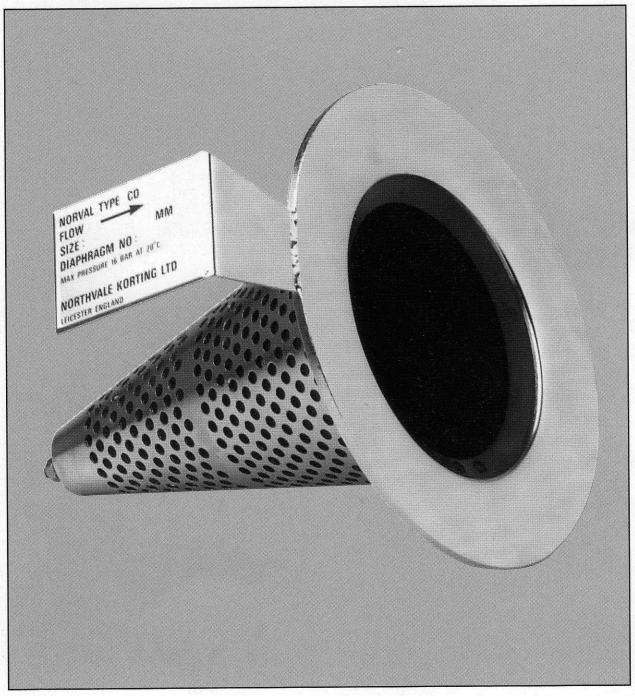
The little valve with the big difference



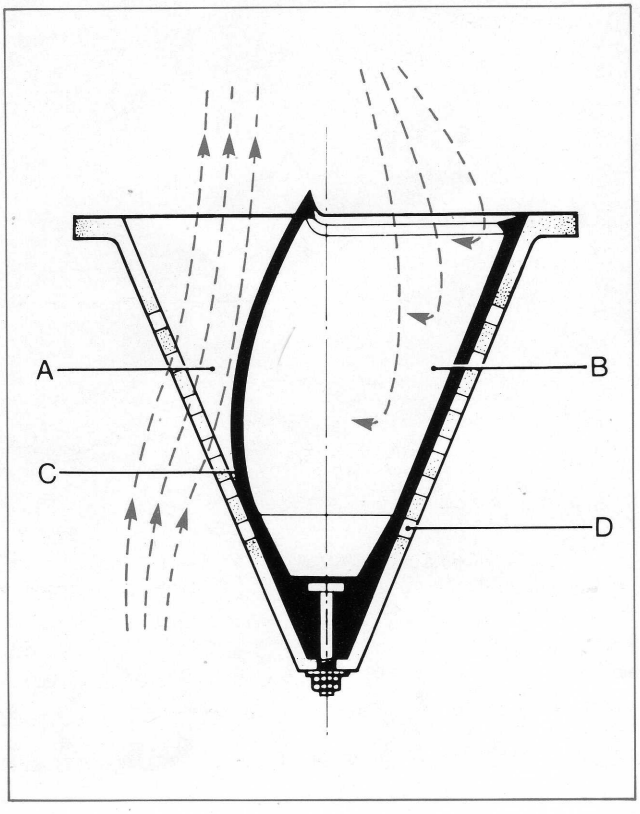
Most pipeline systems require some form of check valve device to maintain flow in one direction to prevent either contamination of liquids already in the system or damage to the pipework and its ancillary components. Quite a simple function you might think! — bitter experience however tells us a different story.

What are the features that the piping engineer is looking for?

- Tight shut off under minimum back pressure.
- Quick response to no-flow or reverse flow conditions.
- Low resistance to forward flow.
- Lightweight construction.
- Ease of installation with unskilled operators.
- No maintenance.

The NORVAL-Non Return Valve has all these features plus one or two less obvious benefits.

- It is extremely simple.
- It operates in any direction, vertically up or down, or horizontal.
- High material specification.
- Less noise due to slamming shut under reverse flow.
- Can be incorporated in a variety of body configurations or simply built into original equipment as a cone and diaphragm assembly.



