

15.9 Blasting Caps, Demolition Charges, And Detonators

Munitions listed in this section begin with the Department of Defense Identification Code (DODIC) letter “M.” This category of munitions includes blasting caps, demolition charges, and detonators. Examples include trinitrotoluene (TNT), Composition C4 demolition block charges, detonation cord, military dynamite, and blasting caps.

15.9.1 M023, M112 Demolition Block Charge

15.9.1.1 Ordnance Description^{1,2}

The M112 Demolition Block Charge (DODIC M023) is a plastic explosive ideally suited for cutting charges as the adhesive backing allows the charge to be attached to any relatively dry, flat surface above freezing. This ammunition is used during combat and on firing ranges during training. The explosive is packed in a mylar wrapper, but it can be removed from the wrapper and hand formed as desired to suit the target. When the charge is detonated, the explosive is converted to compressed gas that exerts pressure in the form of a shock wave. Depending on the placement of the charge in relation to the target, the pressure generated at detonation destroys the target by cutting, breaching, or cratering.

The M112 Demolition Block Charge is used during many Army training exercises, which are held at nearly every Army training installation. At most locations, the training areas are at least 1,000 meters (over 0.5 mile) away from populated areas. On average, 600 M112 charges are used per year at a given training facility.²

15.9.1.2 Emissions And Controls^{1,3-6}

The primary emissions from the detonation of the M112 Demolition Block Charge are carbon dioxide (CO₂), carbon monoxide (CO), and particulate matter. Other criteria pollutants, hazardous air pollutants as defined by the *Clean Air Act* (CAA), and toxic chemicals (i.e., those chemicals regulated under Section 313 of the *Emergency Planning and Community Right-to-Know Act* [EPCRA]) are emitted at low levels. As this ordnance is typically detonated in the field, there are no controls associated with its use.

Table 15.9.1-1 presents emission factors for CO₂, criteria pollutants, methane, and total suspended particulate (TSP). Table 15.9.1-2 presents emission factors for hazardous air pollutants and toxic chemicals. In both tables, the emission factors are presented in units of pounds of emissions per item (lb per item) and in units of pounds of emissions per pound net explosive weight contained in the item (lb per lb NEW).

Table 15.9.1-1 EMISSION FACTORS FOR THE USE OF DODIC M023,
M112 DEMOLITION BLOCK CHARGE – CARBON DIOXIDE, CRITERIA POLLUTANTS,
METHANE, AND TOTAL SUSPENDED PARTICULATE^a

EMISSION FACTOR RATING: C (except as noted)

CASRN ^b	Pollutant	lb per item	lb per lb NEW ^c
124-38-9	CO ₂ ^f	7.9 E-01	6.3 E-01
630-08-0	CO ^g	2.6 E-02	2.1 E-02
7439-92-1	Lead (Pb)	1.7 E-04	1.4 E-04
74-82-8	Methane ^g	1.6 E-03	1.3 E-03
--	Oxides of nitrogen (NO _x) ^f	7.9 E-03	6.3 E-03
--	PM-2.5 ^{d,g}	1.9 E-02	1.5 E-02
--	PM-10 ^e	2.6 E-02	2.1 E-02
7446-09-5	Sulfur dioxide (SO ₂)	1.5 E-04	1.2 E-04
12789-66-1	TSP	3.2 E-02	2.6 E-02

^a Factors represent uncontrolled emissions. References 1, 3, and 6.

^b CASRN = Chemical Abstracts Service Registry Number.

^c NEW = net explosive weight. The NEW for this ordnance is 1.25 pounds per item. Reference 1.

^d PM-2.5 = particulate matter with an aerodynamic diameter equal to or less than 2.5 micrometers (µm).

^e PM-10 = particulate matter with an aerodynamic diameter equal to or less than 10 µm.

^f EMISSION FACTOR RATING A.

^g EMISSION FACTOR RATING B.

Table 15.9.1-2 EMISSION FACTORS FOR THE USE OF DODIC M023,
M112 DEMOLITION BLOCK CHARGE –
HAZARDOUS AIR POLLUTANTS AND TOXIC CHEMICALS^a

EMISSION FACTOR RATING: C (except as noted)

CASRN ^b	Pollutant	lb per item	lb per lb NEW ^c
83-32-9	Acenaphthene ^{d,h}	3.2 E-08	2.6 E-08
208-96-8	Acenaphthylene ^{d,h}	3.5 E-07	2.8 E-07
75-05-8	Acetonitrile ^{e,h}	1.2 E-04	9.9 E-05
107-13-1	Acrylonitrile ^{e,h}	9.4 E-06	7.5 E-06
7429-90-5	Aluminum ^{f,h}	2.1 E-04	1.7 E-04
120-12-7	Anthracene ^{e,h}	5.0 E-08	4.0 E-08
7440-36-0	Antimony ^{e,i}	2.9 E-06	2.3 E-06
7440-39-3	Barium ^f	5.5 E-06	4.4 E-06
71-43-2	Benzene ^{e,h}	1.4 E-05	1.1 E-05
85-68-7	Butylbenzylphthalate ^{d,g}	3.5 E-06	2.8 E-06
7440-47-3	Chromium ^{e,h}	9.4 E-06	7.5 E-06
7440-50-8	Copper ^{f,h}	1.2 E-04	9.4 E-05
84-74-2	Dibutyl phthalate ^{e,g}	4.3 E-06	3.5 E-06
75-71-8	Dichlorodifluoromethane ^{f,h}	5.1 E-08	4.1 E-08
107-06-2	1,2-Dichloroethane ^e	2.9 E-07	2.3 E-07
--	Total dioxin/furan compounds ^e	3.8 E-10	3.0 E-10
74-85-1	Ethylene ^{f,h}	1.3 E-04	1.1 E-04
117-81-7	bis(2-Ethylhexyl)phthalate ^{e,g}	1.5 E-05	1.2 E-05
206-44-0	Fluoranthene ^{e,h}	7.1 E-08	5.7 E-08
86-73-7	Fluorene ^{d,h}	1.8 E-08	1.5 E-08
50-00-0	Formaldehyde ^e	1.4 E-04	1.1 E-04
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	2.9 E-11	2.4 E-11
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran ^e	3.0 E-12	2.4 E-12
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran ^{e,i}	2.3 E-13	1.8 E-13
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin ^e	2.3 E-13	1.8 E-13
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin ^e	5.2 E-13	4.2 E-13
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin ^{e,i}	3.9 E-13	3.1 E-13
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran ^e	8.1 E-13	6.5 E-13
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran ^e	3.0 E-13	2.4 E-13
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran ^e	1.7 E-13	1.3 E-13

Table 15.9.1-2 (cont.)

