



Tank Protection Division

Catalogue





EN ISO 9001



EN ISO 14001

## Standards & Codes

### Abbreviations

- ANSI - American National Standard Institute
- API - American Petroleum Institute
- ASME - American Society of Mechanical Engineers
- BS - British Standards
- ISO - International Standards Organisation
- NACE - National Association of Corrosion Engineers
- ASTM - ASTM International

### International Codes and Standards

- ANSI/ASME B1.20.1 - Pipe Threads - General Purpose
- ANSI/ASME B16.1 - Cast Iron Pipe Flanges & Flanged Fittings
- ANSI/ASME B16.5 - Steel Pipe Flanges and Flanged Fittings
- API 2000 - Venting Atmospheric And low-pressure Storage Tank
- API 2521 - Use of Pressure-Vacuum vent valve for Atmospheric Pressure Evaporation Loss
- API 520 - Sizing, Selection and Installation of Pressure-Relieving Device in Refineries, Part 1-“sizing and selection”
- API 576 - Inspection of Pressure-Relieving Device
- NACE MR 01-75 - Sulphide Stress Cracking Resistant Metallic Materials for Oil Field Equipment

### Standards & codes for flame arresters

#### EUROPE

CEN european standard EN 12874-2001 (Comité Européen de Normalisation)

#### UNITED KINGDOM

BSI EN 12874-2001 (British Standards Institute)

#### UNITED STATES OF AMERICA

- UL 525-1994 (Underwriters Laboratories)
- USCG 33CFR - Part 154 Subpart E (United States Coast Guard)
- FMRC 1990 (Factory Manual Research Corporation)
- ASTM F1273 (American Society for Testing and Materials)
- API RP 2210 - Publication 2028 (American Petroleum Institute)

#### CANADA

CSA 1998 (Canadian Standards Association)

Note: If FNC proposes fitting equipment manufactured, complying to Codes & Standards other than listed above, FNC shall justify that the adopted standards are better than or equal to those listed in this section.



## FNC, full range of fire prevention equipment

**FNC was established as Fabbrica Nazionale Cilindri in 1927** as a manufacturer of made to measure mechanical components. For more than **50 years** FNC has been manufacturing fire prevention fittings for storage tanks and tank venting accessories.

The range of **Flame Arrester** and **Low Pressure Weight Loaded relief valve** is completed by Emergency Vents and Blanketing System.

FNC obtained **ISO 9000** certification since 1994 and has always paid great attention to quality and to innovation offered by the market in order to enable more rational and efficient production.

Since 2003 **ATEX** certified according directive **94/9/EC**.

Flame arresters are tested to **EN 12874** and certified to **ATEX 94/9/EC** by independent third party Institutes.

### Mission

FNC is a leading, innovative, international supplier of a wide range of venting and fire prevention fittings for low pressure storage tank. We offer our products and services based on our broad and deep knowledge of market developments, product properties, applications product and processing. This enables us to contribute positively to our customers' and manufacturers' business operations.

### Strategy

FNC took various types of action and initiated and completed various projects in the year under review in line with the plans outlined under 'Key objectives for tank protection division'.

In order to achieve the group's objectives, and taking into account the conclusions that can be drawn from external and internal analyses, we have categorised our strategy spearheads as follows:

### Wide range of products

FNC possess a broad and deep range of products and services and are able to serve defined sectors. Their professional, top-flight product management adapts the range to meet the market's demands.

### Engineering and processing

The sales and application engineers in FNC are actively involved in helping customers develop new products. FNC possesses in-house facilities for adapting all of its products to the wishes of customers.

## Product selector

We provide innovative solutions and specialize in protection equipment. Understanding this equipment and how it should be applied will ensure proper protection from any number of potential hazards. Protection from rupturing or imploding and protection from fire hazards are the major considerations. The environmental and conservation features provided by these products comply with current air quality and safety criteria. Contact our technical sales group for innovative solutions for low pressure systems protection.



**Flame and detonation arresters**

Explosion Group: IIA-IIB-IIB1-IIB2-IIB3  
 Sizes: 1" (25mm) - 16" (400mm)  
 Flange Ratings: ANSI 150-PN16  
 Flange Faces: RF, FF.  
 Connections: Flanged, Screwed, SW & BW  
 Materials: Carbon Steel & Stainless Steel, additional metals and coating  
 Arresting element: Crimped Metal Ribbon  
 Atex approval for most sizes and materials



**Breather valves**

Sizes: 4" (100mm) - 8" (200mm)  
 Setting Pressure: + 2,5mbar +50mbar  
 Setting Vacuum: -2,5mbar -30mbar  
 Flange Ratings: ANSI 150 - PN16  
 Flange Faces: RF, FF  
 Connections: Flanged  
 Materials: Carbon Steel & Stainless Steel, additional metals and coating



**Pressure relief valves**

Sizes: 2" (50mm) - 12" (300mm)  
 Setting Pressure: +2,5mbar +50 mbar  
 Flange Ratings: ANSI 150 - PN16  
 Flange Faces: RF, FF  
 Connections: Flanged  
 Materials: Carbon Steel & Stainless Steel, additional metals and coating



**Vacuum relief valves**

Sizes: 2" (50mm) - 12" (300mm)  
 Setting Vacuum: -2,5mbar -30 mbar  
 Flange Ratings: ANSI 150 - PN16  
 Flange Faces: RF, FF  
 Connections: Flanged  
 Materials: Carbon Steel & Stainless Steel, additional metals and coating

## Product selector



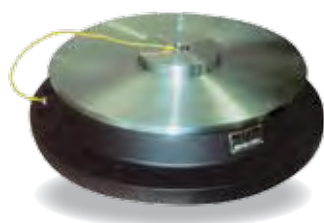
**Breather valves etfined**

Sizes: 2" (50mm) - 14" (350mm)  
 Setting Pressure: +2,5mbar +50 mbar  
 Setting Vacuum: -2,5mbar -30 mbar  
 Flange Ratings: ANSI 150 - PN16  
 Flange Faces: RF, FF  
 Connection: Flanged  
 Materials: Aluminium, Carbon Steel,  
 Stainless Steel, additional metals and  
 coating



**Vent-line / In-line flame arresters**

Flame arresters are at time mounted  
 directly upstream or on vacuum inlet of  
 breather vents.  
 Sizes: 2" (50 mm) through 14" (350  
 mm)



**Emergency vents**

Sizes: 10" (250mm) - 24" (600mm)  
 Setting Pressure: +2,5mbar +30 mbar  
 Flange Ratings: ANSI 150 - PN16  
 Flange Faces: RF, FF  
 Connections: Flanged  
 Materials: Carbon Steel & Stainless  
 Steel, additional metals and coating  
 Customer design solution upon request



**Gauge hatches**

Sizes: 4" (100mm) - 8" (200mm)  
 Flange Ratings: ANSI 150 - PN16  
 Flange Faces: FF  
 Connections: Flanged  
 Materials: Aluminium, Carbon Steel &  
 Staeinless Steel, additional metals and  
 coating



## Flame element *Crimped-metal-ribbon (CMR)*



This element is one of the most widely used types. CMR arresters are made of alternating layers of thin, corrugated metal ribbons and flat metal ribbons of the same width, which are wound together on a mandrel to form a many-layered cylinder of the desired diameter. The thickness of the cylindrical element is equal to the ribbon width. The spaces between the corrugations and the flat ribbon provide multiple small gas passages of approximately triangular shape. Elements can be made in a variety of crimp heights, ribbon and element thicknesses, and diameters.

Some major advantages are: they can be manufactured to within close tolerances; they are sufficiently robust to withstand mechanical and thermal shocks; and they have a fairly low resistance to flow (pressure drop) because usually only about 20% of the face (cross-sectional area) of the arrester is obstructed by the ribbon. The layers of ribbon must not spring apart because this would increase the crimp height and render the device ineffective. Since effectiveness in quenching a flame diminishes rapidly with thin arresters, the elements should be at least 0.5 in. thick.



The elements are often reinforced by inserting metal rods radially through the assembly. CMR arresters may use single or multiple elements with the crimp perpendicular to the ribbon.

A drawback of CMR arrester elements is their sensitivity to damage during handling. This must be considered during maintenance. Damage may lead to either enlarged channels that allow flame penetration, or to channel collapse that increases the pressure drop. Therefore, the FNC's instructions should be strictly followed during maintenance and cleaning. Another possible problem is that the small channel size may make the elements more susceptible to fouling due to solids deposition, and regularly scheduled or predictive maintenance is essential when this is possible.

CMR elements are installed in housings in one method, the element can be removable, in which case it can be cleaned and reinstalled or replaced without taking the housing from the piping.



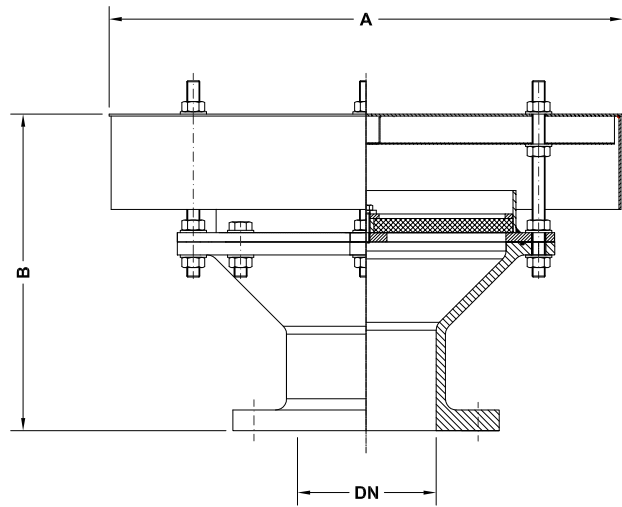
CMR arresters are used to stop deflagrations and detonations. They are especially useful for detonations, since the apertures can be made small, which is necessary to stop the flame and pressure front.

# Flame arrester

## End-of-line



- short-burning
- endurance burning
- deflagration



Number of flame element discs depends on max. allowable operating pressure.

Flame arresters are employed as safety device and have been manufactured by FNC for over than 50 years. Designed to stop unconfined deflagrations, and protect against fire by external sources. Due to design available with weatherhood. Upon request installed on vent vacuum inlet. Arresters elements are made of corrugated strip coiled into circular element housing. This construction is named "crimped ribbon" metal. Tested and certified to EN12874 in accordance with ATEX directive 94/9/EC approved by independent, third party approval agencies.

