



# 2012 Minerals Yearbook

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## EXPLOSIVES

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# EXPLOSIVES

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In 2012, U.S. explosives consumption was 3.38 million metric tons (Mt), about 13% more than that of 2011; sales of explosives were reported in all States except Delaware. Coal mining, with about 68% of total consumption, continued to be the dominant use for explosives in the United States. Wyoming, West Virginia, and Kentucky, in descending order, led the Nation in coal production, accounting for 60% of the total. Wyoming and West Virginia were also the leading explosives-consuming States, accounting for 35% of total U.S. explosives sales.

## Legislation and Government Programs

The U.S. Department of Homeland Security (DHS) continued to adjudicate comments received on the Ammonium Nitrate Security Program Notice of Proposed Rulemaking issued August 2011 and is developing a final rule. The Ammonium Nitrate Security Act was passed by Congress in 2007; at that time, DHS was authorized to develop a program to regulate ammonium nitrate. Since the act was passed, the U.S. industry has followed voluntary standards; however, under the proposed Ammonium Nitrate Security Program, these standards would become mandatory. Under the proposed regulations, those engaged in the sale and transfer of ammonium nitrate would be barred from selling or transferring 11.3 kilograms (25 pounds) or more of ammonium nitrate to anyone who is not registered with DHS. In addition, those engaged in the sale and transfer of ammonium nitrate would be required to report losses or thefts to Federal authorities within 24 hours. All records related to the sale and transfer of ammonium nitrate would need to be maintained for 2 years (U.S. Department of Homeland Security, 2011, p. 46,908).

## Production

Sales of ammonium-nitrate-based explosives (blasting agents and oxidizers) were 3.35 Mt, which was 12% higher than those in 2011, and accounted for about 99% of U.S. industrial explosives sales. Sales of permissibles (explosives approved for use in gassy and dusty environments) were about 44% higher than those in 2011, and sales of other high explosives increased by 43% (table 1).

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, Inc.  
Davey Bickford USA, Inc.  
Douglas Explosives, Inc.  
DYNAenergetics US Inc.  
Dyno Nobel, Inc.  
GEODynamics, Inc.

Hunting Titan, Ltd.  
Jet Research Center (a division of Halliburton Co.)  
Maine Drilling & Blasting  
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.  
W.A. Murphy, Inc.

## Consumption

The principal application for explosives in the United States was coal mining, accounting for about 68% of the total explosives sales for consumption (table 2). In 2012, U.S. coal production decreased by 7% to 922 Mt, according to preliminary data from the U.S. Energy Information Administration (EIA). Coal production in the Appalachian region decreased by 13% compared to production in 2011. In the Interior (midwest), coal production increased by 5.3%, and in the western region of the United States, coal production decreased by 7.7%. Three States (Wyoming, West Virginia, and Kentucky, in descending order) led the Nation in coal production, accounting for 60% of the total. Wyoming and West Virginia were also the leading explosives-consuming States (U.S. Energy Information Administration, 2013a, p. 6–7; table 3).

Construction and quarrying and nonmetal mining each accounted for 10% of total explosives sales, metal mining accounted for 9%, and miscellaneous uses were about 3%. Wyoming, West Virginia, Indiana, Kentucky, Nevada, Pennsylvania, Minnesota, Virginia, and Alabama were, in descending order, the leading explosives consuming States (greater than 100,000 metric tons sold), with a combined total of 70% of U.S. sales (table 3).

Explosives are used in the mining industry and virtually every segment of the manufacturing and major construction industry; therefore, changes in the consumption of explosives will be reflected in the decrease or increase in these applications. The dollar value of new construction (residential and nonresidential) put in place in 2012 increased by about 9% compared with that in 2011 (U.S. Census Bureau, 2013). Based on monthly data, the seasonally adjusted industry growth rate from 2011 to 2012 for metal mining decreased slightly, and the growth rate for quarrying and nonmetallic mineral mining increased by 5% (Federal Reserve Board, 2013).

**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 were also 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 were minor and were last reported in 1971. The production classifications used in this report are those adopted by the IME.

**High Explosives.—Permissibles.**—The Mine Safety and Health Administration (MSHA) approved grades by brand name as originally established by the National Institute for Occupational Safety and Health (NIOSH) testing.

**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; ANFO blends containing slurries, water gels, or emulsions; and ammonium nitrate in prilled, grained, or liquor (water solution) form. Bulk and packaged forms of these materials are included in this category. In 2012, about 96% of the total blasting agents and oxidizers sales was in bulk form.