CASRN ^b	Pollutant	lb per item	lb per lb NEW ^c
110-54-3	Hexane ^e	4.6 E-05	3.7 E-05
74-90-8	Hydrogen cyanide ^e	5.3 E-04	4.2 E-04
7439-92-1	Lead ^e	1.7 E-04	1.4 E-04
7439-96-5	Manganese ^{e,h}	2.8 E-05	2.3 E-05
75-09-2	Methylene chloride ^{e,h}	1.9 E-06	1.5 E-06
91-20-3	Naphthalene ^e	2.2 E-06	1.7 E-06
7697-37-2	Nitric acid ^{f,h}	1.2 E-03	9.9 E-04
3268-87-9	1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin ^e	3.3 E-10	2.7 E-10
39001-02-0	1,2,3,4,6,7,8,9-Octachlorodibenzofuran ^{e,i}	6.3 E-12	5.1 E-12
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran ^e	2.3 E-13	1.8 E-13
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran ^{e,i}	9.5 E-13	7.6 E-13
85-01-8	Phenanthrene ^{e,h}	2.9 E-07	2.3 E-07
115-07-1	Propylene ^{f,h}	2.4 E-05	2.0 E-05
129-00-0	Pyrene ^{d,h}	1.7 E-07	1.4 E-07
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran ^e	1.1 E-12	9.0 E-13
108-88-3	Toluene ^{e,h}	3.7 E-06	3.0 E-06
71-55-6	1,1,1-Trichloroethane ^e	7.6 E-09	6.0 E-09
75-69-4	Trichlorofluoromethane ^f	4.7 E-09	3.7 E-09
95-63-6	1,2,4-Trimethylbenzene ^{f,h}	2.2 E-06	1.7 E-06
7440-66-6	Zinc ^{f,h}	2.6 E-05	2.1 E-05

^a Factors represent uncontrolled emissions. References 1, 3, and 6.

^b CASRN = Chemical Abstracts Service Registry Number.

^c NEW = net explosive weight. The NEW for this ordnance is 1.25 pounds per item. Reference 1.

^d Hazardous air pollutant under CAA Section 112(b).

^e Reportable chemical under EPCRA Section 313 and a hazardous air pollutant under CAA Section 112(b).

^f Reportable chemical under EPCRA Section 313.

^g EMISSION FACTOR RATING A.

^h EMISSION FACTOR RATING B.

ⁱ EMISSION FACTOR RATING D.

References For Section 15.9.1

1. *Report No. 1 for the Exploding Ordnance Emission Study Phase II*, Military Environmental Technology Demonstration Center, U.S. Army Aberdeen Test Center, Aberdeen Proving Ground, MD, August 2002.

2. *Training Munitions Health Risk Assessment No. 39-DA-1485-02, Residential Exposure from Inhalation of Air Emissions After Detonation of the M112 Demolition Charge, Department of Defense Identification Code: M023*, U.S. Army Center for Health Promotion and Preventive Medicine, Environmental Health Risk Assessment Program, September 2002.
3. *Detailed Test Plan No. 1 for the Exploding Ordnance Emission Study, Series I*, Military Environmental Technology Demonstration Center, U.S. Army Aberdeen Test Center, Aberdeen Proving Ground, MD, December 2000.
4. *Hazard Classification of United States Military Explosives and Munitions*, U.S. Army Defense Ammunition Center, Logistics Review and Technical Assistance Office, McAlester, OK, Revision 11, February 2001.
5. *Background Document, Report on Revisions to 5th Edition AP-42 Chapter 15 - Ordnance Detonation, Emission Factors Developed Based on Exploding Ordnance Emission Study Phase II Series I Testing Conducted at Aberdeen Proving Ground, Maryland*, MACTEC Federal Programs, Inc., Research Triangle Park, NC, July 2006.
6. Supporting information including Excel spreadsheets, analytical results, field notes, and case summaries supplied upon request by the Applied Science Test Team - Chemistry Unit, U.S. Army Aberdeen Test Center, Aberdeen Proving Ground, MD, May 2004.

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15.9.2 M030, 1/4-Pound Demolition Block Charge

15.9.2.1 Ordnance Description¹⁻³

The 1/4-Pound Demolition Block Charge (DODIC M030) is a trinitrotoluene (TNT) filled cylindrical waterproof cardboard container with metal end caps and a threaded cap well on one end. Typically, demolition block charges are used for all types of demolition work, including cutting and breaching of hard surfaced materials. The high detonating velocity of TNT makes it well suited for demolition; however, the 1/4-Pound Demolition Block Charge is primarily used for training purposes.

The 1/4-Pound Demolition Block Charge is used during many Army training exercises, which are held at nearly every Army training installation. At most locations, the training areas are at least 1,000 meters (over 0.5 mile) away from populated areas. On average, 600 1/4-Pound Demolition Block Charges are used per year at a given training facility.³

15.9.2.2 Emissions And Controls^{1,2,4-9}

The primary pollutant emitted from the detonation of the 1/4-Pound Demolition Block Charge is carbon dioxide (CO₂). Other criteria pollutants, hazardous air pollutants as defined by the *Clean Air Act* (CAA), and toxic chemicals (i.e., those chemicals regulated under Section 313 of the *Emergency Planning and Community Right-to-Know Act* [EPCRA]) are emitted at low levels. As this ordnance is typically detonated in the field, there are no controls associated with its use.

Table 15.9.2-1 presents emission factors for CO₂, criteria pollutants, methane, and total suspended particulate (TSP). Table 15.9.2-2 presents emission factors for hazardous air pollutants and toxic chemicals. In both tables, the emission factors are presented in units of pounds of emissions per item (lb per item) and in units of pounds of emissions per pound net explosive weight contained in the item (lb per lb NEW).

Table 15.9.2-1 EMISSION FACTORS FOR THE USE OF DODIC M030,
 1/4-POUND DEMOLITION BLOCK CHARGE – CARBON DIOXIDE, CRITERIA POLLUTANTS,
 METHANE, AND TOTAL SUSPENDED PARTICULATE^a

EMISSION FACTOR RATING: C (except as noted)

CASRN ^b	Pollutant	lb per item	lb per lb NEW ^c
124-38-9	CO ₂ ^f	3.4 E-01	1.4
630-08-0	Carbon monoxide (CO) ^g	5.0 E-03	2.0 E-02
7439-92-1	Lead (Pb)	1.4 E-04	5.6 E-04
74-82-8	Methane ^g	2.0 E-05	8.1 E-05
--	Oxides of nitrogen (NO _x) ^f	3.0 E-03	1.2 E-02
--	PM-2.5 ^{d,g}	4.6 E-03	1.9 E-02
--	PM-10 ^e	1.2 E-02	5.0 E-02
7446-09-5	Sulfur dioxide (SO ₂)	8.1 E-05	3.2 E-04
12789-66-1	TSP	1.7 E-02	6.7 E-02

^a Factors represent uncontrolled emissions. References 1, 3, and 6.

