UNITOR™

by Wilhelmsen

OPERATING INSTRUCTIONS

Automatic Flashback Arrestor

S-55 AC
S-55 OX

in brass according to DIN EN ISO 5175-1 for fuel gas and oxygen.

IBExU certified
Certification-No.: 2412
See overleaf.

Operating and fundamental safety recommendations
The safety device has a manufacturers label which indicates any special requirements.

Contents

Foreword
These operating instructions should serve to make the correct operation and safe use of the safety device possible. Attention to the instructions aids danger to be avoided, downtime reduced and operational life and certification to be increased.

The operating instructions should be kept in an accessible place within reach at all times. All persons working with the safety device should read and observe the operating instructions. If in doubt contact the manufacturer. In addition to the specific instructions there may be mandatory regulations or codes of practice regarding the installations or use of the equipment. Any such regulations should be complied with.

All particulars marked ⚠ must be regarded as important safety recommendations.

The safety device meets the requirements of DIN EN ISO 5175-1 and is tested before despatch for safe function.

1 Description

The safety device consists of a combination various separate safety elements whose functions are described.

1.1 Non-return valve NV

Prevents the gas flowing in the reverse direction to the normal flow.

1.2 Dirt filter

Protects the safety device from dirt particles.

1.3 Flame arrestor FA

Prevents the transmission of a flame or flashback from the blowpipe passing through the safety device into the equipment connected upstream.

1.4 Cut-off of gas without flashback PV

This is caused by extreme back pressure of upstream pressure when equipment is shut off. The symptom is a warning that operating procedures and/or equipment should be checked.

1.5 Temperature sensitive cut-off valve TV

Cuts off gas supply when the safety device is overheated due to an external flame or a flame returning from downstream.

1.6 Flow direction →

The flow direction of the safety device is indicated by an arrow on the label or housing.

2 Operating and fundamental safety recommendations

2.1 Authorised operation

The safety device is for use in explosion group IIC, categories of equipment 2G.

The safety device determines the safety level of an outlet point in a pipeline or a single cylinder system.

⚠ A safety device which has been used with compressed air may not be subsequently installed in oxygen equipment.

⚠ A single piece of equipment may be connected to a single safety device.

Check that the safety device has the correct flow capacity for the application.

2.2 Unauthorised operation (examples)

Inappropriate handling and unauthorised operation could result in risk of injury to the operator and other persons as well as damage to the equipment. Some examples:

The safety device may not be used with gases in the liquid phase and are not certified for use in temperatures below minus 20 °C and above 60 °C.

⚠ A single piece of equipment may be connected to a single safety device.

⚠ A safety device which has been used with compressed air may not be subsequently installed in oxygen equipment.

⚠ Modification and dismantling of the safety device is not permitted.

3 Marking

The safety device has a manufacturers label which indicates any special requirements!

Label and indicator (red) = combustion gases

Label and indicator (blue) = oxygen and compressed air

4 Recommendations for operation, maintenance and repair

4.1 Installation

⚠ All components coming into contact with oxygen must be oil and fat free to avoid the risk of explosion.

⚠ Marking of the safety device eg. part number or date of purchase, must not be done with punches or any other method requiring force.

⚠ Check that all connecting threads and seating surfaces are clean and without damage.

The safety device may only be fitted to clean and tested pipelines.

After repairing a pipeline it must be blown through and re-tested before safety devices can be re-fitted.

An isolation valve should be fitted to the pipeline before each safety device.

Hoses DIN EN ISO 3821 should be fitted with suitable hoseclips EN 560.

⚠ The fitting of the safety device is unconnected with the type of blowpipe in use.

⚠ The connection of two or several working devices (burners) is not allowable.

The safety device fitted to a pipeline supplied from an acetylene generator may only be used together with an approved gas purifier. A dirt filter in the inlet of the safety device is sufficient in pipelines supplied by acetylene cylinders.

If there is any risk of condensation in a pipeline a moisture separator must be installed.

Wet and dry safety devices should not be installed in the same pipeline wherever possible. When this is impossible to avoid the safety device should be installed in separate parts of the pipeline protected from the entry water.

The safety device is to install at the end of the pipeline - at the beginning of the hose according to the flow direction which is indicated by an arrow on the label or housing.

With equipment that is built in or connected permanently to the pipeline the safety device should be fitted into the pipeline as close as possible to the blowpipe (avoid the possibility of overheating).

