



For Instance Kingsley Engineering Services Employ Layers Of Metal Ribbons With Crimped Corrugations As Shown Below

CRIMPED WOUND METAL RIBBON ELEMENT

The above construction produces a matrix of uniform opening that are carefully constructed to quench flame by absorbing the heat of the flame. This provides an extinguishing barrier to the ignited vapour mixture.

1. Straight (Parallel) Design
2. Inclined (Angular) Design

TYPES OF FLAME ARRESTER

Kingsley Engineering Services application & design fall into three major categories.

1. **End Of Line**
 - A. End of Line Laminar Burning.
 - B. End of Line Long Burning Proof.
2. **In Line Arrester Confined Deflagration.**
 - A. Low Pressure Deflagration
 - B. Medium Pressure Deflagration
3. **End of Line With Weather Hood.**



Kingsley Engineering Services offers a full range of end of line & in line Flame arrester from size 1/4" NB to 18" NB. Each types of flame arrester are designed, Manufactured & Specifically tailored to the requirement of individual application.

Features :

Kingsley Engineering Services offers In Line & End of Line Flame Arrester with

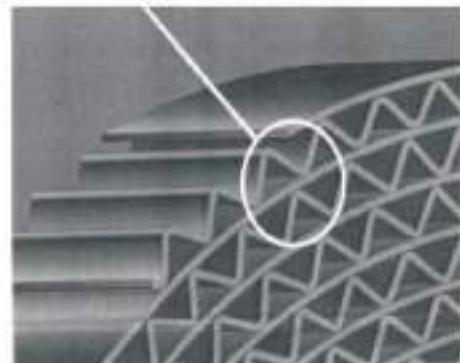
1. A Full Range of Design & Size
2. Excellent Pressure Drop to Flow Capacity
3. Minimum Clogging & ease of Cleaning
4. Bi - directional / Flexible Installation
5. Various Elements of Design
6. Removable Element Assembly.

MESG :

In Order to Design safety equipment the testing & regulatory bodies NEC & IEC classified flammable process gases based on following criteria's.

- A. MESG
- B. Flame Temperature
- C. Flame Velocity
- D. Auto Ignition Temperature &
- E. Ignition Energy

Flame Cell Channel



It Depends upon gas composition.

Groups	Groups Defined By NFPA	MESG
Group II C	Group A & B	< 0.6 MM
Group II B	Group C	0.6 to 1.0 MM
Group II A	Group D	> 1.00 MM

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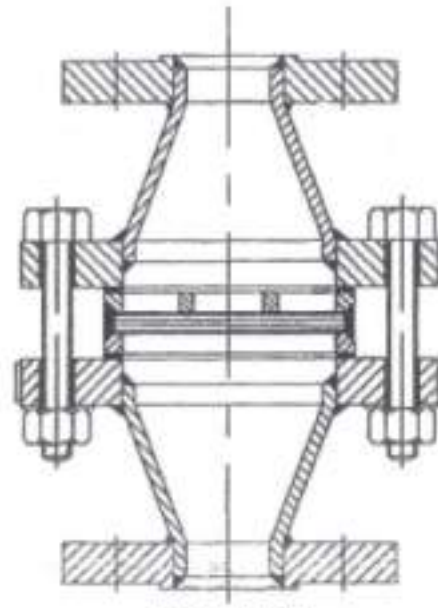


WHAT IS FLAME ARRESTING

The accidental ignition of flammable gases or vapours from vent pipes of storage tank or process vessel presents a constant threat to plant and personnel. The use of flame arresters is one of the essential measures taken to avoid or minimize the possible consequences. Their application is widespread, ranging from the protection of small solvent tanks to the safety of large and complex process plant. The oil, gas, petroleum, chemical and petrochemical industries are major users.

A flame arrester is a static device which stops a flame entering into the storage tank or process vessel containing a flammable gas or vapour. An end-of-line type flame arrester is fitted at the extreme downstream end of a pipeline.

The arrester consists of a flame quenching, element contained within a housing which incorporates thread or flange connections for fitting to pipework. The element is often of greater diameter than the pipework in order to compensate for pressure drop and therefore the housing is enlarged accordingly.



Type FA / 01
For Use With Breather / Vent Valves

FEATURES

The key to the proven flame arresting capabilities of Kingsley Engineering Services is the element pack. Specially woven heat resistant stainless steel wire gauze provides a controlled and reproducible aperture size combined with the necessary physical strength. A series or pack of these corrosion resistant gauzes is assembled and the depth is maintained considering the flame speeds and over pressures likely to be encountered in end of line applications.

Extensive flame testing in accordance with Clause 2.1 of IS11006-1984 has been carried out at CMRI Testing Cell, Dhanbad.

