



2013 Minerals Yearbook

CEMENT [ADVANCE RELEASE]

CEMENT

By Hendrik G. van Oss

Domestic survey tables were prepared by Richard H. Kraft, statistical assistant, and the world production table was prepared by Glenn J. Wallace, international data coordinator.

Production of portland and masonry cement in the United States increased by 3.6% in 2013 to a total of 76.8 million metric tons (Mt) (table 1). Although it was the fourth consecutive annual increase, the 2013 output was still well below the record production of 99.3 Mt in 2005. As measured by sales to final domestic customers, U.S. consumption of portland and masonry cement increased by 4.1% to 81.8 Mt (table 9), still far below the 2005 record consumption level of 127.9 Mt and, except for 2009–12, the lowest level of consumption since 1993. On a rounded, ex-factory basis, the average unit value (“price”) for cement increased by nearly 7% in 2013 after being essentially stagnant in 2012; the 2013 increase, along with higher sales volumes, led to a 10.5% increase in the overall value of cement sales to nearly \$7.8 billion. Based on typical portland cement mixing ratios in concrete, the delivered value of concrete (excluding mortar) in the United States was estimated to be at least \$43 billion in 2013. At nearly 4.1 billion metric tons (Gt) (up by 6.5%), world production of cement in 2013 exceeded 4 Gt for the first time in history; the world production total exceeded 3 Gt for the first time in 2009 (table 22).

Percentage or other changes expressed in this report compare activity in 2013 with that of 2012 unless specified otherwise. Except where otherwise indicated, data and trends in this report exclude those in Puerto Rico. Cements covered in this report are limited to those hydraulic varieties broadly classified as portland cement (including blended cements and other varieties listed in table 15) and masonry cement (including portland-lime and plastic cements). A few other types of hydraulic cement (notably aluminous cement) and (or) clinker are included in some of the trade data (tables 16–18, 21) and within the world production data (table 22). The tables in this report exclude supplementary cementitious materials (SCMs), such as fly ash, other pozzolans, and ground granulated blast furnace slag (GGBFS), except to the degree that the SCMs are incorporated within finished portland cement (especially blended varieties) or masonry cement or are used as raw feed for clinker manufacture. Sales data for blended (also called composite) cements listed separately from portland cement are available in the monthly Mineral Industry Surveys reports of the U.S. Geological Survey (USGS). General background information on cement and its manufacture and on the USGS cement canvasses can be found in van Oss (2005).

Most of the present report is based on data compiled from USGS annual questionnaires sent to cement and clinker manufacturing plants and associated distribution facilities and import terminals, including certain terminals that are independent of U.S. cement manufacturers. For 2013, questionnaires were received for 136 out of the 140 sites canvassed, a response rate of 97%, which included all active production sites. Not all forms were returned fully completed, but the data received included 100% reporting for production

of cement and clinker and all but 0.8% of the cement sales tonnages listed in the tables. Likewise, for 2012, questionnaires were received for 142 of 146 sites canvassed, including all the production sites and 100% of production data. Missing data were estimated based on monthly data or past annual reporting. The apparent decline in the number of forms in 2013 reflects a combination of plant closures and further consolidation of reporting by some companies for certain distribution terminals or accounting inventories that previously had been reported separately. For both years, the data exclude a few importers that did not participate in the surveys. To the degree that they were independent of the respondent companies, sales by the missing importers were estimated to be no more than an additional 0.4% of the total portland cement sales in both 2012 and 2013.

Government Programs and Environmental Issues

Public sector construction projects consume (within concrete) a significant fraction of cement sales, and these sales volumes are thus dependent on various Government funding sources, especially for new construction rather than repairs. State and Federal government funding for public sector construction has been significantly constrained in recent years despite general agreement that the U.S. transportation infrastructure is in need of repair and upgrading.

Environmental issues pertaining to the cement industry stem mainly from the manufacture of the intermediate product called clinker. In making clinker, the thermal decomposition of large tonnages of carbonate raw materials and the combustion of large quantities of fuels to provide the heat for clinker manufacture lead to large emissions of carbon dioxide (CO₂) and can yield significant emissions (if not scrubbed out) of nitrogen oxides (NO_x), sulfur oxides (SO_x), mercury and some other metals, volatile organic carbon compounds, and particulates. Increasingly, these emissions are being stringently regulated.

The largest volume of emissions by far is of CO₂; the cement industry is one of the leading industrial emitters of this greenhouse gas (GHG). Overall, emissions of CO₂ by the U.S. cement industry were calculated for 2013 to be about 60.7 Mt, or about 0.87 metric ton (t) of CO₂ per ton of clinker produced. This calculation incorporates the average of two methodologies of estimating the emissions from the combustion of fuels, one using “standard” heat values for the fuel quantities consumed (table 7), and the other, which yields a lower result, incorporates heat values actually reported by the individual plants. For emissions from calcination of limestone, a standard emissions factor of 0.51 t of CO₂ per ton of clinker produced is included; this factor is derived from the Intergovernmental Panel on Climate Change (IPCC) (Hanle and others, 2006) but excludes any correction for cement kiln dust (CKD) not recycled to the

kiln (for which data are lacking). The calculation omits any deductions from calcination for calcium oxide contributed by noncarbonate alternative raw materials such as ferrous slags and coal combustion ashes. Such a deduction would allow a reduction of the calcination-related emissions by about 2.7% (nearly 1 Mt) in 2013 and about 2.8% in 2012, equivalent to removing the total emissions (including from fuels and without adjustments) of 1.5 average-capacity U.S. cement plants for each year. Relative reductions can be significantly larger for the subset of individual plants that actually burn these alternative raw materials. Certain fuels, including alternative or waste fuels, can either directly reduce plant-level CO₂ emissions or may be allowed to be deducted from some reporting protocols for combustion emissions because they are lower in carbon content per unit heat, because they are considered to be carbon-neutral (certain biofuels), or because credits may be allowed for their use (certain waste fuels). Fuel deductions have not been made in the averages noted above. Apart from substitution of alternative raw materials, plant-level emissions from combustion can be reduced through upgrading to more fuel-efficient kiln line technology. Unit emissions on a finished product basis can also be reduced by use of SCMs and crushed limestone or other fillers in finished cement and in concrete to reduce the clinker content of these products.

The U.S. Environmental Protection Agency (EPA) continues to apply emissions factors similar to those noted above to the USGS published data on clinker production (but including a 2% addition for CKD not recycled to the kilns) to calculate and formally report GHG emissions associated with the U.S. cement industry. The USGS and EPA calculations, being based on the IPCC methodology for cement, have about a 5% uncertainty. The EPA was comparing its calculations to the results of mandatory GHG reporting by major emitter industries; these data began for the 2010 (emissions) data year and are available for 2010–13 as summary spreadsheets for each year (U.S. Environmental Protection Agency, 2014). For 2013, the cement industry reported total CO₂ emissions of 63.1 Mt, equivalent to 0.91 t of CO₂ per ton of clinker (as applied to the USGS clinker total), excluding reported but insignificantly small CO₂-equivalent emissions of methane (CH₄) and nitrous oxide (N₂O). All but 12 (13 including Puerto Rico) U.S. cement plants reported having a continuous emissions monitoring system (CEMS) in 2013. For plants lacking a CEMS, the CO₂ emissions were reported separately for calcination and combustion, whereas for plants that had a CEMS, the emissions were reported as grand totals.

Various other emissions from cement plants have come under stringent regulation in recent years. In 2010, the EPA issued rules pertaining to the national emissions standards for hazardous air pollutants (NESHAP), in which new, very low limits on individual plant emissions of mercury, total hydrocarbons, particulate matter (as a surrogate for nonvolatile metal pollutants), and hydrochloric acid were established for cement plants that do not burn hazardous wastes, and, separately, published performance standards and emissions guidelines for commercial and industrial waste incinerator (CISWI) units. In response to comments from the cement industry, CISWI operators, and the public, the NESHAP rules were revised several times, with the

new “final” ruling being released on February 12, 2013 (U.S. Environmental Protection Agency, 2013a). The new ruling revised the 2010 rule’s particulate matter emissions limits and extended the overall compliance deadline to September 9, 2015. A list of the various environmental rules pertaining to the cement industry is available from the EPA (U.S. Environmental Protection Agency, 2013b).

Production

In line with general economic trends, the U.S. cement industry has operated at well below its output capacity for the past 6 years but has experienced higher sales and commensurate production levels more recently. In 2013, production of portland cement increased by 3.4% to 74.7 Mt (table 3), representing the fourth consecutive year of increase; the relative increase, however, was less than that in 2012 (9.2%). Unlike in 2012, when production increases were recorded in all districts except Illinois, Oregon, and Washington, regional production was mixed in 2013, with declines recorded in one-third of the districts. Much of the higher output overall in 2013 can be attributed to large increases in the leading production States, especially in California and Florida; production in Texas, which had been comparatively strong through the recent recession years, abated significantly in 2013 and recorded only a relatively modest increase for the year. Likewise, output in Missouri, which had increased by nearly 1 Mt in 2012, increased by just 0.3 Mt in 2013, owing to the State’s largest plant (new in 2009) reaching close to full output capacity in 2012. Yearend stockpiles of portland cement fell by 3.6%. Although these stocks are incorporated into the calculation of apparent consumption (table 1), they are as much affected by yearend weather conditions as by sales volumes, and they include stock buildups ahead of scheduled kiln shutdowns for routine maintenance, commonly scheduled for early in the following year.

Cement production capacity (as grinding capacity) is reported directly by the individual plants and, despite being listed in table 3, includes portland and masonry cements; the capacity utilization percentages listed, however, are with respect to portland cement only. Capacity changes reported from year to year can reflect a variety of factors, such as shifts in demand for cements of various degrees of fineness, grinding equipment upgrades, shifts of some capacity to other products (such as GGBFS), new plants, and plant closures. In 2013, the overall capacity was unchanged at 120 Mt (rounded) but included an offsetting mix of increases and decreases in various districts. The closures in 2012 of a grinding plant in Idaho, an integrated plant in Kansas, and one of two grinding plants in Michigan explains the lower capacities for those States in 2013. The significant increase in capacity in southern Texas reflects an additional finish mill, constructed in 2012 but brought online in 2013, at one plant. Most other capacity changes in 2013, including a few that were fairly large, do not appear to be related to additions or subtractions of physical equipment. Capacity utilization in 2013 was about 62% overall, still well below full capacity (considered to be 85% utilization or higher) but was the first return since 2008 to an overall capacity utilization level in

excess of 60%. The plant count in 2013 fell by three, reflecting the plant closures in 2012 noted above but remained inflated because of the retention of a few long-idle facilities for which no formal closures had yet been announced. Plants closed during a given year are retained in that year's count if any production from them was recorded during the year. In a number of cases, closed and idle production facilities continue to be operated as cement distribution terminals.

Continued growth in housing construction during 2013 led to a 9.7% increase in masonry cement production to 2.1 Mt (table 4) and followed a similar relative increase in 2012. The outputs of both years were much lower than the 5.4-Mt record in 2005, and except for 2009–12, the output in 2013 was the lowest since 1982.

With multiple subsidiaries of common parents combined under the larger subsidiary's name and with joint ventures apportioned, the 10 leading cement companies in 2013 were, in descending order of portland cement production, CEMEX, Inc.; Holcim (US) Inc.; Lehigh Hanson, Inc.; Buzzi Unicem USA, Inc. (including Alamo Cement Co.); Ash Grove Cement Co.; Lafarge North America Inc.; Texas Industries, Inc. (TXI); Eagle Materials Inc.; Essroc Cement Corp.; and St. Marys Cement Group. The U.S. industry remained heavily consolidated, with the 5 leading cement companies, combined, contributing 54% of total U.S. portland cement production, and the 10 leading companies accounting for 78% of total production. Of the above named companies, all except Ash Grove, Eagle Materials, and TXI were foreign-owned as of yearend. For the U.S. industry overall, about 79% of total 2013 cement capacity was foreign-owned.

In step with portland cement, production of clinker increased by 3.3% to 69.4 Mt (tables 1, 5), well below the record 99.3 Mt in 2005 and, except for 2009–12, the lowest output since 1994. Of the 21 districts shown in table 5, production increases were recorded in 14, most notably California (up by 0.46 Mt or 5.5%), Florida (up by 0.75 Mt or 20.4%), and Missouri (up by 0.41 Mt or 5.5%). Apparent capacity (rounded) declined slightly to 105 Mt owing in part to the dropping from the 2013 count of a wet plant in Kansas that was officially closed in 2012, but mainly because of changes at many facilities in the reported number of scheduled days of downtime for routine maintenance; the apparent annual capacity statistic is dependent on the characterization of such downtime. As had been the case for several years, many plants reported much longer downtimes for routine maintenance in 2013; where this was evident, corrections were made in both years to remove the extra downtime (a result of slow sales) from the statistic. Capacity utilization (likewise dependent on the downtime reporting) was nearly 66% overall, and although this was higher than the 63% recorded in 2012, it continued to reflect a number of plants that were idle all year, a significant number of idle kilns among the plants that were in production, and longer than normal total amounts of downtime for many of the producing kilns. Although only one district (Missouri) approached "full capacity utilization" (defined as 85% or higher), all but six districts showed significant increases therein. In terms of plant kiln technology, the count for wet plants declined by one owing to closure of the plant in Kansas mentioned previously. The

dry plant count was unchanged for the year overall, but owing to the closure during the year of the wet kilns at the only plant listed as having both wet and dry kilns, the dry plant count at yearend was up by one, which will be reflected in the count for 2014. For the year overall, the kiln count dropped by two (again, representing the closed plant in Kansas), although by yearend (to be reflected in 2014), the kiln count had dropped by three more: two wet kilns in South Dakota and one wet kiln in northern Texas. Overall, wet kilns produced only 4.7% of the total U.S. output of clinker in 2013 (table 7), a continuation of the longstanding shift to more energy efficient dry kiln technology. For comparison, wet kilns accounted for 60.4% of U.S. clinker production in 1970.

