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I. INTRODUCTION

Groth Corporation's flame arresters are designed to inhibit flame propagation in gas piping systems and to protect low pressure tanks containing flammable liquids. They protect low flash point liquids from externally caused sources of heat and ignition, providing increased fire protection and safety.

The flame arresters consist of two main components, the arrester bases and the flame element housing. The bases serve as the connecting interface to the piping system. The housing accommodates the flame element and is instrumental in stopping the flame passage. The depth of the flame element absorbs the heat from the vapor flow, cooling the vapor to prevent auto-ignition on the protected side.

The flame element is comprised of small parallel triangular passageways aligned so that an approaching flame front is slowed down and then quenched before it can propagate to the protected side of the device.

Model 7618 and 7628 flame elements utilize spiral wound, crimped ribbon constructed of corrosion resistant materials, to insure the best flame quenching performance with minimum pressure drop.

Depending on the design of the system in which it is used, the arrester bases can include optional ports for temperature or pressure monitoring devices. These devices can activate warning or shutdown systems if abnormal conditions are detected.

A flame arrester should be treated as a safety device and maintained by a knowledgeable repair technician. Carefully read and understand this Manual before installing or servicing this product.

II. INSPECTION AND INSTALLATION

All Groth Corporation's flame arresters are bi-directional and the installation on a tank or piping system depends to a great extent on the design of the system. The Model 7618 is recommended for vertical installation in closed piping systems or venting to atmosphere. If a Model 7618 is installed in a horizontal line, it should be equipped with drain ports for removal of condensation from the housing.

WARNING: Do not pipe both drainage connections to a common line as this can provide a passage for flame to by-pass the flame arrester element.

The Model 7628 is designed for either vertical or horizontal installation.

These series of flame arresters have 150# ANSI, PN 10 OR PN 16 flange drilling compatibility and are pneumatically tested to 15 PSIG at the factory. Follow the guidelines listed in Table 2 for flange make-up torque. The arresters are NOT rated for full flange pressure and do not require high bolting torque. Recommended torque values are based on pressures [MAWP] in Table 1. Consult factory for higher pressure applications.

Note:

TABLE 1: FLAME ARRESTER MAWP [PSIG (kPa)]

Size	Model 7618 Alum	Model 7618 CS/SS	Model 7628 Alum	Model 7628 CS/SS
2"	50 (345)	100 (690)	150 (1034)	275 (1965)
3"	50 (345)	100 (690)	140 (965)	275 (1965)
4"	50 (345)	100 (690)	140 (965)	275 (1965)
6"	50 (345)	100 (690)	140 (965)	275 (1965)
8"	50 (345)	100 (690)	90 (620)	200 (1379)
10"	50 (345)	100 (690)	75 (482)	150 (1034)
12"	50 (345)	100 (690)	75 (482)	150 (1034)

The MAWP is different from the approved pre-ignition pressure. Consult the factory for pre-ignition pressure limits for your installation.

TABLE 2: BOLT TORQUE [ft-lbs (Nm)]

Size	Flange*				Housing			
	Raised Face Steel	Raised Face Aluminum	Flat Face Steel	Flat Face Aluminum	Model Steel 7618	Model Steel 7628	Aluminum Housing 7618	Aluminum Housing 7628
2"	60 (82)	35 (47)	60 (82)	50 (68)	60 (82)	40 (54)	50 (68)	35 (47)
3"	60 (82)	35 (47)	60 (82)	50 (68)	60 (82)	40 (54)	50 (68)	35 (47)
4"	60 (82)	35 (47)	60 (82)	50 (68)	60 (82)	40 (54)	50 (68)	35 (47)
6"	105 (143)	60 (81)	105 (143)	90 (122)	105 (143)	105 (143)	90 (122)	90 (122)
8"	105 (143)	60 (81)	105 (143)	90 (122)	105 (143)	105 (143)	90 (122)	90 (122)
10"	140 (190)	100 (136)	170 (231)	140 (190)	170 (231)	220 (300)	140 (190)	170 (231)
12"	140 (190)	100 (136)	170 (231)	140 (190)	170 (231)	220 (300)	140 (190)	170 (231)

*Torque values are for reference only and based on a nitrile binder synthetic gasket, 1/16" thick and unlubricated threads.

