

ANSI/ASSP A10.7 - 2018

Safety and Health Requirements for Construction and Demolition Use, Storage, Handling and Site Movement of Commercial Explosives and Blasting Agents



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SAFETY PROFESSIONALS

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ANSI/ASSP A10.7 – 2018

American National Standard
Construction and Demolition Operations

Safety and Health Requirements for
Construction and Demolition Use, Storage, Handling and
Site Movement of Commercial Explosives and Blasting Agents

Secretariat

American Society of Safety Professionals
520 N. Northwest Highway
Park Ridge, Illinois 60068

Approved July 25, 2018

American National Standards Institute

American National Standard

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Foreword (This Foreword is not a part of American National Standard A10.7-2018.)

This standard is one of a series of safety standards that have been formulated by the Accredited Standards Committee on Safety in Construction and Demolition Operations, A10. It is expected that the standards in the A10 series will find a major application in industry, serving as a guide to contractors, labor and equipment manufacturers. For the convenience of users, a list of existing and proposed standards in the A10 series for Safety Requirements in Construction and Demolition Operations follows.

A10.1	Pre-Project & Pre-Task Safety & Health Planning
A10.2	Safety, Health and Environmental Training (under development)
A10.3	Powder-Actuated Fastening Systems
A10.4	Personnel Hoists and Employee Elevators
A10.5	Material Hoists
A10.6	Demolition Operations
A10.7	Use, Storage, Handling and Site Movement of Commercial Explosives and Blasting Agents
A10.8	Scaffolding
A10.9	Concrete and Masonry Construction
A10.10	Temporary and Portable Space Heating Devices
A10.11	Personnel Nets
A10.12	Excavation
A10.13	Steel Erection
A10.15	Dredging
A10.16	Tunnels, Shafts and Caissons
A10.17	Safe Operating Practices for Hot Mix Asphalt (HMA) Construction
A10.18	Temporary Roof and Floor Holes, Wall Openings, Stairways and Other Unprotected Edges
A10.19	Pile Installation and Extraction Operations
A10.20	Ceramic Tile, Terrazzo, and Marble Work
A10.21	Safe Construction and Demolition of Wind Generation/Turbine Facilities (under development)
A10.22	Rope-Guided and Non-Guided Workers' Hoists
A10.23	Safety Requirements for the Installation of Drilled Shafts
A10.24	Roofing – Safety Requirements for Low-Sloped Roofs
A10.25	Sanitation in Construction
A10.26	Emergency Procedures for Construction Sites
A10.27	Hot Mix Asphalt Facilities
A10.28	Work Platforms Suspended from Cranes or Derricks
A10.29	Aerial Platforms in Construction (under development)
A10.31	Digger-Derricks
A10.32	Personal Fall Protection Used in Construction and Demolition Operations
A10.33	Safety and Health Program Requirements for Multi-Employer Projects
A10.34	Public Protection
A10.37	Debris Nets
A10.38	Basic Elements of a Program to Provide a Safe and Healthful Work Environment
A10.39	Construction Safety and Health Audit Program
A10.40	Reduction of Musculoskeletal Problems in Construction
A10.42	Rigging Qualifications and Responsibilities in the Construction Industry
A10.43	Confined Spaces in Construction and Demolition Operations
A10.44	Lockout/Tagout in Construction
A10.46	Hearing Loss Prevention
A10.47	Highway Construction Safety
A10.48	Communication Structures
A10.49	Control of Health Hazards

One purpose of these standards is to serve as guides to governmental authorities having jurisdiction over subjects within the scope of the A10 Committee standards. If these standards are adopted for governmental use, the reference of other national codes or standards in individual volumes may be changed to refer to the corresponding regulations.

Normative Requirements

This standard uses the single column format common to many international standards. The normative requirements appear aligned to the left margin. To meet the requirements of this standard, machinery, equipment and process suppliers and users must conform to these normative requirements. These requirements typically use the verb “shall.”

