

Responsiveness to detonation • deflagration FLAME ARRESTER



● Major user industries and facilities

Available for pipeline protection of a wide variety of flammable gas and solvent handling industrial plants and facilities including petroleum, chemical and gas plants as well as fuel cell-related hydrogen-handling facilities and biogas facilities.

Silent Technology KANEKO





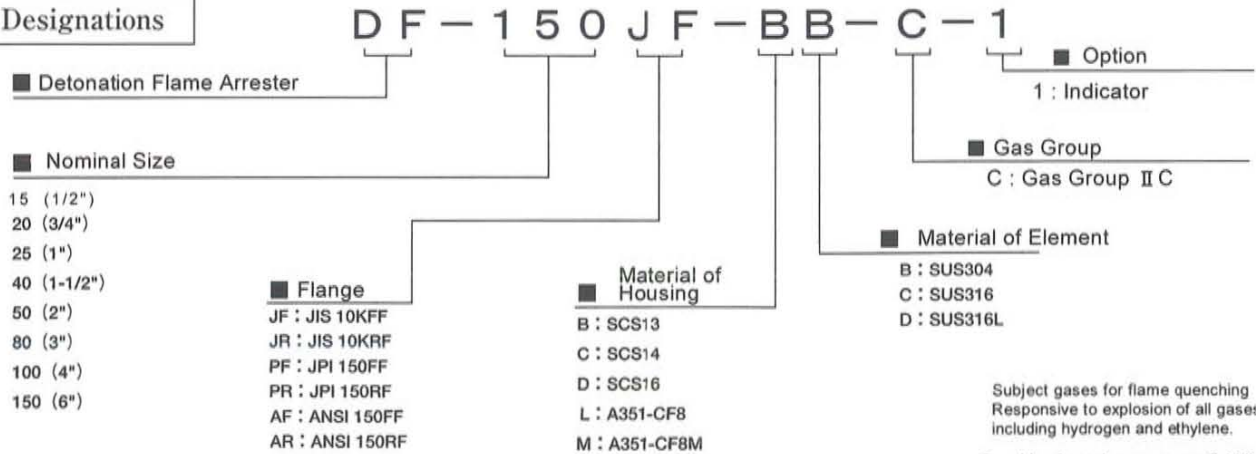
KANEKO Safety Device

There is something Kaneko Sangyo as a safety device manufacturer has persisted in continuing to maintain. That "SAFETY."

The company offers a wide variety of flame arresters that can serve customer needs, for example, inline flame arresters, end-of-line flame arresters and detonation-responsive flame arresters able to cope with the high risk of hydrogen gas detonation.

Please use them to ensure the safety of your plant equipment.

Designations



Subject gases for flame quenching
 Responsive to explosion of all gases
 including hydrogen and ethylene.

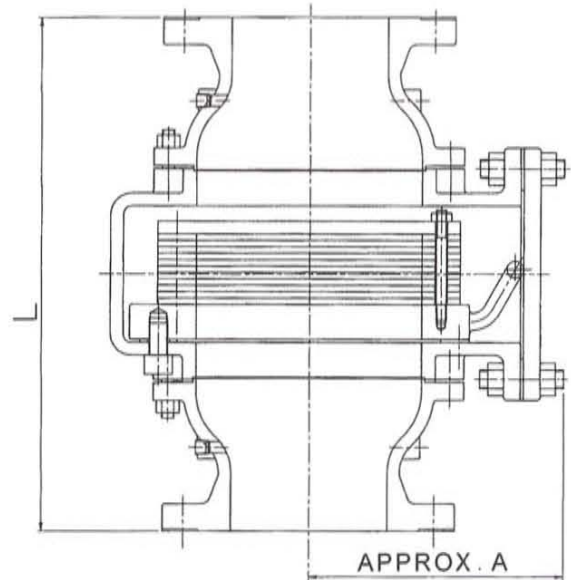
Capable of passing necessary fluid flow
 with lower pressure loss owing to a newly
 developed construction.

PT. 2005-308230

Photograph showing the product without option



15A~100A



150A

Consult us for nominal diameters
 exceeding 200A.

