



## ANDERSON GREENWOOD AMAL IR SERIES (REMOVABLE ELEMENT) FLAME ARRESTERS INSTALLATION & MAINTENANCE INSTRUCTIONS

Includes: IRF, IRD, IRDB, IRQ & IRQS types and eccentric variants (E)

### 1. GENERAL

IR Series flame arresters are intended for use in piping systems handling flammable gases/vapors.

### 2. GUIDANCE

1. Maximum temperature limits -20° to +60°C covering the general range of flame arresters (see special conditions for safe use).
2. IR series detonation or deflagration type flame arresters are designed to protect piping systems and equipment from explosions, detonations or deflagrations that have occurred in associated piping/equipment or external to the vent piping.
3. ONLY install for the application for which it has been designed and specified and within its tested/certified limitations - refer to product data sheet for guidance. It is potentially dangerous to use in other applications.
4. Mounting of any electrical monitoring devices shall be in accordance with EN 50018:2000.
5. Flame arresters should not be positioned near hot equipment unless certified for the elevated temperature, as heat transfer to the flame arrester will reduce its performance and may cause it to fail.
6. Shut-off devices should be fully open during normal operation.
7. Continuous monitoring of pressure drop is advised if the process is known to contain particulates or substances which can block the element and over-pressurize the system.
8. Metal parts insulated by gaskets should be earthed where necessary.
9. Flame velocities and pressures of flammable mixtures can be enhanced by upstream turbulence, which can be caused by bends, valves or any change in section of the pipework. The flame arrester should only be used for the process application; if the process conditions or the pipework configuration change, the flame arrester specification should be re-checked with the manufacturer.
10. If the normal operating or atmospheric temperature can cause freezing within the flame arrester, it is advisable to provide trace heating to the flame arrester element and housings - if electrical this must be in accordance with EN500018:2000. It is important to ensure that the flame arrester unit is ATEX certified for use at the elevated temperature of the process fluid, created by the external heating source.
11. Where a dedicated heating jacket (steam or hot fluids) is supplied as part of the flame arrester unit, the flame arrester will be denoted J type e.g. IRQJ. In these cases, the flame arrester should be fitted with the heating fluid connection in a vertical attitude. The inlet connection should be at the top of the housing and the outlet should be at the bottom of the housing to facilitate drainage. Extra care should be taken to ensure that when the heating fluid pipes are removed for maintenance purposes, heat resisting hand protection is worn to protect the operator from any potential burning. Monitor the temperature of the flame arrester unit to ensure that the process fluid does not rise above its auto ignition temperature.
- 2.2 Screwed connection (DN 80 or 3 NPS and smaller) - fit to the corresponding male/female threads. Sealing tape or sealant may be used to ensure a good seal.
3. Ensure that any accessory nozzles are fitted with the necessary accessories or with plugs/blanking flanges as appropriate.
4. When appropriate, it is recommended that a protective cage be installed to guard the flame arrester against accidental impact from vehicles or from heavy falling objects.

### 3. INSTALLATION

1. Remove all packaging from the flame arrester prior to installation, paying particular attention to the inlet and outlet housing sections.
2. Mount the flame arrester in the pipeline in the orientation for which it has been designed. Amal IRDB, IRQ, IRQS (E) types are normally bi-directional and can be fitted either way round unless they are made one directional by accessories fitted to the inlet or outlet housing sections only - in this case a directional arrow is included showing the direction of normal flow. Types IR, IRF & IRD are one directional and a directional arrow is included.
  - 2.1 Flanged connection - bolt to flanges of the same specification as those fitted to the flame arrester itself, with intermediate gaskets of a type appropriate to the service conditions. Tighten the bolting uniformly to ensure a good seal.

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### 4. MAINTENANCE

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Maintenance should only be carried out by suitably qualified personnel.

1. During service the element matrix may become blocked with particles and impurities from the atmosphere and/or process. If too severe, the blockage will impair the free flow of gases/vapors. In severe cases this can cause damage to equipment and the flame arrester itself. If excessive pressure drop is experienced, or after any flashback or incident, immediate inspection should be made. Where a process is known to be 'dirty', a pressure limiting device, installed within the associated pipeline is strongly recommended.
2. A periodic maintenance schedule is recommended for the flame arrester, the frequency to be based on operational experience and actual operating conditions, but at least annually.
3. No special tools are required. Standard spanners and lifting equipment for larger sizes of flame arrester, are required.
4. IR series flame arresters are designed to allow inspection and maintenance in situ, however, this should only be done if it is safe to do so.  
NOTE: Potentially toxic substances may have been passing through the flame arrester. Always wear appropriate safety equipment, with eye protection, when working on or near flame arresters. If the flame arrester has a heating jacket it will be necessary to drain the flame arrester jacket, and in order to do this the heating fluid pipes will need to be disconnected. Always ensure that heat resisting gloves are worn before this is done since hot fluid may spill from the connecting joints.
5. Loosen the bolting around the central flanges containing the element assembly/assemblies.
6. Separate the central flanges, using any jacking bolts that may be fitted to the flame arrester or other appropriate means, by an amount sufficient to allow removal of the gaskets and element assembly/assemblies. Note that where unsupported backing flanges have been used this may not be possible and the complete flame arrester may have to be taken from the pipeline.
7. Remove sufficient bolting to allow the gaskets and element assembly to be removed or, where a swing out element assembly is fitted, for it to be swung out for inspection.
8. Remove the element(s), using lifting equipment where appropriate, and examine both surfaces. DO NOT insert any probes into the element.
9. If the element matrix is visibly damaged or corroded it must be replaced before the flame arrester is returned into service. If cleaning is required see Section 5 before re-fitting.

