



2017 Minerals Yearbook

IRON AND STEEL [ADVANCE RELEASE]

IRON AND STEEL

By Candice C. Tuck

Domestic survey data and tables were prepared by Hoa P. Phamdang, statistical assistant.

In 2017, U.S. raw steel production increased to 81.6 million metric tons (Mt), an increase of 4.0% from 78.5 Mt in 2016. Of that quantity, carbon steel accounted for 75.7 Mt, stainless steel accounted for 2.75 Mt, and other alloy steels accounted for 3.17 Mt. The domestic industry used 74% of the raw steel production capability. Exports of steel-mill products increased by 13% to 9.55 Mt in 2017 from 8.45 Mt in 2016, and imports increased by 15% to 34.6 Mt in 2017 from 30.0 Mt in 2016. Among raw materials, pig iron production remained nearly the same at 22.4 Mt, and direct-reduced iron production increased by 65% to 2.99 Mt (table 1).

World production of raw steel increased by 3.8% to 1,690 Mt in 2017 from 1,630 Mt in 2016. In 2017, global production of pig iron increased slightly to 1,180 Mt from 1,160 Mt in 2016, and production of direct-reduced iron increased by 5.0% to 75.0 Mt from 71.4 Mt in 2016 (table 1). In 2017, global steelmaking capacity decreased for the second year in a row to 2,250 million metric tons per year (Mt/yr), a slight decrease from 2,280 Mt/yr in 2016 and a 3.6% decrease from 2,330 Mt/yr in 2015. Production capacity increased steadily through 2015 from 1,360 Mt/yr in 2005. Global capacity utilization increased to 75.0% in 2017 from 71.3% in 2016 and 69.4% in 2015 as capacity decreased and production increased (U.S. Department of Commerce, International Trade Administration, 2018, p. 3–6).

Legislation and Government Programs

In April 2017, an investigation into whether dependence on steel imports constituted a national security threat was initiated by the U.S. Department of Commerce (DOC) through the Presidential authority under Section 232 of the Trade Expansion Act of 1962. Citing concerns of increased low-cost imports from China in recent years and potential plant closings, the DOC had 270 days to complete an investigation and submit findings to the President of the United States. If imports are determined to be a national security threat, the DOC may recommend imposing trade actions, such as quotas or tariffs, to modify import levels. Throughout 2017, additional antidumping or countervailing duties were enacted or continued for several economically important steel products, and several investigations into potential antidumping and countervailing cases were ongoing (U.S. Department of Commerce, 2007; Holland and Stone, 2017).

Production

In 2017, U.S. raw steel production increased to 81.6 Mt, an increase of 4.0% from 78.5 Mt in 2016. The American Iron and Steel Institute (AISI) estimated raw steel production capacity in 2017 to be 110 Mt, a slight decrease from 111 Mt in 2016. Production in 2017 accounted for 74.0% of capability utilization compared with 70.5% in 2016 (American Iron and Steel Institute, 2018, p. 73).

Integrated steel producers smelted iron ore to make liquid iron in blast furnaces and used basic oxygen furnaces (BOFs) to refine the liquid iron, with some steel scrap, to produce raw liquid steel. The BOF process was used to make 25.8 Mt of steel in the United States, essentially unchanged from 25.9 Mt in 2016. The use of this process decreased to 31.6% of total steel production in 2017 from 33.0% in 2016 (American Iron and Steel Institute, 2018, p. 70–71). Blast furnaces in the United States were operated by AK Steel Corp., ArcelorMittal USA, LLC, and U.S. Steel Corp. at nine locations in 2017 (Iron and Steel Technology, 2018b).

Minimills and specialty mills are nonintegrated steel producers that use electric arc furnaces (EAFs) to melt low-cost raw materials (primarily scrap). They also employ continuous casting machines and hot-rolling mills that are often closely coupled to casting operations. Specialty mills include producers of electrical alloys, stainless steel, and tool steel; high-temperature alloys; forged ingots; and other low-volume steel products. During 2017, a total of 54 companies operated 111 EAF facilities in the United States (Iron and Steel Technology, 2018a, p. 144–159). These mills accounted for 68.4% of all domestic steelmaking, up from 67.0% in 2016, and produced 55.8 Mt of steel in 2017, 6% more than the 52.6 Mt produced in 2016 (American Iron and Steel Institute, 2018, p. 70–71).

Raw liquid steel is mostly cast into semifinished products in continuous casting machines. Continuous casting production accounted for nearly all the domestic steel production, or 81.3 Mt. Only 295,000 metric tons were produced in ingot form in 2017 (American Iron and Steel Institute, 2018, p. 71).

Consumption and Shipments

Steel products are delivered in a variety of intermediate forms as continuous casting products (such as blooms, billets, and bars), or in a variety of semifinished steel products (such as plates, rods, sheets, or wires), or finished steel products (such as nails, pipes, rebar, or tracks). Steel-mill products are produced either by forging or by rolling into forms normally delivered for fabrication or use. Some companies purchase semifinished steel-mill products directly from other steel companies and use them to produce finished steel products. The accumulated shipments of all companies less the shipments to other reporting companies are identified as net shipments to avoid double counting.

U.S. apparent steel consumption, calculated as net shipments plus imports minus exports, was 107 Mt in 2017, a 7.5% increase from 100 Mt in 2016 (table 1). Since 2000, apparent steel consumption has ranged between a high of 120 Mt in 2006 and a low of 63 Mt in 2009. Net shipments of steel-mill products by U.S. companies were 82.5 Mt, a 5% increase from 78.5 Mt in 2016. Shipments of steel-mill products by end use in 2017 were

led by construction and contractors' products (21.2 Mt); automotive products (13.2 Mt); containers, packaging, and shipping materials (1.38 Mt); and rail transportation products (1.13 Mt). The largest year-on-year increases were in the construction and contractors' products (25.8%) and automotive products (16%) (American Iron and Steel Institute, 2018, p. 23, 27).

