

# Enardo DFA Series

## Detonation Flame Arrestor

### Introduction

Enardo™ DFA Series detonation flame arrestors represent the best value in flame arrestor protection. They prevent flame propagation by absorbing and dissipating heat using spiral wound crimped ribbon flame cells. These cells allow maximum flow with maximum protection. They provide protection against flame propagation in piping systems that are manifolded or have long run-up distances. This design utilizes a superior element assembly that dampens the high velocities and pressures associated with deflagrations and detonations while quenching the flame front. Our design is unique in the ability to provide larger flame channels which requires less frequent maintenance and greater ease in cleaning when service is required, translating to less down time. The element offers maximum flow to pressure drop characteristics enhancing the value of our product in any system.

They are typically used for extended pipe length or multiple pipe bend configurations to stop high pressures and flame velocities associated with detonations and overdriven detonations. In addition, it stops confined and unconfined, low and high pressure deflagrations. All units are bi-directional and are proven to stop an ignited flammable vapor mixture approaching from either direction that can be traveling at subsonic or supersonic velocities.

Designed with flanged connections, this Arrestor provides the option of the removal of the flame cell element for easy cleaning and replacement without disconnecting of the pipe connection. Special material and protective coatings are available on request.

U.S. Coast Guard (USCG) Approved 1 through 24 inches / 25 through 600 mm IIA (D) and IIB3 (C) Concentric and Eccentric design.

EN 12874 ATEX Certified 1 through 24 inches / 25 through 600 mm IIA and IIB3 Concentric and Eccentric design.

### Models

Enardo DFA Series  
EN 12874 ATEX Certified  
U.S. Coast Guard (USCG) Approved

### Sizes Available

4 to 48 in. / 100 to 1200 mm  
1 through 24 in. / 25 through 600 mm

### Construction Materials

**Housing:** Carbon steel, 304 Stainless steel, 316 Stainless steel and Hastelloy®<sup>(1)</sup>

**Element:** 304 Stainless steel, 316 Stainless steel and Hastelloy®

### Gas Group

IIA (D), IIB3 (C) and IIC (B)



Figure 1. Enardo EN DFA

### Features

- All Detonation Flame Arrestors are Designed for Unstable Detonations
- Removable Element Design Allows for Easy Inspection, Cleaning and Replacement
- Fluoropolymer Coated Hardware Provides Outstanding Corrosion and Chemical Resistance
- Standard Temperature Probe on EN Models
- Maximum Flow
- Less Pressure Drop
- Easy Cleaning
- Less Clogging
- Less Maintenance
- Bi-directional Design
- Available in ANSI, DIN and JIS Flanges



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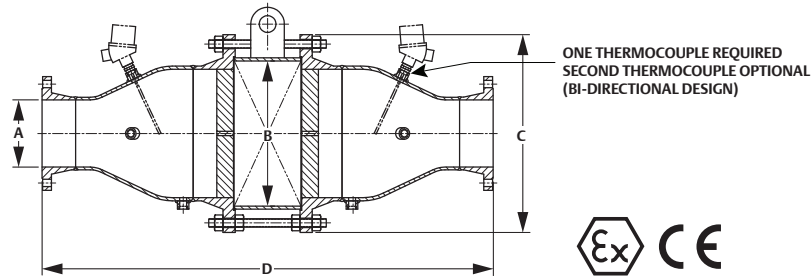
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## ATEX Certified Model



See Following Page For Additional ATEX Certified Models

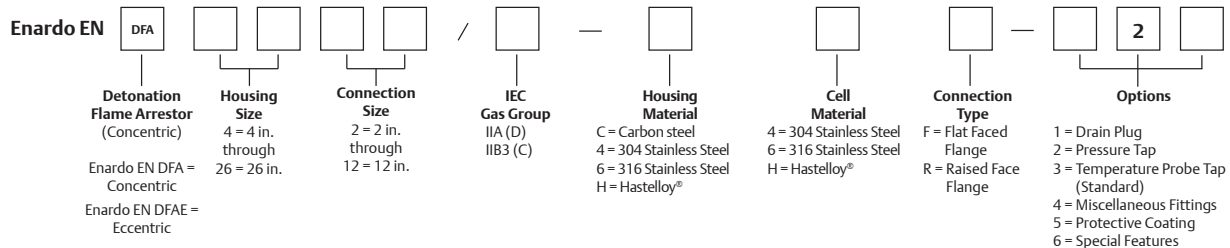
Figure 2. Enardo™ EN DFA Series Dimensions