These not only provide exceptional protection against fire and explosion from external ignition, but also offer effective flow at the lowest resistance (Pressure drop) of the flammable gas or vapour.

They are extremely robust and will both resist the pressure waves which accompany flame fronts and withstand vigorous cleaning when required.

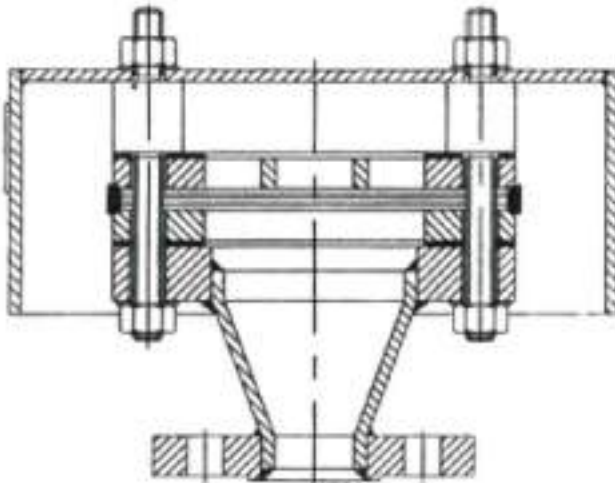
Quick and easy inspection and maintenance, due to reduced weight and simple removal of element.

Complete range of sizes from 1/2" inch through 12" inches are available with flat face or raised face flanges to match ANSI 150# connections. (Higher size on request)

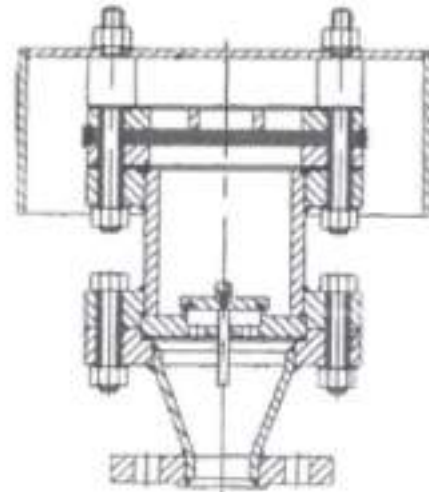


OPERATION

The operating principle is that whilst allowing gas or vapour to flow, the elements break the back travelling of flame by breaking it down into small flames, absorbing & dissipating heat & reducing the temperature to a level which will not support combustion. It thus extinguishes the flame or contains it so as to prevent further propagation & damage.



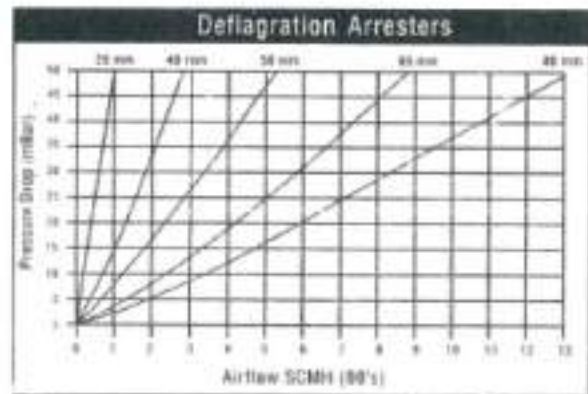
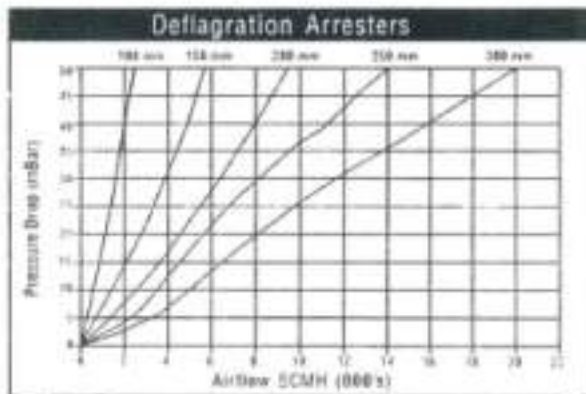
Type FA / 01 - WH
With Breather hood



Type FA / 02 - WH
For Hydrogen & Acetylene Service

FLOW CAPACITY & PRESSURE DROP

All Flame Arresters Present some resistance (Pressure Drop) to flow & the following graphs are a guide to the pressure drop across Kingsley Engineering Services flame arresters over a range of air flow rates.



To Determine Equivalent Flow Capacity For Other Gases Divide the given capacity by square root of appropriate specific gravity.

