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# 2019 Minerals Yearbook

## SALT [ADVANCE RELEASE]

U.S. Department of the Interior
U.S. Geological Survey

February 2025

U.S. Geological Survey, Reston, Virginia: 2025

# Salt

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Total U.S. salt production in 2019 increased slightly to 44.8 million metric tons (Mt) compared with production in 2018 (table 1). Total U.S. apparent consumption was 62.5 Mt, a slight increase compared with that in 2018. Global salt production in 2019 was 308 Mt, of which 67 Mt was produced in China (table 13). Although China remained the global leader in salt production, India overtook the United States in production, making the United States the third-ranked salt-producing nation.

Salt, also known as sodium chloride, consists 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; chlorine is a greenish-colored gas that is dangerous and may be lethal. Yet combined, these two elements form sodium chloride, which is a white crystalline compound essential to life itself. Virtually every person in the world has some direct or indirect daily contact with salt. 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 and sales data for salt were developed by the U.S. Geological Survey (USGS) from an annual survey of U.S. salt-producing sites and company operations (table 2). Production refers to the quantity of salt mined or manufactured that was available for sale. Salt sold or used is the quantity of salt that was sold directly to customers or used by a salt producer, which usually was a chloralkali (chlorine and sodium hydroxide) manufacturer. The data in table 2 are rated capacities for mines and refineries as of December 31, 2019. Rated capacity is defined as the maximum quantity of product that can be produced in a specific time period on a normally sustainable long-term operating rate, based on the physical equipment of the plant, and the given acceptable routine operating procedures involving energy, labor, maintenance, and materials.

Louisiana (34%), Texas (17%), New York (15%), Kansas (7%), and Utah (6%) were 5 of the 10 leading salt-producing States (table 5). California, Michigan, New Mexico, Ohio, and West Virginia were among the top 10 salt-producing States in total quantity of salt sold or used, but their percentages were withheld to avoid disclosing company proprietary data. The distribution of domestic and imported evaporated and rock salt to each State and the District of Columbia in 2019 is reported in table 7.

The USGS did not survey small-scale producers of culinary "sea salt" operating from several locations in the United States. Most of these operations were located along the Atlantic, Gulf, or Pacific coasts, but some interior operations extracted brine for specialty salt production. These boutique operations, in total, are thought to have annually produced less than 100 metric tons (t) of sea salt.

The four types of salt that were included in the USGS canvass were classified according to the method of recovery, as follows: vacuum pan salt, from mechanical evaporation of a purified brine feedstock; solar salt, from solar evaporation of seawater, landlocked bodies of saline water, or primary or byproduct brines; rock salt, from surface or underground mining of halite deposits; and salt brine, from solution mining of underground halite deposits. Data for brine production and consumption represent anhydrous salt content only and not the weight of the water (tables 3, 4).

***Vacuum Pan Salt.***—Vacuum pan salt production in 2019 equaled 4.28 Mt, essentially unchanged compared with the 2018 total of 4.26 Mt (table 1). Mechanical evaporation of salt by the vacuum pan process is dependent on the number and size of the vacuum crystallizers operating in series. Salt producers provided the rated capacities in table 2 by using the proven design performance of the equipment.

Although rock salt, solar salt, and salt brine may be used to make vacuum pan salt, virtually all domestic vacuum pan salt was obtained from solution mining of underground salt formations. Vacuum pan salt was obtained by dehydrating brine using only heat or in combination with a vacuum. The grainer or open-pan process used open, rectangular pans with steam-heated immersion coils to evaporate the water in the brine. The final product was usually flake shaped rather than the typical cubic form. Flake salt was preferred for the production of baked goods, butter, and cheese.

***Solar Salt.***—Solar salt production equaled 3.52 Mt in 2019, a 20% increase from the 2018 total of 2.95 Mt (table 1). The climatic conditions and geographic locations of solar evaporation facilities are critical to the successful production and harvesting of solar salt because evaporation rates must exceed precipitation rates. Therefore, rated capacities in table 2 generally were based on the historical evaporation patterns within a region and differ depending on the location and the surface acreage of the evaporation ponds. Unpredictable seasonal precipitation and market conditions affected production rates of the facilities.

***Rock Salt.***—Rock salt production was essentially unchanged in 2019 at 19.1 Mt compared with the 2018 total of 18.9 Mt (table 1). Rock salt was mined by the room-and-pillar method, similar to that used in coal and trona mining. Because most rock salt was used for deicing, the operating rate of rock salt facilities fluctuated with the demand for deicing salt, which was dependent on the severity of winter weather conditions. During periods of strong demand, production levels often achieved, or exceeded in certain situations, the rated capacities. Full mine capacity generally is a function of the hoisting capabilities of the mine. Rock salt mining companies provide the production

capacities of domestic rock salt operations listed in table 2. The companies based the capacity calculations on the assumption that the workweek was 5 days (250 workdays per year) with two working shifts, one maintenance shift per day, and at least one short-term planned turnaround for the mine and mill per year.

***Salt Brine.***—U.S. salt brine production in 2019 equaled 17.9 Mt, unchanged from that in 2018 (table 1). Brine production capacities were difficult to derive because they were based on the variabilities of the injection rate of the solvent and the dissolution rates of the underground salt bodies, both of which determined the quantity of brine produced. In turn, these production levels usually were dependent on the demand for the products that the brine was being used to manufacture.

Solution mining was used to obtain a sodium chloride feedstock for vacuum pan salt production and for chlorine, caustic soda, and synthetic soda ash manufacture. Synthetic soda ash, however, was not produced in the United States. The quantity of underground salt dissolved and recovered as brine to make vacuum pan salt usually was not reported as primary salt production; only the quantity of vacuum pan salt manufactured was reported. The quantity of brine used to make chloralkali chemicals was reported as either the amount of captive brine used or brine sold. The chemical industry was the leading consumer of salt brine worldwide.

Olin Corp., a leading U.S. chloralkali producer, planned to permanently close two facilities in Freeport, TX, including a 210,000-metric-ton-per-year (t/yr) chloroalkali operation and a nearby vinylidene chloride plant (BIC Magazine, 2019).

Shintech, Inc., was developing a new chloralkali and vinyl chloride monomer production facility at Plaquemine, LA. The company was in the process of commissioning an ethane cracker at the site which would add 270,000 t/yr of capacity for both PVC and vinyl chloride monomer (Powder and Bulk Solids, 2019).

## Consumption

There were about 14,000 direct and indirect uses of salt, according to industry sources. The USGS annual surveys cover eight major categories consisting of 29 end uses. The 2019 reported consumption (sales or use as reported by the salt companies, including their exports and imports) equaled 51.8 Mt, and the distribution of salt by major end use was ice control (42%), chemical (38.7%), distributors (grocery and other wholesalers, retailers, and so forth) (9.2%), food processing (3.6%), agricultural (2.5%), general industrial (1.7%), primary water treatment (1.3%), and other uses combined with exports (1.2%) (table 6).

In 2019, apparent consumption (salt sold or used plus imports minus exports) equaled 62.5 Mt (table 1). Reported consumption statistics are those reported only by domestic salt-producing companies. Apparent consumption normally is greater than reported consumption because apparent consumption accounts for quantities of salt imported and exported by non-salt-producing companies, such as some chloralkali operations and salt distributors, especially importers along the northeastern coast of the United States, primarily for snow and ice control.

Distributors represented a substantial share of salt sales by the salt industry. All of the salt sold by distributors was ultimately resold to a variety of end users. For a more complete analysis of end-use markets, specific sectors of distribution listed in table 6 can be combined, such as agricultural and water treatment quantities reported by salt producers and those supplied by distributors. In addition to the various types of salt, there were distinctions in packaging and applications of salt. Salt for human consumption was packaged in variously sized containers for several specialized purposes.

***Ice Control and Road Stabilization.***—In 2019, U.S. consumption of salt for this application was 21.8 Mt, which was 5% less than that in 2018 (table 6). The 2018–19 winter season was considered slightly above average for salt consumption in many parts of the United States as a result of an above average number of winter storms in the United States after an average winter in 2017–18.

Salt is an inexpensive, widely available, and effective ice-control agent. It does, however, become less effective as temperatures decrease below −9.5 degrees Celsius (°C) [15 degrees Fahrenheit (°F)]. At lower temperatures, more salt must be applied to maintain higher brine concentrations to provide the same degree of melting. Most winter snowstorms and ice storms happen when temperatures are between −4 °C and 0 °C (25 °F and 32 °F), the range in which salt is most effective.

The use of salt brine for road deicing increased during the previous several years. Regular rock salt can be dissolved to create a salt brine solution, which was used as pretreatment prior to ice or snow accumulation. In highway deicing, salt has been associated with corrosion of bridge decks, motor vehicles, reinforcement bar and wire, and unprotected steel structures used in road construction. Surface runoff, vehicle spraying, and windblown actions also affect soil, roadside vegetation, and local surface water and groundwater supplies. When the salt leaches from the immediate environment adjacent to roads, it often collects in lakes and other inland freshwater bodies, potentially changing water chemistry and affecting ecosystems and communities that use this water. Research by governmental and private organizations into the use of salt brine and overall reduction in salt usage for winter precipitation cleanup has resulted in less road salt consumption at some locales. The number of consumers striving to decrease road salt applications continued to increase amid concerns regarding the effect of salt in the environment.