### FEATURES

- **SIZE:** 1 " (25 mm) through 16" (400 mm)
- **CONSTRUCTED:** carbon steel, stainless steel, additional metals and coatings
- **FLANGE RATING:** ANSI 150, PN16
- **EXPLOSION GROUPS:** I - IIA - IIB - IIB1 - IIB2 - IIB3
- **Manufacturing comply with the requirements of Directive 94/9/EC**
- **TESTED EN12874**

### PRODUCTS:

AE I FL  
AE IIA FL  
AE IIB3FL

| DESCRIPTION                 | STANDARD MATERIALS OF CONSTRUCTION |         |         |
|-----------------------------|------------------------------------|---------|---------|
|                             | CARBON STL                         | SS      | SPECIAL |
| weatherhood                 | SS                                 | SS      | SS      |
| spacer                      | CS                                 | SS      | SS      |
| gasket                      | NON-ASB                            | NON-ASB | NON-ASB |
| stud, nut, hex, lock washer | SS                                 | SS      | SS      |
| housing, element            | CS                                 | SS      | SS      |
| element, flame              | SS                                 | SS      | HAST    |
| housing                     | CS                                 | SS      | SS/HAST |

| DN   | 25   | 40   | 50   | 80   | 100  | 150  | 200  | 250  | 300  | 350  | 400  |
|------|------|------|------|------|------|------|------|------|------|------|------|
| A    | 160  | 160  | 230  | 330  | 400  | 550  | 700  | 870  | 1050 | 1250 | 1400 |
| B    | 145  | 145  | 200  | 230  | 260  | 340  | 390  | 440  | 500  | 570  | 635  |
| CODE | 7525 | 7540 | 7502 | 7503 | 7504 | 7506 | 7508 | 7510 | 7512 | 7514 | 7516 |

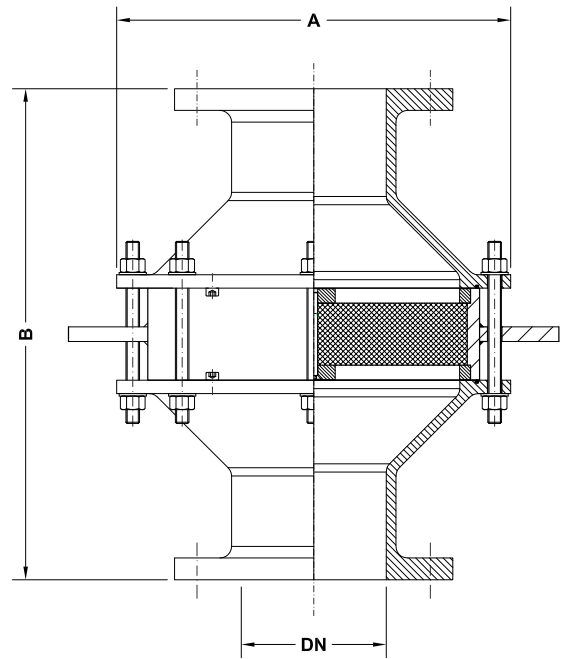
Dimensions shown are for reference only. Contact factory for certified drawings.

# Bidirectional flame arrester

## In-line deflagration



- short-burning
- deflagration
- endurance burning upon request



Number of flame element discs depends on max. allowable operating pressure.

In line flame arrester is fitted with two body connectors one on each side of the flame arrester housing element, prevent flame trasmission when flammable gas/air — or vapor/air — mixtures are present.

Intended function is to allow flow but prevent the transmission of flame.

Bi-directional design prevent flame trasmission from both sides. Arrester elements are made of corrugated strips coiled into circular element housing. Number of flame elements discs depends on design as well as explosion group.

Tested and certified to EN12874 in accordance with ATEX directive 94/9/EC approved by independent, third party approval agencies.

### FEATURES

- **SIZE:** 1 " (25 mm) through 20" (500 mm)
- **CONSTRUCTED:** carbon steel, stainless steel, additional metals and coatings
- **FLANGE RATING:** ANSI 150, PN16
- **EXPLOSION GROUPS:** I - IIA - IIB - IIB1 - IIB2 - IIB3
- **Manufacturing comply with the requirements of Directive 94/9/EC**
- **TESTED EN12874**

### PRODUCTS:

- AE I
- AE IIA
- AE IIB3

| DESCRIPTION                 | STANDARD MATERIALS OF CONSTRUCTION |         |         |
|-----------------------------|------------------------------------|---------|---------|
|                             | CARBON STL                         | SS      | SPECIAL |
| housing                     | CS                                 | SS      | SS/HAST |
| gasket                      | NON-ASB                            | NON-ASB | NON-ASB |
| housing, element            | CS                                 | SS      | SS      |
| handle/lifting lug          | CS                                 | SS      | SS      |
| element, flame              | SS                                 | SS      | HAST    |
| spacer                      | CS                                 | SS      | SS      |
| stud, nut, hex, lock washer | SS                                 | SS      | SS      |
| clamping screw              | SS                                 | SS      | SS      |

| DN          | 25   | 40   | 50   | 80   | 100  | 150  | 200  | 250  | 300  | 350  | 400  | 500  |
|-------------|------|------|------|------|------|------|------|------|------|------|------|------|
| <b>A</b>    | 125  | 150  | 212  | 260  | 327  | 404  | 470  | 568  | 685  | 930  | 930  | 1130 |
| <b>B</b>    | 165  | 165  | 263  | 304  | 348  | 472  | 532  | 592  | 662  | 865  | 865  | 976  |
| <b>CODE</b> | 8023 | 8041 | 8050 | 8080 | 8100 | 8150 | 8200 | 8250 | 8300 | 3032 | 3052 | 8510 |

Dimensions shown are for reference only. Contact factory for certified drawings.

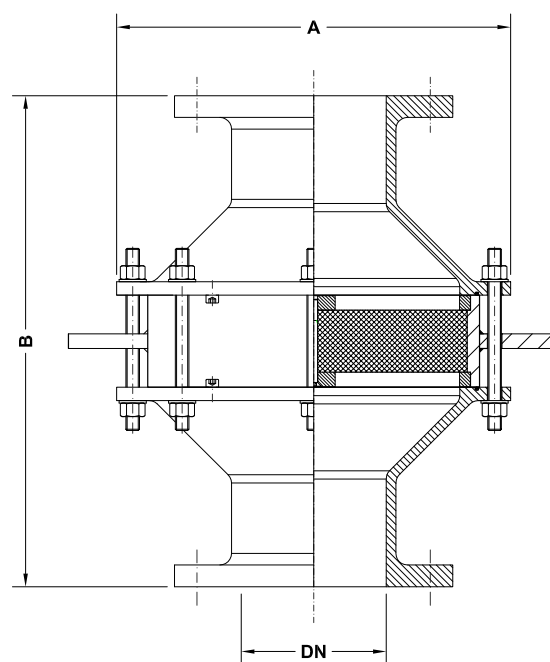


# Bidirectional flame arrester

## *In-line stable, unstable detonation*



- short-burning
- deflagration
- endurance burning
- stable, unstable detonation upon request



Number of flame element discs depends on max. allowable operating pressure.

A detonation flame arrester is used in all cases where sufficient "run-up" distance exist for a detonation to develop, depending on the length of piping and pipe configuration on the unprotected side of the arrester and the restriction on the protected side of the arrester.

Number of element depends on design as well as explosion group, arrester elements are made of corrugated strips coiled into circular element housing.

Tested and certified to EN12874 in accordance with ATEX directive 94/9/EC approved by independent, third party approval agencies.

### FEATURES

- **SIZE:** 1" (25 mm) through 16" (400 mm)
- **CONSTRUCTED:** carbon steel, stainless steel, additional metals and coatings
- **FLANGE RATING:** ANSI 150, PN16
- **EXPLOSION GROUPS:** I - IIA - IIB - IIB1 - IIB2 - IIB3
- **CONFORMING ATEX 94/9/EC**
- **TESTED EN12874**

### PRODUCTS:

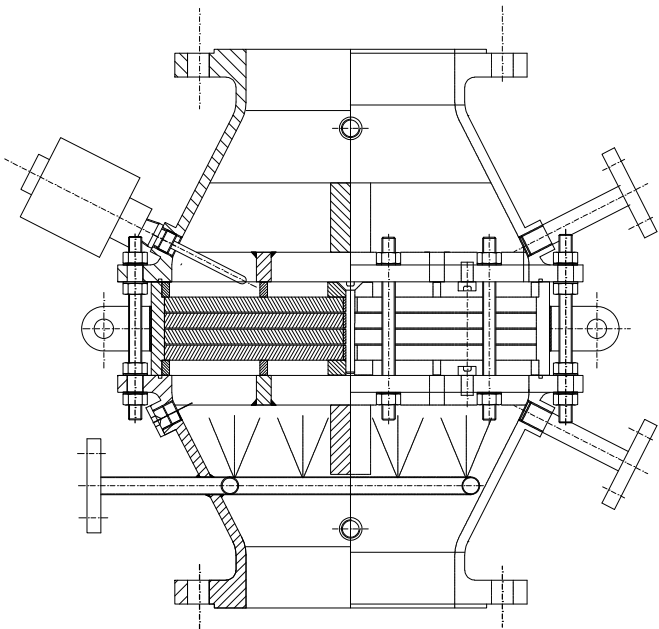
AD IIA  
AD IIB3

| DESCRIPTION                 | STANDARD MATERIALS OF CONSTRUCTION |         |         |
|-----------------------------|------------------------------------|---------|---------|
|                             | CARBON STL                         | SS      | SPECIAL |
| housing                     | CS                                 | SS      | SS/HAST |
| gasket                      | NON-ASB                            | NON-ASB | NON-ASB |
| housing, element            | CS                                 | SS      | SS      |
| handle/lifting lug          | CS                                 | SS      | SS      |
| element, flame              | SS                                 | SS      | HAST    |
| spacer                      | CS                                 | SS      | SS      |
| stud, nut, hex, lock washer | CS                                 | SS      | SS      |
| clamping screw              | SS                                 | SS      | SS      |

| DN          | 25   | 40   | 50   | 80   | 100  | 150  | 200  | 250  | 300  | 350  | 400  |
|-------------|------|------|------|------|------|------|------|------|------|------|------|
| <b>A</b>    | 180  | 180  | 212  | 260  | 327  | 404  | 470  | 568  | 930  | 930  | 930  |
| <b>B</b>    | 195  | 195  | 263  | 304  | 348  | 488  | 565  | 625  | 685  | 897  | 897  |
| <b>CODE</b> | 8027 | 8043 | 8060 | 8090 | 8125 | 2906 | 2920 | 2954 | 2969 | 3030 | 3050 |

Dimensions shown are for reference only. Contact factory for certified drawings.

# Special features



# Flame and detonation arresters tested and certificated to EN12874 in accordance with ATEX directive 94/9/EC

Effective July 1st, 2003, all flame and detonation arresters installed in the jurisdiction of the European Economic Area must have ATEX certification.

FNC arresters have been examined according to Standard EN 12874:2001 and the certificates have been issued, assuring compliance with the Essential Health and Safety Requirements of Directive 94/9/EC. FNC flame and detonation arresters utilize the crimped metal ribbon construction. For capacities, certified drawing, weights and other features not shown in the product catalog, contact FNC

## Arrestor limit for use

### STANDARD EN 12874

### TESTING AND CERTIFICATION

Acceptance testing which proves capacity of an arrester is the only guarantee of arrester performance, arrester should be tested to meet a recognized standard as EN 12874.

