

PRODUCT ADVANTAGES

- **Reliable** : high mechanical strength due to GRP construction; design verified by Finite Element Stress Analysis; durable materials
- **Watertight** : resistant up to 1 bar (10 m head), back pressure (0,6 to 1,0 bar by model); integral rubber seals easily replaced if damaged
- **Light weight** : 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** : high resistance to corrosion and UV degradation; no coatings needed; long service life; low maintenance
- **Quality** : NORHAM is certified to ISO 9001

PROTECTION AGAINST BACKWATER/FLOODING



Designed &
Manufactured
by NORHAM



NORHAM
DESIGNER & SUPPLIER

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COUPLINGS
& SEALS

PLUGS

NON-RETURN
AND FLAP VALVES

PENSTOCKS &
REGULATORS

MULTITUBE

The drainage & sewerage backwater protection

VALVES / NON-RETURN AND FLAP VALVES

For over 20 years, **NORHAM** has designed and manufactured **MULTITUBE** non-return and flap valves.

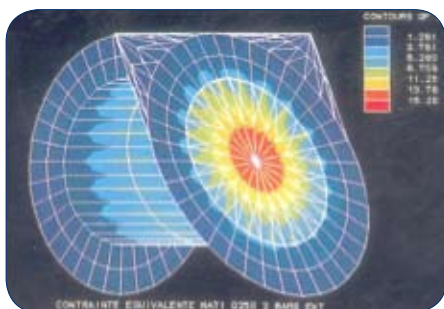
Our range in **glass reinforced plastic using a isophthalic polyester resin** is designed **to prevent backflow in sewerage and drainage systems.**

Choosing as the main material GRP, **NORHAM** offers a **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.
- **Flexible couplings** enable watertight connection to any circular pipe.

R&D

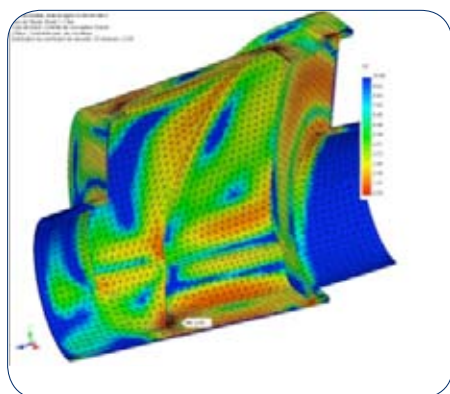
The design of every valve has been modelled and tested by the **NORHAM R&D** department prior to manufacture to ensure optimum performance and durability.



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

Since then, modelling is done internally to validate all conceptual designs. This enables optimisation of form, structure and thickness to satisfactorily resist the designated pressure requirement.

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



Finite Element Model of the new
MULTI-315



Laboratory testing



MATERIALS

	Materials	Advantages
Body and flap	Glass reinforced Isophthalic polyester resin Isophthalic Gelcoat	Low weight combined with strenght, durability and corrosion resistance
Seal	EPDM EN681-1 grade WC (Optional Nitrile (NBR) seal available, consult us)	Long term resistance to ozone, UV and mechanical compression.
Hinge	EN 10088-2 Grade 1.4401 (316) stainless steel ERTACETAL (POM) (MULTI-BD & MULTI)	Resistant to normal drainage and sewerage effluents and sea water Self lubricating plastic.
Eye bolt**	EN 10088-2 Grade 1.4401 (316) stainless steel	Resistant to normal drainage and sewerage effluents and sea water
Fittings		

** Flap valves are supplied with or without eye bolt (See options by product)



THE MULTITUBE RANGE

MULTI-BD
Flap valve
(page 4)



MULTI-CD
Flap valve
(page 4)



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



MULTI-NB DN 700 à 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)



MULTITUBE *The drainage & sewerage backwater protection*

VALVES / NON-RETURN AND FLAP VALVES

MULTI BD FLAP VALVE

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

INSTALLATION

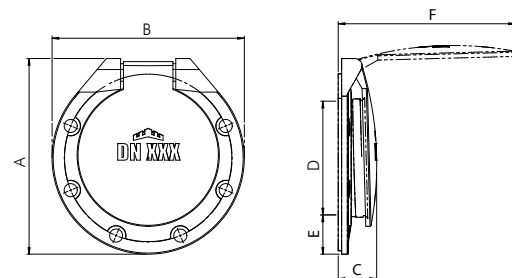
- Integral foamed EPDM rubber gasket for direct fixing to a flange or headwall
- Stainless steel mechanical anchors are provided as standard for vertical wall mounting
- For flange ISO PN 10 use standard stainless steel bolts and nuts (not provided)

DIMENSIONS

Ref. *	ND	A	B	C	D	E	F	Weight
MULTI-100-BD	100	212	220	50	110	55	195	0,50
MULTI-125-BD	125	252	250	55	125	66	230	0,70
MULTI-150-BD	150	285	285	55	160	66	260	1,10
MULTI-200-BD	200	372	340	70	200	75	315	1,60



