



2016 Minerals Yearbook

IRON AND STEEL [ADVANCE RELEASE]

IRON AND STEEL

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In 2016, global steelmaking capacity continued to increase and more than doubled from about 1,050 million metric tons per year (Mt/yr) in 2000 to 2,380 Mt/yr in 2016. China was the global leader in capacity with 1,165 million metric tons (Mt) in 2016, increasing from 1,162 Mt in 2015. Global steel production was 1,630 Mt in 2016, a slight increase from 2015 (table 10), resulting in a global overcapacity of 750 Mt. In 2016, U.S. raw steel production was 78.5 Mt, a slight decrease from 78.8 Mt produced in 2015 (table 1); the utilization rate was 70.5%, well below the 80% used as a benchmark for long-term industry viability. During the past 15 years, U.S. capacity has decreased from 118 Mt in 2000 to 112 Mt in 2016. China's Ministry of Finance said it was making funds available to limit overcapacity, specifically to eliminate 100 to 150 Mt of annual production during the next 5 years. Others estimated that a 400-Mt annual reduction would be needed to make a difference (Price and others, 2016).

Legislation and Government Programs

ArcelorMittal USA LLC, Nucor Corp., and SSAB Enterprises, LLC alleged that the United States steel industry had been injured because of subsidized imports of certain carbon and alloy steel cut-to-length plate from Brazil, China, and the Republic of Korea and less-than-fair-value imports of certain carbon and alloy steel cut-to-length plate from Austria, Belgium, Brazil, China, France, Germany, Italy, Japan, the Republic of Korea, South Africa, Taiwan, and Turkey. Accordingly, effective April 8, 2016, the U.S. International Trade Commission began a countervailing duty investigation and an antidumping duty investigation (U.S. International Trade Commission, 2016, p. 3).

Production

Raw steel production in the United States was 78.5 Mt in 2016, a slight decrease compared with that in 2015 (table 1). U.S. capacity utilization for raw steel production, which had reached a low of 41% in April 2009, increased to 80.2% in August 2014, decreased to 62.1% in December 2015, and then fluctuated between 65% and 75% during 2016. The American Iron and Steel Institute (AISI) estimated raw steel production capacity in 2016 to be 111 Mt, about the same as that in 2015. Production in 2016 represented 70.5% of estimated capacity, up slightly from 70.1% in 2015 (American Iron and Steel Institute, 2017, 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 25.9 Mt of steel in the United States. The use of this process decreased to 33.0% of total steel production in 2016 from 37.3% in 2015 (American Iron and Steel Institute, 2017, p. 70–71). Blast furnaces in the

United States were operated by three companies at 11 locations in 2015 and 2016 (Iron and Steel Technology, 2017b, p. 222).

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, and tool steel; high-temperature alloys; forged ingots; and other low-volume steel products. During 2016, 54 companies operated 109 EAF facilities in the United States (Iron and Steel Technology, 2017a, p. 144–159). These mills accounted for 67.0% of total steelmaking, producing 52.6 Mt of steel in 2016, 6% more than the 49.4 Mt produced in 2015 (American Iron and Steel Institute, 2017, p. 70–71).

Raw liquid steel is mostly cast into semifinished products in continuous casting machines. Continuous casting production accounted for more than 99% of total steel production, or 78.0 Mt. Less than 1.0% of U.S. production was cast in ingot form in 2016 and subsequently rolled into semifinished forms, a slightly lower percentage than that of 2015 (American Iron and Steel Institute, 2017, p. 71).

Consumption and Shipments

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 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, an indicator of economic growth, which had decreased from a high of 120 Mt in 2006 to a low of 63 Mt in 2009, then increased to 107 Mt in 2014, and then decreased again to 95 Mt in 2016. Net shipments of steel mill products by U.S. companies were 78.5 Mt, essentially unchanged compared with those of 2015 (American Iron and Steel Institute, 2017, p. 23). From 2015 to 2016, shipments of steel mill products by end use increased for industrial machinery, equipment, and tools (10.6%), construction products (9.8%), and automotive products (7.4%). From 2015 to 2016, shipments of steel mill products by end use decreased for lumber, mining, and quarrying industries (60%); steel containers, packaging, and shipping materials (10.2%); steel service centers (7.6%); oil and gas uses (4.8%); and appliances, utensils, and cutlery (3.1%) (American Iron and Steel Institute, 2017, p. 27).