### VAPOR COMPOSITION

For arrester selection gas classification used is Maximum Experimental Safe Gap (MESG).

### IDENTIFICATION OF PROTECTIVE SYSTEMS AND EXPLOSION GROUP ACC. EN 12874 - BASED ON MESG

|                                    |      |
|------------------------------------|------|
| (Maximum Experimental Safe Gap)    |      |
| (I) ( $\geq 1.1$ )                 | [mm] |
| IIA $> 0.9$                        | [mm] |
| IIB1 $0.9 \geq s \Rightarrow 0.85$ | [mm] |
| IIB2 $0.85 > s \Rightarrow 0.75$   | [mm] |
| IIB3 $0.75 > s \Rightarrow 0.65$   | [mm] |
| IIB $0.65 > s \Rightarrow 0.5$     | [mm] |
| IIC $< 0.5$                        | [mm] |

### OPERATING PRESSURE

Operating pressure of system where arrester is to be installed should not exceed the pressure at which the arrester has been tested.

### LIMITS FOR USE

Operating temperature:  $-20^{\circ}\text{C}$  up to  $+60^{\circ}\text{C}$   
 Operating pressure: 0.8 bar abs up to 1.1 bar abs

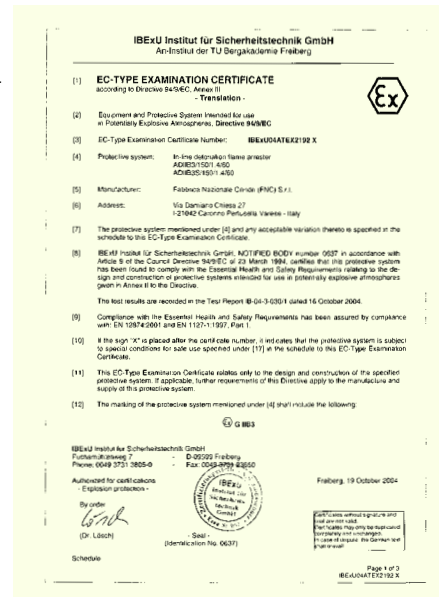
### TEMPERATURE

$60^{\circ}\text{C} < T < 150^{\circ}\text{C}$  acc EN 12874  
 $T > 150^{\circ}\text{C}$  based on EN 12874

### PRESSURE

$1.1 \text{ bar} < p < 1.6 \text{ bar}$  acc to EN 12874  
 $p > 1.6 \text{ bar}$  based on EN 12874

The FNC TPD has submitted their flame arresters and detonation arresters for inspection and testing by EU recognized, independent, third party approval agencies. We have been granted acceptance of our arresters by IBExU in Germany.



Type examination certificate



# ATEX Approval on Pressure / Vacuum Relief Valves

**FNC Tank Protection Division** is proud to announce conformity with European **ATEX Directive 94/9/EC**: Essential Health and Safety Requirements of the Equipment and Protective Systems in Potentially Explosive Atmospheres on the models listed below:

series 1000

series 2100

series 2500

series 3000

series 4000

series 5000

series 6000

**Materials of Construction:** This approval covers the models listed above in aluminum, carbon steel, stainless steel and "Hastelloy", and would encompass standard designs as well as designs incorporating minor modifications that would not affect the unit's pressure / vacuum relieving characteristics.

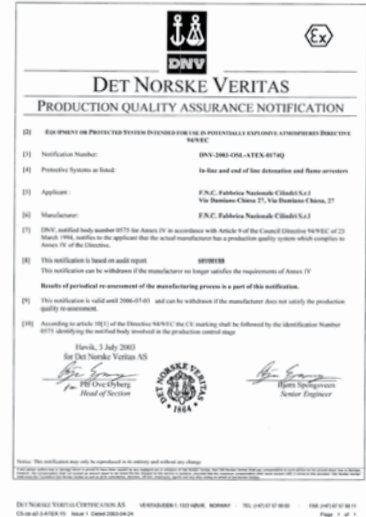
**Assessment Criteria:** Each of these designs has been assessed in accordance with EN13463-1:2001 Non-electrical equipment for potentially explosive atmospheres - part 1: Basic method and requirements. This assessment includes analysis of the following risks: 1) Hot surface 2) Electrostatic Discharge 3) Electrical Sparking 4) Mechanical Sparking 5) Radiation 6) Adiabatic Compression.

**Labeling:** All of these designs are now approved and orders shipped to territories in Europe will be supplied with a stainless steel **CE conformity tag**.

The legal requirement for the tagging is applicable to European territories.

**Certification:** Every unit shipped from **FNC Tank Protection Division** for the defined territories will be issued with a "**Certificate of Conformance**" in accordance with the ATEX requirements.

Validity: Equipment certification is to be renewed every **10 years** and applies to new equipment used in the production, storage, processing filling and transportation of volatile products.



ATEX Directive 94/9/EC







# Breather valves



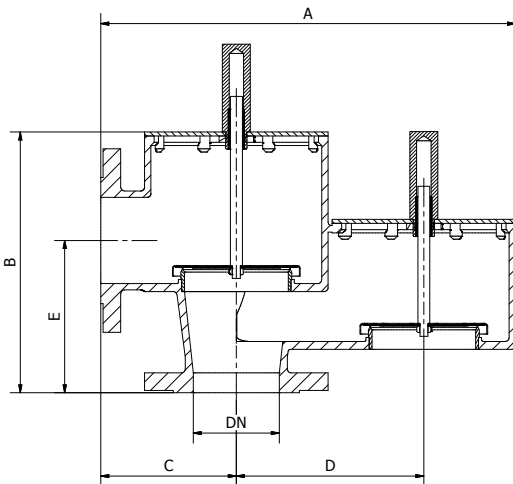
PV relief valves are safety equipment designed to protect tank against rupturing or imploding. As long as the tank pressure remains within the valve pressure and vacuum setting the pallets remains in contact with the seat ring and no venting or breathing take place. If direct atmosphere discharge or nitrogen is used on vacuum inlet, a flanged connection is available. PV relief valve is commonly referred to as a "breather valve" because of its primary function. Flame arrester can be mounted directly upstream of breather vent.

- new shape for fluid dynamic improvements
- pipeway connection on Pressure and process side
- pallet guide outside the process

### FEATURES

- **SIZE:** 4" (100 mm) through 8" (200 mm)
- **CONSTRUCTED:** aluminium, carbon steel, stainless steel, additional metals and coatings
- **SETTING PRESSURE:** +2,5 mbar to +50 mbar
- **SETTING VACUUM:** -2,5 mbar to -30 mbar
- **FLANGE RATING:** ANSI 150, PN16

**PRODUCTS:**  
series 1000



| DESCRIPTION              | STANDARD MATERIALS OF CONSTRUCTION |            |         |
|--------------------------|------------------------------------|------------|---------|
|                          | ALUMINUM                           | CARBON STL | SS      |
| nut, hex                 | SS                                 | SS         | SS      |
| cover                    | AL GR 356 T6                       | CS WCB     | SS      |
| gasket, cover            | NON-ASB                            | NON-ASB    | NON-ASB |
| pallet, pressure         | SS                                 | SS         | SS      |
| o-ring, plate pallet (2) | VITON                              | VITON      | VITON   |
| flange                   | SS                                 | SS         | SS      |
| rod, guide               | SS                                 | SS         | SS      |
| stem, pressure           | SS                                 | SS         | SS      |
| body                     | AL GR 356 T6                       | CS         | SS      |
| stud - nut               | SS                                 | SS         | SS      |

| DN | 4"  | 6"  | 8"   |
|----|-----|-----|------|
| A  | 520 | 778 | 1010 |
| B  | 327 | 418 | 484  |
| C  | 170 | 248 | 330  |
| D  | 235 | 355 | 460  |
| E  | 191 | 263 | 305  |

Dimensions shown are for reference only. Contact factory for certified drawings.



# Breather valves



PV relief valves are safety equipment designed to protect tank against rupturing or imploding. As long as the tank pressure remains within the valve pressure and vacuum setting the pallets remains in contact with the seat ring and no venting or breathing take place. If direct atmosphere discharge or nitrogen is used on vacuum inlet, a flanged connection is available.

PV relief valve is commonly referred to as a “breather valve” because of its primary function.

Flame arrester can be mounted directly upstream of breather vent or by means of an elbow to vacuum inlet.

### FEATURES

- **SIZE:** 2” (50 mm) through 14” (350 mm)
- **CONSTRUCTED:** aluminium, carbon steel, stainless steel, additional metals and coatings
- **SETTING PRESSURE:** +2,5 mbar to +50 mbar upon request +450 mbar
- **SETTING VACUUM:** -2,5 mbar to -30 mbar upon request -300 mbar
- **FLANGE RATING:** ANSI 150, PN10, PN16

### PRODUCTS:

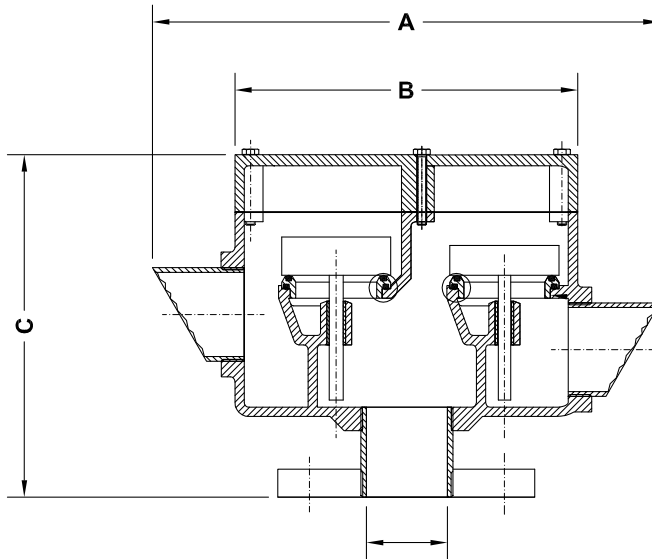
- series 430
- series B430
- series 502
- series B502