The following guidelines should be observed at installation:

WARNING: The 7618 & 7628 models must be installed within 10 pipe diameters of the open end of the vent pipe.

1. Remove any flange protectors and discard all packing material. Inspect flange faces and flame element for damage or contamination.
2. Inspect the gasket seating surface of the tank nozzle or piping. It must be clean, flat, free of scratches, corrosion and tool marks.
3. Aluminum flame arresters are furnished with flat face flanges; they should only be installed on a mating flat face flange with a full face gasket.

WARNING: Installation of an aluminum arrester in piping with raised face flanges can cause permanent distortion of the base flanges. This may result in vapor leakage at the flange connection.

Adjacent piping must have appropriate structural support to prevent excessive loads on the flame arrester flanges.

4. Inspect the gasket; make sure that the material is suitable for the application. Center the gasket within the bolt circle.
5. Set the arrester between its mating flanges or on the nozzle. Position the lifting handles and jacking nuts to facilitate future removal of the flame arrester housing (See Maintenance Instructions section). Install the studs and tighten nuts hand tight.

WARNING: The handles on the arrester housing are to be used for handling the element only during inspection and maintenance. DO NOT use the handles to lift the entire flame arrester assembly.

Notes:

- When installing Model 7628 in the horizontal position, the eccentric portion of the housing must be positioned upward (See Page 14). In this position condensation will tend to move in the direction of flow and not collect in the element.
 - Leave space behind mating pipe flange for insertion of studs, as there may not be sufficient space to insert studs from the flame arrester side.
6. Torque all fasteners to half the value listed in Table 2 in a staggered, alternating pattern to provide an evenly compressed gasket joint.
 7. Make up the final torque and check that no further nut rotation occurs at the specified torque value.

WARNING: After installation, all connections must be inspected for vapor leakage. This may be accomplished by static pressure test, gas detector, or "bubble" test using a liquid leak detector.

III. MAINTENANCE

For maximum operating efficiency the element of a flame arrester must be inspected for clogging at regular intervals. Frequency of inspection and maintenance should be based on the experience gained in each application. For ease of service, the flame element housing can be easily removed for inspection and maintenance without removing the arrester from the line. It is recommended that the arrester be removed for inspection of the element at least once per year or any time that one of the following conditions occurs:

- Excessive pressure drop is encountered at a known flow rate.
- A flame front is detected.

1. Purge the line or tank with an inert gas before attempting to remove the arrester for maintenance.

CAUTION: The connecting pipeline must be free of all hazardous or flammable vapors before inspection procedures begin. Before disassembling consult Material Safety Data Sheets (MSDS) for all products that were exposed to in service. The components should be cleaned according to MSDS procedures. Take appropriate safety precautions regarding eye protection, skin contact & respiration.

