Pressure & Flame Protection

Amal

Flame Arresters

WHY USE A FLAME ARRESTER

It could be a bolt of lightning.

It could be the tiniest spark.

The result would still be the same,
death, destruction and devastation.

Many processes involve the transportation of potentially flammable or explosive gases or vapours through piping systems.

When a confined flammable gas or vapour ignites, the flame will rush along the pipe at an alarming speed, with devastating results.
As the flame accelerates to 3000m/sec, what is going to stop this explosive fireball from destroying your plant and killing your staff?

The answer is an Amal flame arrester.

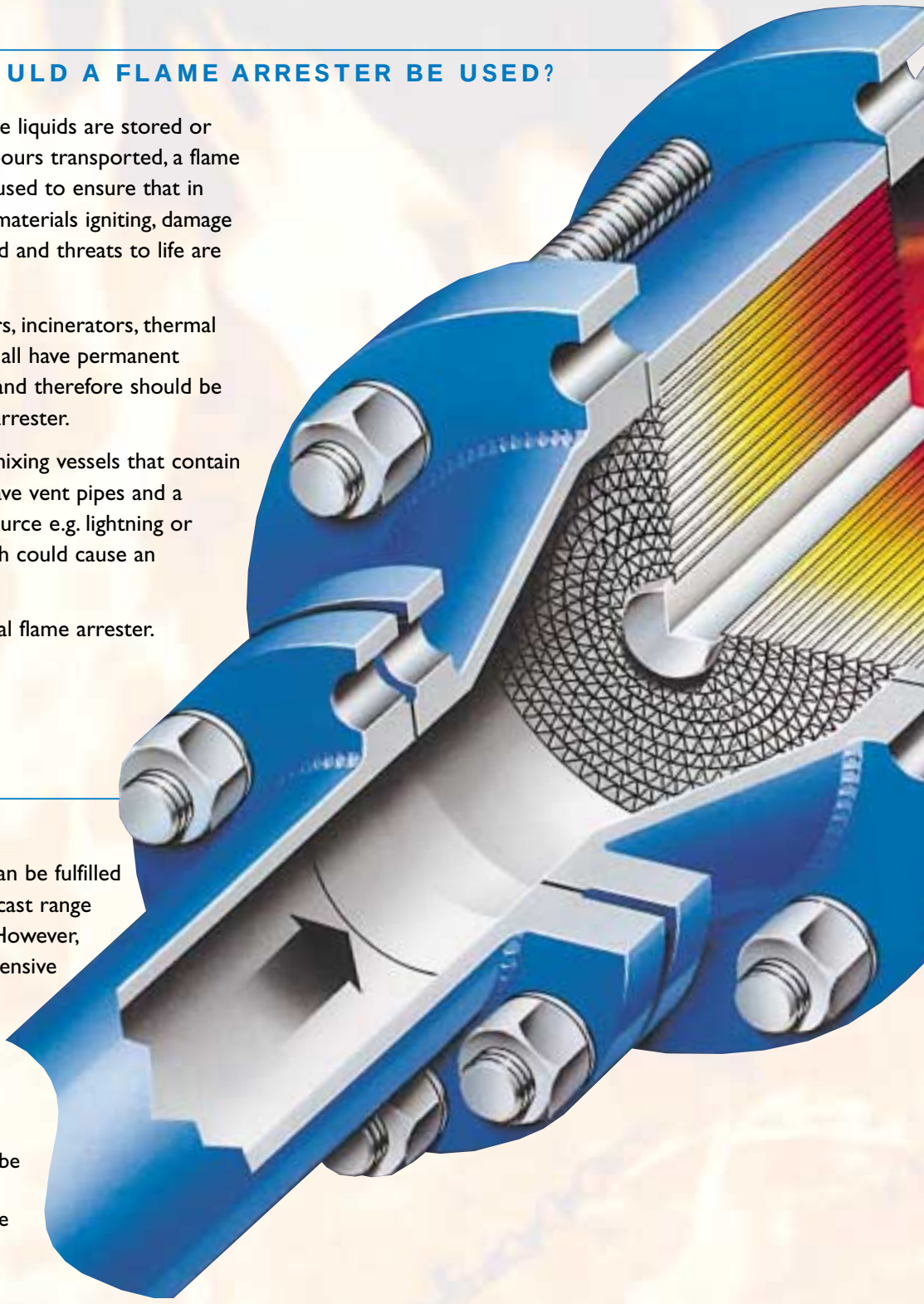
WHERE SHOULD A FLAME ARRESTER BE USED?

Wherever flammable liquids are stored or flammable gases/vapours transported, a flame arrester should be used to ensure that in the event of those materials igniting, damage to plant is minimised and threats to life are eliminated.

For example burners, incinerators, thermal oxidisers and flares all have permanent sources of ignition and therefore should be fitted with a flame arrester.

Storage tanks and mixing vessels that contain flammable liquids have vent pipes and a potential ignition source e.g. lightning or external flame which could cause an explosion.

Solution - fit an Amal flame arrester.



RANGE

Many applications can be fulfilled using our standard cast range of flame arresters. However, we also have an extensive fabricated range to meet the rigorous requirements of special applications.

Many types of Amal flame arresters may be used with the complementary range of Marvac pressure-vacuum valves.

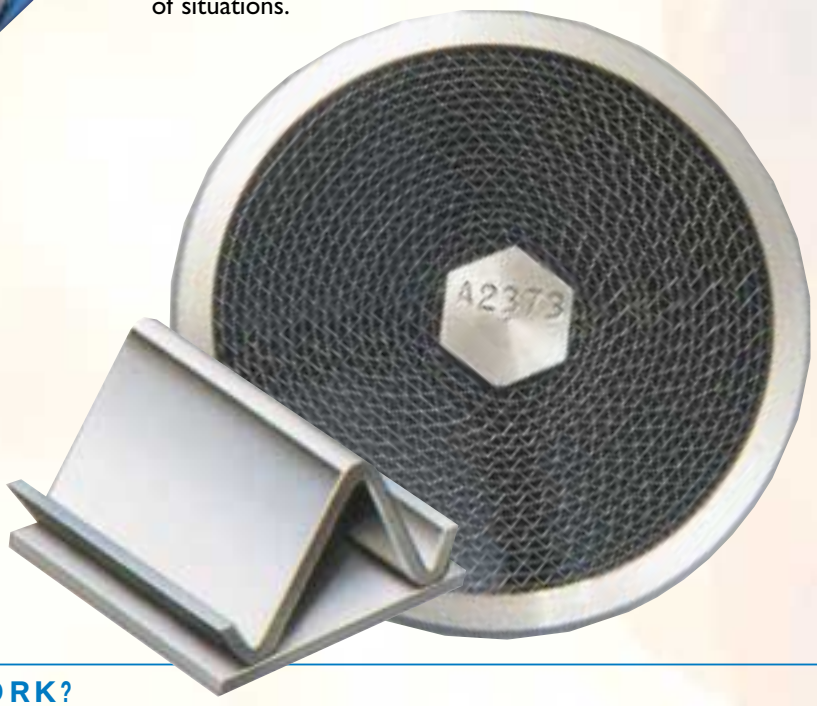
Amal

DO YOUR FLAME ARRESTERS WORK?

In this vital area of safety, it is comforting to know that at least one company is taking the trouble to test its products well beyond the accepted norms, we do it in order to justify one simple claim, 'Amal make flame arresters that work for all gas groups in the Process Industry,'...because anything less could be disastrous!

All Amal units are precision made to guarantee a consistent performance every time, and the special foil material just 0.05mm (0.002ins) thick is used to ensure an extremely low pressure drop through the arrester, which means low energy usage.

Amal are one of the few manufacturers who have their own test facilities, where customer's actual pipe configurations can be tested in Amal's flame and explosion laboratory. Computer controlled test instrumentation measures the flame speed and explosion pressure in test pipes, and with the help of closed circuit video monitoring, Amal's engineers can accurately assess the performance of different types of flame arresters in all sorts of situations.



HOW DO THEY WORK?

A flame arrester is a passive explosion protection device with no moving parts. At the core of each Amal flame arrester is a crimped metal element, which in section comprises a series of triangular passages or cells. All gases have a defined gap through which a flame will not pass; this is called the Maximum Experimental Safe Gap (MESG).

To quench a flame, and so prevent its onward passage, the height of the cells in the element should be below the MESG of the gas/vapour being handled.

The length of the cells in the element is also important. Once the flame enters the element, the cells will absorb heat from the burning gas, progressively reducing its temperature so that when exiting the arrester, the gases are cooled to below the point where auto ignition would occur.

After more than 80 years' of experience and extensive testing Amal has conclusive proof that the crimped metal concept of triangular cells is without doubt the most effective method of quenching potentially lethal or destructive flame fronts.

Amal

Flame Arresters

In-Line (Gas and Vapours)

Detonation (Unstable): For flames with supersonic speeds and shock wave.
Deflagration: For flames with sub-sonic speeds.

In-Line (Liquid)

Detonation: For use in filling and emptying lines on storage tanks.

Combination Flame Arresters/Breather Valves

A comprehensive range of Pressure/Vacuum Breather Valves is available to work in combination with the AMAL Flame Arresters to give added tank protection.

End-of-Line

Deflagration: For flames with sub-sonic speeds.
Can be supplied "Endurance burn proof".

CONTENTS

Flame Arresting Technology

Safety Systems UK Ltd.

DEFINITIONS

Flame arrester
A device fitted to the opening of an enclosure or to the connecting pipework of a system of enclosures and whose intended function is to allow flow but prevent the transmission of flame.

Flame arrester element
That portion of a flame arrester whose principal function is to prevent flame transmission.

Flame arrester housing
That portion of a flame arrester whose principal function is to provide a suitable enclosure for the flame arrester element, and to allow mechanical connections to other systems.

Stabilised burning
Steady burning of a flame stabilised at or close to the flame arrester element.

Short time burning (standard)
Stabilised burning for a specified time.

Endurance burning
Stabilised burning for an unspecified time.

Explosion
Abrupt oxidation or decomposition reaction producing an increase in temperature, pressure, or in both simultaneously.

Deflagration
Explosion propagating at subsonic velocity.

Detonation
Explosion propagating at supersonic velocity and characterised by a shock wave.

Stable detonation
A detonation is stable when it progresses through a confined system without significant variation of velocity and pressure characteristics.

NOTE: For atmospheric conditions and for the test mixtures and test configurations of EN12874:2001 typical velocities range between 1600m/s and 2200m/s.

Unstable detonation
A detonation is unstable during the transition of a combustion process from a deflagration into a stable detonation. The transition occurs in a limited spatial zone where the velocity of the combustion wave is not constant and where the explosion pressure is significantly higher than in a stable detonation.

NOTE: With regard to the test apparatus of EN12874:2001 the occurrence of unstable detonation is limited to pipe sections with a length of few pipe diameters. The approximate position of this transition zone depends on the details of the test apparatus and has to be determined for the individual case.

Maximum experimental safe gap (MESG)
The maximum gap of the joint between the two parts of the interior chamber of a test apparatus which, when the internal gas mixture is ignited and under specified conditions, prevents ignition of the external gas mixture through a 25mm long joint, for all concentrations of the tested gas or vapour in air. The MESG is a property of the respective gas mixture.

Bi-directional flame arrester
A flame arrester which stops flame transmission from both sides.

Deflagration flame arrester
A flame arrester designed to prevent the transmission of a deflagration. It may be end-of-line or in-line.

Detonation flame arrester
A flame arrester designed to prevent the transmission of a detonation. It may be end-of-line or in-line.

Endurance burning flame arrester
A flame arrester which prevents flame transmission during and after burning.

Liquid product detonation flame arrester
A flame arrester, in which the liquid product is used to form a liquid seal as a flame arrester and which prevents a flame transmission of a detonation.

Liquid seal
An arresting element formed by the liquid product.

End-of-line flame arrester
A flame arrester which is fitted with one pipe connection only.

In-line flame arrester
A flame arrester which is fitted with two pipe connections one on each side of the flame arrester element.

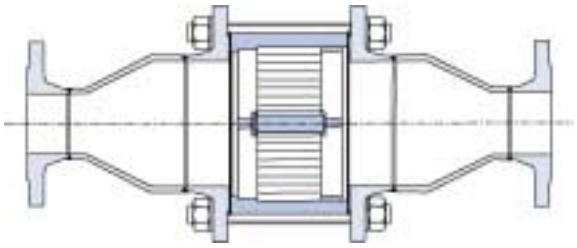
Pre-volume flame arrester
Pre-volume flame arresters prevent flame transmission from inside a vessel to the outside or into connected pipework. They may be end-of-line or in-line.

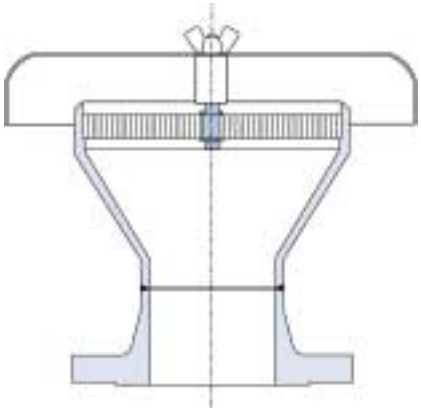
Integrated temperature sensor
A temperature sensor integrated into the flame arrester by the manufacturer to indicate a stabilised flame.