### DESCRIPTION

### STANDARD MATERIALS OF CONSTRUCTION

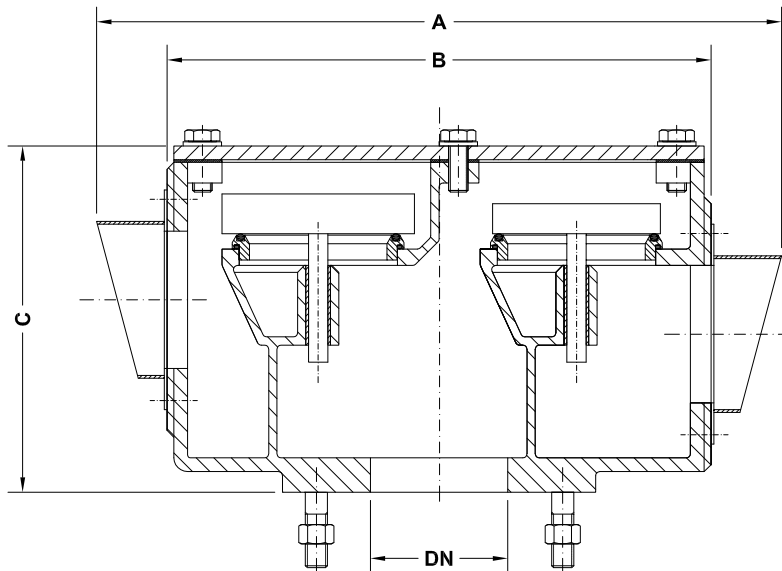
| DESCRIPTION              | STANDARD MATERIALS OF CONSTRUCTION |            |         |
|--------------------------|------------------------------------|------------|---------|
|                          | ALUMINUM                           | CARBON STL | SS      |
| nut, hex                 | SS                                 | SS         | SS      |
| cover                    | AL GR 356 T6                       | CS         | SS      |
| gasket, cover            | NON-ASB                            | NON-ASB    | NON-ASB |
| pallet, pressure         | SS                                 | SS         | SS      |
| o-ring, plate pallet (2) | VITON                              | VITON      | VITON   |
| flange                   | SS                                 | SS         | SS      |
| rod, guide               | SS                                 | SS         | SS      |
| stem, pressure           | SS                                 | SS         | SS      |
| body                     | AL GR 356 T6                       | CS         | SS      |
| stud - nut               | SS                                 | SS         | SS      |

## Breather valve *Vent to atmosphere*



| DN           |  | 20    | 25    | 40    | 50    |
|--------------|--|-------|-------|-------|-------|
| <b>DN</b>    |  | 20    | 25    | 40    | 50    |
| <b>A</b>     |  | 330   | 330   | 330   | 330   |
| <b>B</b>     |  | 220   | 220   | 220   | 220   |
| <b>C</b>     |  | 200   | 200   | 200   | 200   |
| <b>WIDTH</b> |  | 108   | 108   | 108   | 108   |
| <b>CODE</b>  |  | 00430 | 00430 | 00430 | 00430 |

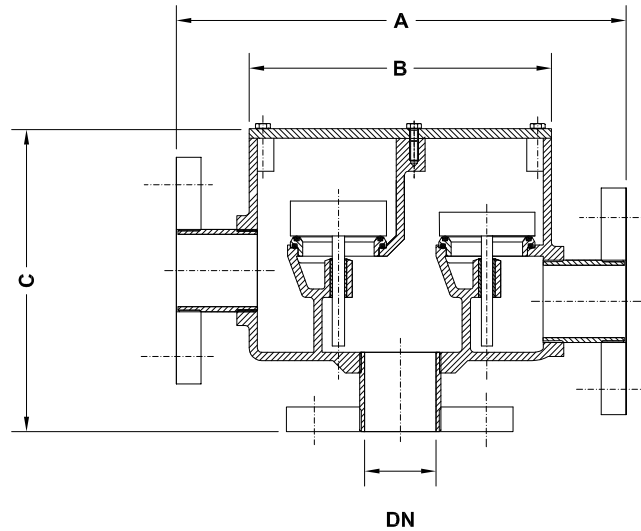
## Breather valve *Vent to atmosphere*



| DN          | 80   | 100  | 150  | 200  | 250  | 300  | 350  |
|-------------|------|------|------|------|------|------|------|
| <b>A</b>    | 500  | 600  | 870  | 970  | 1150 | 1240 | 1460 |
| <b>B</b>    | 320  | 400  | 600  | 740  | 850  | 970  | 1154 |
| <b>C</b>    | 240  | 275  | 330  | 390  | 440  | 570  | 700  |
| <b>D</b>    | 200  | 229  | 292  | 350  | 410  | 490  | 550  |
| <b>CODE</b> | 0502 | 0563 | 0624 | 1102 | 1118 | 1120 | 1141 |

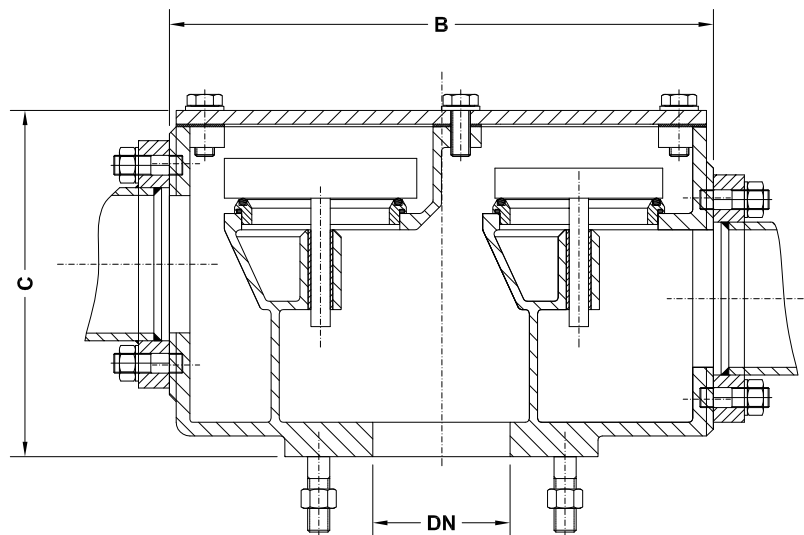
Dimensions shown are for reference only. Contact factory for certified drawings.

## Breather valve *Pipe away*



| DN    | 20    | 25    | 40    | 50    |
|-------|-------|-------|-------|-------|
| A     | 330   | 330   | 330   | 330   |
| B     | 220   | 220   | 220   | 220   |
| C     | 200   | 200   | 200   | 200   |
| WIDTH | 108   | 108   | 108   | 108   |
| CODE  | B0430 | B0430 | B0430 | B0430 |

## Breather valve *Pipe away*



| DN    | 80    | 100   | 150   | 200   | 250   | 300   | 350   |
|-------|-------|-------|-------|-------|-------|-------|-------|
| B     | 320   | 400   | 600   | 740   | 850   | 970   | 1154  |
| C     | 240   | 275   | 330   | 390   | 440   | 570   | 700   |
| WIDTH | 200   | 229   | 292   | 350   | 410   | 490   | 550   |
| CODE  | B0502 | B0563 | B0624 | B1102 | B1118 | B1120 | B1141 |

Dimensions shown are for reference only. Contact factory for certified drawings.

# Pressure Relief Valves Weight loaded



Pressure relief valves are weight loaded vents designed to prevent tank deformation caused by increase in internal pressure. When tank pressure reach valve pressure setting, weight loaded pallet is lifted allowing the excess pressure to be vented to atmosphere or to be piped-away. Pallets have knife edged ring with sealing or metal to metal. Mesh screen over inlet excludes foreign matter.

## FEATURES

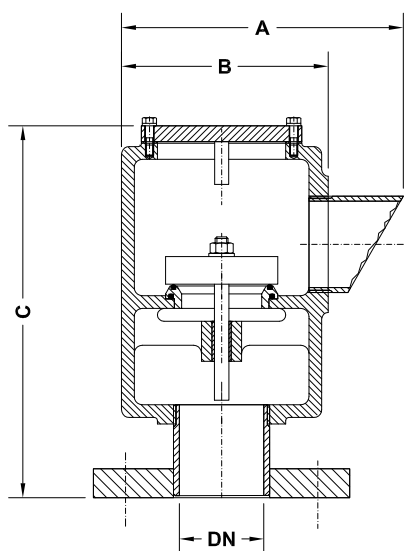
- **SIZE:** 1" (25 mm) through 14" (350 mm)
- **CONSTRUCTED:** carbon steel, stainless steel, additional metals and coatings
- **SETTING PRESSURE:** +2,5 mbar to +50 mbar
- **FLANGE RATING:** ANSI 150, PN16
- **ATEX manufacturing facility**
- **Tested and sized in accordance with API2000**

## PRODUCTS:

- 6200 — vent to atmosphere 3/4" to 2"
- B6220 — pipe away 3/4" to 2"
- 6000 — vent to atmosphere 3" to 6"
- B6000 — pipe away 3" to 6"
- 4000 — vent to atmosphere 8" to 14"
- B4400 — pipe away 8" to 14"
- 2100 — vent to atmosphere 2" to 8"

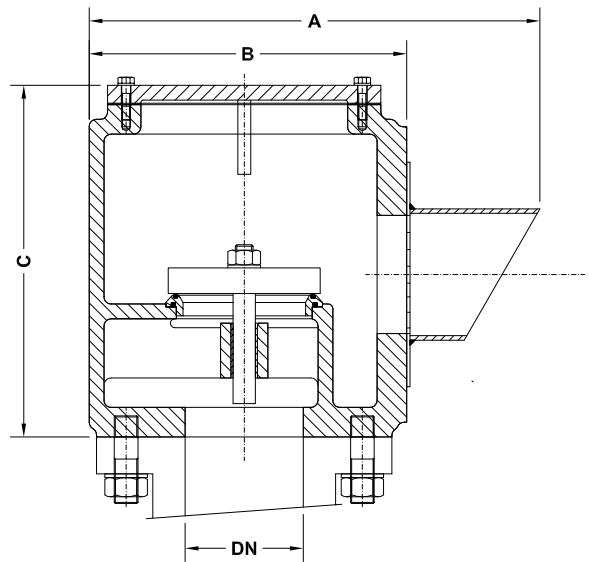
| DESCRIPTION              | STANDARD MATERIALS OF CONSTRUCTION |            |         |
|--------------------------|------------------------------------|------------|---------|
|                          | ALUMINUM                           | CARBON STL | SS      |
| nut, hex                 | SS                                 | SS         | SS      |
| cover                    | AL GR 356 T6                       | CS         | SS      |
| gasket, cover            | NON-ASB                            | NON-ASB    | NON-ASB |
| pallet, pressure         | SS                                 | SS         | SS      |
| o-ring, plate pallet (2) | VITON                              | VITON      | VITON   |
| flange                   | SS                                 | SS         | SS      |
| rod, guide               | SS                                 | SS         | SS      |
| stem, pressure           | SS                                 | SS         | SS      |
| body                     | AL GR 356 T6                       | CS         | SS      |
| stud - nut               | SS                                 | SS         | SS      |

## Pressure Relief Valves Weight loaded *Series 6000 - Vent to atmosphere*



| DN   | 20   | 25   | 40   | 50   |
|------|------|------|------|------|
| A    | 170  | 170  | 170  | 170  |
| B    | 125  | 125  | 125  | 125  |
| C    | 230  | 230  | 230  | 230  |
| CODE | 6200 | 6200 | 6200 | 6200 |

## Pressure Relief Valves Weight loaded *Series 6000 - Vent to atmosphere*

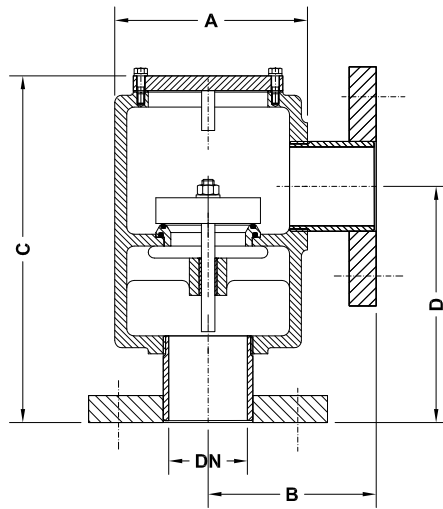


| DN    | 80   | 100  | 150  |
|-------|------|------|------|
| A     | 275  | 310  | 370  |
| B     | 215  | 245  | 285  |
| C     | 225  | 250  | 295  |
| WIDTH | 210  | 249  | 249  |
| CODE  | 6001 | 6002 | 6003 |

Dimensions shown are for reference only. Contact factory for certified drawings.