Raw materials consumed to make clinker and cement are listed in table 6. Cement plants commonly can substitute among a variety of raw materials to make clinker as long as the material mix used will yield the requisite oxide balance to make the key clinker compounds (minerals). For 2012–13, the ratios among the raw materials and the amount of clinker and total cement made appear to be largely unchanged. For some of the smaller tonnage commodities, large relative changes may not be significant because they likely reflect activity at just a few plants. In some cases, the changes could reflect possible misidentification of the material; for example, the apparent decline in 2013 of use of "Other blast furnace slag" and "Steel slag" may reflect identification instead as "Other slag," which showed a large relative increase. A similar issue likely exists between "Fly ash" and "Other ash, including bottom ash." The "Other ash" had shown a large increase in 2012; at least at some plants, the increase was to replace (relatively) high-mercury-content fly ash with bottom ash (which typically has a lower mercury content) in anticipation of new NESHAP limits and, in some cases, to avail themselves of a relatively abundant material in markets where fly ash shortages have arisen owing to the switch by some powerplants from coal to natural gas.

The data in table 6 for fly ash and other ash (for clinker and cement combined) may be compared with data for sales of fly ash and bottom ash for use in blended cement or raw material for clinker published by the American Coal Ash Association (ACAA). For 2013, the ACAA reported sales of fly ash were about 24% lower than the tonnage reported in table 6, and bottom ash sales were about 14% higher than the tonnage reported in table 6 (American Coal Ash Association, 2014). The differences could be related to a difference in timing between actual sales and consumption (including from stockpiles) and misidentification of the materials on some USGS canvasses. The "Gypsum and anhydrite" data in table 6 for 2013 include 0.83 Mt of synthetic gypsum, but this likely underrepresents actual use of the synthetic material because the USGS canvass does not require that the two types of gypsum be differentiated; the ACAA reported 2013 sales of flue gas desulfurization gypsum to the cement industry of 0.98 Mt.

Fuel consumption by the U.S. cement industry is shown in table 7. As with nonfuel raw materials, data shifts can reflect activities at just a few plants. A significant decline was apparent in 2013 in the use of fuel oil and liquid waste fuels (commonly including used and under-specification fuel oils) and natural gas, which may reflect the closure during the year of a number of

wet kilns, price-related shifts among fuels, and, to some degree, more continuous operation of kilns (as possibly evidenced by the overall higher capacity utilization noted above); liquid fuels and natural gas are commonly used for the warmup phase of kiln restarts.

Although not shown in table 7, overall unit heat consumption (gross heat basis) in 2013 was about 4.1 billion joules per metric ton (GJ/t) of clinker, essentially unchanged from 2012. Wet kiln plants averaged 7.0 GJ/t of clinker, up by about 3%, and dry kiln plants averaged about 3.9 GJ/t of clinker, unchanged from 2012. Overall, coal continued to supply the largest share of total heat consumed (57%, up from 56%), followed by petroleum coke (18%, up from 17%), waste fuels (about 16%, up from about 15%), and natural gas (9%, down from 12%).

Average unit consumption of electricity in 2013 is shown in table 8. Unit consumption increased significantly for the remaining operational wet kilns but decreased modestly for dry plants and for the industry overall. The overall improvement in part reflects the higher grinding capacity and clinker capacity utilization rates noted earlier (tables 3, 5).

Industry Structure Changes

No U.S. cement production facilities changed ownership in 2013. This was in contrast to 2012 when Eagle Materials, Inc. purchased two cement plants (Sugar Creek, MO, and Tulsa, OK) from Lafarge and, toward yearend 2012, Essroc Cement Corp. transferred its Essexville, MI, grinding plant to Lafarge as part of an asset swap (largely of terminals). As a result of this transfer, Essexville ceased being a grinding plant and was used in 2013 as a terminal only; the plant count in table 3 for Michigan for 2013 reflects this functional change. No new plants were opened in 2013, and none closed. The number of operational wet kilns in the country continued to decline. At its Rapid City, SD, plant, GCC Dacotah, Inc. wrote off (closed) the facility's two wet kilns at the end of the third quarter, keeping operational only the plant's precalciner dry kiln. At Midlothian, TX, Ash Grove shut one of the facility's three wet kilns at the end of April and was constructing a new, semidry kiln that, when brought online in mid-2014, is intended to replace all three wet kilns. Lafarge continued with plans to replace the two wet kilns at its plant at Ravena, NY, with a new precalciner dry kiln but, owing to weak cement sales, in July 2013 was granted an extension by the EPA, to mid-2016, for the project to be completed. Upgrades were also underway at various dry plants. Having brought online a new precalciner kiln in late 2012 at the Hunter, TX, plant, TXI commenced a project in March 2013 to upgrade the facility's older precalciner kiln. The upgrade was expected to be completed in early 2014. In May, Capitol Aggregates, Inc. completed an upgrade to the kiln line's preheater at its San Antonio, TX, plant.

Consumption

Data on cement consumption are for sales to final domestic customers and in this report are derived from both the USGS annual canvass (tables 1, 11, 12, and 14) and monthly surveys (table 9). Despite close agreement in the national totals between the annual and monthly data, only table 9 regional breakout

tonnages represent State-level consumption. The regional breakouts in tables 11, 12, and 14 pertain to the locations of the reporting entities (chiefly the production sites), not the locations of consumption; it is very common for shipments to cross State lines. In both datasets, the sales include domestically produced cement (made from domestic and imported clinker) as well as imported cement.

Sales of portland cement for the first half of 2013 were essentially unchanged from those in 2012 and represented a levelling off of a fairly steady monthly growth trend that had begun in March 2010. However, in the second half of 2013, monthly sales increased significantly, including exceptionally large increases in July (up by 10.6%) and September (up by 14.4%), and only one decline (November, down by 1.0%). For the year overall, sales increased by 4.0% to 79.7 Mt (table 9). The top five consuming States in 2013, in descending order, were Texas, California, Florida, Ohio, and Pennsylvania. Consumption in Texas, which had been comparatively strong throughout the recession, was up by a relatively modest 5.0% in 2013, whereas California's consumption was up by 8.9%, and that in Florida increased by 22.3%. Despite the overall increase in portland cement sales in 2013 noted above, sales for the year remained well below the record 122.4 Mt sold in 2005. Likewise, although per capita consumption of portland cement, at 252 kilograms (kg), was somewhat higher than the 244 kg in 2012, it remained much lower than the 413-kg record in 2005.

Masonry cement sales increased in all months in 2013 except for February and March, and increased by 9.2% for the year overall to 2.1 Mt. Although the increases reflected a significant increase in residential construction, the masonry cement sales in 2013 were only about 39% of the record sales levels in 2005.

As noted earlier, a few importers do not participate in the USGS annual cement canvass, and their sales to final customers are missing from the data in this report. An estimate of the missing sales volumes would include essentially all the gray cement imports into the Philadelphia customs district and some of the white cement imports into various districts. Overall, it is estimated that the missing sales totaled only about 0.3 Mt (0.4%) of total sales in both 2012 and 2013. However, the sales data in this report capture a significant tonnage of imported cement that is absent from the official trade data (see "Foreign Trade" section).

Table 10 lists sales of portland cement by mode of transportation. Although the data in this table are rounded in line with uncertainties in the reported tonnages (particularly for flows from plants to terminals), it remains evident that the dominant transportation method for sales to final customers continued to be by truck. Deliveries, especially waterborne, from plants to terminals appear to have fallen significantly but likely reflect greater reliance by some terminals on imported cement rather than domestic sourcing. The data also show the continued dominance of bulk portland cement sales in the U.S. market.

Time lags are common between the onset or cutoff of construction spending and the actual consumption of cement (within concrete), and some types of construction require proportionately more concrete (are more cement-intensive) than others; correlation between spending trends and cement

consumption would be expected to be better for the more cement-intensive forms of construction. The Portland Cement Association converts U.S. Census Bureau data on construction spending from current dollars to 2009 constant dollars, believing the constant dollar data to provide a more reliable basis for cement consumption analysis. In terms of 2009 constant dollars, overall construction spending increased by just 1.9% in 2013 to \$840.5 billion (Portland Cement Association, 2015). As in 2012, residential construction accounted for the largest share of the total spending in 2013, at \$314 billion, up by 12%. Single-family housing, which is only moderately cement-intensive, accounted for \$160 billion of the residential total, up by 21%; multifamily housing, which is more cement-intensive, totaled about \$30 billion, up by almost 37%. Public sector construction spending, which was the largest category for 2009 through 2011, but which had been falling for several years, was just \$212.5 billion in 2013, down by 6.4%. Public sector construction tends to be very cement-intensive and the spending decline in this sector partly offset the nearly 4% gain, to about \$175 billion, in the cement-intensive nonresidential buildings sector; this offset, along with cement price increases (see below), was reflected in the modest 4% gain in portland cement consumption for 2013 noted above. The relative strength in single-family housing construction, in contrast, was reflected in the larger (9.3%) increase in masonry cement consumption. Overall, again in constant 2009 dollar terms, the total cement intensity in 2013 was about 97 t of cement consumed per \$1 million of construction spending compared with about 95 t in 2012.

Table 14 lists regional sales of portland cement by type of customer. Ready-mixed concrete producers, as listed, accounted for 71% of total shipments, but the true percentage to this type of customer was larger (probably about 75%) because some sales were instead registered to other customer categories, especially airport and road paving contractors, that also make use of ready-mixed concrete. The ready-mixed customer category (as listed) was up by 5.2%. Sales to concrete product manufacturers increased by 8.8%, and within this category, sales to brick and block makers were up by 3.5%, sales to precast and prestressed slab makers were up by 3.4%, and those to pipe manufacturers were up by 4.6%; these increases may be understated because the subcategory “other or unspecified” rose by 24.4%. Sales to building material dealers increased by 3.8%. These shifts were broadly in line with those for residential and nonresidential building construction spending noted above. Sales to contractors fell by 13.7%, including a 17.4% decline in sales to road paving companies and a 9.5% decline to soil cement companies; these declines are in line with the reduced public sector construction spending noted above.

Sales to the smaller categories of customers may be underrepresented because some respondents seem to report only broad categories. As listed in table 14, sales into the mining sector increased by 26%, but the data represent reporting by relatively few respondents. Sales of cement for oil (and gas) well drilling increased by 4.5%, despite a reported 8.2% decline in the average weekly drill rig count (Baker Hughes Inc., 2014). Much of the decline in the drill count was for gas wells (down by 31%) and reflected lower natural gas prices during the year.

The breakout of portland cement sales, by type, is given in table 15. Sales in 2013 continued to be dominated by Types I and II cements and sulfate-resistant varieties of cement (Type V and Type II/V hybrids reported as Type V); these also included equivalent cements sold under the specifications of ASTM C1157. Assignment between “General use and moderate heat” cements and “Sulfate resisting” categories is somewhat artificial because some hybrid cements are listed as meeting the standards for both Type II (or I/II) and Type V (such as II/V) cements; these are supposed to be included under the more restrictive category “Sulfate resisting” cements but may not always be so reported. As listed, “Type V” sales increased by 7.8%, mostly because of higher sales in Arizona and California (table 9). Sales of oil well cements increased by 21% to 2.4 Mt; this was a significantly higher shift, but a 0.7-Mt lower tonnage, than that noted above for sales to oil and gas well drillers. Both factors may imply an increase in the proportion of deep wells requiring specialized oil well cements; shallower wells can make use of ordinary grades of portland cement.

Sales of blended cements continued to decline overall, although the slight decrease was modest compared with the 4% decrease in 2012 and an 11% decline in 2011. Most of the decline was in blends containing GGBFS and likely reflected reduced availability of this SCM. Monthly sales data (wherein blended cements are reported separately from portland cements) showed a 2.5% decline in domestic blended cement sales to 1.29 Mt; although the overall 2013 tonnage was very close to that in table 15, the larger relative decrease may reflect different reporting personnel and the choice of reporting category (portland versus blended) for sales of portland cement containing ground limestone as the extender or of ASTM C1157 cements in general. The ASTM C1157 standard at one time was confined solely to blended cements but is now a performance standard for hydraulic cements in general. In 2013, the ASTM C595 standard was revised to include two additional types of blended cement (ASTM International, 2013). The first is a new binary blend, Type IL (portland-limestone cement), which allows for incorporation of ground limestone in amounts greater than 5% (by weight) but no more than 15%. The second, Type IT (ternary blended cement), represents the standard’s first departure from binary blends; it allows for the incorporation of any two of GGBFS, pozzolan(s), or ground limestone and provides for mass limits on these additions (limestone not to exceed 15%). The revised ASTM C595 standard also allows for a significantly higher GGBFS fraction (up to 95%, up from 70%) in the existing Type IS, portland blast furnace slag cement. The introduction of Type IL followed the successful introduction of similar limestone-containing blends in Canada a few years earlier and the allowance of up to a 5% limestone addition into Type-I portland cement (per ASTM C150) even earlier, and brings ASTM C595 closer in line to the performance standard ASTM C1157, which allows for limestone addition in excess of 5%. Type IT effectively recognizes that performance improvements can be obtained by incorporating more than one material addition. Although the earlier allowance of limestone addition in ASTM C150 Type-I and in ASTM C1157 cements had yet to result in a major increase in overall limestone addition to portland cements, the new Type IL and IT standards

were likely to increase the acceptance of limestone addition in a variety of concrete applications.

Prices

Price data (as mill net values) are listed by district in tables 11 and 12; however, table 9 gives a better indication of individual State-level consumption tonnages. Mill net values represent ex-factory average values for all varieties of cement sold, include bagging and palletizing charges for cements sold in bags or packages [a small fraction of total portland sales (table 10) but a large fraction of masonry cement sales], and except for independently reporting terminals, exclude charges for onward transportation to terminals from where, in fact, much of the cement was sold. Accordingly, mill net values are better viewed as price indexes rather than “shopping prices” for cement. They serve mainly to show general regional variations and trends over time, and small unit price differences are of little statistical significance.