Prices

The Producer Price Index (PPI) program of the U.S. Department of Labor, Bureau of Labor Statistics (2018) measures the average change over time in the selling prices received by domestic producers for their output. Exports are included, and imports are excluded so that the output of U.S. producers may be valued. The PPI of steel-mill products is one of about 10,000 PPIs for individual products and groups of products released each month. The PPI for steel-mill products was 187.4 in 2017, an increase of 12% from 167.8 in 2016 and an increase of 5.0% from that in 2015 (1982 base=100) (table 1). The average monthly price of hot-rolled steel sheet (U.S. Midwest mills, free on board) fluctuated from a low of \$299 per metric ton in September 2017 to a high of \$378 per metric ton in May 2017 (American Metal Market, 2018).

Foreign Trade

U.S. exports of steel-mill products in 2017 were 9.6 Mt, a 13% increase from 8.4 Mt in 2016. Canada received 4.7 Mt of United States steel products, an 11% increase from those in 2016, followed by Mexico with 3.7 Mt, a 12% increase from those in 2016. Domestic imports of steel-mill products were 34.6 Mt in 2017, a 15% increase from 30 Mt in 2016. Canada was the leading source of imports with 17%, followed by Brazil (14%), the Republic of Korea (10%), the European Union (10%), Mexico (9%), Russia (8%), and Turkey (6%) (tables 1, 4).

Imports of semifinished steel by steel companies are taken into consideration when calculating apparent consumption (supply) of steel-mill products in the United States and the share of the market represented by imported steel. The amount of semifinished steel consumed by companies that also produced raw steel is subtracted from domestic consumption to avoid double counting the imported, semifinished steel and the products produced from it. In 2017, imports, as a percentage of apparent supply, were 26.9%, an increase from 25.4% in 2016 and a decrease from 29.1% in 2015 (American Iron and Steel Institute, 2018, p. 45).

World Review

World production of pig iron in 2017 totaled 1,180 Mt, a slight increase from 1,160 Mt in 2016. China continued to be the leading producer of pig iron in the world, producing 711 Mt, which was 60% of the world total and slightly more than that of 2016, followed by Japan (78.3 Mt), India (66.0 Mt), Russia (51.6 Mt), the Republic of Korea (46.7 Mt), Brazil (28.4 Mt), Germany (28.4 Mt), and the United States (22.4 Mt) (tables 1, 9).

World production capacity of direct-reduced iron (DRI) at facilities that were operating, under construction, or under contract in 2017 was estimated to be 128 Mt/yr, including 14 Mt/yr that was idle. DRI production worldwide was 87.1 Mt in 2017, a 3% increase from 72.7 Mt in 2016. The

leading producer of DRI was India (22.3 Mt), followed by Iran (20.6 Mt), Russia (6.99 Mt), Mexico (6.01 Mt), and Saudi Arabia (5.74 Mt). In 2017, an additional DRI capacity of about 12 Mt/yr was under construction in Algeria, Iran, the United States, and Venezuela. The leading technology was, according to a declining order of production, the Midrex process, followed by coal-based and HYL/Energiron (Midrex Technologies, Inc., 2018, p. 9, 12–15).

World production of raw steel was 1,690 Mt, a 3.8% increase from 1,630 in 2016. China led global steel production with 832 Mt, followed by Japan (105 Mt), India (101 Mt), the United States (81.6 Mt), Russia (71.3 Mt), and the Republic of Korea (71.0 Mt). These six countries accounted for 75% of all global production (table 10). China led apparent steel use of finished steel products (46.4%), followed by other countries in Asia (20.0%), the European Union (10.2%), and North America (8.9%). The leading exporter of steel in 2017 was China with 74.8 Mt, followed by Japan (37.5 Mt), the Republic of Korea (31.4 Mt), Russia (31.1 Mt), and the European Union (31.1 Mt). The leading importer of steel in 2017 was the European Union with 41.2 Mt, followed by the United States (35.4 Mt), Germany (27.1 Mt), Italy (20.1 Mt), and the Republic of Korea (19.3 Mt). The leading global steel producers were ArcelorMittal S.A. (97 Mt), China Baowu Steel Group Corp., Ltd. (65 Mt), Nippon Steel and Sumitomo Metal Corp. Group (47 Mt), and Hesteel Group Co. Ltd. (46 Mt). The leading steel product exports in 2017, by quantity, were hot-rolled sheets and coils (84.8 Mt), ingots and semifinished materials (60.1 Mt), galvanized sheet (46.2 Mt), steel tubes and fittings (41.9 Mt), and cold-rolled sheets and coils (37.4 Mt) (World Steel Association, 2018a, p. 7, 15, 25–26).

Outlook

The increase or decrease of gross domestic product (GDP), the broadest measure of a nation's economic activity, can be considered an indicator of the health of the steelmaking and steel manufacturing industries, worldwide and domestically. The World Bank's forecast of global GDP growth for 2018, 2019, and 2020 is 3.1%, 3.0%, and 2.9%, respectively, after 3.1% and 2.4% in 2017 and 2016, respectively. The 2017 rate of GDP growth for China is estimated to be 6.9% and is projected to decrease to 6.5%, 6.3%, and 6.2% in 2018, 2019, and 2020, respectively. The rate of GDP growth for India is estimated to be 6.7% in 2017 and is projected to be 7.3%, 7.5%, and 7.5% in 2018, 2019, and 2020, respectively (World Bank, The, 2018, p. 4). The U.S. Federal Reserve's projections for GDP rate of growth for the United States are 3.0% for 2018, 2.3% for 2019, and 2.0% for 2020 (Board of Governors of the Federal Reserve System, 2018).

