



A Guide for Meeting NFPA 10 Subsection 5.5.1.1

**Extinguishers for Pressurized
Flammable Liquids and
Pressurized Gas Fires**

A Quick Review

The NFPA 10 Standard contains many guidelines that may impact you if your facility uses, transports, stores, or handles flammable liquids or gases.

Fires involving flammable liquids and gases can be extremely dangerous to your employees and disastrous to your business. To quickly suppress these fires, specialized portable or wheeled fire extinguishers are required.

Then and Now

Prior to the 2007 Edition, the NFPA 10 Standards were not specific about the requirements for these specialized fire extinguishers. They merely stated that a manufacturer's recommendations should be followed. Johnson Controls recommends the use of specialized ANSUL® fire extinguishers, designed with high agent flow rates, to fight flammable liquid and gas fires. This comes from decades of proven research, testing, and live fire training at the ANSUL Fire Technology Center.

Starting in the 2007 Edition, NFPA 10 Subsection 5.5.1.1 mandated the minimum size and flow rate that a portable fire extinguisher must meet for the protection of three specific Class B fire hazards: Pressure Fire Hazards, Three-Dimensional Fire Hazards, and Obstacle Fire Hazards.

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Pressure Fire Hazards

Which of these is a good example of a Pressure Fire Hazard?

- A. Propane storage tanks
- B. Gasoline fuel pumps
- C. Paint spray booths and prep areas

Answer: All

Pressure Fires involve a flammable liquid or gas that is being released under pressure from a hose, pipe, flange, fitting, valve, pump, cylinder, tank, or any other storage and transport devices.

Examples of Pressure Fire Hazards:

- LPG tanks and transfer areas
- Paint and solvent spray operations
- Pumps and piping networks
- Gasoline fuel pumps
- Processing and distribution equipment
- Compressed gas cylinders and manifolds
- High-pressure hydraulic equipment

Pressure Fire Hazards (Continued)

What are the NFPA 10 requirements?

- 5.5.1.1. Extinguishers for Pressurized Flammable Liquids and Pressurized Gas Fires
- 5.5.1.1.1. Selection of fire extinguishers for this type of hazard shall be made on the basis of recommendations by manufacturers of this specialized equipment.
- 5.5.1.1.2. Large capacity dry chemical extinguishers of 10 lb (4.54 kg) or greater and a discharge rate of 1 lb/sec (0.45 kg/sec) or more shall be used to protect these hazards.

CAUTION

Attempting to suppress this type of fire is undesirable unless there is reasonable assurance that the source of fuel can be promptly shut off.

Three-Dimensional Fire Hazards

Which of these is a good example of a Three-Dimensional Fire Hazard?

- A. Vehicle fueling island
- B. Flammable liquid storage area
- C. Spray line conveyor system

Answer: All

Three-Dimensional Fires involve flammable liquid in motion and usually include both horizontal and vertical surfaces. Often, flammable liquid leaks down a vertical surface, pooling on a horizontal surface below.

Examples of Three-Dimensional Fire Hazards:

- Pumps and transfer equipment
- Flammable liquid storage cabinets
- Electric power transformers
- Machinery and process equipment
- Coating operations and conveyors
- Walls or structures that support pipes
- Tanker loading racks (highway or rail)
- Storage tanks and drum storage racks
- Tank trucks and off-loading points
- Vehicle fueling areas

What are the NFPA 10 requirements?

5.5.2. Three-Dimensional Fires. Large capacity dry chemical extinguishers of 10 lb (4.54 kg) or greater and having a discharge rate of 1 lb/sec (0.45 kg/sec) or more shall be used to protect these hazards.

Obstacle Fire Hazards

Which of these is a good example of an Obstacle Fire Hazard?

- A. Dip tank
- B. Solvent cleaning area
- C. Drum storage area

Answer: All

Obstacle type fires involve flammable liquid on a horizontal surface where a solid object creates a barrier within the perimeter of the burning liquid. This can occur when a flammable liquid is spilled on the floor around a solid object. A solid object can also create a barrier within an open container of flammable liquid, such as a dip tank.