2. Refer to Fig. 1 which illustrates a typical flame arrester with the element removed.

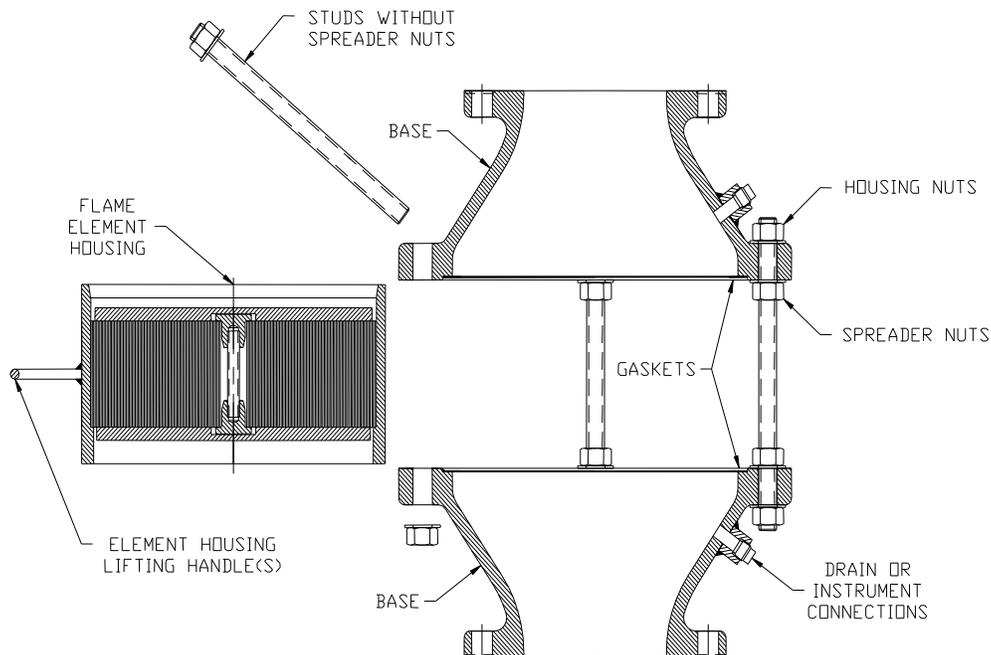


FIGURE 1 - TYPICAL MODEL 7618 FLAME ARRESTER

- Loosen the housing nuts and remove only those studs necessary to withdraw the housing. Do not remove studs with spreader nuts.

WARNING: The handles on the arrester housing are to be used for handling the element only during inspection and maintenance. DO NOT use the handles to lift the entire flame arrester assembly.

- If the flame arrester is in a horizontal line, attach whatever lifting equipment is required to remove the element [see weights table 3]

TABLE 3 – ELEMENT HOUSING WEIGHT [Lb. (kg)]

Models 7618 / 7628			
Size	Aluminum	Alum/SS	Steel
2"	5 (2)	10 (5)	15 (7)
3"	10 (5)	10 (5)	20 (9)
4"	15 (7)	20 (9)	35 (16)
6"	30 (14)	45 (20)	75 (34)
8"	45 (20)	70 (32)	115 (52)
10"	70 (32)	110 (50)	175 (80)
12"	95 (43)	160 (73)	250 (114)

TABLE 4 – FLAME ARRESTER ASSEMBLY WEIGHT [lb.] (kg)]

Models 7618			
Size	Aluminum	Alum/SS	Steel
2"	15 (7)	20 (9)	45 (20)
3"	25 (11)	30 (14)	75 (34)
4"	40 (18)	45 (20)	105 (48)
6"	80 (36)	100 (45)	225 (102)
8"	130 (59)	155 (70)	260 (164)
10"	200 (91)	245 (111)	555 (252)
12"	285 (130)	345 (157)	795 (361)

Models 7628			
Size	Aluminum	Alum/SS	Steel
2"	22 (11)	30 (14)	70 (32)
3"	35 (16)	40 (18)	95 (43)
4"	50 (23)	60 (27)	105 (48)
6"	85 (39)	100 (45)	225 (102)
8"	150 (68)	175 (80)	360 (164)
10"	235 (107)	280 (127)	555 (252)
12"	320 (125)	385 (175)	795 (361)

WARNING: If not supported, the element housing will drop onto the remaining studs when the bases are separated. Be careful to avoid contact with the housing while separating the bases.

- On the remaining studs, loosen the housing nuts incrementally while advancing the spreader nuts to separate the bases. When the bases are separated sufficiently to remove the housing, tighten the housing nuts so the bases form a rigid assembly when the housing is removed.
- If vertically mounted flame arrester is used to support the relief valve or similar equipment, tightening the housing nuts after separating the bases will provide sufficient support for the relief valve.

7. Remove the hosing assembly for inspection. Visually inspect the flame element and the supporting grids for damage or corrosion build-up from both sides. If the flame element appears to be damaged, it should be replaced immediately.

WARNING: Failure to replace a damaged flame element can render the flame arrester ineffective.

8. Verify that the element openings are not clogged by viewing a light source through the element passages. If the flame element is dirty or clogged it can be cleaned by one of the following methods:

- Compressed air
- High pressure steam or water purge
- Solvent wash flowed by compressed air

WARNING: Never try to clean the element by inserting a sharp tool or probe into the orifices. Any damage to the integrity of these passages can render the flame arrester ineffective.

