Formal Interpretation

NFPA 37

Standard for the Installation and Use of Stationary Combustion Engines and Gas Turbines

2010 Edition

Reference: 4.1.4 FI 06-1 (NFPA 37)

Background: Subsection 4.1.4 of NFPA 37 reads as follows: "4.1.4 Engines Located Outdoors. Engines, and their weatherproof housings if provided, that are installed outdoors shall be located at least 1.5 m (5 ft) from openings in walls and at least 1.5 m (5 ft) from structures having combustible walls. A minimum separation shall not be required where the following conditions exist:

The adjacent wall of the structure has a fire resistance rating of at least 1 hour.
 (2)* The weatherproof enclosure is constructed of noncombustible materials and it has been demonstrated that a fire within the enclosure will not ignite combustible materials outside the enclosure."

Question No. 1: Is it the intent of Subsection 4.1.4 of NFPA 37 to require both conditions (1) and (2) to be complied with in order for an installation to be exempt from the minimum separation specified by 4.1.4?

Answer: No.

Question No. 2: If the answer to Question No 1 is "No", is it the intent of Subsection 4.1.4 of NFPA 37 to require <u>either</u> condition (1) <u>or</u> condition (2) to be complied with in order for an installation to be exempt from the minimum separation specified by 4.1.4?

Answer: Yes.

Issue Edition: 2006 Reference: 4.1.4 Issue Date: April 14, 2009 Effective Date: April 28, 2009

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 37-10 Log #CP14
 Final Action: Accept

 (4.1.4)
 (4.1.4)

Submitter: Technical Committee on Internal Combustion Engines, **Recommendation:** Revise 4.1.4 to read as follows:

4.1.4 Engines Located Outdoors.

Engines, and their weatherproof housings if provided, that are installed outdoors shall be located at least 1.5 m (5 ft) from openings in walls and at least 1.5 m (5 ft) from structures having combustible walls. A minimum separation shall not be required where <u>either of</u> the following conditions exist:

(1) The adjacent wall of the structure has a fire resistance rating of at least 1 hour.

(2)* The weatherproof enclosure is constructed of noncombustible materials and it has been demonstrated that a fire within the enclosure will not ignite combustible materials outside the enclosure.

Substantiation: As currently worded, this requirement is misunderstood as requiring both conditions [(1) and (2)] to be met, in order to qualify for the exemption from the separation distance. Such was never the Technical Committee's intent. It was always intended that these be alternatives.

Committee Meeting Action: Accept Number Eligible to Vote: 15 Ballot Results: Affirmative: 14

Ballot Not Returned: 1 Weir, R.

37-11 Log #5 Final Action: Accept in Principle (5.2)

Submitter: Kenneth M. Elovitz, Foxboro, MA

Recommendation: Reissue this formal interpretation without question 3. **Substantiation:** Question 3 has been superseded by a definition of gas train in the standard. The answer to question 3 is inconsistent with the definition.

Committee Meeting Action: Accept in Principle

Retire this Formal Interpretation

Committee Statement: Annex Item A.5.2 now provides sufficient explanatory information to address the questions posed in the Formal Interpretation. Number Eligible to Vote: 15

Ballot Results: Affirmative: 14

Ballot Not Returned: 1 Weir, R

37-12 Log #CP7Final Action: Accept(5.2)

Submitter: Technical Committee on Internal Combustion Engines, Recommendation: Revise Section 5.2 to read as follows:

5.2* Gas Trains.

<u>5.2.1</u> Gas trains for engines, as defined in 3.3.5, shall contain at least the following safety components:

(1) An equipment isolation valve

(2) A regulator, if the prime mover does not operate at the gas supply

pressure

(3) Two automatic safety shutoff valves

(4) A manual leak test valve for each automatic safety shutoff valve or an alternative means of proving the full closure of the automatic safety shutoff valves

 $(5)\,A$ low-pressure switch for engines with a 2500 MBH (2.5 million Btu/hr) full-load input or greater

(6) A high-pressure switch (manual reset) for engines with a 2500 MBH (2.5 million Btu/hr) full-load input or greater

(7) Any other components or equipment that the manufacturer requires for safe operation

5.2.2 For engines operating at more than a gauge pressure of 2 psi inlet gas pressure, a vent valve shall be provided between the two automatic safety shutoff valves. This vent valve shall fail open without an externally supplied source of power and shall discharge outdoors.

Substantiation: Changes in numbering are to comply with the NFPA Manual of Style. The change made to 5.2.1(2) is because a regulator serves no purpose if the system operates at the pressure of the gas supply; therefore, it is not needed. New 5.2.2 is added to ensure that any large volume of gas that might be trapped between the two ASSVs is discharged to a safe location outside the building. (This is being mandated by ISO 2178)

Committee Meeting Action: Accept

Number Eligible to Vote: 15

Ballot Results: Affirmative: 14

Ballot Not Returned: 1 Weir, R.

