



2019 Minerals Yearbook

EXPLOSIVES [ADVANCE RELEASE]

EXPLOSIVES

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In 2019, total U.S. consumption of explosives decreased to 1.73 million metric tons (Mt), a slight decrease from that in 2018 and 2017 and a 5% increase from that in 2016 (table 1). These decreases are attributed to changes in market conditions, namely coal mining. Sales of explosives were reported in all States except Delaware. Coal mining, accounting for 56% of total consumption, continued to be the dominant use of explosives in the United States (table 3). Wyoming was the leading explosives-consuming State, accounting for 25% of total U.S. explosives sales. Nevada, West Virginia, and Indiana, in descending order, together accounted for an additional 20% of U.S. explosives sales (table 4). In 2019, 33.8 million detonators were used, a 14% decrease from that in 2018 (table 2).

Legislation and Government Programs

On June 3, 2019, the U.S. Department of Homeland Security published a Notice of Availability of Redacted Ammonium Nitrate Security Program Technical Assessments Report in the Federal Register (84 FR 25495). The U.S. Department of Homeland Security had entered into an interagency agreement with the U.S. Department of Energy to obtain scientific data on the detonability of ammonium nitrate before establishing a threshold percentage and quantity of ammonium nitrate that would be subject to regulation. Release of the redacted report was to provide important information to those who manufacture, store, process, or engage in other transactions involving ammonium nitrate (U.S. Department of Homeland Security, 2019).

Production

Sales of ammonium-nitrate-based explosives (blasting agents and oxidizers) were 1.69 Mt in 2019, a slight decrease from those in 2018 and 2017, a 5% increase from those in 2016, and a 15% decrease from those in 2015, and accounted for 98% of U.S. industrial explosives sales in 2019. Permissibles (explosives approved for use in gassy and dusty environments) and other high explosives accounted for the remaining 2% of U.S. industrial explosives sales. Sales of permissibles were 11% higher than those in 2018, whereas sales of other high explosives decreased by 14% (table 1). Decreased coal production resulted in decreased consumption of explosives in 2019 (U.S. Energy Information Administration, 2020a).

Companies contributing data to this report, which are members of the Institute of Makers of Explosives (IME), are as follows:

Accurate Energetic Systems, LLC,
Austin Powder Co.,
Baker Hughes Co.,
Davey Bickford North America,
DynaEnergetics US Inc.,
Dyno Nobel Inc. (a subsidiary of Incitec Pivot Ltd.),
GEODynamics, Inc.,

Hunting Titan, Ltd.,
Jet Research Center (a division of Halliburton Co.),
Maine Drilling & Blasting Inc.,
Maxam North America, Inc.,
Nelson Brothers, Inc.,
Orica USA Inc.,
Owen Oil Tools LP (a division of Core Laboratories N.V.),
Senex Explosives, Inc.,
Vet's Explosives, Inc., and
W.A. Murphy, Inc.

Consumption

The principal application for explosives in the United States was coal mining, accounting for 56% of the total explosives sales for consumption in 2019 (table 3). U.S. coal production decreased by 6.7% to 640 Mt in 2019 from that in 2018, according to data from the U.S. Energy Information Administration (2020a, p. 3). Coal production in the Appalachian region decreased by 4% compared with production in 2018. In the Midwest, coal production decreased by 7%, and in the Western United States, coal production decreased by 8%. Wyoming and West Virginia led the Nation in coal production, accounting for 39% and 13% of the total, respectively.

Construction work accounted for 18% of the total explosives sales, quarrying and nonmetal mining accounted for 15%, metal mining accounted for 9%, and miscellaneous uses were 3% (table 3). Wyoming, Nevada, West Virginia, and Indiana were, in descending order, the leading explosives-consuming States, each with more than 100,000 metric tons sold and accounting for a combined total of 45% of U.S. sales (table 4).

