



ANDERSON GREENWOOD 5910C PRESSURE/VACUUM RELIEF VALVE WITH INTEGRATED FLAME ARRESTER (ATEX APPROVED)

Before installation, these instructions must be carefully read and understood.

FIGURE 1
MODEL 5910C



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WARNING

Failure to follow these instructions or to properly install and maintain this equipment could result in an explosion, fire and/or chemical contamination causing property damage and personal injury or death.

DISCLAIMER OF WARRANTIES

The contract between Anderson Greenwood and our customer states Anderson Greenwood's entire obligation. The contents of this instruction manual shall not become part of or modify any prior or existing agreement, commitment or relationship between Anderson Greenwood and our customer. There are no express or implied warranties set out in this instruction manual. The only warranties that apply are those in the existing contract between Anderson Greenwood and our customer.

The Anderson Greenwood 5910C Pressure and vacuum relief valves with flame arrester assembly have not been tested by Anderson Greenwood under all possible operational conditions, and Anderson Greenwood does not have all the data relative to your application. The information in this instruction manual is not all-inclusive and does not and cannot take into account all unique situations. Consequently, you should review this product literature in view of your application. If you have any further questions, please contact Anderson Greenwood for assistance.

LIMITATIONS OF SELLER'S LIABILITY

In the event that a court holds that this instruction manual created some new warranties, Seller's liability shall be limited to repair or replacement under the standard warranty clause. In no case shall Seller's liability exceed that stated as limitations of remedy in the contract between the Seller and Buyer. Use of parts that are not manufactured or supplied by Anderson Greenwood voids any Anderson Greenwood warranty and relieves Anderson Greenwood of any obligation to service the product under warranty. Anderson Greenwood recommends the use of only Anderson Greenwood manufactured or supplied parts to maintain or service Anderson Greenwood 5910C Series Pressure and Vacuum relief valve with Flame Arrester assembly.

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SAFETY PRECAUTIONS

Read and understand this instruction manual before installing, operating or performing maintenance on Anderson Greenwood 5910C Series Pressure and vacuum relief valve with flame arrester assembly. Follow all precautions and warnings noted herein when installing, operating, or performing maintenance on this equipment.

WARNING

- Failure to follow these instructions or to properly install and maintain this equipment could result in an explosion, fire and/or chemical contamination causing property damage and personal injury or death. Anderson Greenwood™ flame arrester must be installed, operated and maintained in accordance with federal, state and local codes, rules and regulations, and Emerson instructions. Failure to correct trouble could result in a hazardous condition. Call a qualified service person to service the unit. Installation, operation and maintenance procedures performed by unqualified person may result in improper adjustment and unsafe operation. Either condition may result in equipment damage or personal injury. Only a qualified person must install or service the flame arrester.
- Unit must be isolated from tank pressure before servicing. All gas must be blocked and pressure safely vented.
- Flame Arresters are not capable of stopping a flame front in mixtures of air with hydrogen, acetylene, ethylene oxide, or carbon disulphide.

PRACTICAL LIMITATIONS

While flame arresters decrease the possibility of flame propagation in a system, certain

variables must be evaluated to ensure safety. The relative fire hazard of flammable mixtures can be judged by the upper and lower explosive limits. These limits are expressed as percent by volume of the gas or vapor in air. The explosive range is that span of concentrations lying between the lower and upper limits. The upper limit is the point at which the mixture is too rich to burn, i.e., contains minimal oxygen to support combustion. The broader the explosive range, the easier it is to create an air-gas explosive mixture. Conversely, when an explosive range is narrow, the chance of developing a hazardous air-gas mixture is reduced.

GENERAL

The 5910C is designed to protect low-pressure storage tanks, anaerobic digesters and gas-holders from excessive pressure and/or vacuum. In addition, it maintains system operating pressure, so gas is not routinely vented to atmosphere. The flame arrester element assembly protects from accidental ignition of the gas within the low-pressure storage tank, anaerobic digesters, and gas-holders similar low-pressure storage devices. The arrester is designed to stop the propagation of flame from external sources. The combination valve and flame arrester is installed vertically on the roof of low pressure storage tanks, anaerobic digesters and gas-holders. The 5910C Series unit relieves pressure directly to the atmosphere. A weatherhood and mesh screen protects the valve pressure pallet, and guideposts & flame element assembly from contamination, nesting animals, weather, etc. In-breathing ambient air relieves vacuum pressure. Flame arresters may be used in combination with additional

protection measures, the overall safety of the combined installation shall be assessed, taking account of any hazardous area classification (zones) and of the likelihood of possible ignition sources.