⚠ After installations all connections should be tested under pressure for leak tightness to atmosphere. Suitable leak protection fluids should be used. Leak protection should not be carried out with a naked flame.

4.2 Commissioning

Pay attention to the operation instructions for the equipment to be connected.

4.3 Breakdowns

4.3.1 No gas flow
Test the isolation valve before the safety device is open.

4.3.2 Red / blue indicator is visible
If the red / blue alarm mark is seen (5 mm ring at the top of the housing), the pressure cut-off valve is closed and the gasflow is stopped.

The closing of the pressure cut-off valve could have several reasons.

⚠ The reason is to examine and to eliminate. The lever is not to block !

a) Back feeding of gas due to a faulty blowpipe.

b) Flashback due to insufficient gas flow, check that safety device with sufficient flow has been chosen.

Please check, if a flashback arrestor with an enough high flow is used for the application.

Okay, the flashback arrestor could be plugged by dirt from the distribution pipe or by carbon caused of several flashbacks.

Also water can block the flame arrestor.

The safety device is to repair by the manufacturer.

c) A leak between the ball valve before the flashback arrestor and the non-return valve of the flashback arrestor.

The pressure disappears over the leak in the atmosphere if the ball valve before and behind the flashback arrestor is closed and system was under pressure .

The pressure cut-off valve closes at a pressure difference of max. 1.2 bar between the pressure before the flashback arrestor and the pressure behind the non-return valve. This could be caused by a leak between the ball valve and the flashback arrestor.

⚠ The flashback arrestor is to release of the pressure and the leak is to eliminate before the flashback arrestor is resetted.

If it is not possible to reset the flashback arrestor the temperature cut-off valve is activated. If so the Flashback arrestor has served is purpose and will have to be deposed off.

d) The temperature activated cut-off valve and the gas flow cut-off has operated.

At the same time the red alarm mark could be visible.

There is nothing to indicate that the temperature activated cut-off valve has operated. Backburn has stabilised internally or the ambient temperature is to high.

4.4 De-commissioning

In the event of an outlet point not being used for a long time carefully close the isolation valve before the safety device. At the outlet connection fit a threaded blanking plug.

4.5 Maintenance

Annual testing of the non-return valve, leak tightness and flow capacity is recommended.

The test may be carried out by the operator and must be documented. See overleaf.

4.6 Repair

⚠ Repairs may be only carried out by the manufacturer.

Model	Gases max. working pressure [bar]	
S-55 AC	Acetylene (A)	1.5
	LPG (P) Natural gas (M)	5.0
	Hydrogen (H)	3.0
S-55 OX	Oxygen (O) Air (D)	15.0

pressure [bar]	S-55	
0.1	0.5	Q [Nm³/h] for air (20 °C)
0.9	5.5	
1.5	8.6	
10.0	49.0	
15.0	74.0	
20.0	99.0	
25.0	-	

Conversion factors:

Acetylene	x 1.04
Butane	x 0.68
Natural Gas	x 1.25
Ethylene	x 1.02
Methane	x 1.33
Propane	x 0.80
Oxygen	x 0.95
Town gas	x 1.54
Hydrogen	x 3.75

Maintenance guidelines for Unitor Flash Back Arrestors S-55 AC, S-55 OX, W-66 S, W-85-10 AC, W-85-10 OX and E460-3

The manufacturing date of the Flash Back Arrestors S-55 AC, S-55 OX, W-66 S, W-85-10 AC, W-85-10 OX and E460-3 is engraved in a code on their cylindrical sides. It is also stated as MM/YY on the outer packaging,

Maintenance guidelines for Unitor Flashback Arrestors S-55 AC, S-55 OX, W-66 S, W-85-10 AC, W-85-10 OX and E460-3

- Unitor flashback arrestors do not require specific maintenance unless the operator suspects malfunctioning or improper operation.
- Regular maintenance checks of Unitor flashback arrestors can include inlet filter cleaning and checking of the functioning of the non-return valve (checking for back flow by applying dry Nitrogen).
- It is advised to routinely check the inlet filter.
- Flashback arrestors should be replaced every 5 years because the internal condition of the flame arrestor is difficult to judge (also refer to OCIMF SIRE for Tankers and related vessels and RIGHTSHIP RISQ for bulk carriers & cargo ships).