Because explosives are used in the mining industry and many segments of the manufacturing and major construction industries, changes in the consumption of explosives reflect activity decreases or increases in these industries. The value of new construction (residential and nonresidential) put in place in 2019 increased slightly compared with that in 2018 (U.S. Census Bureau, 2020). Based on monthly data, the seasonally adjusted industry growth rate from 2018 to 2019 for metal mining decreased slightly and the growth rate for quarrying and nonmetallic mineral mining increased by 3% (Federal Reserve Board, 2020). The explosives and blasting agents reported in table 3 are estimated by the quantity sold for consumption in each category from demand in previous years; however, this does not necessarily reflect decreases or increases in the industry activity.

Classification of Industrial Explosives and Blasting Agents.—Apparent consumption of commercial explosives used for industrial purposes is defined in this report as sales reported to the IME. Commercial explosives imported for industrial uses also are included in sales. The principal distinction between high explosives and blasting agents is their sensitivity to initiation. High explosives are cap sensitive, whereas blasting agents

are not. Black powder sales in 2019 were minor and were last reported in 1971. The consumption classifications used in this report are those adopted by the IME.

High Explosives—Permissibles.—Permissibles are grades of high explosives approved by brand name by the Mine Safety and Health Administration for use in gassy and dusty environments.

Other High Explosives.—These include all high explosives except permissibles.

Blasting Agents and Oxidizers.—These include ammonium nitrate-fuel oil (ANFO) mixtures, regardless of density; slurries, water gels or emulsions including blends with ANFO; and ammonium nitrate in prilled, grained, or liquor (water solution) form. Bulk and packaged forms of blasting agents and oxidizers are included in this category. In 2019, about 95% of the total sales of blasting agents and oxidizers were in bulk form.

Classification of Detonators.—A detonator is any device containing an initiation or primary explosive that is used for initiating detonation in another explosive material as reported to the IME. A detonator may not contain more than 10 grams of total explosive by weight, excluding ignition or delay charges. The detonator classifications used in this report are those adopted by the IME.

Electric Detonator.—A detonator designed for, and capable of, initiation by means of an electric current.

Nonelectric Detonator.—A detonator that does not require the use of electric energy to function.

Electronic Detonator.—A detonator that uses stored electrical energy as a way of powering an electronic timing delay element or module and that provides initiation energy for firing the base charge.

A total of 33.8 million detonators were consumed in 2019, a 14% decrease from that in 2018. Nonelectric detonators accounted for 68% of the total detonators used, followed by electronic, 19%; electric, 13%; and other, 1% (table 2). For the oil and gas sector, which accounted for 14% of the total detonators used, consumption in 2019 increased by 17% from that in 2018.

World Review

India.—Casale SA was awarded a contract by Messrs Smartchem Technologies Ltd. for a new technical ammonium nitrate complex. The complex included a 900-metric-ton-per-

day (t/d) nitric acid plant, a 1,143-t/d ammonium nitrate solution plant, and one prilling unit capable of producing 970 t/d of either high-density or low-density ammonium nitrate. The project was to make use of unused equipment from another project that never materialized (Casale SA, 2018).

Outlook

According to the U.S. Energy Information Administration (2020b, p. 4), total U.S. coal production in 2020 is estimated to decrease by 29% from that in 2019. Decreased consumption of coal is projected to result from the decreased use of coal and increased use of natural gas in the electric power sector. Based on coal production projections, explosives consumption is expected to decrease in 2020.

References Cited

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- Federal Reserve Board, 2020, Industrial production and capacity utilization—Tables 1 and 2; 1A, 1B, 1C, 1D, and 1E of the G.17 supplement; and table 10, September 17: Federal Reserve Board. (Accessed July 14, 2020, via http://www.federalreserve.gov/releases/G17/table1_2.htm.)
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- U.S. Energy Information Administration, 2020a, Quarterly coal report, October–December 2019: U.S. Energy Information Administration, April. (Accessed July 7, 2020, at <https://www.eia.gov/coal/production/quarterly/archive/012119q4.pdf>.)
- U.S. Energy Information Administration, 2020b, Short-term energy outlook: U.S. Energy Information Administration, August, 53 p. (Accessed August 31, 2020, at <https://www.eia.gov/outlooks/steo/archives/aug20.pdf>.)