NOTE: The informative or explanatory notes in this standard appear indented, in italics, in a reduced font size, which is an effort to provide a visual signal to the reader that this is informative note, not normative text, and is not to be considered part of the requirements of this standard; this text is advisory in nature only. The suppliers and users are not required to conform to the informative note. The informative note is presented in this manner in an attempt to enhance readability and to provide explanation or guidance to the sections they follow.

Revisions: The A10 Committee welcomes proposals for revisions to this standard. Revisions are made to the standard periodically (usually five years from the date of the standard) to incorporate changes that appear necessary or desirable, as demonstrated by experience gained from the application of the standard. Proposals should be as specific as possible, citing the relevant section number(s), the proposed wording and the reason for the proposal. Pertinent documentation would enable the A10 Committee to process the changes in a more-timely manner.

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No one but the A10 Committee (through the A10 Secretariat) is authorized to provide any interpretation of this standard.

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Committee Meetings: The A10 Committee meets twice per year. Persons wishing to attend a meeting should contact the Secretariat for information.

Standard Approval: This standard was processed and approved for submittal to ANSI by the American National Standards Committee on Safety in Construction and Demolition Operations, A10. Approval of the standard does not necessarily imply (nor is it required) that all Committee members voted for its approval. At the time ANSI approved this standard, the A10 Committee had the following members:

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AMERICAN NATIONAL STANDARD A10.7 SAFETY AND HEALTH REQUIREMENTS FOR CONSTRUCTION AND DEMOLITION USE, STORAGE, HANDLING AND SITE MOVEMENT OF COMMERCIAL EXPLOSIVES AND BLASTING AGENTS

1. Scope and Purpose

1.1 Scope

1.1.1 This standard is applicable to all entities involved in any construction or demolition project that requires the use of commercial explosives and blasting agents.

1.1.2 This standard is intended to work with the other federal, state and local regulations for use of commercial explosives and blasting agents.

1.1.3 The requirements of this standard do not apply to display or consumer pyrotechnics, small-arms ammunition or explosive power packs in the form of explosive-activated or explosive-charged construction devices such as explosive rivets, explosive bolts, explosive charges for driving pins or studs, cartridges for explosive-actuated power tools, and powder-actuated fastening systems.

1.2 Purpose

The purpose of this standard is to provide the construction industry with recommendations for establishing and maintaining a level of safety and health for the off-highway transportation, storage, storage, and use of commercial explosives and blasting agents for construction and demolition.

2. References

2.1 Referenced American National Standards.

The following ANSI/ASSE A10 standards, in addition to others listed at the front of this document, provide guidance for development of safe and healthful operations.

ANSI/ASSP A10.1, *Pre-Project & Pre-Task Safety & Health Planning*

ANSI/ASSP A10.3, *Safety Requirements for Powder-Actuated Fastening Systems*

ANSI/ASSP A10.6, *Safety & Health Program Requirements for Demolition Operations*

ANSI/ASSP A10.8, *Scaffolding Safety Requirements*

ANSI/ASSP A10.12, *Safety Requirements for Excavation*

ANSI/ASSP A10.13, *Safety Requirements for Steel Erection*

ANSI/ASSP A10.15, *Safety Requirements for Dredging*

ANSI/ASSP A10.16, *Safety Requirements for Tunnels, Shafts and Caissons*

ANSI/ASSP A10.19, *Safety Requirements for Pile Installation & Extraction Operations*