All districts except for Arizona and New Mexico reported unit mill net value increases for portland cement in 2013, with the overall average price (rounded) increasing by \$5 per metric ton (tables 11, 13). Price changes commonly lag changes in sales volumes because of the common existence of long-term pricing contracts; increased sales volumes in 2012 resulted in no significant change to the U.S. average price in that year. The price increases in 2013 reflected continued higher volumes and contract renegotiations but had yet to regain the \$97.50 per ton average in 2009 or the \$102.50 per ton record in 2007. The prices for portland cement reflect a strong dominance of bulk (as opposed to higher priced bag or package) sales (table 10). Although table 11 does not distinguish between gray and white portland cement, white portland cement commands a much higher average price than does gray portland (table 13) but has only a minor effect on the overall average because white cement is sold in comparatively small amounts (table 15). Masonry cement prices averaged \$8.50 per metric ton (rounded) higher in 2013, but the average is sensitive to even small shifts in the proportion of bulk sales; most masonry cement is sold in bag or packaged form.

Foreign Trade

Trade data from the U.S. Census Bureau are listed in tables 16 through 21. After increasing by 24% to a record 1.75 Mt in 2012, exports in 2013 fell modestly to 1.67 Mt (table 16). Cement exports remained a very small part of the total cement economy (table 9) and continued to be small compared with cement imports. The main destination of U.S. cement exports continued to be Canada, which took 67% of the total in 2013.

Overall imports of cement and clinker increased by about 3% to about 7.1 Mt (tables 1, 17), although the data for both years remained incomplete. As listed, the 2013 total remained far below the record 35.6 Mt imported in 2006. About 76% of the imports were of gray portland cement (table 19). The largest import sources were, in decreasing order of tonnage, Canada, the Republic of Korea, Greece, China, Mexico, Taiwan, and Italy, which, combined, accounted for 95% of the total. Large increases in imports from China (up by 37%), Greece (12.6%),

Italy (essentially none in 2012), and Taiwan (up almost sixfold) offset a 2.5% decrease in imports from Canada and a 2.8% decline in imports from the Republic of Korea.

Imports from Mexico showed a small (2.6%) increase, but the data for imports from Mexico were incomplete for both years, and the deficit concerned imports entering the El Paso, TX, customs district (table 18). The missing material, estimated at about 0.2 Mt in both 2012 and 2013, was cement coming in by truck where each truckload had a customs value of less than \$2,000; such shipments are considered to be “informal entries” by the U.S. Customs Service and the data on these entries are not sent to the U.S. Census Bureau under the cement tariff code. However, because the importer is a respondent to the USGS cement canvasses, the missing imports are included in the sales data in this report (for example, tables 9, 11). It was unclear if any imports of cement from Canada were being similarly omitted from the import data.

White cement imports are listed in table 20. In many past years, and based on unexpectedly low unit values, the data appeared to have included some gray cement or clinker; the apparent errors likely were because of the use of the wrong tariff code by importers. However, the only low unit valuations evident in 2012 and 2013 are the 2012 material from Spain, which was actually miscoded white cement clinker, and the 2013 material from Turkey, which, at about \$45 per ton, was likely to be miscoded gray clinker. Overall imports of white cement did not change much, but for both years, the imports plus U.S. production significantly exceeded the sales indicated in table 15. The apparent excess was qualitatively explained by the use of white cement in some finished gray and colored portland cement products being reported as gray portland cement sales and in some masonry cements (not included in table 15).

If the miscoded white clinker imports from Spain for 2012 noted for table 20 are reassigned to the data for clinker imports, it is evident that overall imports of clinker did not change significantly in 2013 (table 21). Table 21 includes significant aluminous cement clinker imports from France into the Norfolk, VA, customs district. The data for clinker imports from Canada are incomplete because of sub-\$2,000 truckloads that, as with cement from Mexico noted previously, were being registered as “informal entries.” The deficits were estimated to be 0.1 Mt in 2012 and 0.2 Mt in 2013.

For cement and clinker combined, the 10 busiest customs districts of entry in 2013 were, in descending order of tonnage, Houston-Galveston, TX; Seattle, WA; Detroit, MI; Columbia-Snake, ID, OR, and WA; Cleveland, OH; Buffalo, NY; New York City, NY; Honolulu, HI; Pembina, ND; and Ogdensburg, NY (table 18). These leading districts accounted for about 84% of the total imports for the year.

World Review

The production of hydraulic cement, by country, is given in table 22. For most countries, the data include all forms of hydraulic cement; however, the data for the United States are for portland and masonry cement only, and data for some other countries may be incomplete. For some countries, the production data may include exports of clinker.

Total world production of cement in 2013 increased by 6.5% to a new record of nearly 4.1 Gt. This represented the first time in history that annual output has exceeded 4 Gt and was all the more remarkable given that the 3-Gt threshold was reached (and exceeded) just 4 years earlier (2009). China, with an output of 2.4 Gt (up by 9.3%), continued to be the world's leading producer by far and exceeded the second largest producer (India) by about 8.5-fold. The remaining top 20 producers in 2013 were, in descending order, the United States, Iran, Turkey, Brazil, Russia, Vietnam, Japan, Saudi Arabia, Indonesia, Egypt, the Republic of Korea, Thailand, Mexico, Germany, Pakistan, Italy, Malaysia, and the United Arab Emirates. Although cement was produced in more than 150 countries, cumulatively, the top 5 countries accounted for nearly 72% of total world output; the top 10 countries, about 79%; and the top 20 countries, about 88%.

In broad regional terms, cement production in Asia and the Pacific was 75.8% of the 2013 world total; the region included 9 of the 20 leading producing countries and continued to have the highest growth rate of all regions. Within the region, China's production in 2013 itself accounted for 59% of the world total output for the year and was 3% higher than the total world output (including that of China) in 2005. Relative to the United States, China's cement production in 2013 was equivalent to about 58% of the total U.S. production for 1900 through 1999, and China's production for 2011 through 2013 was 25% higher than the entire U.S. output for 1900 through 2013. Similar superlatives apply to China's cement consumption levels.

The Middle East (including Turkey) was the next ranked producing region, with 6.7% of the 2013 total, and was followed by Africa, at 4.0%; Central and South America (including the Caribbean), 3.6%; Western Europe, 3.2%; North America (including Mexico), 3.0%; the Commonwealth of Independent States, 2.6%; and Eastern Europe, 1.0%.

Outlook

Growth in portland cement sales volumes for the second half of 2013 was nearly 8%, and this led to expectations for a similar rate of growth for 2014. Anticipated strong corporate profits were expected to lead to improved levels of nonresidential private sector construction in 2014, but funding was not expected to improve significantly for public sector construction, and lackluster housing starts toward yearend 2013 led to some concerns about the single-family housing construction sector in 2014. The long-term prognosis was for eventual returns to significantly higher cement consumption levels, perhaps approaching those of the 2005–06 record years. Given that several domestic plants have closed, that many of the remaining long-idle kilns at the existing cement plants were energy-inefficient and might be difficult to restart, and the difficulty of securing environmental permits for plant upgrades and, especially, for new plants, it was unclear to what degree domestic production capacity could service a return to high levels of consumption. It seemed likely that imports would be called upon to supply a growing share of the U.S. cement market in the future.

Revised cement standards, to allow for more use of SCMs and ground limestone in finished cement, were expected to allow

cement plants to boost their overall sales of cement without needing to increase their clinker production capacities, and thus allow for a lowering of unit emissions per ton of product. There was a concern that the trend of electric power utilities switching away from coal to natural gas, if long term, could lead to shortages of fly ash and bottom ash. Both ash types are significant raw materials for clinker production at a number of plants, and fly ash is an important SCM, especially for the concrete industry. The availability of domestic and imported GGBFS was expected to remain stagnant at best, and it was uncertain if sufficient other SCMs would be able to offset the anticipated fly ash shortage. Thus, other than by means of limestone addition, it was unclear to what degree U.S. cement plants will, in fact, be able to lower the clinker component of their cement output.

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TABLE 1
 SALIENT CEMENT STATISTICS FOR THE UNITED STATES^{1,2}

(Thousand metric tons unless otherwise specified)

	2009	2010	2011	2012	2013
Production:					
Cement ³	63,907	66,447	67,895	74,151	76,804
Clinker	56,116	59,802	61,241	67,173	69,420
Shipments from mills and terminals: ^{3,4,5}					
Quantity	71,000	70,300	72,100	78,300	81,700
Value ⁶ thousand dollars	7,020,000	6,490,000	6,440,000	7,020,000	7,760,000
Average value ⁶ dollars per metric ton	99.00	92.00	89.50	89.50	95.00
Stocks, yearend:					
Cement	6,080	6,180	6,270	6,900 ^r	6,570
Clinker	5,130	4,760	4,620	4,870 ^r	5,090
Exports	884	1,178	1,414	1,749	1,670
Imports: ⁷					
Cement	6,211	6,013	5,812	6,107	6,289
Clinker	556	613	606	786	806
Total ⁸	6,767	6,626	6,418	6,893	7,095
Consumption, apparent ⁹	71,510	71,180	72,200	77,880	81,750
World production ^{6,10}	3,050,000 ^r	3,290,000	3,650,000	3,820,000 ^r	4,070,000

^rEstimated. ^rRevised.

¹Unless otherwise indicated, data are for portland (including blended) and masonry cements only. Even where presented unrounded, data are thought to be accurate to no more than three significant digits.

²Excludes Puerto Rico.

³Includes cement made from imported clinker. Includes a double-counted component (less than 0.5% per year) of portland cement subsequently converted at the plants to masonry cement; because of the involvement of stockpiles, the precise amount converted from actual production cannot be determined.

⁴Includes imported cement.

⁵Shipments to final domestic customers. Data are from an annual survey of plants and terminals and may differ from the totals in table 9, which are based on consolidated monthly surveys from companies.

⁶Free on board mill or independently reporting terminal.

⁷All forms of hydraulic cement or clinker.

⁸May not add to totals shown because of independent rounding.

⁹Production (including that from imported clinker) of cement plus imports of hydraulic cement minus exports of hydraulic cement minus the change in yearend cement stocks.

¹⁰Total hydraulic cement. May include clinker exports for some countries.

TABLE 2
COUNTY BASIS OF SUBDIVISION OF STATES IN CEMENT TABLES

State subdivision	Defining counties
California, northern	Alpine, Fresno, Kings, Madera, Mariposa, Monterey, Tulare, Tuolumne, and all counties farther north.
California, southern	Inyo, Kern, Mono, San Luis Obispo, and all counties farther south.
Illinois, excluding Chicago	All counties other than those in metropolitan Chicago.
Illinois, metropolitan Chicago	Cook, DuPage, Kane, Kendall, Lake, McHenry, and Will Counties in Illinois.
New York, eastern	Delaware, Franklin, Hamilton, Herkimer, Otsego, and all counties farther east and south, except those within metropolitan New York.
New York, western	Broome, Chenango, Lewis, Madison, Oneida, St. Lawrence, and all counties farther west.
New York, metropolitan	New York City (Bronx, Kings, New York, Queens, and Richmond), Nassau, Rockland, Suffolk, and Westchester.
Pennsylvania, eastern	Adams, Cumberland, Juniata, Lycoming, Mifflin, Perry, Tioga, Union, and all counties farther east.
Pennsylvania, western	Centre, Clinton, Franklin, Huntingdon, Potter, and all counties farther west.
Texas, northern	Angelina, Bell, Concho, Crane, Culberson, El Paso, Falls, Houston, Hudspeth, Irion, Lampasas, Leon, Limestone, McCulloch, Reagan, Reeves, Sabine, San Augustine, San Saba, Tom Green, Trinity, Upton, Ward, and all counties farther north.
Texas, southern	Brazos, Burnet, Crockett, Jasper, Jeff Davis, Llano, Madison, Mason, Menard, Milam, Newton, Pecos, Polk, Robertson, San Jacinto, Schleicher, Tyler, Walker, Williamson, and all counties farther south.

TABLE 3
PORTLAND AND BLENDED CEMENT PRODUCTION, CAPACITY, AND STOCKS IN THE UNITED STATES, BY DISTRICT¹

(Thousand metric tons unless otherwise specified)

District ²	2012						2013					
	Number of plants	Production ³	Grinding capacity ⁴	Percentage utilized ⁵	Yearend stocks ⁶	Number of plants	Production ³	Grinding capacity ⁴	Percentage utilized ⁵	Yearend stocks ⁶		
Maine and New York	4	2,004	3,604	55.6	224	4	1,719	3,604	47.7	200		
Pennsylvania	8	3,360	6,010	55.9	328	8	3,619	6,079	59.5	271 ⁷		
Illinois	3	1,149	2,755	41.7	283	3	1,104	2,532	43.6	194		
Indiana	4	2,393	3,745	63.9	208	4	2,284	3,745	61.0	210		
Michigan	4	3,891	5,515	70.5	527	3	3,855	5,224	73.8	581		
Ohio	2	797	1,188	67.1	47	2	829	1,207	68.7	49		
Iowa, Nebraska, South Dakota	5	3,140	5,824	53.9	407	5	3,176	5,932	53.6	416		
Kansas	3	1,732	3,348	51.7	236	2	1,776	3,172	56.0	213		
Missouri	5	7,951	10,929	72.8	510 ⁷	5	8,223	10,929	75.2	537 ⁷		
Florida	8	3,786 ⁸	10,000 ⁷	37.8 ⁷	264	8	4,680	9,620 ⁷	48.6 ⁷	279		
Georgia, Maryland, Virginia, West Virginia	6	5,280	8,216	64.3	413 ⁷	6	5,417	7,360 ⁷	73.6 ⁷	362		
South Carolina	3	2,766	5,085	54.4	133	3	2,776	5,085	54.6	142		
Alabama, Kentucky, Tennessee	8	5,669	10,141	55.9	613	8	5,760	10,141	56.8	582		
Arkansas and Oklahoma	4	2,057	3,655	56.3	179	4	2,044	3,729	54.8	181		
Texas, northern	6	4,527	7,583	59.7	250	6	4,453	7,674	58.0	266		
Texas, southern	6	5,472	6,529	83.8	261	6	5,662	7,708	73.5	277		
Arizona and New Mexico	4	1,540	3,715	41.4	112	4	1,784	3,715	48.0	120		
Colorado and Wyoming	4	2,875	4,517	63.6	191	4	2,897	4,889	59.3	228		
Idaho, Montana, Nevada, Utah	6	2,439	3,729	65.4	228	5	2,099	3,250	64.6	208		
Alaska and Hawaii	--	--	--	--	72	--	--	--	--	68		
California	9	8,402	11,989	70.1	477	9	9,264	12,080	76.7	402		
Oregon and Washington	4	993	2,399	41.4	238	4	1,266	2,399	52.8	201 ⁷		
Importers ⁹	--	--	--	--	285 ⁷	--	--	--	--	185 ⁷		
Total ¹⁰	106	72,222	120,000 ⁷	59.9 ⁷	6,400 ⁷	103	74,689	120,000 ⁷	62.2 ⁷	6,170 ⁷		
Puerto Rico	2	783	1,780	44.0	29 ⁷	2	610	1,780	34.2	54 ⁷		
Grand total ¹⁰	108	73,005	122,000 ⁷	59.7 ⁷	6,430 ⁷	105	75,298	122,000 ⁷	61.8 ⁷	6,230 ⁷		

¹Revised. -- Zero.