WARNING

The flame element assembly in this product is validated and certified, per ISO 16852 to protect against flame propagation **only** for Gas Group IIA or IIB3. Please refer to nameplate.

CONSTRUCTION

Refer to Figure 04 for construction and assembly detail.

Standard materials of construction for the valve include cast body and cover(s). Pallets are dead weight loaded with lead or coated steel weights and include a flexible membrane-sealing insert. The pallet is loosely guided through a center stem and pallet guide posts.

The maximum working pressure for the 5910C Series unit is 2 psig (13.8 kpa). For material selection see product data sheet.

WARNING

Ensure all selected materials are suitable for the environment and processes for which they are being installed. Attention must be paid to selection of materials to ensure effective operation of the valve and flame arrester functionality.

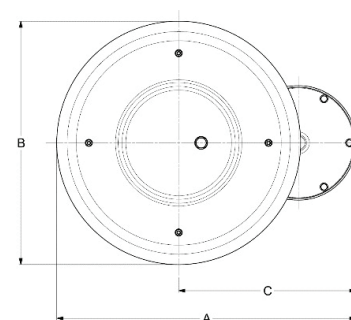
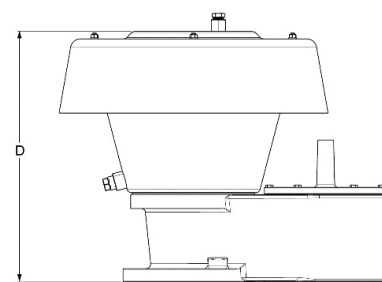
Size	A [mm]	B [mm]	C [mm]	D ¹ [mm]
2"	445	390	251	329
3"	505	390	311	360
4"	588	543	316	430
6"	666	543	395	503
8"	818	642	497	577

1. Does not include coupling.

Size	A [in]	B [in]	C [in]	D ¹ [in]
2"	17.52	15.35	9.88	12.95
3"	19.88	15.35	12.24	14.17
4"	23.15	21.38	12.44	16.93
6"	26.22	21.38	15.55	19.80
8"	32.20	25.28	19.57	22.72

1. Does not include coupling.

Note: Minimum clearance for installation, to allow for appropriate air flow around the valve inlet and outlet, should be 150 mm



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OPERATION

When the internal tank pressure approaches the valve setting, the pressure pallet in the valve begins to lift. As the pressure exceeds the valve setting, the pressure pallet lifts off the seat ring. Excess product vapor is allowed to vent to the atmosphere, relieving the over pressure condition. The valve pallet automatically re-seats as the tank pressure drops below the valve setting. If a vacuum within the tank approaches the valve setting, the vacuum pallet in the valve begins to lift. As the vacuum exceeds the valve setting, the vacuum pallet lifts off the seat ring. Atmospheric air is allowed to flow into the tank, relieving the excess vacuum condition. The pallet automatically re-seats as the vacuum drops below the valve setting. Flame element assemblies integrated into the unit do not prevent ignition of flammable mixtures but provide protection from unconfined deflagration from the outside atmosphere to the internal tank space. Flame Arresters in the unit do not prevent the ignition of flammable mixtures but prevents the propagation of flame in case of ignition. The Flame Arrester element assembly stops the propagation of flame by absorbing and dissipating heat through the surface area of the crimped foil. Heat is absorbed as ignited gas attempts to pass through the small passages within the element assembly. This action lowers the temperature of the gas below its ignition point and quenches the flame. Also, 5910C models rated for short-time burning provide protection from deflagration when a stabilized burn condition exists on the unprotected side of the element.

CALIBRATION

To verify setting, calculate the total necessary weight using the Table 1. Check this value against the actual weight of the pallet assembly (including loading weights). Adjust loading weights as required.

INSTALLATION (PLACING INTO SERVICE)

5910C Series pressure and vacuum relief valves must be mated with the appropriate flange(s). The valve is installed vertically. The nozzle must be plumb and the inlet flange face level to ensure proper operation of the relief valve. The valve's vacuum inlet and pressure outlet must remain clear and at a reasonable distance from any obstructions to ensure free and easy access for maintenance and any obstructions which may impair flame protection or flow.

TABLE 1. PALLET LOADING (INCLUDES WEIGHT OF PALLET)

Valve size	Ounces of weight required per ounce of setting	Ounces of weight required per inch of WC of setting
2"	8.3	4.8
3"	16.8	9.7
4"	22.1	12.8
6"	43.4	25.1
8"	72.7	42.0

Weight tolerance: +5%/-5%

Setting tolerance: +0%/-10%

1. Remove the valve from the shipping container. Check to see if extra loading weights were bagged and packed separately.
2. Remove the weatherhood, flame element assembly and/or cover(s) and all packing material above the pallets and within the valve.