Comment on Affirmative:

DANNER, L.: The ISO document that forms part of the substantiation for this proposal is "ISO 21789, *Gas turbine applications - Safety*"

 37-13 Log #CP8
 Final Action: Accept

 (5.4.3)
 Final Action: Accept

Submitter: Technical Committee on Internal Combustion Engines, Recommendation: Revise 5.4.3 to read as follows:

5.4.3* Automatic Safety Shutoff Valves for Engines Other Than Gas

<u>Turbines</u>. The automatic safety shutoff valves shall stop the flow of fuel <u>within</u> <u>1 second</u> in the event the engine stops for any cause. <u>The valve shall fail closed</u> without an externally applied source of power.

Substantiation: The intent of this amendment is to separate the requirements for internal combustion engines from the differing requirements for gas turbines. The addition to the original sentence incorporates the performance requirement that was erroneously a part of the definition of ASSV. The new second sentence is added to ensure that any failure of the system results in shutting of the ASSV, thus stopping the flow of fuel to the engine. Committee Meeting Action: Accept

Number Eligible to Vote: 15 Ballot Results: Affirmative: 14 Ballot Not Returned: 1 Weir, R.

 37-14 Log #CP9
 Final Action: Accept

37-14 Log #CP9 (5.4.4 (New))

Submitter: Technical Committee on Internal Combustion Engines, **Recommendation:** Add a new 5.4.4 to read as follows:

5.4.4 Automatic Safety Shutoff Valves for Gas Turbines. The two automatic safety shutoff valves required by 5.2.3 shall operate as follows:

(1) One of the ASSVs shall stop the flow of fuel when the engine is shut down under normal conditions.

(2) Both ASSVs shall be closed if the engine must be shut down due to abnormal or emergency operating conditions as specified by the manufacturer.

<u>5.4.4.1 The ASSV shall stop flow of fuel to the engine as follows:</u> <u>(1) For combustion turbines supplied by piping 6 inches diameter or less</u> within 3 seconds.

(2) For combustion turbines supplied by piping greater than 6 inches diameter, within 5 seconds.

The valve shall fail closed without an externally supplied source of power. 5.4.4.2* It shall be permissible to replace one of the automatic safety shutoff valves required by 5.4.4.1 (1) and 5.4.4.1(2) with a control valve, provided the device will automatically shut off the flow of fuel within the time limits specified in 5.4.4.1 (1) and 5.4.4.1(2), whichever is applicable.

<u>5.4.4.3* If the engine is shut down for abnormal or emergency operating</u> conditions as specified by the manufacturer, a vent valve shall open automatically to depressurize the included piping. The vent shall fail open without an externally supplied source of power and shall discharge outdoors. 5.4.4.4* One automatic safety shutoff valve shall be located external to the

equipment damage from an extended shutdown time becomes a primary factor in deciding between a dedicated ASSV and substituting a control valve in its place.

<u>Place.</u> <u>A.5.4.4.3</u> The vent valve is used to depressurize the gas trapped between two ASSVs and thereby minimize the risk from any leaks that may occur in the gas train. Consequently, the valve should be sized to depressurize the trapped volume quickly.

<u>A.5.4.4.4 Gas turbines are typically installed in a dedicated enclosure which</u> provides acoustic isolation from the rest of the plant and incorporates high volume forced ventilation to manage the very high heat rates from the turbine casings (some portions of which can exceed 1000°F). Additionally, facilities that have multiple turbines may include a large building to provide weather protection for the equipment and personnel. The ability to isolate the fuel supply external to these enclosed spaces mitigates potentially catastrophic flammable atmospheres within the enclosed spaces.

Substantiation: This new section establishes requirements for ASSVs that are separate and distinct from those for internal combustion engines. This is primarily due to the fact that the ASSVs for gas turbines cannot, due to size and flowrate, be closed within one second, as is required of ASSVs serving internal combustion engines. Guidance is also given for substitution of one ASSV with a control valve, if deemed appropriate by the manufacturer. Committee Meeting Action: Accept

Number Eligible to Vote: 15

Ballot Results: Affirmative: 14 Ballot Not Returned: 1 Weir, R.

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37-15 Log #11 **Final Action: Accept** (6.2)

Submitter: Kenneth M. Elovitz, Foxboro, MA

Recommendation: Revise 6.2.1 as follows:

Tanks for Class I fuels other than engine mounted tanks shall be located underground or aboveground outside of structures.

Delete 6.2.2, 6.2.3, and 6.2.4.

Substantiation: This proposal eliminates the storage of Class I fuels (gasoline) indoors. There is no appreciable market for stationary gasoline fueled engines installed indoors, so there is no need for NFPA 37 to acquiesce in the known dangerous practice of storing gasoline indoors.