²Even where presented unrounded, data are thought to be accurate to no more than three significant digits. Includes data for white cement. Includes cement made from imported clinker.

³District assignment is the location of the reporting facilities. Specific districts include importers where district assignments were possible.

⁴Data include a small amount of portland cement subsequently consumed at the plant to make masonry cement; the amount thus double-counted cannot be determined precisely because of the involvement of cement stockpiles, but is less than 0.5% of the grand totals listed.

⁵Based on fineness needed to produce a plant's normal output mix, including masonry cement, and allowing for downtime for routine maintenance.

⁶Calculated relative to portland cement output; utilization would be higher if calculated to include output of masonry cement.

⁷Includes imported cement and stocks of domestic and imported cement at mills, and terminals, and in transit.

⁸Includes estimates for nonrespondents or facilities that provided incomplete information.

⁹Adjusted to avoid double-counting of portland cement supplied by one plant to another for the sole purpose of conversion to blended or masonry cement.

¹⁰Includes only those importers or terminals for which district assignments were not possible.

¹¹May not add to totals shown because of independent rounding.

TABLE 4
MASONRY CEMENT PRODUCTION AND STOCKS IN THE UNITED STATES, BY DISTRICT¹

(Thousand metric tons unless otherwise specified)

District ²	2012			2013		
	Number of active plants	Production ³	Yearend stocks ⁴	Number of active plants	Production ³	Yearend stocks ⁴
Maine and New York	4	45	18	4	26	14
Pennsylvania	7	147	41	7	143	38
Indiana and Ohio	6	287	49	6	274	49
Michigan	3	73	25	3	61	22
Iowa, Nebraska, South Dakota	--	W	W	1	W	W
Kansas	2	W	W	2	W	W
Missouri	1	W	W	1	W	W
Florida	6	225	42	6	342	57
Georgia, Maryland, Virginia, West Virginia	5	215	46 ⁵	5	223	36
South Carolina	3	158	16	3	155	15
Alabama, Kentucky, Tennessee	7	227	77	7	287	59
Arkansas and Oklahoma	4	90	14	4	98	17
Texas	7	215	20	7	238	17
Arizona and New Mexico	3	46	4	3	48	6
Colorado and Wyoming	1	W	W	1	W	W
Idaho, Montana, Nevada, Utah	1	W	W	1	W	W
California	6	152	26	6	178	32
Importers ⁶	--	--	2 ⁵	--	--	2 ⁵
Total ⁷	66	1,929	411 ⁵	67	2,116	393 ⁵
Puerto Rico	1	(8)	--	1	(8)	--
Grand total ⁷	67	1,929	411 ⁵	68	2,116	393 ⁵

W Withheld to avoid disclosing company proprietary data; included in "Total." -- Zero.

¹Includes masonry, portland-lime, plastic, and stucco cements. Even where presented unrounded, data are thought to be accurate to no more than three significant digits.

²District assignment is the location of the reporting facilities. Specific districts include importers where district assignments were possible.

³Includes cement produced from imported clinker.

⁴Includes imported cement.

⁵Includes estimates for nonrespondents or facilities that provided incomplete information.

⁶Includes only those importers or terminals for which district assignments were not possible.

⁷May not add to totals shown because of independent rounding.

⁸Less than ½ unit.

TABLE 5
CLINKER CAPACITY AND PRODUCTION IN THE UNITED STATES IN 2013, BY DISTRICT¹

District	Number of active plants ²			Number of kilns ⁴	Daily capacity ^{4,5} (thousand metric tons)	Average days of routine maintenance ⁶	Apparent annual capacity ^{4,7} (thousand metric tons)	Production (thousand metric tons)	Percentage of capacity utilized	Yearend stocks (thousand metric tons)
	Process used		Total							
	Dry	Wet	Both ³							
Maine and New York	2	1	--	4	9.6	23.8 ⁸	3,280 ⁸	1,633	49.8 ⁸	217 ⁸
Pennsylvania	5	2	--	11	16.9	27.3 ⁸	5,630 ⁸	3,450	61.3 ⁸	345
Illinois	3	--	--	3	7.7	12.5 ⁸	2,660 ⁸	1,072	40.3 ⁸	173
Indiana	3 ⁹	1	--	4	9.9	23.2	3,407	2,262	66.4	176
Michigan	2	--	--	2	11.2	32.8 ⁸	3,670 ⁸	2,894	79.0 ⁸	309 ⁸
Ohio	1	1	--	3	3.3	17.3 ⁸	1,140 ⁸	818	71.9 ⁸	114
Iowa, Nebraska, South Dakota	4	--	1	5	14.0	15.1 ⁸	4,830 ^{8,10}	2,778	57.5 ⁸	153
Kansas	2	--	--	3	7.3	36.3	2,449	1,640	66.9	72
Missouri	5	--	--	5	29.6	37.0	9,360	7,794	83.3	415
Florida	7	--	--	10	25.7	20.6 ⁸	8,820 ⁸	4,437	50.3 ⁸	321
Georgia, Maryland, Virginia, West Virginia	5	--	--	5	19.4	31.0 ⁸	6,470 ⁸	5,110	79.0 ⁸	251
South Carolina	3	--	--	3	12.2	29.9 ⁸	4,070 ⁸	2,580	63.4 ⁸	154
Alabama, Kentucky, Tennessee	8	--	--	8	26.6	25.5 ⁸	9,050 ⁸	5,637	62.3 ⁸	450
Arkansas and Oklahoma	3	1	--	4	9.8	19.5	3,363	2,077	61.7	175
Texas, northern	4	2	--	6	19.1 ⁸	11.1	6,690 ⁸	4,271	63.8 ⁸	257
Texas, southern	5	--	--	7	19.6	21.6 ⁸	6,740 ⁸	5,173	76.7 ⁸	239
Arizona and New Mexico	4	--	--	4	10.4	17.8	3,560	1,573	44.2	116
Colorado and Wyoming	4	--	--	4	11.8	18.3	4,055	2,591	63.9	97
Idaho, Montana, Nevada, Oregon, Utah, Washington	5	2	--	7	12.6	29.9	4,222	3,070	72.7	338
California	8	--	--	9	34.8	26.6 ⁸	11,800 ⁸	8,563	72.4 ⁸	713
Total ¹¹	83 ⁹	10	1	94	311.4 ⁸	22.8 ⁸	105,000 ⁸	69,420	65.9 ⁸	5,060 ⁸
Puerto Rico	2	--	--	2	5.0	40.0	1,650	481	29.1	58
Grand total ¹¹	85 ⁹	10	1	96	318.4 ⁸	23.0 ⁸	107,000 ⁸	69,900	65.4 ⁸	5,120 ⁸

-- Zero.

¹Even where presented unrounded, data are thought to be accurate to no more than three significant digits.

²Includes white cement plants and all plants (gray or white) that produced clinker for at least 1 day during the year.

³Plants that can operate both wet and dry kilns, whether or not both types were active during the year.

⁴Includes kilns active for at least 1 day during the year. For kilns idle all year, excludes those that cannot be restarted, fully permitted, in less than 6 months.

⁵Sum of reported kiln capacities for all plants in a district.

⁶Total days of routine maintenance (summed for all kilns) divided by the number of kilns.

⁷Sum of apparent annual capacities for all kilns. For each kiln, the statistic is calculated as 366 days (leap year) minus days reported for routine maintenance and then multiplied by the unrounded daily capacity.

⁸Contains estimates for some facilities and have been rounded to no more than three significant digits.

⁹Includes one semiwet kiln.

¹⁰Significantly unchanged from 2012, which should have read 4,880 instead of the 3,830 listed in the 2012 edition of table 5. The U.S. annual capacity total and district capacity utilization percentage for 2012, however, were correct as listed.

¹¹May not add to totals shown because of independent rounding.

TABLE 6
RAW MATERIALS USED TO PRODUCE CLINKER AND CEMENT IN THE UNITED STATES^{1,2}

(Thousand metric tons)

Material	2012		2013	
	Clinker	Cement ³	Clinker	Cement ³
Calcareous:				
Limestone (aragonite, chalk, coral, marble)	86,800	1,720	90,530	1,930
Cement rock (includes marl)	8,310	12	9,410	23
Cement kiln dust (CKD) ⁴	10	137	50	136
Lime ⁴	40	53	73	38
Other	80	9	75	4
Aluminous:				
Clay	3,310	--	3,260	--
Shale and schist	2,330	50	2,130	39
Other ⁵	418	--	545	--
Ferrous:				
Iron ore	608	--	671	--
Mill scale	713	--	656	--
Other ⁶	25	--	84	--
Siliceous:				
Sand, calcium silicates	3,170	--	3,100	--
Sandstone, quartzite, soils, nonpozzolanic rocks	563	--	738	--
Fly ash	2,410	137	2,580	135
Other ash, including bottom ash	1,230	--	1,050	--
Granulated blast furnace slag ⁷	8	224	--	237
Other blast furnace slag	85	--	35	--
Steel slag	444	--	390	--
Other slag	84	--	199	--
Natural rock pozzolans ⁸	--	40	--	52
Other pozzolans ⁹	5	2	1	3
Other:				
Gypsum and anhydrite	(10)	3,920	(10)	4,020
Miscellaneous ¹¹	76	39	38	27
Total ¹²	111,000	6,340	116,000	6,640
Clinker, imported, raw materials equivalent ¹³	--	1,390	--	1,260
Grand total ¹²	111,000	7,730	116,000	7,890

-- Zero.

¹Excludes Puerto Rico.

²Data have been rounded to no more than three significant digits.

³Includes portland, blended, and masonry cements.

⁴Data are probably underreported.

⁵Includes alumina, aluminum dross, bauxite, spent catalysts, and other aluminous materials.

⁶Includes iron sludges, pyrite, and other ferrous materials.

⁷Includes both ground and unground material.

⁸Includes pozzolana and burned clays or shales (except where directly reported as clay or shale).

⁹Includes diatomite, silica fume, other microcrystalline silica, and other pozzolans, even if not used as such.

¹⁰Included with Calcareous: Other.

¹¹Includes fluorspar and all other materials not listed earlier.

¹²May not add to totals shown because of independent rounding.

¹³Converted as 1.7 times the weight of foreign clinker consumed.

TABLE 7
CLINKER PRODUCED AND FUEL CONSUMED BY THE U.S. CEMENT INDUSTRY, BY KILN PROCESS¹

Kiln process	Number of plants	Production ²		Conventional fuels ³				Waste fuels ³		
		Quantity (thousand metric tons)	Percentage of total	Coal ⁴ (thousand metric tons)	Petcoke (thousand metric tons)	Oil ⁵ (thousand liters)	Natural gas ⁶ (thousand cubic meters)	Tires (thousand metric tons)	Solid (thousand metric tons)	Liquid (thousand liters)
2012:										
Wet	11	3,848	5.7	503	110	5,120	59,000	64	7	181,000
Dry ^{7,8}	83	63,326	94.3	5,250	1,290	36,800	834,000	336	880	1,024,000
Both ^{8,9}	1	W	W	W	W	W	W	W	W	W
Total ¹⁰	95	67,173	100.0	5,750	1,400	41,900	893,000	400	887	1,210,000
2013										
Wet	10	3,293	4.7	450	108	1,430	65,600	50	7	158,000
Dry ^{7,8}	83	66,126	95.3	5,590	1,450	14,300	629,000	349	1,100	647,000
Both ^{8,9}	1	W	W	W	W	W	W	W	W	W
Total ¹⁰	94	69,420	100.0	6,030	1,560	15,700	694,000	399	1,110	805,000

W Withheld to avoid disclosing company proprietary data.

¹Excludes Puerto Rico.

²Data are all reported. Although unrounded, data are thought to be accurate to no more than three significant digits.

³With the exception of natural gas (for better summation), all fuel data have been rounded to no more than three significant digits.

⁴All reported to be bituminous.

⁵Distillate and residual fuel oils. Excludes used oils that were reported under liquid wastes.

⁶Includes landfill gas and propane.

⁷Includes one semiwet plant.

⁸Data for the category "Both" have been included in those for "Dry" plants to protect company proprietary information.

⁹Plants that can operate both wet and dry kilns, whether or not both types were active during the year. Includes plants that converted from wet to dry technology during the year.

¹⁰May not add to totals shown because of independent rounding.

TABLE 8
ELECTRICITY CONSUMED BY U.S. CEMENT PLANTS, BY PLANT PROCESS¹

Plant process	Electricity consumed ²										Cement produced ⁴ (thousand metric tons)	Average consumption (kilowatthours per ton of cement produced)	
	Generated					Purchased							Total ³ Quantity (million kilowatthours)
	Number of plants	Quantity (million kilowatthours)	Number of plants	Quantity (million kilowatthours)	Number of plants	Quantity (million kilowatthours)	Number of plants	Quantity (million kilowatthours)	Percentage of total				
2012:													
Integrated plants:													
Wet	--	--	11	532	11	532	532	532	5	5	4,061	131	
Dry ^{5,6}	3	228	85 ⁷	9,550	85 ⁷	9,550	9,770	95	95	68,922	142		
Both ^{6,8}	--	--	1	W	1	W	W	W	W	W	W		
Total or average ³	3	228	97 ⁷	10,100	97 ⁷	10,100	10,300	100	100	72,983	141		
Grinding plants ⁹	--	--	7	118	7	118	118	--	--	1,092	108		
Exclusions ¹⁰	--	--	1	XX	1	XX	XX	--	--	609	XX		
2013:													
Integrated plants:													
Wet	--	--	10	485	10	485	485	5	5	3,439	141		
Dry ^{5,6}	4	230	85 ⁷	9,800	85 ⁷	9,800	10,000	95	95	72,000	139		
Both ^{6,8}	--	--	1	W	1	W	W	W	W	W	W		
Total or average ³	4	230	96 ⁷	10,300	96 ⁷	10,300	10,500	100	100	75,439	139		
Grinding plants ⁹	--	--	5	137	5	137	137	--	--	1,277	108		
Exclusions ¹⁰	--	--	2	XX	2	XX	XX	--	--	89	XX		

W Withheld to avoid disclosing company proprietary data. XX Not applicable. -- Zero.