CAUTION: If compressed air, steam or high pressure water jet is used to clean clogged passageways, restrict the access to the area to prevent injury from blown debris exiting the element. Use appropriate personal safety equipment for the cleaning method used.

TIP: The best method of cleaning and frequency should be based on the experience gained in each application.

9. Inspect the sealing gaskets for damage and replace if necessary. (See Table 6 for replacement gasket part numbers.
10. Install a gasket in the counter bore of each base. Position the element housing to align with the counter bores. Insert the studs and torque all fasteners to half the value listed in Table 2 in a staggered, alternatio9n pattern to provide an evenly compresses gasket joint.

If the arrester is high temperature service or stainless steel external studs and nuts used, apply an anti-seize compound such as moly-disulfide to all threaded components.

11. Make up the final torque and check that no further nut rotation occurs at the specified torque values. The torque values are based on the original gaskets supplied by Groth Corporation.

IV. SPARE PARTS

Flame Bank Kits are available upon request. Kits include the flame element and two non-asbestos gaskets. Kit are based on Model Number, Size, and Material. The kits only apply to arresters manufactured since 1992; consult factory for sizes greater than 12". To procure appropriate kit, please contact Groth Corporation with the Serial Number, Model Number, Size, and Material.

TABLE 5 - FLAME BANK ASSEMBLY KITS

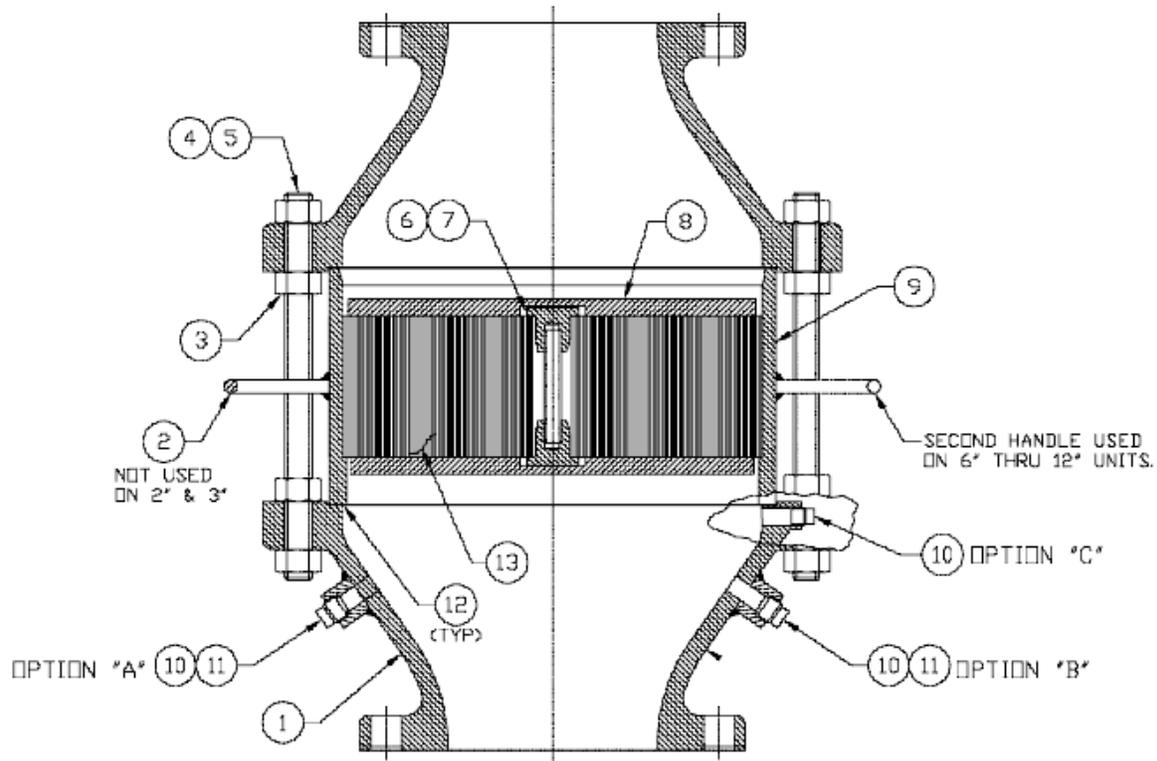
Size	Housing Material	Element Material	Kit P/N	Size	Housing Material	Element Material	Kit P/N
2"	Aluminum	Aluminum	KFB76180211	8"	Carbon Steel	Aluminum	KFB76180831
3"	Aluminum	Aluminum	KFB76180311	10"	Carbon Steel	Aluminum	KFB76181031
4"	Aluminum	Aluminum	KFB76180411	12"	Carbon Steel	Aluminum	KFB76181231
6"	Aluminum	Aluminum	KFB76180611	2"	Carbon Steel	316 SS	KFB76180235
8"	Aluminum	Aluminum	KFB76180811	3"	Carbon Steel	316 SS	KFB76180335
10"	Aluminum	Aluminum	KFB76181011	4"	Carbon Steel	316 SS	KFB76180435
12"	Aluminum	Aluminum	KFB76181211	6"	Carbon Steel	316 SS	KFB76180635
2"	Aluminum	316 SS	KFB76180215	8"	Carbon Steel	316 SS	KFB76180835
3"	Aluminum	316 SS	KFB76180315	10"	Carbon Steel	316 SS	KFB76181035
4"	Aluminum	316 SS	KFB76180415	12"	Carbon Steel	316 SS	KFB76181235
6"	Aluminum	316 SS	KFB76180615	2"	316 SS	316 SS	KFB76180255
8"	Aluminum	316 SS	KFB76180815	3"	316 SS	316 SS	KFB76180355
10"	Aluminum	316 SS	KFB76181015	4"	316 SS	316 SS	KFB76180455
12"	Aluminum	316 SS	KFB76181215	6"	316 SS	316 SS	KFB76180655
2"	Carbon Steel	Aluminum	KFB76180231	8"	316 SS	316 SS	KFB76180855
3"	Carbon Steel	Aluminum	KFB76180331	10"	316 SS	316 SS	KFB76181055
4"	Carbon Steel	Aluminum	KFB76180431	12"	316 SS	316 SS	KFB76181255
6"	Carbon Steel	Aluminum	KFB76180631				