^b CASRN = Chemical Abstracts Service Registry Number.

^c NEW = net explosive weight. The NEW for this ordnance is 0.25 pounds per item. Reference 1.

^d PM-2.5 = particulate matter with an aerodynamic diameter equal to or less than 2.5 micrometers (µm).

^e PM-10 = particulate matter with an aerodynamic diameter equal to or less than 10 µm.

^f EMISSION FACTOR RATING A.

^g EMISSION FACTOR RATING B.

Table 15.9.2-2 EMISSION FACTORS FOR THE USE OF DODIC M030,
1/4-POUND DEMOLITION BLOCK CHARGE –
HAZARDOUS AIR POLLUTANTS AND TOXIC CHEMICALS^a

EMISSION FACTOR RATING: C (except as noted)

CASRN ^b	Pollutant	lb per item	lb per lb NEW ^c
83-32-9	Acenaphthene ^{d,h}	4.9 E-09	2.0 E-08
208-96-8	Acenaphthylene ^{d,h}	3.8 E-08	1.5 E-07
107-13-1	Acrylonitrile ^{e,i}	5.8 E-07	2.3 E-06
7429-90-5	Aluminum ^{f,h}	2.7 E-04	1.1 E-03
120-12-7	Anthracene ^{e,h}	7.0 E-09	2.8 E-08
7440-39-3	Barium ^f	1.5 E-04	5.9 E-04
71-43-2	Benzene ^e	2.9 E-07	1.2 E-06
56-55-3	Benzo[a]anthracene ^e	2.7 E-09	1.1 E-08
71-36-3	n-Butanol ^{f,i}	6.3 E-06	2.5 E-05
75-65-0	t-Butyl alcohol ^e	3.9 E-07	1.6 E-06
85-68-7	Butylbenzylphthalate ^{d,g}	5.5 E-06	2.2 E-05
74-87-3	Chloromethane ^{e,h}	6.6 E-08	2.6 E-07
7440-47-3	Chromium ^{e,h}	5.4 E-06	2.2 E-05
218-01-9	Chrysene ^e	2.6 E-09	1.0 E-08
7440-50-8	Copper ^{f,h}	1.2 E-04	4.7 E-04
84-74-2	Dibutyl phthalate ^{e,g}	2.2 E-06	8.9 E-06
75-71-8	Dichlorodifluoromethane ^{f,h}	3.7 E-09	1.5 E-08
121-14-2	2,4-Dinitrotoluene ^e	3.6 E-07	1.4 E-06
--	Total dioxin/furan compounds ^e	8.9 E-11	3.6 E-10
100-41-4	Ethylbenzene ^{e,h}	7.6 E-07	3.1 E-06
74-85-1	Ethylene ^{f,h}	6.5 E-06	2.6 E-05
117-81-7	bis(2-Ethylhexyl)phthalate ^{e,g}	3.7 E-06	1.5 E-05
206-44-0	Fluoranthene ^{e,h}	1.2 E-08	4.9 E-08
86-73-7	Fluorene ^{d,h}	1.5 E-08	6.0 E-08
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin ^e	6.4 E-12	2.5 E-11
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran ^{e,i}	9.7 E-13	3.9 E-12
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran ^e	1.3 E-13	5.1 E-13
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin ^e	3.3 E-13	1.3 E-12
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin ^e	2.4 E-13	9.7 E-13
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran ^{e,i}	1.9 E-13	7.8 E-13

Table 15.9.2-2 (cont.)

CASRN ^b	Pollutant	lb per item	lb per lb NEW ^c
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran ^e	1.3 E-13	5.1 E-13
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran ^e	6.7 E-14	2.7 E-13
74-90-8	Hydrogen cyanide ^e	1.3 E-04	5.2 E-04
7439-92-1	Lead ^e	1.4 E-04	5.6 E-04
7439-96-5	Manganese ^{e,h}	1.9 E-05	7.8 E-05
75-09-2	Methylene chloride ^{e,h}	3.3 E-07	1.3 E-06
91-20-3	Naphthalene ^{e,h}	7.9 E-08	3.2 E-07
7697-37-2	Nitric acid ^{f,i}	5.9 E-05	2.4 E-04
3268-87-9	1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin ^e	8.0 E-11	3.2 E-10
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran ^{e,i}	1.4 E-13	5.5 E-13
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran ^e	1.7 E-13	6.9 E-13
85-01-8	Phenanthrene ^{e,h}	4.8 E-08	1.9 E-07
129-00-0	Pyrene ^{d,h}	2.2 E-08	8.9 E-08
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran ^e	6.7 E-13	2.7 E-12
108-88-3	Toluene ^{e,h}	9.3 E-09	3.7 E-08
71-55-6	1,1,1-Trichloroethane ^{e,i}	5.7 E-06	2.3 E-05
95-63-6	1,2,4-Trimethylbenzene ^f	1.7 E-06	6.9 E-06
108-05-4	Vinyl acetate ^e	3.2 E-07	1.3 E-06
106-42-3, 108-38-3	m-Xylene, p-Xylene ^{e,h}	2.3 E-06	9.2 E-06
95-47-6	o-Xylene ^{e,h}	1.5 E-06	6.1 E-06
7440-66-6	Zinc ^{f,h}	1.4 E-05	5.8 E-05

^a Factors represent uncontrolled emissions. References 1, 3, and 6.

^b CASRN = Chemical Abstracts Service Registry Number.

^c NEW = net explosive weight. The NEW for this ordnance is 0.25 pounds per item. Reference 1.

^d Hazardous air pollutant under CAA Section 112(b).

^e Reportable chemical under EPCRA Section 313 and a hazardous air pollutant under CAA Section 112(b).

^f Reportable chemical under EPCRA Section 313.

^g EMISSION FACTOR RATING A.

^h EMISSION FACTOR RATING B.

ⁱ EMISSION FACTOR RATING D.

References For Section 15.9.2

1. *Report No. 1 for the Exploding Ordnance Emission Study Phase II*, Military Environmental Technology Demonstration Center, U.S. Army Aberdeen Test Center, Aberdeen Proving Ground, MD, August 2002.