The quantity of salt consumed for road deicing each year was directly related to the severity of the winter weather conditions. By February 2019, deicing salt was reportedly in short supply throughout the Midwest, including Nebraska, and also eastward into Pennsylvania. But, as is usually the case, a small percentage of regions reported average or below average salt consumption and some remaining stocks at the close of the winter season. This situation set up a relatively strong market for restocking throughout the Midwest in 2019. Unusually early winter storms in November and December 2019, including freezing rain and sleet, affected Georgia, North Carolina, South Carolina, and Texas. Significant winter storms were also reported in the States in the traditional snowbelt. Long-range forecasting of salt consumption and pricing in this application is extremely difficult because of the complexities in long-range forecasting of the weather.

In addition to use on highways during winter weather, salt can be added to soil to stabilize it and to provide firmness to the foundation upon which highways are built. The salt also acts to minimize the effects of changes in humidity and traffic load, which can cause shifting in the subsurface.

***Chemical.***—Since 1941, when the U.S. Bureau of Mines began collecting end-use data for salt, the leading consumer of salt has been the chemical industry, primarily as salt brine, except for 2011 and 2013–19 when salt for road deicing was the leading end use. Salt brine was extracted from natural underground saline sources or solution-mined halite deposits (salt beds or salt domes) or produced through the dissolution of solar salt. Within this industry, the chloralkali sector remained the major consumer of salt for manufacturing chlorine, coproduct sodium hydroxide (caustic soda), and synthetic soda ash. Since 1986, when the last domestic synthetic soda ash plant was closed because of high production costs and an inability to compete with less expensive natural soda ash, no synthetic soda ash has been manufactured in the United States. Many other countries, however, continued to produce synthetic soda ash and used vast quantities of salt brine as feedstock. Reported consumption of salt for chemical manufacture was 20 Mt (table 6).

Salt was used as the primary raw material in chlorine manufacture because it was an inexpensive and widely available source of chlorine ions. For sodium hydroxide production, salt is the main source of sodium ions. Chlorine and caustic soda are classified as the first generation of products made from salt. These two chemicals were used to manufacture other materials, such as household cleaners, plastics, and solvents for dry cleaning, which are classified as the second generation of products made from salt. Although most salt brine was produced by the same companies that used it, many chloralkali manufacturers purchased brine from independent brine supply companies. In certain cases, brine was produced by a chemical company that used some of it and sold the excess to neighboring competitors. According to industry sources, about 48% of the salt used to manufacture chlorine was captive (produced by the chloralkali companies) and 31% was purchased brine; domestically purchased solar salt and rock salt accounted for 12% of the supply; and imported rock, solar, and vacuum pan salt, combined, accounted for 9%.

The industry average ratio was 1.75 t of salt required to produce 1.0 t of chlorine and 1.1 t of joint-product sodium hydroxide. Reported consumption of salt for chloralkali manufacture in 2019 was 18.3 Mt (table 6); however, the data do not include salt imported directly by the chloralkali industry that was used to produce brine.

Salt also was used as a feedstock in chemical plants that make sodium chlorate, metallic sodium, and other downstream chemical products. In powdered soaps and detergents, salt was used as a bulking agent and a coagulant for colloidal dispersion after saponification. In pharmaceuticals, salt was a chemical reagent and was used as the electrolyte in saline solutions. It was used with sulfuric acid to produce sodium sulfate and hydrochloric acid. The "Other chemical" subsector was relatively small, representing about 9% of domestic salt sales for the entire chemical sector and only 3% of total domestic salt consumption. The amount of salt consumed in this category decreased by 4% in 2019 compared with that in 2018.

***Distributors.***—A large quantity of salt was marketed through distributors, some of which specialized in agricultural and water treatment services—two sectors in which the salt companies also had direct sales (table 6). Distributor sales also included grocery wholesalers and (or) retailers, institutional wholesalers, U.S. Government resale, and other wholesalers and retailers. Total salt sold to distributors was 4.77 Mt in 2019 (table 6).

***Food Processing.***—Nearly every person uses some quantity of salt in food, and sodium is found in many processed foods. Salt is added to food by the food processor or by the consumer as a flavor enhancer, preservative, binder, fermentation-control additive, texture-control agent, and color developer. Table salt may contain 0.01% potassium iodide as an additive to provide a source of iodine, which is essential to the oxidation processes in the human body. Kosher salt, sea salt, condiment salt, and salt tablets are varieties of salt that were used mostly for human consumption.

The food-processing category is subdivided, in descending order of salt consumption, into other food processing, meat packers, baking, canning, dairy, and grain mill products. Total salt sold for food processing was 1.84 Mt in 2019, 8% less than that in 2018 (table 6).

In meat packing, salt was 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 to prevent spoilage of the product. Salt in sausages forms a binding gel made up of meat, fat, and moisture. Salt also acts as a flavor enhancer and as a tenderizer.

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

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

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

The food-processing category also contains grain-mill products. These products consisted of milling flour and rice, manufactured cereal breakfast food, and blended or prepared flour.

In the "Other food processing" category, salt was used mainly as a seasoning agent. This category included miscellaneous establishments that made food for human consumption (such as potato chips and pretzels) and for domestic pet consumption (such as cat and dog food).

***Agricultural.***—Barnyard and grazing livestock need supplemental salt rations to maintain proper nutrition. In 2019, 1.29 Mt of salt was sold to the agricultural industry (table 6). Animal feed and water conditioning salt were pressed into 22.7-kilogram (50-pound) blocks. Iodine, sulfur, trace elements, and vitamins were occasionally added to salt blocks to provide nutrients not found naturally in the diet of certain livestock.

***General Industrial.***—The industrial uses of salt were diverse. They included, in descending order of quantity consumed, other industrial applications, oil and gas exploration, pulp and paper

production, tanning and leather treatment, metal processing, textiles and dyeing, and rubber manufacture. Total salt sold to these sectors increased by 19% to 866,000 t in 2019 compared with 729,000 t in 2018 (table 6).

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

In the pulp and paper industry, salt was used to bleach wood pulp. It also was used to make sodium chlorate, which was added with sulfuric acid and water to manufacture chlorine dioxide, a strong oxygen-based bleaching chemical. The chlorine dioxide process, which originated in Germany after World War I, has become more popular because of efforts to reduce or eliminate other bleaching compounds containing chlorine.

In tanning and leather treatment, salt was added to animal hides to inhibit microbial activity on the underside of the hides and to attract moisture back into the hides. In rubber manufacture, salt was used to make buna, neoprene, and white types of rubbers. Salt brine and sulfuric acid were used to coagulate an emulsified latex made from chlorinated butadiene.

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

In textiles and dyeing, salt was 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 salt's main roles was to provide the positive ion charge to promote the absorption of negatively charged ions of dyes.

***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 and pipes. Many commercial and residential water-softening units used salt to remove the ions that cause the hardness. Salt was compressed into pellets used for water conditioning. The sodium ions captured on a resin bed are exchanged for the calcium and magnesium ions. Periodically, the water-softening units need to be recharged because the sodium ions become depleted. Salt is added and dissolved, and the brine replenishes the lost sodium ions. In 2019, 650,000 t of salt was sold for primary water treatment, and an additional 510,000 t was sold for water conditioning by distributors (table 6).

## Prices

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

Price quotations are not synonymous with average unit values reported to the USGS. The quotations do not necessarily represent prices at which transactions took place, or bid and asked prices. The annual average unit values, as collected by the USGS and listed in table 8, represent a national average unit value for each of the types of salt and the various product forms.

## Transportation

Because the locations of the salt supplies often were not near consumers, transportation costs significantly added to the price of salt. In some cases, shipping costs were greater than the actual value of the salt. Pumping salt brine through pipelines was an economic means of transportation but could not be used for dry salt. Large bulk shipments of dry salt in ocean freighters or river barges were low in cost but restricted in points of origin and consumption. River and lake movement of salt in winter often was curtailed severely because of frozen waterways.

Transoceanic imports of salt have been increasing in some areas of the United States because they were cost competitive with purchasing salt from domestic suppliers and transporting it using barge, rail, or truck. One important factor that often determined the quantity of salt that could be imported was the depth of the channels and the ports; many ports were not deep enough to accommodate larger ships. When salt was packaged, handled, and shipped in smaller units, the costs increased and were reflected in higher selling prices.

## Foreign Trade

In the Harmonized Tariff Schedule of the United States (HTS), 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 HTS code for salt is 2501.00.0000. The same classification also applies to exports. 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 2019, the United States exported 1.02 Mt of salt, a 4% increase compared with that in 2018 (table 9). In 2019, most exports (87%) were to Canada. Salt was shipped to 103 countries through 38 customs districts. The Cleveland, OH, customs district exported the most salt by tonnage and represented 44% of the U.S. total (table 10). No other customs district exported more than 7% of the U.S. total. Large percentage increases in exports and imports normally take place in response to increased demand for rock salt for deicing related to the frequency and severity of winter storms in Canada and the United States.