TABLE 6 - GASKET KIT PART NUMBERS

Size	Part No.
2"	KS761802
3"	KS761803
4"	KS761804
6"	KS761806
8"	KS761808
10"	KS761810
12"	KS761812

Synthetic-Non-Asbestos Fiber sheet material with a nitrile binder. For special applications or chemical compatibility please contact the factory.

APPENDIX A: Model: 7618 Flame Arrester (2" – 12")

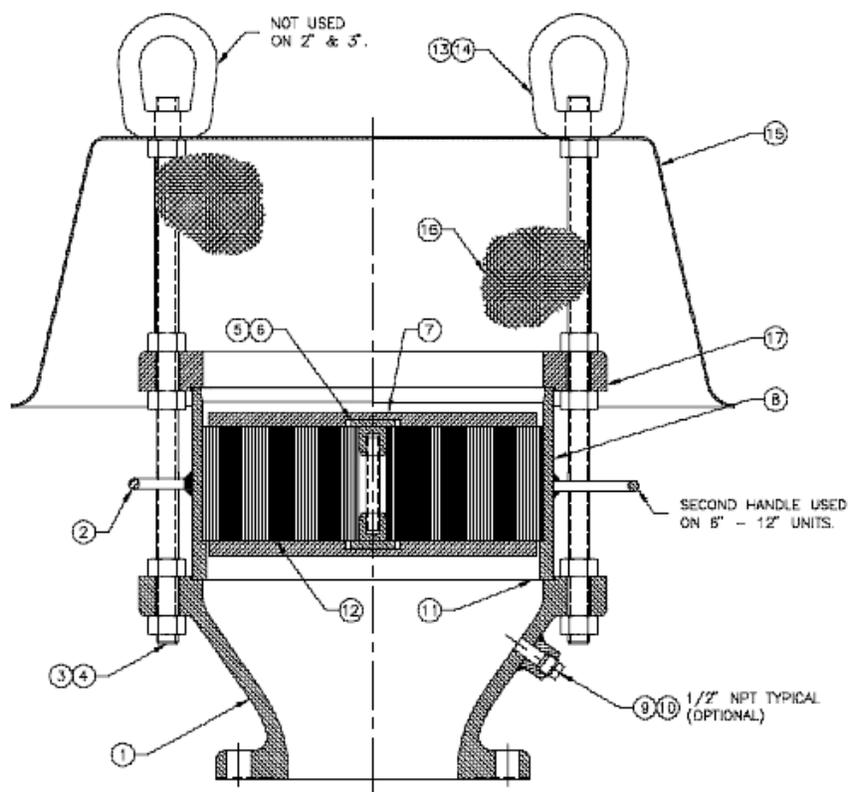


ITEM	DESCRIPTION	STANDARD MATERIALS OF CONSTRUCTION		
		ALUMINUM	CARBON STL	316 SS
1	BASE	AL (356 T6)	CS (WCB)	316 SS (CF-8M)
2	HANDLE	ALUM	CS	SS
3	SPREADER HEX NUT	SS	SS	SS
4	HEX NUT	SS	SS	SS
5	STUD	SS	SS	SS
6	ELEMENT PLUG	SS	SS	303 SS
7	ELEMENT ROD	SS	SS	316 SS
8	ELEMENT GRID	ALUM	316 SS	316 SS
9	* ELEMENT HOUSING	ALUM	CS	316 SS
10	PIPE PLUG (OPTIONAL)	ALUM	CS	316 SS
11	COUPLING (OPTIONAL)	ALUM	CS	316 SS
12	* GASKET	NON-ASB	NON-ASB	NON-ASB
13	* FLAME ELEMENT	ALUM (1)	316 SS	316 SS

(1) Available in 316 SS

* Recommended Spare Parts

APPENDIX B: Model: 7618 End-of-Line Flame Arrester (2" – 12")