Prices

The Producer Price Index (PPI) program of the U.S. Bureau of Labor Statistics (2017) 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 evaluated. The PPI of steel mill products is 1 of about 10,000 PPIs for individual products and groups of products released each month. The PPI for steel mill products was 167.8 in 2016, a decrease of 5.3% from 177.1 in 2015 and a decrease of 16% from that in 2014 (1982 base=100) (table 1). The average monthly price of hot-rolled steel sheet U.S. domestic Midwest free on board mills fluctuated from a low of \$382 per metric ton in January 2016 to a high of \$581 per metric ton in December 2016 (American Metal Market, 2018).

Foreign Trade

Export shipments of steel mill products by AISI-reporting companies decreased to 8.5 Mt from 9.1 Mt in 2015 (table 4). Canada received 4.2 Mt of United States steel products, 5% less than in 2015; followed by Mexico, which again ranked second with 3.3 Mt, 4% less than in 2015. Domestic imports of steel mill products decreased by 15% to 30.0 Mt in 2016 from 35.2 Mt in 2015 (table 4). Canada, Brazil, the Republic of Korea, the European Union (EU), Mexico, Turkey, Japan, and Russia, in decreasing order of quantity, were major sources of steel mill product imports in 2016 (table 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. To avoid double counting the imported semifinished steel and the products produced from it, the amount of semifinished steel consumed by companies that also produced raw steel is subtracted from domestic consumption. Between 1993 and 2015, semifinished steel imports ranged between 2.5 and 9.6 Mt/yr. Prior to 1993, the amount was less than 0.2 Mt/yr. Taking the imported semifinished steel into consideration, the share of the U.S. steel market represented by imported steel was an estimated 32% in 2016 compared with 35% in 2015.

World Review

World production of pig iron totaled about 1,160 Mt, about the same as that in 2015 (table 9). China continued to be the leading producer of pig iron in the world, producing 701 Mt, which was 61% of the world total and slightly more than that of 2015, followed by Japan (80.2 Mt), India (63.0 Mt), Russia (51.8 Mt), the Republic of Korea (46.3 Mt), Germany (27.3 Mt), Brazil (26.0 Mt), Ukraine (23.6 Mt), and the United States (22.3 Mt). Russia and Ukraine were the only major pig iron producers in the Commonwealth of Independent States (CIS), where production in 2016 decreased slightly from that in 2015. In South America, the only major pig iron producer was Brazil. Germany was the leading producer in the EU.

World capacity of direct-reduced iron (DRI) facilities operating, under construction, and under contract in 2016 was estimated to be about 126 Mt/yr, including about 19 Mt/yr that was idle (Midrex Technologies, Inc., 2016, p. 11–14). DRI production worldwide increased by 4% to 72.7 Mt in 2016 from 69.7 Mt in 2015 (table 9). The leading producer of DRI was

India (18.5 Mt), followed by, in descending order of tonnage, Iran (16.0 Mt), Saudi Arabia (5.89 Mt), Russia (5.70 Mt), and Mexico (5.31 Mt). In 2016, additional DRI capacity of almost 21 Mt/yr was under construction in Algeria, India, Iran, Russia, the United States, and Venezuela. The leading technology was, according to declining order of production, the Midrex process, followed by coal-based and HYL/Energiron.

World production of raw steel was 1,630 Mt, about the same as that of 2015 (table 10). Steel production was essentially unchanged during 2016 in the CIS, the EU, and North America. As in previous years, production varied widely among major regions of the world. China produced 50% of world total raw steel in 2016. Countries in Asia, excluding China, produced 19% of the world's steel; the EU, 10%; North America, 7%; and the CIS, 6%.

According to the World Steel Association (2017a, p. 9), China was the top steel producer in the world during 2016 (808 Mt), with its leading steelmaker, China Baowu Steel Group Corp., Ltd., placing second (63.8 Mt) behind the world's leading steelmaker—ArcelorMittal (95.5 Mt). Japan was the world's second-ranked steel producer (105 Mt), followed by India (95.5 Mt), the United States (78.5 Mt), Russia (70.8 Mt), and the Republic of Korea (68.6 Mt). These countries accounted for 75% of world production. Steel production in Asia, excluding China, increased slightly during 2016. Steel production also increased slightly in the CIS, and Russia and Ukraine remained the leading producers in the CIS. During 2016, steel production decreased in Africa (4.4%), North America (4.0%), and the EU (slight decrease).