Examples of Obstacle Fire Hazards:

- Drum storage areas
- Dip tank process areas
- Floor areas around machinery
- Flammable liquid storage cabinets
- Drums or other types of dispensing areas
- Solvent cleaning operations or areas

What are the NFPA 10 requirements?

5.5.4. Obstacles Fires. When selecting a fire extinguisher for this type of hazard, selection shall be based on the following:

- (1) Extinguisher containing a vapor-suppressing foam agent
- (2) Multiple extinguishers containing non-vapor-suppressing Class B agents intended for simultaneous application
- (3) Large capacity extinguishers of 10 lb (4.54 kg) or greater and a minimum discharge rate of 1 lb/sec (0.45 kg/sec)

Fire Extinguishers Manufactured Prior to October 1984

What types of fire extinguishers (manufactured prior to October 1984) need to be replaced?

- A. Cartridge-operated
- B. Carbon dioxide
- C. Stored pressure, dry chemical

Answer: C

In section 4.4.1, NFPA 10 mandates the removal and replacement of dry chemical stored pressure fire extinguishers at their next 6-year maintenance or next hydrostatic test interval, whichever comes first. Many times, not all of the affected extinguishers in a facility have the same date of manufacture. Therefore, a phase-out schedule can be developed to comply with this standard.

Mandated Employee Training

Who mandates employee training?

- A. OSHA
- B. Insurance companies
- C. Fire marshals

Answer: All

The training of employees in the proper use of all portable fire extinguishers is a federally mandated requirement that is found in the CFR29 (OSHA Regulations). Employees must be trained upon initial employment and annually thereafter.

To comply with this OSHA requirement, many employers send their employees to the world renowned ANSUL Fire School in Marinette, Wisconsin, for three days of training that includes:

- Classifications of fire and hazards
- Basic fire science
- Training manuals and materials
- Classroom training
- Over 20 hands-on, live fire training sessions

Many Authorized ANSUL Distributors can also provide on-site customer training.

ANSUL Solutions

ANSUL fire protection products have been protecting people and facilities since 1939 representing decades of leadership and experience in developing and manufacturing “special hazard” solutions. So what do our experts recommend for the protection of the hazards outlined in NFPA 10?

Dry chemical suppressing agents are excellent choices for flammable liquid and gas fires. Further, dry chemical is one of the only agents effective on Pressure Fires and Three-Dimensional Fires. The preferred dry chemical agents are:

- ANSUL Purple-K Dry Chemical – Made of potassium bicarbonate, Purple-K is the most effective chemical agent for Class B fires, especially Pressure Fires and Three-Dimensional Fires. Purple-K is not listed for fires that involve Class A (ordinary combustible) materials.
- ANSUL FORAY Dry Chemical – Made of monoammonium phosphate, FORAY agent is an “ABC” dry chemical with excellent Class B fire suppressing capabilities. It is also the only ANSUL dry chemical agent that is listed for Class A fires.

ANSUL training resources:

- *ANSUL Fire School*
- *On-site fire training classes*
- *DVD – using a portable fire extinguisher*
- *Worldwide distributor network*

ANSUL Solutions (Continued)