Method of Operation

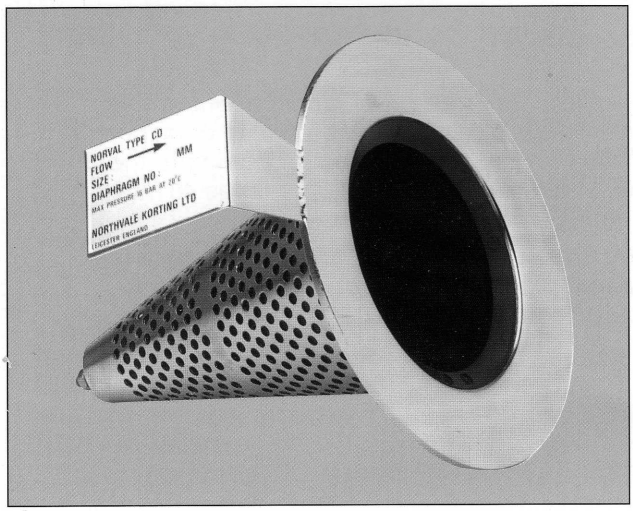
Flow takes place in the direction of the arrows under forward and reverse flow.

A – Valve Open	C – Diaphragm
B – Valve Closed	D – Cone

With flow in the forward direction the diaphragm deflects inwards (A) allowing easy passage of the liquid with little pressure loss. When a no flow, or back pressure, condition occurs the diaphragm returns to its relaxed position (B) sealing off all flow in the reverse direction.

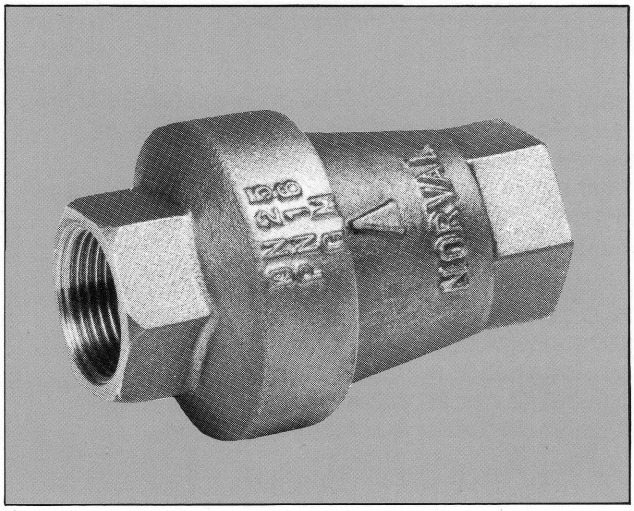
This action is unaffected by the orientation of the valve.

Valve specifications



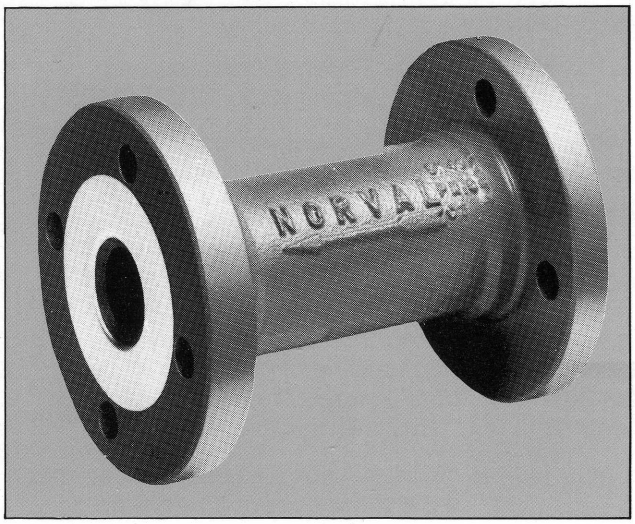
Type CD

This valve comprises an integral increased flange cone in stainless steel 316 type and is available in the size range 40 mm (1½ in) to 200 mm (8 in) diameter for mounting between adjacent pipe flanges to BS 4504 NP 16 or equivalent. Cone and diaphragm assemblies are also available in nominal 25 mm (1 in) and 32 mm (1¼ in) diameters but are not normally suitable for bolting between standard flanges. Diaphragms to suit application.