According to the World Steel Association (2018b), global consumption of finished steel is expected to increase slightly to 1,620 Mt in 2018 and 1,630 Mt in 2019, from 1,590 Mt in 2017. In developing countries, steel demand was expected to increase by 4.9% in 2018 and by 4.5% in 2019, owing to increased oil and other commodity prices. In the United States and the European Union, steel demand is expected to increase in 2018 owing to steady growth in the construction and manufacturing sectors. Infrastructure investment plans in the United States are

not expected to contribute to an increase in steel demand in the short term, despite announcements of a potential infrastructure plan in early 2018. China's steel demand is forecast to remain flat in 2018 and decrease slightly in 2019, owing to a lack of investment and only mild stimulus in 2017, as well as the continued slowing in construction activity and decelerating growth in the automotive and home appliance sectors.

References Cited

- American Iron and Steel Institute, 2018, Annual statistical report 2017: Washington, DC, American Iron and Steel Institute, 115 p.
- American Metal Market, 2018, Custom pricing reports: New York, NY, American Metal Market. (Accessed June 15, 2019, via <http://www.amm.com>.)
- Board of Governors of the Federal Reserve System, 2018, December 19, 2018—FOMC projections materials, accessible version: Washington, DC, Board of Governors of the Federal Reserve System, December 19. (Accessed June 15, 2019, at <https://www.federalreserve.gov/monetarypolicy/fomcprojtab120181219.htm>.)
- Holland, Steve, and Stone, Mike, 2017, Trump targets cheap Chinese steel in probe, rallying U.S. steel stocks: Thomson Reuters, April 20. (Accessed June 15, 2019, at <https://www.reuters.com/article/us-usa-trump-steel-idUSKBN17M237>.)
- Iron and Steel Technology, 2018a, 2017 AIST electric arc furnace roundup: Iron and Steel Technology, January, p. 136–159.
- Iron and Steel Technology, 2018b, 2017 AIST North American blast furnace roundup: Iron and Steel Technology, March, p. 222–223.
- Midrex Technologies, Inc., 2018, 2017 world direct reduction statistics: Charlotte, NC, Midrex Technologies, Inc., May 24, 16 p. (Accessed June 15, 2019, at https://www.midrex.com/wp-content/uploads/MidrexStatsBook2017.5_24_18_.pdf.)
- U.S. Department of Commerce, 2007, Section 232 investigations program guide—The effects of imports on the national security: Washington, DC, U.S. Department of Commerce, June, 20 p. (Accessed August 12, 2019, at <https://www.bis.doc.gov/index.php/documents/section-232-investigations/86-section-232-booklet/file>.)
- U.S. Department of Commerce, International Trade Administration, 2018, Global steel report: U.S. Department of Commerce, International Trade Administration, September, 15 p. (Accessed June 15, 2019, at <https://www.trade.gov/steel/pdfs/global-monitor-report-2017.pdf>.)
- U.S. Department of Labor, Bureau of Labor Statistics, 2018, Producer Price Indexes—Steel mill products: Washington, DC, U.S. Department of Labor, Bureau of Labor Statistics. (Accessed June 15, 2019, at https://www.bls.gov/regions/mid-atlantic/data/producerpriceindexmetals_us_table.htm.)
- World Bank, The, 2018, Global economic prospects—The turning of the tide?: Washington, DC, The World Bank, June, p. 182. (Accessed June 15, 2019, via <http://hdl.handle.net/10986/29801>.)

- World Steel Association, 2018a, World steel in figures 2018: Brussels, Belgium, World Steel Association, 17 p. (Accessed June 15, 2019, at <https://www.worldsteel.org/en/dam/jcr:f9359dff-9546-4d6b-bed0-996201185b12/World%2520Steel%2520in%2520in%2520Figures%25202018.pdf>.)
- World Steel Association, 2018b, World steel short range outlook April 2018: Brussels, Belgium, World Steel Association press release, April 17. (Accessed June 15, 2019, at <https://www.worldsteel.org/media-centre/press-releases/2018/worldsteel-short-range-outlook-april-2018.html>.)

GENERAL SOURCES OF INFORMATION

U.S. Geological Survey Publications

- Iron and Steel. Ch. in Mineral Commodity Summaries, annual.
- Iron and Steel (Fe). Ch. in Metal Prices in the United States Through 2010, Scientific Investigations Report 2012–5188, 2013.
- Iron and Steel Scrap. Mineral Industry Surveys, monthly.
- Iron and Steel Scrap (Fe). Ch. in Metal Prices in the United States Through 2010, Scientific Investigations Report 2012–5188, 2013.
- Iron and Steel Slag. Ch. in Mineral Commodity Summaries, annual.
- Iron and Steel Slag. Ch. in Minerals Yearbook, annual.
- Iron Ore. Ch. in Mineral Commodity Summaries, annual.
- Iron Ore. Ch. in Minerals Yearbook, annual.
- Iron Ore. Mineral Industry Surveys, monthly.