¹Excludes Puerto Rico.

²Data are rounded to no more than three significant digits because they contain estimates.

³May not add to totals shown because of independent rounding.

⁴Portland and masonry cement. Data are all reported and are unrounded but are thought to be accurate to no more than three significant digits.

⁵Includes one semiwet plant.

⁶Data for the category "Both" have been included in those for "Dry" plants to protect company proprietary information.

⁷Includes two grinding plants whose data were included with the integrated plants.

⁸Plants that can operate both wet and dry kilns, whether or not both types were active during the year. Includes plants that converted from wet to dry technology during the year.

⁹Plants that did not produce clinker but ground clinker from outside sources. Excludes plants that only made masonry cement or just reground one type of portland cement into another, or which reported a substantial component of grinding of excess granulated blast furnace slag. Excludes two plants that were reported under "Dry" as noted in footnote 6.

¹⁰Plants at which production of portland cement was by regrinding of one type into another or which reported production only of masonry cement.

TABLE 9
CEMENT SHIPMENTS TO FINAL CUSTOMER, BY DESTINATION AND ORIGIN^{1,2}

(Thousand metric tons)

Destination and origin	Portland cement		Masonry cement	
	2012	2013	2012	2013
Destination:				
Alabama	1,024	993	77	71
Alaska ³	165	172	--	--
Arizona	1,672	1,852	21	18
Arkansas	787	828	39	43
California, northern	2,571	2,950	34	44
California, southern	4,836	5,117	132	149
Colorado	1,631	1,806	5	6
Connecticut ³	507	545	10	11
Delaware ³	143	183	4	4
District of Columbia ³	237	213	(4)	(4)
Florida	3,883	4,748	255	364
Georgia	1,795	1,842	112	122
Hawaii ³	282	270	2	2
Idaho	354	405	(4)	(4)
Illinois, excluding Chicago	1,412	1,328	7	8
Illinois, metropolitan Chicago ³	1,171	1,266	17	17
Indiana	1,668	1,517	35	35
Iowa	1,782	1,696	2	(4)
Kansas	1,389	1,213	5	4
Kentucky	972	995	47	50
Louisiana ³	2,053	2,049	46	49
Maine	183	181	1	1
Maryland	1,057	1,037	41	38
Massachusetts ³	863	825	10	9
Michigan	1,570	1,624	46	46
Minnesota ³	1,462	1,402	9	6
Mississippi ⁵	733	737	32	32
Missouri	1,453	1,482	15	12
Montana	312	313	1	1
Nebraska	1,125	1,208	1	1
Nevada	1,035	1,064	6	6
New Hampshire ³	196	185	7	6
New Jersey ³	1,116	1,332	37	38
New Mexico	612	589	5	3
New York, eastern	468	494	8	9
New York, western ³	729	660	13	12
New York, metropolitan ³	1,194	1,251	47	49
North Carolina ³	1,851	1,967	122	141
North Dakota ³	804	972	1	(4)
Ohio	2,692	2,834	72	68
Oklahoma	1,629	1,557	41	23
Oregon	578	710	(4)	(4)
Pennsylvania, eastern	1,397	1,487	36	36
Pennsylvania, western	1,032	1,039	29	29
Rhode Island ³	105	105	1	1
South Carolina	1,092	1,224	59	64
South Dakota	485	501	(4)	(4)
Tennessee	1,370	1,272	112	118
Texas, northern	5,489	5,719	82	101
Texas, southern	6,958	7,350	163	176
Utah	1,196	1,044	(4)	(4)
Vermont ³	110	114	1	1
Virginia	1,614	1,605	73	72
Washington	1,378	1,500	(4)	(4)

See footnotes at end of table.

TABLE 9—Continued
CEMENT SHIPMENTS TO FINAL CUSTOMER, BY DESTINATION AND ORIGIN^{1,2}

(Thousand metric tons)

Destination and origin	Portland cement		Masonry cement	
	2012	2013	2012	2013
Destination:—Continued				
West Virginia	496	481	13	13
Wisconsin ³	1,606	1,536	11	12
Wyoming	315	322	--	(4)
Total ⁶	76,637	79,709	1,945	2,125
Puerto Rico	861	707	(4)	--
Foreign countries ⁷	1,367	1,351	2	2
Grand total ⁶	78,866	81,768	1,947	2,127
Origin:				
United States	72,528	74,760	1,927	2,107
Puerto Rico	782	630	(4)	--
Foreign countries ⁸	6,337	6,377	20	20
Total shipments ⁶	78,866	81,768	1,947	2,127

-- Zero.

¹Includes cement produced from imported clinker and imported cement shipped by domestic producers and importers. Data include all revisions available as of February 27, 2015.

²Data are developed from consolidated monthly surveys of shipments by companies and may differ from data in tables 1, 10–12, and 14–15, which are from annual surveys of individual plants and importers. Although unrounded, data are thought to be accurate to no more than three significant digits.

³Has no cement plants.

⁴Less than ½ unit.

⁵The sole plant in Mississippi was closed in 2012 and had no production in either year.

⁶May not add to totals shown because of independent rounding.

⁷Includes shipments to U.S. possessions and territories.

⁸Imported cement sold to final customers in the United States as reported by domestic producers and other importers. Data do not match the imports in tables 17–20.

TABLE 10
SHIPMENTS OF PORTLAND CEMENT IN THE UNITED STATES, BY TYPE OF CARRIER^{1,2}

(Thousand metric tons)

Type of carrier	Plant to terminal		Plant to customer		Terminal to customer		Total to customers ⁴
	In bulk	In bags ³	In bulk	In bags ³	In bulk	In bags ³	
2012:							
Railroad	12,100	3	1,060	--	107	6	1,170
Truck	3,540	170	39,200	811	34,600	432	75,000
Barge and boat	9,020	--	185	--	2	--	187
Total ⁴	24,600	173	40,400	811	34,700	437	76,400 ⁵
2013:							
Railroad	11,500	42	1,440	--	249	6	1,700
Truck	3,680	151	41,500	858	34,900	351	77,600
Barge and boat	7,910	--	159	17	17	--	193
Total ⁴	23,100	193	43,100	875	35,200	357	79,500 ⁵

-- Zero.

¹Includes imported cement and cement made from imported clinker. Excludes Puerto Rico.

²Data are rounded to no more than three significant digits.

³Includes packages, bags, and supersacks.

⁴May not add to totals shown because of independent rounding.

⁵Shipments are based on an annual survey of plants and importers; may differ from totals in table 9, which are based on consolidated monthly data.

TABLE 11
PORTLAND CEMENT SHIPPED IN THE UNITED STATES, BY DISTRICT¹

District ³	2012			2013		
	Quantity ⁴ (thousand metric tons)	Value ²		Quantity ⁴ (thousand metric tons)	Value ²	
		Total (thousands)	Average (per metric ton)		Total (thousands)	Average (per metric ton)
Maine and New York	2,144	\$208,253	\$97.12	1,898	\$187,173	\$98.64
Pennsylvania	3,962	362,000 ⁵	91.50 ⁵	4,277	417,000 ⁵	97.50 ⁵
Illinois	1,528	127,317	83.35	1,489	142,432	95.67
Indiana	2,034	163,783	80.51	1,952	162,924	83.47
Michigan	4,120 ^{r,5}	367,000 ⁵	89.00 ⁵	4,070 ⁵	391,000 ⁵	96.00 ⁵
Ohio	760	68,717	90.47	817	78,354	95.87
Iowa, Nebraska, South Dakota	3,709	375,373	101.20	3,716	393,248	105.81
Kansas	1,539	150,211	97.58	1,477	147,842	100.13
Missouri	7,478	597,056	79.84	6,390 ⁵	546,000 ⁵	85.50 ⁵
Florida	3,650	301,404	82.58	4,620 ⁵	397,000 ⁵	86.00 ⁵
Georgia, Maryland, Virginia, West Virginia	4,628	363,000 ⁵	78.50 ⁵	4,797	443,926	92.54
South Carolina	2,725	218,999	80.37	2,763	234,895	85.03
Alabama, Kentucky, Mississippi, Tennessee	5,021	419,360	83.52	6,070	522,000 ⁵	86.00 ⁵
Arkansas and Oklahoma	2,250	189,862	84.40	2,142	199,955	93.35
Texas, northern	5,133	506,000 ⁵	98.50 ⁵	5,389	548,985	101.88
Texas, southern	6,508	584,797	89.86	7,038	673,082	95.63
Arizona and New Mexico	2,008	209,383	104.26	2,147	221,738	103.28
Colorado and Wyoming	2,262	225,046	99.50	2,404	257,592	107.14
Idaho, Montana, Nevada, Utah	2,312	213,725	92.43	2,119	205,730	97.07
Alaska and Hawaii	394	59,185	150.25	377	57,005	151.17
California	7,904	584,379	73.93	8,683	669,076	77.06
Oregon and Washington	1,490 ⁵	144,000 ⁵	96.50 ⁵	1,830	183,760	100.44
Importers ⁶	2,800 ⁵	313,000 ⁵	111.50 ⁵	3,060 ⁵	365,000 ⁵	119.50 ⁵
Total or average ⁷	76,400 ⁵	6,750,000 ⁵	88.50 ⁵	79,500 ⁵	7,450,000 ⁵	93.50 ⁵
Puerto Rico	862 ⁵	W	W	698 ⁵	W	W
Grand total ⁷	77,200 ⁵	W	W	80,200 ⁵	W	W

¹Revised. W Withheld to avoid disclosing company proprietary data.

¹Includes gray and white portland cement. Includes cement made from imported clinker. Even where presented unrounded, data are thought to be accurate to no more than three significant digits.

²Values are mill net or ex-plant (free on board) valuations of total sales to final customers, including sales from plants' external distribution terminals. The data are ex-terminal for independently reporting terminals. Data include all varieties of portland cement and both bulk and bag shipments.

Unless otherwise specified, data are presented unrounded. Unrounded or not, unit value data should be viewed as value indicators, accurate to no more than the nearest \$0.50 or \$1.00 per metric ton.

³The location of the reporting entities, not necessarily the location of sales (see table 9 for sales data, by State). Specific districts include shipments by importers where district assignments were possible.

⁴Tonnages are those by reporting entities in the district but may include shipments into other districts. They differ from the data in table 9, which are the actual reported sales into the specific States.

⁵Data are rounded to three significant digits (unit values to the nearest \$0.50) because they include estimates.

⁶Importers for which district assignments were not possible.

⁷May not add to totals shown because of independent rounding.

TABLE 12
MASONRY CEMENT SHIPPED IN THE UNITED STATES, BY DISTRICT^{1,2}

District ⁴	2012			2013		
	Quantity ⁵ (thousand metric tons)	Value ³		Quantity ⁵ (thousand metric tons)	Value ³	
		Total (thousands)	Average (per metric ton)		Total (thousands)	Average (per metric ton)
Maine and New York	55	\$6,321	\$115.46	37	\$4,470 ⁶	\$121.50 ⁶
Pennsylvania	167	24,000	143.00	172	24,700 ⁶	143.50 ⁶
Illinois, Indiana, Ohio	218	32,098	146.95	217	32,800 ⁶	151.00 ⁶
Michigan	70	9,143	131.50	77	10,739	138.63
Iowa, Nebraska, South Dakota	2	234	96.29	1	72	101.15
Kansas and Missouri	79	11,422	145.26	30	4,840 ⁶	159.50 ⁶
Florida	220	24,891	113.23	329	40,858	124.36
Georgia, Maryland, Virginia, West Virginia	182 ⁶	27,800 ⁶	153.00 ⁶	220	40,720	185.06
South Carolina	166	21,875	132.11	164	23,284	142.01
Alabama, Kentucky, Mississippi, Tennessee	234	31,148	133.25	311	42,830	137.78
Arkansas and Oklahoma	92	10,595	114.93	94	10,334	110.28
Texas	218	32,300 ⁶	148.50 ⁶	246	38,500 ⁶	156.50 ⁶
Arizona, Colorado, Idaho, Montana, Nevada, New Mexico, Utah, Wyoming	30	3,658	122.32	28	3,438	121.56
Alaska and Hawaii	2	559	313.99	2	527	323.10
California, Oregon, Washington	178	18,591	104.70	201	22,092	110.07
Importers ⁷	41	6,160 ⁶	200.50 ⁶	39 ⁶	9,670 ⁶	247.00 ⁶
Total or average ⁸	1,950 ⁶	263,000 ⁶	134.50 ⁶	2,170 ⁶	310,000 ⁶	143.00 ⁶
Puerto Rico	(9)	W	W	(9)	W	W
Grand total or average ⁸	1,950 ⁶	W	W	2,170 ⁶	W	W

W Withheld to avoid disclosing company proprietary data.

¹Shipments are those by cement companies to final customers and include imported cement and cement made from imported clinker. Excludes sales of masonry cement by portland cement final customers who made masonry cement from purchased portland cement. Data exclude Puerto Rico. Even where presented unrounded, data are thought to be accurate to no more than three significant digits.

²Data include true masonry, plastic, portland-lime, and stucco cements.

³Values are mill net or ex-plant valuations of total sales to final customers, including sales from plants external distribution terminals. The data are ex-terminal for independently reporting terminals. Data include both bulk and bag shipments. Unless otherwise specified, data are presented unrounded. Unrounded or not, unit value data should be viewed as value indicators, accurate to no more than the nearest \$0.50 or even \$1.00 per metric ton.