Nominal Size	15	20	25	40	50	80	100	150
A	112	112	131	155	178	215	254	254
L	228	227	254	283	308	348	424	490

Designations

FAR - 25JF - BB - A

■ Crimped metal type Flame arrester

■ Nominal Size

- 20 (3/4")
- 25 (1")
- 40 (1-1/2")
- 50 (2")
- 80 (3")
- 100 (4")
- 150 (6")
- 200 (8")
- 250 (10")
- 300 (12")
- 350 (14")
- 400 (16")
- 450 (18")
- 500 (20")

■ Flange

- JF : JIS 10KFF
- JR : JIS 10KRF
- JZ : JIS other
- PF : JPI 150FF
- PR : JPI 150RF
- PZ : JPI other
- AF : ANSI 150FF
- AR : ANSI 150RF
- AZ : ANSI other

■ Material of Housing

- B : SCS13 (20A, 25A SUS304)
- C : SCS14 (20A, 25A SUS316)
- D : SCS16 (20A, 25A SUS316L)
- K : SCPH2 (20A, 25A S25C)
- L : A351-CF8
- M : A351-CF8M
- N : A216-WCB (20A, 25A A106)

In the case of body materials K to N, whether the body can be made of them depends on the nominal diameter.

■ Gas Group

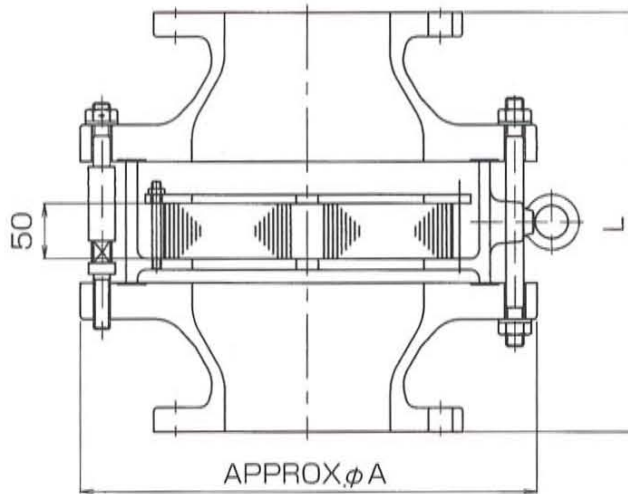
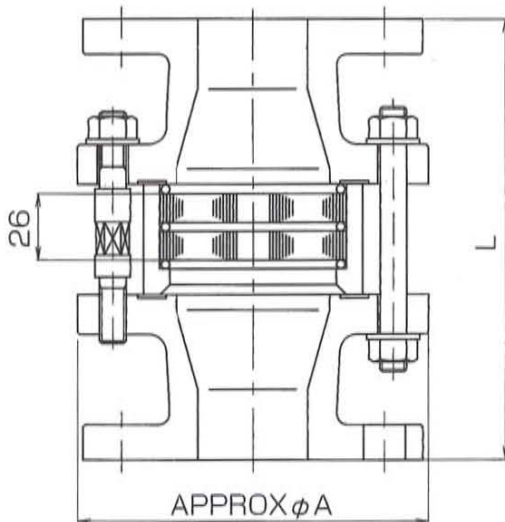
- A : Gas Group II A
- B : Gas Group II B
- C : Gas Group II C

■ Material of Element

- B : SUS304
- C : SUS316
- D : SUS316L

20 ~ 80 A

100 ~ 500 A



Nominal Size	20	25	40	50	80	100	150	200	250	300	350	400	450	500
A	117	135	145	160	200	360	415	510	650	740	782	860	980	1240
L	190	190	200	200	220	380	387	470	520	550	550	600	650	735
Weight kg	10	11	13	15	25	40	65	110	200	340	380	500	600	1000

Designations

F A R E - 25 J F - B B - A

End-of-line
■ Crimped metal type Flame arrester

■ Nominal Size

- 20 (3/4")
- 25 (1")
- 40 (1-1/2")
- 50 (2")
- 80 (3")
- 100 (4")
- 150 (6")
- 200 (8")
- 250 (10")
- 300 (12")
- 350 (14")
- 400 (16")
- 450 (18")
- 500 (20")

■ Flange

- JF : JIS 10KFF
- JR : JIS 10KRF
- JZ : JIS other
- PF : JPI 150FF
- PR : JPI 150RF
- PZ : JPI other
- AF : ANSI 150FF
- AR : ANSI 150RF
- AZ : ANSI other

■ Material of Housing

- B : SCS13 (20A, 25A SUS304)
- C : SCS14 (20A, 25A SUS316)
- D : SCS16 (20A, 25A SUS316L)
- K : SCPH2 (20A, 25A S25C)
- L : A351-CF8
- M : A351-CF8M
- N : A216-WCB (20A, 25A A105)

In the case of body materials K to N, whether the body can be made of them depends on the nominal diameter.