Other

- American Metal Market, daily.
- Annual Statistical Report. American Iron and Steel Institute, Washington, DC.
- Direct from Midrex Journal. Midrex Direct Reduction Corporation. Iron & Steelmaker. American Institute of Mining, Metallurgical, and Petroleum Engineers—Iron and Steel Society, Warrenton, PA.
- Making, Shaping, and Treating of Steel. Association of Iron and Steel Engineers, Pittsburgh, PA.
- Metal Bulletin, weekly.
- Steel Manufacturers Association, Washington, DC.
- Steel Statistical Yearbook. World Steel Association, Brussels, Belgium.
- Steel Times International.

TABLE 1
SALIENT IRON AND STEEL STATISTICS¹

(Thousand metric tons unless otherwise noted)

	2013	2014	2015	2016	2017
United States:					
Pig iron: ²					
Production	30,300	29,400	25,400	22,300	22,400
Exports	18	7	17	37	37
Imports for consumption	4,120	4,600	4,530	3,870	5,130
Direct-reduced iron:					
Production ³	--	1,300	1,100	1,810	2,990
Exports ²	(4)	1	20	178	640
Imports for consumption ²	2,240	2,390	1,860	1,600	1,790
Raw steel production: ⁵					
Carbon steel	80,700	81,400	73,600	73,200	75,700
Stainless steel	2,030	2,390	2,350	2,480	2,750
All other alloy steel	4,110	4,420	2,930	2,820	3,170
Total	86,900	88,200	78,800	78,500	81,600
Capability utilization, percent	76.7	77.5	70.1	70.5	74.0
Steel mill products:					
Net shipments ²	86,600	89,100	78,500	78,500	82,500
Exports ²	11,500	10,900	9,050	8,450	9,550
Imports ²	29,200	40,200	35,200	30,000	34,600
Producer Price Index (1982=100.0) ⁶	195.0	200.2	177.1	167.8	187.4
World production:					
Pig iron	1,170,000	1,190,000	1,160,000	1,160,000	1,180,000
Direct-reduced iron ³	70,300	74,400	68,400	71,400	75,000
Raw steel	1,610,000	1,670,000	1,620,000	1,630,000	1,690,000

-- Zero.

¹Table includes data available through August 29, 2019. Data are rounded to no more than three significant digits, except "Producer Price Index"; may not add to totals shown.

²Source: American Iron and Steel Institute (AISI).

³Sources: Midrex Technologies, Inc., foreign Governments, and producing companies.

⁴Less than ½ unit.

⁵Raw steel is defined by AISI as steel in the first solid state after melting, suitable for rolling.

⁶Source: U.S. Department of Labor, Bureau of Labor Statistics.

TABLE 2
MATERIALS CONSUMED IN BLAST FURNACES AND
PIG IRON PRODUCED¹

(Thousand metric tons)

Material	2016	2017
Iron oxides: ²		
Pellets	29,000	28,900
Sinter ³	4,230	4,190
Total	33,200	33,100
Scrap ⁴	1,940	1,480
Coke ²	7,150	7,120
Pig iron, produced ²	22,300	22,400

¹Table includes data available through August 29, 2019. Data are rounded to no more than three significant digits; may not add to totals shown.

²Source: American Iron and Steel Institute (AISI).

³Includes sintered ore and pellet fines, dust, mill scale, and other revert iron-bearing materials; also includes some nodules.

⁴Mainly briquetted turnings and borings; shredded scrap, scrap produced at blast furnaces, and remelt not included.

TABLE 3
DISTRIBUTION OF SHIPMENTS OF STEEL MILL PRODUCTS, BY STEEL TYPE, PRODUCT,
AND MARKET¹

	Quantity (thousand metric tons)		Percent of total	
	2016	2017	2016	2017
Shipments by steel type:				
Carbon steel	74,000	77,000	94.22	93.43
Alloy steel	2,170	2,920	2.77	3.54
Stainless steel	2,360	2,500	3.01	3.04
Total	78,500	82,500	100.00	100.00
Steel mill products:				
Ingots, blooms, billets, and slabs	434	658	0.55	0.80
Wire rods	1,600	1,920	2.03	2.33
Structural shapes, heavy	5,720	5,430	7.28	6.59
Plates, cut lengths	5,450	5,550	6.94	6.73
Plates, in coils	1,680	2,120	2.14	2.57
Rails	659	712	0.84	0.86
Railroad accessories	192	280	0.24	0.34
Bars, hot-rolled	3,730	3,670	4.76	4.46
Bars, light-shaped	1,840	1,820	2.34	2.20
Bars, reinforcing	6,020	6,390	7.67	7.75
Bars, cold finished	894	781	1.14	0.95
Pipe and tubing, standard pipe	375	570	0.48	0.69
Pipe and tubing, oil country goods	1,060	1,720	1.35	2.08
Pipe and tubing, line pipe	442	499	0.56	0.61
Pipe and tubing, mechanical tubing	466	491	0.59	0.60
Pipe and tubing, pipe piling	--	94	--	0.11
Pipe and tubing, pressure tubing	15	17	0.02	0.02
Pipe and tubing, stainless	16	14	0.02	0.02
Pipe and tubing, structural	8	464	0.01	0.56
Wire	330	384	0.42	0.47
Tin mill products, blackplate	32	43	0.04	0.05
Tin mill products, tinplate	1,010	970	1.29	1.18
Tin mill products, tin free steel	238	234	0.30	0.28
Tin mill products, tin coated sheets	80	64	0.10	0.08
Sheets, hot-rolled	19,200	20,300	24.45	24.65
Sheets, cold-rolled	9,950	10,100	12.68	12.28
Sheets and strip, hot dip galvanized	14,400	14,100	18.29	17.11
Sheets and strip, electrogalvanized	872	713	1.11	0.86
Sheets and strip, other metallic coated	1,390	1,650	1.77	2.00
Strip, hot-rolled	39	53	0.05	0.06
Strip, cold-rolled	412	582	0.52	0.71
Total	78,500	82,500	100.00	100.00
Shipments by markets:				
Service centers and distributors	21,900	21,900	27.84	26.60
Construction	20,200	21,200	25.70	25.75
Automotive	13,700	13,000	17.45	15.81
Machinery	1,010	1,290	1.28	1.57
Containers	1,410	1,380	1.79	1.67
All others	20,400	23,600	25.94	28.60
Total	78,500	82,500	100.00	100.00

-- Zero.