Types of Flame Arresters

DETONATION/DEFLAGRATION

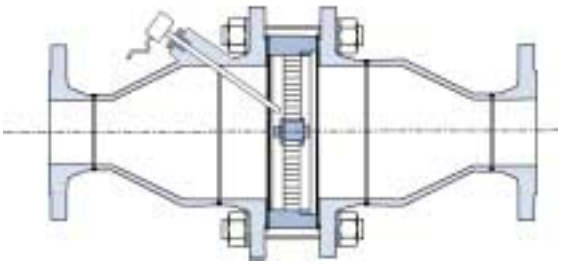
The recommended flame arrester will either be a deflagration unit used in gases with sub-sonic flame speeds or a detonation unit to handle supersonic speeds. Detonation units are always confined in the pipeline, whereas deflagration units can be located in the pipeline or at the end of the pipe-vent.





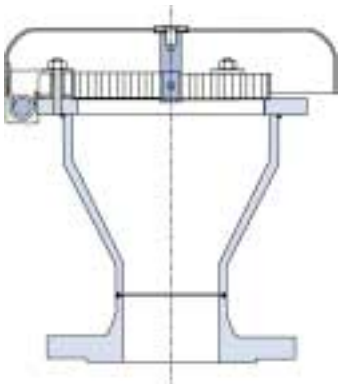
STABILISED BURNING IN-LINE

After a flash back, flames may stabilise and burn continually on the element surface, causing re-ignition of the gas on the protected side. Stabilised burning can be detected and controlled by the use of temperature sensors, that can be fitted close to the element to detect any abnormal rise in temperature. These can be interlocked to 'shut-off,' 'extinguishing' or other systems appropriate to the process.



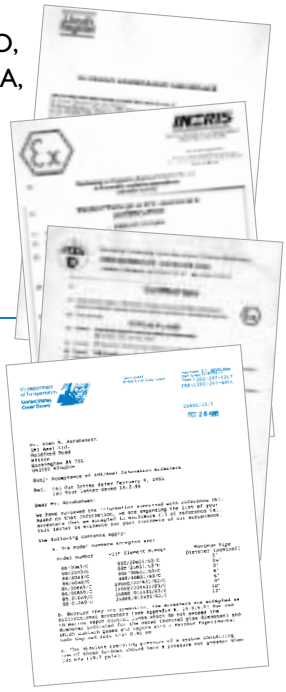
STABILISED BURNING END-OF-LINE

On end of line applications a different solution is required. A fusible link holds the weather cover in the normal position, during an endurance burn extreme temperatures are generated which ultimately cause the fusible link to melt, releasing the cover and allowing the heat to escape.



QUALITY AND INTERNATIONAL STANDARDS

Quality in such a critical area as explosion protection must be assured and Amal is certified to the highest international standard - ISO 9001:2000. In addition Amal Flame Arresters are designed, tested and certified to EN 12874:2001 in accordance with ATEX Directive 94/9/EC by INERIS and have also been tested in accordance with various standards and organisations such as: BS 7244:1990, USCG, IMO, FTZU, PTB, BAM, PROCHEM, CSA, HSE, GOST-R, NEMCO, and IBExU. Amal Flame Arresters are also designed and certified to the Pressure Equipment Directive (PED) 97/23/EC by Lloyds.



DESIGN CONSIDERATIONS

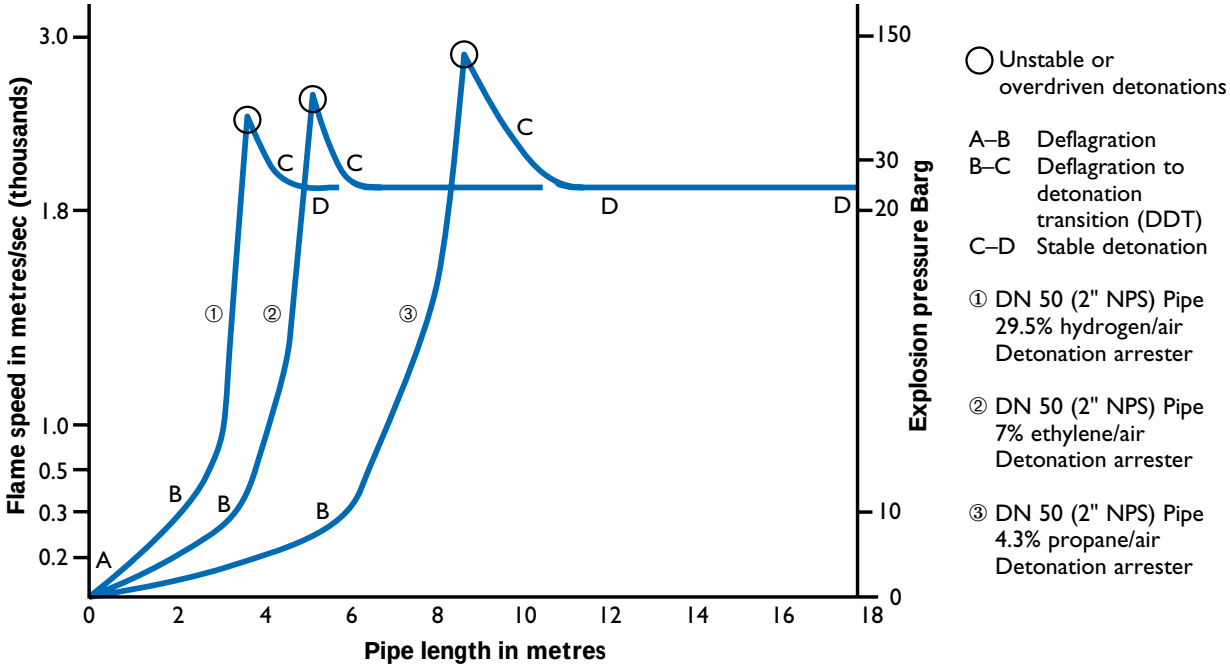
Due to the safety critical nature of the process, designing and specifying flame arresters requires great care and consideration. There is a wide range of volatile gaseous compounds and mixtures, each having its own unique combustion characteristics. Careful consideration also needs to be given to the corrosive nature of these compounds, as the element and housing of any flame arrester will need to be constructed of materials resistant to this corrosion.

MATERIALS

Amal manufacture elements from Stainless Steel 316L as standard, and have the capability to produce elements from many commercially available materials, including Hastelloy®, Nickel, Monel® and Tantulum.

FLAME SPEEDS

Effect of Straight Pipe on Flame Speeds and Explosion Pressure

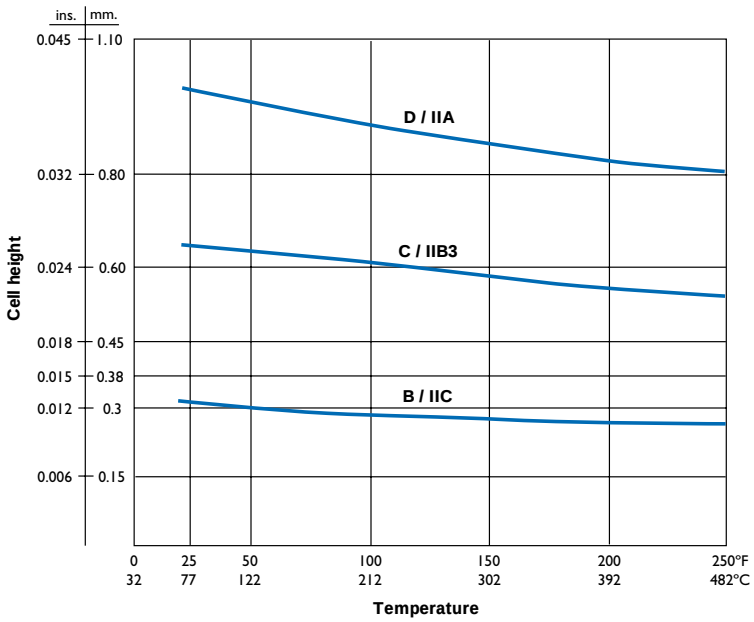


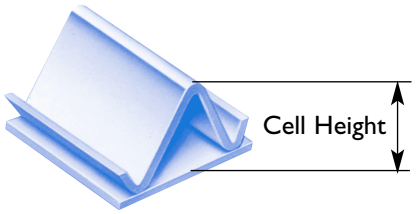
Flame speed can have a crucial role in the specifying of a flame arrester and flame speeds can be directly related to pipe length and diameter. While the flame characteristics can vary with different gases the basic pattern remains the same.

In the example ② above an ethylene/air mixture in a DN50/2" pipeline shows the classic profile of increasing flame speed and pressure up to a 3m pipe length, this is the deflagration zone with subsonic flame speeds, there then follows a rapid acceleration to a peak of 2300m/sec, called an overdriven or unstable detonation, where the flame speed is actually supersonic, this is the deflagration to detonation transition zone (DDT). At 6 metres the flame speed decays to a stable detonation speed of 1830m/sec.

All Amal detonation flame arresters are tested up to the level of over-driven detonation.

THE EFFECT OF TEMPERATURE



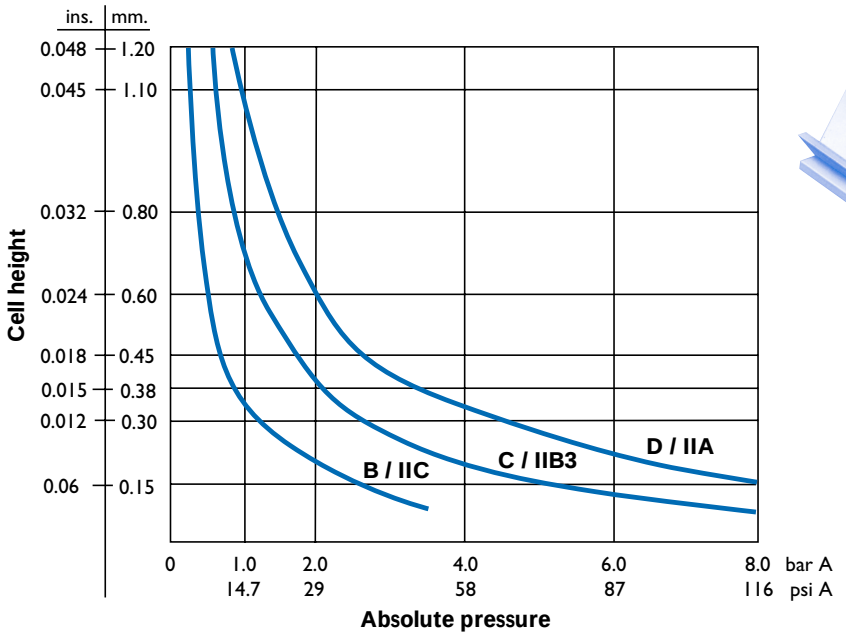


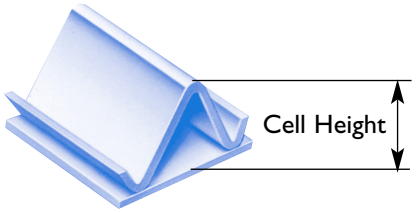
The operating temperature is important, as the safe gap (MESG) is affected by temperature, the higher the temperature the smaller the safe gap for the same gas.

Heat transfer is less efficient at higher temperatures, therefore more surface area may be required, hence longer cells and/or smaller cell heights.

The operating temperature is therefore important to ensure the correct arrester is specified.
e.g. although a gas may be IIA at ambient it may become equivalent to IIB3 at higher temperatures.

THE EFFECT OF PRESSURE





As can be seen the safe gap is significantly affected by pressure. An example is, at 2 barA the safe gap is approximately half of that at 1barA, and at 8 or 9 barA the safe gap is so small that manufacture of a suitable element is impractical.

Amal have tested IIB3 arresters up to 6 barA. High pressure applications are typically on pumps and compressors.

The operating pressure is defined as the pressure at which ignition of gas/vapour and air can occur.

CELL SELECTOR (For use under ambient conditions*)

END-OF-LINE

European Gas Group	US Gas Group	Cell Height mm	Width mm	Notes
IIA	D	0.8	19	
IIB1	C	0.8	19	
IIB2	C	0.6	19	
IIB3	C	0.6	19	
IIB	B	0.45	19	US all gases except Hydrogen
IIC	A	0.15	19	US plus Hydrogen

Hydrogen is "B" in the USA but treat as "A"

END-OF-LINE (Endurance Burn)

European Gas Group	US Gas Group	Cell Height mm	Width mm	Notes
IIA	D	0.8	19	Hydrocarbons only
IIB1	C	††	††	Refer to Factory
IIB2	C	††	††	Refer to Factory
IIB3	C	††	††	Refer to Factory
IIB	B	††	††	Refer to Factory
IIC	A	††	††	Refer to Factory

DEFLAGRATION

If mounted directly under a breather valve which cannot be piped away.

European Gas Group	US Gas Group	Cell Height mm	Width mm	Notes
IIA	D	0.8	19	
IIB1	C	0.8	19	
IIB2	C	0.6	19	
IIB3	C	0.6	19	
IIB	B	0.45	19	US all gases except Hydrogen
IIC	A	0.15	19	US plus Hydrogen

DEFLAGRATION

If mounted in-line or under a breather valve which can be piped away.
Hence the length of pipe between the ignition source and flame arrester is important.‡

European Gas Group	US Gas Group	Up to DN65 Up to 2.5" Cell Height mm	Width mm	DN80 to DN350 3" to 14" Cell Height mm	Width mm	DN400 & larger 16" & larger Cell Height mm	Width mm	Notes
IIA	D	0.8	19	0.8	38	0.8	76	
IIB1	C	0.6	19	0.6	38	0.6	76	
IIB2	C	0.6	19	0.6	38	0.6	76	
IIB3	C	0.6	19	0.45	38	0.45	76	
IIB	B	0.45	19	0.38	38	0.38	76	US all but Hydrogen
IIC	A	0.15	19	0.15	38	0.15	76	US plus Hydrogen

**Ambient conditions are up to 60°C and up to 1.1bar a. Cell configurations are available for higher temperatures and pressures, refer to factory.*

†† Refer to factory.