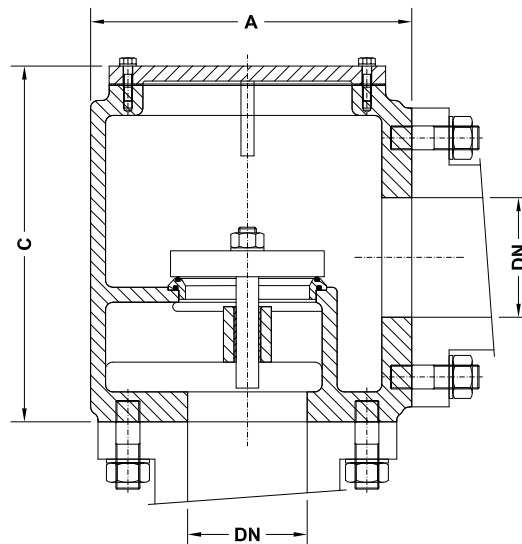


Pressure Relief Valves  
Weight loaded  
*Series 6000 - Pipe away*



| DN   | 20   | 25   | 40   | 50   |
|------|------|------|------|------|
| A    | 125  | 125  | 125  | 125  |
| B    | 112  | 112  | 112  | 112  |
| C    | 230  | 230  | 230  | 230  |
| D    | 158  | 158  | 158  | 158  |
| CODE | 6220 | 6220 | 6220 | 6220 |

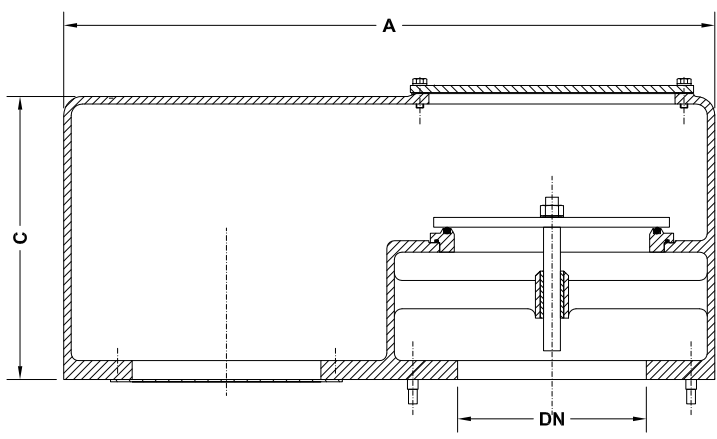
Pressure Relief Valves  
Weight loaded  
*Series 6000 - Pipe away*



| DN   | 80    | 100   | 150   |
|------|-------|-------|-------|
| A    | 215   | 245   | 285   |
| C    | 225   | 250   | 295   |
| D    | 210   | 249   | 295   |
| CODE | B6001 | B6002 | B6003 |

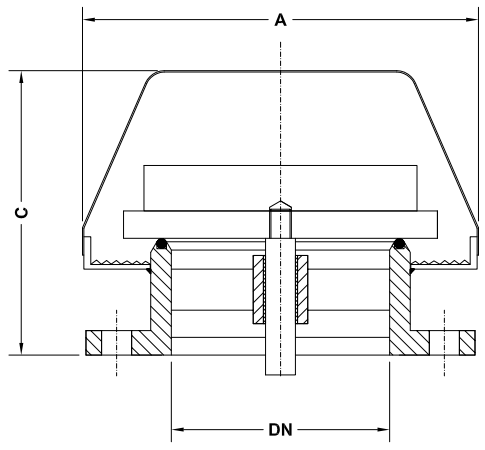
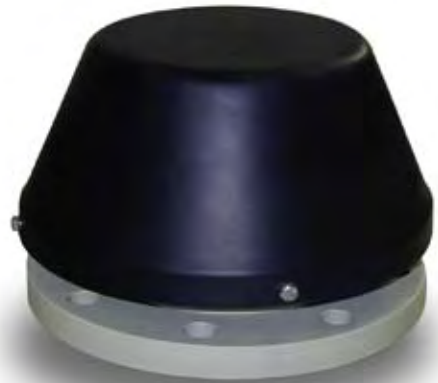
Dimensions shown are for reference only. Contact factory for certified drawings.

## Pressure Relief Valves Weight loaded Series 4000 - Vent to atmosphere



| DN    | 200  | 250  | 300  | 350  |
|-------|------|------|------|------|
| A     | 690  | 810  | 970  | 1070 |
| C     | 300  | 320  | 330  | 390  |
| WIDTH | 345  | 408  | 484  | 534  |
| CODE  | 3004 | 3005 | 3006 | 3007 |

## Pressure Relief Valves Weight loaded Series 2100 - Vent to atmosphere



| DESCRIPTION    | STANDARD MATERIALS OF CONSTRUCTION |    |
|----------------|------------------------------------|----|
|                | CARBON STL                         | SS |
| weatherhood    | CS                                 | SS |
| pallet weight  | SS                                 | SS |
| insert, seat   | SS                                 | SS |
| housing        | CS                                 | SS |
| screen         | SS                                 | SS |
| guide, stem    | SS                                 | SS |
| stem, pressure | SS                                 | SS |

| DN   | 100   | 150   | 200   |
|------|-------|-------|-------|
| A    | 290   | 290   | 390   |
| C    | 185   | 185   | 200   |
| CODE | B2095 | B2100 | B2105 |

Dimensions shown are for reference only. Contact factory for certified drawings.

# Vacuum Relief Valves Weight loaded



Vacuum relief valves are weight loaded vents designed to relief negative pressure. When tank vacuum reach the valve vacuum setting the pallet is lifted from it seats ring allowing air or nitrogen to flow into tank to relive excess vacuum condition, available with pipe-away feature. Pallets have knife-edged ring, with sealing or metal to metal. Mesh screen over inlet excludes foreign matter

## FEATURES

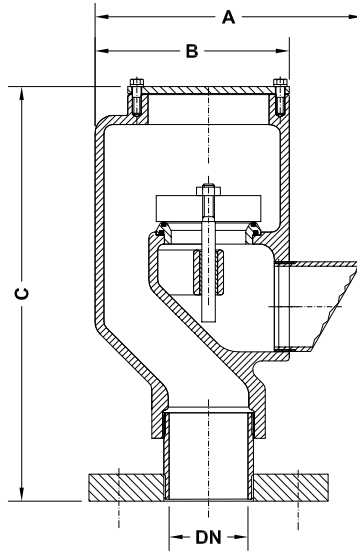
- **SIZE:** 1" (25 mm) through 14" (350 mm)
- **CONSTRUCTED:** carbon steel, stainless steel, additional metals and coatings
- **SETTING PRESSURE:** -2,5 mbar to -50 mbar upon request -450 mbar
- **FLANGE RATING:** ANSI 150, PN10, PN16

## PRODUCTS:

- series 5200 — atmospheric inlet - 1/2" to 2"
- series B5220 — piped inlet - 1/2" to 2"
- series 5000 — atmospheric inlet - 3" to 6"
- series B5000 — flanged inlet - 3" to 6"
- series 3000 — atmospheric inlet - 8" to 14"
- series B3000 — flanged inlet - 8" to 14"

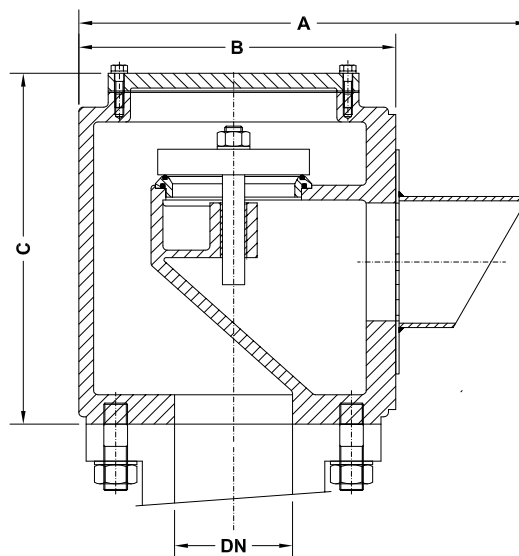
| DESCRIPTION              | STANDARD MATERIALS OF CONSTRUCTION |            |         |
|--------------------------|------------------------------------|------------|---------|
|                          | ALUMINUM                           | CARBON STL | SS      |
| nut, hex                 | SS                                 | SS         | SS      |
| cover                    | AL GR 356 T6                       | CS         | SS      |
| gasket, cover            | NON-ASB                            | NON-ASB    | NON-ASB |
| pallet, pressure         | SS                                 | SS         | SS      |
| o-ring, plate pallet (2) | VITON                              | VITON      | VITON   |
| flange                   | SS                                 | SS         | SS      |
| rod, guide               | SS                                 | SS         | SS      |
| stem, pressure           | SS                                 | SS         | SS      |
| body                     | AL GR 356 T6                       | CS         | SS      |
| stud - nut               | SS                                 | SS         | SS      |

## Vacuum Relief Valves Weight loaded *Series 5000 - Vent to atmosphere*



| DN    | 25   | 40   | 50   |
|-------|------|------|------|
| A     | 170  | 170  | 170  |
| B     | 130  | 130  | 130  |
| C     | 283  | 283  | 283  |
| WIDTH | 108  | 108  | 108  |
| CODE  | 5200 | 5200 | 5200 |

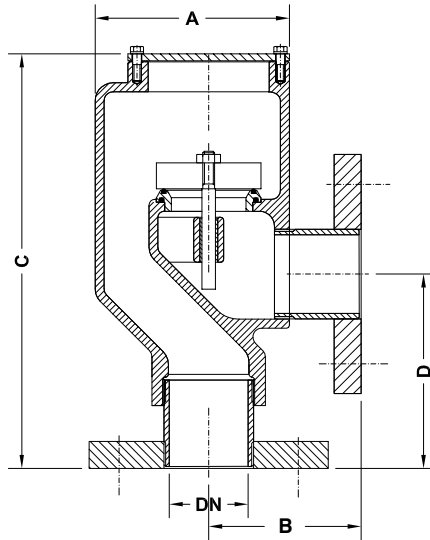
## Vacuum Relief Valves Weight loaded *Series 5000 - Vent to atmosphere*



| DN    | 80    | 100   | 150   |
|-------|-------|-------|-------|
| A     | 265   | 305   | 380   |
| B     | 215   | 245   | 310   |
| C     | 225   | 250   | 320   |
| WIDTH | 210   | 240   | 285   |
| CODE  | B5001 | B5002 | B5003 |

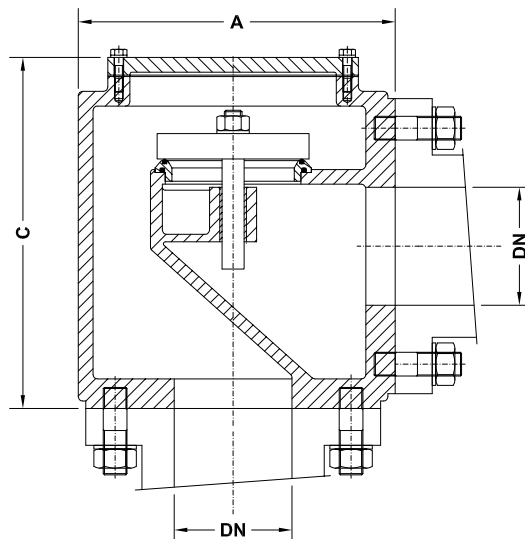
Dimensions shown are for reference only. Contact factory for certified drawings.