¹Table includes data available through August 29, 2019. Data are rounded to no more than three significant digits, except percentages; may not add to totals shown.

Source: American Iron and Steel Institute.

TABLE 4
U.S. IMPORTS AND EXPORTS OF STEEL MILL PRODUCTS,
BY COUNTRY OR LOCALITY¹

(Thousand metric tons)

Country or locality	2016		2017	
	Imports	Exports	Imports	Exports
Argentina	81	6	211	13
Australia	--	16	--	16
Brazil	3,960	53	4,670	50
Canada	5,120	4,220	5,730	4,680
China	789	73	748	87
European Union ²	2,890	177 ^r	3,340	316
Germany	1,110	42	1,380	37
India	318	--	743	--
Japan	1,950	16	1,730	19
Korea, Republic of	3,460	40	3,410	43
Mexico	2,720	3,340	3,170	3,740
Russia	1,870	--	2,870	--
South Africa	211	4	535	2
Sweden	281	11	302	17
Taiwan	983	14	1,130	21
Turkey	2,190	--	1,990	--
Ukraine	195	--	241	--
Venezuela	--	21	--	14
Vietnam	871	--	679	--
Other	962	413 ^r	1,710	502
Total	30,000	8,450	34,600	9,550

^rRevised. -- Zero.

¹Table includes data available through August 29, 2019. Data are rounded to no more than three significant digits; may not add to totals shown.

²Excludes Germany and Sweden.

Source: American Iron and Steel Institute.

TABLE 5
U.S. EXPORTS OF IRON AND STEEL PRODUCTS¹

(Thousand metric tons)

	2016	2017
Steel mill products:		
Ingots, blooms, billets, and slabs	111	143
Wire rods	102	101
Structural shapes, heavy	434	455
Steel piling	20	13
Plates, cut lengths	1,090	1,130
Plates, in coils	481	667
Rails, standard	70	81
Rails, other	64	59
Railroad accessories	40	39
Bars, hot-rolled	405	480
Bars, light-shaped	72	59
Bars, concrete reinforcing	258	349
Bars, cold-finished	124	138
Tool steel	69	105
Pipe and tubing, standard pipe	50	51
Pipe and tubing, oil country goods	246	346
Pipe and tubing, line pipe	60	114
Pipe and tubing, mechanical tubing	74	61
Pipe and tubing, stainless	37	33
Pipe and tubing, nonclassified	280	304
Pipe and tubing, structural	159	165
Pipe for piling	4	4
Wire	111	109
Tin mill products, blackplate	1	1
Tin mill products, tinplate	108	142
Tin mill products, tin free steel	9	9
Sheets, hot-rolled	926	1,140
Sheets, cold-rolled	815	954
Sheets and strip, hot-dip galvanized	1,210	1,320
Sheets and strip, electrogalvanized	248	209
Sheets and strip, other metallic coated	205	237
Sheets and strip, electrical	77	56
Strip, hot-rolled	203	185
Strip, cold-rolled	282	297
Total	8,450	9,550
Fabricated steel products:		
Structural shapes, fabricated	289	276
Rails, used	2	2
Railroad products	212	179
Wire rope	13	22
Wire, stranded products	27	24
Wire, other products	76	64
Springs	127	133
Nails and staples	26	29
Fasteners	628	667
Chains and parts	39	44
Grinding balls	128	125
Pipe and tube fittings	28	29
Other ²	209	192
Total	1,800	1,790
Grand total	10,300	11,300

See footnotes at end of table.

TABLE 5—Continued
U.S. EXPORTS OF IRON AND STEEL PRODUCTS¹

(Thousand metric tons)

	2016	2017
Cast iron and steel products:		
Cast steel pipe fittings	19	20
Cast iron pipe and fittings	28	28
Cast steel rolls	(3)	(3)
Cast grinding balls ⁴	50	41
Granules, shot and grit ⁵	29	31
Other castings	62	69
Total	188	189

¹Table includes data available through August 29, 2019. Data are rounded to no more than three significant digits; may not add to totals shown.

²Includes shapes cold formed, sashes and frames, fence and sign posts, architectural and ornamental work, and conduit.

³Less than ½ unit.

⁴Harmonized Tariff Schedule of the United States (HTS) code 7325.91.0000.

⁵HTS code 7205.10.0000.

Sources: American Iron and Steel Institute and the U.S. Census Bureau.