China ranked first in the world for total exports of raw steel, semifinished steel, and finished steel products during 2016 (108 Mt), followed by Japan (40.5 Mt), Russia (31.2 Mt), and the Republic of Korea (30.6 Mt). The United States was the leading country in total imports of steel in 2016 (30.9 Mt), followed by Germany (25.5 Mt) (World Steel Association, 2017a, p. 27).

Outlook

The expansion or contraction of gross domestic product (GDP), the broadest measure of a nation's economic activity, may 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 2017, 2018, 2019, and 2020 is 3.0%, 3.1%, 3.0%, and 2.9%, respectively, after 2.4% in 2016 (World Bank, The, 2018, p. 4). The U.S. Federal Reserve's projections for GDP rate of growth for the United States are 2.4% for 2017, 2.1% for 2018, 2.0% for 2019, and 1.8% for 2020 (Board of Governors of the Federal Reserve System, 2017). The 2016 rate of GDP growth for China was 6.7% and is projected to be 6.8% in 2017 and 6.5% in 2018. The rate of GDP growth for India was 7.1% in 2016 and is projected to be 6.7% in 2017 and 7.3% in 2018 (World Bank, The, 2018, p. 14).

World apparent steel consumption is forecast to be 1,616 Mt and 1,627 Mt in 2018 and 2019, respectively, after consumption in 2017 was 1,587 Mt (World Steel Association, 2017b).

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TABLE 1
SALIENT IRON AND STEEL STATISTICS¹

(Thousand metric tons unless otherwise noted)

	2012	2013	2014	2015	2016
United States:					
Pig iron: ²					
Production	32,100	30,300	29,400	25,400	22,300
Exports	94	18	7	17	37
Imports for consumption	4,270	4,120	4,600	4,530	3,870
Direct-reduced iron:					
Production ³	--	--	1,300	1,100	1,810
Exports ²	(4)	(4)	1	20	178
Imports for consumption ²	2,470	2,240	2,390	1,860	1,600
Raw steel production: ⁵					
Carbon steel	81,900	80,700	81,400	73,600	73,200
Stainless steel	1,980	2,030	2,390	2,350	2,480
All other alloy steel	4,770	4,110	4,420	2,930	2,820
Total	88,700	86,900	88,200	78,800	78,500
Capability utilization, percent	75.2	76.7	77.5	70.1	70.5
Steel mill products:					
Net shipments ²	87,000	86,600	89,100	78,500	78,500
Exports ²	12,500	11,500	10,900	9,050	8,450
Imports ²	30,400	29,200	40,200	35,200	30,000
Producer Price Index (1982=100.0) ⁶	208.0	195.0	200.2	177.1	167.8
World production:					
Pig iron	1,120,000	1,170,000	1,190,000	1,160,000	1,160,000
Direct-reduced iron	70,800 ^r	71,100 ^r	75,800 ^r	69,700 ^r	72,700
Raw steel	1,560,000 ^r	1,610,000 ^r	1,670,000	1,620,000	1,630,000

¹Revised. -- Zero.

¹Table includes data through June 20, 2018. Data are rounded to no more than three significant digits, except

“Producer Price Index”; may not add to totals shown.

²Data are from the American Iron and Steel Institute (AISI).

³Data are from Midrex Technologies, Inc., governments, and companies.

⁴Less than ½ unit.

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

⁶Data are from the U.S. Bureau of Labor Statistics.

TABLE 2
MATERIALS CONSUMED IN BLAST FURNACES AND
PIG IRON PRODUCED¹

(Thousand metric tons)

Material	2015	2016
Iron oxides: ²		
Pellets	32,100	29,000
Sinter ³	4,920	4,230
Total	37,100	33,200
Scrap ⁴	2,160	1,940
Coke ²	7,990	7,150
Pig iron, produced ²	25,400	22,300

¹Table includes data through June 20, 2018. Data are rounded to no more than three significant digits; may not add to totals shown.

²Data are from the American Iron and Steel Institute.