‡ For group IIA, IIBI, IIB2, IIB3, IIB, and IIC, maximum length (L) to ignition shall not exceed 50 x pipe diameters (50 x D). Refer to factory for actual L/D ratios.

CELL SELECTOR (For use under ambient conditions*)

DEFLAGRATION (Endurance Burn - Bio Gas only)

European Gas Group	US Gas Group	DN50 to DN150 2" to 6" Cell Height mm	Width mm	DN200 8" Cell Height mm	Width mm
I	D	0.6	19	0.6	38

DETONATION

Pipe length to ignition source is not important.

European Gas Group	US Gas Group		up to DN20 up to 0.75"	DN25 to DN40 1" to 1.5"	DN50 to DN80 2" to 3"	DN100 to DN150 4" to 6"	DN200 8"	DN250 to DN300 10" to 12"	DN350 to DN400 14" to 16"	DN450 & above 18" & above
IIA	D	Cell Ht mm	0.6	0.6	0.45	0.45	0.45	0.45	0.45	0.45
		Width mm	76	76	76	76	76	152	152	152
IIB1 IIB2 IIB3	C	Cell Ht mm	0.45	0.45	0.38	0.38	0.38	0.38	0.38	††
		Width mm	76	76	76	76	114	190	190	††
IIB	–	Cell Ht mm	0.3	0.3	0.3	0.3	††	††	††	††
		Width mm	76	76	76	76	††	††	††	††
IIC	B & A	Cell Ht mm	0.15	0.15	0.15	0.15	††	††	††	††
		Bi-Direction Width mm	76	76	76	152	††	††	††	††

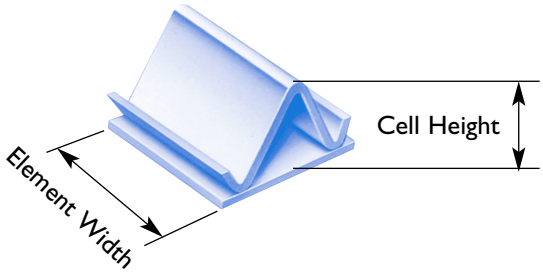
DETONATION (US Coast Guard)

Pipe length to ignition source is not important.

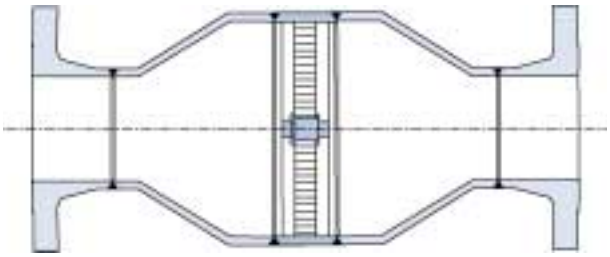
	US Coast Guard Gas Group		up to DN20 up to 0.75"	DN25 to DN100 1" to 4"	DN125 5"	DN150 6"	DN200 8"	DN250 to DN350 10" to 16"	DN450 & above 18" & above
	D	Cell Ht mm	0.6	0.45	0.45	0.45	0.45	0.45	0.45
		Width mm	76	76	76	152	152	152	152
	C	Cell Ht mm	0.38	0.38	0.45	0.45	0.38	0.38	††
		Width mm	76	76	152	152	114	190	††
	B & A	Cell Ht mm	††	††	††	††	††	††	††
		Bi-Direction Width mm	††	††	††	††	††	††	††

Element Width	Number of Elements
19 = 19mm (0.75")	1 x 19
38 = 38mm (1.5")	1 x 38
76 = 76mm (3.0")	1 x 76
114 = 114mm (4.5")	3 x 38
152 = 152mm (6.0")	2 x 76
190 = 190mm (7.5")	1 x 38 2 x 76

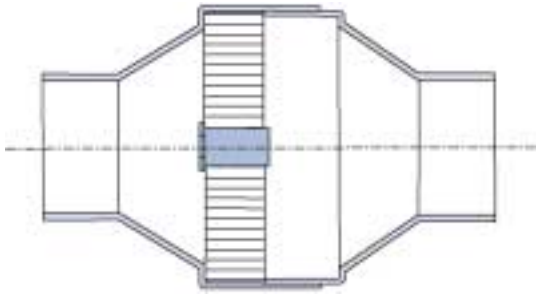
Nominal Cell Height
80 = 0.80mm (0.032")
60 = 0.60mm (0.024")
45 = 0.45mm (0.018")
38 = 0.38mm (0.015")
30 = 0.30mm (0.012")
15 = 0.15mm (0.006")



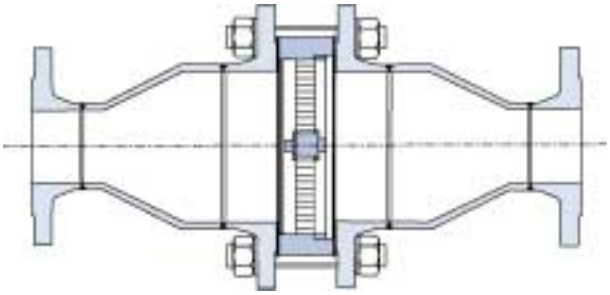
IN-LINE MODEL DIAGRAMS



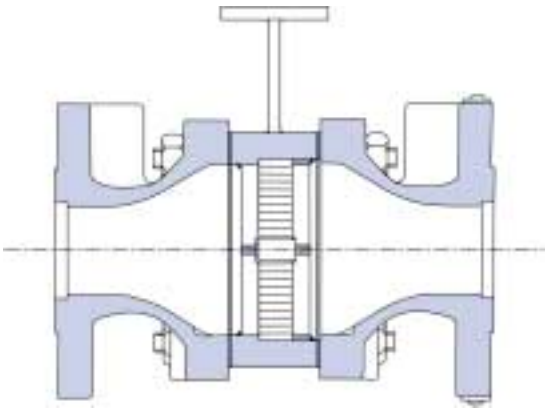
LIR Flanged* (LF Version)



LIR (LS Version)

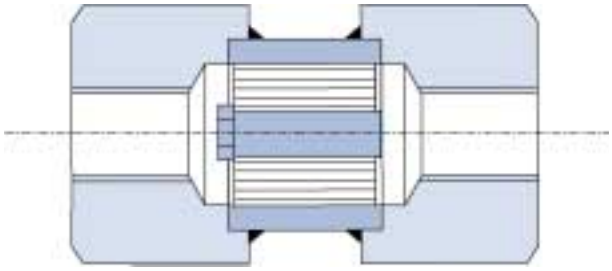


IRQ* (DF Version)

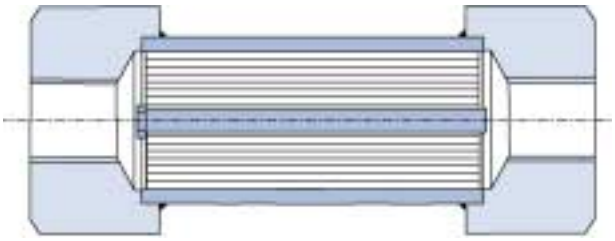


CIR (CI Version)

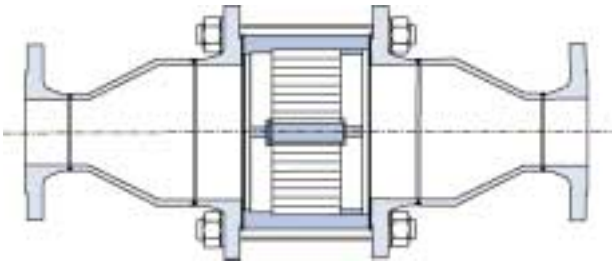
*Eccentric variants are available



LIR Screwed (LR Version)



LIRD Screwed (DS Version)



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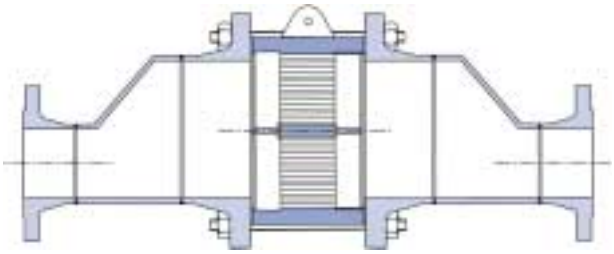

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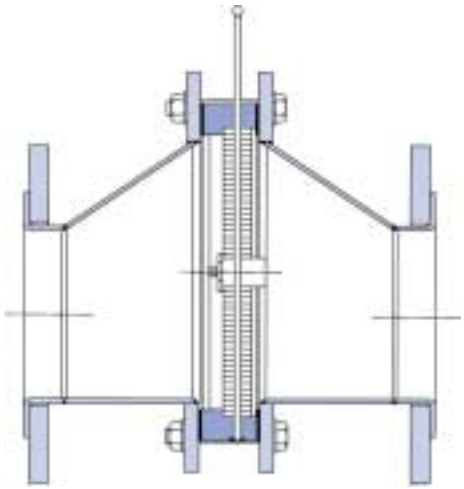
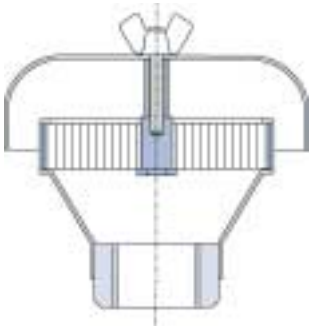
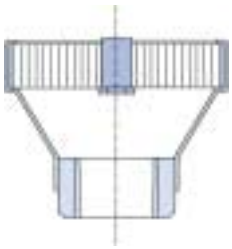


IRE (DF Version)

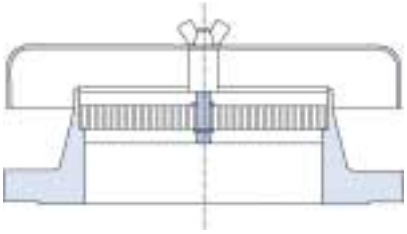
END-OF-LINE MODEL DIAGRAMS



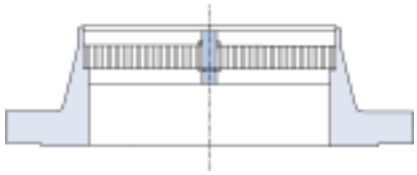
NPC Screwed (NC Version)



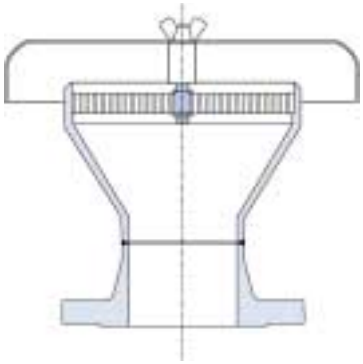
NP Screwed (NP Version)



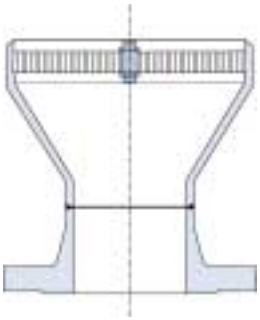
LEFC (LC Version)



LEF (LE Version)



LERC (LC Version)



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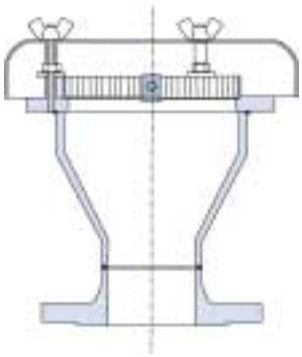
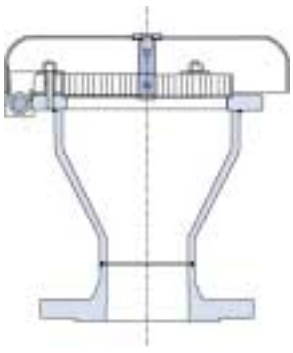
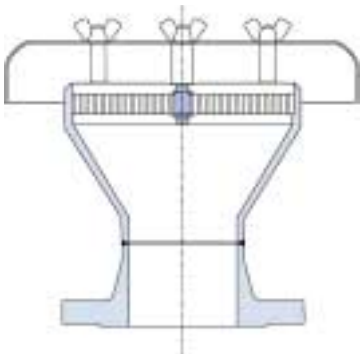


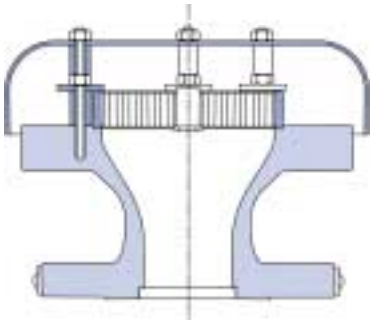
ERQ (EC Version)



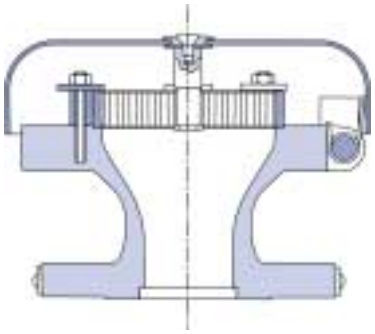
ERQB Endurance Burn (EC Version)



LERC Screwed (LC Version)



CER (CE Version)



CERB Endurance Burn (CE Version)

FIGURE NUMBERING SYSTEM

Model		Nominal (mm) Connection Dia.		Element Code		Nominal (mm) Element Dia.		Nominal (mm) Element Width		Nominal Cell Height
ERQ	/	50	/	EC	/	100	/	19	/	*80