ANSI/ASSP A10.23, *Safety Requirements for the Installation of Drilled Shafts*

ANSI/ASSP A10.25, *Sanitation in Construction*

ANSI/ASSP A10.26, *Emergency Procedures for Construction & Demolition Sites*

ANSI/ASSP A10.31, *Safety Requirements, Definitions & Specifications for Digger-Derricks*
 ANSI/ASSP A10.32, *Personal Fall Protection Used in Construction & Demolition Operations*
 ANSI/ASSP A10.33, *Safety & Health Program Requirements for Multi-Employer Projects*
 ANSI/ASSP A10.34, *Protection of the Public on or Adjacent to Construction Sites*
 ANSI/ASSP A10.38, *Basic Elements of an Employer's Program to Provide a Safe and Healthful Work Environment*
 ANSI/ASSP A10.39, *Construction Safety & Health Audit Program*
 ANSI/ASSP A10.40, *Reduction of Musculoskeletal Problems in Construction*
 ANSI/ASSP A10.43, *Confined Spaces in Construction & Demolition Operations*
 ANSI/ASSP A10.46, *Hearing Loss Prevention for Construction & Demolition Workers*
 ANSI/ASSP A10.47, *Work Zone Safety for Highway Construction*
 ANSI/ASSP A10.49, *Control of Chemical Health Hazards in Construction and Demolition Operations*

2.2 Referenced Institute of Makers of Explosives Standards

Further information is available from the Institute of Makers of Explosives (IME), 1212 New York Avenue, NW, Suite 650, Washington, DC 20005.

IME Publication No. 1 (September 2006), *Construction Guide for Storage Magazines*

IME Publication No. 2 (June 1991 incorporates changes through October 2011), *The American Table of Distances*

IME Publication No. 3 (October 2015), *Suggested Code of Regulations for the Manufacture, Transportation, Storage, Sale, Possession and Use of Explosive Materials*

IME Publication No. 4 (October 2009), *Warnings and Instructions for Consumers in Transporting, Storing, Handling and Using Explosive Materials*

IME Publication No. 12 (May 2013), *Glossary of Commercial Explosives Industrial Terms*

IME Publication No. 14 (May 2013) *Handbook for the Transportation and Distribution of Explosive Materials*

IME Publication No. 17 (October 2015), *Safety in the Transportation, Storage, Handling and Use of Explosive Materials*

IME Publication No. 20 (December 2011), *Safety Guide for the Prevention of Radio Frequency Radiation Hazards in the Use of Commercial Detonators*

IME Electronic Blast Initiation Systems (EBIS) Guideline: General User Information for Mining, Quarrying and Construction Applications (September 2017)

2.3 Referenced Governmental Publications

This standard is also intended for use with the following publications. They are available from U.S. Government Printing Office, Superintendent of Documents, Washington, DC 20402 and at the internet site, <http://www.gpo.gov/fdsys/browse/collectionCfr.action?collectionCode=CFR> or <http://www.ecfr.gov>:

Environmental Protection Agency, CFR Title 40, Parts 1-1099

U.S. Customs and Border Protection, Department of Homeland Security; Department of the Treasury, CFR Title 19, Parts 1-999

U.S. Department of Interior, Office of Surface Mining and Reclamation, CFR Title 30 Parts 710-725, 850

U.S. Department of Justice, Bureau of Alcohol, Tobacco, Firearms and Explosives, CFR Title 27, Part 555 – Commerce in Explosives

(The regulations contained in this part relate to commerce in explosives and implement Title XI, Regulation of Explosives (18 U.S.C. Chapter 40; 84 Stat. 952), of the Organized Crime Control Act of 1970 (84 Stat. 922), Pub. L. 103-322 (108 Stat. 1796), Pub. L. 104-132 (110 Stat. 1214), and Pub. L. 107-296 (116 Stat. 2135), 33 U.S.C. 1341)

U.S. Department of Labor, Mine Safety and Health Administration CFR Title 30, Parts 1-199

U.S. Department of Labor, CFR Title 29, Occupational Safety and Health Administration, Parts 1900-1999

U.S. Department of Transportation, Pipeline and Hazardous Materials Safety Administration, CFR Title 49, Parts 100-199

2.4 Referenced and Related Standards

The following standards are listed for supplemental information.