Type CD/S

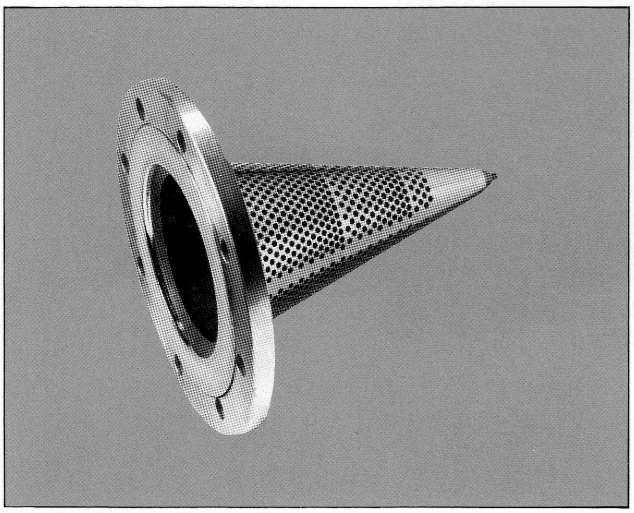
A screwed pattern valve incorporating the basic cone and diaphragm assembly with a specially reduced diameter flange in a two piece bronze body to BS 1400 – LG2C (ASTM equivalent B 145-836). End connections screwed 15 mm (½ in) to 50 mm (2 in) BSP.



Type CD/F

A flanged check valve incorporating the basic cone and diaphragm assembly housed in a flanged cast iron body BS 1452 grade 17 (ASTM equivalent 48 Gr.35). Available in the size range 40 mm (1½ in) to 200 mm (8in) diameter with flanges to BS 4504 NP 16 or equivalent. Fabricated steel bodies are available as an option. Diaphragms to suit application.

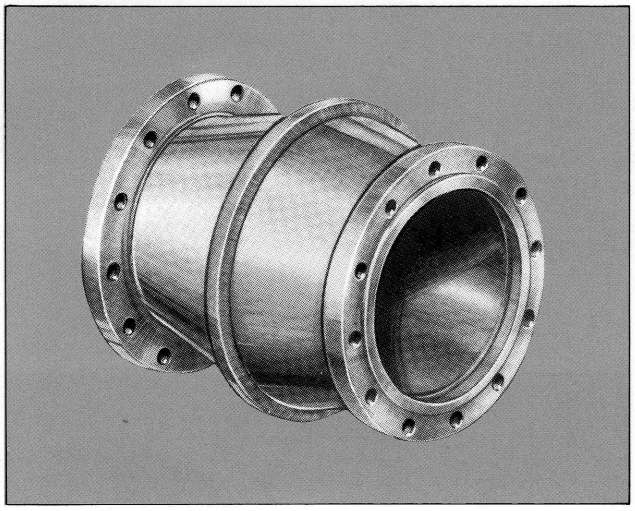
Valve specifications



Type CD/WF

Essentially for "foot valve" applications where single flange bolting to the end of an open pipe is necessary. May also be used for bolting to the sides of tanks or bulkheads. Size range 40 mm (1½ in)-200 mm (8 in).

Note: Should not be used for clamping between adjacent pipe flanges. First choice for which should be the type CD.



Type CD/M

For large bore installations we offer the NORVAL in modular form, in sizes 250 mm-600 mm diameter. These valves are constructed by mounting a number of small cone and diaphragm assemblies onto a centre plate which is housed in a mild steel fabricated body.

The number and size of the individual NORVAL cone is determined by the flow requirements and by using one of our standard mounting plates and fabricated ends, a permutation to meet all requirements can be achieved. If required a hand hole cover can be incorporated in the body.

Diaphragm Selection

By careful selection from one of the standard series of rubber diaphragms it is possible to control a wide range of industrial and process fluids effectively and economically. The combination of 316 stainless steel cones and specially formulated polymers makes NORVAL a truly universal check valve for neutral and aggressive liquids.

Grade	Material
3	Flurocarbon
6	Nitrile (Buna Type)
7	E P D M Ethylene Propylene
4	Silicone

Fluid Application

E P D M	- Water, dilute acids and alkalis up to 121°C (250°F)
Nitrile (Buna type)	- Mineral oils up to 80°C (175°F)
Flurocarbon	- Hydrocarbons, concentrated acids organic solvents up to 200°C (392°F) (not suitable for water)

This table gives our recommended diaphragm materials for a wide grouping of general fluids. For other fluids and more detailed chemical resistance data consult our "Diaphragm Application Guide."