Annual testing guidelines for Unitor Flashback Arrestors S-55 AC, S-55 OX, W-66 S, W-85-10 AC, W-85-10 OX and E460-3

S-55 AC, S-55 OX, W-66 S, W-85-10 AC, W-85-10 OX and E460-3 arrestors' Instruction Manuals recommend annual Functionality Test (leak test, back pressure test, and flow test). These are our recommendations, please observe these steps:

- Leak tightness of S-55 AC, S-55 OX, W-66 S, W-85-10 AC, W-85-10 OX and E460-3 body is normally done together with either the AC-OX fixed system annual leakage test, or as a test of the standard assembly including R-510 regulator. Working pressure is applied. Soapy water is applied externally.
- Back Pressure function is verified by applying 1-2 Bar compressed Nitrogen in the reverse direction.
- Flow Test normally requires dedicated and regularly Certified testing equipment, and it is physically impossible to implement Flow Test within on-board conditions.

Immediate replacement of Flash Back Arrestors is required when:

- Flashback arrestor body does not pass leak tightness test or back pressure test at the working pressure.
- It is faulty, it is older than 5 years, or it is corroded.
- The Flashback Arrestors and Welding Gas Regulators must be replaced every 5 years interval (also refer to OCIMF SIRE requirements for Tankers and related vessels and RIGHTSHIP RISQ for bulk carriers & cargo ships).

Template for registration of the annual inspection of flashback arrestors:

Flashback Arrestor	Location / Application	Gas Type	Manufacturing Date	Inspected By	Inspection Date	Sign	Remarks

SAFETY PRECAUTIONS FOR GAS REGULATING EQUIPMENT VERIFICATION ON- BOARD:

The use of compressed air (likely to contain traces of oil), for testing and/or for cleaning is a source of problems, because later compressed pure oxygen will react violently with these minor amounts of oil.
Other safety risks are the use of copper adaptors for acetylene, non-approved secondary pressure hoses, use of faulty pressure regulators, or even not using a pressure regulator and thinking that throttling the pressure by a shut-off valve is possible.
Even properly organized guidelines and documentation is not a guarantee against "the human factor" influence.
Always follow the instructions of the manufacturers/suppliers in detail, as they have experience in handling these products.

Wilhelmsen Ships Service

DECLARATION OF CONFORMITY

WILHELMSEN SHIPS SERVICE AS.
Strandveien 20
NO-1366 LYSAKER
Norway

WILHELMSEN SHIPS SERVICE AS. herewith declare that the below mentioned products are manufactured conforming to the standards mentioned and meeting all the requirements as below:

	Product Number	Product description	Applicable Standards
1	585372	Flashback Arrestor Unitor W-85-10 AC	DIN EN ISO 5175-1:2018
2	682427	Flashback Arrestor Unitor W-85-10 OX	
3	708554	Flashback Arrestor Unitor W-66 S ACETYLENE	
4	708550	Flashback Arrestor Unitor W-66 S OXYGEN	
5	708537	Flashback Arrestor Unitor S-55 AC	
6	708545	Flashback Arrestor Unitor S-55 OX	
7	708350	Flashback Arrestor Unitor E460-3 Torch Shank (Pair)	

The brand name UNITOR^{TM} is a registered trademark fully owned by Wilhelmsen Ships Service AS.

For WILHELMSEN SHIPS SERVICE AS.

CHRIS TEOH

Chris Teoh
Senior Product Manager
Welding & Repair

Danial Arsad
Head of Product Management
Welding & Gases

IBExU Institut für Sicherheitstechnik GmbH
Your first point of contact for explosion protection

TEST CERTIFICATE

IBExU Institut für Sicherheitstechnik GmbH has carried out the following examination as a competent company in the field of explosion protection.

Manufacturer	Wilhelmsen Ships Service AS
Address	Strandvn 20, Lysaker NO-1324 Lysaker I NORWAY
Product	Safety devices and quick-action couplings
Product description	Type series Super, E460-3, 85-10, Unitor Quick Coupling These products and the various versions are specified in the annex and the test report listed.
Product testing was carried out experimentally according to	EN 561:2002 EN ISO 5175-1:2018 EN ISO 9090:2020 EN ISO 9539:2014
Supplementary in compliance with the BAM standard operating procedures	BAM-StAA-SE-16 from 2017-11-14 BAM-StAA-SE-18 from 2018-04-12 BAM-StAA-SE-19 from 2020-12-08
Test report	IB2440037
Annexes	This test certificate consists of this document and an annex.
Test result	The products were successfully retested orientating/random on the basis of the BAM type tests in accordance with the standards listed under product testing and documented in separate test report. The orientating/sampling monitoring of the products takes place in an annual cycle.

