4	4	4	4
India:					
Marine salt	14,249	11,962	14,450	14,450	14,500
Rock salt e/	3	2	3	3	3
Total	14,251	11,964	14,453	14,453	14,503
Indonesia e/	680	650	680	680	680
Iran 9/	1,180	1,912	1,600	1,600 e/	1,600
Iraq e/	250	250	250 r/	225 r/	225
Israel	750	874	538 r/	526 r/	537
Italy: e/					
Brine and rock salt	2,910 4/	3,000	3,000	3,000	3,000
Marine salt, crude 10/	600	600	600	600	600
Total	3,510 4/	3,600	3,600	3,600	3,600
Jamaica	16	16	15 e/	15 e/	15
Japan	1,329	1,293	1,327	1,374 r/	1,330
Jordan	158	263	279 r/	311 r/	321
Kenya (crude salt)	6	22	45	16 r/	17
Korea, North e/	590	550	500	500	500
Korea, Republic of e/	770	780	800	800	800
Kuwait e/	100	100	100	100	100
Laos (rock salt)	18 e/	39	2 r/	2 r/	2
Lebanon e/	4	4	4	4	4
Leeward and Windward Islands e/	1	--	--	--	--
Libya e/	30	30	30	40	40
Madagascar	37	27	26 r/	36 r/	26
Mali e/	5	6	6	6	6
Malta (marine salt) e/	(6/)	(6/)	(6/)	(6/)	(6/)
Martinique e/	200	200	200	200	200
Mauritania e/	6	6	6	6	6
Mauritius	7 r/ e/	7 r/ e/	7 r/	6 r/	6
Mexico	7,933	8,412	8,236	8,884	8,900
Mongolia (mine output)	1	1 e/	2 r/	1	1
Morocco (marine and rock salt)	258	148	156 r/	148 r/	150
Mozambique (marine salt) e/	60	60	40 r/	38 r/	42
Namibia (marine salt)	493	507	503	542 r/	540
Nepal e/ 11/	7	6	6	6	6
Netherlands e/	5,000	5,500 4/	5,000	5,000	5,000
Netherlands Antilles	432	487	500 e/	500 e/	500
New Zealand e/	67	65	65	60	70
Nicaragua (marine salt)	14	15	27 r/	28 r/	28
Niger e/	3	2	2	2	2
Pakistan: 5/					
Marine salt	19	15	16	20 e/	20
Rock salt	1,042	1,038	1,019	1,313	1,300
Total	1,061	1,053	1,035	1,333	1,320
Panama (marine salt) e/	22	23	23	23	23
Peru e/	79 4/	80	80	80	80
Philippines (marine salt)	687	728	704	590 r/	600
Poland:					
Rock salt	791	748	923	841 r/	900
Other	3,068	3,257	3,289	3,466 r/	3,300
Total	3,859	4,005	4,212	4,200 r/	4,200
Portugal (rock salt) e/	600	600	600	600	600
Romania:					
Rock salt	350 e/	68	64 r/	52 r/	50
Other	2,300 e/	2,152	2,133 r/	2,215 r/	2,200
Total	2,650 e/	2,220	2,197 r/	2,267 r/	2,250
Russia	2,100	2,200	3,200	3,200 e/	2,800
Saudi Arabia	140 e/	140 e/	200 r/	200 r/	200
Senegal	120 e/	130 e/	130 r/	130 r/	130
Serbia and Montenegro	28	78	64	78	62 4/

See footnotes at end of table.

TABLE 12--Continued
SALT: WORLD PRODUCTION, BY COUNTRY 1/ 2/

(Thousand metric tons)

Country 3/	1997	1998	1999	2000	2001 e/
Sierra Leone e/	10	--	--	--	--
Slovakia	101	100 e/	100 r/ e/	99 r/ e/	100
Slovenia e/	5	5	5	2	2
Somalia e/	1	1	1	1	1
South Africa	322	356	388 r/	346	354 4/
Spain: e/					
Marine and other evaporated salt	1,500	1,500	1,200	1,200	1,200
Rock salt	2,500	2,000	2,000	2,000	2,000
Total	4,000	3,500	3,200	3,200	3,200
Sri Lanka	65 e/	82	107 r/	81 r/	80
Sudan	50 e/	72 r/	117 r/	120 r/ e/	120
Switzerland e/	300	300	300	300	300
Syria	119 r/	178 r/	104 r/	106 r/	106
Taiwan (marine salt)	62	7	77	70 r/	66 4/
Tanzania	73	75	35 r/	70 r/	75
Thailand:					
Rock salt	555	546	740	792	750
Other e/	100	100	100	100	100
Total	655	646	840	892	850
Tunisia (marine salt)	394	473	447 e/	481	490
Turkey	2,344	2,170	2,146 r/	2,126 r/	2,130
Turkmenistan e/	217 4/	215	215	215	215
Uganda e/	10	5	5	5	5
Ukraine	2,500 e/	2,500 e/	2,185	2,287	2,300
United Kingdom: e/					
Brine salt 12/	1,300	1,300	1,300	1,300	1,300
Rock salt	1,800	1,800	1,500	1,500	1,500
Other salt 12/	3,500	3,500	3,000	3,000	3,000
Total	6,600	6,600	5,800	5,800	5,800
United States including Puerto Rico:					
United States:					
Brine	21,400	21,100	22,700	22,500	20,400 4/
Rock salt	12,900	12,900	14,400	15,000	17,000 4/
Solar salt	3,170	3,190	3,580	3,810	3,330 4/
Vacuum and open pan	3,980	4,040	4,190	4,200	4,120 4/
Puerto Rico e/	45	45	45	45	45
Total	41,500	41,300	45,000	45,600	44,800 4/
Venezuela e/	350	350	350	350	350
Vietnam	743	867 r/	653 r/	635 r/	650
Yemen	136 r/ e/	147	149 r/	150 e/	150
Grand total	221,000 r/	214,000 r/	223,000 r/	225,000 r/	225,000

e/ Estimated. r/ Revised. -- Zero.

1/ World totals, U.S. data, and estimated data are rounded to no more than three significant digits; may not add to totals shown.

2/ Table includes data available through July 10, 2002.

3/ Salt is produced in many other countries, but quantities are relatively insignificant and reliable production data are not available. Some salt brine production data for manufacture of chlorine, caustic soda, and soda ash are not reported because of incomplete data reporting by many countries.

4/ Reported figure.

5/ Year ending June 30 of that stated.

6/ Less than 1/2 unit.

7/ From natural soda ash production.

8/ Brine salt produced, as reported by the Burmese Government in metric tons, was as follows: 1997--97,276; 1998--91,992; 1999--61,674; 2000--69,245; and 2001--61,000 (estimated).

9/ Year beginning March 21 of that stated.

10/ Does not include production from Sardinia and Sicily, which is estimated to be 200,000 metric tons per year.

11/ Year ending July 15 of that stated.

12/ Data captioned "Brine salt" for the United Kingdom are the quantities of salt obtained from the evaporation of brine; that captioned "Other salt" are for salt content of brines used for purposes other than production of salt.