The United States imported 18.7 Mt of salt from 64 countries in 2019, which was 4% more than was imported during 2018 (tables 1, 11). Chile was the leading source of imports, supplying 30% of the total, followed by Canada (26%), Egypt (16%), and Mexico (11%). Table 12 lists the imports of salt by customs district. Of the 40 customs districts that imported salt in 2019, the New York, NY, customs district led in terms of tonnage, accounting for 16% of the total, followed by

New Orleans, LA (11%), Detroit, MI, and Philadelphia, PA (10% each), and Milwaukee, WI (8%).

The quantity of salt imports remained about 18 times greater than that of exports in 2019. Net salt imports represented 28% of U.S. apparent consumption, indicating the magnitude of the U.S. reliance on salt imports. Most imported salt was brought into the country by foreign subsidiaries of major U.S. salt producers. Generally, imported salt could be purchased and delivered to many U.S. customers at prices lower than the comparable domestic product because production costs were lower abroad, currency exchange rates sometimes caused the price of imported salt to be lower than the price of domestic salt, and ocean freight rates were lower than overland rail or truck rates.

### World Review

Table 13 lists world salt production for 94 countries or localities based on reported and estimated information. In 2019, total world production increased by 3% to 308 Mt. The United States became the third-ranked salt-producing country in 2019 behind China and India. China rapidly increased its production of salt in the 21st century from 37 Mt in 2004 to 67 Mt in 2019, making it the leading salt producer in the world. Salt production in India increased from about 24 Mt in 2015 to 45 Mt in 2019 as exports for chloroalkali production surged in recent years.

***Brazil.***—Brazil's Geological Survey determined there was a link between salt mining operations and geological damage in the vicinity of the salt mining. Braskem S.A. agreed that if studies proved there was a relationship that it would accept responsibility for the damages. The company mined salt near Maceio in the State of Alagoas for the production of chloroalkali products upstream from the company's PVC plants (Hays, 2019).

***Canada.***—Vulcan Minerals Inc. continued its multiyear investigation into developing a salt mine in western Newfoundland. Its subsidiary Red Moon Resources, Inc. provided an update on the Captain Cook salt project. The project had been ongoing since 2013; 2016 National Instrument 43–101-compliant mineral-resource assessment reports concluded that there was an inferred resource of more than 900 Mt of high-purity salt. Vulcan Minerals was studying the feasibility of producing deicing salt for the Canadian and United States markets facilitated by ocean shipping using existing port facilities (Vulcan Minerals Inc., 2019).

***Germany.***—K+S AG continued to move towards restarting production of potash and salt at the Siegfried-Giesen Mine. The deposit reportedly had proven reserves of at least 100 Mt of sylvinite and halite (Roskill, 2019).

***Morocco.***—SCE Chemicals selected Nuberg EPC to build a new chloralkali plant at Jorf Lasfar Industrial Medz in El-Jadida. The plant would produce caustic soda, hydrochloric acid, and sodium hypochlorite chlorine (Ondrey, 2019).

### Outlook

The United States continues to be one of the leaders in salt production, consumption, and world trade. Solar salt and vacuum pan salt production and consumption have been relatively stable and are expected to remain near recent production levels. Rock salt production and consumption are heavily dependent on the severity of winter weather. The average to slightly above average number of winter weather events for many areas of the United States during the 2019–20 winter season will likely maintain or slightly increase salt consumption and production in 2020, compared with that in 2019.

Because salt is a relatively low-value commodity, the shipping cost for ocean, rail, or truck transportation can be an important determining factor when attempting to secure supply sources from either domestic or foreign locations. As energy prices change, one mode of transportation may be more cost effective than others. Excluding deicing salt, domestic salt consumption may fluctuate but is likely to continue to increase with population growth.

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TABLE 1
SALIENT SALT STATISTICS[1]

(Thousand metric tons and thousand dollars)

| | 2015 | 2016 | 2017 | 2018 | 2019 |
|---|---|---|---|---|---|
| United States: | | | | | |
| Production:[2] | | | | | |
| Vacuum and open pans | 4,190 | 4,050 | 4,490 | 4,260 | 4,280 |
| Solar | 3,590 | 2,900 | 3,340 | 2,950 | 3,520 |
| Rock | 20,400 | 17,900 | 16,500 | 18,900 | 19,100 |
| Brine | 16,900 | 16,900 | 15,600 | 17,900 | 17,900 |
| Total | 45,100 | 41,700 | 39,900 | 43,900 | 44,800 |
| Sold or used by producers: | | | | | |
| Quantity | 42,800 | 39,900 | 38,700 r | 44,200 | 44,900 |
| Value | 2,360,000 | 2,190,000 | 2,410,000 r | 2,570,000 | 2,650,000 |
| Exports: | | | | | |
| Quantity | 830 | 729 | 1,130 | 986 | 1,020 |
| Value | 141,000 | 146,000 | 180,000 | 176,000 | 146,000 |
| Imports for consumption: | | | | | |
| Quantity | 21,600 | 12,100 | 12,600 | 17,900 | 18,700 |
| Value | 578,000 | 390,000 | 438,000 | 629,000 | 626,000 |
| Consumption: | | | | | |
| Apparent[3] | 63,600 | 51,300 | 50,200 r | 61,100 | 62,500 |
| Reported | 52,300 | 47,800 | 45,500 | 53,800 r | 51,800 |
| World, production | 288,000 r | 278,000 r | 280,000 r | 300,000 r | 308,000 |

rRevised.
[1]Table includes data available through October 19, 2022. Data are rounded to no more than three significant digits; may not add to totals shown.
[2]Excludes Puerto Rico.
[3]Sold or used plus imports minus exports.

TABLE 2
U.S. SALT COMPANIES BY PRODUCTION CAPACITY, LOCATION, AND TYPE IN 2019[1]

(Thousand short tons)

| Company | Vacuum and open pans | Solar | Rock | Brine |
|---|---|---|---|---|
| American Rock Salt Co., Hampton Corners, NY | -- | -- | 4,500 | -- |
| Boardwalk Louisiana Midstream, LLC, Plaquemine, LA | -- | -- | -- | (2) |
| California Supreme Salt, LLC, Twentynine Palms, CA | -- | 20 | -- | -- |
| Cargill, Inc.: | | | | |
| Akron, OH | 350 | -- | -- | (2) |
| Avery Island, LA | -- | -- | 2,700 | (2) |
| Breaux Bridge, LA | 250 | -- | -- | -- |
| Cleveland, OH | -- | -- | 4,000 | -- |
| Freedom, OK | -- | 300 | -- | -- |
| Hersey, MI | 300 | -- | -- | -- |
| Lake Point, UT | -- | 850 | -- | -- |
| Lansing, NY | -- | -- | 2,500 | -- |
| Hutchinson, KS | 450 | -- | -- | -- |
| Newark, CA | 150 | 750 | -- | (2) |
| St. Clair, MI | 425 | -- | -- | -- |
| Watkins Glen, NY | 450 | -- | -- | -- |
| Chemours Co., The, New Johnsonville, TN | 230 | -- | -- | -- |
| Compass Minerals International.: | | | | |
| Cote Blanche, LA | -- | -- | 3,500 | -- |
| Lyons, KS | 425 | -- | -- | -- |
| Ogden, UT | -- | 1,500 | -- | -- |
| Corpus Christi Brine Services, Inc., Benavides, TX | -- | -- | -- | (2) |
| Huck Salt Co., Fallon, NV | -- | 20 | -- | -- |
| Hutchinson Salt Co., Hutchinson, KS | -- | -- | 750 | -- |
| Independent Salt Co., Kanopolis, KS | -- | -- | 750 | -- |
| Key Energy Services, LLC, Hobbs, NM | -- | -- | -- | (2) |
| Kissner Group Holdings, LP, The: | | | | |
| Detroit, MI | -- | -- | 2,000 | -- |
| Lyons, KS | -- | -- | 750 | -- |
| Watkins Glen, NY | 375 | -- | -- | (2) |
| Moab Salt, Inc., Moab, UT | -- | 250 | -- | -- |
| Morton International, Inc.: | | | | |
| Fairport, OH | -- | -- | 2,000 | -- |
| Glendale, AZ | -- | 150 | -- | -- |
| Grand Saline, TX | 150 | -- | 400 | -- |
| Grantsville, UT | -- | 500 | -- | -- |
| Manistee, MI | 360 | -- | -- | -- |
| Rittman, OH | 600 | -- | -- | -- |
| Silver Springs, NY | 375 | -- | -- | (2) |
| South Hutchinson, KS | 350 | -- | -- | -- |
| Weeks Island, LA | -- | -- | 1,800 | (2) |
| New Mexico Salt and Mineral Corp., Loving, NM | -- | 125 | -- | -- |
| Occidental Chemical Corp., Wichita, KS | -- | -- | -- | (2) |
| Olin Corp.: | | | | |
| Freeport, TX | -- | -- | -- | (2) |
| McIntosh, AL | -- | -- | -- | (2) |
| Plaquemine, LA | -- | -- | -- | (2) |
| PB Energy Storage, Inc.: | | | | |
| Dale, NY | -- | -- | -- | (2) |
| Napoleonville, LA | -- | -- | -- | (2) |
| Redmond Clay & Salt Co., Inc., Redmond, UT | -- | -- | 750 | -- |
| Searles Valley Minerals, Inc., Trona, CA | -- | 250 | -- | -- |
| South Bay Salt Works, Chula Vista, CA | -- | 125 | -- | -- |
| Tetra Technologies, Inc., Amboy, CA | -- | 75 | -- | -- |
| Texas Brine Corp.: | | | | |
| Baytown, TX | -- | -- | -- | (2) |
| Beaumont, TX | -- | -- | -- | (2) |
| Chacahoula, LA | -- | -- | -- | (2) |
| Clemville, TX | -- | -- | -- | (2) |

See footnotes at end of table.