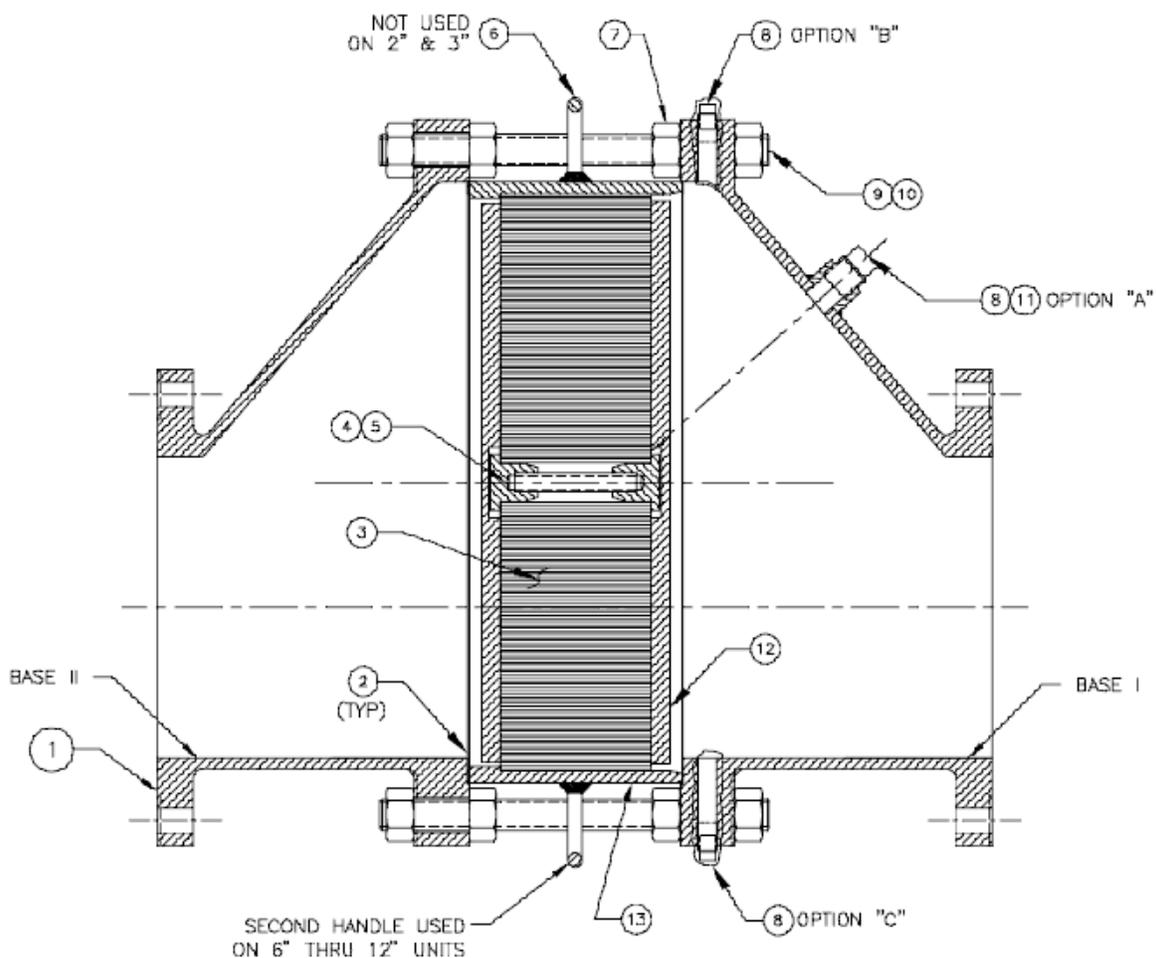


ITEM	DESCRIPTION	STANDARD MATERIALS OF CONSTRUCTION		
		ALUMINUM	CARBON STL	316 SS
1	BASE	AL (356 T6)	CS (WCB)	316 SS (CF-8M)
2	HANDLE	ALUM	CS	SS
3	HEX NUT	SS	SS	SS
4	STUD	SS	SS	SS
5	ELEMENT PLUG	SS	SS	303 SS
6	ELEMENT ROD	SS	SS	316 SS
7	ELEMENT GRID	ALUM	316 SS	316 SS
8	* ELEMENT HOUSING	ALUM	CS	316 SS
9	COUPLING (OPTIONAL)	ALUM	CS	316 SS
10	PIPE PLUG (OPTIONAL)	ALUM	CS	316 SS
11	* GASKET	NON-ASB	NON-ASB	NON-ASB
12	* FLAME ELEMENT	ALUM (1)	316 SS	316 SS
13	EYE NUT	CS	CS	316 SS
14	HEX NUT	SS	SS	SS
15	WEATHERHOOD	ALUM	CS	316 SS
16	BIRD SCREEN	SS	SS	SS
17	ADAPTER PLATE	CS	CS	316 SS

(1) Available in 316 SS

* Recommended Spare Parts

APPENDIX C: Model: 7628 Flame Arrester (2" – 12")



ITEM		DESCRIPTION	STANDARD MATERIAL OF CONSTRUCTION		
			ALUMINUM	CARBON STL	316 SS
1		BASE	AL (356 T6)	CS (WCB)	316 SS (CF-8M)
2		SPACER	ALUM	CS	316 SS
3	*	FLAME ELEMENT	ALUM (1)	316 SS	316 SS
4	*	ELEMENT HOUSING	ALUM	CS	316 SS
5		STUD	SS	SS	SS
6		HEX NUT	SS	SS	SS
7		ELEMENT GRID	ALUM	316 SS	316 SS
8		ELEMENT SHAFT	SS	SS	316 SS
9	*	GASKET	NON-ASB	NON-ASB	NON-ASB
10		LIFTING LUG	ALUM	CS	316 SS
11		PIP PLUG (OPTIONAL)	ALUM	CS	316 SS
12		COUPLING (OPTIONAL)	ALUM	CS	316 SS
13		SPREAFTER HEX NUT	SS	SS	SS

* Recommended Spare Parts

(1) Available in 316 SS