



Rev. Apr. 2/02

# INLINE FLAME ARRESTERS

## Westech Industrial Ltd. INLINE DETONATION FLAME ARRESTER

### **SERIES 59**

### **INSTALLATION AND MAINTENANCE MANUAL**

**Customer:**  
**Customer P.O. No.:**  
**Westech Order No.:**

**Model No.:**  
**Serial No.:**  
**Tag No.:**

**WFA59-**

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<b>INSTALLATION &amp; MAINTENANCE MANUAL</b>	
<b>DETONATION FLAME ARRESTER</b>	
<b>SERIES 59</b>	
<b>FABRICATED STEEL</b>	
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## **SECTION ONE**

### ***PRODUCT DESCRIPTION***

#### **INLINE DETONATION FLAME ARRESTER**

The Series 59 In-line Detonation Flame Arrester is built to exceed industry standards for In-line Flame Arresters. These standards provide the minimum requirements for design, construction, performance and testing of detonation flame arresters.

#### ***Gas Composition***

The Model WFA59 is suitable for gases with an MESG of 0.9 mm (.035 in.) or greater.

#### ***Operation Pressure***

The Westech Series 59 Inline Detonation Flames Arresters are approved for use in systems with varying maximum operating pressures. The limit is dependent on the governing standards. Refer to the unit nameplate or the drawings in Section 6 for the specification of your unit.

#### ***Warranty Statement***

Westech warrants that the Westech Inline Detonation Flame Arrester will quench all traveling and stabilized flames generated from any mixture of air and a gas having a MESG above the stated minimum and operating at or under the stated maximum operating pressure for the specific size and model of arrester. See conditions and parameters as described in the attached Warranty Statement in Section 8.

***The Detonation Flame Arrester is designed and tested to stop all types of traveling flame profiles generated by the specified gases. The standards also require the Detonation Flame Arrester to contain stabilized flame. The method of determining the time capability varies in all standards. To provide protection in excess of these standards, it is highly recommended that instrument alarms or alternative shutdown systems such as the Westech Stabilized Flame Suppression System (SFSS) be provided as appropriate.***

**TABLE 1**

**WESTECH INLINE DETONATION FLAME ARRESTERS**

**SERIES 59**

**MODEL AND SERIAL NUMBER DESIGNATION**

<b>ARRESTER MODEL DESIGNATION</b>						
SERIES NO.	NOMINAL PIPE SIZE		HOUSING MATERIAL	ORIENTATION	ELEMENT MATERIAL	OPTIONS
	Inches RF 150# ANSI- B16.5	mm PN16 DIN				
<b>WFA59-</b>	<b>XXX-</b>		<b>X-</b>	<b>X-</b>	<b>X-</b>	<b>XXXX</b>
	001 002 003 004 006 008 010 012	025 050 080 100 150 200 250 300	1 = Carbon Steel 2 = 316 Stainless Steel 7 = 304 Stainless Steel 8 = Hastelloy	C = Concentric E = Eccentric	1 = 304 Stainless Steel 2 = 316 Stainless Steel 3 = Hastelloy	1 = Instrument/Drain Connections 2 = Special Paint 3 = NDE 4 = Other Special Options
<b>EXAMPLE:</b> WFA59-004-1-C-2-1200 would be for a 4" line size (RF 150# ANSI-B16.5), with a carbon steel body, concentric orientation, 316 S.S. element, instrument and/or drain connections and special paint.						
<b>ARRESTER SERIAL NUMBER DESIGNATION</b>						
SERIES NO.	NOMINAL PIPE SIZE		PRODUCTION NO.			
	Inches	mm				
<b>WFA59-</b>	<b>XXX-</b>		<b>XXXX</b>			
	001 002 003 004 006 008 010 012	025 050 080 100 150 200 250 300	0001 0002, etc.			
<b>ELEMENT SERIAL NUMBER DESIGNATION</b>						
SERIES NO.	NOMINAL PIPE SIZE		ELEMENT PRODUCTION NO.			
	Inches	mm				
<b>E59-</b>	<b>XXX-</b>		<b>XXXX</b>			
	001 002 003 004 006 008 010 012	025 050 080 100 150 200 250 300	0001 0002, etc.			