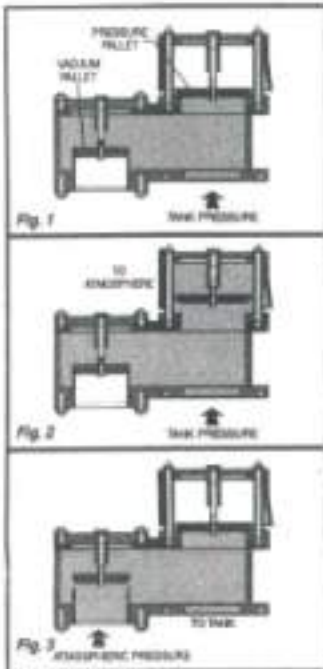
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PRODUCT DESCRIPTION



It Shows the relation of the pressure or vacuum pallet assembly to the seat when atmospheric & tank pressures are equal.

As the pressure or vacuum increases the pallet begins to rise. Because there is still wrap - around effect of the seat good sealing is maintained. Elastomer seating surface further enhance sealing characteristics.

Increasing vapor pressure continues to lift the pressure port pallet. As set relief pressure is reached, the pallet of the pressure relief port leaves the seat (see Figure 2) and the out breathing vapor pressure helps further tight - shut - off at vacuum port.

Increasing vacuum inside the tank / vessel continues continues to lift the vacuum port pallet. As set vacuum pressure is reached, the pallet of the vacuum port leaves the seat (see Figure 3) this deflects the incoming air stream directly into the instead of into a dead end space in the creather body. Inbreath air lifts vacuum port pallet even further. Other end inbreath air helps further tight shut - off at pressure relief port.

CAPACITY / SIZING CALCULATIONS FOR BREATHER VALVE

1. Pressure Reliving

$$\text{Reliving Capacity} = D^2 \times (Pr - 0.9) \times 10^3 \times \sqrt{P \times Pr} \times 0.58 \text{ in SCFH (air)}$$

Where,

D = Valve size in inches.

P = Set Pressure in inches of W.C.

Pr = Ratio of over pressure to set pressure.

(e.g. : Pr 1.2 for set pressure of 100mm WC with 20% over pressure i.e. over pressure upto 120mmWC)

2. Vacuum Relief

$$\text{Reliving Capacity} = D^2 \times (Pd^2 - 1) \times 10^3 \times \sqrt{P \times Pd} \times 0.5 \text{ in SCFH (air)}$$

Where,

D = Valve size in inches.

P = Set Pressure in inches of W.C.

Pd = Ratio of built up vacuum to set vacuum

(e.g. : Pd = 1.25 for set vacuum of -20mm WC with 25% built - up in vacuum upto 25mmWC)



BREATHER VALVE

These are useful as relief valves for blanketed vessels in which solvents are filled & drawn out at a high flow rate. These can also be fitted, on the process vessels to safeguard the process equipment where unpredicted fluctuations in pressure may occur. By retaining toxic vapours and avoiding atmospheric contamination these help to provide increased fire protection and safety. Pressure cum vacuum relief / breather valves are designed to protect your tanks from possible casualty due to over pressure created by thermal expansion & product movement into the tank and excessive vacuum created by thermal contraction & product movement out of the tank. At the same time it minimises costly product evaporation / loss. Continued design improvements provide these valve with high efficiency, maximum flow capacity and minimum leakage. These are available "closed end hoods" type of standard design or with "pipe-away design" for vapour recovery. These can also be offered as only the vacuum relief valves with blind flange on pressure port and vice-versa



Typical Breather Valve

FEATURES

Tradition of Excellence :
Continued design improvements and carefully engineered body, seat and pallet assembly results in a superior capacity at low pressure with minimal breakdown, thus conserving valuable tank content.

Design Flexibility :
These are available "closed end hoods" type of standard design or with "Pipe-away design" for vapour recovery.

Easy to Maintain :
The easily serviceable configuration and lightweight construction reduces maintenance and installation costs.

Cohesion Resistant :
Specially designed elastomer seating contribute to high resistance to cohesion of ice and gum formations, thus ensuring protection against pallet sticking to the seating surface. In addition, the body is self draining to keep condensates away from the seating surfaces.

Specification

Body Size & Connections :
1", 2", 3", 4", 6" 8", 10 & 12" Flanged to ANSI B16.5 Class 150 ratings. (RV/- Series: Different port sizes for pressure & vacuum can be provided).

Model Configuration :
BV/04 : Pressure cum Vacuum Relief Valve
BV/03 : Pressure cum Vacuum Relief Valve with pipe away
BV/02 : Only Vacuum Relief Valve
BV/01 : Only Pressure Relief Valve
1", 2", 3", 4", 6" 8", 10 & 12" Flanged to ANSI B16.5 Class 150 ratings. (RV/- Series: Different port sizes for pressure & vacuum can be provided).

Temperature Capabilities :
-25°C to 80°C with Nitrile elastomeric parts
-15°C to 180°C with Fluoropolymer elastomeric parts.

Pressure Setting Adjustment :
Weight Loaded