ANSI/ISEA 107, *High Visibility Safety Apparel and Headwear*

ISEA 207, *High-Visibility Safety Apparel and Headwear*

ANSI/ISEA Z87.1, *Occupational and Educational Personal Eye and Face Protection Devices*

ANSI/ISEA Z89.1, *Industrial Head Protection*

ASTM F2413, *Standard Specification for Performance Requirements for Foot Protection*

ASTM A366/A366M-97e1, *Standard Specification for Commercial Steel (CS) Sheet, Carbon (0.15 Maximum Percent) Cold-Rolled (Withdrawn 2000)*

NFPA 1, *Fire Prevention Code*

NFPA 10, *Portable Fire Extinguishers*

NFPA 70, *National Electrical Code*

NFPA 495, *Manufacture, Transportation, Storage and Use of Explosive Materials*

NFPA 498, *Explosives Motor Vehicle Terminals*

3. Definitions

3.1 Acceptor

A charge of explosives or blasting agent receiving an impulse from an exploding donor charge.

3.2 Ammonium Nitrate

The ammonium salt of nitric acid, represented by the formula NH_4NO_3 .

3.3 Approve; Approval

Sanctioned, endorsed, accredited, certified or accepted as satisfactory by an authority having jurisdiction.

3.4 Attendant

An authorized individual who has the explosives or the use of explosives within their field of vision.

3.5 Attended

The physical presence of an authorized person within the field of vision of explosives or the use of explosives.

3.6 Authorized; Authorization

Approved or assigned by the employer to perform a specific type of duty or duties or to be at a specific location or locations at the jobsite.

3.7 Authority Having Jurisdiction (AHJ)

The governmental agency, office or individual responsible for approving equipment, materials, an installation or a procedure.

3.8 Backbreak

Rock broken beyond the limits of the last row of holes in a blast.

3.9 Barricade**3.9.1 Artificial Barricade**

An artificial mound or revetted wall of earth of a minimum thickness of 3 feet.

3.9.2 Natural Barricade

Natural features of the ground, such as hills, or timber of sufficient density that the surrounding exposures which require protection cannot be seen from the magazine when the trees are bare of leaves.

3.10 Barricaded

The effective screening of a building containing explosive materials from a magazine or other building, railway or highway by a natural or an artificial barrier. A straight line from the top of any sidewall of the building containing explosive materials to the eave line of any magazine or other building or to a point 12 feet (3.7m) above the center of a railway or highway shall pass through such barrier.

3.11 Barrier

A physical obstruction that blocks or limits access or demarcates in a conspicuous manner.

3.12 Blast Area

The area in which concussion (shock wave), flying material, or gases, dusts, smoke, blasting fumes, from an explosion may cause injury to persons.

3.13 Blast Preparation

Drilling, inspection of drill holes, loading explosive charges, installing systems for initiation and confinement of the blast.

3.14 Blast Site

The area where explosive materials are handled during the loading of a borehole, including 50 feet (15.2m) in all directions from the perimeter formed by loaded holes. A minimum of 30 feet (9.1m) may replace the 50 feet (15.2m) requirement if the perimeter for loaded holes is marked

and separated from non-blast site areas by a barrier. The 50 feet (15.2m) or 30 feet (9.1m) distance requirements, as applicable, shall apply in all directions along the full depth of the borehole. In underground operations, at least 15 feet (4.6m) of a solid rib, pillar or broken rock can be substituted for the 50-foot (15.2m) distance.

3.15 Blaster

A qualified individual who assists with the design, loading and firing of explosives. May or may not be licensed according to local regulations. May be synonymous with Shot Firer.

3.16 Blaster-in-Charge

The blaster who is in charge of and responsible for the design, loading and firing of explosives at a specific job site and shall also be a competent person.

3.17 Blasting Agent

An explosive material that meets prescribed criteria for insensitivity to initiation.

NOTE: For storage, CFR Title 27, Part 555, of the Bureau of Alcohol, Tobacco, Firearms and Explosives of the Department of the Justice defines a blasting agent as any material or mixture, consisting of fuel and oxidizer, intended for blasting but not otherwise defined as an explosive. This assumes that the finished product, as mixed for use or shipment, cannot be detonated by means of a No. 8 test blasting cap when unconfined. For transportation, CFR Title 49, Part 173.50, defines Class 1, Division 1.5 (blasting agent) as a substance which has mass explosion hazard but is so insensitive that there is very little probability of initiation or of transition from burning to detonation under normal conditions in transport.