Vacuum Relief Valves  
 Weight loaded  
 Series 5000 - Pipe away



| DN   | 20   | 25   | 40   | 50   |
|------|------|------|------|------|
| A    | 130  | 130  | 130  | 130  |
| B    | 98   | 98   | 98   | 98   |
| C    | 283  | 283  | 283  | 283  |
| D    | 120  | 120  | 120  | 120  |
| CODE | 5220 | 5220 | 5220 | 5220 |

Vacuum Relief Valves  
 Weight loaded  
 Series 5000 - Pipe away

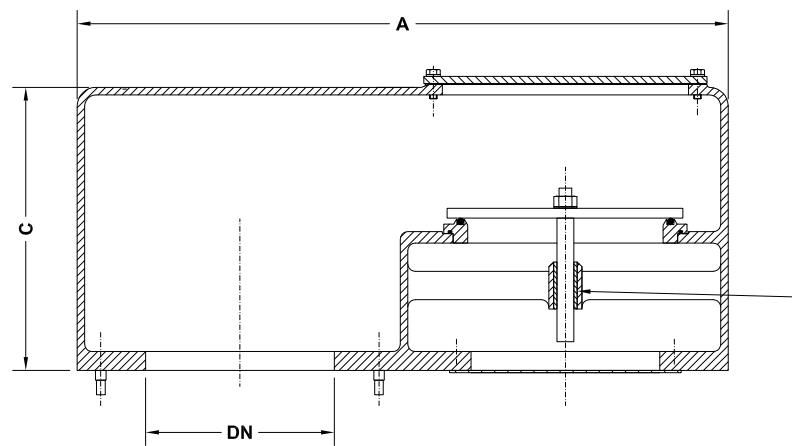


| DN    | 80    | 100   | 150   |
|-------|-------|-------|-------|
| A     | 215   | 245   | 310   |
| C     | 225   | 250   | 320   |
| WIDTH | 210   | 240   | 285   |
| CODE  | B5001 | B5002 | B5003 |

Dimensions shown are for reference only. Contact factory for certified drawings.



# Vacuum Relief Valves Weight loaded Series 3000 - Vent to atmosphere



| DN    | 200  | 250  | 300  | 350  |
|-------|------|------|------|------|
| A     | 690  | 810  | 970  | 1070 |
| C     | 300  | 320  | 330  | 390  |
| WIDTH | 345  | 408  | 484  | 534  |
| CODE  | 3004 | 3005 | 3006 | 3007 |

Dimensions shown are for reference only. Contact factory for certified drawings.

# Sample and Gauge hatches



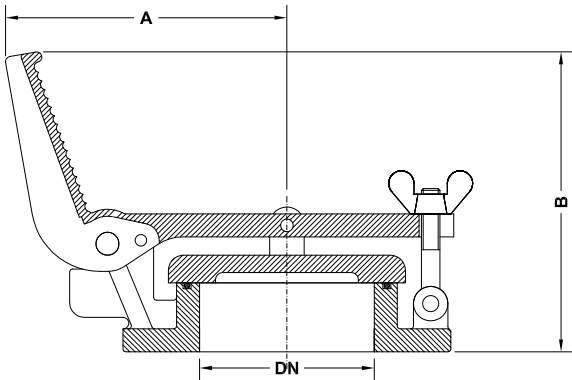
Hatches are made in model: type "LP" sealed closing hatches, to keep inside the tank a pressure beyond 50-70 bar.

## FEATURES

- **SIZE:** 4" - 8"
- **CONSTRUCTED:** Aluminium
- **FLANGE RATING:** ANSI 150LB - PN16
- **Flange Faces:** FF
- **Connections:** Flanged

## PRODUCTS

Series LP

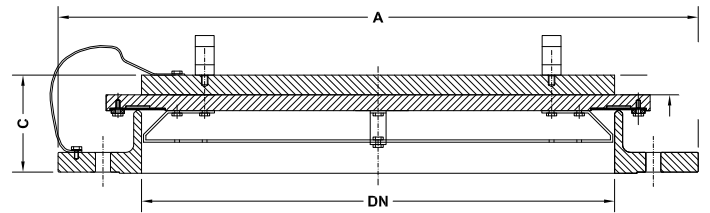


| DESCRIPTION | STANDARD MATERIAL OF CONSTRUCTION |
|-------------|-----------------------------------|
|             | <b>ALUMINIUM</b>                  |
| arm         | Aluminium                         |
| base        | Aluminium                         |
| lid gasket  | PTFE/VITON                        |
| lid         | Aluminium                         |
| swing bolt  | SS                                |
| roll pin    | SS                                |

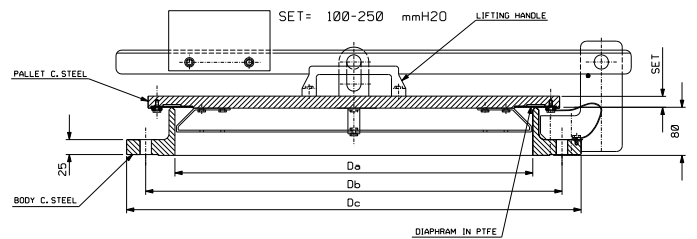
| DN   | 4"    | 6"    | 8"    |
|------|-------|-------|-------|
| A    | 210   | 245   | 267   |
| B    | 210   | 240   | 240   |
| CODE | LP603 | LP701 | LP592 |

Dimensions shown are for reference only. Contact factory for certified drawings.

# Emergency vents Roof Manhole Cover



Weight loaded



Weight loaded hinged

Sized to provide emergency relief due to overpressure from tank inside.

When internal pressure is beyond the capacity of breather vent.

To be used also as "manhole" with sizes 20"-24"

Venting requirements can be calculated using API2000.

Available also weight loaded hinged arm design.

## FEATURES

- **SIZE:** 10" - 20" - 24"
- **CONSTRUCTED:** carbon steel, stainless steel, additional metals and coatings
- **SETTING PRESSURE:** +30mbar max
- **FLANGE RATING:** ANSI 150, PN10, PN16

## PRODUCTS:

2500

| DESCRIPTION       | STANDARD MATERIALS OF CONSTRUCTION |             |
|-------------------|------------------------------------|-------------|
|                   | CARBON STL                         | SS          |
| cable, retention  | SS                                 | SS          |
| body              | CS                                 | SS          |
| diaphragm (2) (3) | Teflon® FEP                        | Teflon® FEP |
| pallet            | SS                                 | SS          |
| weight, plate     | CS                                 | CS          |
| plate, retainer   | SS                                 | SS          |
| nut, hex, washer  | SS                                 | SS          |

| DN        | 10"   | 20"   | 24"   |
|-----------|-------|-------|-------|
| A         | 406   | 715   | 840   |
| C         | 100+S | 100+S | 100+S |
| CODE      | 2460  | 2500  | 2510  |
| datasheet | 25set | 25set | 25set |

Dimensions shown are for reference only. Contact factory for certified drawings.

## Special features

### *Blanketing system*



#### FEATURES

- **SIZE:** 2" (50mm) - 6" (150mm)
- **CONSTRUCTED:** Aluminium, Carbon Steel & Stainless Steel, additional metals and coatings
- **FLANGE RATING:** ANSI 150LB - PN16
- **Flange Faces:** RF, FF
- **Connections:** Flanged

### *Vent-line / In-line flame arresters*



Flame arresters are at time mounted directly upstream or on vacuum inlet of breather vents.

#### FEATURES

- **SIZE:** 2" (50 mm) through 14" (350 mm)