## World Review

**Australia.**—Yara International ASA reached an agreement with Orica Ltd. and Apache Corp. to form a joint venture to build a 330,000 metric-tons-per-year (t/yr) technical-grade ammonium nitrate plant on the Burrup peninsula in Western Australia. At a cost of \$800 million, the joint venture would be owned 45% by Yara, 45% by Orica, and 10% by Apache. The plant was expected to be completed by the end of 2015 (Green Markets, 2012).

Orica received approval to upgrade its Kooragang Island production site in New South Wales at a cost of \$524 million. Orica planned to expand the capacity to 750,000 t/yr from 430,000 t/yr of ammonium nitrate. A major component of the expansion would be to improve the site's safety and environmental performance. No timetable was announced for the completion of the project (Fertilizer Week, 2012b).

Orica made plans to expand its Yarwum ammonium nitrate plant at Gladstone at a cost of \$800 million. The expansion was expected to be completed in 2017 or 2018 and was expected to double the plant's capacity (Nitrogen + Syngas, 2012).

**Vietnam.**—Mining Chemical Industry Holding Corp. (MICCO) awarded a contract for the construction of a low density ammonium nitrate (LDAN) plant in the Thai Binh province to a consortium consisting of ThyssenKrupp Uhde, Toyo-Thai Corporation Public Company Ltd., Toyo-Vietnam Corporation Ltd., and Lilama 69-1 Joint Stock Company. At a cost of \$200 million, the plant would have a capacity of 625 metric tons per day (t/d) (200,000 t/yr) of LDAN and include a 500-t/d (165,000-t/yr) nitric acid plant. This plant was scheduled to be operational by 2015 and was expected to meet Vietnam's demand for technical ammonium nitrates for the civil and mining industry (Fertilizer Week, 2012a).

## Outlook

According to the EIA, U.S. coal production in 2013 was expected to remain the same as that of 2012. In 2014, production was projected to increase by about 3.3%, a result of increased domestic coal consumption (U.S. Energy Information Administration, 2013b, p. 7). Based on the coal production projections, explosives consumption was not expected to increase in 2013, but slightly increase in 2014 resulting from the expected increase in domestic coal demand.

## References Cited

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TABLE 1  
SALIENT STATISTICS OF INDUSTRIAL EXPLOSIVES AND BLASTING  
AGENTS SOLD FOR CONSUMPTION IN THE UNITED STATES<sup>1</sup>

(Metric tons)

Class	2011	2012
Permissibles	1,020	1,470
Other high explosives	21,900	31,400
Blasting agents and oxidizers	2,980,000	3,350,000
Total	3,000,000	3,380,000

<sup>1</sup>Data are rounded to no more than three significant digits; may not add to totals shown.

Source: Institute of Makers of Explosives.

TABLE 2  
ESTIMATED INDUSTRIAL EXPLOSIVES AND BLASTING AGENTS SOLD FOR CONSUMPTION IN  
THE UNITED STATES, BY CLASS AND USE<sup>1,2</sup>

(Thousand metric tons)

Class	Coal mining	Quarrying and nonmetal mining	Metal mining	Construction work	All other purposes	Total
2011:						
Permissibles	1	(3)	(3)	(3)	--	1
Other high explosives	3	7	1	10	1	22
Blasting agents and oxidizers	2,120	272	257	255	74	2,980
Total	2,130	279	258	265	75	3,000
2012:						
Permissibles	2	(3)	(3)	(3)	--	2
Other high explosives	4	11	1	14	1	31
Blasting agents and oxidizers	2,300	336	293	338	87	3,350
Total	2,300	347	294	351	88	3,380

-- Zero.

<sup>1</sup>Distribution 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.

<sup>2</sup>Data are rounded to no more than three significant digits; may not add to totals shown.

<sup>3</sup>Less than ½ unit.