**\*Consult factory for larger line sizes.**

Distribution: CF, EP, MS, PP

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## **SECTION TWO**

### **INSTALLATION**

#### ***Lifting of Westech Detonation Flame Arrester***

Ensure proper cranes and lifting cables are used that will offer adequate maneuverability for the weight of the Detonation Flame Arrester. See Table 3 in Section 4 for unit weights. The Westech Detonation Flame Arrester should only be moved/raised by use of the unit lifting lug as shown in Section 6, General Layout Drawing. The lifting lug is located in such a position to allow the lifting of the Westech Detonation Flame Arrester in the proper aligned horizontal position at the center of gravity of the detonation flame arrester.

***WARNING - all personnel should remain clear of the Flame Arrester during lifting operations. Personnel should never be allowed to be physically located directly beneath the Westech Detonation Flame Arrester during lifting operations.***

#### ***Flange Rating***

The Detonation Flame Arrester is intended to be installed in piping systems having a nominal diameter equal to the line size designation indicated in the Model Number. The standard pipe flanges provided on both the inlet and outlet of the Detonation Flame Arrester are raised face, class 150 pipe flanges, ANSI B16.5. Check the Layout Drawing in Section 6 to ensure the mating customer-supplied piping system should include equivalent pipe flanges of the same type and class as the Westech Detonation Flame Arrester.

The Westech Detonation Flame Arrester is shipped with a rust protective coating on the pipe flange faces and is fitted with flange covers to protect the internals.

#### ***Pipe Flange Studs & Nuts***

Studs, nuts and gaskets for the mating pipe flange connections are not supplied with the unit. Use of the correct size studs, nuts and gaskets are mandatory as follows:

Standard flange studs and nuts shall be as per ANSI B16.5 standards.

Ensure bolts are torqued according to applicable specifications.

All pipe flange seating areas are to be wiped clean of sand and all other foreign material before assembly.

### ***Flow Direction***

The performance of the Model 59 In-Line Detonation Flame Arresters is not sensitive to flow direction.

### ***Orientation***

The performance of the Model 59 In-Line Detonation Flame Arresters is not sensitive to installation angle. In all orientations, consideration should be given for collection and draining of any free liquid, condensate and/or sediment.

### ***Mechanical Support***

The Westech Detonation Arrester is designed for inline use. The weight of the Westech Detonation Arrester is to be supported by suitable pipe supports located as close as practical to the arrester. See Section 4, Table 3 for unit weights.

### ***Ground Level Distance to Pipe Flange Center Line***

The Westech Detonation Flame Arrester has a ground level to pipe flange center line distance as shown in Section 6, General Layout Drawing. The detonation arrester should be installed with sufficient clearance around the unit to facilitate maintenance and inspection activities.

### ***Instrument Connections***

The Westech Detonation Flame Arrester may be provided with standard instrument ports (plugged). If so fitted, the size and location of the ports are shown in Section 6, General Layout Drawing.

### ***Drain Connection***

The Westech Detonation Flame Arrester may be provided with drain ports. If so fitted, the size and location of the ports are as shown in Section 6, General Layout Drawing. Ensure that during installation, the unit is orientated to allow for any condensate and/or free liquid to collect in the area of the drain ports.

### **CONNECTION WARNING:**

***All drains vents, instrument connections and thermowell connections discussed above can be subjected to the same flame and pressure profiles as the inside of the Detonation Flame Arrester. It is absolutely mandatory that there are no flame paths between any vents, drains, thermowells, pressure taps, instrument connections (i.e. diaphragm in differential pressure ( $\Delta P$ ) gauges, etc.), or any other connections which could cause flame to bypass the Detonation Flame Arrester rendering it useless for the intended purpose.***

***INSTALLATION INSTRUCTIONS***

1. Ensure mating flange and gasket surfaces are clean and of equivalent size.
2. Align the unit, if fitted, with drain port down.
3. Install proper sized nuts and studs for both the inlet and outlet flanges and torque to stated customer or gasket manufacturer specifications.
4. If applicable, connect drain and vent run-offs and/or instruments.
5. Leak test all connections and pipe flanges.