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	
	2015	2016	2015	2016
Shipments by steel type:				
Carbon steel	74,100	74,000	94.35	94.22
Alloy steel	2,210	2,170	2.81	2.77
Stainless steel	2,230	2,360	2.84	3.01
Total	78,500	78,500	100.00	100.00
Steel mill products:				
Ingots, blooms, billets, and slabs	690	434	0.88	0.55
Wire rods	1,910	1,600	2.43	2.03
Structural shapes, heavy	5,300	5,720	6.75	7.28
Plates, cut lengths	5,580	5,450	7.11	6.94
Plates, in coils	2,370	1,680	3.02	2.14
Rails	929	659	1.18	0.84
Railroad accessories	242	192	0.31	0.24
Bars, hot-rolled	4,180	3,730	5.32	4.76
Bars, light-shaped	1,770	1,840	2.25	2.34
Bars, reinforcing	5,840	6,020	7.44	7.67
Bars, cold finished	984	894	1.25	1.14
Pipe and tubing, standard pipe	391	375	0.50	0.48
Pipe and tubing, oil country goods	1,210	1,060	1.54	1.35
Pipe and tubing, line pipe	426	442	0.54	0.56
Pipe and tubing, mechanical tubing	493	466	0.63	0.59
Pipe and tubing, pressure tubing	25	15	0.03	0.02
Pipe and tubing, stainless	15	16	0.02	0.02
Pipe and tubing, structural	21	8	0.03	0.01
Wire	348	330	0.44	0.42
Tin mill products, blackplate	21	32	0.03	0.04
Tin mill products, tinplate	1,120	1,010	1.43	1.29
Tin mill products, tin free steel	309	238	0.39	0.30
Tin mill products, tin coated sheets	73	80	0.09	0.10
Sheets, hot-rolled	18,700	19,200	23.78	24.45
Sheets, cold-rolled	9,110	9,950	11.60	12.68
Sheets and strip, hot dip galvanized	13,600	14,400	17.34	18.29
Sheets and strip, electrogalvanized	1,070	872	1.37	1.11
Sheets and strip, other metallic coated	1,350	1,390	1.72	1.77
Strip, hot-rolled	34	39	0.04	0.05
Strip, cold-rolled	439	412	0.56	0.52
Total	78,500	78,500	100.00	100.00
Shipments by markets:				
Service centers and distributors	23,600	21,900	30.11	27.84
Construction	18,400	20,200	23.40	25.70
Automotive	12,800	13,700	16.24	17.45
Machinery	911	1,010	1.16	1.28
Containers	1,570	1,410	2.00	1.79
All others	21,300	20,400	27.09	25.94
Total	78,500	78,500	100.00	100.00

¹Table includes data through June 20, 2018. 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	2015		2016	
	Imports	Exports	Imports	Exports
Argentina	108	11	81	6
Australia	--	22	--	16
Brazil	4,830	50	3,960	53
Canada	5,260	4,440	5,120	4,220
China	2,160	84	789	73
European Union ²	3,830	249	2,890	186
Germany	1,420	44	1,110	42
India	786 ^r	-- ^r	318	--
Japan	2,410 ^r	15 ^r	1,950	16
Korea, Republic of	4,400	35	3,460	40
Mexico	2,510	3,480	2,720	3,340
Russia	1,920	--	1,870	--
South Africa	168	5	211	4
Sweden	256	4	281	11
Taiwan	1,090	12	983	14
Turkey	2,560	--	2,190	--
Ukraine	154	--	195	--
Venezuela	--	44	--	21
Vietnam	202	--	871	--
Other	1,120 ^r	553	962	404
Total	35,200	9,050	30,000	8,450

^rRevised. -- Zero.

¹Table includes data through June 20, 2018. 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)

	2015	2016
Steel mill products:		
Ingots, blooms, billets, and slabs	138	111
Wire rods	99	102
Structural shapes, heavy	517	434
Steel piling	20	20
Plates, cut lengths	1,120	1,090
Plates, in coils	370	481
Rails, standard	76	70
Rails, other	58	64
Railroad accessories	52	40
Bars, hot-rolled	449	405
Bars, light-shaped	61	72
Bars, concrete reinforcing	328	258
Bars, cold-finished	137	124
Tool steel	64	69
Pipe and tubing, standard pipe	52	50
Pipe and tubing, oil country goods	320	246
Pipe and tubing, line pipe	100	60
Pipe and tubing, mechanical tubing	81	74
Pipe and tubing, stainless	40	37
Pipe and tubing, nonclassified	339	280
Pipe and tubing, structural	216	159
Pipe for piling	8	4
Wire	129	111
Tin mill products, blackplate	4	1
Tin mill products, tinplate	104	108
Tin mill products, tin free steel	8	9
Sheets, hot-rolled	909	926
Sheets, cold-rolled	922	815
Sheets and strip, hot-dip galvanized	1,190	1,210
Sheets and strip, electrogalvanized	313	248
Sheets and strip, other metallic coated	222	205
Sheets and strip, electrical	128	77
Strip, hot-rolled	189	203
Strip, cold-rolled	284	282
Total	9,050	8,450
Fabricated steel products:		
Structural shapes, fabricated	320	289
Rails, used	(2)	2
Railroad products	236	212
Wire rope	14	13
Wire, stranded products	29	27
Wire, other products	87	76
Springs	133	127
Nails and staples	25	26
Fasteners	556	628
Chains and parts	43	39
Grinding balls	132	128
Pipe and tube fittings	34	28
Other ³	256	209
Total	1,870	1,800
Grand total	10,900	10,300