## Reference list

|                               |               |                               |               |
|-------------------------------|---------------|-------------------------------|---------------|
| 3V GREEN EAGLE S.P.A.         | CHEMICAL      | FATA ENGINEERING GROUP        | ENGINEERING   |
| 3V SIGMA                      | CHEMICAL      | FELCHER LUIGI                 | ENGINEERING   |
| 5P ENGINEERING                | BIOGAS        | FISIA ENGINEERING             | ENGINEERING   |
| ABB POWER GEN.                | CHEMICAL      | FORMOSA                       | CHEMICAL      |
| ACS DOBFAR                    | PHARMA        | FOSTER WHEELER                | ENGINEERING   |
| ADPO                          | CHEMICAL      | GENERAL EUROPE VACUUM         | ENGINEERING   |
| AFROS                         | CHEMICAL      | GESCO SRL                     | ENGINEERING   |
| AGIPLASS ROBASSOMERO          | PETROCHEMICAL | HENKEL SPA                    | CHEMICAL      |
| AGROLINZ MELANINE             | CHEMICAL      | HOECHST                       | PETROCHEMICAL |
| AIR LIQUIDE                   | CRIOGENIC     | ICAP-SIRA CHEMICALS           | CHEMICAL      |
| AKZO CHEMICALS                | CHEMICAL      | ICC SENECA SRL                | ENGINEERING   |
| ALCAN PECHINEY                | CHEMICAL      | ITAL                          | CHEMICAL      |
| ALFA CHEMICALS                | CHEMICAL      | ITALWISAD SRL                 | ENGINEERING   |
| ALOSUISSE ITALIA              | BIOGAS        | LENNETAL                      | BIOGAS        |
| ANSALDO INDUSTRIES            | ECOLOGY       | LS ENGINEERING SRL            | ENGINEERING   |
| API RAFFINERIA DI ANCONA SPA  | PETROCHEMICAL | LUBRIZOL                      | CHEMICAL      |
| ATLAS EUROPOL                 | CHEMICAL      | LURGI                         | ENGINEERING   |
| ATOFINA                       | PETROCHEMICAL | MAERSK OLIE OG GAS AS         | ENGINEERING   |
| AUSIMONT                      | CHEMICAL      | NAN YA                        | CHEMICAL      |
| AVENTIS                       | PHARMA        | NEC S.R.L.                    | ENGINEERING   |
| BAKELITE ITALIA               | CHEMICAL      | NESTE                         | ENGINEERING   |
| BALLESTRA ENGINEERING         | PETROCHEMICAL | NOYVALLESINA ENGINEERING SPA  | ENGINEERING   |
| BARLOCHER D                   | CHEMICAL      | ORIL INDUSTRIE                | CHEMICAL      |
| BASF VERNICI E INCHIOSTRI SPA | CHEMICAL      | OXON ITALIA SPA               | CHEMICAL      |
| BELLELI ENGINEERING           | ENGINEERING   | PERONI POMPE SPA              | POMPS         |
| BUHLER MIAG                   | CHEMICAL      | POLIOLI SPA                   | CHEMICAL      |
| BUSCH ITALIA                  | PUMPS         | POLYMERLATEX SRL              | CHEMICAL      |
| BVPHARMES S.R.L.              | PHARMA        | POLYSYSTEMS SPA               | CHEMICAL      |
| CAFFARO                       | CHEMICAL      | PORTO PETROLI DI GENOVA       | PETROCHEMICAL |
| CARGILL S.R.L. DIV. CERESTAR  | CHEMICAL      | PPG                           | CHEMICAL      |
| CGM COSTRUZIONI               | ENGINEERING   | PPG INDUSTRIES ITALIA SPA     | PAINT         |
| CHEMIT S.R.L.                 | CHEMICAL      | PRAOIL OLEODOTTI ITALIANI SPA | REFINERY      |
| CHIMEX                        | CHEMICAL      | PRESSINDUSTRIA                | ENGINEERING   |
| CIBA SPECIALITY CHEMICALS SPA | PHARMA        | PROCOS SPA                    | CHEMICAL      |
| CLARIANT                      | CHEMICAL      | PROCTER & GAMBLE ITALIA       | CHEMICAL      |
| COGNIS                        | CHEMICAL      | RADICI CHIMICA SPA            | CHEMICAL      |
| COMBER                        | ENGINEERING   | RHODIA SPA                    | CHEMICAL      |
| COMBUSTION SERVICE SRL        | ENGINEERING   | ROHM AND HAAS                 | CHEMICAL      |
| CRAY VALLEY ITALIA SRL        | CHEMICAL      | ROSETTI MARINO                | ENGINEERING   |
| CYLINGAS                      | ENGINEERING   | SANOFI                        | CHEMICAL      |
| DEC IMPIANTI                  | ENGINEERING   | SASOL ITALY SPA               | PETROCHEMICAL |
| DETECLINE SRL                 | ENGINEERING   | SEKO BONO EXACTA              | ENGINEERING   |
| DIPHARMA SPA                  | PHARMA        | SIAD MACCHINE ED IMPIANTI     | CRIOGENIC     |
| DISTILLERIE TRANI             | BIOGAS        | SIEMENS                       | ENGINEERING   |
| DOW ITALIA SRL                | CHEMICAL      | SOLVAY SOLEXIS                | CHEMICAL      |
| ECOSERVIZI                    | ECOLOGY       | TASNEE                        | CHEMICAL      |
| ECOTECNICA                    | ECOLOGY       | TECNIMONT                     | ENGINEERING   |
| ENI S.P.A. DIVISIONE REFINING | REFINERY      | TOTAL                         | PETROCHEMICAL |
| ENICHEM MANTOVA               | CHEMICAL      | TVK                           | CHEMICAL      |
| ENICHEM POLIMERI              | CHEMICAL      | UHU                           | CHEMICAL      |
| ENICHEM SYNTHESIS             | CHEMICAL      | VOPAK                         | CHEMICAL      |
| ENOC                          | CHEMICAL      | WESTFALIA SEPARATION          | CHEMICAL      |
| ESSECO S.R.R.                 | ECOLOGY       | ZAMBON GROUP SPA              | PHARMA        |
| FARMABIOS S.P.A.              | PHARMA        | ZANELLI SRL                   | CHEMICAL      |

# International & domestic representatives

## Worldwide

### BELGIUM

BELGIUM VENTIEL NV - Mechelen (Belgium)

### BULGARIA

ENERGAN - Sofia (Bulgaria)

### EGYPT

MISR NAFT C.T.S - Heliopolis-Cairo (Egypt)

### FINLAND

KONTRAM OY - Espoo (Finland)

### FRANCE

TECHNOFRANCE SAS - Les Lilas (France)

### GERMANY

BORMANN & NEUPERT - Dusseldorf (Germany)

### GREECE

GIOXAS SA - Aigaleo (Greece)

### INDIA

TECHNICAL PARTS CO. PVT LTD - Mumbai (India)

### INDONESIA

FEDERAL HARDWARE ENGINEERING - S'pore (Singapore)

### IRAN

TECHNICAL PARTS COMPANY - Abu Dhabi-Dubai (UAE)

### IRELAND

VALCO ENGINEERING - Waterford (Ireland)

### ISRAEL

ETA ENGINEERING LTD - Tel-Aviv (Israel)

### MAGHREB

TECHNOFRANCE SAS - Les Lilas (France)

### OMAN

OILFIELD SUPPLY CENTRE - Muscat (Oman)

### PAKISTAN

GLOBAL LINKS INTERNATIONAL - Islamabad (Pakistan)

### PEOPLE REPUBLIC OF CHINA

SHANGHAI'S KINGSWIN  
INTERNATIONAL CO. LTD. - Shangai (Peoples Republic of China)

### QATAR

PETROGULF - Doha (Qatar)

### ROMANIA

SC PELROM GROUP SRL - Brasov (Romania)

### SAUDI ARABIA

SADC - SAUDI ARABIAN  
DEVELOPMENT CO LTD - Khobar (Saudi Arabia)

### SINGAPORE

FEDERAL HARDWARE ENGINEERING - S'pore (Singapore)

### SLOVENIA / CROATIA / BOSNIA / SERBIA / MONTE NEGRO / MACEDONIA

LARUS PROJECT - Zagreb (Croatia)

### SPAIN

TECNOVENT - Barcelona (Spain)

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EUROTEK DEVELOPMENT CORPORATION - Taipei (Taiwan)

### TURKEY

SERKON KONTROL - Ankara (Turkey)

### UAE

TECHNICAL PARTS COMPANY - Abu Dhabi-Dubai (UAE)

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## Italy

### LIGURIA

F.A.I.C. s.r.l. - Carcare (SV) Italy

### LOMBARDIA

SC CARRISI S.A.S. - San Donato Milanese (MI) Italy

### LAZIO - ABRUZZO - UMBRIA

SAICA SRL - Roma Italy

### SICILIA

INTECO - Roma Italy

### SARDEGNA

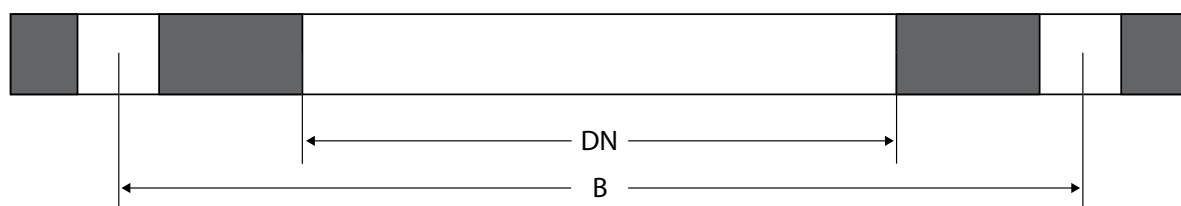
MIOTTI MAURO - Porto Torres (SS) Italy

### TOSCANA

GIANI FABRIZIO - Figline Valdarno (FI) Italy



# Flange connections



**ANSI 150**

| Nominal Diameter |        | Bolt Hole Diameter | N° of Holes | Bolt Circle Diameter |
|------------------|--------|--------------------|-------------|----------------------|
| DN               | Inch   | <b>B</b> (mm)      |             | A (mm)               |
| 15               | 1/2"   | 16,0               | 4           | 60,3                 |
| 20               | 3/4"   | 16,0               | 4           | 69,8                 |
| 25               | 1"     | 16,0               | 4           | 79,4                 |
| 32               | 1,1/4" | 16,0               | 4           | 88,9                 |
| 40               | 1,1/2" | 16,0               | 4           | 98,4                 |
| 50               | 2"     | 19,0               | 4           | 120,6                |
| 80               | 3"     | 19,0               | 4           | 152,4                |
| 100              | 4"     | 19,0               | 8           | 190,5                |
| 150              | 6"     | 22,0               | 8           | 241,3                |
| 200              | 8"     | 22,0               | 8           | 298,5                |
| 250              | 10"    | 25,5               | 12          | 362,0                |
| 300              | 12"    | 25,5               | 12          | 431,5                |
| 350              | 14"    | 28,5               | 12          | 476,2                |
| 400              | 16"    | 28,5               | 16          | 539,7                |
| 450              | 18"    | 32,0               | 16          | 577,8                |
| 500              | 20"    | 32,0               | 20          | 635,0                |
| 600              | 24"    | 35,0               | 20          | 749,3                |

**PN10**

| Nominal Diameter |        | Bolt Hole Diameter | N° of Holes | Bolt Circle Diameter |
|------------------|--------|--------------------|-------------|----------------------|
| DN               | Inch   | <b>B</b> (mm)      |             | A (mm)               |
| 15               | 1/2"   | 14,0               | 4           | 65,0                 |
| 20               | 3/4"   | 14,0               | 4           | 75,0                 |
| 25               | 1"     | 14,0               | 4           | 85,0                 |
| 32               | 1,1/4" | 18,0               | 4           | 100,0                |
| 40               | 1,1/2" | 18,0               | 4           | 110,0                |
| 50               | 2"     | 18,0               | 4           | 125,0                |
| 80               | 3"     | 18,0               | 8           | 160,0                |
| 100              | 4"     | 18,0               | 8           | 180,0                |
| 150              | 6"     | 22,0               | 8           | 240,0                |
| 200              | 8"     | 22,0               | 8           | 295,0                |
| 250              | 10"    | 22,0               | 12          | 350,0                |
| 300              | 12"    | 22,0               | 12          | 400,0                |
| 350              | 14"    | 22,0               | 16          | 460,0                |
| 400              | 16"    | 25,0               | 16          | 515,0                |
| 450              | 18"    | 25,0               | 20          | 565,0                |
| 500              | 20"    | 25,0               | 20          | 620,0                |
| 600              | 24"    | 29,0               | 20          | 725,0                |