TABLE 6
U.S. IMPORTS OF IRON AND STEEL PRODUCTS¹

(Thousand metric tons)

	2016	2017
Steel mill products:		
Ingots, blooms, billets, and slabs	6,060	7,770
Wire rods	1,450	1,430
Structural shapes-heavy	794	780
Steel piling	83	101
Plates, cut lengths	1,110	751
Plates, in coils	1,220	1,240
Rails and railroad accessories	324	239
Bars, hot-rolled	1,080	1,320
Bars, light-shaped	167	153
Bars, reinforcing	1,910	1,420
Bars, cold-finished	281	317
Tool steel	139	157
Pipe and tubing, standard pipe	758	1,060
Pipe and tubing, oil country goods	1,050	3,100
Pipe and tubing, line pipe	1,240	2,030
Pipe and tubing, mechanical tubing	468	608
Pipe and tubing, pressure tubing	44	60
Pipe and tubing, stainless	118	137
Pipe and tubing, nonclassified	21	15
Pipe and tubing, structural	481	574
Pipe for piling	20	39
Wire	808	777
Tin mill products, blackplate	99	61
Tin mill products, tinplate	805	854
Tin mill products, tin free steel	194	212
Sheets, hot-rolled	2,630	1,930
Sheets, cold-rolled	2,300	2,660
Sheets and strip, hot-dip galvanized	2,810	3,100
Sheets and strip, electrogalvanized	148	135
Sheets and strip, other metallic coated	938	1,070
Sheets and strip, electrical	60	97
Strip, hot-rolled	145	181
Strip, cold-rolled	199	213
Total	30,000	34,600
Fabricated steel products:		
Structural shapes, fabricated	1,360	1,420
Rails, used	95	50
Railroad products	166	187
Wire rope	107	127
Wire-stranded products	292	297
Wire, other products	231	256
Springs	418	424
Nails and staples	711	735
Fasteners	1,150	1,330
Chains and parts	124	146
Grinding balls	120	110
Pipe and tube fittings	310	396
Other ²	515	612
Total	5,600	6,090
Grand total	35,600	40,700
Cast iron and steel products:		
Cast steel pipe fittings	144	163
Cast iron pipe and fittings	48	43
Cast steel rolls	14	12
Cast grinding balls ³	16	16
Granules, shot and grit ⁴	54	30
Other castings	228	259
Total	504	523

See footnotes at end of table.

TABLE 6—Continued
U.S. IMPORTS OF IRON AND STEEL PRODUCTS¹

¹Table includes data available through August 29, 2019. Data are rounded to no more than three significant digits; may not add to totals shown.

²Includes shapes cold formed, sashes and frames, fence and sign posts, architectural and ornamental work, and conduit.

³Harmonized Tariff Schedule of the United States (HTS) code 7325.91.0000.

⁴HTS code 7205.10.0000.

Sources: American Iron and Steel Institute and the U.S. Census Bureau.

TABLE 7
U.S. IMPORTS OF STAINLESS STEEL¹

(Metric tons)

Product	2016	2017
Semifinished	110,000	221,000
Plate	76,100	87,800
Sheet and strip	393,000	392,000
Bars and shapes	132,000	165,000
Wire and wire rods	67,000	79,300
Pipe and tube	118,000	137,000
Total	896,000	1,080,000

¹Table includes data available through August 29, 2019. Data are rounded to no more than three significant digits; may not add to totals shown.

Source: American Iron and Steel Institute.

TABLE 8
COAL AND COKE AT COKE PLANTS^{1,2}

(Thousand metric tons)

	2016	2017
Coal, consumption	15,000	15,900
Coke:		
Production ³	10,800	11,700
Exports	907	1,100
Imports	208	53
Consumption, apparent ³	10,200	10,700

¹Table includes data available through August 29, 2019. Data are rounded to no more than three significant digits.

²Includes furnace and merchant coke plants.

³Does not include breeze.

Source: U.S. Energy Information Administration, Quarterly Coal Report.

TABLE 9
 PIG IRON AND DIRECT-REDUCED IRON: WORLD PRODUCTION, BY COUNTRY OR LOCALITY¹

(Thousand metric tons, gross weight)

