

How does the Quencher stand up to NFPA 69, Standard on Explosion Prevention Systems?

The reader should be conversant with the entire NFPA 69 standard. Only pertinent excerpts are presented in this document.

SUMMARY: Although this standard applies mostly to automatic fire and explosion suppression systems, a chapter does cover static in-line spark arrestors. Some of the characteristics for compliance with the standard are:

1. **Quencher meets all the requirements of the standard. The low cost units and imitators, on the market, generally do not!** See for yourself by scrutinizing their literature and consulting our bulletin titled "Compare Spark Arresting Devices" against the presentation in this bulletin.
2. Passive Isolation Techniques (in-line static spark arrestors) are permitted under NFPA 69, but must meet very specific requirements to be accepted by the "Authority Having Jurisdiction".
3. Quencher isolates the ignition source and limits the oxidant concentration. Thereby preventing ignition in the gas stream downstream of the spark arrestor.
4. The supplier (manufacturer) of spark arrestors must clearly document safe installation and operating conditions to be met, and, be prepared to advise the end-user on specifically their application. *Only Quencher has the engineering capability and personnel to do this, and, provides complete comprehensive documentation to go with the product, its installation, operation and application.*
5. Unless it can be proven that all sparks/embers are extinguished, the standard requires additional elaborate spark and flame detection controls both upstream and downstream of the device. *Quencher does extinguish all sparks/embers when operated within its published design parameters, and therefore does not require these controls. No other product currently on the market will make that claim. They usually say "virtually all sparks are eliminated", and that is very different from Quencher's performance guarantee.*
6. Many in-line spark arrestors have a serious design flaw in that debris can build up in them and block the free flow of air in the system, which is a violation of this standard. *The Quencher is self-cleaning and prevents pressure build up.*
7. Many spark arrestors require a drop out conduit to release the sparks, and debris, into a separate collection drum or bin. This is a violation of paragraph 12.2.5.4.5 because it poses a fire and explosion hazard beyond the arrestor. *Quencher uses no such drop out provision.*

1.5 Equivalency; Nothing in the NFPA 69 standard prevents the use of spark arresting devices.

1.5.2; NFPA does not approve or certify anything. It is left up to the authority having jurisdiction.

3.3.16* Flame Arrestor; *Spark arrestors do not extinguish or stop a flame front. They will extinguish and cool the spark, reducing the likelihood of a fire.*

3.3.24.4 Ignition Source Isolation; This is what a good spark arrestor does. Not all spark arrestors are effective on 100% of the sparks/embers and therefore do not meet this definition. Quencher does.

3.3.25* Limiting Oxidant Concentration (LOC); Quencher strips the oxidant from the spark/ember, to below the concentration needed for a deflagration.

3.3.35 Self-Decomposing mixtures; Cellulose, paper, and the like, where a spark arrestor will not extinguish the spark/ember until the material is completely consumed and is strictly a spark/ ember. *This is a limiting factor in the effectiveness of a passive spark arrestor. The Quencher will tend to chop up the material into small pieces and accelerate the consumption of the material.*

4.2.2.2; Quencher prevents ignition in the gas stream and/or dust collection system downstream of the device.

5.2.3.1; Quencher prevents combustible material from attaining ignition temperature.

6.1.1 Methods based on the Prevention of Combustion; Quencher applies for “oxidant concentration reduction” around the spark/ember.

9.5.1.2 & 9.5.1.3 Process analysis; factors such as the type of combustible material, the enclosure internal geometry, the total volume to be protected, and the operating conditions shall be reviewed in detail. The potential process malfunctions that could affect the extent of the deflagration hazard shall be determined. *Our engineering personnel are the most qualified in the industry to undertake this and advise the end-user.*

9.6.1; The system manufacturer shall provide the owner or operator with information and documentation supporting the design; this information shall be suitable for review by the AHJ. *Quencher manufacturer is the only passive spark arrestor manufacturer capable of providing this.*

10.1.2; Enclosures that can be protected by a deflagration suppression system shall include dust collectors, pneumatic and screw conveyors and bucket elevators.

10.4.4.5 The system manufacturer shall provide to the owner or operator installation instructions, operating manuals, and maintenance instructions. *Quencher provides a detailed owner’s manual.*

12.2 Passive Isolation Techniques. Passive isolation system design shall be permitted to be based on various techniques that include, but are not limited to, the use of the following equipment: static dry flame arrestors

12.2.5.3 Static Flame Arrestor System Design; *passive spark arrestors fall under this category.*

12.2.5.4.4 Flame arresters shall be installed and maintained in accordance with the manufacturer’s instructions. *Quencher provides detailed specifications for the proper operation of the spark arrestor. Most other devices provide very little or no instructions.*

12.2.5.4.5 In-line arresters that can experience continued burning for a time longer than that for which they were tested or that are installed in a different orientation than in the approval test... shall meet the criteria in 12.2.5.4.5.1 through 12.2.5.4.5.4. *Unfortunately low end spark arrestors do not have such approval tests to refer to. The Quencher spark arrestor is designed and demonstrated to eliminate spark/ember in the arrestor cell and does not allow burning downstream of the arrestor cell. Therefore, Quencher is not required to comply with 12.2.5.4.5.1 through 12.2.5.4.5.4, which is rather involved.*

12.2.5.4.5.1 through 12.2.5.4.5.4; A means of detecting the burning shall be provided on both sides of the arrestor along with an alarm or automatic device to interrupt flow prior to failure. The response time for shutoff shall not extend beyond 1 minute. The shutoff temperature selected shall be determined on a case-by- case basis by, but not limited to, the following criteria: (1) The normal operating temperature of the vapor stream (2) The maximum operating temperature of the vapor stream (3) The vapor with the lowest auto-ignition temperature in the vapor stream. If thermocouples are used, they shall not be placed in thermowells unless specifically tested in that configuration.

12.2.5.4.6 The pipe diameter on the unprotected side shall be no larger than the flame arrestor inlet connection within 120 times the length-to-diameter ratio of the arrestor inlet. This is a common violation when designers oversize the ductwork.

12.2.5.4.7 The pipe diameter on the protected side shall be no less than the pipe diameter on the unprotected side, unless tested with a restriction on the protected side. Another common violation when designers undersize the ductwork.

12.2.5.4.8 Continuous monitoring of pressure drop shall be provided if the process is known to contain particulates or substances that may block the element and over-pressurize the system. Many competitive arrestors are designed to cause blockages within the spark arrestor unit. Quencher has no such restrictions and in fact provides an optional cell cleaner option to prevent any possibility of a blockage.

12.2.5.4.10 All parts of the flame arrestor shall be constructed to resist the expected mechanical, thermal, and chemical loads for the intended use. *Quencher is heavy duty industrial construction. Unfortunately, many other spark arrestors are flimsy light duty ductwork grade construction.*

12.2.5.4.14.2 Design shall allow internal inspection of flame filter elements. *Quencher offers an inspection “access door”.*

12.2.5.6.2 Use of these devices shall not apply to operational pressure outside the approved pressure range; special testing and approval shall be required if the operational pressure is exceeded. *Most spark arrestor suppliers do not provide the data to comply with this section. Quencher does!*

12.2.5.6.5 For in-line deflagration arresters the ratio of pipe length (between the potential ignition source and the flame arrestor) and pipe diameter shall not exceed the tested ratio of length to diameter. *Quencher recommends at least a 5:1 length to diameter ratio, while others ignore any such stipulation.*

12.2.5.6.7 Use of these devices shall not apply outside the tested application limits. *Most devices have not been tested and therefore are not approved for use. Proper application of the QUENCHER does apply.*