■ Gas Group

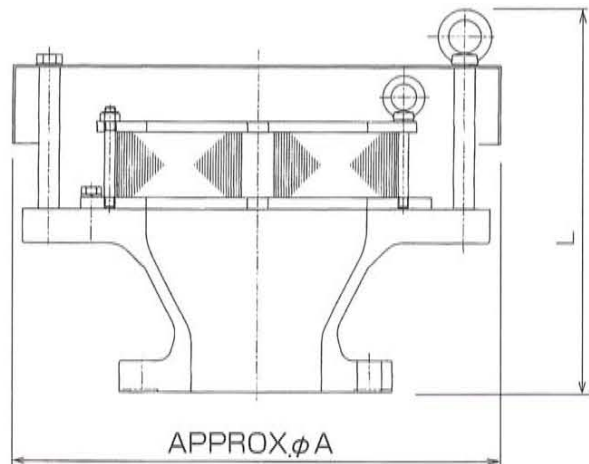
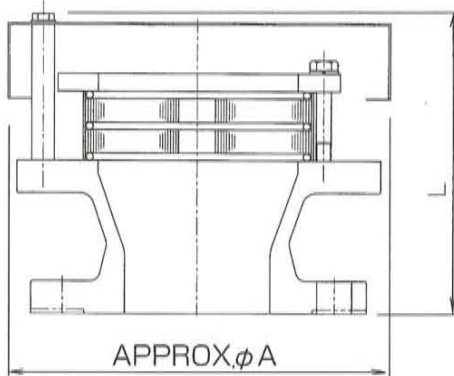
- A : Gas Group II A
- B : Gas Group II B
- C : Gas Group II C