⁴District is the location of the reporting entities, not necessarily the location of sales (see table 9 for sales data, by State). Specific districts include shipments by importers where district assignments were possible.

⁵Tonnages are those by reporting entities in the district but may include shipments into other districts. They differ from the data in table 9, which are the actual reported sales into the specific States.

⁶Data are rounded to no more than three significant digits (unit values to the nearest \$0.50) because they include estimates.

⁷Importers for which district assignments were not possible.

⁸May not add to totals shown because of independent rounding.

⁹Less than ½ unit.

TABLE 13
AVERAGE MILL NET VALUE OF CEMENT SOLD IN THE UNITED STATES^{1,2}

(Dollars per metric ton)

Year	Portland cement			Masonry cement	All cement
	Gray	White ³	All		
2012	87.50	194.50	88.50	134.50	89.50
2013	92.50	198.50	93.50	143.00	95.00

¹Values are average of sales to final customers, free on board the plant or independently reporting terminal. Values include any bagging charges but exclude delivery charges to customers or to external terminals. Data exclude Puerto Rico.

²Data are rounded to the nearest \$0.50 per metric ton.

³Data for white cement include a component of resales showing significant price markups.

TABLE 14
PORTLAND CEMENT SHIPMENTS IN 2013, BY DISTRICT AND TYPE OF CUSTOMER¹

(Thousand metric tons)

District ²	Ready- mixed concrete	Concrete product manufacturers	Contractors	Building material dealers	Oil well, mining, waste stabilization	Government and other ³	Total ^{4,5}
Maine and New York	1,350	291	80	137	5	37	1,898
Pennsylvania	2,540	916	351	241	93	142	4,277
Illinois	863	88	87	3	335	112	1,489
Indiana	1,430	234	195	28	10	58	1,952
Michigan	3,120	370	389	144	44	8	4,070 ⁶
Ohio	654	61	63	8	31	--	817
Iowa, Nebraska, South Dakota	2,790	421	291	13	188	10	3,716
Kansas	1,160	149	64	36	65	--	1,477
Missouri	4,970	385	382	538	64	55	6,390 ⁶
Florida	3,350	657	126	449	1	41	4,620 ⁶
Georgia, Maryland, Virginia, West Virginia	3,360	854	247	147	2	192	4,797
South Carolina	2,220	257	95	72	4	115	2,763
Alabama, Kentucky, Mississippi, Tennessee	4,300	828	433	300	45	163	6,070
Arkansas and Oklahoma	1,520	142	297	42	140	1	2,142
Texas, northern	2,890	456	960	49	987	44	5,389
Texas, southern	4,590	541	587	200	858	265	7,038
Arizona and New Mexico	1,480	428	142	36	45	14	2,147
Colorado and Wyoming	1,810	129	222	75	162	7	2,404
Idaho, Montana, Nevada, Utah	1,460	205	54	80	298	19	2,119
Alaska and Hawaii	360	8	--	--	--	10	377
California	6,680	1,066	511	284	134	8	8,683
Oregon and Washington	1,400	217	86	60	50	15	1,830 ⁶
Importers ⁷	2,250	324	186	60	109	123	3,060 ⁶
Total ⁵	56,500	9,030	5,850	3,000	3,670	1,440	79,500 ⁶
Puerto Rico	271	59	20	348	--	--	698 ⁶
Grand total ⁵	56,800	9,090 ⁸	5,870 ⁹	3,350	3,670 ¹⁰	1,440	80,200 ⁶

-- Zero.

¹Includes imported cement and cement made from imported clinker. Except for district totals, data have been rounded to three significant digits but are likely accurate to only two significant digits. District totals are likely accurate to no more than three significant digits.

²The location of the reporting entity, not the location of sales (see table 9 for sales data, by State). Specific districts include shipments by importers where district assignments were possible.

³Includes shipments to miscellaneous customer types and for which customer types were not specified.

⁴Except where noted, district totals are unrounded but are thought to be accurate to no more than three significant digits.

⁵May not add to totals shown because of independent rounding.

⁶District totals are rounded to three significant digits because they include estimates.

⁷Shipments by importers where district assignments were not possible.

⁸Includes brick and block—2,670; precast and prestressed—3,030; pipe—902; and other or unspecified—2,490.

⁹Includes airport—102; road paving—3,190; soil cement—1,680; and other or unspecified—894.

¹⁰Includes oil well drilling—3,130; mining—381; and waste stabilization—163.

TABLE 15
 PORTLAND CEMENT SHIPMENTS IN THE UNITED STATES,
 BY TYPE OF CEMENT^{1, 2, 3}

(Thousand metric tons)

Type of cement ⁴	2012	2013
General use and moderate heat (Types I and II) ^{5, 6}	59,400	61,000
High early strength (Type III)	2,520	2,670
Sulfate resisting (Type V) ⁵	10,300	11,100
Block	142	165
Oil well	2,000	2,420
White ⁷	705	794
Blended: ⁸		
Portland, natural pozzolans	76	96
Portland, ground granulated blast furnace slag	560	519
Portland, fly ash	408	396
Portland, other pozzolans ⁹	235	256
Total blended ¹⁰	1,280	1,270
Expansive and regulated fast setting	7	--
Miscellaneous ¹¹	3	37
Grand total ¹⁰	76,400	79,500

--Zero.

¹Includes sales of imported cement. Excludes Puerto Rico.

²Data are rounded to no more than three significant digits.

³Gray portland-type cements unless otherwise specified.

⁴Sold mostly under specifications ASTM C150, ASTM C595, and ASTM C1157.

⁵Type II/V and similar sulfate-resisting hybrids are included within Type V, as are Type HS and similar cements in ASTM C1157.

⁶Includes ASTM C1157 general use and moderate heat cements that contain no pozzolans.

⁷White or colored portland-type cements. Most are Types I or II but may include Types III and V and block cements.

⁸Cements sold under ASTM C595 and those under ASTM C1157 that contain pozzolans.

⁹Includes blends with cement kiln dust, silica fume, or other pozzolans, and blends containing multiple pozzolans.

¹⁰May not add to totals shown because of independent rounding.

¹¹Includes low heat (Type IV), waterproof, and other portland-type cements.

TABLE 16
U.S. EXPORTS OF HYDRAULIC CEMENT AND CLINKER, BY COUNTRY¹

(Thousand metric tons and thousand dollars)

Country	2012		2013	
	Quantity	Value ²	Quantity	Value ²
Aruba	5	979	(3)	137
Australia	1	667	5	1,640
Bahamas, The	144	12,032	164	14,097
Barbados	1	115	(3)	81
Belize	2	482	(3)	28
Brazil	15	1,913	64	6,633
Canada	1,195	155,050	1,119	157,494
Cayman Islands	2	204	3	397
Chile	4	549	1	384
China	1	198	1	355
Colombia	27	3,095	11	1,980
Dominica	(3)	118	1	197
Dominican Republic	12	1,621	3	1,008
France	1	45	(3)	26
Greece	5	216	1	94
Guyana	1	335	6	613
Haiti	32	2,691	112	8,140
Hong Kong	1	479	(3)	52
India	1	134	(3)	212
Israel	2	438	1	289
Italy	1	201	(3)	64
Jamaica	116	11,995	62	6,864
Japan	4	1,653	1	192
Korea, Republic of	(3)	80	1	510
Kuwait	3	1,195	(3)	4
Liberia	1	1,036	(3)	20
Mexico	78	17,188	79	17,568
Nicaragua	(3)	89	3	823
Norway	(3)	267	1	264
Pakistan	1	69	(3)	55
Panama	71	6,801	4	1,071
Qatar	(3)	8	1	65
Russia	1	337	(3)	81
Saudi Arabia	(3)	36	1	285
Singapore	1	70	(3)	265
Sint Maarten	4	528	(3)	22
Taiwan	1	541	(3)	270
Trinidad and Tobago	(3)	123	7	408
Turks and Caicos Islands	7	671	1	585
United Arab Emirates	1	200	1	421
United Kingdom	2	1,031	1	280
Uruguay	(3)	59	1	205
Venezuela	1	721	8	2,535
Other	6	3,051	7	3,327
Total ⁴	1,749	229,310	1,670	230,041
Puerto Rico:				
British Virgin Islands	16	1,711	12	1,589
Curacao	9	1,105	9	1,181
Trinidad and Tobago	1	1,083	--	3
Other	(3)	27	(3)	11
Total ⁴	26	3,925	21	2,784
Grand Total ⁴	1,776	233,235	1,691	232,825

-- Zero

¹Includes portland and masonry cements. Data are unrounded but are thought to be accurate to no more than three significant digits.

²Free alongside ship value. The value of exports at the U.S. seaport or border point of export is based on the transaction price, including inland freight, insurance, and other charges incurred in placing the merchandise alongside the carrier. The value excludes the cost of loading the carrier.

³Less than ½ unit.

⁴May not add to totals shown because of independent rounding.

Source: U.S. Census Bureau.

TABLE 17
U.S. IMPORTS FOR CONSUMPTION OF HYDRAULIC CEMENT AND CLINKER, BY COUNTRY¹

(Thousand metric tons and thousand dollars)

Country	2012			2013		
	Quantity	Value		Quantity	Value	
		Customs ²	C.i.f. ³		Customs ²	C.i.f. ³
Canada ⁴	3,709	286,335	301,907	3,615	285,881	294,823
China	375	23,898	34,439	514	30,255	43,738
Colombia	84	4,837	7,274	2	183	243
Croatia	24	7,925	9,590	22	8,752	10,293
Curacao	--	--	--	3	301	303
Denmark	96	12,166	15,607	36	3,748	6,756
Egypt	84	8,468	11,741	89	10,209	13,472
France	85	31,248	32,492	93	34,623	35,942
Germany	(5)	256	344	1	712	886
Greece	609	27,033	40,267	686	30,314	44,009
Hong Kong	--	--	--	1	134	174
Italy	(5)	24	38	116	5,371	8,265
Jamaica	6	1,874	1,933	--	--	--
Japan	1	958	1,117	2	1,142	1,380
Korea, Republic of	1,280	55,134	85,126	1,244	55,289	84,609
Mexico ⁴	300	35,410	38,690	308	37,465	40,635
Netherlands	7	3,518	3,714	2	2,637	2,806
Poland	(5)	376	456	1	702	889
Spain	38	2,808	3,283	(5)	17	21
Sweden	132	5,385	10,413	46	3,101	4,932
Taiwan	39	1,958	2,743	270	13,718	19,224
Thailand	13	1,925	2,825	14	1,853	2,898
Turkey	9	1,467	2,269	26	3,401	5,620
United Kingdom	2	260	408	4	223	314
Other	(5)	23 ⁵	25 ⁵	(5)	110	129
Total ^{4,6}	6,893	513,285	606,702	7,095	530,141	622,361
Puerto Rico:						
Colombia	4	431	541	(5)	54	71
Mexico	16	1,944	2,771	11	1,279	1,896
Portugal	--	--	--	4	699	763
Spain	124	7,949	10,185	132	9,031	11,116
Other	(5)	60	80	(5)	55	73
Total ⁶	144	10,384	13,576	148	11,117	13,919
Grand total ^{4,6}	7,037	523,669	620,278	7,243	541,258	636,280

¹Revised. -- Zero.

¹Includes portland, masonry, and other hydraulic cements. Data are unrounded but are thought to be accurate to no more than three significant digits.

²Customs value. The price actually paid or payable for merchandise when sold for exportation to the United States, excluding U.S. import duties, freight, insurance, and other charges incurred in bringing the merchandise to the United States.

³Cost, insurance, and freight. The value represents the customs value plus insurance, freight, and other delivery charges to the first port of entry, but excludes costs of offloading, other U.S. port handling charges, and demurrage.

⁴Data are underreported with respect to clinker from Canada, and cement from Mexico, owing to additional material coming in as "informal entries."

⁵Less than ½ unit.

⁶May not add to totals shown because of independent rounding.

Source: U.S. Census Bureau.

TABLE 18
U.S. IMPORTS FOR CONSUMPTION OF HYDRAULIC CEMENT AND CLINKER, BY CUSTOMS DISTRICT AND COUNTRY¹

(Thousand metric tons and thousand dollars)

Customs district and country	2012			2013		
	Quantity	Value		Quantity	Value	
		Customs ²	C.i.f. ³		Customs ²	C.i.f. ³
Anchorage, AK:						
Canada	6	370	1,284	8	612	1,928
Germany	(4)	5	6	(4)	10	11
Korea, Republic of	105	4,805	8,607	83	4,271	8,015
Total ⁵	111	5,180	9,896	91	4,894	9,953
Baltimore, MD:						
China	2	68	77	2	78	90
Sweden	--	--	--	2	595	736
Other	(4)	296	310	(4)	9	9
Total ⁵	2	363	386	3	682	835
Boston, MA: Other	-4	18	18	--	--	--
Buffalo, NY:						
Canada	572	51,574	53,260	457	42,619	43,925
Other	(4)	54	54	--	--	--
Total ⁵	572	51,627	53,313	457	42,619	43,925
Charleston, SC: Other	--	--	--	(4)	91	108
Chicago, IL:						
Turkey	1	291	291	(4)	125	125
Other	(4)	427	460	(4)	339	383
Total ⁵	1	718	751	(4)	464	508
Cleveland, OH:						
Canada	536	37,437	39,628	518	37,243	38,892
China	1	234	404	(4)	185	220
Poland	(4)	376	456	1	702	889
Other	(4)	616	665	(4)	429	458
Total ⁵	538	38,664	41,154	519	38,558	40,459
Columbia-Snake, OR, WA:						
Canada	29	1,791	1,946	42	2,606	2,766
China	300	14,957	22,895	457	21,341	32,462
Korea, Republic of	6	286	466	35	1,437	2,403
Total ⁵	335	17,034	25,307	534	25,385	37,632
Dallas-Fort Worth, TX: China	--	--	--	(4)	32	32
Detroit, MI:						
Canada ⁶	1,113	82,381	89,541	1,061	79,169	81,139
Other	(4)	206	215	(4)	188	197
Total ^{5,6}	1,114	82,587	89,756	1,061	79,357	81,335
El Paso, TX:						
Canada	--	--	--	(4)	99	111
Mexico ⁶	114	13,354	14,602	107	13,259	14,404
Total ^{5,6}	114	13,354	14,602	107	13,358	14,515
Great Falls, MT:						
Canada	8	250	271	8	276	300
Other	(4)	90	94	(4)	29	30
Total ⁵	8	341	365	8	305	330
Honolulu, HI:						
Italy	--	--	--	(4)	3	3
Korea, Republic of	229	10,067	15,277	--	--	--
Taiwan	39	1,958	2,743	270	13,704	19,202
Total ⁵	267	12,024	18,021	270	13,707	19,205
Houston-Galveston, TX:						
China	2	164	167	9	1,004	1,048
Colombia	3	358	497	--	--	--
Egypt	40	4,073	5,407	50	5,411	7,065
Germany	(4)	154	183	1	475	555
Greece	337	14,679	23,115	338	15,014	23,473
Italy	--	--	--	116	5,364	8,257

See footnotes at end of table.