## **SECTION THREE**

### **MAINTENANCE**

#### **1. Training**

Westech offers a regular maintenance training program (1 day) which can be held at your location or at our facilities in Calgary, Alberta, Canada. This comprehensive training program provides an excellent background in flame propagation technology. Certificates are issued upon completion of the maintenance training course.

#### **2. Cleaning Frequency**

The decision to clean the element is made when the pressure drop of flowing gases through the arrester exceeds the maximum allowable value as set by plant engineering.

The pressure drop is determined by calculating the difference in pressure from a point as close as possible to the arrester upstream and a second point as close as possible downstream.

This connection must only be made when non-explosive gases are flowing through the arrester. See "**Connection Warning**", Page 6.

If the pressure difference exceeds a predetermined limit, cleaning of the element needs to be considered. See item 4 c) for cleaning procedure.

#### **3. Element Pack Removal**

- a. Attach appropriate lifting device to the lifting lug on the element pack (See Table 3, Section 4 for unit weights).
- b. Remove the Arrester Housing studs from the top half of the unit and loosen the nuts on the remaining studs.
- c. Apply light lifting pressure and carefully break the gasket seals. Certain sized units are equipped with Spreader Nuts that can be turned to separate the end caps from the element housing. Alternatively a pry bar may be necessary to separate the parts. Use extreme care not to damage the sealing surfaces of the element housing or end cap face during separation. Do not use the lifting tension of the crane to break the seal.
- d. Lift out the element pack and lower to ground level. The element pack should be placed in the horizontal position on a clean surface.



**WARNING:** The arrester elements are not secured to the element housing. The elements can slide out of the arrester housing as they are not mechanically attached. Handle with care so that the elements do not fall out unintentionally.

#### 4. *Removal and Installation of the Elements*

*For most applications it is not necessary to remove the elements from the element housing for cleaning or service. Westech recommends that cleaning be attempted without element removal. Only in extreme cases should the elements be removed and the removal procedure should only be done by qualified personnel.*

**CAUTION:** *Although the element is constructed of durable steel alloys, it must be handled carefully to prevent surface damage or misalignment.*

##### a. **Element Removal**

**WARNING:** The element material is very thin and damages easily. Its edges are as sharp as razor blades and extreme care must be taken when handling. **ALWAYS WEAR PROTECTIVE CLOTHING AND GLOVES WHEN HANDLING MODEL 59 ELEMENTS.**

On smaller units, the elements can be handled relatively easily by hand. See Table 3, Section 4 for element pack weights.

- Place the element pack down on a clean piece of plywood or other protective material. Tip the element pack over so that the centerline of assembly is vertical.

**CAUTION:** *Use extreme care to prevent any element from falling out of the housing or telescoping when handling.*

- Slide the housing up, pushing the elements down as necessary until it is clear. Extreme caution must be used so not damage the parts or telescope the individual elements.
- Inspect the housing for damage and ensure that no debris has collected inside the arrester.

##### b. **Element Inspection**

The elements must be inspected for:

- Material deposits on the outer surfaces which may block flow and cause an increased pressure drop.

- The condition of the element winding, paying particular attention to unnatural conditions such as swelling on the outer surface of the element, or separation of any winding layers.
- The Westech Series 59 arrester elements are constructed of coiled, expanded metal. After coiling, the end is secured with stainless steel screw(s) and duct tape. The screw prevents unwrapping of the material and the tape covers the sharp edge of the material. Elements for larger units have also been fitted with a stainless steel band to retain the material. **SEE WARNING ABOVE.**
- Repair to any damage of the elements is not authorized by anyone other than Westech Industrial personnel.