Table 1. Enardo EN DFA Series Dimensions<sup>(1)</sup>

MODEL	A (NOMINAL CONNECTION SIZE)		B (HOUSING SIZE)		C (OUTSIDE DIAMETER)		D (OVERALL LENGTH)				APPROXIMATE WEIGHT (GROUP IIA MODELS)	
	In.	mm	In.	mm	In.	mm	Gas Group IIA		Gas Group IIB3			
							In.	mm	In.	mm	Lbs	kg
Enardo EN DFA-0402	2	50	4	101	7.5	188	25.3	644	23.3	593	80	36
Enardo EN DFA-0602	2	50	6.6	168	10	250	29.8	758	27.8	707	118	54
Enardo EN DFA-0603	3	75	6.6	168	10	250	30.3	771	28.3	720	125	57
Enardo EN DFA-0803	3	75	10	254	13.5	338	33.3	847	31.3	796	206	94
Enardo EN DFA-0804	4	100	10	254	13.5	338	33.8	859	31.8	809	215	98
Enardo EN DFA-1204	4	100	14	356	19	475	38.8	986	36.8	936	452	205
Enardo EN DFA-1206	6	150	14	356	19	475	39.8	1012	37.8	961	468	212
Enardo EN DFA-1606	6	150	18	457	23.5	588	52.8	1342	50.8	1291	874	396
Enardo EN DFA-1608	8	200	18	457	23.5	588	53.8	1367	51.8	1317	910	413
Enardo EN DFA-2008	8	200	22	559	27.5	688	67.2	1707	65.2	1656	1294	587
Enardo EN DFA-2010	10	250	22	559	27.5	688	67.2	1707	65.2	1656	1320	599
Enardo EN DFA-2410	10	250	26	660	32	800	67.8	1723	65.8	1672	1740	789
Enardo EN DFA-2412	12	300	26	660	32	800	68.8	1748	66.8	1698	1800	817

1. Dimensions may vary somewhat from those given above. Allow for a tolerance of ± 1.00 in. / 25 mm. Specific dimensions available on request.

### Key to Enardo EN DFA Model Number



### Example:



Indicates a 6 in. Concentric Enardo DFA with a 12 in. Carbon steel housing, ANSI 150 lb raised faced flange connection and a 304 Stainless steel IEC Group "IIA" flame cell element. It also has an options of drain plugs, pressure taps and standard temperature probe.



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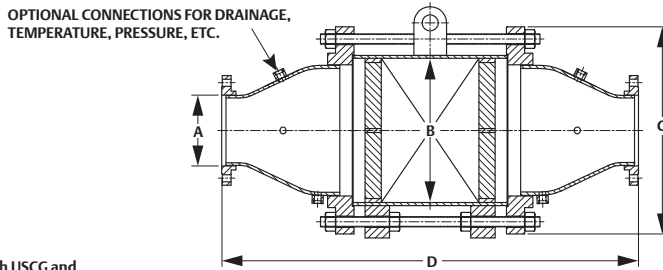
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# Enardo DFA Series

Detonation Flame Arrestor

## ATEX/US Coast Guard Certified Model\*



\*Not all models are available with USCG and ATEX certifications. Consult Flame Arrestor Certifications Chart for more information.

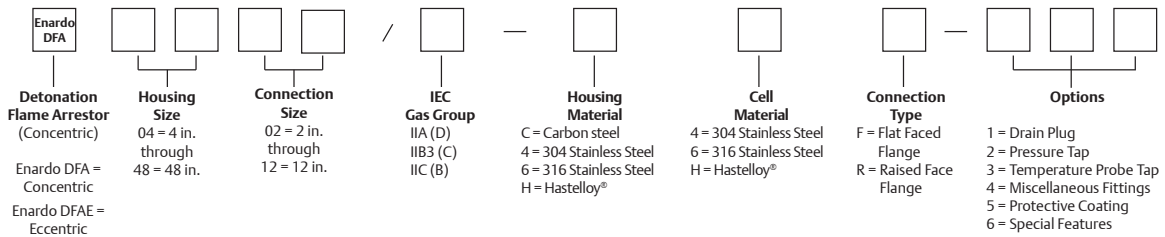
Figure 3. Standard Enardo™ DFA Series Dimensions