■ Material of Element

- B : SUS304
- C : SUS316
- D : SUS316L

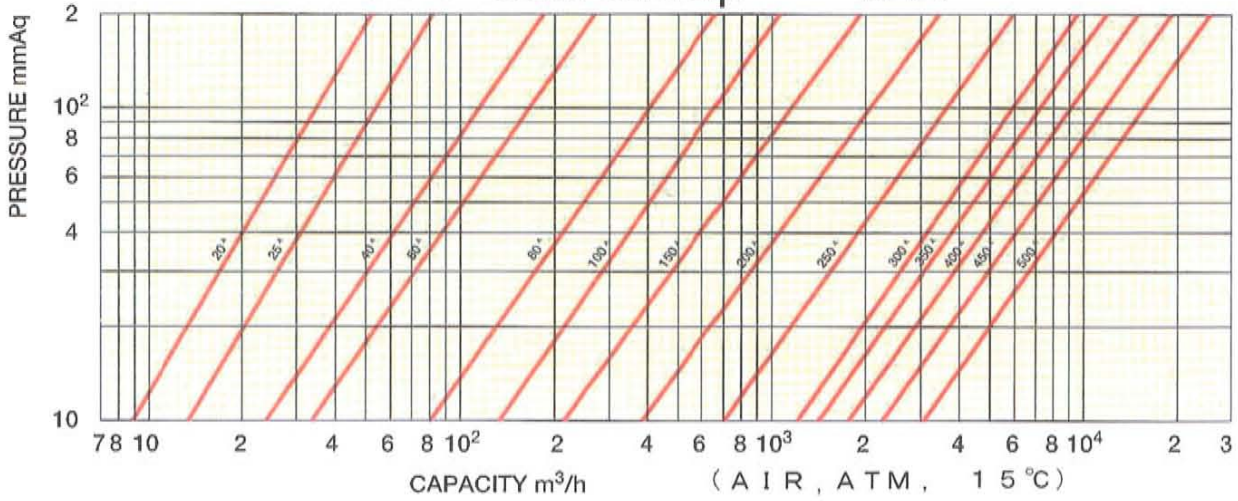
20 ~ 80 A

100 ~ 250 A

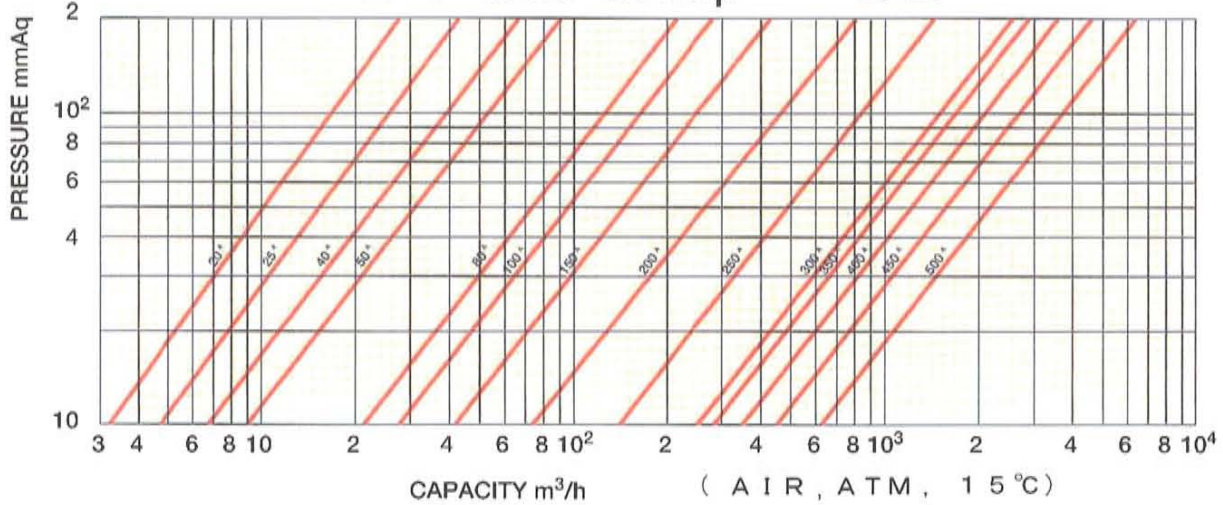


Nominal Size	20	25	40	50	80	100	150	200	250	300	350	400	450	500
A	140	155	162	170	210	376	436	536	690	Consult us for nominal diameters exceeding 300A.				
L	141	143	145	154	166	293	298	362	380					
Weight kg	6	7	9	10	17	26	43	72	130					

A : Gas Group II A



B : Gas Group II B





OUTLINE

In August 2002, Kaneko Sangyo obtained the first certification for "flame arrester for piping" in Asia, proving the product quality and reliability of its flame arresters on a global scale.

The flame arrester is an important device that serves to extinguish fire produced in piping at an early stage and arrest the spread of the fire. In Japan, it is regrettable that there is no such state or third-party organization that conducts performance verification and evaluation with respect to the safety and reliability of the device.

In order to verify the performance characteristics of this important device, the company has carried out tests to evaluate the flame quenching performance and reliability by actually causing fire in piping by use of its test facility. However, this has been no better than part of its research and development efforts.

For more positive evaluation of the flame quenching performance and reliability of this device that plays a key role in maintaining the plant safety in various fields, the company has lately decided to request the state organization "BAM"*1 of the Federal Republic of Germany to grant "EN12874 (2001)"*2 certification.

- 2001 Verification of flame quenching performance by performance test specimens as well as documentary examination of the company's quality system by its quality manual and quality plan is planned to be conducted in Germany.
- 2002 Evaluation of the operating status of the company's quality system as well as the conditions of its production equipment, production process and test facilities is planned to be conducted at the company's Hiratsuka Factory by German examiners visiting Japan.

*1 BAM (federal materials research and testing organization)

The BAM (German) is a national research institute that conducts risk assessment as a global organization comparable to the TNO (Dutch) and the HES (British). In particular, its evaluation tests for combustion, decomposition and explosion properties of chemical substances have been adopted by the UN. The BAM performs risk assessment of highly dangerous substances and performance evaluation of safety equipment through actual combustion, decomposition and explosion tests and carries out examination of products.