See footnotes at end of table.

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

(Thousand metric tons)

	2015	2016
Cast iron and steel products:		
Cast steel pipe fittings	22	19
Cast iron pipe and fittings	42	28
Cast steel rolls	(2)	(2)
Cast grinding balls ⁴	41	50
Granules, shot and grit ⁵	36	29
Other castings	80	62
Total	221	188

¹Table includes data through June 20, 2018. Data are rounded to no more than three significant digits; may not add to totals shown.

²Less than ½ unit.

³Includes shapes cold formed, sashes and frames, fence and sign post, architectural and ornamental work, and conduit.

⁴Cast grinding balls Harmonized Tariff Schedule of the United States (HTS) code 7325.91.000.

⁵Granule, shot and grit HTS code 7205.10.000.

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)

	2015	2016
Steel mill products:		
Ingots, blooms, billets, and slabs	6,620	6,060
Wire rods	1,440	1,450
Structural shapes, heavy	825	794
Steel piling	126	83
Plates, cut lengths	1,410	1,110
Plates, in coils	1,820	1,220
Rails and railroad accessories	338	324
Bars, hot-rolled	1,350	1,080
Bars, light-shaped	167	167
Bars, reinforcing	1,820	1,910
Bars, cold-finished	338	281
Tool steel	178	139
Pipe and tubing, standard pipe	930	758
Pipe and tubing, oil country goods	2,040	1,050
Pipe and tubing, line pipe	2,310	1,240
Pipe and tubing, mechanical tubing	525	468
Pipe and tubing, pressure tubing	62	44
Pipe and tubing, stainless	129	118
Pipe and tubing, nonclassified	15	21
Pipe and tubing, structural	459	481
Pipe for piling	21	20
Wire	807	808
Tin mill products, blackplate	135	99
Tin mill products, tinplate	699	805
Tin mill products, tin free steel	156	194
Sheets, hot-rolled	3,520	2,630
Sheets, cold-rolled	2,440	2,300
Sheets and strip, hot-dip galvanized	3,050	2,810
Sheets and strip, electrogalvanized	115	148
Sheets and strip, other metallic coated	958	938
Sheets and strip, electrical	69	60
Strip, hot-rolled	135	145
Strip, cold-rolled	196	199
Total	35,200	30,000
Fabricated steel products:		
Structural shapes, fabricated	1,230	1,360
Rails, used	103	95
Railroad products	353	166
Wire rope	124	107
Wire-stranded products	295	292
Wire, other products	208	231
Springs	406	418
Nails and staples	671	711
Fasteners	1,180	1,150
Chains and parts	142	124
Grinding balls	112	120
Pipe and tube fittings	403	310
Other ²	517	515
Total	5,740	5,600
Grand total	40,900	35,600
Cast iron and steel products:		
Cast steel pipe fittings	145	144
Cast iron pipe and fittings	40	48
Cast steel rolls	13	14
Cast grinding balls ³	20	16
Granules, shot and grit ⁴	53	54
Other castings	269	228
Total	540	504

See footnotes at end of table.

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

(Thousand metric tons)

¹Table includes data through June 20, 2018. 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 post, architectural and ornamental work; and conduit.

³Cast grinding balls Harmonized Tariff Schedule of the United States (HTS) code 7325.91.000.

⁴Granule, shot and grit HTS code 7205.10.000.