**Note: Nominal cell size - 80 = nominal 0.80mm (0.032") etc.*

	Type	Element Model	Element code	Connections	Construction	Element	Burn type	Weather Cover	Pipe size range Metric	Pipe size range Imperial	Element size range Metric	Element size range Imperial
In-Line	Deflagration	CIR	CI	Flanged	Standard	Replaceable	Standard	Not req'd	DN50 to DN300	2" to 12"	DN100 to DN600	4" to 24"
	Deflagration	LIR	LR	Screwed	Light weight	Fixed	Standard	Not req'd	DN6 to DN40	¼" to 1½"	DN25 to DN50	1" to 2"
	Deflagration	LIR/ LIRE	LF	Flanged or screwed	Light weight	Fixed	Standard	Not req'd	Flanged DN15 to DN400 Screwed DN50 to DN80	Flanged ½" to 16" Screwed 2" to 3"	DN40 to DN600	1½" to 24"
	Deflagration	LIR	LS	Flanged, screwed or plain	Light weight	Fixed	Standard	Not req'd	Flg DN20 to DN150 Scd DN20 to DN50 Pln DN20 to DN150	Flg ¾" to 6" Scd ¾" to 2" Pln ¾" to 6"	DN50 to DN300	2" to 12"
	Deflagration	IRQ/ IRQE	DF	Flanged or screwed	Standard	Replaceable	Standard	Not req'd	Flanged DN15 to DN1000 Screwed DN15 to DN80	Flanged ½" to 40" Screwed ½" to 3"	DN25 to DN2000	1" to 80"
	Deflagration	IRE	DF	Flanged	Light weight	Replaceable	Endurance	Not req'd	DN40 to DN200	1½" to 8"	DN50 to DN250	2" to 10"
	Detonation	LIRD	DS	Screwed	Standard	Fixed	Standard	Not req'd	DN6 to DN40	¼" to 1½"	DN25 to DN50	1" to 2"
	Detonation	LIRD/ LIRDE	DR	Flanged	Standard	Fixed	Standard	Not req'd	DN15 to DN150	½" to 6"	DN40 to DN300	1½" to 12"
	Detonation	IRDB/ IRDBE	DT	Flanged or screwed	Standard	Replaceable	Standard	Not req'd	Flanged DN15 to DN600 Screwed DN15 to DN80	Flanged ½" to 24" Screwed ½" to 3"	DN25 to DN2000	1" to 80"
End-of-Line	Deflagration	NP	NP	Screwed & plain	Light weight	Fixed	Standard	None	Screwed DN6 to DN50 Plain DN32, 40 & 80	Screwed ¼" to 2" Plain 1¼", 1½", 3"	DN50, 80 & 100	2", 3" & 4"
	Deflagration	NPC	NC	Screwed & plain	Light weight	Fixed	Standard	Fitted	Screwed DN6 to DN50 Plain DN32, 40 & 80	Screwed ¼" to 2" Plain 1¼", 1½", 3"	DN50, 80 & 100	2", 3" & 4"
	Deflagration	LER	LE	Screwed	Light weight	Fixed	Standard	None	DN6 to DN50	¼" to 2"	DN25 to DN100	1" to 4"
	Deflagration	LER	LE	Flanged	Light weight	Fixed	Standard	None	DN15 to DN400	½" to 16"	DN25 to DN600	1" to 24"
	Deflagration	LERC	LC	Screwed	Light weight	Fixed	Standard	Fitted	DN6 to DN50	¼" to 2"	DN25 to DN100	1" to 4"
	Deflagration	LERC	LC	Flanged	Light weight	Fixed	Standard	Fitted	DN15 to DN400	½" to 16"	DN25 to DN600	1" to 24"
	Deflagration	LEF	LE	Flanged	Light weight	Fixed	Standard	None	DN40 to DN400	1½" to 16"	DN40 to DN400	1½" to 16"
	Deflagration	LEFC	LC	Flanged	Light weight	Fixed	Standard	Fitted	DN40 to DN400	1½" to 16"	DN40 to DN400	1½" to 16"
	Deflagration	ERQ	EC	Screwed	Standard	Replaceable	Standard	Fitted	DN15 to DN50	½" to 2"	DN50 to DN100	2" to 4"
	Deflagration	ERQ	EC	Flanged	Standard	Replaceable	Standard	Fitted	DN15 to DN600	½" to 24"	DN50 to DN800	2" to 32"
	Deflagration	ERQB	EC	Screwed	Standard	Replaceable	Endurance	Sprung	DN15 to DN50	½" to 2"	DN50 to DN100	2" to 4"
	Deflagration	ERQB	EC	Flanged	Standard	Replaceable	Endurance	Sprung	DN15 to DN150	½" to 6"	DN50 to DN200	2" to 8"
	Deflagration	ERQB	EC	Flanged	Standard	Replaceable	Endurance	Sprung	DN200 to DN350	8" to 14"	DN200 multiples	8" multiples
	Deflagration	CER	CE	Flanged	Standard	Replaceable	Standard	Fitted	DN50 to DN300	2" to 12"	DN100 to DN600	4" to 24"
	Deflagration	CERB	CE	Flanged	Standard	Replaceable	Endurance	Sprung	DN50 to DN100	2" to 4"	DN100 to DN200	4" to 8"

GAS GROUPS

Material Name	Formula	MW	Vapour Density relative to air (air=1)	Flash Point (°C)	Auto-Ignition Point (°C)	Boiling Point (°C)	Melting Point (°C)	Flammable Range (Vol. %)	European Gas Group	US Gas Group
Acetaldehyde	C_2H_4O	44.06	1.52	-38	175	21.1	-123.5	4.0 to 60	IIA	D
Acetic Acid	$C_2H_4O_2$	60.06	2.07	39	427	118	16.6	5.0 to 16.0	IIA	D
Acetic Anhydride	$C_4H_6O_3$	102.1	3.53	49	316	140	-73	2.7 to 10.3	IIA	D
Acetone	C_3H_6O	58.08	2.00	-18	465	56.2	-95.4	2.5 to 13.0	IIA	D
Acetonitrile	C_2H_3N	41.06	1.41	12	524	82	-46	3.0 to 16.0	IIA	D
Acetyl Chloride	C_2H_3OCl	78.5	2.70	5	390	51	-112	7.3 to 19.0	IIA	D
Acetyl Acetone	$C_5H_8O_2$	100.1	3.45	34	340	140	-23	2.4 to 11.6	IIA	D
Acetylene	C_2H_2	26.04	0.90	Gas	335	-85	-81	2.5 to 100	IIC*	A
Acrolein	C_3H_4O	56.06	1.94	-26	235	52.5	-87	2.8 to 31.0	IIB3	C
Acrylic Acid	$C_3H_4O_2$	72.06	2.49	54	360	141	13	2.0 to 8.0	IIA	D
Acrylonitrile	C_3H_3N	53.06	1.83	-1	481	77	-84	3.0 to 17.0	IIB1	C
Allyl Alcohol	C_3H_6O	58	2.00	21	378	97	-129	2.5 to 18	IIB2	C
Allyl Bromide	C_3H_5Br	121	4.19	-2	294	71	-119	4.4 to 7.3	IIA	D
Allyl Chloride	C_3H_5Cl	76.5	2.65	-32	390	45	-135	2.9 to 11.2	IIA	D
Allylene	C_3H_4	40.06	1.38	Gas		-23	-103	2.4 to 11.7	IIB3	C
Ammonia	NH_3	17.04	0.59	Gas	651	-33	-78	15 to 28	IIA	D
n-Amyl Acetate	$C_7H_{14}O_2$	130.2	4.50	38	379	149	-71	1.1 to 7.5	IIA	D
n-Amyl Alcohol	$C_5H_{12}O$	88.2	3.05	33	300	133	-8	1.2 to 10.0	IIA	D
Aniline	C_6H_7N	93.13	3.22	76	615	185	-6	1.2 to 11.0	IIA	D
Anisole	C_7H_8O	108.1	3.74	52	475	155	-37		IIB2	D
Benzene	C_6H_6	78.12	2.70	-11	498	80	5.5	1.3 to 8.0	IIA	D
Benzonitrile	C_6H_5CN	103.1	3.57	72	550	190	-13	1.4 to 7.2	IIA	D
Benzyl Acetate	$C_9H_{10}O_2$	150.2	5.20	90	460	212	-51	0.9 to 8.4	IIA	D
Benzaldehyde	C_6H_5CHO	106.1	3.67	62	190	179	-26	1.4 to 13.5	IIA	D
Benzyl Chloride	C_7H_7Cl	126.5	4.38	67	585	179	-43	1.1 to 14.0	IIA	D
Bromobenzene	C_6H_5Br	157	5.43	51	566	156	-31	6.0 to 36.5	IIA	D
1-Bromobutane	C_4H_9Br	137	4.74	14	265	104	-112	2.8 to 6.6	IIA	D
Bromoethane	C_2H_5Br	109	3.77	-20	511	38.4	-119	6.8 to 11.0	IIA	D
1,3-Butadiene	C_4H_6	54.1	1.87	Gas	414	-4.4	-109	1.1 to 16.3	IIB2	B
n-Butane	C_4H_{10}	58.1	2.01	Gas	287	-0.5	-138	1.9 to 8.5	IIA	D
1-Butanol (n-Butanol)	$C_4H_{10}O$	74.1	2.56	29	340	118	-89	1.4 to 11.3	IIB1	D
2-Butanol	$C_4H_{10}O$	74.1	2.56	24	390	99	-89	1.7 to 9.8	IIA	D
1-Butene	C_4H_8	56.12	1.94	Gas	384	-6	-185	1.6 to 9.3	IIA	D
2-Butene	C_4H_8	56.12	1.94	Gas	313	1	-140	1.7 to 9.3	IIB1	D
n-Butyl Acetate	$C_6H_{12}O_2$	116.2	4.02	22	425	126	-77	1.7 to 7.6	IIA	D
Butyl Acrylate	$C_7H_{12}O_2$	128.2	4.43	37	267	149	-64	1.3 to 9.9	IIB1	D
Butyl Chloride	C_4H_9Cl	92.58	3.20	-9	240	78	-123	1.8 to 10.1	IIA	D
n-Butylamine	$C_4H_{11}N$	73.14	2.53	-12	312	78	-49	1.7 to 9.8	IIA	D
n-Butyraldehyde	C_4H_8O	72.12	2.49	-7	230	76	-96	2.5 to 12.5	IIA	D
Carbon Disulphide	CS_2	76.14	2.63	-30	80	46.1	-111	1.3 to 50.0	IIC*	B
Carbon Monoxide	CO	28.01	0.97	Gas	609	-191	-205	12.5 to 74.2	IIB3	C
Chlorobenzene	C_6H_5Cl	112.6	3.89	28	593	132	-46	1.3 to 7.1	IIA	D
1-Chlorobutane	C_4H_9Cl	92.58	3.20	-9	240	78	-123	1.8 to 10.1	IIA	D
Chloroethanol	C_2H_5OCl	80.5	2.79	60	425	130	-67	4.9 to 16	IIA	D
Chloromethane - (Methyl Chloride)	CH_3Cl	50.49	1.75	-45	632	-24	-97	8.1 to 17.2	IIA	D
1-Chloropropane	C_3H_7Cl	78.54	2.72	-18	520	47	-123	2.6 to 11.1	IIA	D
Chloroethane - (Ethyl Chloride)	C_2H_5Cl	64.5	2.23	-50	519	12	-139	3.8 to 15.4	IIA	D
m-Cresol	C_7H_8O	108.2	3.74	86	626	202	11	1.1 to 1.4	IIA	D
Crotonaldehyde	C_4H_6O	70.09	2.43	13	232	102	-76.5	2.1 to 15.5	IIB2	C
Cumene	C_9H_{11}	120.2	4.16	36	424	152	-96	0.9 to 6.5	IIA	D
Cyclohexane	C_6H_{12}	84.16	2.91	-18	260	81	6.5	1.3 to 8.4	IIA	D
Cyclohexene	C_6H_{10}	82.15	2.84	-20	244	83	-104		IIA	D
Cyclopentane	C_5H_{10}	70.15	2.43	-37	361	49	-94	1.1 to 8.7	IIA	D
Cyclopropane	C_3H_6	42.08	1.46	Gas	498	-33	-128	2.4 to 10.4	IIA	C
n-Decane	$C_{10}H_{22}$	142.3	4.92	46	210	174	-30	0.8 to 5.4	IIA	D
n-Decanol	$C_{10}H_{22}O$	158.3	5.48	82	288	231	7		IIA	D
Dekalin	$C_{10}H_{18}$	138.1	4.78	58	250	194	-43	0.7 to 49	IIA	D
n-Dibutyl Amine	$C_8H_{19}N$	129.3	4.47	47	312	159	-60		IIA	D
1,2-Dichlorobenzene	$C_6H_4Cl_2$	147.0	5.07	66	648	180	-17	2.2 to 9.2	IIA	D
1,2-Dichloroethane	$C_2H_4Cl_2$	98.96	3.42	13	413	83	-35	6 to 16	IIA	D
1.2-Dichloroethylene	$C_2H_2Cl_2$	96.95	3.35	2	460	60	-50	5.6 to 12.8	IIA	D

