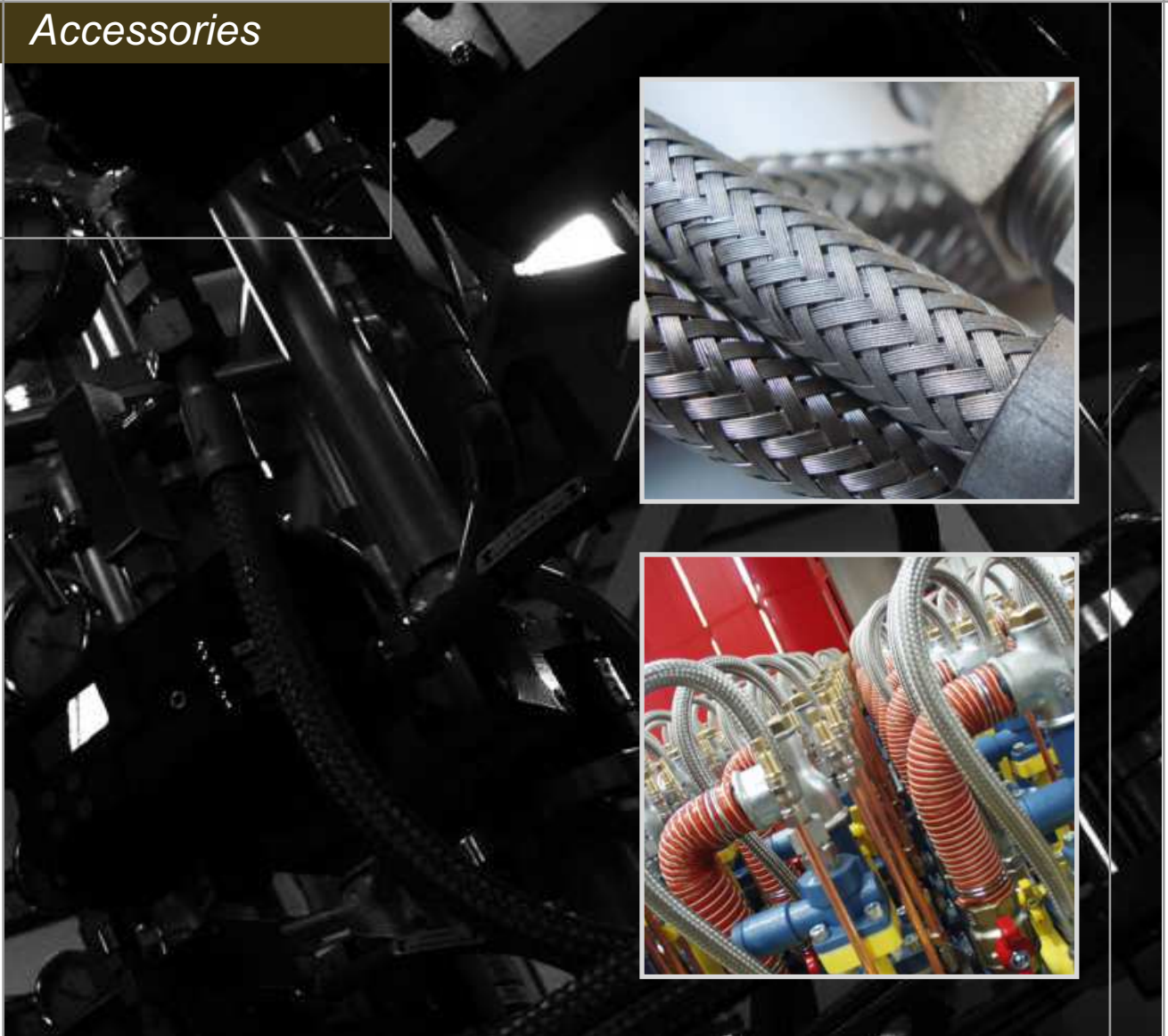


## Accessories



## Flexible Compensators

FN & ESA FLEX & INOXESTENS  
(E5603 rev. 03 - 23/03/2015)

## GENERAL WARNINGS:



■ All installation, maintenance, ignition and setting must be performed by qualified staff, respecting the norms present at the time and place of the installation.