UNITOR™ by Wilhelmsen

The products may be labeled as follows in conjunction with the number of the test certificate:

IBExU® geprüft und überwacht or IBExU® tested and under surveillance

© ProMotion Vorlage: 00VD002v170_170117 | öffentlich 30VD000.1v240_241128

Number of the test certificate 2412-02 | valid until 2027-11-30 Page 1/2

IBExU Institut für Sicherheitstechnik GmbH | Fuchsmühlenweg 7 | 09599 Freiberg | Germany
www.ibexu.com

Annex of test certificate 2412 | Issue 02
2
Description of product

Part 1: Safety devices with integrated flame arrester and multiple functions

Depending on the model, these are designed to protect tapping points on distribution lines and/or individual cylinder systems. The safety devices consist of a housing, a sintered flame arrester and a gas non-return valve. Depending on the model, a temperature-sensitive cut-off and pressure-sensitive cut-off valve are also installed.

Table 1

Type series	max. connectable inner tube / hose Ø in mm	article-No.:	max. operation pressure per gas type[1)] p [MPa]				
Super			A	P	M	H	O
Unitor W-66 S	10	708554	0.2[2)]	0.5	0.5	0.5	
Unitor W-66 S		708550					1.0
Unitor S-55 AC	10	708537	0.15	0.5	0.5	0.3	
Unitor S-55 OX		708545					1.5

Type series	max. connectable inner tube / hose Ø in mm	article-No.:	max. operation pressure per gas type[1)] p [MPa]				
E 460-3			A	P	M	H	O
E 460-3 AC	10	708350	0.15	0.5	0.5	0.4	
E 460-3 OX		708350					2.0

Type series	max. connectable inner tube / hose Ø in mm	article-No.:	max. operation pressure per gas type[1)] p [MPa]				
85-10			A	P	M	H	O
85-10 AC	10	585372	0.15	0.5	0.5	0.4	-
85-10 OX		682427	-	-	-	-	2.5

1) Acetylene (A); Propane (P); Methane (M); Hydrogen (H); Oxygen/ air (O)
2) Based on EN ISO 5175-1:2018

© ProMotion Vorlage: 00VD002v170_170117 | öffentlich 30VD000.1v240_241128

Number of the test certificate 2412-02 Page 1/4

Part 2: Quick-action couplings

Quick-action couplings with automatic gas shut-off are used on equipment for welding, cutting and related processes to connect gas hoses to pressure regulators and torches. The quick-action coupling consists of a coupling pin and a coupling body. This quick-action coupling is equipped with an automatic gas lock. When disconnected, the gas lock prevents gas from escaping from the coupling body and is opened again by coupling.

Table 2

Type series	max. connectable inner tube / hose Ø in mm	article-No.:	max. operation pressure per gas type p [MPa]		
Unitor Quick Coupling			Acetylene	Fuel gase	Oxygen
Unitor Quick Coupling	10	734007	0.15	2.0	
		734016			
		734004			
		734013			
		734025			
Unitor Quick Coupling		734001			2.0
		734010			
		734019			
		734022			
		734028			

The quick-action couplings listed in Table 2 fulfil the requirements of the operating conditions specified in EN 561:2002. The compliance with the requirements of paragraph 6.5 is extended within BAM Standard Operating Procedures:

- BAM-StAA-SE-16 "Test for resistance for non-metallic materials" (Resistance to solvents) dated 2017-11-14 and
- BAM-StAA-SE-18 "Test for resistance to ageing in oxygen for non-metallic materials" dated 2018-04-12.

Furthermore, the non-metallic materials used in the devices were successfully tested for use in gaseous oxygen, at the specified maximum operating pressures and the maximum oxygen temperature of 60 °C (test for reactivity with oxygen when exposed to oxygen pressure surges).

© ProMotion Vorlage: 00VD002v170_170117 | öffentlich 30VD000.1v240_241128

Number of the test certificate 2412-02 Page 3/4

For a full copy of the Certificates, please download from https://www.wilhelmsen.com/product-catalogue/ or contact your nearest Wilhelmsen Ships Service representative