2. *Report No. 3 for the Exploding Ordnance Emission Study Phase II*, Military Environmental Technology Demonstration Center, U.S. Army Aberdeen Test Center, Aberdeen Proving Ground, MD, February 2004.
3. *Training Munitions Health Risk Assessment No. 39-DA-1485-02, Residential Exposure from Inhalation of Air Emissions After Detonation of the M30 Demolition Charge*, Department of Defense Identification Code: M031, U.S. Army Center for Health Promotion and Preventive Medicine, Environmental Health Risk Assessment Program, September 2002.
4. *Detailed Test Plan No. 1 for the Exploding Ordnance Emission Study, Series I*, Military Environmental Technology Demonstration Center, U.S. Army Aberdeen Test Center, Aberdeen Proving Ground, MD, December 2000.
5. *Detailed Test Plan No. 3 for the Exploding Ordnance Emission Study, Phase II*, Military Environmental Technology Demonstration Center, U.S. Army Aberdeen Test Center, Aberdeen Proving Ground, MD, October 2001.
6. *Hazard Classification of United States Military Explosives and Munitions*, U.S. Army Defense Ammunition Center, Logistics Review and Technical Assistance Office, McAlester, OK, Revision 11, February 2001.
7. *Background Document, Report on Revisions to 5th Edition AP-42 Chapter 15 - Ordnance Detonation, Emission Factors Developed Based on Exploding Ordnance Emission Study Phase II Series 1 Testing Conducted at Aberdeen Proving Ground, Maryland*, MACTEC Federal Programs, Inc., Research Triangle Park, NC, July 2006.
8. *Background Document, Report on Revisions to 5th Edition AP-42 Chapter 15 - Ordnance Detonation, Emission Factors Developed Based on Exploding Ordnance Emission Study Phase II Series 3 Testing Conducted at Aberdeen Proving Ground, Maryland*, MACTEC Federal Programs, Inc., Research Triangle Park, NC, July 2006.
9. Supporting information including Excel spreadsheets, analytical results, field notes, and case summaries supplied upon request by the Applied Science Test Team - Chemistry Unit, U.S. Army Aberdeen Test Center, Aberdeen Proving Ground, MD, May 2004 and January 2005.

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15.9.4 M032, 1-Pound Demolition Block Charge

15.9.4.1 Ordnance Description¹⁻³

The 1-Pound Demolition Block Charge (DODIC M032) is a trinitrotoluene (TNT) filled rectangular waterproof cardboard container with metal end caps and a threaded cap well on one end. The high detonating velocity of TNT makes it well suited for demolition, and these charges are used for all types of demolition work, including cutting and breaching of hard surfaced materials. This ammunition is used during combat and on firing ranges during training.

15.9.4.2 Emissions And Controls^{1,2,4-8}

Carbon dioxide (CO₂) is the primary emission from the detonation of the 1-Pound Demolition Block Charge. Other criteria pollutants, hazardous air pollutants in the *Clean Air Act* (CAA), and toxic chemicals (i.e., those chemicals regulated under Section 313 of the *Emergency Planning and Community Right-to-Know Act* [EPCRA]) are emitted at low levels. As this ordnance is typically fired in the field, there are no controls associated with its use.

Table 15.9.4-1 presents emission factors for CO₂, criteria pollutants, and total suspended particulate (TSP). Table 15.9.4-2 presents emission factors for hazardous air pollutants and toxic chemicals. In both tables, the emission factors are presented in units of pounds of emissions per item (lb per item) and in units of pounds of emissions per pound net explosive weight contained in the item (lb per lb NEW).

Table 15.9.4-1 EMISSION FACTORS FOR THE USE OF DODIC M032,
 1-POUND DEMOLITION BLOCK CHARGE – CARBON DIOXIDE, CRITERIA POLLUTANTS,
 AND TOTAL SUSPENDED PARTICULATE^a

EMISSION FACTOR RATING: C (except as noted)

CASRN ^b	Pollutant	lb per item	lb per lb NEW
124-38-9	CO ₂ ^f	1.2	1.2
630-08-0	Carbon monoxide (CO) ^g	4.8 E-03	4.8 E-03
7439-92-1	Lead (Pb)	2.0 E-04	2.0 E-04
--	Oxides of nitrogen (NO _x) ^f	1.3 E-02	1.3 E-02
--	PM-2.5 ^{d,g}	1.4 E-02	1.4 E-02
--	PM-10 ^e	2.5 E-02	2.5 E-02
7446-09-5	Sulfur dioxide	4.0 E-05	4.0 E-05
12789-66-1	Total suspended particulate	3.2 E-02	3.2 E-02

^a Factors represent uncontrolled emissions. References 1-4 and 8.

^b CASRN = Chemical Abstracts Service Registry Number.

^c NEW = net explosive weight. The NEW for this ordnance is 1.0 pound per item. References 1 and 2.

^d PM-2.5 = particulate matter with an aerodynamic diameter equal to or less than 2.5 micrometers (µm).

^e PM-10 = particulate matter with an aerodynamic diameter equal to or less than 10 µm.

^f EMISSION FACTOR RATING A.

^g EMISSION FACTOR RATING B.

Table 15.9.4-2 EMISSION FACTORS FOR THE USE OF DODIC M032,
1-POUND DEMOLITION BLOCK CHARGE –
HAZARDOUS AIR POLLUTANTS AND TOXIC CHEMICALS^a

EMISSION FACTOR RATING: C (except as noted)