CAUTION

Whenever the flame element assembly and/or cover(s) is removed and reinstalled, the end of the pallet stem must engage the stem guide in the flame element assembly and/or the stem guide chamber in the cover(s) for proper seating and valve operation.

3. To load vacuum pallet weights, perform the following:
 - a. With vacuum cover and gasket removed, remove vacuum pallet assembly from body.
 - b. Remove grip ring from pallet stem.
 - c. Non-variable setting: locate weight marked "VACUUM" and place on top of compensating weight and/or pallet. Secure with grip ring. Note: if setting is less than 2" WC, weight will be pre-loaded on the pallet.
 - d. Variable setting: each lead weight is calibrated from 1" WC increment. (Increments of 1/4" WC and 1/2" WC may be supplied on special order). Those weights necessary for the initial specified setting will be tagged separately from any extra weight provided. Remove the packaging on the weights tagged from the initial specified setting and place the weights on top of the compensating weight. Secure with grip ring. Store remaining weights for future use (in case the setting needs to be increased).
 - e. Weigh entire pallet assembly (including installed weights). Using Table 1, confirm that the assembly is the proper weight to achieve the required setting. Allowable weight tolerance is +5%, -5%.
 - f. Remove any remaining packing material from valve body. Wipe vacuum seat ring, guide posts and pallet assembly with a soft cloth to remove any material which could affect valve operation.

- g. Place pallet assembly on valve body seat. Ensure that pallet moves freely within guide posts and rests flat on the seat ring.
- h. Replace the cover gasket and cover. Tighten cover screws uniformly.

CAUTION

The end of the pallet stem must engage the stem guide chamber in the cover for proper seating and valve operation.

4. To load pressure pallet weights, perform the following:
 - a. With weatherhood and flame element assembly removed, remove pressure pallet assembly from body.
 - b. Remove grip ring from pallet stem.
 - c. Non-variable setting: locate weight marked "PRESSURE" and place on top of compensating weight and/or pallet. Secure with grip ring. If setting is less than 2" WC, weight will be pre-loaded on the pallet.
 - d. Variable setting: each lead weight is calibrated from 1" WC increment. (Increments of 1/4" WC and 1/2" WC may be supplied on special order). Those weights necessary for the initial specified setting will be tagged separately from any extra weight provided. Remove the packaging on the weights tagged from the initial specified setting and place the weights on top of the compensating weight. Secure with grip ring. Store remaining weights for future use (in case the setting needs to be increased).
 - e. Weigh entire pallet assembly (including installed weights). Using Table 1, confirm that the assembly is the proper weight to achieve the required setting. Allowable weight tolerance is +5%, -5%.
 - f. Remove any remaining packing material from valve body. Wipe pressure seat ring, guide posts and pallet assembly with a soft cloth to remove any material which could affect valve operation.
 - g. Place pallet assembly on seat. Ensure that pallet moves freely within guide posts and rests flat on the seat ring.
 - h. Replace the weatherhood and flame element assembly.

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CAUTION

The end of the pallet stem must engage the stem guide in the flame element assembly or the stem guide chamber in the cover for proper seating and valve operation.

- Place the valve in a level position. Reach up through the inlet flange and carefully push up on the pressure pallet, then lower it onto the seat. Pallet should move up and down freely and rest flat on the seat ring.
- Remove all vacuum element screws from the body except for the furthest outboard. Loosen the outboard screw only enough to allow the vacuum flame element assembly and gasket to rotate away from the valve vacuum bore. [Figure 02]
- Reach up through the vacuum bore and carefully push up on the vacuum pallet, then lower it onto the seat. Pallet should move up and down freely.
- Rotate the element assembly and gasket back into place and re-install all screws.
- Mount the valve on the flanged nozzle using the appropriate gasket.

CAUTION

DO NOT MATE A FLAT FACE FLANGE TO A RAISED FACE FLANGE.

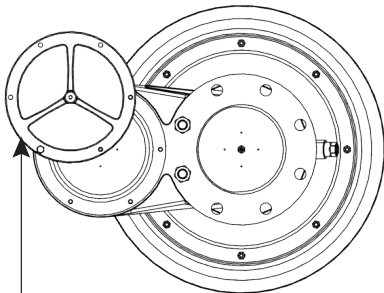
If it necessary to mate an ANSI Class 125 F.F. Flange with an ANSI Class 150 R.F. Flange, use the proper spacer to convert the raised face to a flat face.

- Verify that the valve is level to permit proper operation of the pallets. Install mounting hardware and tighten uniformly.
- Use a full faced gasket and tighten all mounting hardware uniformly.
- Metal parts insulated by gaskets should be earthed where necessary.