■ To avoid damage to people and things, it is essential to observe all the points indicated in this handbook. The reported indications do not exonerate the Client/User from observing general or specific laws concerning accidents and environmental safeguarding.

■ The operator must wear proper DPI clothing (shoes, helmets...) and respect the general safety, prevention and precaution norms.

■ To avoid the risks of burns or high voltage electrocution, the operator must avoid all contact with the burner and its control devices during the ignition phase and while it is running at high temperatures.

■ All ordinary and extraordinary maintenance must be performed when the system is stopped.

■ To assure correct and safe use of the combustion plant, it is of extreme importance that the contents of this document be brought to the attention of and be meticulously observed by all personnel in charge of controlling and working the devices.

■ The functioning of a combustion plant can be dangerous and cause injuries to persons or damage to equipment. Every burner must be provided with certified combustion safety and supervision devices.

■ The burner must be installed correctly to prevent any type of accidental/undesired heat transmission from the flame to the operator or the equipment.

■ The performances indicated in this technical document regarding the range of products are a result of experimental tests carried out at ESA-PYRONICS. The tests have been performed using ignition systems, flame detectors and supervisors developed by ESA-PYRONICS. The respect of the above mentioned functioning conditions cannot be guaranteed if equipment, which is not present in the ESA-PYRONICS catalogue, is used.

## DISPOSAL:



To dispose of the product, abide by the local legislations regarding it.

## GENERAL NOTES:



■ In accordance to the internal policy of constant quality improvement, ESA-PYRONICS reserves the right to modify the technical characteristics of the present document at any time and without warning.

■ It is possible to download technical sheets which have been updated to the latest revision from the **www.esa-pyronics.com** website.

■ The products manufactured by ESA-PYRONICS have been created in conformity to the **UNI EN 746-2:2010** Norms: Equipment for industrial thermal process - Part 2: Safety requirements for combustion and the movement and treatment of combustible elements. This norm is in harmony with the Machine Directive **2006/42/CE**. It is certified that the products in question respect all the requirements prescribed by the above mentioned Norms and Directives.

■ Certified in conformity with the **UNI EN ISO 9001** Norm by DNV GL.

## CERTIFICATIONS:



The products comply with the requirements of the Eurasian market (Russia, Belarus and Kazakhstan) and are exempt from the EAC certification ref. **Doc. 01-11/437**

## CONTACTS / SERVICE:



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The ESA flexible compensators represent a wide range of couplings to suit various needs according to certain technical and dimensional characteristics. Expansion joints are commonly used on gas, air and oxygen pipelines and on gas measuring and regulation stations. They simplify and speed up the installation of the pipes and allow easy adaptation in length and alignment.

## APPLICATIONS

- Air and gas line connection to all types of burners.
- Compensation of heat expansion on pipes for hot fluids.

## CHARACTERISTICS

### FN - THREADED HOSE

- Maximum working temperature: 500°C
- Maximum working pressure: (see dimension table)
- Threads: UNI-ISO 7/1 & UNI-ISO 228/1
- Flexible hose body: AISI 321

### ESA FLEX - FLANGED HOSE

- Working temperature: -10°C ÷ +70 °C
- Maximum working pressure: 6 Bar
- Conforms to PED 97/23/CE on request
- Flexible hose body: AISI 321
- Procetitive steel mesh: AISI 304
- Plane flange UNI EN 1092-1 PN16: Fe ST37

### INOXESTENS - STAINLESS STEEL HOSE

- Working temperature: 0°C ÷ +100°C
- Maximum working pressure: (see dimension table)
- Threads: UNI ISO 7/1 & UNI ISO 228/1
- Flexible hose body: AISI 304
- Fittings: AISI 303 and Brass

## DESCRIPTION

The flexible joints in the ESA range have been designed to prevent damage to the burners, valves and control devices, significantly eliminating the tension caused by misalignments and to heat expansion. The flexible **FN** series are constituted by a non-woven, corrugated, flat steel pipe with brazed steel nipples on both ends. Up to the **24FN** model (3") the ends are threaded, while from the **32FN** model (DN100) to thr 64FN model (DN200) the ends are prepared for a solder connection. The ESA **FLEX** series identifies a type of flexible steel compensator covered with a braided protective mesh, corrugated blank at the ends with two rotating flanges in carbon steel. When these hoses are used to connect non-aligned

FN



F5603103

ESA FLEX



F5603104

INOXESTENS



F5603106

tubes, the mounter will have to bend them slightly before installation so that no force is applied to the burner or to the piping during tightening of the flange or fitting. The **INOXESTENS** series represent a type of extensible threaded joints in non-woven stainless steel. These flexible models are delivered with end fittings chosen according to the required junction (fixed or revolving).