CASRN ^b	Pollutant	lb per item	lb per lb NEW ^c
83-32-9	Acenaphthene ^{d,h}	9.2 E-09	9.2 E-09
208-96-8	Acenaphthylene ^{d,h}	1.0 E-07	1.0 E-07
107-13-1	Acrylonitrile ^{e,h}	3.1 E-07	3.1 E-07
7429-90-5	Aluminum ^{f,h}	9.1 E-04	9.1 E-04
120-12-7	Anthracene ^{e,h}	1.2 E-08	1.2 E-08
7440-39-3	Barium ^f	6.2 E-04	6.2 E-04
71-43-2	Benzene ^{e,h}	1.7 E-07	1.7 E-07
85-68-7	Butylbenzylphthalate ^{d,g}	1.7 E-06	1.7 E-06
74-87-3	Chloromethane ^{e,h}	1.1 E-07	1.1 E-07
7440-47-3	Chromium ^{e,h}	8.7 E-06	8.7 E-06
18540-29-9	Chromium hexavalent ion ^e	2.1 E-06	2.1 E-06
7440-50-8	Copper ^{f,h}	5.3 E-04	5.3 E-04
84-74-2	Dibutyl phthalate ^{e,g}	2.9 E-06	2.9 E-06
75-71-8	Dichlorodifluoromethane ^{f,h}	1.0 E-09	1.0 E-09
121-14-2	2,4-Dinitrotoluene ^e	1.5 E-06	1.5 E-06
--	Total dioxin/furan compounds ^e	2.5 E-10	2.5 E-10
74-85-1	Ethylene ^{f,h}	5.8 E-06	5.8 E-06
117-81-7	bis(2-Ethylhexyl)phthalate ^{e,g}	9.9 E-06	9.9 E-06
86-73-7	Fluorene ^{d,h}	2.1 E-08	2.1 E-08
50-00-0	Formaldehyde ^e	5.8 E-05	5.8 E-05
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin ^e	1.5 E-11	1.5 E-11
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran ^e	1.8 E-12	1.8 E-12
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran ^e	5.5 E-13	5.5 E-13
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran ^e	4.4 E-13	4.4 E-13
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran ^e	5.4 E-13	5.4 E-13
74-90-8	Hydrogen cyanide ^e	4.4 E-05	4.4 E-05
7439-92-1	Lead ^e	2.0 E-04	2.0 E-04
7439-96-5	Manganese ^{e,h}	4.3 E-05	4.3 E-05
91-20-3	Naphthalene ^{e,h}	2.6 E-07	2.6 E-07
7697-37-2	Nitric acid ^{f,h}	4.5 E-04	4.5 E-04

Table 15.9.4-2 (cont.)

CASRN ^b	Pollutant	lb per item	lb per lb NEW ^c
3268-87-9	1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin ^e	2.2 E-10	2.2 E-10
39001-02-0	1,2,3,4,6,7,8,9-Octachlorodibenzofuran ^e	3.4 E-12	3.4 E-12
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran ^{e,i}	7.0 E-13	7.0 E-13
85-01-8	Phenanthrene ^{e,h}	1.3 E-07	1.3 E-07
7782-49-2	Selenium ^e	3.8 E-06	3.8 E-06
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran ^e	8.6 E-13	8.6 E-13
75-69-4	Trichlorofluoromethane ^f	5.8 E-10	5.8 E-10
7440-62-2	Vanadium ^f	2.6 E-04	2.6 E-04
75-01-4	Vinyl chloride ^{e,i}	8.0 E-08	8.0 E-08
7440-66-6	Zinc ^{f,h}	3.3 E-04	3.3 E-04

^a Factors represent uncontrolled emissions. References 1, 2, 4, 5, and 8.

^b CASRN = Chemical Abstracts Service Registry Number.

^c NEW = net explosive weight. The NEW for this ordnance is 1.0 pounds per item. References 1 and 2.

^d Hazardous air pollutant under CAA Section 112(b).

^e Reportable chemical under EPCRA Section 313 and a hazardous air pollutant under CAA Section 112(b).

^f Reportable chemical under EPCRA Section 313.

^g EMISSION FACTOR RATING A.

^h EMISSION FACTOR RATING B.

ⁱ EMISSION FACTOR RATING D.

References For Section 15.9.4

1. *Report No. 2 for the Exploding Ordnance Emission Study Phase II*, Military Environmental Technology Demonstration Center, U.S. Army Aberdeen Test Center, Aberdeen Proving Ground, MD, December 2003.
2. *Report No. 3 for the Exploding Ordnance Emission Study Phase II*, Military Environmental Technology Demonstration Center, U.S. Army Aberdeen Test Center, Aberdeen Proving Ground, MD, February 2004.
3. *Hazard Classification of United States Military Explosives and Munitions*, U.S. Army Defense Ammunition Center, Logistics Review and Technical Assistance Office, McAlester, OK, Revision 11, February 2001.
4. *Detailed Test Plan No. 2 for the Exploding Ordnance Emission Study, Phase II*, Military Environmental Technology Demonstration Center, U.S. Army Aberdeen Test Center, Aberdeen Proving Ground, MD, March 2001.
5. *Detailed Test Plan No. 3 for the Exploding Ordnance Emission Study, Phase II*, Military Environmental Technology Demonstration Center, U.S. Army Aberdeen Test Center, Aberdeen Proving Ground, MD, October 2001.

6. *Background Document, Report on Revisions to 5th Edition AP-42 Chapter 15 - Ordnance Detonation, Emission Factors Developed Based on Exploding Ordnance Emission Study Phase II Series 2 Testing Conducted at Aberdeen Proving Ground, Maryland, MACTEC Federal Programs, Inc., Research Triangle Park, NC, July 2006.*
7. *Background Document, Report on Revisions to 5th Edition AP-42 Chapter 15 - Ordnance Detonation, Emission Factors Developed Based on Exploding Ordnance Emission Study Phase II Series 3 Testing Conducted at Aberdeen Proving Ground, Maryland, MACTEC Federal Programs, Inc., Research Triangle Park, NC, July 2006.*
8. Supporting information including Excel spreadsheets, analytical results, field notes, and case summaries supplied upon request by the Applied Science Test Team - Chemistry Unit, U.S. Army Aberdeen Test Center, Aberdeen Proving Ground, MD, May 2004 and January 2005.

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15.9.17 M591, M1 Military Dynamite Demolition Block Charge

15.9.17.1 Ordnance Description^{1,2}

The M1 Military Dynamite Demolition Block Charge (DODIC M591) is a medium velocity blasting explosive used in military construction, quarrying, and demolition. This ammunition is used during combat and on firing ranges during training.

The M1 Military Dynamite Demolition Block Charge is used during many Army training exercises, which are held at nearly every Army training installation. At most locations, the training areas are at least 1,000 meters (over 0.5 mile) away from populated areas. On average, 7,100 M1 charges are used per year at a given training facility.²

15.9.17.2 Emissions And Controls^{1,3-6}

The primary emissions from the detonation of the M1 Military Dynamite Demolition Block Charge are carbon dioxide (CO₂) and particulate matter. Other criteria pollutants, hazardous air pollutants as defined by the *Clean Air Act (CAA)*, and toxic chemicals (i.e., those chemicals regulated under Section 313 of the *Emergency Planning and Community Right-to-Know Act [EPCRA]*) are emitted at low levels. As this ordnance is typically detonated in the field, there are no controls associated with its use.

Table 15.9.17-1 presents emission factors for CO₂, criteria pollutants, methane, and total suspended particulate (TSP). Table 15.9.17-2 presents emission factors for hazardous air pollutants and toxic chemicals. In both tables, the emission factors are presented in units of pounds of emissions per item (lb per item) and in units of pounds of emissions per pound net explosive weight contained in the item (lb per lb NEW).