**ANSI 300**

| Nominal Diameter |        | Bolt Hole Diameter | N° of Holes | Bolt Circle Diameter |
|------------------|--------|--------------------|-------------|----------------------|
| DN               | Inch   | <b>B</b> (mm)      |             | A (mm)               |
| 15               | 1/2"   | 16,0               | 4           | 66,7                 |
| 20               | 3/4"   | 19,0               | 4           | 82,5                 |
| 25               | 1"     | 19,0               | 4           | 88,9                 |
| 32               | 1,1/4" | 19,0               | 4           | 98,4                 |
| 40               | 1,1/2" | 22,0               | 4           | 114,3                |
| 50               | 2"     | 19,0               | 8           | 127,0                |
| 80               | 3"     | 22,0               | 4           | 168,3                |
| 100              | 4"     | 22,0               | 8           | 200,0                |
| 150              | 6"     | 22,0               | 12          | 269,9                |
| 200              | 8"     | 25,5               | 12          | 330,2                |
| 250              | 10"    | 28,5               | 16          | 387,3                |
| 300              | 12"    | 32,0               | 16          | 450,8                |
| 350              | 14"    | 32,0               | 20          | 514,3                |
| 400              | 16"    | 35,0               | 20          | 571,5                |
| 450              | 18"    | 35,0               | 24          | 628,6                |
| 500              | 20"    | 35,0               | 24          | 685,8                |
| 600              | 24"    | 41,5               | 24          | 812,8                |

**PN16**

| Nominal Diameter |        | Bolt Hole Diameter | N° of Holes | Bolt Circle Diameter |
|------------------|--------|--------------------|-------------|----------------------|
| DN               | Inch   | <b>B</b> (mm)      |             | A (mm)               |
| 15               | 1/2"   | 14,0               | 4           | 65,0                 |
| 20               | 3/4"   | 14,0               | 4           | 75,0                 |
| 25               | 1"     | 14,0               | 4           | 85,0                 |
| 32               | 1,1/4" | 18,0               | 4           | 100,0                |
| 40               | 1,1/2" | 18,0               | 4           | 110,0                |
| 50               | 2"     | 18,0               | 4           | 125,0                |
| 80               | 3"     | 18,0               | 8           | 160,0                |
| 100              | 4"     | 18,0               | 8           | 180,0                |
| 150              | 6"     | 22,0               | 8           | 240,0                |
| 200              | 8"     | 22,0               | 12          | 295,0                |
| 250              | 10"    | 25,0               | 12          | 355,0                |
| 300              | 12"    | 25,0               | 12          | 410,0                |
| 350              | 14"    | 25,0               | 16          | 470,0                |
| 400              | 16"    | 29,0               | 16          | 525,0                |
| 450              | 18"    | 29,0               | 20          | 585,0                |
| 500              | 20"    | 33,0               | 20          | 650,0                |
| 600              | 24"    | 36,0               | 20          | 770,0                |



# Product Limited Warranty - Terms and Conditions

## Product Limited Warranty terms only apply to purchase orders accepted by FNC

The Seller warrants products to be manufactured in accordance with published specifications and free from defects in materials and/or workmanship for a period of (12) twelve months. The Seller, at his discretion, will repair or replace any products returned intact to the factory, transportation charges prepaid, which the Seller, upon inspection, shall determine to be defective in material and/or workmanship. The foregoing shall constitute the sole remedy for any breach of the Seller's warranty.

THERE ARE NO UNDERSTANDINGS, AGREEMENTS, REPRESENTATIONS, OR WARRANTIES, EXPRESS OR IMPLIED, UNLESS SPECIFIED IN THE SALES CONTRACT. THIS CONTRACT STATES THE ENTIRE OBLIGATION OF THE SELLER.

The Seller makes no warranties, either express or implied, except as provided herein, including without limitation thereof, warranties as to marketability, merchantability, for a particular purpose or use, or against infringement of any patent of products. In no event shall the Seller be liable for any direct, incidental or consequential damages of any nature, or losses or expenses resulting from any defective new product or the use of any such product, including any damages for loss of time, inconvenience, or loss of use of any such product.

The original Manufacturer shall be solely responsible for the design, development, supply, production, and performance of its products hereunder, and the protection of its trade name, if any. It assumes no responsibility for products modified or changed in any way by its agent or customer. Any such modifications or changes to products sold by the Seller hereunder shall make the product limited warranty null and void.

The Manufacturer shall be under no obligation to manufacture, sell, or supply or to continue to manufacture, sell or supply any of the Products.

## Terms and Conditions

### Article 1: General provisions

- 1.1. All legal relationships between you and us are exclusively governed by these general terms and conditions. Amendments thereto can only be proven by our written acceptance. By placing the order you acknowledge and accept these general terms and conditions.
- 1.2. In the event that we act in joint venture for the supply of goods or services, the general terms and conditions of our partners will also govern the contract, provided this is explicitly mentioned.
- 1.3. You will indemnify us against all and any claims made by third parties, directly directed against us, concerning goods or services delivered to you, in so far as such claims made by said third parties exceed our responsibility as defined in the present general terms and conditions.

### Article 2: Offers

- 2.1. All data mentioned in our catalogues, documentation and price lists as well as in e-mail files and websites, such as dimensions, volumes, weights, capacities, work speed and other technical specifications and prices, are subject to amendment, do not bind us and cannot be considered an offer. We decline all responsibility for printing errors. Entire or partial duplication or multiplication of our trade documentation, in electronic or any other format, such as price lists, brochures, folders, images, tables or technical data, is prohibited without our prior written consent.
- 2.2. Our offers are only considered valid when made in writing. They are without engagement and do not bind us. Even after written confirmation of an offer, it may be altered by us in the event of force majeure, for example in the event of modifications in exchange rates, a labour strike, lockout, etc. Our offers are strictly limited to the elements specified therein.

### Article 3 : Requests for offers and orders

- 3.1. Orders and their amendments are only considered valid when made in writing. Contracts are only concluded after our express acceptance of your order.
- 3.2. We are under no obligation to scrutinize the contents of requests for offers and orders. These are deemed to be correct in terms of quantity and technical specifications and to fully reflect the purpose that the goods or services are intended for. When ordering, you must draw our attention to any special application conditions, such as damp or dusty locations, an acid or saline atmosphere, high or low temperatures, etc. that could lead to susceptibility of surface or impregnation substances, as well as shrinkage, oxidation and other harmful consequences.

### Article 4: Delivery and risk

- 4.1. Unless otherwise stipulated, any delivery times quoted are only to be considered estimates, and we are not liable in any way for failing to deliver within such time. Delays in delivery do not entitle you to indemnity of any kind or to resolution of the contract.
- 4.2. All goods, even those requiring installation, are delivered ex-works (EXW) Incoterms 2000. Failing written stipulation to the contrary, you must organise and pay for transport and insurance of the goods. Our intervention with transporters, insurers, customs agents etc. is always deemed to be performed in your name and for your account and is without obligation or liability on our part. Transport

tation organised by us is at your risk and expense.

- 4.3. Subject to written notification we are entitled to suspend the delivery or partial delivery and request a guarantee for the price of the goods and/or services already delivered as well as for the goods and/or services still to be delivered. Costs for such a guarantee remain at your expense. Failing delivery of the requested guarantee within the given time period, we are entitled to terminate the contract with indemnity at your expense.
- 4.4. All instructions supplied by us related to installation, operation and use are confidential and destined for your own use and must not be entirely or partially disclosed to others. Packaging will not be taken back.
- 4.5. Risk is transferred to you at the moment that the goods leave our establishment, even in the event of partial delivery or if the goods are to be installed by us or in the event that the cost of delivery is included in the price or the goods are transported by us.

### Article 5 : Reservation of title

- 5.1. The passage of title and ownership of the goods to be sold will not occur until we have received full payment.
- 5.2. In the event of any sign of non-payment, we are entitled, without summons or judiciary intervention, to immediately disassemble and take back the goods delivered, at your own expense. You irrevocably empower us to access the area where the goods are located.

### Article 6 : Prices and payment

- 6.1. All of our prices are net our warehouse, excluding packing or certification costs, with all extra costs and taxes at your expense. All of the prices indicated can be modified without prior notice in the event of an increase in price-determining elements, such as the prices of raw material, wages or social charges.
- 6.2. In the event that lesser quantities are ordered than those specified in your request for offer, we reserve the right to increase the offered price accordingly. For goods produced according to your specifications we always reserve a quantity margin of 10% extra.
- 6.3. All invoices are payable to our company offices or our bank account, within 30 days from the date of invoice, without rebate. Payments will be imputed on the oldest debt or invoice. For all overdue payments, an indemnity of 15% of the overdue amount, V.A.T. inclusive, will be ipso jure owed by you, as well as interest at the rate of 1% per month from the date of invoice.
- 6.4. In the event of one overdue invoice, all payment terms and rebates will be cancelled and all unpaid amounts will immediately become due. You explicitly waive any right to set off and/or retention.

### Article 7: Notification of objections

You must file any objections concerning invoices or order confirmations in writing within 8 days of their receipt. You must examine goods and/or services for defects and/or shortages immediately on receipt or performance. In the event of shortages or visible defects, you must immediately send a claim in writing on performance or receipt. For claims against hidden defects, the delay is 8 days from discovery of the hidden defects. Overdue and/or non-written claims will lead to loss of right. Disassembling, processing, manufacturing, incorporating, trading, changing or repairing delivered goods render any claim impossible.

### Article 8 : Liability

- 8.1. We are only liable for fraud or gross failure, even in the event that certain products or groups of products have to be recalled for hidden defects.
- 8.2. The extent of our liability is limited to replacement or crediting of the goods, at our discretion. All other damages, such as those caused by injury, demurrage or damage to other goods or work is always excluded. Damage other than that for which we are insured, or, in view of industry customs and practices, should have been insured for, is also excluded. You cannot invoke our liability unless you can prove that the goods or services in question cannot be used.

### Article 9 : Termination

- 9.1. We will refuse to accept any returns without prior consent in writing. Accepted returns must be sent back to FNC at your own expense. Order cancellations are only accepted for undamaged standard goods, in their original packaging, against payment of return costs equal to 25% of the total invoice value. Custom-made goods or non-standard goods will not be taken back or cancelled.
- 9.2. We have the right, without summons, to avoid a contract, even in the event that the goods have been entirely or partially shipped, should deliveries or partial deliveries not be accepted on the due date and/or paid, or in the event that our trust in your credit is shaken by any situation. In such case we are entitled to the entire indemnity for any undelivered or unaccepted quantities.
- 9.3. In case events, independent from our will, render performance of our obligation impossible or unreasonably onerous, we are entitled to terminate the contract unilaterally, with written notification and without any liability for indemnity.

### Article 10: Limitation periods

The exercise of your rights under this contract, against us, is barred by the expiry of a period of time of 3 months, after such date such rights can be exercised.

### Article 11: Applicable law and competent court

- 11.1. Italian law is exclusively applicable to all our contracts. The applicability of the United Nations Treaty of 11 April 1980 concluded at Vienna (CISG) is excluded.
- 11.2. All litigation can, at our discretion, be brought in the court competent for one of our establishments or for your establishment.
- 11.3. In the event of litigation, all of our costs, such as court costs, expert costs, attorney costs, are at your expense.



**Fabbrica Nazionale Cilindri S.p.A.**

Via Maestri del Lavoro , 79

21040 | CISLAGO (VA) Italy

<http://www.fncitalia.it>