TABLE 2—Continued
U.S. SALT COMPANIES BY PRODUCTION CAPACITY, LOCATION, AND TYPE IN 2019[1]

(Thousand short tons)

| Company | Vacuum and open pans | Solar | Rock | Brine |
|---|---|---|---|---|
| Texas Brine Corp.:—Continued | | | | |
| Houston, TX | -- | -- | -- | (2) |
| Napoleonville, LA | -- | -- | -- | (2) |
| Plaquemine, LA | -- | -- | -- | (2) |
| Wyoming, NY | -- | -- | -- | (2) |
| United Salt Corp.: | | | | |
| Baytown, TX | 400 | -- | -- | (2) |
| Carlsbad, NM | -- | 400 | -- | -- |
| Hockley, TX | -- | -- | 150 | -- |
| Saltville, VA | 200 | -- | -- | -- |
| Westlake Chemical Corp.: | | | | |
| Lake Charles, LA | -- | -- | -- | (2) |
| New Martinsville, WV | -- | -- | -- | (2) |
| Willow Creek Salt Co., Salina, UT | -- | -- | 150 | -- |
| Total | 5,840 | 5,320 | 26,700 | 17,900 |

-- Zero.
[1]Table includes data available through October 19, 2022. Data are rounded to no more than three significant digits; may not add to totals shown.
[2]Includes brine for sale and for captive use. Individual brine capacity is assumed to be equal to the quantity of annual brine production, and therefore, considered company proprietary data. Brine producers include those chloralkali producers that produce captive brine and companies that supply brine for chloralkali manufacture, oilfield chemicals, and so on. Total brine production capacity is the quantity of brine produced for the year.

TABLE 3
SALT PRODUCED IN THE UNITED STATES, BY TYPE AND PRODUCT FORM[1]

(Thousand metric tons)

| Year and product form | Vacuum and open pans | Solar | Rock | Brine | Total |
|---|---|---|---|---|---|
| 2018: | | | | | |
| Bulk | 961 | 1,910 | 18,300 | 17,900 | 39,000 |
| Compressed pellets | 1,310 | 269 | XX | XX | 1,580 |
| Packaged | 1,870 | 642 | 530 | XX | 3,040 |
| Pressed blocks | 120 | 126 | 55 | XX | 301 |
| Total | 4,260 | 2,950 | 18,900 | 17,900 | 43,900 |
| 2019: | | | | | |
| Bulk | 1,000 | 2,200 | 18,700 | 17,900 | 39,900 |
| Compressed pellets | 1,310 | 444 | XX | XX | 1,750 |
| Packaged | 1,850 | 735 | 338 | XX | 2,920 |
| Pressed blocks | 121 | 144 | 38 | XX | 303 |
| Total | 4,280 | 3,520 | 19,100 | 17,900 | 44,800 |

XX Not applicable.
[1]Table includes data available through October 19, 2022. Data are rounded to no more than three significant digits; may not add to totals shown.

TABLE 4
SALT SOLD OR USED IN THE UNITED STATES, BY TYPE AND PRODUCT FORM[1, 2]

(Thousand metric tons and thousand dollars)

| Year and product form | Vacuum and open pans | | Solar | | Rock | | Brine | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Quantity | Value | Quantity | Value | Quantity | Value | Quantity | Value | Quantity | Value |
| 2018: | | | | | | | | | | |
| Bulk | 759 | 104,000 | 1,830 | 171,000 | 18,600 | 1,070,000 | 17,900 | 148,000 | 39,100 | 1,490,000 |
| Compressed pellets | 1,250 | 253,000 | 244 | 49,100 | XX | XX | XX | XX | 1,490 | 302,000 |
| Packaged: | | | | | | | | | | |
| Less-than-5-pound units | 323 e | NA | 24 e | NA | 6 e | NA | XX | XX | 352 e | XX |
| 5-pound or larger units | 1,770 e | NA | 554 e | NA | 676 e | NA | XX | XX | 3,000 e | XX |
| Total | 2,090 | 520,000 | 577 | 99,200 | 681 | 108,000 | XX | XX | 3,350 | 727,000 |
| Pressed blocks: | | | | | | | | | | |
| For livestock | 83 e | NA | 57 e | NA | 24 e | NA | XX | XX | 164 e | XX |
| For water treatment | 32 e | NA | 66 e | NA | 29 e | NA | XX | XX | 128 e | XX |
| Total | 116 | 20,500 | 123 | 23,800 | 53 | 8,940 | XX | XX | 292 | 53,200 |
| Grand total | 4,210 | 898,000 | 2,770 | 343,000 | 19,400 | 1,180,000 | 17,900 | 148,000 | 44,200 | 2,570,000 |
| 2019: | | | | | | | | | | |
| Bulk | 927 | 129,000 | 2,060 | 189,000 | 18,600 | 1,070,000 | 17,900 | 135,000 | 39,500 | 1,520,000 |
| Compressed pellets | 1,250 | 248,000 | 414 | 87,700 | XX | XX | XX | XX | 1,670 | 336,000 |
| Packaged: | | | | | | | | | | |
| Less-than-5-pound units | 329 e | NA | 30 e | NA | 4 e | NA | XX | XX | 363 e | XX |
| 5-pound or larger units | 1,800 e | NA | 708 e | NA | 500 e | NA | XX | XX | 3,000 e | XX |
| Total | 2,130 | 534,000 | 738 | 129,000 | 504 | 78,500 | XX | XX | 3,370 | 741,000 |
| Pressed blocks: | | | | | | | | | | |
| For livestock | 41 e | NA | 124 e | NA | 38 e | NA | XX | XX | 203 e | XX |
| For water treatment | 74 e | NA | 19 e | NA | XX e | NA | XX | XX | 93 e | XX |
| Total | 115 | 20,200 | 143 | 27,800 | 38 | 6,530 | XX | XX | 296 | 54,500 |
| Grand total | 4,420 | 931,000 | 3,360 | 433,000 | 19,200 | 1,150,000 | 17,900 | 135,000 | 44,900 | 2,650,000 |

[e]Estimated. NA Not available. XX Not applicable.
[1]Table includes data available through October 19, 2022. Data are rounded to no more than three significant digits; may not add to totals shown (or same totals on other tables).
[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 the 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 5
SALT SOLD OR USED BY PRODUCERS IN THE UNITED STATES, BY STATE[1, 2]

(Thousand metric tons and thousand dollars)

| State | 2018 | | 2019 | |
|---|---|---|---|---|
| | Quantity | Value | Quantity | Value |
| Kansas | 2,940 | 236,000 | 3,190 | 267,000 |
| Louisiana | 14,900 | 461,000 | 15,400 | 426,000 |
| New York | 6,940 | 568,000 | 6,930 | 606,000 |
| Texas | 7,560 | 181,000 | 7,500 | 186,000 |
| Utah | 2,180 | 306,000 | 2,770 | 317,000 |
| Other Eastern States[3] | 8,380 | 667,000 | 7,660 | 676,000 |
| Other Western States[4] | 1,330 | 154,000 | 1,400 | 174,000 |
| Total | 44,200 | 2,570,000 | 44,900 | 2,650,000 |
| Puerto Rico[e] | 45 | 1,800 | 45 | 1,800 |

[e]Estimated.
[1]Table includes data available through October 19, 2022. Data are rounded to no more than three significant digits; may not add to totals shown (or same totals on other tables).
[2]The term "sold or used" indicates that some salt, usually salt brine, is not sold but is used for captive purposes by the plant or company.
[3]Includes Alabama, Michigan, Ohio, Tennessee, Virginia, and West Virginia.
[4]Includes Arizona, California, Nevada, New Mexico, and Oklahoma.