NOTE

Although steel valves have a standard paint system, it is recommended that steel valves be inspected and touch-up applied if necessary. Apply paint to external surfaces only.

FIGURE 2



Rotate from the vacuum bore on the outboard screw

MAINTENANCE (ASSEMBLING AND DISMANTLING)

The valve should be inspected and cleaned at periodic intervals. The first inspection should be made approximately 30 days after commissioning. Subsequent inspections should be made every 30 days. The user may adjust the schedule for his own convenience and safety, depending upon the product being stored.

WARNING

- Relief valve must be isolated from tank pressure before servicing. All gas must be blocked and pressure safely vented. If no isolation valve is present, carefully open vacuum cover or lift pressure pallet, allowing pressure to vent slowly.
- Wear appropriate gloves and/or breathing apparatus if hazardous vapors are present.

- To inspect valve proceed as follows:
 - Remove the weatherhood and flame element assembly and/or cover.
 - Remove pallets one at a time. Identify the pallets to ensure they are returned to the correct valve seat.
 - Inspect pallet inserts for ripples, tears, or nicks, as well as seating surfaces for debris, abrasion or pitting. Pallet edges and guide posts should be free of burrs, corrosion or other obvious damage. Clean all components, replacing any showing excess wear or damage.
 - Reassemble in reverse order.

CAUTION

The end of the pallet stem must engage the stem guide chamber in the flame element assembly and/or cover for proper seating and valve operation.

CAUTION

During periods of freezing weather, extra maintenance is required for 5910C Series. Either remove the pallets or apply generous portions of silicone grease to the pallets, seat rings and guide posts. When using silicone grease, inspect valves at least weekly. Extra attention must be given to inspection of the Flame Cell Assembly to ensure clear and consistent flow.

- To replace pallet insert proceed as follows:
 - Remove weatherhood and/or cover(s) and flame element assemblies and then pallet assembly.
 - Remove nut from base of pallet stem. Remove retainer plate and insert. Clean all surfaces and threads. Install new insert, handling carefully to avoid damaging insert or pallet.
 - Reassemble pallet and place on seat of valve body. Ensure pallet assembly moves freely within guide posts and rests flat on seat ring.
 - Reinstall flame element assembly, weatherhood and/or cover(s).

CAUTION

The end of the pallet stem must engage the stem guide chamber in the flame element assembly for proper seating and valve operation.

- To replace pressure seat ring perform the following:
 - Remove weatherhood, screen, flame element assembly, spacer ring (if applicable), pallet assembly, guide posts, shroud assembly, and seat gasket.
 - Remove seat ring and O-Ring from valve body. Clean body, outlet adapter mating surfaces and O-Ring Groove.
 - Install new O-Ring into groove; ensure that the O-Ring stays properly in groove while installing seat ring.
 - Install new seat ring carefully to avoid distortion. Reassemble seat gasket, shroud assembly, guide posts and spacer ring (if applicable) to secure seat. Ensure that seat is flush and level with valve body.
 - Place pallet assembly on valve body seat. Ensure pallet assembly moves freely within guide posts and rests flat on seat ring.
 - Reassemble remaining parts in reverse order.

CAUTION

The end of the pallet stem must engage the stem guide chamber in the flame element assembly for proper seating and valve operation.

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4. To replace vacuum seat ring perform the following:
 - a. To replace vacuum side seat, it is only necessary to remove the vacuum-side element assembly & seat gasket. The seat will drop right out. No need to remove guide posts on vacuum side.
 - b. Remove flame element assembly, seat gasket, seat ring and O-Ring from valve body. Clean body mating surface and O-Ring groove.
 - c. Install new O-Ring into groove; ensure that the O-Ring stays properly in groove while installing seat ring.
 - d. Install new seat ring carefully to avoid distortion. Reassemble flame element assembly and seat gasket to secure seat ring. Ensure that seat is flush and level with valve body.
 - e. Place pallet assembly on valve body seat. Ensure pallet assembly moves freely within guide posts and rests flat on seat ring.
 - f. Reassemble cover and gasket.
 - g. Remove all vacuum element screws from the body except for the furthest outboard. Loosen the outboard screw only enough to allow the vacuum flame element assembly and gasket to rotate away from the valve vacuum bore. (Figure 02)
 - h. Reach up through the vacuum bore and carefully push up on the vacuum pallet, then lower it onto the seat. Pallet should move up and down freely.
 - i. Rotate the element assembly and gasket back into place and re-install all screws.

CAUTION

The end of the pallet stem must engage the stem guide chamber in the cover for proper seating and valve operation.