Country or locality	2013	2014	2015	2016	2017
Algeria, pig iron	300	300 ^c	300 ^c	300 ^c	300 ^c
Argentina:					
Direct-reduced iron	1,540	1,670	1,260	780	780 ^c
Pig iron	2,650	2,766	2,685	2,141	2,200
Australia, pig iron	3,342	3,282	3,594	3,738	3,800
Austria, pig iron	6,152	6,029	5,805	5,642	6,300
Bahrain, pig iron	780	1,440	1,230	1,260	1,260
Belgium, pig iron	4,343	4,388	4,248	4,869	4,900
Bosnia and Herzegovina, pig iron	759	860	845	778	778 ^c
Brazil, pig iron	26,200	27,016	27,803	26,031	28,400
Canada:					
Direct-reduced iron	1,250	1,550	1,502	1,400	1,600
Pig iron	6,100	6,728	5,851	6,240	6,306
Chile, pig iron	766	584	644	678	700
China, pig iron ²	708,970	713,740	691,410	700,740	710,800
Colombia, pig iron	307	234	240	225	225 ^c
Czechia, pig iron	4,040	4,152	4,031	4,164	3,700
Egypt:					
Direct-reduced iron	3,430	2,880	2,730	2,820	2,820 ^c
Pig iron	550	550	500	500 ^c	500 ^c
Finland, pig iron	2,050	2,475	2,594	2,670 ^c	2,600
France, pig iron	10,276	10,866	10,095	9,724	10,700
Germany:					
Direct-reduced iron	500	570	550	600	600 ^c
Pig iron	26,678	27,379	27,842	27,264	28,400
Hungary, pig iron	628	801	1,247	863	1,311
India:					
Direct-reduced iron	16,893	20,366	16,228	18,470	18,500 ^c
Pig iron	51,359	55,166	58,393	62,994	66,000
Indonesia, pig iron	760 ^c	120 ^c	-- ^c	--	-- ^c
Iran:					
Direct-reduced iron	14,458 ^r	14,551 ^r	14,546 ^r	16,010	16,000 ^c
Pig iron	2,007	2,782	2,459	2,251	2,300
Italy, pig iron	6,933	6,371	5,051	6,048	5,100
Japan, pig iron	83,849	83,872	81,011	80,170	78,300
Kazakhstan, pig iron	2,634	3,185	3,234	3,302	4,200
Korea, North, pig iron ^c	250	250	250	250	250
Korea, Republic of, pig iron	41,045	46,909	47,639	46,327	46,700
Libya, direct-reduced iron	950	1,000	450	690	560
Malaysia, direct-reduced iron	1,400	1,330	960	660	660 ^c
Mexico:					
Direct-reduced iron	6,100	5,976 ^r	5,500	5,310	6,000
Pig iron	4,910 ^{r,c}	5,116	4,580 ^{r,c}	4,474	4,200
Netherlands, pig iron ³	5,681	5,868	6,050	6,091	6,100
New Zealand, pig iron	682	680	678	670	700
Norway, pig iron	106	102	100	100	100 ^c
Oman, direct-reduced iron	1,470	1,450	1,480	1,460	1,460 ^c
Pakistan, pig iron	165	142	163	--	--
Paraguay, pig iron	69	71	73	50	38
Peru, direct-reduced iron	93	88	72	11	--
Poland, pig iron	4,011	4,637	4,821	4,673	5,200
Qatar, direct-reduced iron	2,385 ^r	2,547 ^r	2,631	2,506	2,548
Romania, pig iron	1,604	1,631	1,790	1,980	1,900
Russia:					
Direct-reduced iron	5,330	5,350	5,440	5,700	7,200 ^c
Pig iron	49,945	51,460	52,411	51,829	51,600
Saudi Arabia, direct-reduced iron	6,070	6,460 ^c	5,800 ^c	5,890	5,890 ^c
Serbia, pig iron	365	550	904	1,154	1,150 ^c
Slovakia, pig iron	3,617	3,838	3,738	3,987 ^r	4,100

See footnotes at end of table.

TABLE 9—Continued
 PIG IRON AND DIRECT-REDUCED IRON: WORLD PRODUCTION, BY COUNTRY OR LOCALITY¹

(Thousand metric tons, gross weight)

Country or locality	2013	2014	2015	2016	2017
South Africa:					
Direct-reduced iron	1,295	1,612	1,125	700	700 ^e
Pig iron	4,929	4,402	4,464	4,310	4,400
Spain, pig iron	3,949	3,958	4,450	4,114	4,500
Sweden, pig iron	2,896	3,078	2,865	3,078	3,100
Taiwan, pig iron	13,319	14,440	14,370	14,830	14,400
Trinidad and Tobago, direct-reduced iron	1,295	1,612	1,125	1,500	1,500 ^e
Turkey, pig iron	9,180	9,364	10,184	10,303	10,600
Ukraine, pig iron	29,089	24,801	21,863	23,613	20,100
United Arab Emirates, direct-reduced iron	3,075	2,410	3,190	3,480	3,608
United Kingdom, pig iron	9,471	9,705	8,774	6,218	6,000
United States:					
Direct-reduced iron	--	1,300	1,100	1,810	2,990
Pig iron	30,300	29,400	25,400	22,300	22,400
Venezuela, direct-reduced iron	2,770	1,680	2,750	1,590	1,590 ^e
Vietnam, pig iron	650	1,393	1,700	2,000 ^e	2,000 ^e
Total	1,240,000	1,260,000	1,230,000	1,240,000	1,250,000
Of which:					
Direct-reduced iron	70,300	74,400	68,400	71,400	75,000
Pig iron	1,170,000	1,190,000	1,160,000	1,160,000	1,180,000

^eEstimated. ^rRevised. -- Zero.

¹Table includes data available through September 13, 2018. All data are reported unless otherwise noted. Totals and estimated data are rounded to no more than three significant digits; may not add to totals shown.

²Data reported by State Statistical Bureau and are considered by the Government of China to be official statistics.

³Includes blast furnace ferroalloys.

TABLE 10
RAW STEEL: WORLD PRODUCTION, BY COUNTRY OR LOCALITY^{1,2}

(Thousand metric tons, gross weight unless otherwise specified)