TABLE 6

DISTRIBUTION OF DOMESTIC AND IMPORTED SALT BY PRODUCERS IN THE UNITED STATES, BY END USE AND TYPE[1, 2]

(Thousand metric tons)

| End use | Vacuum and open pans | | Solar | | Rock | | Brine | | Total[3] | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 2018 | 2019 | 2018 | 2019 | 2018 | 2019 | 2018 | 2019 | 2018 | 2019 |
| Chemical: | | | | | | | | | | |
| Chloralkali producers | 8 | 2 | 293 | 293 | 518 | 387 | 18,200 r | 17,600 | 19,000 r | 18,300 |
| Other chemical | 334 | 316 | 162 | 187 | 769 | 663 | 550 | 571 | 1,820 | 1,740 |
| Total | 342 | 318 | 455 | 479 | 1,290 | 1,050 | 18,800 r | 18,200 | 20,900 r | 20,000 |
| Food-processing industry: | | | | | | | | | | |
| Meat packers | 248 | 224 | 53 | 47 | 8 | 13 | -- | -- | 310 | 284 |
| Dairy | 194 | 164 | 16 | 11 | 3 | 6 | -- | -- | 213 | 181 |
| Canning | 174 | 152 | 27 | 24 | 2 | 5 | -- | -- | 203 | 181 |
| Baking | 204 | 179 | 4 | 3 | 8 | 10 | -- | -- | 215 | 192 |
| Grain mill products | 103 | 91 | 11 | 10 | 7 | 10 | -- | -- | 121 | 111 |
| Other food processing | 692 | 623 | 181 | 202 | 59 | 64 | 1 | 4 | 933 | 892 |
| Total | 1,620 | 1,430 | 291 | 297 | 86 | 108 | 1 | 4 | 1,990 | 1,840 |
| General industrial: | | | | | | | | | | |
| Textiles and dyeing | 10 | 9 | 27 | 25 | (4) | 4 | -- | -- | 37 | 37 |
| Metal processing | 4 | 4 | 3 | 2 | 31 | 39 | -- | -- | 38 | 45 |
| Rubber | 2 | 2 | 1 | (4) | 1 | 5 | (4) | (4) | 4 | 8 |
| Oil and gas exploration | 82 | 81 | 165 | 152 | 59 | 53 | 7 | 15 | 313 | 301 |
| Pulp and paper | 8 | 7 | 49 | 45 | 18 | 19 | -- | -- | 76 | 72 |
| Tanning and (or) leather | 1 | 1 | 16 | 15 | 27 | 29 | -- | -- | 44 | 46 |
| Other industrial | 65 | 53 | 79 | 82 | 74 | 223 | (4) | (4) | 218 | 358 |
| Total | 173 | 157 | 338 | 322 | 211 | 372 | 7 | 15 | 729 | 866 |
| Agricultural: | | | | | | | | | | |
| Feed retailers and (or) dealers mixers | 276 | 235 | 330 | 336 | 155 | 171 | -- | -- | 761 | 742 |
| Feed manufacturers | 84 | 73 | 92 | 69 | 187 | 161 | -- | -- | 363 | 303 |
| Direct-buying end user | 21 | 18 | 23 | 22 | 82 | 207 | -- | -- | 126 | 246 |
| Total | 381 | 326 | 445 | 427 | 424 | 539 | -- | -- | 1,250 | 1,290 |
| Water treatment: | | | | | | | | | | |
| Government (Federal, State, local) | 83 | 80 | 127 | 117 | 181 | 172 | 1 | 4 | 392 | 373 |
| Commercial or other | 38 | 32 | 54 | 52 | 55 | 72 | 27 | 121 | 174 | 277 |
| Total | 121 | 112 | 181 | 169 | 236 | 245 | 28 | 124 | 567 | 650 |
| Ice control and (or) stabilization: | | | | | | | | | | |
| Government (Federal, State, local) | 35 | 5 | 422 | 417 | 18,600 | 17,600 | -- | -- | 19,000 | 18,000 |
| Commercial or other | 90 | 73 | 222 | 257 | 3,570 | 3,430 | -- | -- | 3,880 | 3,760 |
| Total | 125 | 78 | 644 | 674 | 22,200 | 21,000 | -- | -- | 22,900 | 21,800 |
| Distributors: | | | | | | | | | | |
| Agricultural | 116 | 125 | 84 | 110 | 327 | 179 | -- | -- | 526 | 413 |
| Grocery wholesalers and (or) retailers | 383 | 360 | 145 | 165 | 41 | 175 | (4) | (4) | 570 | 701 |
| Institutional wholesalers and end users | 199 | 166 | 95 | 83 | 49 | 96 | (4) | (4) | 342 | 346 |
| Water conditioning | 157 | 132 | 346 | 335 | 16 | 36 | 2 | 7 | 520 | 510 |
| U.S. Government resale | (4) | (4) | (4) | (4) | 192 | 206 | -- | -- | 192 | 206 |
| Other wholesalers and (or) retailers | 1,450 | 1,280 | 1,130 | 1,070 | 135 | 245 | (4) | (4) | 2,720 | 2,590 |
| Total | 2,310 | 2,060 | 1,800 | 1,760 | 759 | 937 | 2 | 8 | 4,870 | 4,770 |
| Other[5] | 147 | 136 | 313 | 324 | 105 | 163 | -- | -- | 565 | 623 |
| Grand total | 5,210 | 4,620 | 4,470 | 4,450 | 25,300 | 24,400 | 18,800 r | 18,300 | 53,800 r | 51,800 |

rRevised. -- Zero.

[1]Table includes data available through October 19, 2022. Data are rounded to no more than three significant digits; may not add to totals shown.

[2]The quantity 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, 9, 10, 11, and 12.

[3]Because data include salt imported, produced, and (or) sold from inventory from regional distribution centers, data for 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 from these tables may differ from totals shown in tables 5 and 7 because of changes in inventory and (or) incomplete reporting.

[4]Less than ½ unit.

[5]Includes exports.

TABLE 7
DISTRIBUTION OF DOMESTIC AND IMPORTED EVAPORATED AND ROCK SALT IN THE UNITED STATES, BY DESTINATION[1, 2]

(Thousand metric tons)

| | 2018 | | | | 2019 | | | |
|---|---|---|---|---|---|---|---|---|
| | Evaporated | | | | Evaporated | | | |
| Destination | Vacuum and open pans | Solar | Rock | Total | Vacuum and open pans | Solar | Rock | Total |
| Alabama | 56 | 16 | 56 | 128 | 50 | 16 | 41 | 107 |
| Alaska | 1 | 3 | (3) | 4 | 1 | 4 | (3) | 5 |
| Arizona | 56 | 88 | 1 | 145 | 52 | 82 | 27 | 161 |
| Arkansas | 49 | 10 | 61 | 119 | 44 | 9 | 75 | 128 |
| California | 305 | 717 | 100 | 1,120 | 271 | 705 | 106 | 1,080 |
| Colorado | 25 | 97 | 29 | 152 | 22 | 110 | 112 | 244 |
| Connecticut | 12 | 5 | 500 | 517 | 11 | 5 | 423 | 438 |
| Delaware | 10 | 10 | 65 | 85 | 8 | 9 | 52 | 69 |
| District of Columbia | -- | -- | 33 | 33 | -- | (3) | 27 | 27 |
| Florida | 132 | 201 | 115 | 449 | 121 | 194 | 94 | 408 |
| Georgia | 152 | 109 | 123 | 385 | 136 | 104 | 102 | 342 |
| Hawaii | 1 | 2 | -- | 3 | 1 | 2 | -- | 3 |
| Idaho | 32 | 243 | 2 | 277 | 32 | 230 | 52 | 313 |
| Illinois | 391 | 123 | 1,930 | 2,450 | 351 | 118 | 1,860 | 2,330 |
| Indiana | 306 | 117 | 628 | 1,050 | 265 | 99 | 632 | 997 |
| Iowa | 155 | 117 | 442 | 714 | 137 | 111 | 276 | 525 |
| Kansas | 87 | 48 | 843 | 978 | 80 | 44 | 1,090 | 1,210 |
| Kentucky | 79 | 6 | 782 | 867 | 70 | 5 | 663 | 738 |
| Louisiana | 115 | 11 | 152 | 278 | 107 | 11 | 123 | 241 |
| Maine | 20 | 3 | 147 | 170 | 17 | 3 | 118 | 137 |
| Maryland | 83 | 39 | 730 | 851 | 70 | 41 | 612 | 724 |
| Massachusetts | 43 | 20 | 623 | 686 | 39 | 19 | 534 | 592 |
| Michigan | 328 | 30 | 2,000 | 2,360 | 272 | 30 | 2,050 | 2,360 |
| Minnesota | 140 | 223 | 582 | 946 | 119 | 205 | 751 | 1,080 |
| Mississippi | 24 | 6 | 123 | 153 | 23 | 5 | 95 | 123 |
| Missouri | 128 | 120 | 392 | 640 | 115 | 119 | 521 | 755 |
| Montana | 5 | 26 | (3) | 32 | 5 | 26 | 26 | 57 |
| Nebraska | 66 | 50 | 161 | 277 | 55 | 46 | 301 | 402 |
| Nevada | 15 | 43 | (3) | 57 | 13 | 43 | 78 | 134 |
| New Hampshire | 12 | 8 | 230 | 250 | 11 | 8 | 197 | 216 |
| New Jersey | 105 | 35 | 1,010 | 1,150 | 94 | 34 | 803 | 931 |
| New Mexico | 33 | 143 | (3) | 176 | 28 | 150 | (3) | 178 |
| New York | 196 | 37 | 3,810 | 4,040 | 182 | 39 | 3,580 | 3,810 |
| North Carolina | 144 | 65 | 235 | 444 | 131 | 66 | 127 | 324 |
| North Dakota | 7 | 17 | 5 | 29 | 6 | 11 | 3 | 20 |
| Ohio | 525 | 66 | 2,830 | 3,420 | 462 | 61 | 2,640 | 3,170 |
| Oklahoma | 27 | 30 | 68 | 124 | 29 | 27 | 76 | 132 |
| Oregon | 29 | 61 | 1 | 90 | 24 | 98 | 79 | 201 |
| Pennsylvania | 226 | 134 | 2,600 | 2,960 | 195 | 132 | 2,400 | 2,730 |
| Rhode Island | 3 | 1 | 183 | 187 | 2 | 1 | 152 | 155 |
| South Carolina | 66 | 17 | 54 | 137 | 61 | 16 | 43 | 120 |
| South Dakota | 33 | 56 | 39 | 128 | 29 | 51 | 51 | 131 |
| Tennessee | 95 | 14 | 456 | 565 | 86 | 14 | 365 | 465 |
| Texas | 360 | 263 | 103 | 726 | 329 | 253 | 125 | 708 |
| Utah | 35 | 217 | 96 | 348 | 30 | 257 | 205 | 492 |
| Vermont | 3 | 1 | 464 | 468 | 3 | 1 | 411 | 415 |
| Virginia | 90 | 38 | 567 | 695 | 79 | 38 | 475 | 591 |
| Washington | 42 | 248 | (3) | 291 | 36 | 258 | 53 | 346 |
| West Virginia | 27 | 8 | 292 | 326 | 25 | 8 | 270 | 303 |
| Wisconsin | 252 | 187 | 1,330 | 1,770 | 222 | 170 | 1,310 | 1,700 |
| Wyoming | 5 | 31 | 60 | 96 | 4 | 41 | 1 | 45 |
| Other[4] | 83 | 313 | 208 | 603 | 70 | 324 | 201 | 595 |
| Total[5] | 5,210 | 4,470 | 25,300 | 34,900 | 4,620 | 4,450 | 24,400 | 33,500 |