10. Check that the sealing face of the housing is clean and free from particles that may affect the sealing of the element.

NOTE: Any gaps between the housing and gaskets/element may provide a flame path around the flame arrester element and are therefore DANGEROUS.

11. Fit new gaskets of the same specification and re-fit the element(s) ensuring that it is located centrally - there may be locating collars fitted to some of the bolts to assist in this.
12. Where more than one element is fitted ensure that all lifting eyes are in complete alignment.
13. Replace the bolting and tighten to the appropriate torque.
14. After any external fire in the locality of the flame arrester, it is recommended that the equipment be examined for damage, with particular attention paid to the joint gaskets, replacing them if necessary. Also check the tightness of the flange bolting and retighten if necessary.

### 5. CLEANING THE ELEMENT ASSEMBLY

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1. DO NOT attempt to remove the element matrix from its cage/casing.
2. DO NOT allow the element assembly to become blocked severely.
3. DO NOT clean by inserting probes into the cell structure.
4. DO NOT use excessively corrosive materials [e.g. hydrochloric acid] to clean the element.
5. High-pressure water jets ARE NOT recommended.
6. The following ARE recommended: detergents, solvents, compressed air, steam or ultrasonic. The actual cleaning method will depend on the nature of the substance causing the blockage.
7. If the element is damaged during cleaning a NEW element assembly should be fitted. If in doubt refer to your nearest representative for advice.

### 6. SPARE PARTS

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Under normal conditions only the element assembly and gaskets should need replacing. It is recommended that for every three-flame arresters of a given type and size, at any one site, at least one spare element assembly is available at all times. One set of gaskets for each flame arrester assembly should also be available.

When requesting spare elements the full type code, part number, and serial number MUST be quoted fitting the incorrect element is potentially DANGEROUS. See the flame arrester label and/or associated detailed spare parts list for details.

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### 7. AFTER SALES SERVICE

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After sales service is available through the relevant Emerson office in the United Kingdom or through our worldwide network of regional offices and agents.

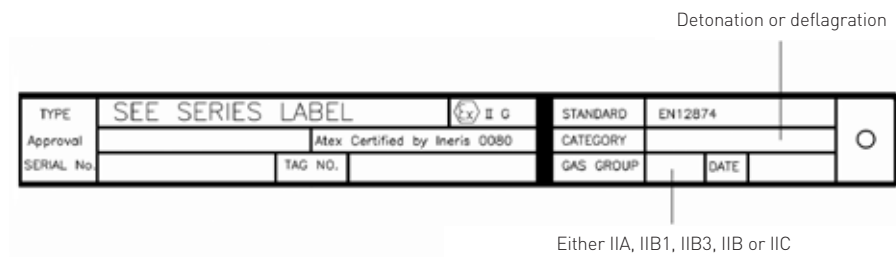
### 8. MARKING ON THE FLAME ARRESTER (CE PLATE)

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### 9. MARKING ON THE FLAME ARRESTER (NAMEPLATE)

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### 10. SPECIAL CONDITIONS FOR SAFE USE – MANUFACTURING IS INTENDED AS FOLLOWS:

#### Flame Arrester Matrix for ATEX approval covering Certificates INERIS03ATEX0075X with Additions /01, /02 and /03

Type	Connection	Gas group	Size range	Short burn	Det.	Deflag.	Max. temp. deflagration	Max. temp. unstable detonation	Element
IR (E)	Flanged	IIA	DN12/450	Yes	N/A	Yes	-20 / +60°C	N/A	1 x 0.8mm
IR (E)	Flanged	IIB1/IIB3	DN12/450	Yes	N/A	Yes	-20 / +60°C	N/A	1 x 0.8/0.6mm
IRF, (E)	Flanged	IIA	DN12/450	Yes	N/A	Yes	-20 / +60°C	N/A	1 x 0.8mm
IRF, (E)	Flanged	IIB1/IIB3	DN12/450	Yes	N/A	Yes	-20 / +60°C	N/A	1 x 0.8/0.6mm
IRE	Flanged	IIA	DN40/200	Yes	N/A	Yes	-20 / +60°C	N/A	1 x 0.6mm
IR, IRF, (E)	Flanged	IIA	DN12/450	No	N/A	Yes	-20 / +165°C	N/A	1 x 0.6mm
IR, IRF, (E)	Flanged	IIB1/IIB3	DN12/450	No	N/A	Yes	-20 / +165°C	N/A	1 x 0.38mm
IR, IRF, (E)	Flanged	IIB	DN12/400	Yes	N/A	Yes	-20 / +60°	N/A	1 x 0.45mm
IR, IRF (E)	Flanged	IIC	DN12/150	Yes	N/A	Yes	-20 / +60°C	N/A	1 x 0.15mm
IR, IRF, (E)	Flanged	IIB	DN12/100	No	N/A	Yes	-20 / +165°C	N/A	1 x 0.3mm
IR, IRF (E)	Flanged	IIC	DN12/150	No	N/A	Yes	-20 / +165°C	N/A	1 x 0.15mm
IR, IRQ	Flanged	IIB3	DN200	No	N/A	Yes	-20 / +260°	N/A	1 x 0.38mm
IRQ, IRQS, (E)	Flanged	IIA	DN12/450	Yes	N/A	Yes	-20 / +60°C	N/A	1 x 0.8mm
IRQ, IRQS, (E)	Flanged	IIB1/IIB3	DN12/450	Yes	N/A	Yes	-20 / +60°C	N/A	1 x 0.8/0.6mm
IRQ, IRQS, (E)	Flanged	IIA	DN12/450	No	N/A	Yes	-20 / +165°C	N/A	1 x 0.6mm
IRQ, IRQS, (E)	Flanged	IIB1/IIB3	DN12/450	No	N/A	Yes	-20 / +165°C	N/A	1 x 0.38mm
IRQ, IRQS, (E)	Flanged	IIB	DN12/400	Yes	N/A	Yes	-20 / +60°C	N/A	1 x 0.45mm
IRQ, IRQS, (E)	Flanged	IIC	DN12/150	Yes	N/A	Yes	-20 / +60°C	N/A	1 x 0.15mm
IRQ, IRQS, (E)	Flanged	IIB	DN12/100	No	N/A	Yes	-20 / +165°C	N/A	1 x 0.3mm
IRQ, IRQS, (E)	Flanged	IIC	DN12/100	No	N/A	Yes	-20 / +165°C	N/A	1 x 0.15mm

Type	Connections	Gas group	Size range	Short burn	Det.	Deflag.	Max. temp. deflagration	Max. temp. unstable detonation	Element
IRD, IRDB, (E)	Flanged	IIA	DN12/200	Yes	Yes	N/A	N/A	-20 / +60°C	1 x 0.6/0.45mm
IRD, IRDB, (E)	Flanged	IIA	DN250/450	Yes	Yes	N/A	N/A	-20 / +60°C	2 x 0.45mm
IRD, IRDB, (E)	Flanged	IIA	DN12/200	No	Yes	N/A	N/A	-20 / +165°C	1 x 0.45mm
IRD, IRDB, (E)	Flanged	IIA	DN250/450	No	Yes	N/A	N/A	-20 / +165°C	2 x 0.45mm
IRD, IRDB, (E)	Flanged	IIB1/IIB3	DN12/150	Yes	Yes	N/A	N/A	-20 / +60°C	1 x 0.45/0.38mm
IRD, IRDB, (E)	Flanged	IIB1/IIB3	DN200/400	Yes	Yes	N/A	N/A	-20 / +60°C	2x0.45/3 x0.38mm
IRD, IRDB, (E)	Flanged	IIB1/IIB3	DN12/150	No	Yes	N/A	N/A	-20 / +165°C	1 x 0.38mm
IRD, IRDB, (E)	Flanged	IIB1/IIB3	DN200/400	No	Yes	N/A	N/A	-20 / +165°C	3 x 0.38mm
IRD, IRDB, (E)	Flanged	IIB	DN12/150	Yes	Yes	N/A	N/A	-20 / +60°C	1 x 0.3mm
IRD, IRDB, (E)	Flanged	IIB	DN12/100	No	Yes	N/A	N/A	-20 / +165°C	1 x 0.3mm
IRD, IRDB, (E)	Flanged	IIC	DN12/150	Yes	Yes	N/A	N/A	-20 / +60°C	1 x 0.15/2x0.15mm
IRD, IRDB, (E)	Flanged	IIC	DN100	No	Yes	N/A	N/A	-20 / +165°C	2 x 0.15mm
IRD, IRDB, (E)	Flanged	IIC	DN12/80	No	Yes	N/A	N/A	-20 / +165°C	1 x 0.15mm

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