TABLE 18—Continued
 U.S. IMPORTS FOR CONSUMPTION OF HYDRAULIC CEMENT AND CLINKER, BY CUSTOMS DISTRICT AND COUNTRY¹

(Thousand metric tons and thousand dollars)

Customs district and country	2012			2013		
	Quantity	Value		Quantity	Value	
		Customs ²	C.i.f. ³		Customs ²	C.i.f. ³
Houston-Galveston, TX:—Continued						
Korea, Republic of	478	20,792	32,825	619	28,786	43,160
Turkey	(4)	4	5	5	490	895
Other	(4)	46	71	(4)	135	149
Total ⁵	861	40,270	62,271	1,137	56,679	84,603
Laredo, TX:						
China	--	--	--	(4)	12	12
Mexico	108	14,118	14,330	115	15,346	15,477
Total ⁵	108	14,118	14,330	115	15,357	15,488
Los Angeles, CA:						
China	20	2,201	3,081	24	2,694	3,619
Croatia	2	141	224	(4)	112	168
Egypt	9	935	1,461	5	562	826
Hong Kong	--	--	--	1	59	63
Thailand	8	1,121	1,636	9	1,172	1,829
Turkey	4	463	838	10	1,167	2,125
Other	(4)	32	40	(4)	225	262
Total ⁵	44	4,892	7,279	49	5,991	8,892
Miami, FL:						
Colombia	2	276	357	(4)	37	45
Egypt	23	2,345	3,370	20	2,136	3,069
Greece	15	596	923	--	--	--
Mexico	73	7,368	9,131	81	8,259	10,092
Sweden	131	4,750	9,653	43	1,823	3,367
Turkey	4	563	916	6	925	1,407
Other	(4)	45	62	(4)	70	86
Total ⁵	248	15,943	24,411	150	13,249	18,066
Minneapolis, MN:						
Canada	133	16,160	16,172	141	16,920	16,932
Other	(4)	15	15	(4)	35	40
Total ⁵	133	16,175	16,187	141	16,955	16,972
Mobile, AL: China	--	--	--	(4)	176	202
New Orleans, LA:						
China	15	3,659	4,051	12	2,834	3,577
Croatia	21	7,785	9,366	22	8,640	10,125
Other	(4)	9	11	(4)	87	106
Total ⁵	36	11,453	13,428	34	11,562	13,808
New York City, NY:						
Denmark	19	1,912	3,001	28	2,871	3,937
Greece	256	11,758	16,230	348	15,300	20,536
Turkey	(4)	27	45	2	344	506
Other	1	453	502	1	492	602
Total ⁵	276	14,150	19,777	379	19,007	25,581
Norfolk, VA:						
China	1	275	350	1	271	351
Egypt	2	230	300	3	292	377
France	85	31,024	31,889	93	34,317	35,614
Jamaica	6	1,874	1,933	--	--	--
Sweden	2	635	760	1	457	546
Other	(4)	45	47	(4)	10	11
Total ⁵	95	34,083	35,279	97	35,346	36,899
Ogdensburg, NY:						
Canada	205	18,340	18,731	232	22,507	22,885
Other	(4)	16	16	(4)	23	24
Total ⁵	205	18,356	18,747	232	22,530	22,908

See footnotes at end of table.

TABLE 18—Continued
 U.S. IMPORTS FOR CONSUMPTION OF HYDRAULIC CEMENT AND CLINKER, BY CUSTOMS DISTRICT AND COUNTRY¹

(Thousand metric tons and thousand dollars)

Customs district and country	2012			2013		
	Quantity	Value		Quantity	Value	
		Customs ²	C.i.f. ³		Customs ²	C.i.f. ³
Pembina, ND: Canada	281	17,414	17,558	259	18,780	18,918
Philadelphia, PA:						
Korea, Republic of	173	6,271	7,432	189	7,773	9,623
Spain	16	1,279	1,749	--	--	--
Other	1	559	650	1	1,172	1,326
Total ⁵	190	8,109	9,831	190	8,945	10,949
Portland, ME: Canada	25	2,713	3,036	17	1,816	2,038
San Diego, CA: Mexico	6	570	627	5	602	662
San Francisco, CA:						
China	8	806	1,144	8	874	1,154
Egypt	2	198	330	1	89	119
Hong Kong	--	--	--	1	75	111
Thailand	5	788	1,169	5	630	1,000
Other	(4)	19	22	1	331	428
Total ⁵	15	1,811	2,666	15	1,998	2,811
Savannah, GA:						
Egypt	7	686	873	11	1,719	2,017
Spain	22	1,529	1,534	--	--	--
Other	(4)	441	461	(4)	367	385
Total ⁵	29	2,656	2,868	11	2,085	2,402
Seattle, WA:						
Canada ⁶	717	48,797	50,750	783	53,722	54,791
China	27	1,343	2,063	--	6	7
Japan	1	607	733	1	499	634
Korea, Republic of	289	12,905	20,510	316	12,922	21,300
United Kingdom	2	149	286	4	126	194
Other	(4)	131	478	(4)	149	179
Total ⁵	1,036	63,932	74,820	1,104	67,424	77,105
St. Albans, VT: Canada	83	9,108	9,731	89	9,609	10,310
St. Louis, MO:						
China	--	--	--	(4)	6	11
Netherlands	(4)	411	432	(4)	374	392
Total ⁵	(4)	411	432	(4)	380	403
Tampa, FL:						
Colombia	1	115	155	--	--	--
Denmark	77	10,251	12,604	9	872	2,814
Turkey	(4)	93	146	2	295	448
Other	(4)	62	62	(4)	33	41
Total ⁵	78	10,522	12,966	11	1,200	3,303
U.S. Virgin Islands:						
Colombia	--	--	--	1	128	179
Curacao	--	--	--	3	301	303
Netherlands	5	519	537	--	--	--
Total ⁵	5	519	537	5	429	483
Wilmington, NC:						
China	(4)	52	60	1	511	662
Colombia	78	4,049	6,216	--	--	--
Other	(4)	68	75	(4)	59	61
Total ⁵	78	4,169	6,351	1	570	723
U.S. total ^{5,6}	6,893	513,285	606,702	7,095	530,141	622,361
San Juan, PR:						
Colombia	4	431	541	(4)	54	71
Mexico	16	1,944	2,771	11	1,279	1,896
Portugal	--	--	--	4	699	763

See footnotes at end of table.

TABLE 18—Continued
U.S. IMPORTS FOR CONSUMPTION OF HYDRAULIC CEMENT AND CLINKER, BY CUSTOMS DISTRICT AND COUNTRY¹

(Thousand metric tons and thousand dollars)

Customs district and country	2012			2013		
	Quantity	Value		Quantity	Value	
		Customs ²	C.i.f. ³		Customs ²	C.i.f. ³
San Juan, PR:—Continued						
Spain	124	7,949	10,185	132	9,031	11,116
Other	(4)	60	80	(4)	55	73
Total ⁵	144	10,384	13,576	148	11,117	13,919
Grand total ^{5,6}	7,037	523,669	620,278	7,243	541,258	636,280

-- Zero.

¹Includes all varieties of hydraulic cement and clicker. Data are unrounded but are thought to be accurate to no more than three significant digits.

²Customs value. The price actually paid or payable for merchandise when sold for exportation to the United States, excluding U.S. import duties, freight, insurance, and other charges incurred in bringing the merchandise to the United States.

³Cost, insurance, and freight. The value represents the customs value plus insurance, freight, and other delivery charges to the first port of entry, but excludes costs of offloading, other U.S. port handling charges, and demurrage.

⁴Less than ½ unit.

⁵May not add to totals shown because of independent rounding.

⁶Data are underreported with respect to clinker from Canada and cement from Mexico owing to additional material coming in as “informal entries.”

Source: U.S. Census Bureau.

TABLE 19
U.S. IMPORTS FOR CONSUMPTION OF GRAY PORTLAND CEMENT, BY COUNTRY¹

(Thousand metric tons and thousand dollars)

Country	2012			2013		
	Quantity	Value		Quantity	Value	
		Customs ²	C.i.f. ³		Customs ²	C.i.f. ³
Canada	2,718	208,397	222,397	2,558	202,313	209,468
China	327	16,327	24,989	457	21,355	32,477
Colombia	78	4,049	6,216	1	138	190
Curacao	--	--	--	3	301	303
Greece	609	27,033	40,267	686	30,312	44,006
Italy	(4)	4	4	116	5,324	8,214
Korea, Republic of	1,276	55,023	84,874	1,243	55,195	84,508
Mexico	22 ⁵	1,533 ⁵	1,848 ⁵	22 ⁵	1,552 ⁵	1,843 ⁵
Netherlands	5	519	537	--	--	--
Sweden	131	4,750	9,653	43	1,823	3,367
Taiwan	39	1,958	2,743	270	13,704	19,202
Other	(4)	132	525	(4)	131	211
Total ^{6,7}	5,203 ⁵	319,717 ⁵	394,045 ⁵	5,399 ⁵	332,148 ⁵	403,789 ⁵
Puerto Rico:						
Guatemala	(4)	7	9	--	--	--
Spain	124	7,949	10,185	132	9,031	11,116
Total ^{6,7}	124	7,956	10,194	132	9,031	11,116
Grand total ^{6,7}	5,327 ⁵	327,672 ⁵	404,239 ⁵	5,532 ⁵	341,178 ⁵	414,906 ⁵

-- Zero.

¹Data are unrounded but are thought to be accurate to no more than three significant digits.

²The price actually paid or payable for merchandise when sold for exportation to the United States, excluding U.S. import duties, freight, insurance, and other charges incurred in bringing the merchandise to the United States.

³Cost, insurance, and freight. The value represents the customs value plus insurance, freight, and other delivery charges to the first port of entry, but excludes costs of offloading, other U.S. port handling charges, and demurrage.

⁴Less than ½ unit.

⁵Data are underreported with respect to imports into the El Paso, TX, customs district owing to additional material coming in as “informal entries.”

⁶May not add to totals shown because of independent rounding.

⁷Total imports do not include gray portland cement that was misregistered by importers under the white cement tariff code; these quantities are included in table 20.

Source: U.S. Census Bureau.

TABLE 20
U.S. IMPORTS FOR CONSUMPTION OF WHITE CEMENT, BY COUNTRY¹

(Thousand metric tons and thousand dollars)

Country	2012			2013		
	Quantity	Value		Quantity	Value	
		Customs ²	C.i.f. ^{3,4}		Customs ²	C.i.f. ^{3,4}
Canada	305	41,564	42,650	329	43,800	44,875
China	29	2,970	4,141	39	4,340	5,568
Colombia	6	787	1,057	(5)	44	53
Denmark	96	12,163	15,604	36	3,748	6,756
Egypt	84	8,468	11,741	89	10,209	13,472
Hong Kong	--	--	--	1	134	174
Mexico	199	24,243	26,399	222	27,858	30,097
Spain	16 ⁶	1,279	1,749	(5)	4	5
Thailand	13	1,911	2,809	14	1,837	2,882
Turkey	9	1,153	1,952	26	3,262	5,475
United Kingdom	2	230	375	4	119	180
Other	(5)	24	28	(5)	111	136
Total ⁷	759 ⁶	94,792	108,506	761	95,465	109,672
Puerto Rico:						
Colombia	4	431	541	(5)	54	71
Guatemala	(5)	12	16	(5)	32	43
Mexico	16	1,944	2,771	11	1,241	1,843
Portugal	--	--	--	4	699	763
Total ⁷	20	2,387	3,327	15	2,026	2,720
Grand total ⁷	779 ⁶	97,179	111,833	776	97,491	112,392

-- Zero.

¹Data are unrounded but are thought to be accurate to no more than three significant digits.

²The price actually paid or payable for merchandise when sold for exportation to the United States, excluding U.S. import duties, freight, insurance, and other charges incurred in bringing the merchandise to the United States.

³Cost, insurance, and freight. The value represents the customs value plus insurance, freight, and other delivery charges to the first port of entry, but excludes costs of offloading, other U.S. port handling charges, and demurrage.

⁴Values of less than \$90.00 (c.i.f.) per metric ton likely indicate the mistaken total or partial inclusion of data for gray portland or similar cement or clinker. This error happens when the importer records the wrong tariff number with the U.S. Customs Service.

Values that exceed \$200 per ton likely indicate misidentified specialty cement, not white cement.

⁵Less than ½ unit.

⁶Includes 16,499 metric tons of white cement clinker from Spain that was misregistered as white cement by the importer.

⁷May not add to totals shown because of independent rounding.

Source: U.S. Census Bureau.

TABLE 21
U.S. IMPORTS FOR CONSUMPTION OF CLINKER, BY COUNTRY¹

(Thousand metric tons and thousand dollars)

Country	2012			2013		
	Quantity	Value		Quantity	Value	
		Customs ²	C.i.f. ³		Customs ²	C.i.f. ³
Canada ⁴	673	33,392	33,693	702	34,144	34,486
China	5	726	746	12	2,485	3,174
Croatia	2	106	167	(5)	112	168
France	84	30,580	31,416	92	33,251	34,482
Spain	22 ⁶	1,529	1,534	--	--	--
Other	(5)	13	14	(5)	11	19
Total ⁷	786 ⁶	66,346	67,570	806	70,003	72,329
Puerto Rico	--	--	--	--	--	--
Grand Total ^{4,7}	786 ⁶	66,346	67,570	806	70,003	72,329

-- Zero.