*2 EN12874 (Flame Arresters Performance Requirements, Test Methods, Limits for Use)

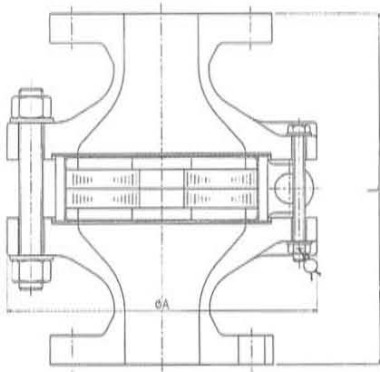
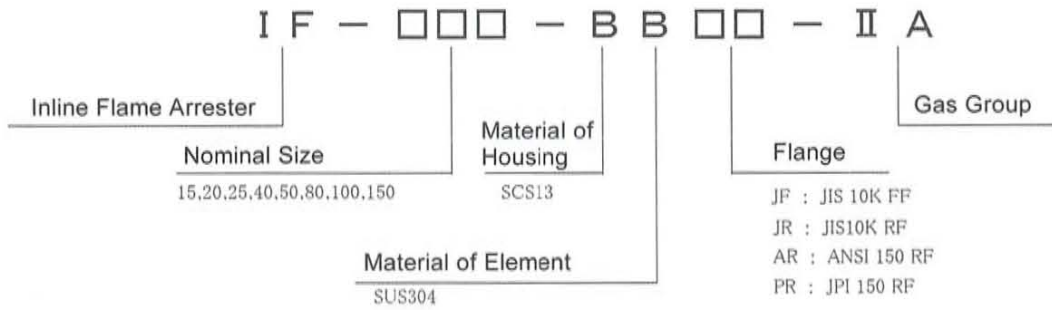
This standard was drawn up based on the authority given the CEN by the European Commission and European Free Trade Association. It is an European standard that prescribes the definitions of terms, construction requirements, test conditions (schemes) including those for flame propagation tests, etc. for flame arresters used as safety devices to arrest flame spread in the presence of a flammable gas/air or vapor/air mixture in piping.

LIMITS OF CERTIFICATION GRANTED

1. Responsiveness to deflagration
Available within the deflagration limits in which the "flame propagation speed" does not exceed the velocity of sound.
2. Adaptability to Gas Group IIA
Available for gases of Gas Group IIA specified in EN60014 Annex A "Subdivision of gases and vapors by maximum test safe gap and minimum firing current."
(Propane, toluene, naphtha, methanol, acetone, ammonia, methylamine, etc.)
3. Responsiveness to short time burning
Available in pipings having a system by which the flow of a flammable mixture (inner fluid) can be stopped or bypassed within one minute after the occurrence of fire in piping has been confirmed through the temperature rise of a heat sensor installed to the flame arrester.

Designations

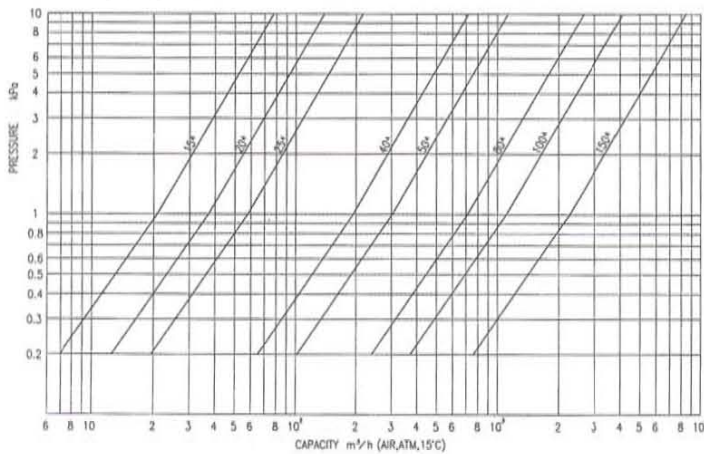
The model number of an in-line type flame arrester is composed as shown below.



		mm							
Nomial Size		15	20	25	40	50	80	100	150
A		105	119	143	184	203	263	324	458
L (ANSI,JPI)		165	187	197	210	239	325	363	491
L (JIS)		165	189	197	207	232	313	351	484