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

TABLE 7
U.S. IMPORTS OF STAINLESS STEEL¹

(Metric tons)

Product	2015	2016
Semifinished	120,000	110,000
Plate	76,100	76,100
Sheet and strip	725,000	393,000
Bars and shapes	161,000	132,000
Wire and wire rods	80,900	67,000
Pipe and tube	129,000	118,000
Total	1,290,000	896,000

¹Table includes data through June 20, 2018. 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)

	2015	2016
Coal, consumption	17,900	15,000
Coke:		
Production ³	12,500	10,800
Exports	777	907
Imports	127	208
Consumption, apparent ³	11,900	10,200

¹Table includes data through June 20, 2018. 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 AND DIRECT-REDUCED IRON: WORLD PRODUCTION, BY COUNTRY OR LOCALITY^{1,2}

(Thousand metric tons)

Country or locality	2012	2013	2014	2015	2016
Algeria	350 ^r	300 ^c	300 ^c	300 ^c	300 ^c
Argentina:					
Direct-reduced iron	1,610	1,540	1,670	1,260	780
Pig iron	2,073	2,650	2,766	2,685	2,141
Australia	3,480 ^r	3,342 ^r	3,282	3,594	3,738
Austria	5,751	6,152	6,029	5,805	5,641
Bahrain, direct-reduced iron	--	780	1,440	1,230	1,260
Belgium	4,073	4,343	4,388	4,248	4,868
Bosnia and Herzegovina	750	759	860	845	778
Brazil	26,900	26,200	27,016	27,803	26,031
Canada:					
Direct-reduced iron	842	1,250	1,550	1,502 ^r	1,400
Pig iron	7,654	6,100	6,728	5,851	6,240
Chile	1,068	766	584	644	678
China ³	663,500	708,970	713,740 ^r	691,410 ^r	700,740
Colombia	345	307	234	240	225
Czechia	3,935	4,040	4,152	4,031	4,164
Egypt:					
Direct-reduced iron	2,840	3,430	2,880	2,730	2,820
Pig iron	550	550 ^c	550 ^c	500 ^c	500 ^c
Finland	2,130	2,050	2,475	2,594	2,670 ^c
France	9,532	10,276	10,866	10,095 ^r	9,722
Germany:					
Direct-reduced iron	560	500	570	550	600
Pig iron	26,493	26,678	27,379	27,842	27,264
Hungary	1,229	628	801	1,247	863
India:					
Direct-reduced iron	20,050	16,893 ^r	20,366 ^r	16,228 ^r	18,470
Pig iron	47,987	51,359	55,166	58,393	62,994
Indonesia, direct-reduced iron	520 ^{r,c}	760 ^{r,c}	120 ^{r,c}	-- ^r	--
Iran:					
Direct-reduced iron	11,600 ^r	14,500 ^r	14,600 ^r	14,500 ^r	16,010
Pig iron	2,143	2,007	2,782	2,459	2,251
Italy	9,424	6,933	6,371	5,051	6,048
Japan	81,405	83,849 ^r	83,872	81,011	80,170
Kazakhstan	2,707 ^r	2,634 ^r	3,185	3,234 ^r	3,302
Korea, North ^c	250	250	250	250	250
Korea, Republic of	41,734	41,045 ^r	46,909	47,639	46,327
Libya, direct-reduced iron	510	950	1,000	450	690
Malaysia, direct-reduced iron	2,010	1,400	1,330	960 ^r	660
Mexico:					
Direct-reduced iron	5,586 ^r	6,100 ^r	5,980	5,500	5,310
Pig iron	4,611	4,911	5,116 ^r	4,575	4,474
Netherlands ⁴	5,917	5,681	5,868	6,050	6,091
New Zealand	670	682	680	678	670
Norway	100	106	102	100	100
Oman, direct-reduced iron	1,460 ^r	1,470	1,450	1,480	1,460
Pakistan	196 ^r	165	142	163	--
Paraguay	67	69	71	73	50
Peru, direct-reduced iron	98 ^r	93 ^r	88 ^r	72 ^r	11
Poland	3,952	4,011	4,637	4,821	4,673
Qatar, direct-reduced iron	2,420	2,390	2,550 ^r	2,710	2,580
Romania	1,467	1,604	1,631	1,790	1,980
Russia:					
Direct-reduced iron	5,240	5,330	5,350	5,440	5,700
Pig iron	50,459 ^r	49,945 ^r	51,460 ^r	52,411 ^r	51,829
Saudi Arabia, direct-reduced iron	5,660	6,070	6,460	5,800 ^c	5,890
Serbia	312	365	550	904	1,154
Slovakia	3,520	3,617	3,838	3,738	3,986

See footnotes at end of table.