**c. Cleaning of Clogged Elements**

- Soak clogged elements in a hydrocarbon solvent for a prolonged period. Westech manufactures and sells a container specially designed for element cleaning. Contact your representative for more information.
- After soaking, blow the unit dry using an air gun
- Using a steam hose or pressure washer can also work effectively to clean the elements.

**d. Element Replacement**

- Stack up the elements on a clean surface.
- Slowly lower the arrester housing over the stack. Use care not to crush or telescope the outer wraps of the elements. The fit should be snug.
- Once the housing has been lowered over all elements, lift to the assembly to vertical using the lifting lug. Use extreme care to prevent the bottom element from falling out of the housing or telescoping. **SEE CAUTION ABOVE.**
- Please see the Assembly Drawing in Section 6 for an exploded view of the arrester assembly.

**5. Arrester Body Internal Inspection**

- Inspect the arrester housing seating surfaces and end caps for corrosion.
- Wire brush, clean and vacuum the arrester housing of all sand, scale and hydrocarbon deposits, etc.
- Check all internal parts for security and integrity.
- If any defects are noted, contact Westech Service Department immediately.

### ***ELEMENT TYPES***

Westech manufactures different types of elements in order to meet the various needs of our customers. Different elements may be required for other initial operating pressures or MESG specifications that are nonstandard.

**SECTION FOUR**

**SPECIFICATIONS FOR THE  
SERIES 59 FLAME ARRESTERS**

<b>TABLE 2: BOLT TORQUES</b>				
<b>ITEM</b>	<b>PART NO.</b>	<b>QTY.</b>	<b>SIZE</b>	<b>TORQUE</b>
<b>2" Model 59</b>				
Arrester Housing Studs	FA60ACS-2	8	5/8" x 10" B7	320 ft-lb
Arrester Housing Nuts	FA60ACN-2	16	5/8" UNC 2H	(45 kg-m)
<b>3" Model 59</b>				
Arrester Housing Studs	FA60ACS-3	8	3/4" x 11" B7	320 ft-lb
Arrester Housing Nuts	FA57CAN-2/3	16	3/4" UNC 2H	(45 kg-m)
<b>4" Model 59</b>				
Arrester Housing Studs	FA59ACS-4	12	7/8" x 12" B7	320 ft-lb
Arrester Housing Nuts	FA57ACN-4	24	7/8" UNC 2H	(45 kg-m)
<b>6" Model 59</b>				
Arrester Housing Studs	FA59ACS-4	12	7/8" x 12" B7	320 ft-lb
Arrester Housing Nuts	FA57ACN-4	24	7/8" UNC 2H	(45 kg-m)
<b>8" Model 59</b>				
Arrester Housing Studs	FA59ACS-8	16	1" x 12" B7	320 ft-lb
Arrester Housing Nuts	FA57ACN-6/8	32	1" UNC 2H	(45 kg-m)
<b>10" Model 59</b>				
Arrester Housing Studs	FA59ACS-10	20	1-1/8" x 13" B7	480 ft-lb
Arrester Housing Nuts	FA60ACN-10	40	1-1/8" UNC 2H	(60 kg-m)
<b>12" Model 59</b>				
Arrester Housing Studs	FA59ACS-12	20	1-1/4" x 14" B7	480 ft-lb
Arrester Housing Nuts	FA60ACN-12	40	1-1/4" UNC 2H	(60 kg-m)
Use only manufacturer's parts.				

**\*Note:**

- a. Torque specifications are based on specified gasket material. Please check with gasket manufacturer for proper torque settings when using materials other than graphite filled spiral wound gaskets.
- b. This torque setting is based on a dry stud that has no lubrication on either the nut or the stud. Lubrication of either item can significantly reduce the allowable torque setting.