Country or locality ³	2013	2014	2015	2016	2017
Afghanistan	25 ^r	24 ^r	3 ^r	24 ^e	33
Albania	550 ^r	560 ^r	150 ^r	100	100 ^e
Algeria	417	415	650	650	650 ^e
Argentina	5,186	5,488	5,028	4,126	4,600
Australia	4,731	4,582	4,935	5,259	5,300
Austria	7,953	7,876	7,687	7,440 ^{r,e}	8,100
Azerbaijan	223	324	302	180	180 ^e
Bahrain ^e	970	970	970	960 ^r	960
Belarus	2,395	2,598	2,579	2,188	2,400
Belgium	7,093	7,331	7,257	7,687	7,800
Bosnia and Herzegovina	722	792	796	806	806 ^e
Brazil ⁴	34,163	33,912	33,300	31,275	34,400
Bulgaria	523	612	543	527	527 ^e
Canada	12,417	12,730	12,473	12,646	13,600
Chile ⁴	1,323	1,079	1,112	1,153	1,150 ^e
China ⁵	779,040	822,300	803,820	808,366	831,700
Colombia	1,236	1,208	1,211	1,272	1,300
Croatia	135	167	122	--	-- ^e
Cuba	267	258	222	244	244 ^e
Czechia	5,171	5,360	5,262	5,305	4,600
Ecuador	570	667	720	576	576 ^e
Egypt	6,754	6,485	5,506	5,036	6,900
El Salvador	118	121	124	100	100 ^e
Ethiopia ^e	--	--	--	690	690
Finland	3,517	3,807	3,988	4,101	4,000
France	15,685	16,143	14,984	14,413	15,500
Germany	42,645	42,943	42,676	42,080	43,400
Greece	1,030	1,022	910	1,158	1,400
Guatemala	385	395	403	314	314 ^e
Hungary	883	1,152	1,675	1,274	1,900
India	81,299	87,292	89,026	95,477	101,400
Indonesia	2,644	4,428	4,854	4,746	4,800 ^e
Iran	15,422	16,331	16,146	17,895	21,200
Israel ^e	300	300	300	300	300
Italy	23,093	23,714	22,000 ^e	23,373	24,100
Japan	110,595	110,666	105,134	104,775	104,700
Kazakhstan	2,738	2,909	2,948	4,236	4,500
Kenya	360 ^r	370 ^r	360 ^r	410 ^{r,e}	430 ^e
Korea, North	1,210	1,220	1,079	1,250	1,300 ^e
Korea, Republic of	66,061	71,542	69,670	68,576	71,000
Latvia	198	--	--	--	-- ^e
Libya	712	712	352	492	600
Luxembourg	2,090	2,193	2,127	2,175	2,172
Macedonia	146	196	165	239 ^r	238
Malaysia	4,693	4,316	3,784	2,764	2,800 ^e
Mauritania ^e	5	5	5	5	5
Mexico	18,242	18,930	18,200 ^e	18,809	19,900
Moldova	190	344	430	128 ^{r,e}	469
Mongolia ^e	-- ^r	-- ^r	-- ^r	50	50
Montenegro	70	140	150	120	120 ^e
Morocco	558	500	516 ^e	520	520 ^e
Netherlands	6,713	6,964	6,995	6,917	6,800
New Zealand	900 ^e	859	793 ^e	577	577 ^e
Nigeria ^e	--	--	--	100	100
Norway	605 ^e	600 ^e	590 ^e	620	620 ^e
Oman ^e	500	1,500	2,000	2,000	2,000
Pakistan	1,845	2,423	2,892	3,553	5,000
Paraguay	45	47	48	35	24
Peru	1,069	1,078	1,082	1,168	1,207

See footnotes at end of table.

TABLE 10—Continued
RAW STEEL: WORLD PRODUCTION, BY COUNTRY OR LOCALITY^{1,2}

(Thousand metric tons, gross weight unless otherwise specified)

Country or locality ³	2013	2014	2015	2016	2017
Philippines	1,308	1,196	968	1,075	1,080 ^e
Poland	8,199	8,800	9,337	9,001	10,300
Portugal	2,050	2,070	2,030	2,010	2,100 ^e
Qatar	2,536	3,474	2,593	2,521	2,644
Romania	3,071	3,193	3,346	3,276	3,400
Russia	68,861	70,548	69,421	70,808	71,300
Rwanda ^e	15	15	15	19 ^r	23
Saudi Arabia	5,471	6,291	5,230 ^{r,e}	5,461	4,800
Serbia	396	583	955	1,173	1,500
Singapore	434	540	501	520	520 ^e
Slovakia	4,511	4,705	4,562	4,808	5,000
Slovenia	618	615	604	613	613 ^e
South Africa	7,162	6,412	6,417	6,141	6,300
Spain	14,252	14,249	14,845	13,616	14,500
Sweden	4,404	4,539	4,374	4,617	4,700
Switzerland	1,530	1,475	1,480 ^{r,e}	1,500	1,500 ^e
Syria	10	5	5	5	5 ^e
Taiwan	22,282	23,121	21,392	21,751	22,000 ^e
Tanzania ^e	--	--	--	210	210
Thailand	3,579	4,095	3,718	3,825	4,500 ^e
Trinidad and Tobago	616	483	267	36	36 ^e
Tunisia	109	101	50 ^e	50 ^e	50 ^e
Turkey	34,654	34,035	31,517	33,163	37,500
Uganda ^e	30	30	30	30	30
Ukraine	33,199 ^r	27,373 ^r	22,935	24,128	21,300
United Arab Emirates	2,878	2,390	3,006	3,149	3,300
United Kingdom	11,858	12,120	10,907	7,635	7,500
United States	86,900	88,200	78,800	78,500	81,600
Uruguay	91	94	97	61	58
Uzbekistan	746	751	643	654	654 ^e
Venezuela	2,139	1,485	1,345	553	553 ^e
Vietnam	3,484	3,954	4,122	7,811	11,500
Zambia	91	91	52 ^r	45 ^r	54 ^e
Total	1,610,000	1,670,000	1,620,000	1,630,000	1,690,000

^eEstimated. ^rRevised. -- Zero.

¹Table includes data available through September 5, 2018. All data are reported unless otherwise noted. Totals, U.S. data, and estimated data are rounded to no more than three significant digits; may not add to totals shown.

²Steel formed in solid state after melting, suitable for further processing or sale; for some countries, includes material reported as liquid steel, presumably measured in the molten state prior to cooling in any specific form.

³In addition to the countries and (or) localities listed, Hong Kong, Mozambique, and Sri Lanka may have produced steel, but available information was inadequate to make reliable estimates of output.

⁴Does not include castings.

⁵Data reported by the State Statistical Bureau and are considered by the Government of China to be official statistics.