Table 15.9.17-1 EMISSION FACTORS FOR THE USE OF DODIC M591,
M1 MILITARY DYNAMITE DEMOLITION BLOCK CHARGE – CARBON DIOXIDE, CRITERIA
POLLUTANTS, METHANE, AND TOTAL SUSPENDED PARTICULATE^a

EMISSION FACTOR RATING: C (except as noted)

CASRN ^b	Pollutant	lb per item	lb per lb NEW ^c
124-38-9	CO ₂ ^f	3.3 E-01	9.0 E-01
630-08-0	Carbon monoxide (CO) ^g	5.4 E-03	1.5 E-02
7439-92-1	Lead (Pb)	1.5 E-04	4.1 E-04
74-82-8	Methane ^g	6.5 E-05	1.7 E-04
--	Oxides of nitrogen (NO _x) ^f	2.4 E-03	6.5 E-03
--	PM-2.5 ^{d,g}	3.5 E-03	9.4 E-03
--	PM-10 ^e	8.9 E-03	2.4 E-02
12789-66-1	TSP	1.6 E-02	4.2 E-02

^a Factors represent uncontrolled emissions. References 1, 3, and 6.

^b CASRN = Chemical Abstracts Service Registry Number.

^c NEW = net explosive weight. The NEW for this ordnance is 3.7 E-01 pounds per item. Reference 1.

^d PM-2.5 = particulate matter with an aerodynamic diameter equal to or less than 2.5 micrometers (µm).

^e PM-10 = particulate matter with an aerodynamic diameter equal to or less than 10 µm.

^f EMISSION FACTOR RATING A.

^g EMISSION FACTOR RATING B.

Table 15.9.17-2 EMISSION FACTORS FOR THE USE OF DODIC M591,
M1 MILITARY DYNAMITE DEMOLITION BLOCK CHARGE –
HAZARDOUS AIR POLLUTANTS AND TOXIC CHEMICALS^a

EMISSION FACTOR RATING: C (except as noted)

CASRN ^b	Pollutant	lb per item	lb per lb NEW ^c
83-32-9	Acenaphthene ^{d,h}	6.3 E-09	1.7 E-08
208-96-8	Acenaphthylene ^{d,h}	2.9 E-08	7.8 E-08
75-07-0	Acetaldehyde ^{e,h}	6.9 E-06	1.9 E-05
75-05-8	Acetonitrile ^{e,h}	1.3 E-05	3.5 E-05
7429-90-5	Aluminum ^{f,h}	1.4 E-04	3.9 E-04
120-12-7	Anthracene ^{e,h}	7.3 E-09	2.0 E-08
7440-39-3	Barium ^f	1.1 E-05	2.8 E-05
71-43-2	Benzene ^{e,h}	6.1 E-07	1.7 E-06
56-55-3	Benzo[a]anthracene ^e	2.2 E-09	5.9 E-09
85-68-7	Butylbenzylphthalate ^{d,g}	3.6 E-06	9.6 E-06
7440-47-3	Chromium ^{e,h}	2.3 E-06	6.3 E-06
218-01-9	Chrysene ^e	6.9 E-09	1.9 E-08
7440-50-8	Copper ^{f,h}	2.7 E-05	7.4 E-05
84-74-2	Dibutyl phthalate ^{e,g}	4.3 E-06	1.1 E-05
75-71-8	Dichlorodifluoromethane ^{f,h}	4.8 E-08	1.3 E-07
121-14-2	2,4-Dinitrotoluene ^{e,i}	1.1 E-07	3.0 E-07
--	Total dioxin/furan compounds ^e	1.4 E-10	3.8 E-10
111-76-2	Ethanol, 2-butoxy- ^{d,i}	3.0 E-06	8.1 E-06
100-41-4	Ethylbenzene ^{e,h}	6.4 E-07	1.7 E-06
74-85-1	Ethylene ^f	4.6 E-06	1.2 E-05
117-81-7	bis(2-Ethylhexyl)phthalate ^{e,h}	1.1 E-05	3.0 E-05
206-44-0	Fluoranthene ^{e,h}	3.1 E-08	8.4 E-08
86-73-7	Fluorene ^{d,h}	1.1 E-08	2.9 E-08
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin ^e	9.9 E-12	2.7 E-11
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran ^{e,i}	1.3 E-12	3.6 E-12
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran ^e	1.4 E-13	3.7 E-13
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin ^e	2.4 E-13	6.5 E-13
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin ^e	3.2 E-13	8.7 E-13
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin ^e	2.5 E-13	6.7 E-13
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran ^{e,i}	1.5 E-13	4.1 E-13

Table 15.9.17-2 (cont.)

CASRN ^b	Pollutant	lb per item	lb per lb NEW ^c
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran ^e	2.2 E-13	6.0 E-13
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran ^e	1.5 E-13	4.1 E-13
110-54-3	Hexane ^{e,i}	5.5 E-05	1.5 E-04
74-90-8	Hydrogen cyanide ^e	1.4 E-04	3.7 E-04
7439-92-1	Lead ^e	1.5 E-04	4.1 E-04
7439-96-5	Manganese ^{e,h}	2.1 E-05	5.6 E-05
75-09-2	Methylene chloride ^{e,h}	1.8 E-06	4.9 E-06
91-20-3	Naphthalene ^{e,h}	8.9 E-07	2.4 E-06
7697-37-2	Nitric acid ^{f,h}	8.0 E-05	2.2 E-04
3268-87-9	1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin ^e	1.3 E-10	3.5 E-10
85-01-8	Phenanthrene ^{e,h}	6.5 E-08	1.8 E-07
129-00-0	Pyrene ^{d,h}	3.7 E-08	1.0 E-07
7664-93-9	Sulfuric acid ^f	3.0 E-05	8.2 E-05
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran ^e	4.4 E-13	1.2 E-12
108-88-3	Toluene ^{e,h}	6.8 E-08	1.8 E-07
71-55-6	1,1,1-Trichloroethane ^e	2.2 E-08	6.0 E-08
75-69-4	Trichlorofluoromethane ^f	4.8 E-10	1.3 E-09
95-63-6	1,2,4-Trimethylbenzene ^{f,h}	5.1 E-07	1.4 E-06
106-42-3, 108-38-3	m-Xylene, p-Xylene ^{e,h}	2.1 E-06	5.7 E-06
95-47-6	o-Xylene ^{e,h}	1.0 E-06	2.7 E-06
7440-66-6	Zinc ^{f,h}	1.6 E-05	4.4 E-05

^a Factors represent uncontrolled emissions. References 1, 3, and 6.

^b CASRN = Chemical Abstracts Service Registry Number.

^c NEW = net explosive weight. The NEW for this ordnance is 3.7 E-01 pounds per item. Reference 1.