Nomial Size		200	250	300	350	400	450	500
A		510	650	740	782	860	980	1240
L (ANSI,JPI)		470	520	550	550	600	650	735
L (JIS)		470	520	550	550	600	650	735

FLOW CAPACITY

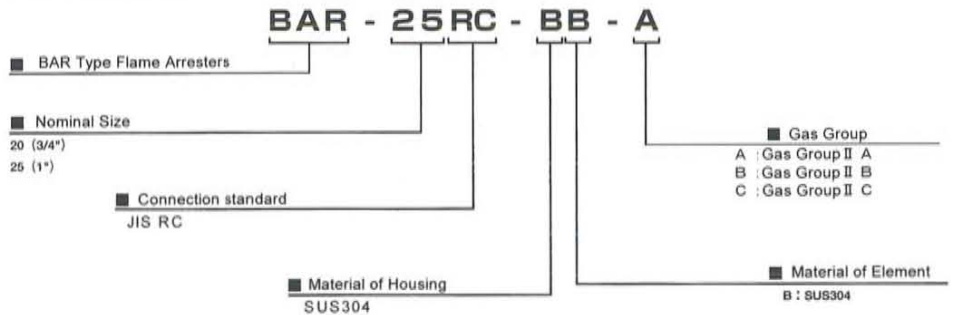


Flow test made by a flow test equipment according to the inspection regulations of CEN/TC 305/WG3/SG1 Study group (in the working group) for safety systems and devices for explosion protection of explosive gases in the CEN (European Standards Coordinating Committee).



BAR Series Flame Arrester

Compact, comparable to the crimped metal type and adaptable to all explosive gases.



L : 20A 80mm , 25A 85mm



BAR Series Welding Connection Flame Arrester

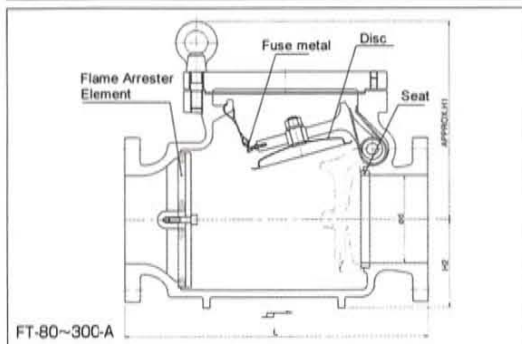
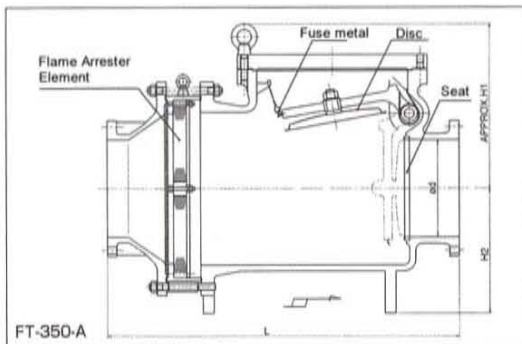
In the case of exhausting hydrogen gas from a bent stack or the like, the flame arrester is installed to the leading end of the discharge pipe, but it is necessary to attach a pipe support, etc. because of the product weight. This product is made not only strong but also lightweight by the company's original technology of thin-wall drawing.

Bore: 100A, 150A, 200A

Material: SUS304 (other materials are also available)

The model number is the same as that for other FAR series with the exception of the connection symbol "BW" indicating butt welding.

Example of model number: FAR-100BW-BB-C



Flame trap assembly

This product has the function of preventing back firing and the function of blocking passage by valve disc closing by flame.

These two functions contribute to increasing the safety.

The flame trap assembly arrests the spread of the fire of an ignitable gas such as methane gas. It is particularly effective in cases where the direction of the ignition source is easy to suppose. The flame trap is made up of a flame suppressing part (flame arrester bank) and a blocking device using a heat fusible piece as shown in the figure left.

The flames of the gas coming from the downstream side, i.e., the right side of the figure, can be prevented from propagating to the upstream side for a while by the flame arrester bank.

When the gas supply continues, the gas keeps burning in place as a matter of course. However, when the resulting heat raises the temperature to a certain level, the fusible piece melts to close the disc. The flames are quenched with the stop of the gas flow.