<b>TABLE 3: UNIT WEIGHTS (approximate)</b>		
<b>MODEL</b>	<b>ASSEMBLED WEIGHT</b>	<b>ELEMENT PACK WEIGHT</b>
WFA59-02	80 lbs (36 kg)	32 lb. (15 kg)
WFA59-03	135 lbs (61 kg)	50 lb. (23 kg)
WFA59-04	280 lbs (127 kg)	100 lb. (45 kg)
WFA59-06	365 lbs (165 kg)	136 lb. (62 kg)
WFA59-08	740 lbs (336 kg)	190 lb. (86 kg)
WFA59-10	1132 lbs (514 kg)	285 lb. (129 kg)
WFA59-12	1480 lbs (671 kg)	356 lb. (161 kg)

The weights listed above are for standard, unpainted, carbon steel units with 316SS elements. Actual unit weight may vary depending on construction materials and options.

**SECTION FIVE**

Westech Industrial Ltd. recommends that the customers keep on hand the following spare parts for their arresters. The specific parts listed below are for the standard carbon steel units. Check the model number designation of your unit (refer to Table 1 in Section 1) and order the parts of equal material and element type specified. Please refer to Sections 3 and 4 for instructions on installing these parts.

<b>RECOMMENDED SPARE PARTS</b>		
<b>WESTECH PART NO.</b>	<b>DESCRIPTION</b>	<b>RECOMMENDED QTY.</b>
<b>2" Model 59</b>		
FA60ACS-2	Arrester Housing Stud (5/8" x 10" L B7)	2
FA60ACN-2	Arrester Housing Nuts (5/8" 2H)	4
FA60GAC-2	Arrester Housing Gasket (978C)	2
FA59EL-002-1-C-2	Element Pack: CS Housing, 316SS element material	1
<b>3" Model 59</b>		
FA60ACS-3	Arrester Housing Stud (3/4" x 11" L B7)	2
FA57ACN-2/3	Arrester Housing Nuts (3/4" 2H)	4
FA60GAC-3	Arrester Housing Gasket (978C)	2
FA59EL-003-1-C-2	Element Pack: CS Housing, 316SS element material	1
<b>4" Model 59</b>		
FA59ACS-4	Arrester Housing Stud (7/8" x 12" L B7)	4
FA57ACN-4	Arrester Housing Nuts (7/8" 2H)	8
FA60GAC-4	Arrester Housing Gasket (978C)	2
FA59EL-004-1-C-2	Element Pack: CS Housing, 316SS element material	1
<b>6" Model 59</b>		
FA59ACS-4	Arrester Housing Stud (7/8" x 12" L B7)	4
FA57ACN-4	Arrester Housing Nuts (7/8" x 2H)	8
FA60GAC-6	Arrester Housing Gasket (978C)	2
FA59EL-006-1-C-2	Element Pack: CS Housing, 316SS element material	1
<b>8" Model 59</b>		
FA59ACS-8	Arrester Housing Stud (1" x 12" L B7)	6
FA57ACN-6/8	Arrester Housing Nuts (1" 2H)	12
FA60GAC-8	Arrester Housing Gasket (978C)	2
FA59EL-008-1-C-2	Element Pack: CS Housing, 316SS element material	1
<b>10" Model 59</b>		
FA59ACS-10	Arrester Housing Stud (1-1/8" x 13" L B7)	8
FA60ACN-10	Arrester Housing Nuts (1-1/8" 2H)	16
FA60GAC-10	Arrester Housing Gasket (978C)	2
FA59EL-010-1-C-2	Element Pack: CS Housing, 316SS element material	1

Continued next page

<b>RECOMMENDED SPARE PARTS</b>		
<b>WESTECH PART NO.</b>	<b>DESCRIPTION</b>	<b>RECOMMENDED QTY.</b>
<b>12" Model 59</b>		
FA59ACS-12	Arrester Housing Stud (1-1/4" x 14" L B7)	8
FA57ACN-12	Arrester Housing Nuts (1-1/4" 2H)	16
FA60GAC-12	Arrester Housing Gasket (978C)	2
FA59EL-012-1-C-2	Element Pack: CS Housing, 316SS element material	1

Stainless steel parts use same part numbers as above followed by an S4 for 304SS or S6 for 316SS material. Check your model number (refer to Table 1 in Section 1) to confirm compatibility with case material.