3.18 Blasting Cap

See Detonator.

3.19 Bulk-Mix Delivery Equipment

Equipment (usually a motor vehicle with or without mechanical delivery device) that transports explosive materials in bulk form for mixing, or for loading directly into blastholes, or both.

3.20 Bullet-Resistant Construction

Magazine walls or doors of construction that are resistant to penetration by a bullet of 150-grain M2 ball ammunition of nominal muzzle velocity 2,700 feet per second (820m/s), fired from a .30 caliber rifle at a right angle to the wall or door, from a distance of 100 feet (30.5m).

NOTE 1: When a magazine ceiling or roof is required to be bullet-resistant, the ceiling or roof shall be constructed of materials comparable to the side walls or of other materials that will withstand penetration when the bullet described above is fired at an angle of 45 degrees to the surface.

NOTE 2: Tests to determine bullet-resistance shall be conducted on test panels or empty magazines that will resist penetration of 5 out of 5 shots placed independently of each other in an area at least 3 feet by 3 feet (0.9m x 0.9m). Examples of construction that meet this definition are given in 6.5.1.

3.21 Bullet-Sensitive Explosive Material

Explosive material that can be detonated by 150-grain M2 ball ammunition of nominal muzzle velocity 2,700 feet per second (820m/s), fired from a .30 caliber rifle from a distance of 100 feet (30.5m) when the test material, at 70° to 75° Fahrenheit (21.1° to 23.9° Celsius), is placed against a backing material of half-inch (1.3 cm) steel plate.

3.22 Competent Person

One who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them.

3.23 Connecting Wire

Wire used to extend the firing line or leg wires in an electric blasting circuit.

3.24 Conveyance

Any unit for transporting explosives or blasting agents including, but not limited to, trucks, trailers, rail cars, barges and ships.

3.25 Deflagration

An explosive reaction such as a rapid combustion that moves through an explosive material at a velocity less than the speed of sound in the material.

3.26 Detonating Cord

A flexible cord, containing a center core of high explosive, that can be used to initiate other high explosives.

3.27 Detonation

An explosive reaction that moves through an explosive material at a velocity greater than the speed of sound in the material.

3.28 Detonator

Any device containing any initiating or primary explosive that is used for initiating detonation. A detonator may not contain more than 10 grams of total explosives by weight, excluding ignition or delay charges. The term includes, but is not limited to, electric blasting caps of instantaneous and delay types, electronic detonators, blasting caps for use with safety fuses, detonating-cord delay connectors and nonelectric instantaneous and delay blasting caps that use detonating cord, shock tube or any other replacement for electric leg-wires.

3.29 Donor

An exploding charge producing an impulse that impinges upon an acceptor charge.

3.30 Detonator, Electric

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

3.31 Detonator, Electronic

A detonator that utilizes stored electrical energy as a means of powering an electronic timing delay element/module and that provides initiation energy for firing the base charge.

NOTE: Electronic detonators differ from other detonators by utilizing an integrated circuit (IC) or an application-specific integrated circuit (ASIC) to provide millisecond precise timing as well as a level of communication and control over the firing circuit. Unlike an electric detonator, the igniter or firing device inside an electronic detonator is physically separated from the leads by a circuit board or electronic assembly. See IME's SLP-17 and electronic blast-initiation systems (EBIS) guideline for more information on the differences between electric and electronic detonators.

3.32 Emulsion Explosive

An explosive material containing substantial amounts of oxidizers dissolved in water droplets surrounded by a continuous phase of an immiscible fuel or droplets of an immiscible fuel surrounded by water containing substantial amounts of oxidizer.

3.33 Explosive Materials

Any chemical compound, mixture or device, the primary or common purpose of which is to function by explosion. The term includes, but is not limited to, dynamite and other high explosives; slurries, emulsions and water gels; black powder and pellet powder; initiating explosives; detonators (blasting caps); safety fuses; squibs; detonating cords; igniter cords and igniters. A list of explosive materials determined to be within the coverage of 18 U.S.C. Chapter 40, "Importation, Manufacture, Distribution and Storage of Explosive Materials," which is issued at least annually by the Director of the Bureau of Alcohol, Tobacco, Firearms and Explosives of the Department of Justice.