Adopted as the flame arrester bank is the crimped metal type that is more effective in flame quenching than the wire mesh type.

[FEATURES AND USES]

1. Arrests the spread of the fire caused in pipings such as sewage line where methane gas is apt to be produced.
2. Easy to maintain and resistant to failure owing to the simple construction.
3. The melting point of the fusible piece is 130°C as standard, but it can be changed by consultation.



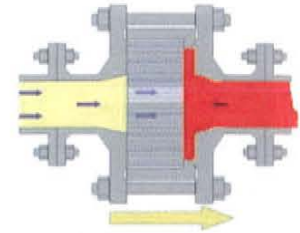
Designations	d	L	H1	H2
FT-80-A	80	370	237	100
FT-100-A	100	440	244	110
FT-150-A	150	520	339	145
FT-200-A	200	640	386	180
FT-250-A	250	750	428	225
FT-300-A	300	900	524	270
FT-350-A	350	1278	594	450

FUNCTION OF FLAME ARRESTER

When investigating whether the flames of a burning fire pass through, it is necessary to contemplate the burning velocity* and the hole size through which the fire can pass. The flames cannot pass through too small a hole. The diameter of the largest hole through which the fire cannot pass is called “quenching diameter.” The quenching element of the flame arrester is an assembly of holes with a smaller diameter than the quenching diameter.

The flames entering into the flame arrester are subdivided by the quenching element into smaller flames, which try to pass through the holes, but fail to do so because of the smaller hole diameter than the quenching diameter and consequently cannot move forward.

* Burning velocity: The flames burn at a constant velocity. This velocity is uniform under atmospheric pressure provided that the kind and temperature of gas are the same, and it is called “burning velocity.”



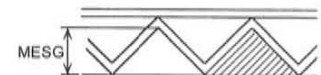
Crimped metal



FLAME QUENCHING PERFORMANCE OF FLAME ARRESTER

In Japan, the so-called flame arresters have hitherto been roughly divided into two types, wire mesh type and crimped metal type, depending on whether the flame suppressing part is a wire mesh type or a crimped metal type. Taken as an example for comparison of the flame quenching performance is the flame propagation speed that is the moving speed of a flame front running through the piping filled with flammable gas. This speed varies depending on the kind of flammable gas and the piping shape and length. The flame propagation with a rate exceeding the sound velocity (343 m/sec), which is accompanied by a shock wave, is called “detonation” and the flame propagation with a rate lower than the sound velocity, which precedes the stage of detonation, is called “deflagration.”

The flame propagation in piping is several meters per second in initial speed, but increases speed as the flames pass through piping and causes detonation, depending on the kind of flammable gas. The flame quenching ability of a flame arrester using a wire mesh as the flame suppressing part is of the order of 5 m/sec in flame propagation speed and therefore insufficient for use in piping. In the case of a flame arresters using a crimped metal as the flame suppressing part, the flame quenching ability can be increased by making the crimped metal clearance smaller according to the kind of explosive gas, so it is suited for higher flame propagation speed. Therefore, the crimped metal type flame arrester is very effective for use in piping and finds extensive use in the piping facilities of flammable gas atmosphere.

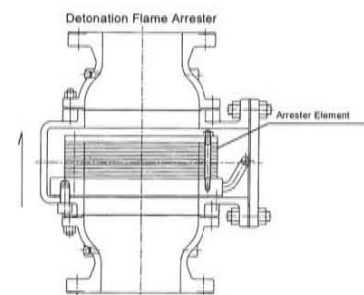


DETONATION FLAME ARRESTER SLIT TYPE

The most difficult in flame quenching is detonation. To manufacture a flame arrester Capable of responding to this detonation, it is necessary to increase the ability of the quenching element, as a matter of course. In the case of the dominating crimped metal type, the triangles of the crimped metal are made smaller to obtain a finer texture and a greater width. This results in increasing the pressure loss and the risk of clogging. The crimped metal when clogged is structurally difficult to clean up, so it is usually replaced with a new one. To eliminate such a drawback, the company manufactures a detonation flame arrester by its original method of stacking ring-like quenching elements on each other at very small intervals (national and international patents applied for).