5. Seat ring repair:
 - a. Seat may be ground or ground and lapped (in place) to improve seal. Use a lapping plate and medium valve grinding compound, applying light pressure.
 - b. Finish lapping with a fine compound. Avoid scoring or removing excessive amounts of material.
 - c. Clean all compound from valve parts.
 - d. Hand buff seat with a medium grade 'Scotch-Brite' (#7447) pad and light oil.

CAUTION

Whenever the flame element assembly and/or cover(s) is removed and reinstalled, the end of the pallet stem must engage the stem guide chamber in the flame element assembly and/or the stem guide chamber in the cover(s) for proper seating and valve operation.

Flame Element Assembly – Cleaning & Maintenance

1. Carefully remove the element assembly from the arrestor and place it on a soft surface such as plywood.
2. Inspect the flame cell visually for any signs of corrosion or other damage.
3. Inspect the flame cell with a calibrated pin gauge to ensure maximum crimp size openings do not exceed the following values for their respective gas group:
 - Explosion Group IIA or IIB3 / D or C – 0.032 in. / 0.8 mm and 0.018 in. / 0.45 mm (Pressure Side Element)
No-go pin sizes:
IIA = 0.027 in. / 0.68 mm
IIB3 = 0.015 in. / 0.38 mm
 - Explosion Group IIA and IIB3 / D – 0.045 in. / 1.14 mm (Vacuum Side Element)
No-go pin size:
IIA and IIB3 = 0.037 in. / 0.94 mm
4. If any damage is noted, or crimp openings exceed maximum size allowable, replace the element assembly.
5. Keep the element openings clean to prevent loss of efficiency in absorbing heat. Remove the element assembly and clean the elements to prevent the openings from becoming clogged with particulate matter. Clean the element with a suitable cleaning media (solvent, soap, water, steam or ultrasonic) then blow dry using compressed air. Be careful not to damage or dent the cell openings as this would hamper the effectiveness of the unit. Do not clean the arrestor elements by rodding to remove blockages, as this practice will damage the elements and seriously impair the arrestor's performance. If the arrestor element cannot be cleaned satisfactorily, replace it.
6. High-pressure water jets are NOT recommended
7. The cleaning interval should be governed by the amount and type of particulate in the system to which it is installed and must be determined by the user. To determine the maintenance interval, the user should check the element in the first few months of operation to find how quickly particulate accumulates in the cells.
8. After cleaning, thoroughly inspect the element for damage. If damaged, replace it.

NOTE

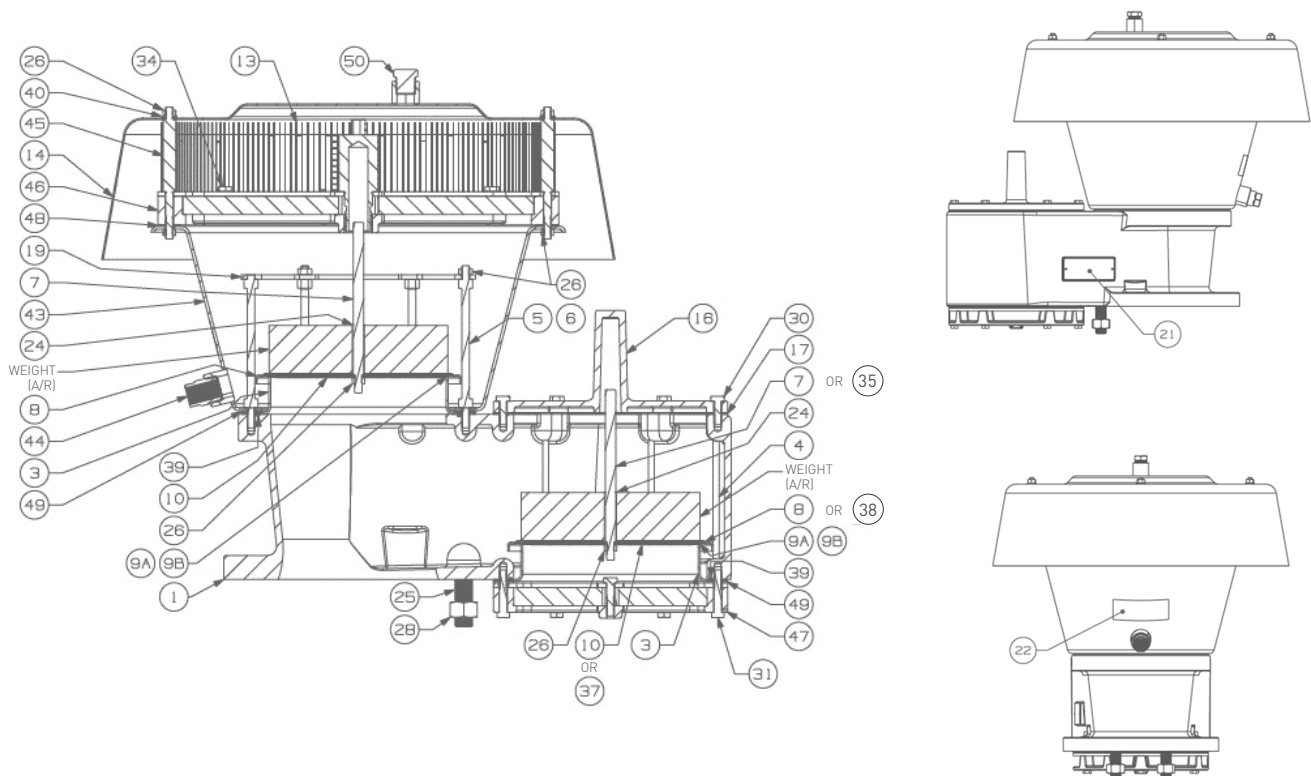
Under no circumstance should the element bank be disassembled from its shell for cleaning or replacement. The element section must be replaced as a complete assembly.

