

OPERATING INSTRUCTIONS

Automatic Flashback Arrestor

E460-3 AC, E460-3 OX

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

IBExU certified
Certification-No.: 2412

Operating and fundamental safety recommendations

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

Contents

Foreword

- 1 Description
- 1.1 Non-return valve **[NV]**
- 1.2 Dirt filter
- 1.3 Flame arrestor **[FA]**
- 1.4 Flow direction 
- 2 Operating and fundamental safety recommendations
- 2.1 Authorised operation
- 2.2 Unauthorised operation (examples)
- 3 Marking
- 4 Recommendations for operation, maintenance and repair
- 4.1 Installation
- 4.2 Commissioning
- 4.3 Malfunctions
- 4.3.1 No gas flow
- 4.4 De-commissioning
- 4.5 Maintenance
- 4.6 Repair

Foreword

These operating instructions should serve to make the correct operation and safe use of the safety device possible. Attention to following these instructions helps to avoid hazards, to reduce down time, and to increase operating life and certification.

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 **Δ** 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 compared 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 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 is intended for securing outlet points on gas pipelines and individual cylinder supplies.

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

Δ 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 is not certified for use in temperatures below minus 20 °C and above 60 °C.

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

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

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

3 Marking

The safety device has a manufacturer's label which indicates any special requirements!

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.

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

Δ 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 to DIN EN ISO 3821 should be fitted with suitable hose clips to EN 560.

Δ The fitting of the safety device does not depend on the type of blowpipe in use.

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

A 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 a separate section of the pipeline, protected from water entry.

The safety device is to be installed at the end of the pipeline - or downstream of the pressure regulator according to the flow direction which is indicated by an arrow on the label or housing.

The ambient temperature must not exceed +60°C.

Δ After installation, all connections should be tested under pressure for leak tightness to atmosphere. Suitable leak detection fluids should be used. Leak detection should not be carried out with a naked flame.

4.2 Commissioning

Observe the operating instructions of the equipment to which the safety device is being connected

4.3 Malfunctions

4.3.1 No gas flow
Check that the isolation valve upstream of the safety device is open.

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

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

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

If so, 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. Replace the safety device immediately.

4.4 De-commissioning

In the event of an outlet point not being used for a long time carefully close the isolation valve upstream of 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

Δ Repairs may only be carried out by the manufacturer.

Δ Unauthorised repair or modification by the user or third part will result in any warranty issued by or liability upon the manufacturer or agent becoming null and void.

Model	Gases max. working pressure [bar]	
E460-3 AC	Acetylene (A)	1.5
	LPG (P) Natural gas (M)	5.0
	Hydrogen (H)	4.0
E460-3 OX	Oxygen (O) Air (D)	20.0

pressure [bar]	E460-3 AC E460-3 OX	Q [Nm³/h] for air (20 °C)
0.1	0.4	
0.9	5.4	
1.5	9.1	
10.0	58.6	
15.0	86.6	
20.0	115.3	

Conversion factors:	
Acetylene	x 1.04
Natural Gas	x 1.25
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 MMYY 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 arrester 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. Soap 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 regulated Certified testing equipment, and it is physically impossible to implement Flow Test without 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 Warning 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 can 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.

Annex of test certificate 2412 / 1404/20

Description of product

Quick action coupling with automatic gas shut-off and use 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 with 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.

Type series	max. recommended inlet pressure (p _{max})	max. operation pressure per gas type (p _{max})
Unitor Quick Coupling	10	0.15 2.0
Unitor Quick Coupling	10	0.15 2.0

Part 2 Quick action coupling

Quick action coupling with automatic gas shut-off and use 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 with 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.

Type series	max. recommended inlet pressure (p _{max})	max. operation pressure per gas type (p _{max})
Unitor Quick Coupling	10	0.15 2.0
Unitor Quick Coupling	10	0.15 2.0

The quick action couplings listed in Table 2 fulfil the requirements of the operating conditions specified in EN 363:2002. The compliance with the requirements of paragraph 6.3 is extended within BAM Standard Operating Procedures: BAM-SAA-SE-26 "Test for resistance for non-metallic materials" (Resistance to solvents) dated 2017-12-14 and BAM-SAA-SE-18 "Test for resistance to aging in oxygen for non-metallic materials" dated 2018-04-11.

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	708330 Flashback Arrestor Unitor E460-3 Torch Shank (Pair)	

The brand name UNITOR™ 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

Daniel Arsad

Daniel Arsad
Head of Product Management
Welding & Gases

TEST CERTIFICATE

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

Manufacturer Address	Wilhelmsen Ships Service AS Strandveien 20, Lysaker NO-1334 Lysaker / NORWAY
Product description	Safety devices and quick-action couplings 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 1371:1-2018 EN ISO 9090:2002 EN ISO 9539:2014 BAM-SAA-SE-18 from 2017-11-14 BAM-SAA-SE-18 from 2018-04-11 BAM-SAA-SE-18 from 2020-12-08
Supplementary in compliance with the BAM standard operating procedures	
Test report Annexes	IB2440037 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.

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

IBExU® geprüft und überwacht or IBExU® testet und surveillances

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