| <u>Model</u> | <u>UL Part No.</u> | <u>ULC Part No.</u> | <u>Capacity</u> | <u>Dry Chemical Agent Type</u> | <u>Agent Flow Rate</u> |
|-------------------|--------------------|---------------------|-------------------|--------------------------------|---------------------------|
| HF-I-A-20-G-1 | 435148 | 440365 | 17 lb (7.7 kg) | FORAY | 1.55 lb/sec (0.70 kg/sec) |
| HF-I-K-20-G | 418467 | 440364 | 18 lb (8.2 kg) | Purple-K | 1.55 lb/sec (0.70 kg/sec) |
| HF-I-A-30-G-1 | 435175 | 440367 | 25 lb (11.3 kg) | FORAY | 2.10 lb/sec (0.95 kg/sec) |
| HF-I-K-30-G | 418280 | 440336 | 27 lb (12.3 kg) | Purple-K | 2.35 lb/sec (1.07 kg/sec) |
| CR-HF-I-K-30-G | 418273 | NA | 27 lb (12.3 kg) | Purple-K | 2.35 lb/sec (1.07 kg/sec) |
| CR-I-A-150-C-1 | 435040 | 435042 | 125 lb (56.7 kg) | FORAY | 3.51 lb/sec (1.59 kg/sec) |
| CR-I-K-150-C | 31500 | 435326 | 125 lb (56.7 kg) | Purple-K | 2.1 lb/sec (0.95 kg/sec) |
| CR-LR-I-K-150-C* | 22520 | 427788 | 125 lb (56.7 kg) | Purple-K | 4.4 lb/sec (2.00 kg/sec) |
| CR-I-150-C | 31007 | NA | 150 lb (68 kg) | PLUS-FIFTY C | 3.5 lb/sec (1.58 kg/sec) |
| CR-I-A-150-D-1 | 435050 | 435052 | 125 lb (56.7 kg) | FORAY | 2.57 lb/sec (1.17 kg/sec) |
| CR-I-K-150-D | 53874 | 435332 | 125 lb (56.7 kg) | Purple-K | 2.6 lb/sec (1.17 kg/sec) |
| CR-LR-I-K-150-D* | 55357 | NA | 125 lb (56.7 kg) | Purple-K | 3.96 lb/sec (1.80 kg/sec) |
| CR-I-150-D | 53868 | 435318 | 150 lb (68 kg) | PLUS-FIFTY C | 2.9 lb/sec (1.31 kg/sec) |
| CR-LR-I-150-D* | 55355 | NA | 150 lb (68 kg) | PLUS-FIFTY C | 4.1 lb/sec (1.86 kg/sec) |
| CR-I-A-350-D-1 | 435056 | 435058 | 300 lb (136.4 kg) | FORAY | 5.3 lb/sec (2.40 kg/sec) |
| CR-I-K-350-D-1 | 53887 | 435336 | 300 lb (136.4 kg) | Purple-K | 3.8 lb/sec (1.72 kg/sec) |
| CR-LR-I-K-350-D* | 54134 | NA | 300 lb (136.4 kg) | Purple-K | 8 lb/sec (3.64 kg/sec) |
| CR-I-350-D | 53879 | 435320 | 350 lb (159 kg) | PLUS-FIFTY C | 6 lb/sec (2.72 kg/sec) |
| CR-LR-I-350-D* | 54133 | NA | 350 lb (159 kg) | PLUS-FIFTY C | 8 lb/sec (3.64 kg/sec) |
| CR-LT-I-A-350-C-1 | NA | 435048 | 300 lb (136.4 kg) | FORAY | 6.58 lb/sec (2.98 kg/sec) |
| CR-I-K-350-C | 31541 | 435328 | 300 lb (136.4 kg) | Purple-K | 4.9 lb/sec (2.20 kg/sec) |
| CR-LR-I-K-350-C | 32972 | NA | 300 lb (136.4 kg) | Purple-K | 7.2 lb/sec (3.30 kg/sec) |
| CR-LT-I-K-350-C | NA | 435330 | 300 lb (136.4 kg) | Purple-K | 4.9 lb/sec (2.20 kg/sec) |
| CR-LT-I-K-350-D | NA | 435338 | 300 lb (136.4 kg) | Purple-K | 3.8 lb/sec (1.72 kg/sec) |
| CR-LT-I-A-350-D-1 | NA | 435060 | 300 lb (136.4 kg) | FORAY | 5.3 lb/sec (2.40 kg/sec) |

An Authorized ANSUL Distributor can help you evaluate your unique hazards and determine the proper RED LINE hand portable or wheeled fire extinguisher for your unique fire hazards.

***NOTE:** Long range nozzles are specifically designed to fight pressure fires (flammable liquids or gases under pressure).

Safety Data Sheets (SDS) are available at www.ansul.com

Note: The metric values in this document are provided for dimensional reference only and do not reflect an actual measurement.

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