GAS GROUPS

Material Name	Formula	MW	Vapour Density relative to air (air=1)	Flash Point (°C)	Auto-Ignition Point (°C)	Boiling Point (°C)	Melting Point (°C)	Flammable Range (Vol. %)	European Gas Group	US Gas Group
1.2-Dichloropropane	$C_3H_6Cl_2$	113	3.91	16	557	96	-100	3.4 to 14.5	IIA	D
Dicyclopentadiene	$C_{10}H_{12}$	132.2	4.57	33	680	170	33	0.8 to 6.3	IIB1	D
Diethyl Amine	$C_4H_{11}N$	73.14	2.53	-28	312	55	-50	1.8 to 10.1	IIA	D
Diethylene Glycol	$C_4H_{10}O_3$	106.1	3.67	124	229	245	-10	1.8 to 12.2	IIA	D
Diethylene Glycol - Monoethyl Ether	$C_6H_{14}O_3$	134.2	4.64	96	204	196	-76		IIB1	
Diethylene Glycol - Monomethyl Ether	$C_5H_{12}O_3$	120.2	4.16	93	215	193	-69	1.6 to 18.1	IIB1	
Diethyl Ether	$C_4H_{10}O$	74.14	2.56	-45	160	35	-116	1.7 to 48	IIB1	C
Diethyl Ketone	$C_5H_{10}O$	86.1	2.98	7	425	102	-42	1.6 to 7.7	IIB1	
Dimethyl Ether	C_2H_6O	46.08	1.59	Gas	350	-25	-141	3.4 to 26.7	IIB2	D
Dimethylamine	C_2H_7N	45.1	1.56	Gas	402	7	-92	2.8 to 14.4	IIA	D
Dimethyl Formamide	C_7H_7NO	73.1	2.53	58	445	153	-60	2.2 to 15.2	IIA	D
Dimethyl Sulphide	C_2H_6S	62.1	2.15	-49	205	37	-98	2.2 to 19.7	IIA	
Di-isopropyl Ether	$C_6H_{14}O$	102.2	3.54	-28	443	69	-60	1.4 to 7.9	IIA	D
1,4-Dioxane	$C_4H_8O_2$	88.11	3.05	12	180	101	12	2.0 to 22.0	IIB3	C
Diketene	$C_4H_4O_2$	84.1	2.91	33	275	127	-7	2.0 to 11.7	IIB3	
Epichlorhydrin	C_3H_5ClO	92.5	3.20	34	385	116	-48	2.3 to 34.4	IIB3	
Ethane	C_2H_6	30.1	1.04	Gas	472	-89	-183	3.0 to 12.5	IIA	D
Ethanol	C_2H_6O	46.1	1.59	13	363	79	-117	3.3 to 19.0	IIB1	D
Ethanolamine	C_2H_7NO	61.1	2.11	85	410	85	171	5.5 to 17.0	IIA	D
2-Ethoxyethanol	$C_4H_{10}O_2$	90.1	3.12	44	235	135	-70	1.7 to 15.6	IIB2	C
Ethyl Acetate	$C_4H_8O_2$	88.1	3.05	-4	427	77	-84	2.2 to 11.5	IIA	D
Ethyl Acetoacetate	$C_4H_{10}O_3$	130.1	4.50	70	295	181	-45	1.0 to 54.0	IIA	D
Ethyl Acrylate	$C_5H_8O_2$	100.1	3.45	9	345	99	-71	1.4 to 14.0	IIB1	C
Ethyl Formate	$C_2H_6O_2$	74.1	2.56	-20	440	53	-80	2.7 to 16.5	IIA	D
Ethyl Mercaptan	C_2H_6S	62.13	2.15	-48	299	36	-144	2.8 to 18.2	IIA	D
Ethyl Methacrylate	$C_6H_{10}O_2$	114.2	3.95	20	393	117	-75	1.8 to ?	IIA	D
Ethylbenzene	C_8H_{10}	106.2	3.67	18	432	136	-95	1.0 to 6.7	IIA	D
Ethylene	C_2H_4	28	0.97	Gas	490	-104	-169	2.70 to 36.0	IIB3	C
Ethylenediamine	$C_2H_8N_2$	60.1	2.08	34	385	116	-8.5	2.7 to 16.6	IIA	D
Ethylene Glycol	C_2H_6O	62.1	2.15	111	398	198	-13	3.2 to 15.3	IIB1	
Ethylene Glycol - Monomethyl Ether	$C_3H_8O_2$	76.1	2.63	39	285	125	-85	1.8 to 14	IIB2	
Ethylene Oxide	C_2H_4O	44.1	1.53	Gas	429	11	-111	3.0 to 100	IIB	
Formaldehyde	CH_2O	30	1.04	Gas	430	-20	-92	7.0 to 73	IIB	C
Formic Acid	CH_2O_2	46	1.59	69	520	101	8	18 to 51	IIA	D
Furan	C_4H_4O	68.1	2.36	-35		31	-86	2.3 to 14.3	IIB3	C
Furfural	$C_5H_4O_2$	96.1	3.32	60	315	162	-36.5	2.1 to 19.3	IIB1	C
Gasoline			~3 to 4	250		20-200		1.3 to 7.1	IIA	D
Heptane	C_7H_{16}	100.2	3.47	-4	285	98	-91	1.1 to 6.7	IIA	D
Hexane	C_6H_{14}	86.2	2.98	-22	225	69	-95	1.1 to 7.5	IIA	D
2-Hexanol	$C_6H_{14}O$	102.2	3.54	41					IIA	D
2-Hexanone	$C_6H_{12}O$	100.2	3.47	23	423	126	-57	1.2 to 8.0	IIA	
1-Hexene	C_6H_{12}	84.2	2.91	-26	253	63	-140	1.2 to 6.9	IIA	
Hydrogen	H_2	2	0.07	Gas	560	-253		4.0 to 76	IIC	B
Hydrogen Sulphide	H_2S	34.1	1.18	Gas	260	-60	-85	4.3 to 46	IIB1	C
Isoprene	C_5H_8	68.1	2.36	-54	220	34	-146	1.5 to 8.9	IIB2	
Methane	CH_4	16	0.55	Gas	537	-161	-183	5.0 to 15.0	IIA	D
Methanol	CH_4O	32	1.11	12	464	65	-98	5.5 to 44.0	IIA	D
2-Methoxyethanol	$C_3H_8O_2$	76.1	2.63	39	285	125	-85	1.8 to 14	IIB2	
Methyl Acetate	$C_3H_6O_2$	74.1	2.56	-13	455	57	-98	3.1 to 16.0	IIA	D
Methyl Bromide	CH_3Br	94.9	3.28	Gas	537	4	-94	10 to 16	IIA	
Methyl Ethyl Ketone	C_4H_8O	72.1	2.49	-9	505	80	-86	1.8 to 11.5	IIB1	C
Methyl Formate	$C_2H_4O_2$	60.1	2.08	-19	449	32	-100	5.0 to 23.0	IIA	D
Methyl Mercaptan	CH_4S	48.1	1.66	-18		6	-123	3.9 to 21.8	IIA	
Methyl Methacrylate	$C_5H_8O_2$	100.1	3.46	10	421	101	-48	1.7 to 12.5	IIA	D
Methyl Tertiarybutyl Ether	$C_5H_{12}O$	88.2	3.05	-28	375	55	-109	1.6 to 15.1	IIA	
Methylene Chloride	CH_2Cl_2	84.9	2.94		556	40	-95	12.0 to 25.0	IIA	D

GAS GROUPS

Material Name	Formula	MW	Vapour Density relative to air (air=1)	Flash Point (°C)	Auto-Ignition Point (°C)	Boiling Point (°C)	Melting Point (°C)	Flammable Range (Vol. %)	European Gas Group	US Gas Group
Naphthalene	$C_{10}H_8$	128.2	4.43	79	567	218	80	0.9 to 5.9	IIA	D
Nitrobenzene	$C_6H_5NO_2$	123.1	4.26	88	480	211	6	1.8 to 40	IIA	D
Nitroethane	$C_2H_5NO_2$	75.1	2.60	28	414	114	-50		IIB2	C
Nitromethane	CH_3NO_2	61.04	2.11	35	417	101	-29	7.3 to 63	IIA	D
1-Nitropropane	$C_3H_7NO_2$	89.1	3.08	36	421	132	-108		IIB2	C
Nonane	C_9H_{20}	128.2	4.43	31	205	151	-51	0.8 to 2.9	IIA	D
n-Octane	C_8H_{18}	114.2	3.95	13	220	126	-57	1.0 to 6.5	IIA	D
1-Octene	C_8H_{16}	112.2	3.88	21	230	121	-102	0.7 to 3.9	IIA	D
2.4-Pentadione	$C_5H_8O_2$	100.1	3.46	34	340	140	-23	2.4 to 11.6	IIA	
n-Pentane	C_5H_{12}	72.2	2.49	-49	309	36	-129	1.5 to 7.8	IIA	D
1-Pentanol	$C_5H_{12}O$	88.2	3.05	33	300	138	-79	1.2 to 10.5	IIA	D
Phenol	C_6H_6O	94.1	3.26	79	715	182	43	1.4 to 10.0	IIA	D
1-Propanol - (propyl alcohol)	C_3H_8O	60.1	2.08	15	371	97	-127	2.1 to 13.5	IIB1	D
2-Propanol - (iso-propyl alcohol)	C_3H_8O	60.1	2.08	12	456	83	-90	2.0 to 12.0	IIA	
n-Propyl Acetate	$C_5H_{10}O_2$	102.1	3.53	14	450	102	-92	2.0 to 8.0	IIA	D
n-Propylamine	C_3H_9N	59.1	2.04	-37	317	48	-83	2.0 to 10.4	IIA	D
Propylene	C_3H_6	42.1	1.46	Gas	460	-48	-185	2.4 to 10.3	IIA	D
Propylene Glycol - Monomethyl Ether	$C_4H_{10}O_2$	90.1	3.12	38	270	120	-96	1.9 to 13.1	IIB1	
Propylene Oxide	C_3H_6O	58.1	2.01	-37	449	34	-104	2 to 38.5	IIB3	C
Pyridine	C_5H_5N	79.1	2.74	20	482	115	-42	1.8 to 12.4	IIA	D
Styrene	C_8H_8	104.1	3.60	31	490	145	-31	0.9 to 6.8	IIA	D
Tetrahydrofuran	C_4H_8O	72.1	2.49	-14.5	321	66	108.5	2.0 to 11.8	IIB1	C
Tetrahydrofurfuryl Alcohol	$C_5H_{10}O_2$	102.1	3.53	75	282	175	-80	1.5 to 9.7	IIB2	C
Tetrahydrothiophene	C_4H_8S	88.2	3.05	12	200	119	-96	1.1 to 12.3	IIA	D
Thiophene	C_4H_4S	84.1	2.91	-1	395	84	-38	1.5 to 12.5	IIA	D
Toluene	C_7H_8	92.1	3.18	4	480	111	-95	1.1 to 7.1	IIA	D
m-Toluidine	C_7H_9N	107.2	3.71	86	482	203	-30	1.1 to 6.6	IIA	D
Trichloroethylene	C_2HCl_3	131.4	4.55		410	87	-73	8.0 to 10.5	IIA	
Triethylamine	$C_6H_{15}N$	101.2	3.50	-17	230	89	-115	1.2 to 8.0	IIA	D
Trimethylamine	C_3H_9N	59.1	2.04	Gas	190	3	-117	2.0 to 11.6	IIA	D
Triethylene Glycol	$C_6H_{14}O_4$	150.2	5.20	165	371	285	-7	0.9 to 9.2		
Trioxane			3.11	(45)	410				IIB3	C
Turpentine	$C_{10}H_{16}$	136.3	4.71	30	220	220	-60	0.8 to 6.0	IIA	D
Vinyl Acetate	$C_4H_6O_2$	86.1	2.98	-8	402	72	-93	2.6 to 13.4	IIA	D
Vinyl Bromide	C_2H_3Br	107	3.70	Gas	530	15.6	-139.5	9.0 to 15.0	IIA	
Vinyl Chloride	C_2H_3Cl	62.5	2.16	-78	472	-13	-154	3.6 to 33	IIA	
Vinyl Fluoride	C_2H_3F	46.1	1.60	Gas	385	-72	-161	2.6 to 21.7	IIA	
Vinylidene Chloride	$C_2H_5Cl_2$	97	3.36	-25	570	32	-122	5.6 to 16	IIA	D
Vinylidene Fluoride	$C_2H_2F_2$	64.04	2.21	Gas	640	-83	-144	5.5 to 21.3	IIA	
White Spirit				21	230	130-230		0.6 to 8.0	IIA	
o-Xylene	C_8H_{10}	106.2	3.67	32	463	144	-25	0.9 to 6.7	IIA	D

*Excluded from EN12874:2001

SPECIFICATION SHEET

Amal

Please complete this form with as much relevant information as possible and return to your local Safety Systems office or representative.

Based on the detailed information supplied, Amal will specify the correct flame arrester to ensure a safe application.

For help in completing this specification sheet, refer to the following page.

Customer	
Enquiry Ref.	Dated
Contact	Tel
	Fax
Email	

Item No
Quantity
Tag No.

Application Data		Units
Selection Code		
Gas Group		
Flow Rate		
Equivalent Air Rate		
MW or Density		
Max. Allowable PD		
Pressure at Ignition		
Pressure - Operating		
Pressure - Design		
Temp. at Ignition		
Temp. - Operating		
Temp. - Min. Design		
Temp. - Max. Design		
Distance to Ignition		

Preferred Flame Arrester	
Type	
Pipe Size	
Connections	
Facing	
Concentricity	
Pipe Schedule	
Burn Type	
Direction	
Orientation	
Location	

Materials	
Housing	
Element: Cage/Matrix	
Bolting	
Gaskets	
Weather Cowl	
Ext. coating	

Analysis of Gases/Vapours

Required Accessories

Required Approvals
PED Yes / No
ATEX Yes / No
Other (specify)

Comments

APPLICATION DATA

Selection Code
Such as European, USA, US Coast Guard, etc.

Gas Group
If known please specify.

Flow Rate
Flow rate of gas or vapour (and units).

Equivalent Air Rate
If known please give the equivalent air flow rate in Nm^3/h.

MW or Density
Specify either Molecular Weight or Density of the flowing gas or vapour.

Max. Allowable PD
State the maximum pressure drop (and units) you can allow across the flame arrester at the given flow rate.