## WARNINGS

- Make sure that the operating pressure and fluid temperature are below the maximum allowed values.
- Avoid twisting of the compensators as this causes unwanted stress. Particular attention must be paid during their installation especially when screwing on the fittings or aligning the holes of the flanges. The ideal solution to avoid this kind of inconvenience is represented by unions and floating flanges.
- Movement out of plane can cause the hoses to twist therefore the use of appropriate fittings is required.
- Check the correct installation of the compensators before starting the flow into the pipeline.
- To avoid premature breaking of the hoses do not to exceed the allowable bending radius.
- Pay special attention when installing twisted compensators to avoid abrasions that would damage the threads of the tracks and the wall of the hose. Therefore prevent resin, paint or other substances from remaining inside the undulations because, solidifying, they may prevent the natural bending of the tube.
- In case of malfunctioning of the flexible hoses check whether the indications in the "GENERAL MAINTENANCE PLAN" have been verified. If the hose breaks it cannot be repaired but must be replaced. In this regard contact ESA-PYRONICS customer service.
- Any modification or repair done by third parties can compromise the application safety and automatically invalidates the general warranty conditions.

## INSTALLATION

### MOUNTING OF THREADED HOSES

- 1 - Make sure that no foreign body is present inside the compensator or in the pipes before performing the assembly, remove any impurities.
- 2 - Using thread sealing paste, screw the equalizer onto the pipe, ensuring an adequate tightening of the thread.
- 3 - Check correct alignment of connecting pipes and the compensator checking the correct distance between the pipes and the coupling, to avoid placing excessive voltages on the piping during tightening.
- 4 - Check the tightness of the threaded connection with a leak detector product pressurizing the pipeline.

### MOUNTING OF FLANGED HOSES

- 1 - Weld the flanges on the ends of the pipelines eliminating any remaining welding burrs.
- 2 - Make sure that no foreign body is present inside the compensator or in the pipes before performing the assembly, remove any impurities
- 3 - Check the correct alignment of connecting pipes and check the correct distance between the tubes and

assembly (flange / compensator), so as not to exert tension on the pipe during tightening.

- 4 - Place the gasket between the two flanges, then insert bolts, washers and nuts.
- 5 - Using proper tools, gradually tighten the bolts in a crisscross pattern, avoiding overtightening.
- 6 - Check the tightness of the flanged connection with a leak detection product pressurizing the piping.

### MOUNTING OF WELDED HOSES

- 1 - Make sure that no foreign body is present inside the compensator or in the pipes before performing welding, remove any impurities.
- 2 - Check the correct alignment of the connecting pipeline and check the correct distance between the pipes and the assembly to avoid exerting pressure on the pipeline during the welding phase.
- 3 - Weld the ends of the pipeline eliminating any remaining welding burrs.
- 4 - Perform a pressure test of the pipe, checking the capacity of the pipe with a leak detector product.