TABLE 9—Continued
 PIG AND DIRECT-REDUCED IRON: WORLD PRODUCTION, BY COUNTRY OR LOCALITY^{1,2}

(Thousand metric tons)

Country or locality	2012	2013	2014	2015	2016
South Africa:					
Direct-reduced iron	1,493 ^r	1,295 ^r	1,612 ^r	1,125 ^r	700 ^c
Pig iron	4,599	4,929	4,402	4,464	4,310 ^c
Spain	3,081	3,949	3,958	4,450	4,114
Sweden	2,805	2,896	3,078	2,865	3,078
Taiwan	11,785	13,319	14,440 ^c	14,370	14,830
Trinidad and Tobago, direct-reduced iron	1,493 ^r	1,295 ^r	1,612 ^r	1,125 ^r	1,500 ^c
Turkey	8,613 ^r	9,180	9,364 ^r	10,184 ^r	10,300 ^c
Ukraine	28,484 ^r	29,089 ^r	24,801 ^r	21,863 ^r	23,613
United Arab Emirates, direct-reduced iron	2,720	3,075 ^r	2,410	3,190	3,480
United Kingdom	7,183	9,471	9,705	8,774	6,218
United States:					
Direct-reduced iron	--	--	1,300	1,100	1,810
Pig iron	32,100	30,300	29,400	25,400	22,300
Venezuela, direct-reduced iron	4,610 ^r	2,770	1,680	2,750	1,590
Vietnam	650	650	1,393	1,700	2,000 ^c
Total	1,190,000	1,240,000	1,260,000	1,230,000	1,240,000
Of which:					
Direct-reduced iron	70,800 ^r	71,100 ^r	75,800 ^r	69,700 ^r	72,700
Pig iron	1,120,000	1,170,000	1,190,000	1,160,000	1,160,000

^cEstimated. ^rRevised. -- Zero.

¹Table includes data available through November 23, 2017. 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.

²Production is pig iron unless otherwise specified. Direct-reduced iron is obtained from ore by reduction of oxides to metal without melting.

³Data reported by the State Statistical Bureau and are considered by the Government of China to be official statistics.

⁴Includes blast furnace ferroalloys.

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

(Thousand metric tons)

Country or locality ³	2012	2013	2014	2015	2016
Afghanistan	--	--	--	--	24
Albania	390 ^r	312 ^r	310 ^{r,c}	280 ^{r,c}	100 ^e
Algeria	557	417	415	650	650
Argentina	4,995	5,186	5,488	5,028 ^r	4,126
Australia	4,851 ^r	4,731 ^r	4,582 ^r	4,935 ^r	5,259
Austria	7,421	7,953	7,876	7,687	7,438
Azerbaijan	268 ^r	223 ^r	324 ^r	302 ^r	180 ^e
Bahrain	950 ^e	970 ^e	970 ^e	970 ^e	--
Belarus	2,869 ^r	2,395 ^r	2,598 ^r	2,579 ^r	2,188
Belgium	7,301	7,093	7,331	7,257	7,687
Bosnia and Herzegovina, ingot production	700	722	792 ^r	796 ^r	806
Brazil ⁴	34,524	34,163	33,912 ^r	33,300 ^r	31,275
Bulgaria	633	523	612	543	527
Canada	13,507	12,417	12,730	12,473	12,646
Chile ⁴	1,671	1,323	1,079	1,112	1,153
China ⁵	723,880 ^r	779,040 ^r	822,300 ^r	803,820 ^r	808,366
Colombia	1,302	1,236	1,208	1,211	1,272
Croatia	1	135	167	122 ^r	--
Cuba	277	267 ^r	258 ^r	222 ^r	244
Czechia	5,072	5,171	5,360	5,262	5,305
Ecuador	425	570	667	720	576
Egypt	6,627	6,754	6,485	5,506	5,036
El Salvador	72	118	121	124	100
Ethiopia, all from scrap ^c	--	--	--	--	690
Finland	3,759	3,517	3,807	3,988	4,101
France	15,609	15,685	16,143	14,984	14,413
Germany	42,661	42,645	42,943	42,676	42,080
Greece	1,247 ^r	1,030 ^r	1,022	910	1,158
Guatemala	334	385	395	403	314
Hungary	1,542	883	1,152	1,675	1,274
India	77,264	81,299	87,292	89,026	95,477
Indonesia	2,254	2,644	4,428	4,854	4,746
Iran	14,463	15,422	16,331	16,146	17,895
Iraq	--	--	--	--	--
Israel ^c	300	300	300	300	300
Italy	27,257	23,093	23,714	22,018	23,373
Japan	107,232	110,595	110,666	105,134	104,775
Jordan ^e	150	150	150	150	150
Kazakhstan	2,610 ^r	2,738 ^r	2,909 ^r	2,948 ^r	4,236
Kenya ^c	20	-- ^r	20	20	20
Korea, North	1,222 ^r	1,210 ^r	1,220 ^r	1,079 ^r	1,250 ^e
Korea, Republic of	69,073	66,061	71,542 ^r	69,670	68,576
Kuwait	975	1,150	1,150	1,150	--
Latvia	805	198	--	--	--
Libya	315	712	712	352	492
Luxembourg	2,208	2,090	2,193	2,127	2,175
Macedonia	225 ^r	146 ^r	196 ^r	165 ^r	169
Malaysia	5,612	4,693	4,316	3,784	2,764
Mauritania	5	5	5	5	5 ^e
Mexico	18,073	18,242	18,930	18,228 ^r	18,809
Moldova	317 ^r	190	344 ^r	430 ^r	126
Mongolia ^c	35	40	45	45	50
Montenegro	120	70	140	150	120 ^e
Morocco	539 ^r	558	500 ^r	516 ^e	520
Netherlands	6,879	6,713	6,964	6,995	6,917
New Zealand	912 ^e	900 ^e	859	793 ^e	577
Nigeria ^c	--	--	--	--	100
Norway	700	605 ^e	600 ^e	590 ^e	620
Oman	300	500	1,500	2,000	2,000 ^e