GENERAL SOURCES OF INFORMATION

Other

Institute of Makers of Explosives

TABLE 1
SALIENT STATISTICS OF INDUSTRIAL EXPLOSIVES AND BLASTING
AGENTS SOLD FOR CONSUMPTION IN THE UNITED STATES¹

(Metric tons)

Class	2015	2016	2017	2018	2019
Permissibles	249	135	239	230	255
Other high explosives	47,200	42,600	38,200	46,400	39,900
Blasting agents and oxidizers	1,990,000	1,600,000	1,710,000	1,720,000	1,690,000
Total	2,040,000	1,650,000	1,740,000	1,770,000	1,730,000

¹Table includes data available through August 3, 2020. Data are rounded to no more than three significant digits; may not add to totals shown.

Source: Institute of Makers of Explosives.

TABLE 2
SALIENT STATISTICS OF DETONATORS
SOLD FOR CONSUMPTION IN THE UNITED STATES¹

(Units)

Class	2015	2016	2017	2018	2019
Mining and quarrying:					
Electric	1,700,000	1,340,000	1,200,000	1,420,000	742,000
Nonelectric	30,300,000	24,800,000	38,600,000	27,600,000	22,800,000
Electronic	5,540,000	4,810,000	5,240,000	5,810,000	5,200,000
Other	361,000	189,000	218,000	220,000	177,000
Total	37,900,000	31,100,000	45,300,000	35,000,000	28,900,000
Oil and gas sector:					
Electric	1,540,000	1,370,000	3,080,000	3,760,000	3,630,000
Nonelectric	5,830	60,800	72,700	--	4,020
Electronic	143,000	128,000	151,000	392,000	1,210,000
Other	5,830	8,910	124,000	5,780	1,160
Total	1,700,000	1,570,000	3,430,000	4,160,000	4,850,000
Grand total	39,600,000	32,700,000	48,700,000	39,200,000	33,800,000

-- Zero.

¹Table includes data available through August 3, 2020. Data are rounded to no more than three significant digits; may not add to totals shown.

Source: Institute of Makers of Explosives.

TABLE 3
ESTIMATED INDUSTRIAL EXPLOSIVES AND BLASTING AGENTS SOLD FOR CONSUMPTION IN
THE UNITED STATES, BY CLASS AND USE^{1,2}

(Thousand metric tons)

Class	Coal mining	Quarrying and nonmetal mining	Metal mining	Construction work	All other purposes	Total
2018:						
Permissibles	(3)	(3)	(3)	(3)	--	(3)
Other high explosives	3	16	1	26	1	46
Blasting agents and oxidizers	1,020	228	157	270	52	1,720
Total	1,020	244	158	296	52	1,770
2019:						
Permissibles	(3)	(3)	(3)	(3)	--	(3)
Other high explosives	4	15	2	16	2	40
Blasting agents and oxidizers	956	239	153	290	51	1,690
Total	961	254	155	306	53	1,730

-- Zero.

¹Distribution of industrial explosives and blasting agents by consuming industry, estimated from indices of industrial production and economies as reported by the U.S. Department of Energy, the Federal Reserve Board, the U.S. Department of Transportation, and the U.S. Census Bureau.

²Table includes data available through August 3, 2020. Data are rounded to no more than three significant digits; may not add to totals shown.

³Less than ½ unit.