Table 2. Standard Enardo DFA Series Dimensions<sup>(1)</sup>

MODEL	A (NOMINAL CONNECTION SIZE)		B (HOUSING SIZE)		C (OUTSIDE DIAMETER)		D (OVERALL LENGTH)				APPROXIMATE WEIGHT (GROUP D MODELS)	
	In.	mm	In.	mm	In.	mm	Gas Group B/C		Gas Group D		Lbs	kg
							In.	mm	In.	mm		
Enardo DFA-0401	1	25	4	100	9.00	229	25.00	635	21.00	533	90	40.8
Enardo DFA-0602	2	50	6	150	11.00	279	28.00	711	24.00	610	175	79.4
Enardo DFA-0803	3	75	8	200	13.50	343	30.00	762	26.00	660	220	99.8
Enardo DFA-1004	4	100	10	250	16.00	406	32.00	813	32.00	813	400	181.4
Enardo DFA-1206	6	150	12	300	19.00	483	36.00	914	36.00	914	500	226.8
Enardo DFA-1608	8	200	16	400	25.50	648	51.25	1302	51.25	1302	1360	616.9
Enardo DFA-2010	10	250	20	500	30.50	775	62.75	1594	62.75	1594	1945	882.2
Enardo DFA-2412	12	300	24	600	36.00	914	64.50	1638	64.50	1638	3000	1360.8
Enardo DFA-2814	14	350	28	700	40.75	1035	70.00	1778	70.00	1778	3400	1542.2
Enardo DFA-3016	16	400	30	750	43.00	1092	79.00	2007	79.00	2007	3800	1723.7
Enardo DFA-3418	18	450	34	850	47.50	1207	89.00	2261	89.00	2261	4800	2177.2
Enardo DFA-3620	20	500	36	900	50.00	1270	89.00	2261	89.00	2261	5600	2540.1
Enardo DFA-4824	24	600	48	1200	59.50	1511	101.00	2565	101.00	2565	8700	3946.3

1. Dimensions may vary somewhat from those given above. Allow for a tolerance of ± 1.00 in. / 25 mm. Specific dimensions available on request.

### Key to Enardo DFA Series Model Number



Example:



Indicates a 6-inch Concentric Enardo DFA with a 12 in. Carbon steel housing, ANSI 150 lb raised faced flange connection and a 304 Stainless steel IEC Group "D" flame cell element. It also has an options of drain plugs, pressure taps and standard temperature probe connections.



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# Standard Flame Arrestor Selection Criteria