See footnotes at end of table.

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

(Thousand metric tons)

Country or locality ³	2012	2013	2014	2015	2016
Pakistan	1,631	1,845	2,423	2,892	3,553
Paraguay	44	45	47	48	35
Peru	981	1,069 ^r	1,078	1,082	1,168
Philippines	1,260	1,308	1,196	968	1,075
Poland	8,543 ^r	8,199 ^r	8,800 ^r	9,337 ^r	9,001
Portugal	1,960	2,050	2,070	2,030	2,010
Qatar	2,443 ^r	2,536 ^r	3,474 ^r	2,593	2,521
Romania	3,417 ^r	3,071 ^r	3,193 ^r	3,346 ^r	3,276
Russia	70,392 ^r	68,861 ^r	70,548 ^r	69,421 ^r	70,808
Rwanda ^c	15	15	15	15	15
Saudi Arabia	5,203	5,471	6,291	5,229	5,461
Serbia	346	396	583	955	1,173
Singapore	688	434	540	501	520
Slovakia	4,403	4,511	4,705	4,562	4,808
Slovenia	632	618	615	604	613
South Africa	6,938	7,162	6,412	6,417	6,141
Spain	16,639	14,252	14,249	14,845	13,616
Sweden	4,326	4,404	4,539	4,374	4,617
Switzerland	1,450	1,530	1,475	1,475	1,500 ^e
Syria ^c	10	10	5	5	5
Taiwan	20,664	22,282	23,121	21,392	21,751
Tanzania ^c	--	--	--	--	210
Thailand	3,328	3,579	4,095	3,718	3,825
Trinidad and Tobago	624 ^r	616	483 ^r	267 ^r	36
Tunisia	109 ^r	109 ^r	101 ^r	50 ^e	50 ^e
Turkey	35,885	34,654	34,035	31,517 ^r	33,163
Uganda ^c	30	30	30	30	30
Ukraine	33,511 ^r	32,771	27,373 ^r	22,935 ^r	24,128
United Arab Emirates	2,408	2,878	2,390	3,006	3,149
United Kingdom	9,579	11,858	12,120	10,907	7,635
United States	88,700	86,900	88,200	78,800	78,500
Uruguay	78	91	94	97	61
Uzbekistan	736	746	751 ^r	643	654
Venezuela	2,359	2,139	1,485	1,345	553
Vietnam	2,965 ^r	3,484 ^r	3,954 ^r	4,122 ^r	7,811
Zambia	76	91	91	91	--
Total	1,560,000 ^r	1,610,000 ^r	1,670,000	1,620,000	1,630,000

^cEstimated. ^rRevised. -- Zero.

¹Table includes data available through November 23, 2017. 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 were known to have steelmaking plants, but available information was inadequate to make reliable estimates of output levels.

⁴Does not include castings.

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