

FLAME & DETONATION ARRESTERS

Flame arresters are a safety device – they stop the spread of a fire in your pipework or tank. Flame arresters also stop a potentially explosive gas mixture from igniting in the first place. Flame arresters may also be known as deflagration arresters.

Detonation arresters are more robust than flame arresters and limit the spread of an explosion.



A flame arrester

HOW FLAME ARRESTERS WORK

A flame will continue to burn until:

1. The fuel (a gas or vapour) is consumed.
2. The oxygen concentration becomes too low or too high to sustain burning.
3. The heat necessary to sustain burning is removed.

Flame arresters work on the third principal – they absorb the heat from a flame front that is travelling at sub-sonic velocities. This reduces the temperature of the gas to below its auto-ignition temperature, which quenches the flame.

The flame arrester element does the work of stopping the flame front. The element is comprised of metal plates, wire mesh or crimped metal windings which are closely packed together. The element forces the gas through a small gap, which creates a difficult path for a flame front to pass through and which quenches the flame.

The size of the gap is measured by the Maximum Experimental Safe Gap (MESG). The MESG varies according to the flammability of the gas mixture. Gases are classed in various Gas Groups to identify the flammability hazard they present. Highly flammable gases such as acetylene require a very small MESG of 0.37mm. Gases that are less flammable such as methane require a larger MESG of 1.14mm. The National Electric Code (NEC) categorises gases by Gas Groups A, B, C or D – Group A is the most hazardous and Group D is the least hazardous. The International Electrotechnical Commission (IEC) categorises gases by Gas Groups IIA, IIB, IIC – Group IIC is the most hazardous and Group IIA is the least hazardous.

DETONATION ARRESTERS

A flame front moves through pipework at less than the speed of sound. In long pipe runs or runs with several bends an uncontrolled flame front accelerates and can reach speeds exceeding the speed of sound. This creates a shock wave which is known as a detonation. The resulting flame front is not only travelling very fast but is at high pressure. A detonation arrester limits the spread of this detonation. It is recommended to limit a flame front before it becomes a detonation.



A detonation arrester

OTHER CONSIDERATIONS

Flame and detonation arresters should be well maintained to ensure they continue to work safely. They should be inspected on a regular basis to make sure that the element is free of any contaminants such as corrosion, residue, dirt or insects.

One of the main considerations when determining the right flame arrester is the pressure drop across the element. The element provides a significant impediment to the gas flow and as a result the pressure drop across the element can be high. Cebeco can calculate this pressure drop using proprietary software.

You should be very careful to install flame arresters and detonation arresters in the right location to ensure they perform their role. Again Cebeco can assist with this work.

Cebeco offers the Protectoseal range of flame arresters and detonation arresters. We are happy to assist you to determine the right solution for your application. Contact us on 02 9651 4220 or sales@cebeco.com.au.



Cebeco Pty Ltd

Unit 22 / 35-39 Higginbotham Road
Gladesville, 2112, NSW, Australia

Ph: 61 2 9651 4220

E: sales@cebeco.com.au

W: www.cebeco.com.au