## Including US Coast Guard and ATEX/US Coast Guard Certified Detonation Arrestors

PARAMETERS	END-OF-LINE FVFA AND VSFA	IN-LINE (STANDARD) ENARDO™ 7 SERIES, HP AND IL	IN-LINE HP DEFLAGRATION ENARDO 8 SERIES	DETONATION ARRESTOR DFA
<b>NEC Group "D" or IEC Group IIA Gases</b>				
Maximum length of pipe between the arrestor and the ignition source without bends.	(Mounted on end of pipe)	20 ft / 6 m	60 ft / 18 m	Unlimited
Maximum length of pipe between the arrestor and ignition source with 1 to 90° bend.	(Mounted on end of pipe)	20 ft / 6 m	60 ft / 18 m	Unlimited
Maximum length of pipe between the arrestor and the ignition source with multiple bends.	(Mounted on end of pipe)	Not Recommended with Multiple Bends	Not Recommended with Multiple Bends	Unlimited
Flame Stabilization at stoichiometric mixture and ambient temperature not to exceed at 140°F / 60°C. <sup>(1)</sup>	5 minutes	5 minutes 30 minutes (Factory Mutual Approved units)	15 minutes	2 hours (concentric only)
Operating Pressure	Atmospheric	15.4 psia / 106 kPa	19.7 psia / 134 kPa	Concentric: 3 to 12 in. (22.7 psia) / 50 to 300 mm (157 kPa) Concentric: 2 and 14 to 20 in. (20.7 psia) / 350 to 500 mm (143 kPa)
<b>NEC Group "C" or IEC Group IIB3 Gases</b>				
Maximum length of pipe between the arrestor and the ignition source without bends.	(Mounted on end of pipe)	6 ft / 2 m (open ended pipe)	35 ft / 10.6 m	Unlimited
Maximum length of pipe between the arrestor and ignition source with 1 to 90° bend.	(Mounted on end of pipe)	6 ft / 2 m (open ended pipe)	35 ft / 10.6 m	Unlimited
Maximum length of pipe between the arrestor and the ignition source with multiple bends.	(Mounted on end of pipe)	Not Recommended with Multiple Bends	Not Recommended with Multiple Bends	Unlimited
Flame Stabilization at stoichiometric mixture and ambient temperature not to exceed at 140°F / 60°C. <sup>(1)</sup>	5 minutes (minimum)	5 minutes (minimum)	15 minutes	15 minutes
Operating Pressure	Atmospheric	15.4 psia / 106 kPa	16.7 psia / 115 kPa	Concentric: 2 to 20 in. (20.7 psia) / 50 to 500 mm (143 kPa) Eccentric: 3 to 20 in. (18.7 psia) / 75 to 500 mm (129 kPa)
<b>NEC Group "B" or IEC Group IIC Gases (Except Acetylene)</b>				
Maximum length of pipe between the arrestor and the ignition source without bends.	(Mounted on end of pipe)	4 ft / 1.2 m (open ended pipe)	15 ft / 4.5 m	Unlimited
Maximum length of pipe between the arrestor and ignition source with 1 to 90° bend.	(Mounted on end of pipe)	Not Recommended with a Bend	15 ft / 4.5 m	Unlimited
Maximum length of pipe between the arrestor and the ignition source with multiple bends.	(Mounted on end of pipe)	Not Recommended with Multiple Bends	Not Recommended with Multiple Bends	Unlimited
Flame Stabilization at stoichiometric mixture and ambient temperature not to exceed at 140°F / 60°C. <sup>(1)</sup>	2 minutes	2 minutes	15 minutes	15 minutes
Operating Pressure	Atmospheric	15.4 psia / 106 kPa	16.7 psia / 115 kPa	Concentric: 2 to 6 in. (17.7 psia) / 50 to 150 mm (122 kPa)
1. Unlimited burning should not be allowed in any flame arrestor regardless of its burn time rating. We recommend the use of flame sensors, along with an appropriate means of extinguishing the fire, in any situation where a stabilized burn may occur.				



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# ATEX Certified Flame Arrestor Selection Criteria

See Previous Page for Information on ATEX/US Coast Guard Detonation Arrestor Selection Criteria

PARAMETERS	END-OF-LINE FVFA	IN-LINE (STANDARD) ENARDO™ 7 SERIES, HP AND IL	DETONATION ARRESTOR DFA
<b>IEC Group IIA Gases or NEC Group "D"</b>			
Maximum length of pipe between the arrestor and the ignition source.	(Mounted on end of pipe)	2 in. to 6.5 ft / 50 mm to 2 m 3 in. to 7.5 ft / 75 mm to 2.3 m 4 in. to 10 ft / 100 mm to 3 m 6 in. to 13.1 ft / 150 mm to 4 m 8 in. to 13.3 ft / 200 mm to 4 m 10 in. to 16.6 ft / 250 mm to 5 m 12 in. to 19.7 ft / 300 mm to 6 m	2 to 12 in. / 50 to 300 mm  Unrestricted (Designed for Unstable Detonations)
Flame Stabilization at stoichiometric mixture and ambient temperature not to exceed at 140°F / 60°C.	Short Time Burn Rating	Short Time Burn Rating	Short Time Burn Rating
Operating Pressure	Atmospheric	15.95 psia / 110 kPa	2 to 6 in. (17.7 psia) / 50 to 150 mm (122 kPa) 8 to 12 in. (16.9 psia) / 200 to 300 mm (116.5 kPa)
<b>IEC Group IIB3 Gases or NEC Group "C"</b>			
Maximum length of pipe between the arrestor and the ignition source.	(Mounted on end of pipe)	2 in. to 8.3 ft / 50 mm to 2.5 m 3 in. to 12.5 ft / 75 mm to 3.8 m 4 in. to 16.6 ft / 100 mm to 5 m 6 in. to 25 ft / 150 mm to 7.6 m 8 in. to 33.3 ft / 200 mm to 10.16 m 10 in. to 39.3 ft / 250 mm to 12 m 12 in. to 39.4 ft / 300 mm to 12 m	2 to 12 in. / 50 to 300 mm  Unrestricted (Designed for Unstable Detonations)
Flame Stabilization at stoichiometric mixture and ambient temperature not to exceed at 140°F / 60°C.	Short Time Burn Rating	Short Time Burn Rating	Short Time Burn Rating
Operating Pressure	Atmospheric	15.95 psia / 110 kPa	17.2 psia / 118.3 kPa



