PRODUCT ADVANTAGES

- **Reliable and Durable**: High mechanical strength due to Glass Reinforced Plastic (GRP) construction. Design is verified by Finite Element Stress Analysis.
- **Watertight**: Resistant up to 1 bar (10 m head) and back pressure (0.6 to 1.0 bar by model). Integral rubber seals easily replaced if damaged.
- **Lightweight**: Fast and easy installation. Most sizes can be handled by one person. Very low operating pressure (cracking head) compared with metal flap valves.
- **Corrosion Resistant**: Highly resistant to corrosion and UV degradation. No coatings needed.
- **Low Maintenance**: Long service life and low maintenance.
- **Quality**: Conforms to ISO 9001 quality standards.
For over 20 years, NORHAM has designed and manufactured MULTITUBE non-return and flap valves.

Our range in **glass reinforced plastic using a isophthalic polyester resin** is designed to prevent backflow in sewage and drainage systems. Choosing as the main material GRP, NORHAM offers an innovative, lightweight and highly resistant MULTITUBE range (0.6 to 1 bar by model).

- **Flap valves** are designed to be installed at the end of pipelines either on vertical walls or directly onto the end of the pipe.
- **Non-return valves** are designed to be installed in-line and located in inspection chambers or manholes for ease of maintenance.
- **Mission Flex-Seal® ARC couplings** enable a watertight connection to any circular pipe.

**R&D**

The design of every valve has been modeled and tested by the NORHAM R&D department prior to manufacture to ensure optimum performance and durability.

The first stress analysis using Finite Element Modeling took place in 1993, in co-operation with the mechanical laboratory of the University of Lyon - France (L2M).

Since then, modeling is done internally to validate all conceptual designs.

This enables optimization of form, structure and thickness to satisfactorily resist the designated pressure requirement.

**Example:** Finite Element Analysis and validation test of the new MULTI-315
MATERIALS

<table>
<thead>
<tr>
<th>Part</th>
<th>Materials</th>
<th>Advantages</th>
</tr>
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<tbody>
<tr>
<td>Body and Flap</td>
<td>Glass reinforced <em>Isophtalic polyester</em> resin</td>
<td>Low weight combined with strength, durability and corrosion resistance</td>
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<tr>
<td></td>
<td><em>Isophtalic Gelcoat</em></td>
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<tr>
<td>Seal</td>
<td>EPDM rubber</td>
<td>Long term resistance to ozone, UV and mechanical compression.</td>
</tr>
<tr>
<td>Hinge</td>
<td>AISI 316 stainless steel</td>
<td>Resistant to normal drainage and sewage effluents and sea water</td>
</tr>
<tr>
<td>Fittings</td>
<td>AISI 316 stainless steel</td>
<td>Resistant to normal drainage and sewage effluents and sea water</td>
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THE MULTITUBE RANGE

**MULTI-BD**
Flap valve (page 4)

**MULTI-CD**
Flap valve (page 4)

**MULTI-NB DN 200 to 600**
Inclined flap valve (page 5)

**MULTI-NB DN 700 to 1500**
Inclined flap valve (page 5)

**MULTI-N**
Inclined flap valve for direct pipe connection (page 6)

**MULTI-250, MULTI-315 & MULTI-400 & 500**
Non-return valve (page 7)
MULTI BD FLAP VALVE

+ ND 100 to 200 mm
+ Straight flap
+ Light & compact
+ Flange ISO PN 10
+ Back pressure: 1 bar (10 m head)

INSTALLATION
- Integral foamed EPDM rubber gasket for direct fixing to a flange or headwall
- Stainless steel mechanical anchors are provided as standard for vertical wall mounting
- For flange ISO PN 10 use standard stainless steel bolts and nuts (not provided)

DIMENSIONS

<table>
<thead>
<tr>
<th>Ref. *</th>
<th>ND</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
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</table>

* Dimensions in mm, Weight in Kg.
Due to NORHAM continual improvement policy, sizes and dimensions could be changed.

MULTI CD FLAP VALVE

+ ND 250 to 600 mm
+ Straight flap
+ Light & compact
+ Flange ISO PN 10
+ Back pressure: 0,8 bar (8 m head)
+ Eye bolt is supplied as standard

INSTALLATION
- Integral foamed EPDM rubber gasket for direct fixing to a flange or headwall
- Stainless steel mechanical anchors are provided as standard for vertical wall mounting
- For flange ISO PN 10 use standard stainless steel bolts and nuts (not provided)

DIMENSIONS

<table>
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<tr>
<th>Ref. *</th>
<th>ND</th>
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<th>C</th>
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*Dimensions in mm, Weight in Kg.
Due to NORHAM continual improvement policy, sizes and dimensions could be changed.
MULTI NB INCLINED FLAP VALVE

INSTALLATION

- Integral foamed EPDM rubber gasket for direct fixing to a flange or headwall
- Stainless steel mechanical anchors are provided as standard for vertical wall mounting
- For flange ISO PN 10 use standard stainless steel bolts and nuts (not provided)

MULTI NB - ND 200 to 600 mm

+ Inclined flap (minimum 15°)
+ Flange ISO PN 10
+ Back pressure: 1 bar (10 m head)

DIMENSIONS

<table>
<thead>
<tr>
<th>Ref. *</th>
<th>DN</th>
<th>A</th>
<th>B</th>
<th>C</th>
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* Dimensions in mm, Weight in Kg.
Due to NORHAM continual improvement policy, sizes and dimensions could be changed.