Parts are available from your local supplier or directly from:

Westech Industrial Ltd.  
5636 Burbank Crescent S.E.  
Calgary, Alberta, Canada T2H 1Z6  
Phone: 1-403-252-8803  
Fax: 1-403-253-6803  
email: [sales-export@westech-ind.com](mailto:sales-export@westech-ind.com)  
Website: [www.westech-ind.com/flame.html](http://www.westech-ind.com/flame.html)

**SECTION SIX**  
**DRAWINGS LIST**

The drawings applicable to this product are as follows in this section:

<b>DRAWING NO.</b>	<b>DESCRIPTION</b>
1.	General Layout Drawing
2.	Assembly Drawing
3.	Name Plate



***SECTION SEVEN***

***MATERIAL TEST REPORTS***

***SECTION EIGHT***

***WESTECH STATEMENT OF WARRANTY***

**STATEMENT OF WARRANTY**

**SERIES 59**

**WESTECH INLINE DETONATION FLAME ARRESTER**

**READ THIS STATEMENT OF WARRANTY CAREFULLY**

The following comprises the sole warranty statement of Westech Industrial Ltd. (hereinafter referred to as "Westech") regarding the Westech Inline Detonation Flame Arrester (hereafter referred to as "Flame Arrester"). No other representations, undertakings, promises or writings of any fashion or nature whatsoever made by Westech, its employees, representatives or agents shall apply.

Westech warrants that this Flame Arrester will quench all flames generated from any mixture of air and gas having a Maximum Experimental Safe Gap (MESG) measurement equal to or greater than that indicated for this unit in Section 1 of the Installation & Maintenance Manual issued with the unit.

**1. Subject to the Conditions Hereinafter Identified**

Westech warrants the Flame Arrester to quench all flames defined above when the unit is installed in any piping system of any configuration with line sizes equal to or smaller than the nominal inlet/outlet size of this Flame Arrester and with an operating line pressure and temperature equal to or lower than that specified on the drawings and nameplate in Section 6 of the unit's Installation & Maintenance Manual.

**2. Conditions as to Honour of Warranty**

Westech's Statement of Warranty for the Flame Arrester shall be honoured solely upon the following conditions and restrictions:

- a) The warranty shall apply and be available solely to the direct purchaser of the Flame Arrester from Westech and shall not apply to subsequent purchasers therefrom.
- b) The said warranty shall apply and be available upon condition that the installation and maintenance of the Flame Arrester shall have been in strict compliance with the Installation and Maintenance Manual distributed to the purchaser at the time of the purchase and further in strict compliance with any and all updated versions or amendments thereto sent to the purchaser by Westech at the purchaser's address last known to Westech. It shall be the responsibility of the purchaser to ensure that its correct address at all times is advised to Westech.
- c) The warranty shall apply and be available upon condition that the Flame Arrester be used solely for the specific proper purpose for which it was designed as described in the Installation & Maintenance Manual.

- d) The warranty shall apply and be available upon condition that any and all defects determined by the purchaser shall be immediately advised to Westech.
- e) The warranty shall not apply nor shall Westech be responsible for damages, howsoever described, in the instance of failure of components manufactured by others, abuse of the Flame Arrester, its improper installation, maintenance or repair, its use in a fashion non-compliant with its intended use or installation of non-authorized components or acts of God.
- f) In the event of failure of the Flame Arrester subject to the above conditions and restrictions, Westech shall be responsible only for replacement of the Flame Arrester or components and shall not be liable for claims, damages costs, expenses, losses, actions or causes of actions arising howsoever therefrom.
- g) Except as aforesaid, there is no condition, warranty or representation made with respect to the said Flame Arrester, either express or implied, at law or by statute, and in particular there is no condition, warranty or representation other than as aforesaid as to the merchantability or fitness for any particular purpose of the said Flame Arrester, and the seller and purchaser agree that any statute providing for any conditions or warranty relating to the said Flame Arrester shall have no application to the sale of the same by this seller to this purchaser.