This quenching element construction ensures a smaller pressure loss than the crimped metal type and can be cleaned up for reuse. In addition, it is capable of preventing the detonation of hydrogen gas included in the explosive gas group IIC considered most difficult to treat.

This flame quenching ability has been verified by the test method specified in the European unified standard EN12874-2001.



Gas Group

range		Major gas
Gas Group	MESG (mm)	
II A	>0.90	Methane, Ethane, Propane, Butane, Hexane
II B1	$0.90 \geq 0.85$	Ethanol, Acrylonitrile
II B2	$0.85 \geq 0.75$	Hydrogen cyanide, Dimethyl ether(DME)
II B3	$0.75 \geq 0.65$	Ethylene, Propylene oxide
II B	$0.65 \geq 0.50$	Ethylene, Ethylene oxide, Paraformaldehyde
II C	<0.50	Hydrogen

MESG : Maximum experimental safe gaps

Crimped metal type
Inline flame arresters



Crimped metal type
End-of-line flame arresters

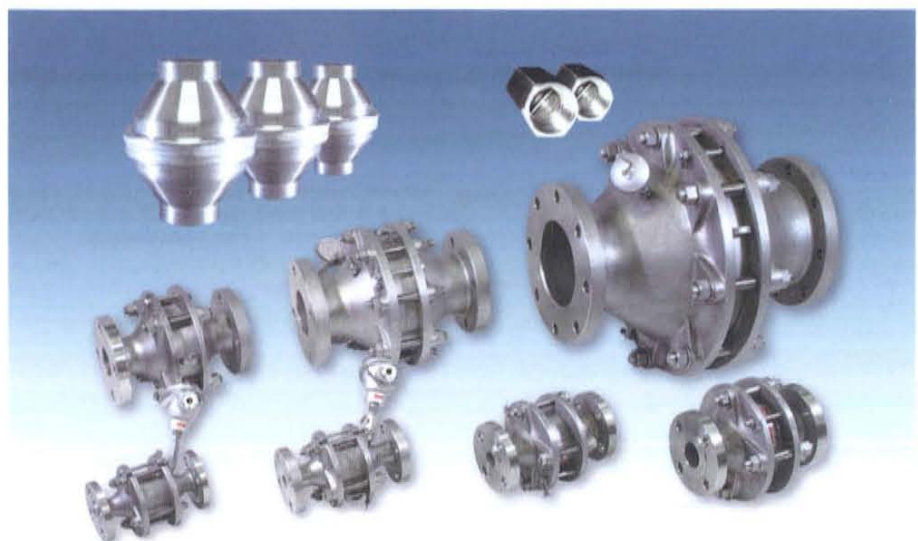


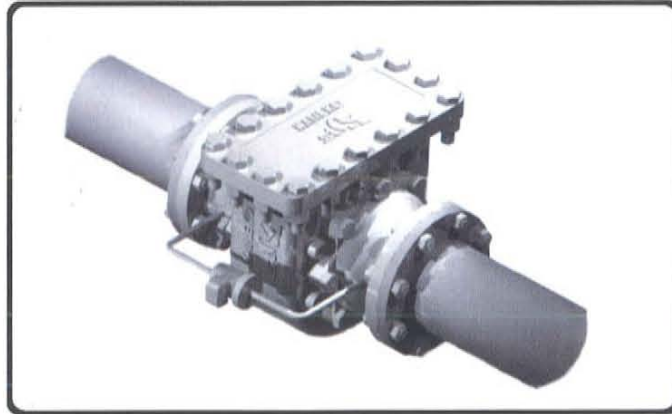
Responsiveness to detonation
Slit type Inline flame arresters



KANEKO Flame arresters

BAM Certification acquisition
Crimped metal type
Inline flame arresters





MAIN PRODUCTS

- SOLENOID VALVES
- LIQUID LEVEL GAUGES
- BREATHER VALVE
- FLAME ARRESTER
- SAFETY VALVES, RELIEF VALVES,
- GAS SEAL UNIT
- REDUCING VALVES
- HYDRAULIC VALVES



ISO9001 Approved, Certified Business for High-pressure Gas Test and Manufacture

Kaneko Sangyo Co., Ltd.

Home page: <http://www.kaneko.co.jp>

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