See footnotes at end of table.

TABLE 7—Continued
DISTRIBUTION OF DOMESTIC AND IMPORTED EVAPORATED AND ROCK SALT IN THE UNITED STATES, BY DESTINATION[1, 2]

-- Zero.
[1]Table includes data available through October 19, 2022. Data are rounded to no more than three significant digits; may not add to totals shown.
[2]Each type of salt includes domestic and imported quantities. Brine is excluded because it is not shipped out of State.
[3]Less than ½ unit.
[4]Includes exports and shipments to overseas areas administered by the United States, Puerto Rico, and unspecified destinations.
[5]Because data include salt imported, purchased, and (or) sold from inventory from regional distribution centers, data for 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 tables 5 and 6 because of changes in inventory and (or) incomplete reporting.

TABLE 8
AVERAGE VALUE OF SALT, BY PRODUCT FORM AND TYPE[1, 2]

(Dollars per metric ton)

| Year and product form | Vacuum and open pans | Solar | Rock | Brine |
|---|---|---|---|---|
| 2018: | | | | |
| Bulk | 137.14 | 87.78 [r] | 57.23 | 8.30 |
| Compressed pellets | 202.84 | 201.36 | XX | XX |
| Packaged | 248.80 | 171.87 | 157.92 | XX |
| Average[3] | 214.12 | 114.32 [r] | 60.78 | 8.30 |
| Pressed blocks | 177.55 | 193.35 | 168.59 | XX |
| 2019: | | | | |
| Bulk | 138.74 | 91.72 | 57.31 | 7.56 |
| Compressed pellets | 198.36 | 212.07 | XX | XX |
| Packaged | 251.12 | 174.21 | 155.83 | XX |
| Average[3] | 211.57 | 126.18 | 59.90 | 7.56 |
| Pressed blocks | 176.43 | 194.24 | 171.50 | XX |

[r]Revised. XX Not applicable.
[1]Net selling value, free on board plant, excluding container costs.
[2] Table includes data available through October 12, 2022.
[3]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 listed in table 3.

TABLE 9
U.S. EXPORTS OF SALT, BY COUNTRY OR LOCALITY[1]

(Thousand metric tons and thousand dollars)

| | 2018 | | 2019 | |
|---|---|---|---|---|
| Country or locality | Quantity | Value[2] | Quantity | Value[2] |
| Australia | 1 | 1,130 | 1 | 1,300 |
| Bahamas, The | 1 | 498 | 1 | 493 |
| Belgium | 5 | 7,860 | 6 | 7,760 |
| Brazil | 2 | 4,610 | 2 | 5,820 |
| Canada | 811 | 63,400 | 886 | 61,100 |
| China | 78 | 44,000 | 54 | 27,300 |
| Colombia | 2 | 1,840 | 1 | 1,880 |
| Costa Rica | 2 | 785 | 1 | 655 |
| Dominican Republic | 3 | 973 | 2 | 550 |
| El Salvador | 1 | 257 | 1 | 329 |
| Germany | 2 | 1,320 | 1 | 667 |
| Honduras | 1 | 302 | 1 | 242 |
| Ireland | 1 | 1,480 | 1 | 1,820 |
| Japan | 4 | 3,060 | 2 | 2,410 |
| Korea, Republic of | 1 | 1,620 | 1 | 1,900 |
| Mexico | 37 | 14,700 | 34 | 13,200 |
| Netherlands | 1 | 880 | 1 | 921 |
| Panama | 1 | 462 | 1 | 544 |
| Saudi Arabia | 2 | 1,010 | 1 | 541 |
| Singapore | 10 | 12,400 | 6 | 5,800 |
| United Arab Emirates | 1 | 345 | 1 | 477 |
| United Kingdom | 2 | 2,510 | 3 | 1,730 |
| Other | 17 | 10,400 | 14 | 8,700 |
| Total | 986 | 176,000 | 1,020 | 146,000 |

[1]Table includes data available through October 19, 2022. Data are rounded to no more than three significant digits; may not add to totals shown. The Schedule B number for salt is 2501.00.0000.
[2]Free alongside ship value at U.S. ports.

Source: U.S. Census Bureau.

TABLE 10
U.S. EXPORTS OF SALT, BY CUSTOMS DISTRICT[1]

(Thousand metric tons and thousand dollars)

| | 2018 | | 2019 | |
|---|---|---|---|---|
| District | Quantity | Value[2] | Quantity | Value[2] |
| Anchorage, AK | 4 | 1,400 | (3) | 66 |
| Baltimore, MD | 1 | 504 | (3) | 209 |
| Buffalo, NY | 36 | 7,280 | 71 | 9,360 |
| Chicago, IL | 26 | 2,050 | 2 | 1,030 |
| Cleveland, OH | 279 | 11,200 | 454 | 15,300 |
| Detroit, MI | 45 | 12,300 | 45 | 10,600 |
| El Paso, TX | 3 | 621 | 2 | 562 |
| Great Falls, MT | 3 | 827 | 5 | 1,170 |
| Houston, TX | 31 | 3,930 | 5 | 2,080 |
| Laredo, TX | 27 | 10,800 | 23 | 8,680 |
| Los Angeles, CA | 88 | 58,800 | 58 | 35,400 |
| Miami, FL | 6 | 3,400 | 6 | 2,680 |
| New Orleans, LA | 1 | 478 | 1 | 394 |
| New York, NY | 15 | 14,000 | 12 | 12,200 |
| Nogales, AZ | 3 | 1,060 | 2 | 790 |
| Norfolk, VA | 8 | 8,760 | 8 | 10,600 |
| Ogdensburg, NY | 81 | 8,660 | 30 | 6,730 |
| Pembina, ND | 7 | 1,620 | 7 | 1,770 |
| Philadelphia, PA | 2 | 1,040 | 1 | 890 |
| San Diego, CA | 5 | 2,150 | 7 | 3,180 |
| San Francisco, CA | 1 | 603 | 1 | 561 |
| Savannah, GA | 1 | 769 | 1 | 681 |
| Seattle, WA | 10 | 3,050 | 12 | 3,470 |
| St. Albans, VT | 4 | 602 | 3 | 607 |
| Other[4] | 299 | 19,900 | 267 | 17,200 |
| Total | 986 | 176,000 | 1,020 | 146,000 |

[1]Table includes data available through October 19, 2022. Data are rounded to no more than three significant digits; may not add to totals shown. The Schedule B number for salt is 2501.00.0000.
[2]Free alongside ship value at U.S. ports.
[3]Less than ½ unit.
[4]Customs district unidentified but assumed to be rail and (or) truck shipments to Canada through various points of departure. Also includes minor shipments through 14 other customs districts.