Pressure at Ignition
Give the pressure at which ignition is likely to occur.

Pressure - Operating
State the opening pressure (and units) under normal flowing conditions.

Pressure - Design
What is the design pressure (and units) of the system?

Temperature at Ignition
What will be the likely temperature (and units) at which ignition would occur?

Temperature - Operating
State the operating temperature (and units) under normal flow conditions.

Temperature - Minimum Design
What is the minimum design temperature (and units) of the system?

Temperature - Maximum Design
What is the maximum design temperature (and units) of the system?

Distance to Ignition
State the maximum distance (and units) the flame arrester is likely to be away from the point of potential ignition.

PREFERRED FLAME ARRESTER

Type
State whether in-line or end-of-line with a fixed or replaceable element.

Pipe Size
Please state the nominal size of the pipe connections.

Connections
State the required flange/thread standard and rating, e.g. ANSI 150#, PN16, API, etc.

Facing
RF, FF, RTJ, etc.

Concentricity
Please state if the inlet and/or outlet need to be concentric or eccentric.

Pipe Schedule
State the preferred pipe schedule of the protected system.

Burn Type
State if the flame arrester needs to be standard/short burn type or endurance.

Direction
State if the flame arrester is required to be bi-directional or uni-directional.

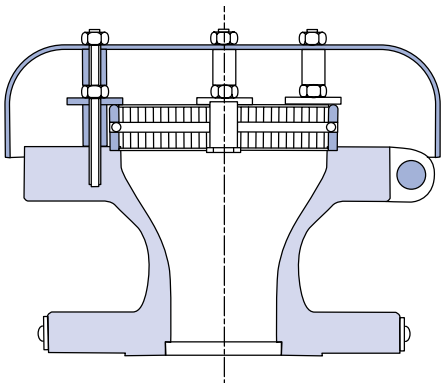
Orientation
Give the orientation of the flame arrester, e.g. horizontal or vertical.

Location
Give details of the location, e.g. directly under a P/V valve, inlet to fan, pump, etc.

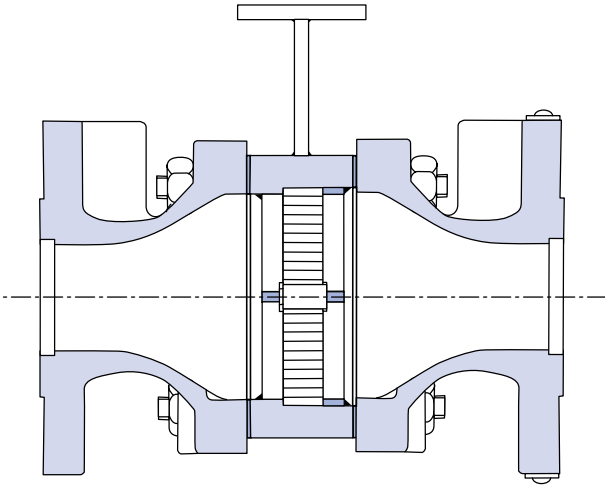
Cast Arresters

PRESSURE DROP CALCULATOR

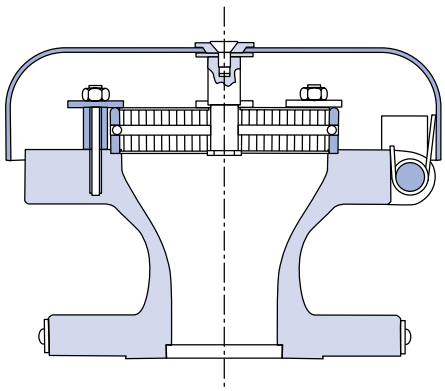
The pressure drop across the flame arrester may be calculated by using the required flow and the charts on the following four pages.



CER



CIR



CERB (Endurance burn)

CERB Pressure Drops (mbar)

CAST END-OF-LINE ENDURANCE BURN

Gas Group	Element	Pipe Size		Flow in Nm³/h Air 5	10	15	20	30	40	50	60	70	80	90	100	150	200	300	400	500
IIA (hydrocarbons)	100/19/80	DN50	2"	<0.5	<0.5	<0.5	<0.5	<0.5	0.5	0.7	0.8	1.0	1.1	1.3	1.5	2.4	3.4	5.9	8.9	12.5
	150/19/80	DN80	3"	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.5	0.8	1.1	1.8	2.5	3.3
	200/19/80	DN100	4"	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.7	1.1	1.5	2.1
IIB1, IIB2, IIB3 IIB, IIC	Refer to factory																			

Gas Group	Element	Pipe Size		Flow in Nm³/h Air 600	700	800	900	1000	2000	3000	4000	5000
IIA (hydrocarbons)	100/19/80	DN50	2"	16.6	21.2	26.4						
	150/19/80	DN80	3"	4.2	5.2	6.3	7.4	8.6				
	200/19/80	DN100	4"	2.6	3.3	3.9	4.7	5.4	16.4	33.2		
IIB1, IIB2, IIB3 IIB, IIC	Refer to factory											

Note: Where pressure drops are not given, please refer to factory

Cast Arresters

CER Pressure Drops (mbar)

CAST END-OF-LINE

Gas Group	Element	Pipe Size		Flow in Nm³/h Air																
				5	10	15	20	30	40	50	60	70	80	90	100	150	200	300	400	500
IIA & IIB1	100/19/80	DN50	2"	<0.5	<0.5	<0.5	<0.5	<0.5	0.5	0.7	0.8	1.0	1.1	1.3	1.5	2.4	3.4	5.9	8.9	12.5
	150/19/80	DN80	3"	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.5	0.8	1.1	1.8	2.5	3.3
	200/19/80	DN100	4"	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.7	1.1	1.5	2.1
	300/19/80	DN150	6"	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.5	0.7
	400/19/80	DN200	8"	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	500/19/80	DN250	10"	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	600/19/80	DN300	12"	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
IIB2 & IIB3	100/19/60	DN50	2"	<0.5	<0.5	<0.5	0.5	0.8	1.1	1.3	1.6	1.9	2.2	2.5	2.8	4.3	5.9	9.4	13.4	17.8
	150/19/60	DN80	3"	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.5	0.6	0.7	0.8	0.9	1.0	1.6	2.1	3.3	4.5	5.8
	200/19/60	DN100	4"	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.5	0.8	1.1	1.6	2.2	2.7
	300/19/60	DN150	6"	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	0.8	1.0
	400/19/60	DN200	8"	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.5	0.6
	500/19/60	DN250	10"	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	600/19/60	DN300	12"	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
IIB	100/19/45	DN50	2"	<0.5	<0.5	0.7	1.0	1.6	2.3	3.0	3.9	4.9	5.9	7.0	8.2	15.5	24.9	49.8	82.9	124.1
	150/19/45	DN80	3"	<0.5	<0.5	<0.5	<0.5	<0.5	0.7	0.9	1.1	1.3	1.5	1.8	2.0	3.5	5.3	9.7	15.2	21.9
	200/19/45	DN100	4"	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	0.7	0.8	0.9	1.4	2.1	3.5	5.3	7.3
	300/19/45	DN150	6"	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.5	0.6	0.8	1.1	1.7	2.3	3.0
	400/19/45	DN200	8"	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.5	0.7	1.0	1.4	1.8
	500/19/45	DN250	10"	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.7	0.9	1.2
	600/19/45	DN300	12"	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.7	0.8
IIC	100/19/15	DN50	2"	2.5	5.2	8.1	11.3	18.2	25.8	34.0	42.7	51.8	61.2	70.7	80.3	125.9				
	150/19/15	DN80	3"	0.9	1.9	2.9	4.0	6.2	8.5	11.0	13.6	16.3	19.2	22.1	25.1	41.6	59.6	97.0	131.1	
	200/19/15	DN100	4"	<0.5	1.0	1.4	1.9	3.0	4.0	5.1	6.2	7.4	8.6	9.8	11.1	17.9	25.4	41.9	60.1	78.9
	300/19/15	DN150	6"	<0.5	<0.5	0.6	0.7	1.1	1.5	1.9	2.3	2.7	3.1	3.5	4.0	6.1	8.5	13.5	19.0	24.9
	400/19/15	DN200	8"	<0.5	<0.5	<0.5	<0.5	0.7	0.9	1.2	1.4	1.6	1.9	2.1	2.4	3.6	4.9	7.7	10.7	13.8
	500/19/15	DN250	10"	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	0.8	0.9	1.1	1.3	1.4	1.6	2.4	3.3	5.0	6.9	8.9
	600/19/15	DN300	12"	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	0.7	0.8	0.9	1.0	1.1	1.7	2.3	3.5	4.8	6.1

Gas Group	Element	Pipe Size		Flow in Nm³/h Air																
				600	700	800	900	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000	12000	14000	16000
IIA & IIB1	100/19/80	DN50	2"	16.6	21.2	26.4														
	150/19/80	DN80	3"	4.2	5.2	6.3	7.4	8.6												
	200/19/80	DN100	4"	2.6	3.3	3.9	4.7	5.4	16.4	33.2										
	300/19/80	DN150	6"	0.8	1.0	1.2	1.3	1.5	3.9	7.0	11.1	16.0	21.9	28.7						
	400/19/80	DN200	8"	<0.5	0.6	0.7	0.7	0.8	2.0	3.4	5.2	7.3	9.7	12.5	15.6	19.0	22.8	31.5		
	500/19/80	DN250	10"	<0.5	<0.5	<0.5	<0.5	0.5	1.2	2.0	3.0	4.1	5.3	6.7	8.3	10.0	11.9	16.1	20.9	26.4
	600/19/80	DN300	12"	<0.5	<0.5	<0.5	<0.5	<0.5	0.8	1.3	1.9	2.6	3.3	4.1	5.0	5.9	6.9	9.2	11.8	14.7
IIB2 & IIB3	100/19/60	DN50	2"	22.7	28.1															
	150/19/60	DN80	3"	7.1	8.5	9.9	11.4	13.0												
	200/19/60	DN100	4"	3.3	3.9	4.5	5.1	5.8	13.1	22.1										
	300/19/60	DN150	6"	1.3	1.5	1.7	1.9	2.1	4.5	7.0	9.8	12.9	16.2	19.8						
	400/19/60	DN200	8"	0.8	0.9	1.0	1.2	1.3	2.6	4.1	5.6	7.2	8.9	10.7	12.6	14.6	16.7	21.2		
	500/19/60	DN250	10"	0.5	0.6	0.7	0.8	0.9	1.8	2.7	3.7	4.7	5.7	6.8	8.3	10.0	11.9	16.1	20.9	26.4
	600/19/60	DN300	12"	<0.5	<0.5	<0.5	0.6	0.6	1.2	1.9	2.6	3.2	3.9	4.7	5.4	6.2	6.9	8.6	10.3	12.1
IIB	100/19/45	DN50	2"	173.0																
	150/19/45	DN80	3"	29.7	38.7	48.8	60.0	72.4												
	200/19/45	DN100	4"	9.7	12.3	15.3	18.5	22.0	72.8											
	300/19/45	DN150	6"	3.6	4.3	5.0	5.8	6.5	16.8	33.1	57.8	93.4	142.2							
	400/19/45	DN200	8"	2.1	2.5	2.9	3.3	3.7	8.5	14.8	23.3	34.6	49.0	67.3	90.0	117.5	150.5			
	500/19/45	DN250	10"	1.4	1.7	1.9	2.2	2.4	5.3	8.7	12.8	17.9	24.1	31.5	40.4	50.9	63.2	93.8	133.6	184.0
	600/19/45	DN300	12"	1.0	1.2	1.4	1.5	1.7	3.6	5.7	8.1	10.9	14.1	17.9	22.1	27.0	32.6	46.0	62.9	83.8
IIC	100/19/15	DN50	2"																	
	150/19/15	DN80	3"																	
	200/19/15	DN100	4"	97.7	115.7															
	300/19/15	DN150	6"	31.2	37.8	44.6	51.7	59.0												
	400/19/15	DN200	8"	17.2	20.7	24.3	28.1	32.0	75.7	119.9										
	500/19/15	DN250	10"	10.9	13.1	15.3	17.6	20.0	47.0	77.6	108.1									
	600/19/15	DN300	12"	7.5	8.9	10.3	11.8	13.4	30.9	51.2	73.1	95.2	116.3	135.1						

Note: Where pressure drops are not given, please refer to factory

Cast Arresters

CIR Pressure Drops (mbar)

CAST IN-LINE (directly under breather valve with an atmospheric discharge)

