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1. **SCOPE**

1.1 This Technical Specification covers mandatory requirements governing the fireproofing of vessels, heat exchangers, and structural support members.

2. **DEFINITIONS**

3.1 Flammable liquids. Low-flash liquids [flash point below 130°F (55°C)]; and high-flash liquids [flash point 130°F or higher] when handled at temperatures above or within 15°F (8°C) of their flash points.

3.2 Flammable materials. Flammable liquids; hydrocarbon vapors; and other vapors, such as hydrogen and carbon disulfide, that are readily ignitable when released to the atmosphere.

3.3 Source of sustained fire. Equipment which would involve both a high potential for fire, and added factors which limit the rapid control of or the extinguishment of the fire.

Such services and conditions are as follows:

a. Specific equipment with a high potential for fire:

   1. Pumps with a rated capacity over 200 gpm (45 m³/h) handling flammable liquids
   2. Gas compressors over 200 hp (150 kW) handling flammable materials
   3. Fired heaters handling flammable liquid in the tubes
   4. Vessels, heat exchangers, and other equipment containing flammable liquids at a temperature over 600°F (315°C).

b. Added factors to create a potential for sustained fire would need to include at least two of the following conditions — as might occur where new facilities are to be located within an existing process unit:

   1. Congestion resulting from spacing inadequacies
   2. Inaccessibility to good cooling from at least one fixed location fire monitor or a fixed firewater spray system
   3. Lack of rapid isolation.
4. FIREPROOF COATINGS

4.1 SHOTCRETE (GUNITE) AND CONCRETE COATINGS

4.1.1 Steel vessels specified to be fireproofed shall be covered on their outside surfaces with a minimum thickness of 1-1/2 in. (38 mm) of gunite.

4.1.2 Steel vessels externally insulated for process reasons shall be considered fireproofed if the finished insulation is covered with a steel jacket: zinc coated (galvanized), aluminum-coated, or stainless; and provided the insulation system meets the following requirements:

   a. Capable of withstanding direct flame impingement.

   b. The insulation, or part of the insulation when a composite system is used, is not destroyed when exposed to 1800°F (1000°C) for 2 hours.

   c. The insulation not destroyed has a heat resistance at least equivalent to 1-1/2 in. (38 mm) of gunite.

   d. The insulation system shall be capable of withstanding the force of fire hose stream impingement.

4.1.3 Structural steel support members and skirt sheets to be fireproofed shall be covered with a minimum thickness of 2 in. (50 mm) of gunite or concrete.

4.1.4 Concrete for fireproofing shall be 3000 psi (20.7 MPa) min. compressive strength. Gunite proportions shall be selected to produce a 3000 psi min. compressive strength.
4.1.5 ALTERNATIVE FIREPROOF COATINGS

4.2 Approved, fireproof coatings are acceptable as alternatives to specified gunite and concrete fireproof coatings, for the applications listed below:

a. Steel vessels (excluding structural steel support members and skirt sheets) not otherwise insulated for process reasons.

b. Support saddles for heat exchangers.

c. Stub-leg structural supports for air-cooled heat exchangers, provided the elevation of these supports is at least 25 ft (7.5 m) above grade, and the exchanger does not handle flammable materials at an inlet temperature above 600° (315°C).

d. Pipe supports, except within diked enclosures of refrigerated storage vessels.

e. Structural supports for elevated ducts around fired heaters.

4.2.1 Proposals to use alternative fireproofing materials shall be approved by the Owner's Engineer. To be considered for acceptance, data shall be submitted which demonstrates that the proposed material and installation will:

a. Be suitable for the specified environmental exposure.

b. Be suitable for the equipment operating conditions and any elevated temperatures that can be encountered during steaming out, cleaning, and flushing operations.

c. Meet the fire test requirements for 1-1/2 hour protection per the test methods of ASTM E 119.

4.2.3 Quality control procedures for the application of alternative fireproof coatings shall be approved by the Owner's Engineer.