Source: U.S. Census Bureau.

TABLE 11
U.S. IMPORTS FOR CONSUMPTION OF SALT, BY COUNTRY OR LOCALITY[1]

(Thousand metric tons and thousand dollars)

| Country or locality | 2018 | | 2019 | |
|---|---|---|---|---|
| | Quantity | Value[2] | Quantity | Value[2] |
| Australia | 22 | 944 | 6 | 1,530 |
| Bahamas, The | 708 | 20,500 | 557 | 18,900 |
| Brazil | 720 | 15,500 | 770 | 20,300 |
| Canada | 3,300 | 154,000 | 4,830 | 191,000 |
| Chile | 6,280 | 179,000 | 5,530 | 113,000 |
| China | 45 | 10,100 | 17 | 5,170 |
| Dominican Republic | 16 r | 561 r | 13 | 297 |
| Egypt | 1,790 | 51,100 | 2,910 | 84,800 |
| Germany | 2 | 2,100 r | 25 | 2,050 |
| Ireland | 132 | 28,500 | 51 | 24,400 |
| Israel | 34 | 10,100 | 71 | 11,500 |
| Italy | 387 | 13,700 | 301 | 14,200 |
| Korea, Republic of | 109 | 4,210 | 77 | 3,210 |
| Mexico | 2,640 | 48,400 | 2,030 | 48,600 |
| Morocco | 211 | 5,690 | 86 | 2,950 |
| Netherlands | 457 | 15,800 | 404 | 13,400 |
| Pakistan | 57 | 16,300 | 223 | 18,600 |
| Peru | 270 | 6,670 | 330 | 6,650 |
| South Africa | 52 | 4,560 | 16 | 3,930 |
| Spain | 180 | 4,590 r | 36 | 5,000 |
| Tunisia | 203 | 5,570 | 36 | 1,430 |
| Turkey | 111 | 4,470 | 196 | 7,170 |
| Other[3] | 138 | 26,700 | 136 | 28,100 |
| Total | 17,900 | 629,000 | 18,700 | 626,000 |

rRevised.
[1]Table includes data available through October 11, 2022. Data are rounded to no more than three significant digits; may not add to totals shown. The Harmonized Tariff Schedule of the United States code for salt is 2501.00.0000.
[2]Customs value.
[3]Includes imports from 48 other countries and (or) localities.

Source: U.S. Census Bureau.

TABLE 12
U.S. IMPORTS OF SALT, BY CUSTOMS DISTRICT[1]

(Thousand metric tons and thousand dollars)

| | 2018 | | 2019 | |
|---|---|---|---|---|
| District | Quantity | Value[2] | Quantity | Value[2] |
| Baltimore, MD | 683 | 25,100 | 942 | 29,700 |
| Boston, MA | 1,220 | 45,000 | 807 | 32,600 |
| Buffalo, NY | 127 | 7,680 r | 87 | 6,920 |
| Charleston, SC | 247 | 8,900 | 166 | 4,810 |
| Chicago, IL | 323 | 12,400 | 709 | 26,200 |
| Cleveland, OH | 525 | 18,100 | 590 | 18,500 |
| Columbia-Snake, OR | 135 | 5,160 | 119 | 4,700 |
| Detroit, MI | 1,140 | 43,800 | 1,820 | 58,500 |
| Duluth, MN | 121 | 12,700 | 142 | 14,900 |
| El Paso, TX | (3) | 93 | 20 | 167 |
| Houston-Galveston, TX | 3 | 4,060 r | 4 | 4,090 |
| Laredo, TX | 915 | 5,310 | 828 | 4,810 |
| Los Angeles, CA | 138 | 18,400 | 118 | 12,600 |
| Miami, FL | 27 | 1,670 | 25 | 1,900 |
| Milwaukee, WI | 1,070 | 30,400 | 1,540 | 46,900 |
| Minneapolis, MN | 263 | 6,820 | 437 | 13,400 |
| Mobile, AL | 74 | 5,150 | 149 | 7,330 |
| New Orleans, LA | 1,840 r | 60,900 | 2,070 | 55,800 |
| New York, NY | 3,050 | 88,500 | 3,060 | 83,400 |
| Nogales, AZ | 64 | 2,560 | 20 | 2,540 |
| Norfolk, VA | 274 | 35,300 | 153 | 27,100 |
| Ogdensburg, NY | 67 | 41,000 | 68 | 24,400 |
| Pembina, ND | 96 | 9,260 | 100 | 9,870 |
| Philadelphia, PA | 1,790 | 44,900 | 1,800 | 38,900 |
| Portland, ME | 1,120 | 28,100 | 884 | 25,300 |
| Providence, RI | 678 | 15,400 | 578 | 11,600 |
| San Diego, CA | 628 | 2,700 | 146 | 3,960 |
| San Francisco, CA | 188 | 9,270 r | 268 | 6,880 |
| Savannah, GA | 205 | 3,280 | 25 | 3,170 |
| Seattle, WA | 94 | 6,740 | 125 | 10,200 |
| St. Albans, VT | 34 | 3,060 | 19 | 2,280 |
| Tampa, FL | 563 | 18,500 r | 634 | 20,300 |
| Wilmington, NC | 125 | 3,970 | 159 | 5,630 |
| Other[4] | 40 | 5,120 | 40 | 6,130 |
| Total | 17,900 | 629,000 | 18,700 | 626,000 |

rRevised.
[1]Table includes data available through October 11, 2022. Data are rounded to no more than three significant digits; may not add to totals shown. The Harmonized Tariff Schedule of the United States code for salt is 2501.00.0000.
[2]Customs value.
[3]Less than ½ unit.
[4]Includes imports through 7 other customs districts.

Source: U.S. Census Bureau.

TABLE 13
SALT: WORLD PRODUCTION, BY COUNTRY OR LOCALITY[1]

(Thousand metric tons)

| Country or locality[2] | 2015 | 2016 | 2017 | 2018 | 2019 |
|---|---|---|---|---|---|
| Afghanistan, rock | 87 | 98 | 64 r | 56 r | 170 |
| Algeria, brine and sea | 176 | 158 | 190 r | 321 r | 330 e |
| Angola | 48 e | 43 e | 45 e | 40 e | 130 |
| Argentina, common | 1,401 | 1,812 | 1,461 | 1,406 | 1,412 |
| Armenia | 27 | 32 | 33 | 23 | 25 |
| Australia | 11,390 | 10,410 | 11,675 | 12,894 | 11,474 |
| Austria: | | | | | |
| Brine | 969 | 1,028 | 1,150 | 1,170 | 1,206 |
| Evaporated[e] | 1,100 | 1,100 | 1,100 | 1,100 | 1,000 |
| Total | 2,069 | 2,128 | 2,250 | 2,270 | 2,206 |
| Azerbaijan, marketable | 5 | 5 | 5 | 4 | 5 |
| Bangladesh, marine[3] | 1,463 | 1,477 | 1,496 | 1,513 | 1,820 e |
| Belarus | 2,055 | 2,477 | 3,069 | 3,347 | 2,949 |
| Bolivia, rock | 2 | 5 | 3 | 5 | 4 |
| Bosnia and Herzegovina | 992 | 1,092 | 1,029 | 1,186 | 1,203 |
| Botswana[4] | 404 | 400 | 370 | 368 | 384 |
| Brazil: | | | | | |
| Rock | 1,476 | 1,410 | 1,382 | 1,400 e | 1,400 e |
| Sea | 6,200 | 6,100 | 6,000 | 6,000 e | 6,000 e |
| Total | 7,676 | 7,510 | 7,382 | 7,400 | 7,400 |
| Bulgaria[e] | 2,100 | 2,100 | 2,100 | 2,100 | 2,100 |
| Burma, rock, crude | 134 | 212 | 158 | 189 | 213 |
| Cambodia, marine[3] | 170 | 140 | 32 | 10 e | 30 e |
| Canada | 14,343 | 10,252 | 11,424 | 10,713 | 11,936 |
| Chile | 11,831 | 8,140 | 7,441 | 10,012 | 10,477 |
| China | 66,655 | 66,201 | 66,542 | 63,640 | 67,014 |
| Colombia: | | | | | |
| Rock | 335 | 354 | 336 | 391 | 347 |
| Sea | 96 | 176 | 165 | 52 r | 55 e |
| Total | 431 | 530 | 501 | 443 r | 402 |
| Croatia | 52 | 40 | 53 | 51 | 48 |
| Cuba | 285 | 248 | 246 | 193 | 210 |
| Denmark[e] | 600 | 600 | 600 | 600 | 600 |
| Djibouti[e] | 1 | 1 | 1 r | 1 r | 1 |
| Egypt | 1,669 | 1,700 e | 1,750 e | 1,700 e | 1,700 e |
| Eritrea, sea[e] | 300 | 300 r | 300 r | 310 r | 310 |
| Ethiopia, rock[e, 3] | 440 | 450 | 450 | 450 | 450 |
| France | 6,062 | 5,463 | 5,003 | 5,653 | 5,439 |
| Germany: | | | | | |
| Evaporated, including sea | 280 e | 963 r | 991 r | 982 r | 983 |
| Industrial brines | 7,747 | 7,897 | 8,046 | 8,090 | 8,226 |
| Rock and other brines | 6,124 | 5,617 | 6,531 | 7,176 | 7,419 |
| Total | 14,151 | 14,477 r | 15,568 r | 16,248 r | 16,628 |
| Ghana[e] | 250 | 250 | 250 | 250 | 250 |
| Greece | 122 | 158 | 160 e | 160 e | 160 e |
| India, other | 24,241 | 27,500 e | 28,000 e | 40,000 r | 45,000 |
| Indonesia[e] | 600 | 1,000 | 1,000 | 1,200 r | 1,200 |
| Iran[5] | 4,450 | 3,000 e | 2,800 e | 2,800 r, e | 2,700 |
| Iraq | 209 | 200 e | 240 e | 270 e | 270 e |
| Israel, marketable | 333 | 389 | 514 | 377 | 301 |
| Italy: | | | | | |
| Industrial[6] | 3,031 | 2,551 | 2,283 | 1,515 | 1,538 |
| Table | 305 | 484 | 576 | 262 | 336 |
| Total | 3,336 | 3,035 | 2,859 | 1,777 | 1,874 |
| Japan | 938 r | 928 r | 926 r | 929 r | 903 |
| Jordan: | | | | | |
| Brine | 40 | 46 | 41 | 49 | 37 |
| Dead sea | 3 | 1 | 1 | 1 | 2 |
| Total | 43 | 47 | 42 | 50 | 39 |