MULTI NB - ND 700 to 1500 mm

+ Inclined flap (minimum 15°)
+ Flange ISO PN 10 on the MULTI-1000-NB (other references, please consult us)
+ Back pressure: 1 bar (10 m head)

DIMENSIONS

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<th>Ref. *</th>
<th>DN</th>
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<th>B</th>
<th>C</th>
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</table>

* Dimensions in mm, Weight in Kg.
Due to NORHAM continual improvement policy, sizes and dimensions could be changed.
MULTI N INCLINED FLAP VALVE FOR DIRECT PIPE CONNECTION

- ND 200 to 600 mm
- For connection to any pipe (PVC, HDPE, Asbestos Cement, Ductile Iron, Clay, Concrete, etc.)
- Inclined flap (minimum 15°)
- Back pressure: 1 bar (10 m head)
- Delivered "Ready to install**" with a Mission Flex-Seal® ARC coupling:
  EPDM rubber and EN 10088-2 Grade 1.4401 (304) stainless steel (Grade 1.4401 (316) in option)

*The MULTI N flap valve is delivered with the appropriate flexible coupling (Please confirm the pipe type and outside diameter when ordering).

INSTALLATION

- For installation directly onto spigot end of pipe
- A Mission Flex-Seal® ARC coupling is supplied and already connected on the MULTI N valve in order to provide an easy and quick installation. It provides a secure and watertight connection to all types of pipe. Make sure to order correctly by quoting both the pipe type and outside diameter.

DIMENSIONS

<table>
<thead>
<tr>
<th>Ref. *</th>
<th>ND</th>
<th>A</th>
<th>B</th>
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<th>D</th>
<th>E</th>
<th>F</th>
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<tbody>
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</tbody>
</table>

** Please designate the outside diameter of the pipe to be joined.

* Dimensions in mm, Weight in Kg without couplings.
Due to NORHAM continual improvement policy, sizes and dimensions could be changed.
MULTITUBE®

The drainage & sewage backwater protection

VALVES/ NON-RETURN AND FLAP VALVES

MULTI NON-RETURN VALVE

+ ND 250 to 500 mm
+ In-line non-return valve
+ For connection to any pipe (PVC, HDPE, Asbestos Cement, Ductile Iron, Clay, Concrete, etc.)
+ Back pressure: 0,6 bar (6 m head)
+ Delivered «Ready to install™» with a Mission Flex-Seal® ARC coupling:
  EPDM rubber and EN 10088-2 Grade 1.4401 (304) stainless steel (Grade 1.4401 (316) in option)

* The MULTI in-line valves are delivered with the appropriate flexible couplings (Please confirm the pipe type and outside diameter when ordering).

ASSEMBLY

• In-line valves should be installed in an inspection chamber (or equivalent) for maintenance.
• Couplings are supplied and are already connected on the MULTI valve for an easy and quick installation. It provides a secure and watertight connection to rigid pipes. Make sure to order correctly by specifying the pipe type and outside diameter.

DIMENSIONS

<table>
<thead>
<tr>
<th>Ref.*</th>
<th>ND</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
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* Dimensions in mm, Weight in Kg without couplings.
Due to NORHAM continual improvement policy, sizes and dimensions could be changed.

Please designate the outside diameter of the pipe to be joined.

NEW ACCESS COVER DESIGN WITH POSITIVE SEALING

Based on the pressure cooker idea: + back pressure = + compressed seal = optimal watertightness

1. Open
2. Fit in
3. Pull up
4. Align and screw tight

www.grippergasket.com
TECHNICAL INFORMATION

- **HEAD LOSS - NON-RETURN VALVE**

Dynamic head loss is a loss of pressure in a pipeline due to friction from pipe walls or as liquids flow through elbows, valves and other fittings.

The chart below shows head loss in full pipelines and compares different types of non-return valves.

Example: ND 250 non-return valve.

Section = $\pi \times \frac{d^2}{4} = 0,05m^2$

Flow = 100 l/s = 0,10 m$^3$/s

Speed (m/s) = Flow (m$^3$/s) / Section (m$^2$)

= 0,10 / 0,05 = 2 m/s

Flap valve head loss (Flow 2m/s):
Loss of head NORHAM valve = 0,25 m
Loss of head non-return valve with double flap = 0,5 m
Loss of head Ball type check valve = 0,9 m

- **OPERATING HEAD - FLAP VALVE**

The head required to operate (crack open) a NORHAM MULTITUBE flap valve can be estimated as follows:

Operating head $\Delta H = \frac{Valve \ diameter (mm)}{10}$

Example: ND 250 flap valve; $\Delta H = 250/10 = 25$ mm

- **INSTALLATION**

**General:** Flap valves should be fixed so as to avoid the accumulation of debris around the invert which could prevent the valve from operating correctly.

**Tidal locations:** Turbulence of flow due to severe wave action will shorten the working life of a flap valve. Therefore, it is recommended that careful consideration is given to the positioning of the valves, and they should be installed within an outfall bay or otherwise protected from direct wave action by baffles.

**EXAMPLES OF APPLICATIONS**

MULTI-BD with eye nut in a concrete tank  
MULTI-CD on wall mounting  
MULTI-800-NB riverbank outfall  
MULTI-N direct to pipe

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