NOTE: The U.S. Department of Transportation classification of explosive materials used in commercial blasting operations is not identical to the statutory definitions of the Organized Crime Control Act of 1970, Title 18 U.S.C., Section 841. To achieve uniformity in transportation, the definitions of the U.S. Department of Transportation in CFR Title 49, Parts 1-999 subdivide these materials as shown in the following table:

Table 1 - U.S. Department of Transportation Definitions

See also Non-mandatory Appendix D.

Current DOT Division	Definition	Pre-1992 DOT Classification
DIVISION 1.1	Mass exploding	(Class A explosives)
DIVISION 1.2	Projection Hazard	(Class A or Class B explosives)
DIVISION 1.3	Fire hazard, minor blast or projection hazard	(Class B explosives)
DIVISION 1.4	Minor explosion hazard - not mass detonating	(Class C explosives)
DIVISION 1.5	Insensitive explosives. Very low probability of initiation or transition from burning to detonation during transport.	(Blasting Agents)

3.34 Explosives

Any chemical compound, mixture or device, the primary or common purpose of which is to function by explosion.

3.35 Fire Extinguisher Rating

A rating set forth in NFPA 10, *Portable Fire Extinguishers*, which may be identified on an extinguisher by a number indicating relative effectiveness (for example, 5, 20 or 70), followed by a letter indicating the class or classes of fires for which the extinguisher has been found to be effective (for example, A, B, C or D).

3.36 Fire-Resistant

Construction designed to provide reasonable protection against fire. (For exterior walls of magazines constructed of wood, this shall mean fire resistance equivalency provided by sheet metal of not less than 26 gauge (0.0179 inches) (0.454 mm).)

3.37 Flyrock

Rocks, rock fragments, other fragments that are propelled from the blast site.

3.38 Fumes, Blasting

The gaseous products of an explosion. For the purpose of determining the fume classification of explosive materials, only poisonous or toxic gases are considered.

3.39 Institute of Makers of Explosives (IME) Fume Class

A classification indicating the amount of carbon monoxide and hydrogen sulfide produced by an explosive or blasting agent. Explosives with positive oxygen balances are not considered as being acceptable in these classifications. (Only Fume Class 1, 2 or 3 explosives should be used as the main charge in underground operations.)

Fume Class	Amount of poisonous gases per 1-1/4 x 8" (32mm x 203mm) cartridge of explosive material
1	Less than 0.16 cu.ft. (4.53 liters)
2	0.16 to 0.33 cu.ft. (4.53 to 9.35 liters)
3	0.33 to 0.67 cu.ft. (9.35 to 18.98 liters)

Calculations by the manufacturer are acceptable for determining IME fume Class.

3.40 Fuse Lighter

Pyrotechnic device for rapid and certain lighting of safety fuse.

3.41 Hardwood

Any close-grained wood, such as red oak, white oak, hard maple, ash or hickory that is free from loose knots, wind shake or similar defects.

3.42 High Explosives

Explosives that are characterized by a very high rate of reaction, high-pressure development, and the presence of a detonation wave in the explosions.

3.43 Highway

Any road, street or way, whether on public or private property, open to public travel. "Open to public travel" means that the road section is available, except during scheduled periods, extreme weather or emergency conditions, passable by four-wheel standard passenger cars, and open to the general public for use without restrictive gates, prohibitive signs or regulation other than restrictions based on size, weight or class of registration. Toll plazas of public toll roads are not considered restrictive gates. See also ATF ruling 2005-2.

3.44 Inhabited Building

A building regularly occupied, in whole or in part, as a habitation for human beings; or any church, schoolhouse, railroad station, store or other structure where people are accustomed to assemble except any building or structure occupied in connection with the manufacture, transportation, storage or use of explosive materials.