See footnotes at end of table.

TABLE 13—Continued
SALT: WORLD PRODUCTION, BY COUNTRY OR LOCALITY[1]

(Thousand metric tons)

| Country or locality[2] | 2015 | 2016 | 2017 | 2018 | 2019 |
|---|---|---|---|---|---|
| Kazakhstan | 609 | 730 | 804 | 886 | 1,095 |
| Kenya, refined | 246 | 263 | 292 r | 363 r | 355 |
| Korea, North[e] | 70 | 100 | 100 | 100 | 100 |
| Korea, Republic of | 332 | 323 | 484 r | 460 r | 433 |
| Kuwait | 64 | 67 | 58 | 59 r | 59 |
| Kyrgyzstan, rock | 2 e | 2 | 2 e | 5 | 6 |
| Laos | 24 | 24 | 24 e | 1 e | 10 |
| Lebanon[e] | 3 | 3 | 3 | 3 | 3 |
| Libya[e] | 30 | 30 | 40 | 50 | 100 |
| Madagascar, sea | 120 e | 107 | 110 e | 110 e | 100 e |
| Malta, solar[e] | 2 | 2 | 2 | 2 | 2 |
| Mauritania[e] | 1 | 1 | 1 | 1 | 1 |
| Mauritius, sea | 2 e | 1 | 1 e | 1 e | 1 |
| Mexico | 9,088 | 8,907 | 9,000 e | 9,000 e | 9,000 e |
| Mongolia | 2 | -- | 1 | 1 | 1 |
| Morocco, rock | 556 | 635 | 659 | 692 | 854 |
| Mozambique, sea[e] | 160 | 170 | 170 | 170 | 170 |
| Namibia | 733 | 836 | 887 | 1,222 | 1,041 |
| Netherlands, rock | 6,743 | 6,625 | 6,935 | 6,744 | 5,914 |
| New Zealand[e] | 100 | 100 | 100 | 100 | 100 |
| Niger[e] | 30 | 30 | 30 | 30 | 30 |
| Oman | 13 | 12 | 18 | 12 | 15 |
| Pakistan: | | | | | |
| Rock[4] | 2,779 | 3,535 | 3,493 | 3,959 | 3,277 |
| Sea | 212 e | 214 e | 222 e | 212 e | 243 |
| Total | 2,991 | 3,749 | 3,715 | 4,171 | 3,520 |
| Panama | 60 e | 60 e | 41 | 38 | 40 e |
| Peru | 1,471 | 1,450 | 1,481 | 1,510 | 1,266 |
| Philippines, sea[e] | 131 | 128 | 125 | 192 | 190 |
| Poland: | | | | | |
| Evaporated | 671 | 647 | 615 | 620 | 591 |
| Rock | 650 | 709 | 994 | 862 | 920 |
| Other | 2,798 | 2,965 | 2,989 | 2,929 | 2,929 |
| Total | 4,119 | 4,321 | 4,598 | 4,411 | 4,440 |
| Portugal, rock | 30 | 6 | 8 | 6 | 5 |
| Romania: | | | | | |
| Rock | 50 | 52 | 52 | 49 | 51 |
| Other | 2,100 | 2,000 | 2,300 | 2,300 | 1,934 |
| Total | 2,150 | 2,052 | 2,352 | 2,349 | 1,985 |
| Russia | 5,600 | 6,887 | 7,073 | 6,710 | 8,175 |
| Saudi Arabia | 2,000 | 2,400 | 2,520 | 2,646 | 2,778 |
| Senegal | 266 e | 263 | 259 | 260 e | 260 e |
| Serbia | 13 | 13 e | 13 e | 13 e | 13 |
| Slovenia | 2 | 2 | 2 | 2 | 1 |
| South Africa | 517 | 473 | 493 | 478 | 510 |
| Spain: | | | | | |
| Rock | 3,032 | 3,253 | 2,870 | 3,200 | 3,084 |
| Sea, including evaporated | 1,403 | 1,200 | 1,168 | 1,195 | 1,134 |
| Total | 4,435 | 4,453 | 4,038 | 4,395 | 4,218 |
| Sri Lanka | 35 | 150 | 117 | 69 r | 57 |
| Sudan | 70 | 223 | 235 | 267 | 197 |
| Switzerland | 550 | 458 | 590 | 492 | 477 |
| Syria[e] | 20 | 25 | 25 | 25 | 100 |
| Taiwan | 78 | 77 | 77 | 79 | 76 |
| Tajikistan | 36 | 36 | 24 | 37 | 35 |
| Tanzania | 92 | 171 | 100 | 36 | 100 |
| Thailand | 1,386 | 1,391 | 1,497 | 1,487 | 1,580 |
| Tunisia, sea | 1,700 | 1,600 e | 1,404 r | 2,117 r | 1,967 |
| Turkey | 6,257 | 5,328 | 6,673 | 6,299 | 6,961 |

See footnotes at end of table.

TABLE 13—Continued
SALT: WORLD PRODUCTION, BY COUNTRY OR LOCALITY[1]

(Thousand metric tons)

| Country or locality[2] | 2015 | 2016 | 2017 | 2018 | 2019 |
|---|---|---|---|---|---|
| Turkmenistan | 100 e | 100 | 100 | 100 e | 105 e |
| Uganda[e] | 15 | 15 | 15 | 15 | 15 |
| Ukraine | 2,137 | 1,784 | 1,816 | 2,192 | 2,093 |
| United Kingdom[7] | 4,700 e | 3,899 r | 2,362 r | 3,430 r | 2,254 |
| United States: | | | | | |
| Brine | 16,900 | 16,900 | 15,600 | 17,900 | 17,900 |
| Rock | 20,400 | 17,900 | 16,500 | 18,900 | 19,100 |
| Solar | 3,590 | 2,900 | 3,340 | 2,950 | 3,520 |
| Vacuum and open pan | 4,190 | 4,050 | 4,490 | 4,260 | 4,280 |
| Other, from Puerto Rico[e] | 46 | 46 | 45 | 45 | 45 |
| Total | 45,100 | 41,800 | 40,000 | 44,000 | 44,900 |
| Vietnam | 1,061 | 982 | 649 | 997 | 945 |
| Yemen[e] | 75 | 75 | 75 | 100 | 100 |
| Grand total | 288,000 r | 278,000 r | 280,000 r | 300,000 r | 308,000 |

[e]Estimated. [r]Revised.

[1]Table includes data available through January 23, 2023. All data are reported unless otherwise noted; totals may include estimated data. Grand totals, U.S. data, and estimated data are rounded to no more than three significant digits; may not add to totals shown.

[2]In addition to the countries and (or) localities listed, Guinea, Iceland, Mali, and Venezuela may have produced salt, but available information was inadequate to make reliable estimates of output. Some salt brine production data for manufacture of chlorine, caustic soda, and soda ash are not reported because of incomplete reporting by many countries.

[3]Production is based on fiscal year, with a starting date of July 1 of the year shown.

[4]From natural soda ash production.

[5]Production is based on fiscal year, with a starting date of March 21 of the year shown.

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

[7]Production is based on fiscal year, with a starting date of July 16 of the year shown.