**GENERAL MAINTENANCE PLAN**

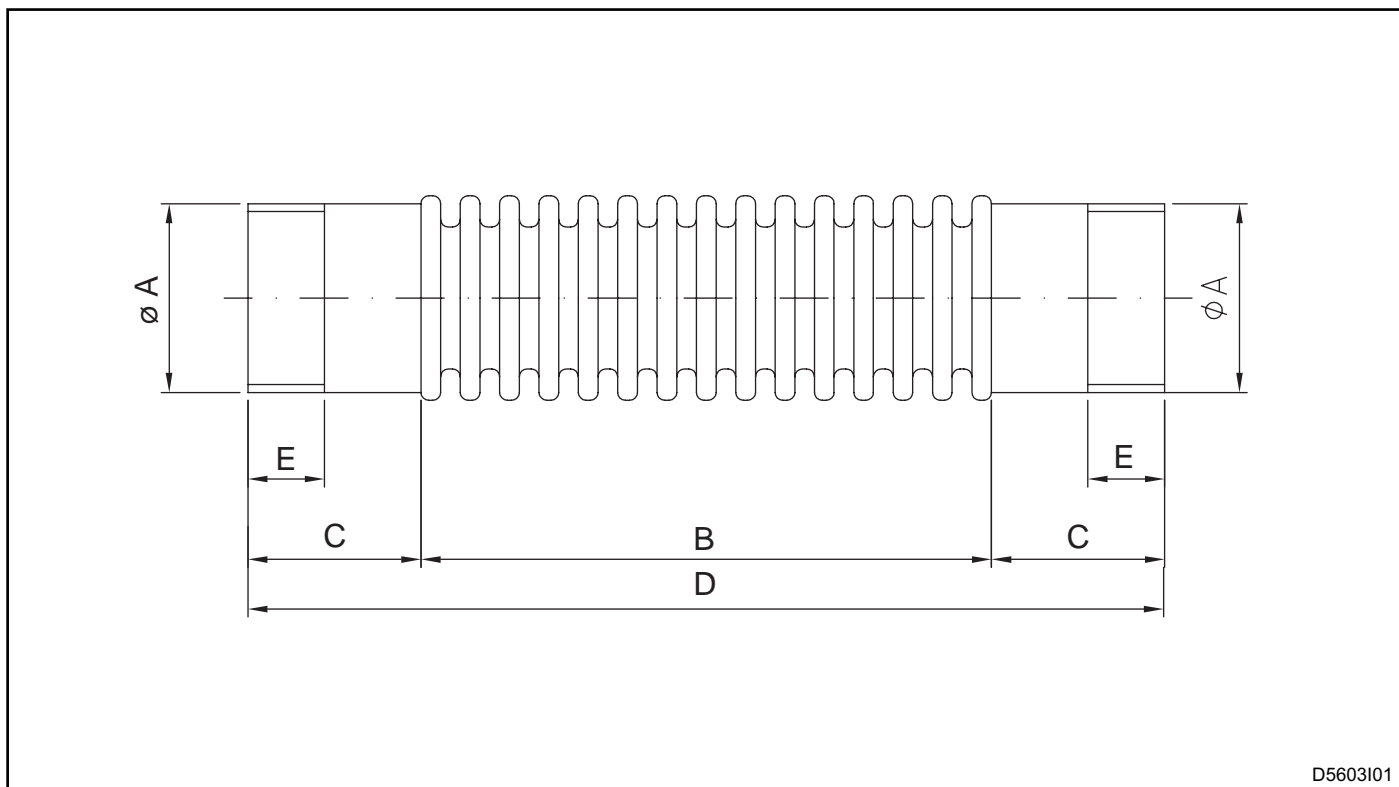
| Operation                  | Type (*) | Timing       | Notes  |
|----------------------------|----------|--------------|--|
| Flange gasket integrity    | O        | annual       | Check that there are no gas leaks towards the outside.         |
| Tightening of flange bolts | E        | twice a year | Reduce to quarterly in applications where there are vibrations |
| Integrity of compensators  | E        | twice a year | Check that there are no abrasions, deformation or ruptures.    |

NOTES:

Key: O = ordinary / E = extraordinary

(\*) We recommend replacing the seals after each flange disassembly

**OVERALL DIMENSIONS - FN COMPENSATOR**

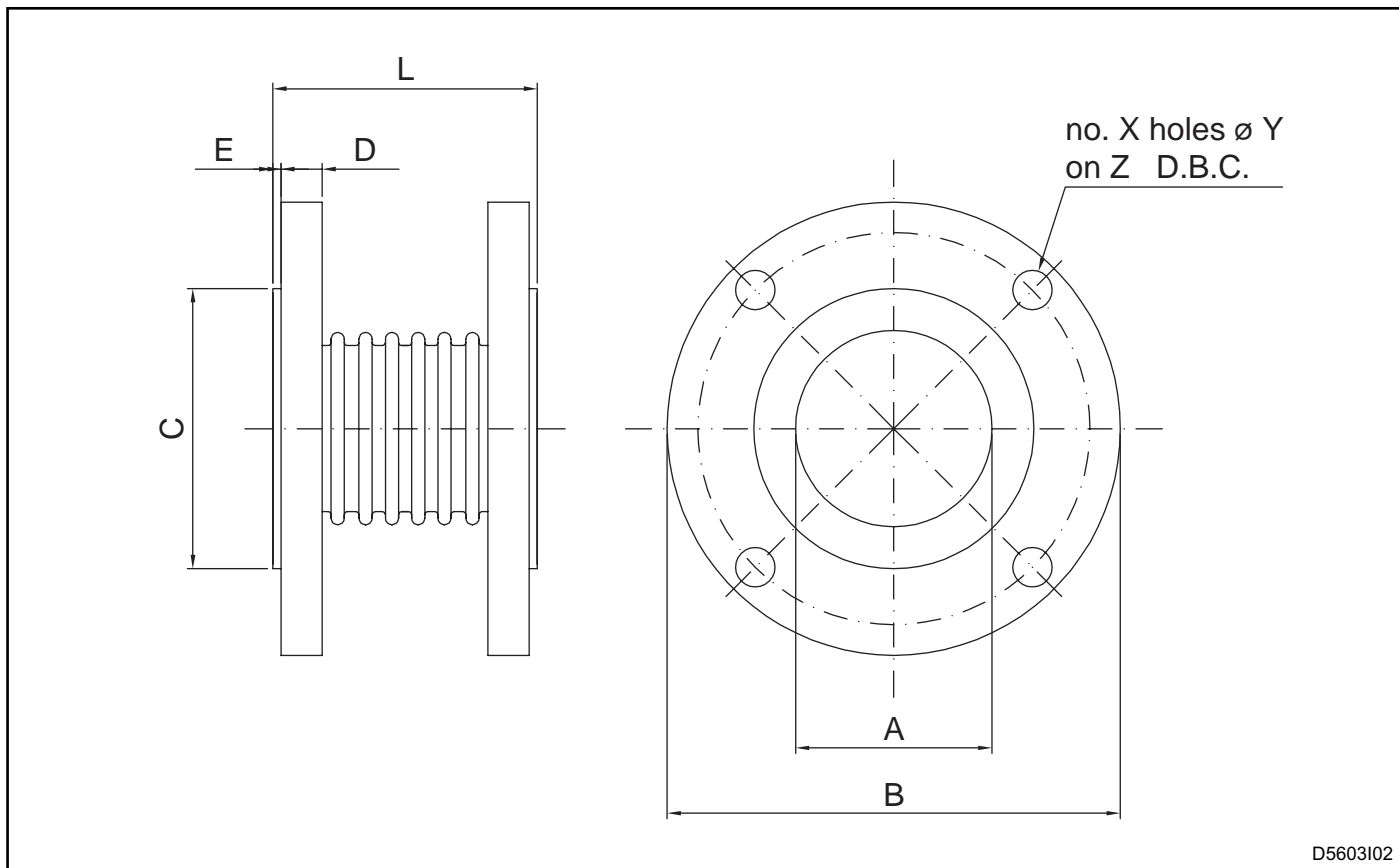


D5603101

| Model | $\phi A$   | $\phi B$<br>[mm] | $\phi C$<br>[mm] | D<br>[mm] | E<br>[mm] | max pres-<br>sure in<br>[bar] | Weight<br>[Kg] |
|-------|------------|------------------|------------------|-----------|-----------|-------------------------------|----------------|
| 3FN   | G - 3/8"   | 85               | 40               | 165       | 15        | 7,7                           | 0,23           |
| 4FN   | G - 1/2"   | 85               | 40               | 165       | 15        | 7,7                           | 0,23           |
| 6FN   | G - 3/4"   | 115              | 40               | 190       | 15        | 4,6                           | 0,23           |
| 8FN   | G - 1"     | 115              | 40               | 195       | 20        | 3,9                           | 0,45           |
| 10FN  | G - 1.1/4" | 125              | 50               | 225       | 20        | 2,4                           | 0,57           |
| 12FN  | G - 1.1/2" | 135              | 50               | 235       | 20        | 1,9                           | 0,68           |
| 16FN  | G - 2"     | 145              | 60               | 265       | 30        | 1,2                           | 1,13           |
| 20FN  | G - 2.1/2" | 180              | 60               | 300       | 30        | 0,9                           | 1,58           |
| 24FN  | G - 3"     | 215              | 60               | 335       | 20        | 0,8                           | 2,5            |
| 32FN  | 4"         | 240              | 70               | 380       | (*)       | 0,6                           | 3,2            |
| 48FN  | 6"         | 260              | 80               | 420       | (*)       | 0,6                           | 7              |
| 64FN  | 8"         | 300              | 80               | 460       | (*)       | 0,6                           | 12             |