CAUTION

If deflagration or stabilised burning is found to have occurred, the flame element assembly should be replaced.

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FIGURE 4
CONSTRUCTION AND ASSEMBLY DETAIL



PARTS LIST

Item No.	Description	Item No.	Description
1	Body	26	Nut
3	Seat Ring	28	Nut
4	Guide Post, Vacuum	30	Screw Cap Hex
5	Guide Post, Pressure	31	Screw Cap Hex
6	Guide Post, Pressure	34	Screw Cap Hex
7	Pallet Stem	35	Pallet Stem
8	Pallet	37	Insert Retainer
9A	Insert (FEP)	38	Pallet
9B	Insert	39	O-ring
10	Insert Retainer	40	Washer
13	Screen, Pressure	42	Washer
14	Hood	43	Shroud
16	Cover	44	Drain
17	Gasket	45	Standoff
19	Spacer, Ring	46	Element Assembly, Pressure
21	Name Plate	47	Element Assembly, Vacuum
22	Warning Label	48	Gasket, Pressure
24	Grip Ring	49	Gasket, Seat
25	Stud	50	Plug

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SPECIAL CONDITIONS FOR SAFE USE

Marking on Pressure/Vacuum Relief Valve with integrated Flame Arrester (ATEX Approved)

Manufacturing for the Model 5910C is intended for sizes 2" (DN 50) to 8" (DN 200) in either Gas Group IIA or IIB3.

WARNING			
FLAME ARRESTERS HAVE INSTALLATION AND APPLICATION LIMITS TYPE DESIGNATION IN ACCORDANCE WITH ISO 16852			
DEF	$L_{U}/D = N/A$	BC: c	
	Ex. Gp IIA	$T_0 = 60^{\circ}C$	

WARNING			
FLAME ARRESTERS HAVE INSTALLATION AND APPLICATION LIMITS TYPE DESIGNATION IN ACCORDANCE WITH ISO 16852			
DEF	$L_{U}/D = N/A$	BC: c	
	Ex. Gp IIB3	$T_0 = 60^{\circ}C$	

Warning label for 5910C without short time burn protection

WARNING			
FLAME ARRESTERS HAVE INSTALLATION AND APPLICATION LIMITS TYPE DESIGNATION IN ACCORDANCE WITH ISO 16852			
DEF	$L_{U}/D = N/A$	BC: b; $t_{BT} = 1 \text{ min}$	
	Ex. Gp IIA	$T_0 = 60^{\circ}C$	

WARNING			
FLAME ARRESTERS HAVE INSTALLATION AND APPLICATION LIMITS TYPE DESIGNATION IN ACCORDANCE WITH ISO 16852			
DEF	$L_{U}/D = N/A$	BC: b; $t_{BT} = 1 \text{ min}$	
	Ex. Gp IIB3	$T_0 = 60^{\circ}C$	

Warning label for 5910C with short time burn protection

ANDERSON GREENWOOD 5910C PRESSURE/VACUUM RELIEF VALVE WITH INTEGRATED FLAME ARRESTER (ATEX APPROVED)

WARNING PLATE INFORMATION EXPLAINED

<u>WARNING</u>			
FLAME ARRESTORS HAVE INSTALLATION AND APPLICATION LIMITS. TYPE DESIGNATION IN ACCORDANCE WITH EN ISO 16852:2016			
DEF	$L_U/D=n/a$	BC: b; $t_{BT} = 1 \text{ min}$	
	EX. G IIA	$T_0 = 60 \text{ }^\circ\text{C}$	