Valve specifications

Frequency of Operation

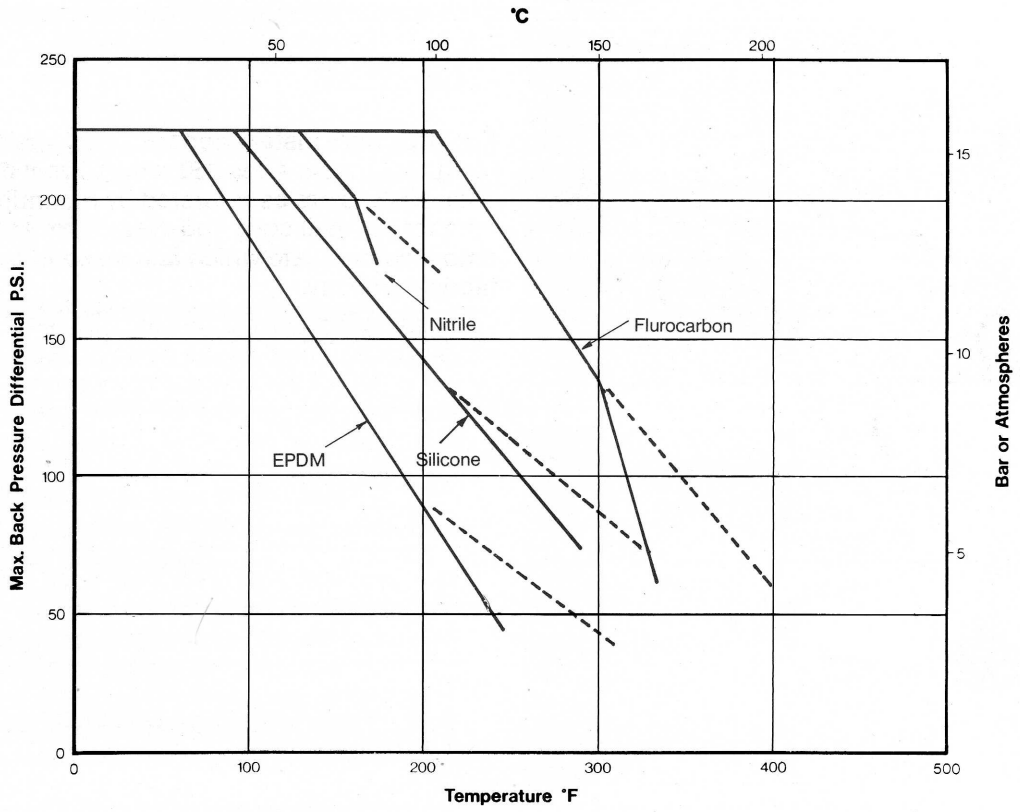
When selecting NORVAL particular attention should be given to the period that the valve will remain in the open position without a flow reversal taking place. The elastic memory of the diaphragm is time dependant and if left open for long periods will result in slow closure of the valve under reverse flow with subsequent leakage.

The degree of diaphragm deformation is a function of the service, temperature and material. Unlike conventional valves, the more arduous and frequent the operating cycle the better NORVAL works.

Velocity Limitations

Liquids —
NORVAL valves are designed for maximum continuous liquid velocities of 10ft/sec with intermittent peak velocities up to 12ft/sec. Where velocity conditions exceed these maximums you are recommended to fit a larger valve.

Gas and Compressed Air —
Since NORVAL is essentially a liquid services valve you should consult our technical dept. before considering for gas and air applications.

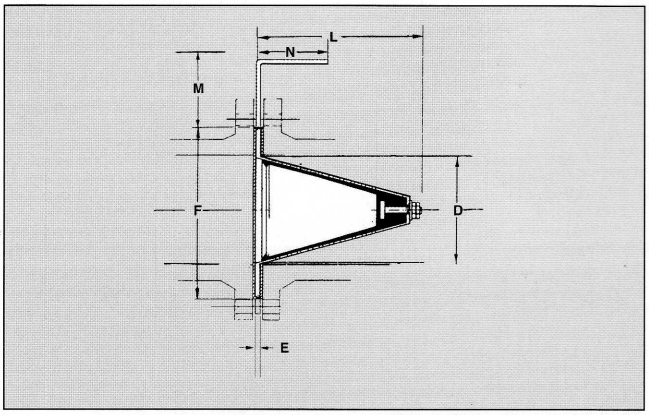


Pressure/Temperature Rating

All NORVAL valves are rated for 16 bar at 21°C (70°F). Variation of pressure with elevated temperature is given on the graph above for continuous operation. For intermittent operation it is permissible to extend the maximum temperature in accordance with the following table.