Gas Group	Element	Pipe Size		Flow in Nm³/h Air 5	10	15	20	30	40	50	60	70	80	90	100	150	200	300	400	500
IIA & IIB1	100/19/80	DN50	2"	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	0.7	0.9	1.1	1.4	1.6	1.8	3.2	4.8	8.5	12.7	16.8
	150/19/80	DN80	3"	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.5	0.6	1.0	1.4	2.5	3.7	5.1
	200/19/80	DN100	4"	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.5	0.7	1.2	1.8	2.5
	300/19/80	DN150	6"	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.7	0.9
	400/19/80	DN200	8"	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	500/19/80	DN250	10"	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	600/19/80	DN300	12"	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
IIB2 & IIB3	100/19/60	DN50	2"	<0.5	<0.5	0.5	0.7	1.0	1.4	1.7	2.0	2.3	2.6	2.9	3.2	4.8	6.6	11.6	19.5	31.6
	150/19/60	DN80	3"	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	0.7	0.9	1.0	1.2	1.3	1.4	2.1	2.7	4.1	5.5	7.1
	200/19/60	DN100	4"	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.5	0.6	0.7	0.8	0.9	1.3	1.7	2.5	3.2	4.0
	300/19/60	DN150	6"	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	0.8	1.2	1.6	2.0
	400/19/60	DN200	8"	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.7	0.9	1.1
	500/19/60	DN250	10"	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	0.8
	600/19/60	DN300	12"	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.5
IIB	100/19/45	DN50	2"	<0.5	<0.5	<0.5	0.7	1.0	1.5	2.0	2.5	3.1	3.7	4.3	5.0	9.2	14.4	28.1	46.0	68.0
	150/19/45	DN80	3"	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.7	0.9	1.0	1.2	1.4	1.6	2.7	4.0	7.1	11.0	15.7
	200/19/45	DN100	4"	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	0.7	0.8	0.9	1.4	2.0	3.4	5.0	7.0
	300/19/45	DN150	6"	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.5	0.6	0.7	1.0	1.3	2.0	2.8	3.5
	400/19/45	DN200	8"	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.5	0.7	1.2	1.4	1.8
	500/19/45	DN250	10"	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.7	0.9	1.2
	600/19/45	DN300	12"	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.5	0.7	0.9
IIC	100/19/15	DN50	2"	2.3	4.6	7.0	9.3	14.0	18.7	23.5	28.3	33.1	38.0	42.9	47.8	72.9				
	150/19/15	DN80	3"	1.0	2.0	2.9	3.9	5.9	7.8	9.8	11.8	13.8	15.8	17.8	19.8	29.8	40.1	60.9	82.3	
	200/19/15	DN100	4"	0.6	1.2	1.7	2.3	3.5	4.6	5.8	7.0	8.1	9.3	10.5	11.7	17.6	23.5	35.6	47.9	60.3
	300/19/15	DN150	6"	<0.5	0.6	0.8	1.1	1.7	2.2	2.8	3.3	2.9	4.4	5.0	5.6	8.4	11.2	16.8	22.5	28.2
	400/19/15	DN200	8"																	
	500/19/15	DN250	10"																	
	600/19/15	DN300	12"																	

Gas Group	Element	Pipe Size		Flow in Nm³/h Air 600	700	800	900	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000	12000	14000	16000
IIA & IIB1	100/19/80	DN50	2"	20.6	23.6	25.4														
	150/19/80	DN80	3"	6.7	8.3	10.0	11.8	13.5												
	200/19/80	DN100	4"	3.2	3.9	4.8	5.6	6.6	16.8	24.6										
	300/19/80	DN150	6"	1.2	1.4	1.7	2.0	2.3	6.2	10.9	15.9	20.5	23.9	25.7						
	400/19/80	DN200	8"	0.5	0.7	0.8	0.9	1.0	2.6	4.6	7.0	9.5	12.2	15.0	17.6	20.0	22.2	25.1		
	500/19/80	DN250	10"	<0.5	<0.5	<0.5	0.5	0.6	1.5	2.6	3.9	5.3	6.9	8.6	10.4	12.2	14.0	17.5	20.7	23.3
	600/19/80	DN300	12"	<0.5	<0.5	<0.5	<0.5	<0.5	1.0	1.6	2.4	3.3	4.3	5.4	6.5	7.7	8.9	11.5	14.1	16.6
IIB2 & IIB3	100/19/60	DN50	2"	49.3	73.9															
	150/19/60	DN80	3"	9.0	11.3	14.1	17.5	21.6												
	200/19/60	DN100	4"	4.8	5.7	6.6	7.7	8.8	31.6	89.2										
	300/19/60	DN150	6"	2.4	2.7	3.1	3.5	3.8	8.3	15.8	28.6	49.1	79.4	122.1						
	400/19/60	DN200	8"	1.3	1.5	1.7	1.9	2.1	4.2	6.4	9.3	13.2	18.5	25.5	34.6	46.2	60.6	99.5		
	500/19/60	DN250	10"	0.9	1.0	1.2	1.3	1.5	2.8	4.1	5.6	7.3	9.3	11.7	14.7	18.3	22.7	34.2	50.1	71.1
	600/19/60	DN300	12"	0.7	0.8	0.9	1.0	1.1	2.1	3.0	4.0	5.0	6.1	7.4	8.8	10.4	12.3	17.0	23.1	31.1
IIB	100/19/45	DN50	2"	94.4	124.8															
	150/19/45	DN80	3"	21.2	27.4	34.4	42.2	50.6												
	200/19/45	DN100	4"	9.2	11.7	14.4	17.4	20.7	68.3											
	300/19/45	DN150	6"	4.3	5.2	6.0	7.0	8.0	21.5	44.5	80.8	134.1	208.3							
	400/19/45	DN200	8"	2.2	2.6	3.0	3.4	3.9	8.9	15.6	24.7	36.9	52.6	72.5	97.2	127.4	163.6			
	500/19/45	DN250	10"	1.4	1.7	1.9	2.2	2.5	5.3	8.8	13.0	18.2	24.5	32.2	41.3	52.1	64.7	96.2	137.2	189.1
	600/19/45	DN300	12"	1.0	1.2	1.4	1.6	1.7	3.7	5.8	8.3	11.2	14.6	18.4	22.9	28.0	33.8	47.9	65.7	87.7
IIC	100/19/15	DN50	2"																	
	150/19/15	DN80	3"																	
	200/19/15	DN100	4"	73.0	85.8															
	300/19/15	DN150	6"	34.0	39.9	45.7	51.6	57.6												
	400/19/15	DN200	8"																	
	500/19/15	DN250	10"																	
	600/19/15	DN300	12"																	

Note: Where pressure drops are not given, please refer to factory

Cast Arresters

CIR Pressure Drops (mbar)

CAST IN-LINE (or directly under a piped away breather valve)

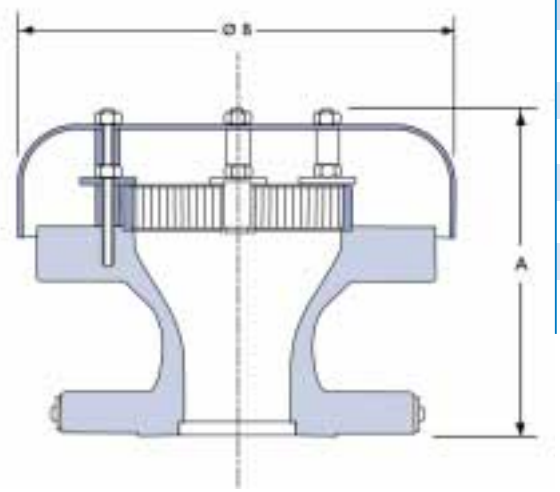
Gas Group	Element	Pipe Size		Flow in Nm³/h Air 5	10	15	20	30	40	50	60	70	80	90	100	150	200	300	400	500
	100/19/80	DN50	2"	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.7	0.9	1.1	1.4	1.6	1.8	3.2	4.8	8.5	12.7	16.8
	150/38/80	DN80	3"	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.5	0.7	0.8	0.9	1.0	1.6	2.4	4.2	6.2	8.6
	200/38/80	DN100	4"	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.5	0.9	1.2	2.1	3.0	4.1
IIA	300/38/80	DN150	6"	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.5	0.8	1.2	1.5
	400/38/80	DN200	8"	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	0.7
	500/38/80	DN250	10"	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	600/38/80	DN300	12"	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	100/19/60	DN50	2"	<0.5	<0.5	0.5	0.7	1.0	1.4	1.7	2.0	2.3	2.6	2.9	3.2	4.8	6.6	11.6	19.5	31.6
	150/3860	DN80	3"	<0.5	<0.5	<0.5	<0.5	0.7	1.0	1.2	1.5	1.7	1.9	2.1	2.4	3.5	4.6	6.8	9.1	11.8
IIB1, IIB2	200/38/60	DN100	4"	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	0.7	0.9	1.0	1.2	1.3	1.4	2.1	2.8	4.1	5.4	6.7
& IIB3	300/38/60	DN150	6"	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	0.6	0.7	1.0	1.4	2.0	2.7	3.3
	400/38/60	DN200	8"	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	0.8	1.1	1.5	1.9
	500/38/60	DN250	10"	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.5	0.8	1.0	1.2
	600/38/60	DN300	12"	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	0.7	0.9
	100/19/45	DN50	2"	<0.5	0.9	1.4	1.8	2.8	3.8	4.8	5.9	7.0	8.1	9.3	10.6	17.8	27.0	52.9	91.9	147.9
	150/38/45	DN80	3"	<0.5	<0.5	0.6	0.8	1.2	1.5	1.9	2.3	2.7	3.2	3.6	4.0	6.2	8.7	14.3	21.1	29.4
	200/38/45	DN100	4"	<0.5	<0.5	<0.5	<0.5	0.7	0.9	1.1	1.4	1.6	1.8	2.1	2.3	3.5	4.8	7.6	10.6	14.0
IIB	300/38/45	DN150	6"	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.5	0.7	0.8	0.9	1.0	1.1	1.6	2.2	3.4	4.6	5.9
	400/38/45	DN200	8"	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.5	0.6	0.9	1.2	1.8	2.4	3.0
	500/38/45	DN250	10"	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	0.8	1.2	1.6	2.0
	600/38/45	DN300	12"	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	0.8	1.1	1.4
	100/19/15	DN50	2"	2.3	4.6	7.0	9.3	14.0	18.7	23.5	28.3	33.1	38.0	42.9	47.8	72.9				
	150/38/15	DN80	3"	3.0	6.0	9.0	12.0	18.2	24.3	30.7	37.2	43.7	50.3	57.1	63.9	99.6	137.9	223.0	320.2	
IIC	200/38/15	DN100	4"	1.8	3.5	5.3	7.1	10.7	14.3	18.0	21.7	25.4	29.2	33.0	36.8	56.5	77.0	120.9	168.6	220.4
	300/38/15	DN150	6"	0.8	1.7	2.5	3.4	5.1	6.8	8.5	10.2	12.0	13.7	15.4	17.2	26.1	35.1	53.9	73.4	93.8
	400/38/15	DN200	8"																	
	500/38/15	DN250	10"																	
	600/38/15	DN300	12"																	

Gas Group	Element	Pipe Size		Flow in Nm³/h Air 600	700	800	900	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000	12000	14000	16000
	100/19/80	DN50	2"	20.6	23.6	25.4														
	150/38/80	DN80	3"	11.1	13.8	16.7	19.6	22.5												
	200/38/80	DN100	4"	5.3	6.6	7.9	9.4	10.9	27.9	41.0										
IIA	300/38/80	DN150	6"	1.9	2.4	2.8	3.3	3.9	10.3	18.2	26.5	34.1	39.9	42.8						
	400/38/80	DN200	8"	0.9	1.1	1.3	1.5	1.7	4.3	7.7	11.6	15.9	20.4	24.9	29.3	33.4	36.9	41.8		
	500/38/80	DN250	10"	0.6	0.7	0.8	0.9	1.0	2.5	4.3	6.4	8.9	11.5	14.3	17.3	20.3	23.3	29.1	34.4	38.8
	600/38/80	DN300	12"	<0.5	<0.5	0.5	0.6	0.7	1.6	2.7	4.1	5.5	7.2	9.0	10.9	12.8	14.9	19.2	23.5	27.7
	100/19/60	DN50	2"	49.3	73.9															
	150/38/60	DN80	3"	15.0	18.8	23.5	29.2	36.1												
IIB1, IIB2	200/38/60	DN100	4"	8.0	9.5	11.1	12.8	14.7	52.6	148.7										
& IIB3	300/38/60	DN150	6"	3.9	4.5	5.2	5.8	6.4	13.9	26.4	47.7	81.8	132.4	203.5						
	400/38/60	DN200	8"	2.2	2.6	2.9	3.2	3.6	6.9	10.7	15.6	22.1	30.8	42.5	57.7	77.0	101.0	165.8		
	500/38/60	DN250	10"	1.5	1.7	2.0	2.2	2.4	4.7	6.9	9.3	12.1	15.5	19.5	24.5	30.6	37.9	57.0	83.4	118.5
	600/38/60	DN300	12"	1.1	1.3	1.4	1.6	1.8	3.4	5.0	6.6	8.3	10.2	12.3	14.6	17.3	20.5	28.3	38.6	51.9
	100/19/45	DN50	2"	224.5	325.4															
	150/38/45	DN80	3"	39.4	51.5	66.0	83.1	103.0												
	200/38/45	DN100	4"	17.2	22.2	27.0	32.5	38.6	148.3											
IIB	300/38/45	DN150	6"	7.2	8.6	10.1	11.6	13.2	35.9	74.2	134.6	223.5	347.2							
	400/38/45	DN200	8"	3.7	4.3	5.0	5.7	6.4	14.8	26.0	41.2	61.4	87.6	120.8	162.0	212.3	272.6			
	500/38/45	DN250	10"	2.4	2.8	3.2	3.7	4.1	8.9	14.7	21.7	30.4	40.9	53.6	68.8	86.8	107.8	160.3	228.6	315.2
	600/38/45	DN300	12"	1.7	2.0	2.3	2.6	2.9	6.1	9.7	13.9	18.7	24.3	30.7	38.2	46.7	56.4	79.9	109.5	146.2
	100/19/15	DN50	2"																	
	150/38/15	DN80	3"																	
IIC	200/38/15	DN100	4"	276.4	336.9															
	300/38/15	DN150	6"	115.0	137.1	160.0	183.9	208.8												
	400/38/15	DN200	8"																	
	500/38/15	DN250	10"																	
	600/38/15	DN300	12"																	