<u>WARNING</u>			
FLAME ARRESTORS HAVE INSTALLATION AND APPLICATION LIMITS. TYPE DESIGNATION IN ACCORDANCE WITH EN ISO 16852:2016			
DEF	$L_U/D=n/a$	BC: b; $t_{BT} = 1 \text{ min}$	
	EX. G IIB3	$T_0 = 60 \text{ }^\circ\text{C}$	

WARNING PLATE FIELD	MARKING
DEF	"DEF" - Deflagration
L_U/D	"N/A" - Suitable for End of Line use only
BC*	"b" - Short time burn (1 minute) "c" - no burn time
Ex. Gp or EX. G	"IIA" - Suitable for MESG $\geq 0.94 \text{ mm}$ "IIB3" - Suitable for MESG $\geq 0.65 \text{ mm}$
T_0	"60°C" - Maximum Operational Temperature

* For short time burning flame arresters, additional external safety equipment is required, such as a temperature sensor. Additional safety equipment is required to ensure appropriate corrective measures are taken within $0.5 \times t_{BT}$ to protect the system if an abnormal temperature is detected. Never disconnect or remove these devices in active process system.

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SPECIAL CONDITIONS FOR SAFE USE (CONTINUED)

All 5910C deflagration elements are rated for short time burning, tBT not to exceed one minute in accordance with EN ISO 16852:2016. These burn times were determined at atmospheric pressure. If there are operating conditions which can lead to a stabilized burning event, additional safety measures are required. The devices shall be equipped with temperature sensors in the hood such that the atmospheric side of the flame cell can be monitored. These temperature sensors are installed into the system in such a way that they trigger the initiation of measures for the elimination of the stabilized burning (for example, emergency functions like switching-off the system, inerting or similar). These measures must occur within half of the time for which the flame arrester is short-time burn proof (0.5 x tBT). See Figure 03 for warning label showing burn rating, tBT. This requires that measures must be able to be taken within 30 seconds.

Threaded instrumentation ports, with standard 1/2 NPT threads, are integrated into each hood. Other instrumentation port thread sizes can be requested.

If the user requests the addition of temperature sensors by Emerson, they will either be installed and shipped threaded into the appropriate instrumentation port in the flame arrester hood or shipped separately with the flame arrester. To install the temperature sensors that have been shipped separately, simply remove any protective packaging from the temperature sensors and thread the temperature sensors into the appropriate threaded instrumentation ports in the flame arrester hood making sure to follow temperature sensor manufacturer's instructions, particularly for wiring.

The temperature sensor shall be installed on the downstream or unprotected ("hot") side of the flame arrester. For end of line deflagration flame arresters this is the atmospheric side of the flame arrester and the only location available. If the temperature sensor is shipped separately, the user shall be responsible for installing the temperature sensor in the appropriate instrumentation port in the hood of the flame arrester.

If a temperature sensor is not requested with the flame arrester then the end user shall be responsible for installation of the temperature sensor on the unprotected ("hot") side of flame arrester. This is the side of the flame