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# Flame Arrestor Certifications

## Flame and Detonation Arrestor



**Table 1. Available Approvals for Enardo™ 7 Series Deflagration Flame Arrestors<sup>(1)</sup>**

MODEL	GROUP IIA (D)		GROUP IIB3 (C)
	ATEX ISO 16852	Factory Mutual	ATEX ISO 16852
Enardo 70402	X	X	X
Enardo 70602	X		X
Enardo 70603	X	X	X
Enardo 70803	X		X
Enardo 70804	X	X	X
Enardo 71204	X		X
Enardo 71206	X	X	X
Enardo 71606	X		X
Enardo 71608	X	X	X
Enardo 72008	X		X
Enardo 72010	X	X	X
Enardo 72410	X		X
Enardo 72412	X	X	X

**Table 2. Available Approvals for Free Vent Flame Arrestors (FVFA)<sup>(1)</sup>**

MODEL	GROUP IIA (D)	GROUP IIB3 (C)
	ATEX ISO 16852	ATEX ISO 16852
Enardo 402	X	X
Enardo 602	X	X
Enardo 603	X	X
Enardo 803	X	X
Enardo 804	X	X
Enardo 1204	X	X
Enardo 1206	X	X
Enardo 1606	X	X
Enardo 1608	X	X
Enardo 2008	X	X
Enardo 2010	X	X
Enardo 2410	X	X
Enardo 2412	X	X

1. Applicable approvals must be specified prior to manufacture and will be indicated on the product nameplate.



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# Flame Arrestor Certifications

## Flame and Detonation Arrestor

**Table 3. Available Approvals for Detonation Flame Arrestors (DFA)<sup>(1)</sup> - Group IIA (D)**

MODEL	TYPE OF DETONATION	ATEX WITH SHORT TIME BURN RATING	U.S. COAST GUARD AND ATEX/U.S. COAST GUARD WITH ENDURANCE BURN RATING <sup>(2)</sup>
Enardo™ DFA-402	Unstable	X	
Enardo DFA-602	Unstable	X	X <sup>(3)</sup>
Enardo DFA-603	Unstable	X	
Enardo DFA-803	Unstable	X	X
Enardo DFA-804	Unstable	X	
Enardo DFA-1004	Unstable		X
Enardo DFA-1204	Unstable	X	X
Enardo DFA-1206	Unstable	X	X
Enardo DFA-1608	Unstable	X	X
Enardo DFA-2010	Unstable	X	X
Enardo DFA-2412	Unstable	X	X
Enardo DFA-2814	Unstable		X
Enardo DFA-3016	Unstable		X
Enardo DFA-3418	Unstable		X
Enardo DFA-3620	Unstable		X

**Table 4. Available Approvals for Detonation Flame Arrestors (DFA)<sup>(1)</sup> - Group IIB3 (C)**

MODEL	TYPE OF DETONATION	ATEX WITH SHORT TIME BURN RATING	U.S. COAST GUARD AND ATEX/U.S. COAST GUARD WITH SHORT TIME BURN RATING
Enardo DFA-402	Unstable	X	
Enardo DFA-602	Unstable	X	X
Enardo DFA-603	Unstable	X	
Enardo DFA-803	Unstable	X	X
Enardo DFA-804	Unstable	X	
Enardo DFA-1004	Unstable		X
Enardo DFA-1204	Unstable	X	X
Enardo DFA-1206	Unstable	X	X
Enardo DFA-1608	Unstable	X	X
Enardo DFA-2010	Unstable	X	X
Enardo DFA-2412	Unstable	X	X
Enardo DFA-2814	Unstable		X
Enardo DFA-3016	Unstable		X
Enardo DFA-3418	Unstable		X
Enardo DFA-3620	Unstable		X

1. Applicable approvals must be specified prior to manufacture and will be indicated on the product nameplate.

2. Endurance burn rating applicable only to concentric configuration.

3. Short time burn rating only for both concentric and eccentric configurations of this model.



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