TABLE 4
INDUSTRIAL EXPLOSIVES AND BLASTING AGENTS SOLD FOR CONSUMPTION IN THE UNITED STATES, BY STATE AND CLASS¹

(Metric tons)

State	2018				2019			
	Fixed high explosives		Blasting agents and oxidizers	Total	Fixed high explosives		Blasting agents and oxidizers	Total
	Permissibles	Other high explosives			Permissibles	Other high explosives		
Alabama	1	201	36,700	36,900	6	331	45,800	46,200
Alaska	--	1,140	20,000	21,200	--	780	20,500	21,300
Arizona	3	1,240	28,900	30,100	2	846	33,900	34,800
Arkansas	--	58	35,400	35,500	--	62	50,800	50,900
California	--	464	53,400	53,900	--	390	34,100	34,500
Colorado	--	1,180	76	1,250	--	1,370	644	2,020
Connecticut	--	146	3,460	3,600	--	118	3,730	3,850
Delaware	--	--	--	--	--	--	--	--
Florida	--	94	16,300	16,300	--	99	15,700	15,800
Georgia	--	674	19,900	20,500	--	658	21,600	22,300
Hawaii	--	--	100	100	--	(2)	91	91
Idaho	--	371	5,170	5,550	--	213	8,010	8,220
Illinois	13	707	56,700	57,400	6	746	49,600	50,300
Indiana	--	575	127,000	127,000	--	573	112,000	112,000
Iowa	--	1,520	22,000	23,500	--	1,730	19,600	21,300
Kansas	--	23	822	845	--	21	909	930
Kentucky	24	5,050	33,300	38,300	42	5,100	35,900	41,000
Louisiana	--	758	758	1,520	--	765	596	1,360
Maine	2	98	2,550	2,650	--	64	3,090	3,160
Maryland ³	--	98	5,770	5,870	(2)	23	3,210	3,230
Massachusetts	--	159	7,010	7,170	--	137	7,920	8,050
Michigan	--	318	25,700	26,000	--	288	27,800	28,100
Minnesota	--	255	93,200	93,500	--	273	96,000	96,300
Mississippi	--	5	--	5	--	(2)	--	(2)
Missouri	--	2,340	34,700	37,100	2	2,130	30,500	32,700
Montana	--	3,830	43,300	47,200	--	3,350	45,900	49,300
Nebraska	--	11	1,760	1,770	--	481	449	930
Nevada	--	1,670	106,000	108,000	--	1,000	114,000	115,000
New Hampshire	--	321	7,600	7,920	--	262	13,000	13,300
New Jersey	--	21	2,200	2,220	--	8	1,750	1,760
New Mexico	--	438	31,500	32,000	--	258	34,300	34,500
New York	--	1,530	17,000	18,500	--	1,580	21,000	22,600
North Carolina	--	244	20,400	20,600	--	281	20,700	20,900
North Dakota	--	40	2,190	2,230	--	34	1,980	2,010
Ohio	--	567	36,500	37,100	--	377	33,300	33,700
Oklahoma	--	194	10,400	10,600	--	313	10,100	10,500
Oregon	--	112	4,380	4,490	--	83	3,790	3,870
Pennsylvania	42	3,380	67,400	70,800	27	3,640	71,800	75,400
Rhode Island	--	16	1,190	1,210	--	16	1,450	1,460
South Carolina	--	253	18,900	19,100	--	201	22,100	22,300
South Dakota	--	4	3,010	3,010	--	3	3,030	3,040
Tennessee	--	1,830	21,000	22,800	--	1,560	20,900	22,500
Texas	--	4,760	17,900	22,600	--	3,630	16,600	20,300
Utah	17	2,940	58,700	61,600	4	804	33,400	34,200
Vermont	3	55	2,480	2,540	1	45	2,350	2,400
Virginia	79	1,020	27,800	28,900	104	825	25,300	26,300
Washington	--	368	13,400	13,800	--	318	12,700	13,000
West Virginia	47	870	118,000	119,000	60	586	113,000	113,000
Wisconsin	--	547	17,600	18,100	--	601	15,300	15,900
Wyoming	--	3,970	443,000	447,000	--	2,890	428,000	431,000
Total	230	46,400	1,720,000	1,770,000	255	39,900	1,690,000	1,730,000

-- Zero.

¹Table includes data available through August 3, 2020. Data are rounded to no more than three significant digits; may not add to totals shown.

²Less than ½ unit.

³Includes the District of Columbia.

Source: Institute of Makers of Explosives.