^d Hazardous air pollutant under CAA Section 112(b).

^e Reportable chemical under EPCRA Section 313 and a hazardous air pollutant under CAA Section 112(b).

^f Reportable chemical under EPCRA Section 313.

^g EMISSION FACTOR RATING A.

^h EMISSION FACTOR RATING B.

ⁱ EMISSION FACTOR RATING D.

References For Section 15.9.17

1. *Report No. 1 for the Exploding Ordnance Emission Study Phase II*, Military Environmental Technology Demonstration Center, U.S. Army Aberdeen Test Center, Aberdeen Proving Ground, MD, August 2002.

2. *Training Munitions Health Risk Assessment No. 39-DA-1485-02, Residential Exposure from Inhalation of Air Emissions After Detonation of the M1 Military Dynamite, Department of Defense Identification Code: M591*, U.S. Army Center for Health Promotion and Preventive Medicine, Environmental Health Risk Assessment Program, September 2002.
3. *Detailed Test Plan No. 1 for the Exploding Ordnance Emission Study, Series I*, Military Environmental Technology Demonstration Center, U.S. Army Aberdeen Test Center, Aberdeen Proving Ground, MD, December 2000.
4. *Hazard Classification of United States Military Explosives and Munitions*, U.S. Army Defense Ammunition Center, Logistics Review and Technical Assistance Office, McAlester, OK, Revision 11, February 2001.
5. *Background Document, Report on Revisions to 5th Edition AP-42 Chapter 15 - Ordnance Detonation, Emission Factors Developed Based on Exploding Ordnance Emission Study Phase II Series I Testing Conducted at Aberdeen Proving Ground, Maryland*, MACTEC Federal Programs, Inc., Research Triangle Park, NC, July 2006.
6. Supporting information including Excel spreadsheets, analytical results, field notes, and case summaries supplied upon request by the Applied Science Test Team - Chemistry Unit, U.S. Army Aberdeen Test Center, Aberdeen Proving Ground, MD, May 2004.

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15.9.25 M913, M58A3 Linear Demolition Charge

15.9.25.1 Ordnance Description¹

The M58A3 Linear Demolition Charge (DODIC M913) is a mine clearing device used to clear a path for tanks, vehicles, and personnel through minefields or other obstacles. The charge consists of a 350-foot sausage-like flexible explosive charge packed in a specialized container along with a steel towing cable assembly, a nylon arresting cable, and an electrically operated fuze. It is designed to be towed out over the target minefield by a rocket motor where it drops onto the ground and is then detonated on command by means of an electrical cable. This ammunition is used during combat and on ranges during training. Note that emission factors presented herein are only associated with the detonation of linear charge; emissions associated with the propelling rocket motor are not addressed in this section.

The M58A3 Linear Demolition Charge contains a core of 3/4-inch nylon rope, a detonating cord, and a bursting charge. A nylon sleeve is wrapped around the core, detonating cord, and bursting charge assembly. An M1134 fuze that contains an initiating charge is used to detonate the demolition charge.

15.9.25.2 Emissions And Controls¹⁻⁵

Carbon dioxide (CO₂) is the primary emission from the detonation of the M58A3 Linear Demolition Charge. Other criteria pollutants, hazardous air pollutants as defined by the *Clean Air Act* (CAA), and toxic chemicals (i.e., those chemicals regulated under Section 313 of the *Emergency Planning and Community Right-to-Know Act* [EPCRA]) are emitted at low levels. As this ordnance is typically detonated in the field, there are no controls associated with its use.

Table 15.9.25-1 presents emission factors for CO₂, criteria pollutants, methane, and total suspended particulate (TSP). Table 15.9.25-2 presents emission factors for hazardous air pollutants and toxic chemicals. In both tables, the emission factors are presented in units of pounds of emissions per pound net explosive weight contained in the item (lb per lb NEW). Because the NEW is dependent upon the length of demolition charge used, emission factors were not developed in units of pounds of emissions per item.

Table 15.9.25-1 EMISSION FACTORS FOR THE USE OF DODIC M913, M58A3 LINEAR DEMOLITION CHARGE (LINEAR CHARGE AND FUZE) – CARBON DIOXIDE, CRITERIA POLLUTANTS, METHANE, AND TOTAL SUSPENDED PARTICULATE^a

EMISSION FACTOR RATING: C (except as noted)

CASRN ^b	Pollutant	lb per lb NEW
124-38-9	CO ₂ ^f	1.2
630-08-0	Carbon monoxide (CO) ^g	1.1 E-02
7439-92-1	Lead (Pb)	3.4 E-05
74-82-8	Methane ^g	2.6 E-04
--	Oxides of nitrogen (NO _x) ^f	1.8 E-02
--	PM-2.5 ^{c,g}	2.1 E-02
--	PM-10 ^d	4.6 E-02
12789-66-1	Total suspended particulate	4.8 E-02

^a Factors represent uncontrolled emissions. References 1, 2, and 5.

^b CASRN = Chemical Abstracts Service Registry Number.

^c NEW = net explosive weight. The NEW for this ordnance is 5.02 pounds per linear foot of demolition charge, not including the NEW associated with the fuze (2.6 E-03 pounds). The complete ordnance includes three 100-foot sections and one 50-foot section that are joined together, and has an NEW of 1,757 pounds. Reference 1.

^d PM-2.5 = particulate matter with an aerodynamic diameter equal to or less than 2.5 micrometers (µm).

^e PM-10 = particulate matter with an aerodynamic diameter equal to or less than 10 µm.

^f EMISSION FACTOR RATING A.

^g EMISSION FACTOR RATING B.

Table 15.9.25-2 EMISSION FACTORS FOR THE USE OF DODIC M913,
M58A3 LINEAR DEMOLITION CHARGE (LINEAR CHARGE AND FUZE) –
HAZARDOUS AIR POLLUTANTS AND TOXIC CHEMICALS^a

EMISSION FACTOR RATING: C (except as noted)