BD



* 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

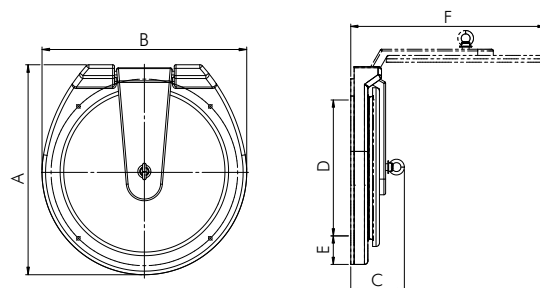
- Integral foamed EPDM rubber gasket for direct fixing to a flange or headwall
- Stainless steel mechanical anchors are provided as standard for vertical wall mounting
- For flange ISO PN 10 use standard stainless steel bolts and nuts (not provided)

DIMENSIONS

Ref. *	ND	A	B	C	D	E	F	Weight
MULTI-250-CD	250	420	395	153	250	75	400	6,00
MULTI-300-CD	300	470	447	153	300	75	470	9,00
MULTI-400-CD	400	585	565	153	400	85	570	15,00
MULTI-500-CD	500	722	715	155	500	118	700	22,00
MULTI-600-CD	600	835	840	162	600	120	780	29,00



CD



*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

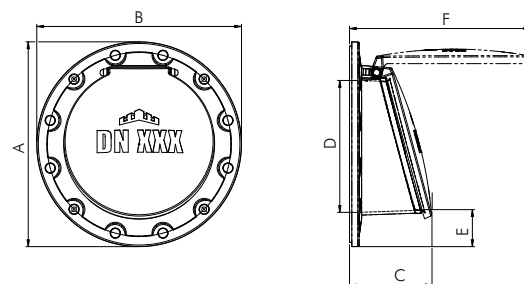
- + **Inclined flap** (minimum **15°**)
- + Flange ISO PN 10
- + **Back pressure** : 1 bar (10 m head)
- + Eye bolt an option

DIMENSIONS

Ref. *	DN	A	B	C	D	E	F	Weight
MULTI-200-NB	200	343	343	150	180	81	285	1,60
MULTI-250-NB	250	395	395	160	245	78	339	2,10
MULTI-315-NB	300	448	448	185	290	80	400	3,70
MULTI-400-NB	400	570	570	205	375	99	478	6,30
MULTI-500-NB	500	676	676	240	469	102	589	10,00
MULTI-600-NB	600	788	788	280	593	93	717	14,30

* Dimensions in mm, Weight in Kg.

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MULTI NB - ND 700 to 1500 mm

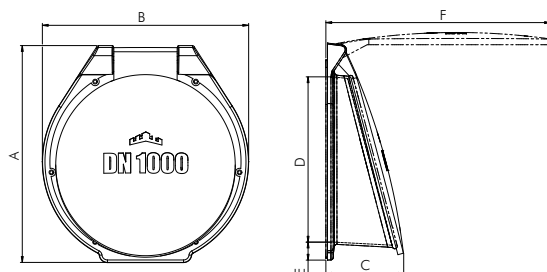
- + **Inclined flap** (minimum **15°**)
- + Flange ISO PN 10 on the MULTI-1000-NB (others references, please to consult us)
- + **Back pressure** : 1 bar (10 m head)
- + Eye bolt an option

DIMENSIONS

Ref. *	DN	A	B	C	D	E	F	Weight
MULTI-700-NB	700	1003	935	450	700	120	1030	50,00
MULTI-800-NB	800	1125	1035	523	800	120	1440	75,00
MULTI-1000-NB	1000	1330	1264	495	1013	110	1400	105,00
MULTI-1200-NB	1200	1525	1440	690	1200	130	1620	190,00
MULTI-1400-NB	1400	1770	1640	800	1400	120	1840	270,00
MULTI-1500-NB	1500	1860	1740	855	1500	120	1980	325,00

* Dimensions in mm, Weight in Kg.

Due to NORHAM continual improvement policy, sizes and dimensions could be changed.



MULTITUBE *The drainage & sewerage backwater protection*

VALVES / NON-RETURN AND FLAP VALVES

MULTI N INCLINED FLAP VALVE FOR DIRECT PIPE CONNECTION

- + ND 200 to 600 mm
- + For connection to any pipe (PVC, PEHD, Fibre-cement, Ductile Iron, Clay, Concrete, etc)
- + **Inclined flap** (minimum **15°**)
- + **Back pressure** : 1 bar (10 m head)
- + Eye nut in option
- + Delivered "**Ready to install**"* with **NORHAM** flexible coupling :
EPDM 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