TABLE 2. TEMPERATURE SENSOR SAFETY SPECIFICATIONS

TECHNICAL DATA	THERMOCOUPLE	
	Standard with Thermowell	Standard without Thermowell
Design Type		
Model	185 03J1	Code 0185 thermocouple (IEC 584 Class 1) without thermowell
Manufacturer	Emerson Rosemount FM12ATEX0065X	Emerson Rosemount FM12ATEX0065X
EC-type approval certificate	ATEX: EN 60079-0:2012+A11:2013; EN 60079-1: 2014	ATEX: EN 60079-0:2012+A11:2013; EN 60079-1: 2014
Temperature sensor design	Type-K thermocouple	Type-K thermocouple
Type of ignition protection	II 2 G Ex d IIC T6... T1 Gb, T6(-50°C ≤ Ta ≤ + 40°C), T5... T1 (-50 °C ≤ Ta ≤ + 60°C)	II 2 G Ex d IIC T6... T1 Gb, T6(-50°C ≤ Ta ≤ + 40°C), T5... T1 (-50°C ≤ Ta ≤ + 60°C)
Protection type (connection head)	Rosemount Aluminum Explosion proof, 2-wire, 3-wire, 4-wire type A, 4-Wire type as specified by customer. Intrinsically safe option is available	Rosemount Aluminum Explosion proof, 2-wire, 3-wire, 4-wire type A, 4-Wire type as specified by customer. Intrinsically safe option is available.
Measuring probe (measuring insert)	1/2 NPT or optional M24 x1.5. Intended for installation into thermowell.	Probe length varies by flame arrester size. Adjustable insertion length.
Connection thread	1/2 NPT. Intended for installation into thermowell.	1/2 NPT. Intended for installation without thermowell.
Transmitter	Optional by customer request.	Optional by customer request.
Intended application	In-line flame arresters and detonation arresters	End-of-line flame arresters. Free-vent style.
Model	TC 10-2 (for additional Thermowell)	TC10-H (threaded for direct insertion without thermowell)
Manufacturer	WIKA	WIKA
EC-type approval certificate	ATEX and IECEx certifications	ATEX and IECEx certifications
Temperature sensor design	Type-K thermocouple	Type-K thermocouple
Type of ignition protection	II 2 G Ex d IIC T6... T1 Gb, T6(-50°C ≤ Ta ≤ + 40°C), T5... T1 (-50°C ≤ Ta ≤ + 60°C)	II 2 G Ex d IIC T6... T1 Gb, T6(-50°C ≤ Ta ≤ + 40°C), T5... T1 (-50°C ≤ Ta ≤ + 60°C)
Protection type (connection head)	Explosion proof, 2-wire, 3-wire, 4-wire type A, 4-Wire type as specified by customer. Intrinsically safe option is available.	Explosion proof, 2-wire, 3-wire, 4-wire type A, 4-Wire type as specified by customer. Intrinsically safe option is available.
Measuring probe (measuring insert)	Spring loaded plate. Probe allows use of transmitter. Length varies by flame arrester size.	Probe length varies by flame arrester size. Adjustable insertion length.
Connection thread	1/2 NPT or optional M24 x1.5. Intended for installation into thermowell.	1/2 NPT. Intended for installation without thermowell.
Transmitter	Optional by customer request.	Optional by customer request.
Intended application	In-line flame arresters and detonation arresters.	End-of-line flame arresters. Free-vent style.

ANDERSON GREENWOOD 5910C PRESSURE/VACUUM RELIEF VALVE WITH INTEGRATED FLAME ARRESTER (ATEX APPROVED)

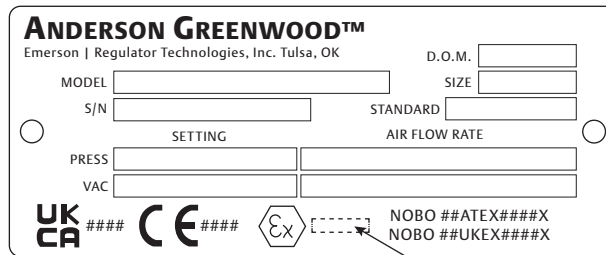
SPECIAL CONDITIONS FOR SAFE USE (CONTINUED)

arrester closest to the source of ignition and is the atmospheric side for end of line deflagration flame arresters. A temperature rise of 20 K (36°F / 20°C) above the flame arrester maximum operating temperature or 20 K (36°F / 20°C) above the process operating temperature, whichever is lower but not to exceed 20 K (36°F / 20°C) above the flame arrester operating temperature, is the recommended activation temperature for initiation of measures against stabilized burning.

Note that a rise in temperature measured by the temperature sensor can indicate to the user deflagration and/or detonation events have occurred as well. This should be used as a trigger to investigate what conditions have lead to ignition of flammable vapors, to inspect the flame arrester for damage, and to initiate appropriate corrective actions relative to process system and safety.

Temperature sensors installed by the user shall follow the specifications in Table 2. Different temperature sensors may be installed by the end user; however these must comply with the safety specifications in Table 2. The use of alternate temperature sensors must include evidence of equivalent response rates to the specified sensors in Table 2, particularly as the 5910C end of line deflagration flame arrester is rated for short time burning. If tBT is exceeded during a short-time burning situation, the flame arrester safety cannot be assured.

If an elevated temperature has been detected by the temperature sensor, whether due to flash back or stabilized burn, the temperature sensor shall be inspected for damage and replaced as necessary. If the recorded temperature exceeds the design temperature of the temperature sensor then the measuring probe shall be replaced.



"G IIA" or "G IIB3"

MARKING PLATE FIELD	MARKING
MODEL	Per Order, ex. 5910C
SIZE	Per Order, ex. 6 in.
Date Of Manufacture (D.O.M)	Date of manufacture
Serial Number (S/N)	Per Order
STANDARD	Standard certified in accordance with
SETTING (PRESS/VAC)	Relief Valve Set Pressures
AIR FLOW RATE	Rated capacity at the indicated relief pressure
Eu-Type Examination Certificate	Based on unit ordered
UKCA - Type Examination Certificate	Based on unit ordered

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