CASRN ^b	Pollutant	lb per lb NEW ^c
83-32-9	Acenaphthene ^{d,h}	3.8 E-08
208-96-8	Acenaphthylene ^{d,h}	2.6 E-07
75-07-0	Acetaldehyde ^{e,h}	4.5 E-05
75-05-8	Acetonitrile ^{e,h}	4.3 E-05
107-02-8	Acrolein ^e	7.4 E-06
107-13-1	Acrylonitrile ^{e,h}	6.6 E-05
7429-90-5	Aluminum ^{f,h}	1.1 E-06
107-18-6	Allyl alcohol ^{e,i}	3.7 E-03
120-12-7	Anthracene ^{e,h}	5.8 E-08
7440-39-3	Barium ^f	6.4 E-06
71-43-2	Benzene ^{e,h}	1.4 E-05
56-55-3	Benzo[a]anthracene ^e	8.7 E-09
205-99-2	Benzo[b]fluoranthene ^e	3.9 E-09
50-32-8	Benzo[a]pyrene ^e	2.4 E-09
192-97-2	Benzo[e]pyrene ^d	5.6 E-09
74-83-9	Bromomethane ^e	6.6 E-07
75-65-0	t-Butyl alcohol ^e	2.7 E-07
85-68-7	Butylbenzylphthalate ^{d,g}	3.3 E-06
123-72-8	Butyraldehyde ^{f,i}	2.5 E-06
7440-43-9	Cadmium ^e	1.9 E-04
74-87-3	Chloromethane ^{e,h}	5.2 E-07
7440-47-3	Chromium ^{e,h}	1.0 E-05
18540-29-9	Hexavalent chromium ^e	1.4 E-07
218-01-9	Chrysene ^e	1.5 E-08
7440-50-8	Copper ^{f,h}	4.4 E-04
4170-30-3	Crotonaldehyde ^f	3.1 E-06
84-74-2	Dibutyl phthalate ^{e,g}	6.3 E-06
--	Total dioxin/furan compounds ^e	3.1 E-10
100-41-4	Ethylbenzene ^{e,h}	6.2 E-07
74-85-1	Ethylene ^{f,h}	3.4 E-04

Table 15.9.25-2 (cont.)

CASRN ^b	Pollutant	lb per lb NEW ^c
117-81-7	bis(2-Ethylhexyl)phthalate ^e	9.4 E-06
206-44-0	Fluoranthene ^{e,h}	1.1 E-07
86-73-7	Fluorene ^{d,h}	9.9 E-08
35822-46-9	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin ^e	3.4 E-11
67562-39-4	1,2,3,4,6,7,8-Heptachlorodibenzofuran ^e	2.7 E-12
55673-89-7	1,2,3,4,7,8,9-Heptachlorodibenzofuran ^e	8.5 E-13
39227-28-6	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin ^e	4.7 E-13
57653-85-7	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin ^e	1.1 E-12
19408-74-3	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin ^e	1.0 E-12
70648-26-9	1,2,3,4,7,8-Hexachlorodibenzofuran ^e	8.0 E-13
57117-44-9	1,2,3,6,7,8-Hexachlorodibenzofuran ^e	4.6 E-13
60851-34-5	2,3,4,6,7,8-Hexachlorodibenzofuran ^e	3.3 E-13
74-90-8	Hydrogen cyanide ^e	2.7 E-04
7439-92-1	Lead ^e	3.4 E-05
7439-96-5	Manganese ^{e,h}	9.3 E-05
74-88-4	Methyl iodide ^e	2.6 E-07
80-62-6	Methyl methacrylate ^e	5.2 E-07
91-20-3	Naphthalene ^{e,h}	1.0 E-06
7697-37-2	Nitric acid ^{f,h}	1.6 E-04
3268-87-9	1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin ^e	2.7 E-10
39001-02-0	1,2,3,4,6,7,8,9-Octachlorodibenzofuran ^e	9.7 E-12
40321-76-4	1,2,3,7,8-Pentachlorodibenzo-p-dioxin ^e	3.4 E-13
57117-41-6	1,2,3,7,8-Pentachlorodibenzofuran ^e	6.8 E-13
57117-31-4	2,3,4,7,8-Pentachlorodibenzofuran ^e	1.0 E-12
85-01-8	Phenanthrene ^{e,h}	3.6 E-07
123-38-6	Propionaldehyde ^e	5.9 E-06
107-12-0	Propionitrile ^{d,i}	1.2 E-06
115-07-1	Propylene ^{f,h}	5.0 E-05
129-00-0	Pyrene ^{d,h}	2.3 E-07
7440-22-4	Silver ^f	5.0 E-06
100-42-5	Styrene ^e	6.1 E-07
51207-31-9	2,3,7,8-Tetrachlorodibenzofuran ^e	1.9 E-12

Table 15.9.25-2 (cont.)

CASRN ^b	Pollutant	lb per lb NEW ^c
108-88-3	Toluene ^{e,h}	5.5 E-06
95-63-6	1,2,4-Trimethylbenzene ^{f,h}	4.0 E-07
75-01-4	Vinyl chloride ^e	9.2 E-07
106-42-3, 108-38-3	m-Xylene, p-Xylene ^{e,h}	5.9 E-07
95-47-6	o-Xylene ^{e,h}	3.9 E-07
7440-66-6	Zinc ^{f,h}	1.5 E-04

^a Factors represent uncontrolled emissions. References 1, 2, and 5.

^b CASRN = Chemical Abstracts Service Registry Number.

^c NEW = net explosive weight. The NEW for this ordnance is 5.02 pounds per linear foot of demolition charge, not including the NEW associated with the fuze (2.6 E-03 pounds). Reference 1.

^d Hazardous air pollutant under CAA Section 112(b).

^e Reportable chemical under EPCRA Section 313 and a hazardous air pollutant under CAA Section 112(b).

^f Reportable chemical under EPCRA Section 313.

^g EMISSION FACTOR RATING A.

^h EMISSION FACTOR RATING B.

ⁱ EMISSION FACTOR RATING D.

References For Section 15.9.25

1. *Report No. 3 for the Exploding Ordnance Emission Study Phase II*, Military Environmental Technology Demonstration Center, U.S. Army Aberdeen Test Center, Aberdeen Proving Ground, MD, February 2004.
2. *Detailed Test Plan No. 3 for the Exploding Ordnance Emission Study Phase II*, Military Environmental Technology Demonstration Center, U.S. Army Aberdeen Test Center, Aberdeen Proving Ground, MD, October 2001.
3. *Hazard Classification of United States Military Explosives and Munitions*, U.S. Army Defense Ammunition Center, Logistics Review and Technical Assistance Office, McAlester, OK, Revision 11, February 2001.
4. *Background Document, Report on Revisions to 5th Edition AP-42 Chapter 15 - Ordnance Detonation, Emission Factors Developed Based on Exploding Ordnance Emission Study Phase II Series 3 Testing Conducted at Aberdeen Proving Ground, Maryland*, MACTEC Federal Programs, Inc., Research Triangle Park, NC, July 2006.
5. Supporting information including Excel spreadsheets, analytical results, field notes, and case summaries supplied upon request by the Applied Science Test Team – Chemistry Unit, U.S. Army Aberdeen Test Center, Aberdeen Proving Ground, MD, January 2005.