Note: Where pressure drops are not given, please refer to factory

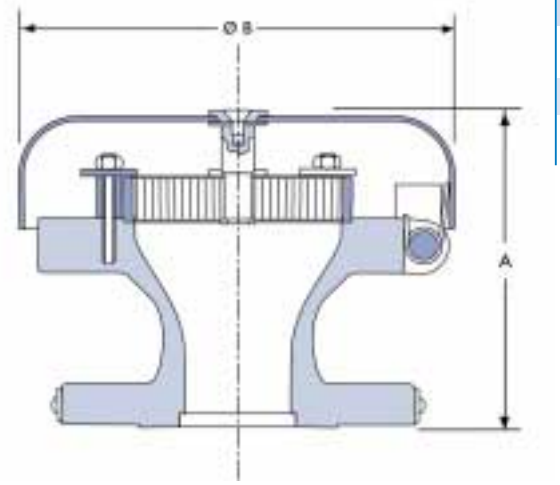
CAST FLAME ARRESTER DIMENSIONS

CER dimensions



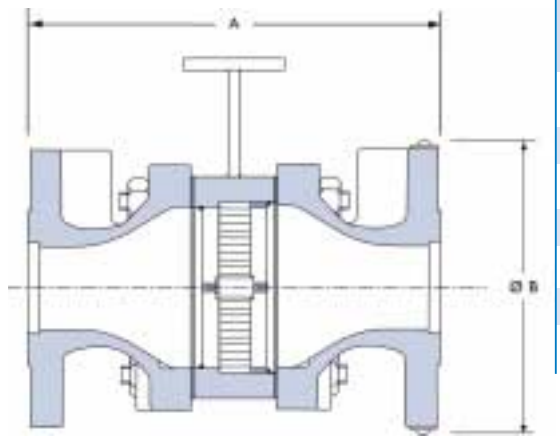
Connection Size	A	B dia
DN50 (2")	160 (6.3")	203 (8.0")
DN80 (3")	185 (7.3")	261 (10.3")
DN100 (4")	235 (9.3")	347 (13.7")
DN150 (6")	360 (14.2")	480 (18.9")
DN200 (8")	405 (15.9")	590 (23.2")
DN250 (10")	495 (19.5")	730 (28.7")
DN300 (12")	565 (22.2")	870 (34.3")

CERB dimensions



Connection Size	A	B dia
DN50 (2")	150 (5.9")	203 (8.0")
DN80 (3")	175 (6.9")	261 (10.3")
DN100 (4")	200 (7.9")	347 (13.7")

CIR dimensions



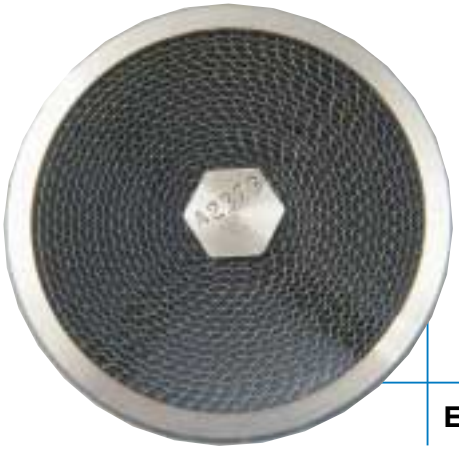
Connection Size	A with 19mm Cell Width	A with 38mm Cell Width	B dia
DN50 (2")	247 (9.7")	266 (10.5")	201 (7.9")
DN80 (3")	299 (11.8")	318 (12.5")	261 (10.3")
DN100 (4")	346 (13.6")	365 (14.4")	346 (13.6")
DN150 (6")	452 (17.8")	471 (18.5")	486 (19.1")
DN200 (8")	524 (20.6")	543 (21.4")	546 (21.5")
DN250 (10")	571 (22.5")	590 (23.2")	620 (24.4")
DN300 (12")	678 (26.7")	697 (27.4")	755 (29.7")

Amal

In-Line

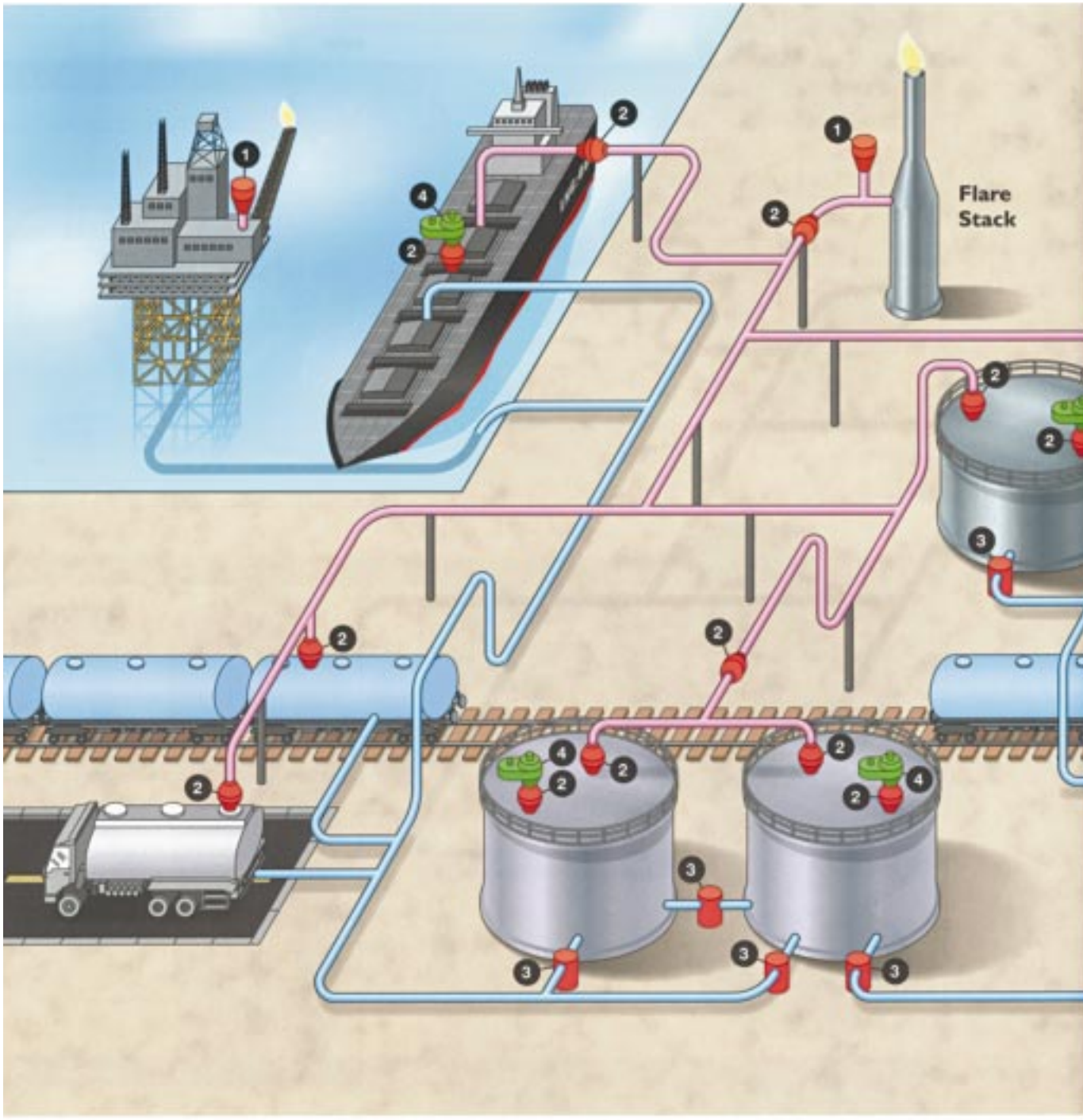
End-of-Line

Combination Flame Arrester/Breather Valve



Element

APPLICATIONS



❶ End-of-Line Arrester

❷ In-Line Arrester

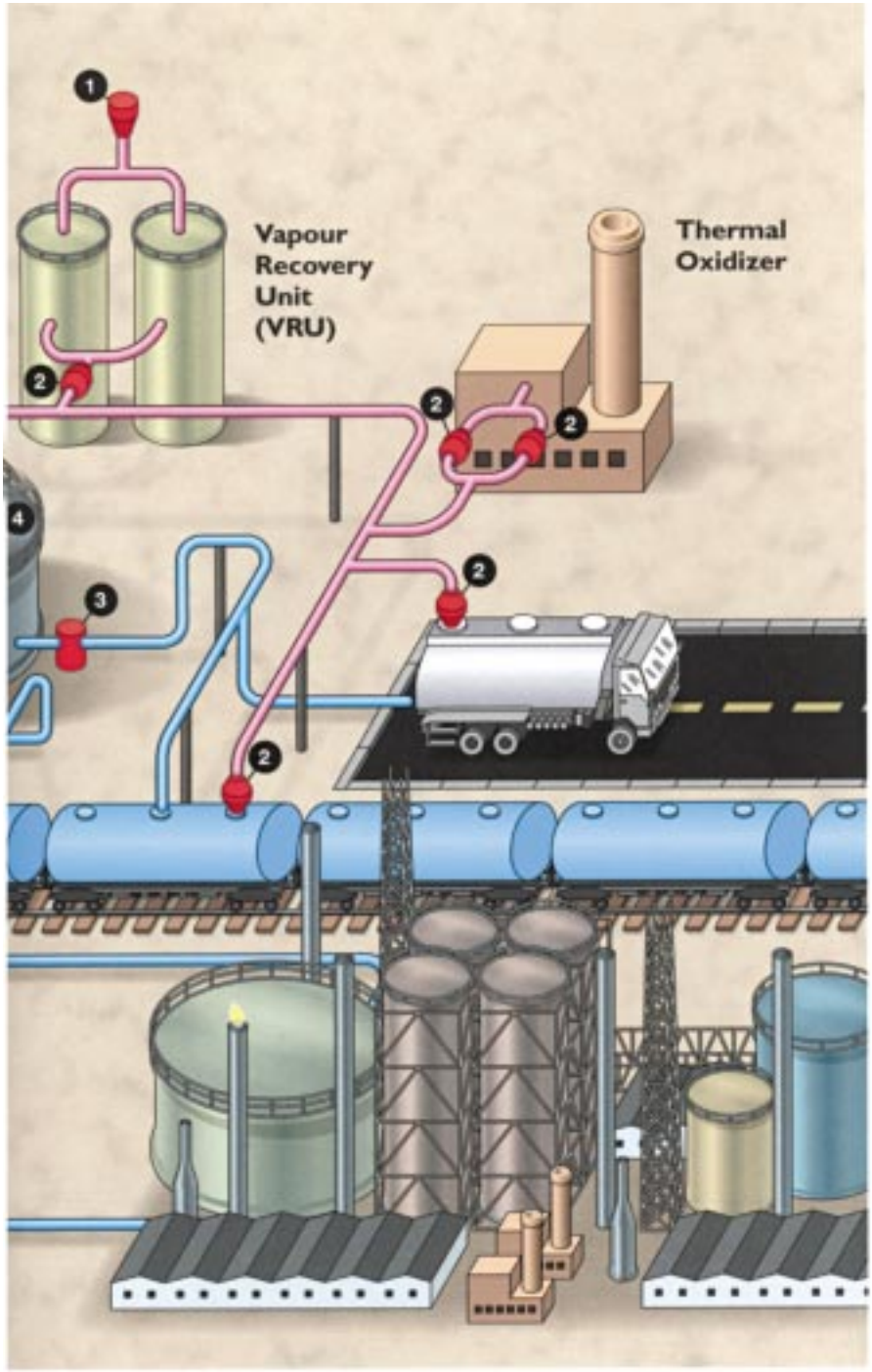
❸ In-Line Arrester (liquid)

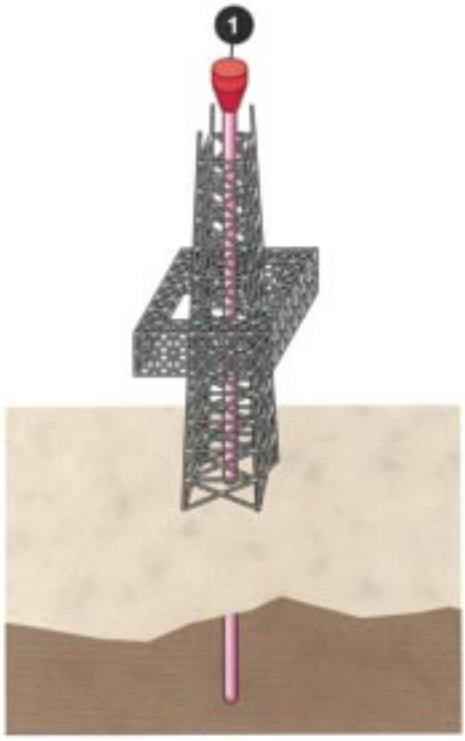
❹ Pressure Vacuum Valve

Amal

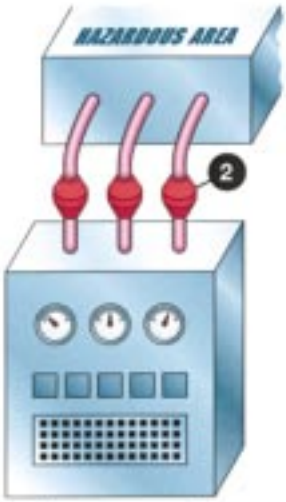
Protecting You

Protecting Your Process

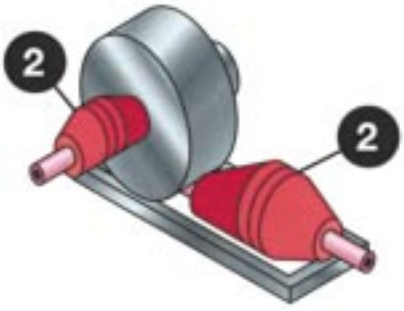




Bio-Gas Landfill



Instrumentation



Fan/Blower/Pump

Diesel Engine

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