TABLE 3  
INDUSTRIAL EXPLOSIVES AND BLASTING AGENTS SOLD FOR CONSUMPTION IN THE UNITED STATES, BY STATE AND CLASS<sup>1</sup>

(Metric tons)

State	2011				2012			
	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	7	225	103,000	103,000	4	378	101,000	101,000
Alaska	--	729	16,200	17,000	--	856	17,600	18,500
Arizona	15	270	56,700	57,000	13	432	33,200	33,700
Arkansas	--	72	15,200	15,200	--	75	17,100	17,100
California	--	414	24,700	25,200	3	428	22,600	23,000
Colorado	37	462	60,300	60,800	16	514	95,500	96,000
Connecticut	--	115	3,490	3,610	--	236	3,860	4,100
Delaware	--	--	--	--	--	--	--	--
Florida	--	62	10,400	10,500	--	103	14,100	14,200
Georgia	--	216	17,800	18,000	--	400	20,800	21,200
Hawaii	--	(3)	258	258	--	--	238	238
Idaho	--	47	16,300	16,300	--	405	16,700	17,100
Illinois	--	368	55,400	55,800	--	801	59,500	60,300
Indiana	4	793	202,000	203,000	1	1,040	254,000	255,000
Iowa	--	616	22,000	22,700	6	1,110	38,600	39,700
Kansas	--	91	11,000	11,100	--	62	9,340	9,400
Kentucky	130	1,540	295,000	297,000	260	2,060	227,000	229,000
Louisiana	--	1,440	2,950	4,400	--	348	1,860	2,210
Maine	--	170	3,050	3,220	--	113	3,420	3,540
Maryland <sup>2</sup>	2	80	16,000	16,100	6	120	16,600	16,700
Massachusetts	--	97	5,010	5,110	--	176	6,000	6,180
Michigan	--	81	18,800	18,800	--	192	41,600	41,800
Minnesota	--	112	87,800	87,900	--	262	122,000	123,000
Mississippi	--	31	(3)	32	--	7	(3)	7
Missouri	147	1,390	70,300	71,900	265	2,120	89,600	92,000
Montana	--	2,030	56,000	58,000	--	4,220	69,500	73,700
Nebraska	--	112	2,600	2,710	--	103	1,780	1,890
Nevada	226	784	130,000	131,000	427	1,130	217,000	219,000
New Hampshire	--	120	3,310	3,430	--	549	5,430	5,980
New Jersey	--	82	5,780	5,860	--	23	8,480	8,510
New Mexico	--	126	32,900	33,000	5	229	68,800	69,000
New York	--	781	14,600	15,400	1	1,290	27,200	28,500
North Carolina	--	318	16,900	17,300	--	360	18,300	18,700
North Dakota	--	9	3,050	2,060	--	21	1,450	1,480
Ohio	(3)	381	52,100	52,400	--	647	64,300	64,900
Oklahoma	1	140	23,200	23,300	1	291	32,400	32,600
Oregon	--	268	6,680	6,950	--	110	8,950	9,060
Pennsylvania	63	1,350	100,000	102,000	73	2,750	133,000	136,000
Rhode Island	--	24	988	1,010	--	35	1,040	1,070
South Carolina	--	96	6,490	6,590	--	73	4,550	4,630
South Dakota	--	7	4,470	4,480	--	10	3,410	3,420
Tennessee	10	1,420	25,900	27,300	49	1,560	25,300	26,900
Texas	--	967	61,800	62,800	3	721	56,200	56,900
Utah	46	542	72,000	72,500	59	939	68,300	69,300
Vermont	4	55	2,060	2,120	7	161	2,550	2,720
Virginia	181	749	114,000	115,000	87	1,010	103,000	104,000
Washington	18	674	15,300	15,900	53	576	10,600	11,200
West Virginia	128	826	342,000	343,000	130	1,400	324,000	326,000

See footnotes at end of table.

TABLE 3—Continued  
INDUSTRIAL EXPLOSIVES AND BLASTING AGENTS SOLD FOR CONSUMPTION IN THE UNITED STATES, BY STATE AND CLASS<sup>1</sup>

(Metric tons)

State	2011				2012			
	Fixed high explosives		Blasting agents and oxidizers	Total	Fixed high explosives		Blasting agents and oxidizers	Total
	Permissibles	Other high explosives			Permissibles	Other high explosives		
Wisconsin	--	282	10,900	11,200	1	429	11,000	11,400
Wyoming	--	355	763,000	764,000	--	562	870,000	871,000
Total	1,020	21,900	2,980,000	3,000,000	1,470	31,400	3,350,000	3,380,000

-- Zero.

<sup>1</sup>Data are rounded to no more than three significant digits; may not add to totals shown.

<sup>2</sup>Includes the District of Columbia.

<sup>3</sup>Less than ½ unit.

Source: Institute of Makers of Explosives.