¹For all types of hydraulic cement. Data are unrounded but are thought to be accurate to no more than three significant digits. Excludes Puerto Rico, which had no imports of clinker for the years shown.

²Customs value. The price actually paid or payable for merchandise when sold for exportation to the United States, excluding U.S. import duties, freight, insurance, and other charges incurred in bringing the merchandise to the United States.

³Cost, insurance, and freight. The value represents the customs value plus insurance, freight, and other delivery charges to the first port of entry, but excludes costs of offloading, other U.S. port handling charges, and demurrage.

⁴Data are underreported with respect to additional material coming in as "informal entries."

⁵Less than ½ unit.

⁶Excludes 16,499 metric tons of white cement clinker that was misregistered by the importer as white cement and which has thus been included in table 20.

⁷May not add to totals shown because of independent rounding.

Source: U.S. Census Bureau.

TABLE 22
HYDRAULIC CEMENT: WORLD PRODUCTION, BY COUNTRY^{1,2}

(Thousand metric tons)

Country	2009	2010	2011	2012	2013 ^c
Afghanistan ^c	32 ³	36 ³	38	37	40
Albania ^c	1,108 ³	1,300	1,800	1,800 ^r	1,800
Algeria ^c	18,732 ³	19,100 ³	19,000	19,000	18,000
Angola ^c	1,800	1,500	1,500	1,600	1,700
Argentina	9,385	10,423	11,592	10,716	11,892 ³
Armenia	467	488	422	438	431 ³
Australia ^c	9,200	8,300	8,600	8,600	8,400
Austria	4,646	4,254	4,427	4,455	4,385 ³
Azerbaijan	1,286	1,279	1,425	1,966	2,296 ³
Bahrain ^c	700	900	1,200	1,300	1,200
Bangladesh ^{c,4}	12,000	13,770 ³	14,690 ³	15,000	15,000
Barbados	256	229	223	176	160
Belarus	4,350	4,531	4,604	4,906	5,057 ³
Belgium	5,990	6,095	6,954	6,280 ^r	6,119 ³
Benin	1,315	1,305	1,460	1,390	1,422 ³
Bhutan ^c	180	200	544 ³	521 ³	500
Bolivia	2,292	2,414	2,658	2,714	2,500
Bosnia and Herzegovina	1,074	949	893	846	882 ³
Botswana ^c	250	260	260	260	260
Brazil	51,748	59,118	64,093	69,323 ^r	69,975 ³
Brunei ^c	220	270	290	300	300
Bulgaria	2,645	1,961	1,866	1,803 ^r	1,800
Burkina Faso	563	587	590 ^e	659 ^r	580 ³
Burma ⁵	670	534	538	600 ^e	600
Burundi	--	--	35	71	100
Cambodia	933 ^r	789	907	980	1,000
Cameroon ^c	1,100 ^r	1,000 ^r	1,146 ^{r,3}	1,275 ^{r,3}	1,400
Canada	10,985	12,431	12,001	12,465	11,612 ³
Chile	3,876	3,871	4,406	4,722	4,800
China	1,644,000	1,822,000	2,099,000	2,210,000	2,416,000 ^{p,3}
Colombia	9,232	9,488	10,777	10,925	11,252 ³
Congo (Brazzaville) ^c	110	80	70	150	170
Congo (Kinshasa)	460	490	458	413 ^r	447 ³
Costa Rica ^c	2,100	1,276 ³	1,400 ^r	1,400 ^r	1,500
Côte d'Ivoire	283	189	99	78	100
Croatia	2,919 ^r	2,775 ^r	2,681 ^r	2,255 ^r	2,436 ³
Cuba	1,626	1,631	1,736	1,825 ^r	1,659 ³
Cyprus	1,481 ^r	1,329	1,207	1,026 ^r	855 ³
Czech Republic	3,672 ^r	3,379 ^r	3,931 ^r	3,434 ^r	3,211 ³
Denmark	1,575	1,553	1,811	1,798	1,830 ³
Djibouti	--	--	--	--	150
Dominican Republic	3,852	4,106	3,997	4,130	4,300
Ecuador	5,310 ^r	5,287	5,706	6,025 ^r	6,600
Egypt	46,900	44,592 ^r	43,384	55,200	50,000
El Salvador ^c	1,212 ³	1,290	1,320	1,380 ^r	1,400
Eritrea ^c	45	45	190 ^r	260 ^r	260
Estonia	326	375	451 ^r	482 ^r	500
Ethiopia ⁶	1,688 ^r	1,639 ^r	2,082 ^r	3,500 ^{r,c}	5,000
Fiji ^c	110	130	120	120	130
Finland	1,052	1,215 ^r	1,387 ^r	1,293 ^r	1,300
France	17,974	17,733	19,270	17,810 ^r	18,018 ³
French Guiana ^c	62 ³	89 ³	90 ^r	100 ^r	92
Gabon ^c	250	223 ^{r,3}	226 ^{r,3}	220	200
Georgia ^c	870 ³	857 ³	860	870 ^r	950
Germany	29,974	29,203	32,779	31,956 ^r	31,308 ³
Ghana ^c	1,800	2,100	2,500 ^r	3,000	3,000
Greece	10,069	8,526	7,321 ^r	4,849 ^r	5,000
Guadeloupe ^c	300	300	300	300	300

See footnotes at end of table.

TABLE 22—Continued
HYDRAULIC CEMENT: WORLD PRODUCTION, BY COUNTRY^{1,2}

(Thousand metric tons)

Country	2009	2010	2011	2012	2013 ^c
Guatemala	1,500 ^e	2,794 ^r	2,850 ^r	2,880 ^r	2,900
Guinea	298	237	365	317	377 ³
Haiti ^c	300	300	300	300	300
Honduras ^e	1,800	1,600 ^r	1,620 ^{r,3}	1,730 ^{r,3}	1,700
Hong Kong	1,124	1,461 ^r	1,537 ^r	1,675 ^r	1,768 ³
Hungary	2,807	2,136	1,694	1,870 ^r	2,022 ³
Iceland ^c	138	140	140	140	140
India ^c	205,000	220,000	250,000	270,000	280,000
Indonesia	36,910	39,480	45,238 ^r	51,000 ^e	56,000
Iran ^c	50,000	61,000	66,000	70,000	72,000
Iraq ^c	7,000	8,000	10,000	10,000	12,000
Ireland	2,797	2,379	2,103	1,198 ^r	2,000
Israel	4,759	5,139	5,480	5,892 ^r	6,398 ³
Italy	36,317	34,408	33,120	26,200 ^r	22,000
Jamaica	737	723	766	760	825 ³
Japan	54,800	51,526	51,291	54,737	57,400 ³
Jordan	3,876	3,929	2,816 ^r	4,900	5,000
Kazakhstan	5,694	6,686	7,642	6,412 ^r	7,072 ³
Kenya	3,320	3,710	4,478	4,640	5,059 ³
Korea, North ^c	6,400	6,400	6,500 ^r	6,600 ^r	7,100
Korea, Republic of	50,126	47,420	48,249	47,087	47,291 ³
Kosovo ^c	500	360	370	535 ^r	535 ³
Kuwait ^c	2,000	2,000	2,250	2,250	2,250
Kyrgyzstan	579	760	1,022 ^r	1,239 ^r	1,676 ³
Laos ^c	1,000 ^r	1,200 ^r	1,300 ^r	1,500 ^r	1,500
Latvia	357 ^r	635 ^r	752 ^r	901 ^r	1,000
Lebanon	4,897 ^r	5,227	5,550	5,309 ^r	5,831 ³
Liberia	71	72	81	122 ^r	182 ³
Libya ^c	6,500	7,000	3,500	2,000	2,000
Lithuania	583	834 ^r	996	1,015 ^r	1,070 ³
Luxembourg	1,000	1,078	1,319	1,177 ^r	1,200
Macedonia	909	820	981	683	762 ³
Madagascar ^c	140	160	150	150	150
Malawi	232	188	203	172 ^r	320
Malaysia	19,457	19,762	21,198	21,726	21,457 ³
Martinique ^c	150	150	150	150	150
Mauritania	324	552	565	644 ^r	650
Mexico	35,160	34,503 ^r	35,400	36,184	34,612 ³
Moldova ^c	700	900 ^r	1,000 ^r	1,200 ^r	1,100
Mongolia	235	323	426	349	282 ³
Morocco	14,519	14,000 ^{r,e}	14,000 ^{r,e}	15,800 ^r	14,900 ³
Mozambique ⁷	777	884	976	1,184	1,299 ³
Namibia	--	5 ^e	390	501	662 ³
Nepal ^c	1,200 ^r	1,360 ^{r,3}	2,100 ^r	2,700 ^r	3,000
Netherlands	2,342	2,138	2,318	2,056 ^r	2,500
New Caledonia	138	160	145	124	112 ³
New Zealand ^c	1,200	1,100	1,200	1,200	1,200
Nicaragua	530 ^r	600	700	730 ^r	700
Niger	42	32	73	73 ^e	70
Nigeria ^c	10,000	11,000	12,800	16,400	18,000
Norway	1,093	1,298	1,387	1,659 ^r	1,700
Oman ^c	4,000	4,500	5,000	5,200 ³	4,472 ³
Pakistan ^c	29,900 ^{r,3}	30,000	29,100 ^{r,3}	30,300 ^r	31,000
Panama	1,679	1,491 ^r	1,766 ^r	2,252 ^r	2,000
Paraguay ^c	600 ^r	650 ^{r,3}	650 ^{r,3}	650 ^r	650
Peru	8,100 ^r	8,396	8,500 ^e	9,000 ^e	10,527 ³
Philippines	14,865	15,900	16,063	18,907	20,150 ³
Poland	15,043 ^r	15,521 ^r	18,552 ^r	15,919	14,538 ³

See footnotes at end of table.

TABLE 22—Continued
HYDRAULIC CEMENT: WORLD PRODUCTION, BY COUNTRY^{1,2}

(Thousand metric tons)

Country	2009	2010	2011	2012	2013 ^c
Portugal	5,318	4,587	5,069	4,090 ^r	5,000
Qatar	4,095	4,000 ^r	5,000	5,500 ^e	5,335 ³
Reunion ^c	380	300	250	350	400
Romania	7,797 ^r	6,909 ^r	7,307 ^r	8,223 ^r	7,451 ³
Russia	44,266	50,400	56,200	61,700	66,400 ³
Rwanda	92	95	94	100 ^e	100
Saudi Arabia	46,000 ^r	47,500 ^r	50,700 ^r	56,200 ^{r,e}	57,000
Senegal	3,320	4,066	4,677	4,689	5,191 ³
Serbia	2,166 ^r	2,130	2,095	1,831	1,592 ³
Sierra Leone	236	301	311	335	313 ³
Slovakia	3,011	2,888	3,219	2,915	3,121 ³
Slovenia	1,082	799	620	953 ^r	1,139 ³
South Africa, sales	11,784	10,870	11,234	11,560	12,200 ³
Spain, including Canary Islands	29,505	26,217	22,178	15,939	13,600 ³
Sri Lanka ^c	1,900	2,600	2,200	2,400	3,000
Sudan	622	1,930	3,002	3,511 ^r	3,500
Suriname	49	45	74	114	65 ³
Sweden	1,586	1,796	2,064	2,141 ^r	2,500
Switzerland	4,163	4,527	4,577	4,467	4,707 ³
Syria ^c	5,176 ^{r,3}	6,000	5,000 ^r	6,000 ^r	4,000
Taiwan	15,918	16,301	16,852	15,806	16,553 ³
Tajikistan	195	288	299	251 ^r	384 ³
Tanzania	1,941	2,312	2,409	2,581	2,600
Thailand	33,562	36,496	36,602	41,047	42,000
Togo ⁸	1,179	1,185	1,160	1,173 ^r	1,233 ³
Trinidad and Tobago	870	791	827	654	802 ³
Tunisia, grey and white	7,514	8,070	7,055	7,241	7,504 ³
Turkey	53,973	62,737	63,405	63,879	71,337 ³
Turkmenistan	1,100	1,150 ^r	1,950 ^r	2,370 ^r	2,650 ³
Uganda	1,162	1,347	1,666	1,780 ^r	2,023 ³
Ukraine	9,496	9,457	10,515	9,801	9,300
United Arab Emirates ^c	18,997 ³	18,000	18,000	17,000	21,000
United Kingdom	7,623	7,882	8,529	7,952 ^r	8,203 ³
United States, including Puerto Rico ⁹	64,843	67,202	68,639	74,934	77,415 ³
Uruguay	1,050 ^r	834 ^r	968 ^r	872 ^r	900
Uzbekistan	6,850	6,872	6,698	6,800	6,990 ³
Venezuela ^c	7,900	7,120	7,760	7,700	7,800 ³
Vietnam	48,810	55,801	58,271	55,531	58,000
Yemen	2,118	1,864	951	2,000 ^e	3,000
Zambia ^c	880	1,127 ³	1,200	1,200	1,200
Zimbabwe ^c	700	800	1,000	1,100 ^r	1,200
Total ^c	3,050,000 ^r	3,290,000	3,650,000	3,820,000 ^r	4,070,000

^cEstimated. ^pPreliminary. ^rRevised. -- Zero.

¹World totals and estimated data are rounded to no more than three significant digits; may not add to totals shown. Even where presented unrounded, reported data are thought to be accurate to no more than three significant digits. Data are from a variety of sources, including the European Cement Association.

²Includes data available through September 8, 2015. Data may include clinker exports for some countries.

³Reported figure.

⁴Data are for fiscal year ending June 30 of the following year.

⁵Data are for fiscal year ending March 31 of the following year.

⁶Data are for fiscal year ending July 7 of the current year.

⁷Cement sales from Cimentos de Moçambique SARL (Sociedade Anónima de Responsabilidade Limitada) only.

⁸Calculated based on reported production of clinker and imports and exports of cement and clinker.

⁹Portland and masonry cements only. Includes a small (less than 0.3% per year) component of double-counting where portland cement (not clinker) is consumed to make masonry cement; the precise amount of double-counting cannot be determined because of the involvement of portland cement stockpiles.