(\*) With straight trunks, not threaded.

**OVERALL DIMENSIONS - ESA FLEX COMPENSATORS**



D5603102

| Model | ø A   | ø B [mm] | ø C [mm] | D [mm] | E [mm] | L [mm] | X [mm] | Y [mm] | Z [mm] | Weight [Kg] |
|-------|-------|----------|----------|--------|--------|--------|--------|--------|--------|-------------|
| F25   | DN25  | 115      | 68       | 14     | 2      | 60     | 4      | 14     | 85     | 2,3         |
| F32   | DN32  | 140      | 78       | 16     | 2      | 65     | 4      | 18     | 100    | 3,1         |
| F40   | DN40  | 150      | 89.5     | 18     | 2      | 75     | 4      | 18     | 110    | 3,95        |
| F50   | DN50  | 165      | 102      | 18     | 2      | 95     | 4      | 18     | 125    | 4,8         |
| F65   | DN65  | 185      | 122      | 18     | 2      | 110    | 4      | 18     | 145    | 5,9         |
| F80   | DN80  | 200      | 138      | 20     | 2      | 125    | 4      | 18     | 160    | 7,2         |
| F100  | DN100 | 220      | 158      | 20     | 2      | 150    | 8      | 18     | 180    | 7,82        |
| F125  | DN125 | 250      | 185      | 22     | 2      | 175    | 8      | 18     | 210    | 13          |
| F150  | DN150 | 285      | 212      | 22     | 2      | 200    | 8      | 22     | 240    | 15          |
| F200  | DN200 | 340      | 268      | 24     | 2      | 240    | 12     | 22     | 295    | 17,3        |

**OVERALL DIMENSIONS - INOXESTENS COMPENSATORS**

| Model      | Nominal diameter | Minimum extension length [mm] | Maximum extension length [mm] | Maximum working pressure [bar] |                             | Minimum curvature radius [mm] |
|------------|------------------|-------------------------------|-------------------------------|--------------------------------|-----------------------------|-------------------------------|
|            |                  |                               |                               | Maximum extension condition    | Minimum extension condition |                               |
| INOXESTENS | 3/8"<br>DN10     | 300                           | 600                           | 10                             | 8                           | 26                            |
|            |                  | 750                           | 1500                          |                                |                             |                               |
|            | 1/2"<br>DN15     | 300                           | 600                           | 10                             | 7                           | 32                            |
|            |                  | 750                           | 1500                          |                                |                             |                               |
|            | 3/4"<br>DN20     | 300                           | 600                           | 5,5                            | 5                           | 40                            |
|            |                  | 750                           | 1500                          |                                |                             |                               |
|            | 1"<br>DN25       | 300                           | 600                           | 5,5                            | 4                           | 50                            |
|            |                  | 750                           | 1500                          |                                |                             |                               |
|            | 1.1/4"<br>DN32   | 260                           | 520                           | 5,5                            | 3,5                         | 64                            |
|            |                  | 750                           | 1500                          |                                |                             |                               |
|            | 1.1/2"<br>DN40   | 290                           | 520                           | 4                              | 3                           | 73                            |
|            |                  | 750                           | 1500                          |                                |                             |                               |
|            | 2"<br>DN50       | 290                           | 520                           | 3,5                            | 2,5                         | 90                            |
|            |                  | 750                           | 1500                          |                                |                             |                               |