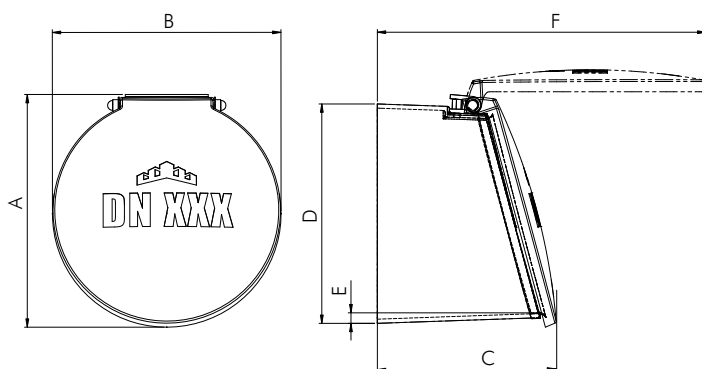
- For installation directly onto spigot end of pipe
- A **NORHAM** coupling is supplied and already connected on the **MULTI N** valve in order to an easy and quick installation. It provides a secure and watertight connection to all types of pipe. Make sure to order correctly by quoting both the pipe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

DIMENSIONS

Ref. *	ND	A	B	C	D	E	F	Weight
MULTI-200-N-... **	200	224	216	205	202	11	345	1,20
MULTI-250-N-... **	250	284	280	225	263	12	399	1,70
MULTI-315-N-... **	300	335	332	265	318	15	480	3,00
MULTI-400-N-... **	400	420	417	295	405	16	570	5,40
MULTI-500-N-... **	500	528	522	320	506	17	678	9,40
MULTI-600-N-... **	600	659	655	345	638	18	808	15,00

** According to the type of pipe :
PFF : PVC/Fibre-Cement/Ductile Iron
G : Clay
BA : Concrete/Structural walled plastic
 These codes enable fixed pricing categories.

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



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, PEHD, Fibre-cement, Ductile Iron, Clay, Concrete, etc)
- + **Back pressure : 0,6 bar (6 m head)**
- + Delivered «Ready to install*» with **NORHAM** flexible couplings :
EPDM 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 chambers (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 precising the pipe type and outside diameter.

DIMENSIONS

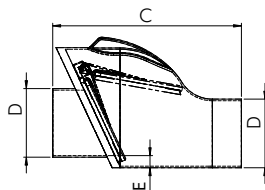
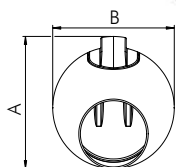
Ref.*	ND	A	B	C	D	E	Weight
MULTI-250-...**	250	485	455	730	260	60	15,00
MULTI-315-...**	300	490	470	825	320	35	16,00
MULTI-400-...**	400	600	610	900	410	30	32,00
MULTI-500-...**	500	730	700	1230	515	40	59,00

** According to the type of pipe :
PFF : PVC/Fibre-Cement/Ductile Iron
G : Clay
BA : Concrete/Structural walled plastic
These codes enable fixed pricing categories.

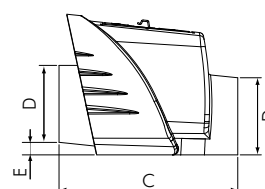
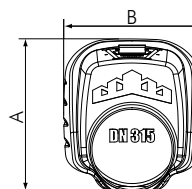
* Dimensions in mm, Weight in Kg without couplings.

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> ND 250

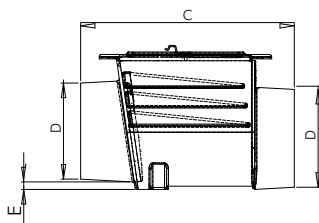
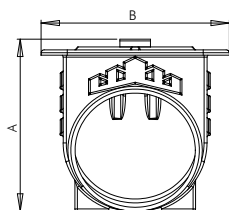


> ND 315



> ND 400/500

NEW DESIGN !



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

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 = $\pi \times \text{Ø}^2 / 4 = 0,05 \text{ m}^2$

Flow = 100 l/s = 0,10 m³/s

Speed (m/s) = Flow (m³/s) / Section (m²)
= 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 :

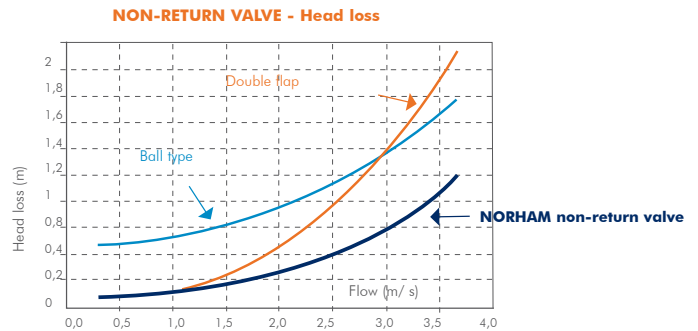
Operating head ΔH = Valve diameter (mm) / 10

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

• INSTALLATION

General : Flap valves should be fixed so as to avoid the accumulation of debris around the invert which could prevent the valve 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 are 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 out fall



MULTI-N direct to pipe



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