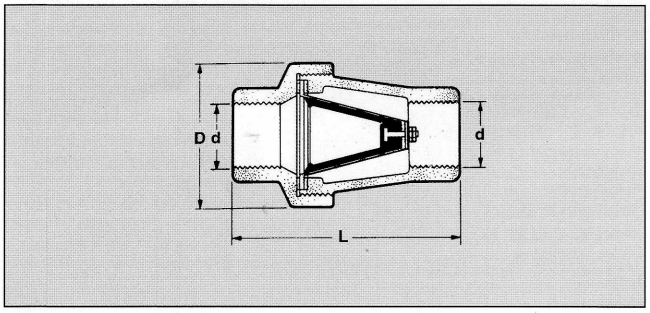
Diaphragm Material	Normal Working Temp.		Maximum Peak Temp.	
Silicone	302°F	150°C	355°F	180°C
Flurocarbon	355°F	180°C	395°F	200°C
Nitrile	175°F	80°C	212°F	100°C
Ethylene Propylene	248°F	120°C	302°F	150°C

Valve dimensions



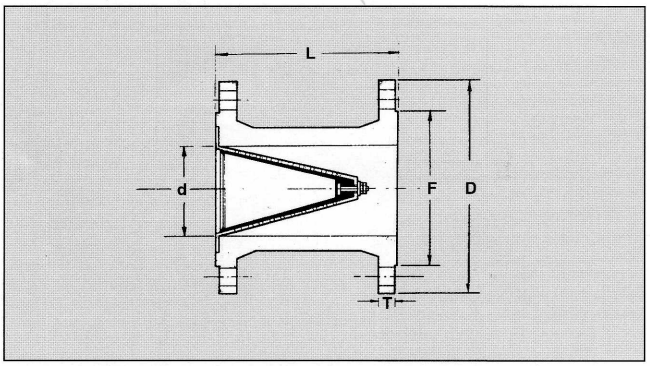
Type CD

D	mm	40	50	65	80	100	125	150	200
E	mm	2	2	2	4	4	6	6	6
F	mm	82	102	118	132	158	188	210	268
L	mm	57	78	95	120	170	218	265	353
M	mm	40	40	40	40	40	60	60	60
N	mm	60	60	60	60	60	60	60	60



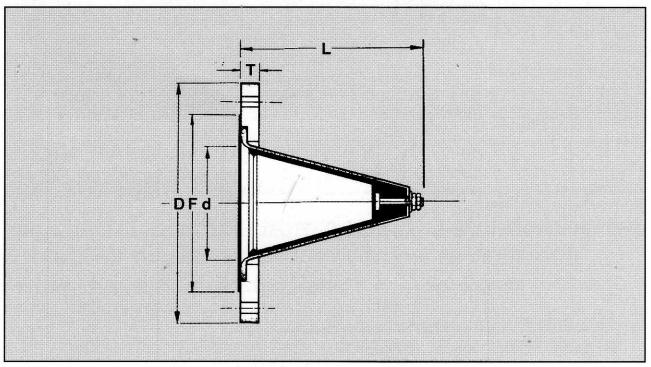
Type CD/S

d	BSP	½"	¾"	1"	1¼"	1½"	2"
L	mm	90	90	112	112	112	135
D	mm	46	46	65	65	70	90



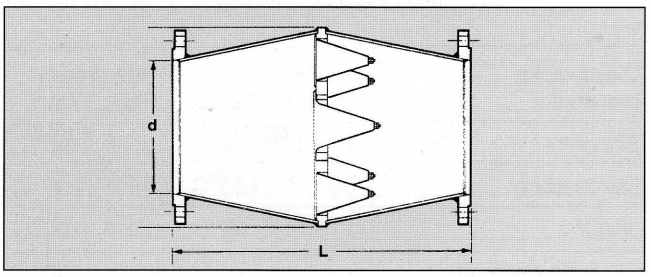
Type CD/F

d	mm	40	50	65	80	100	125	150	200
L	mm	165	203	216	241	292	330	356	495
D F T	Flange details to suit BS4504, NP10, 16 ASA 125/150 or BS Table 10.								



Type CD/WF

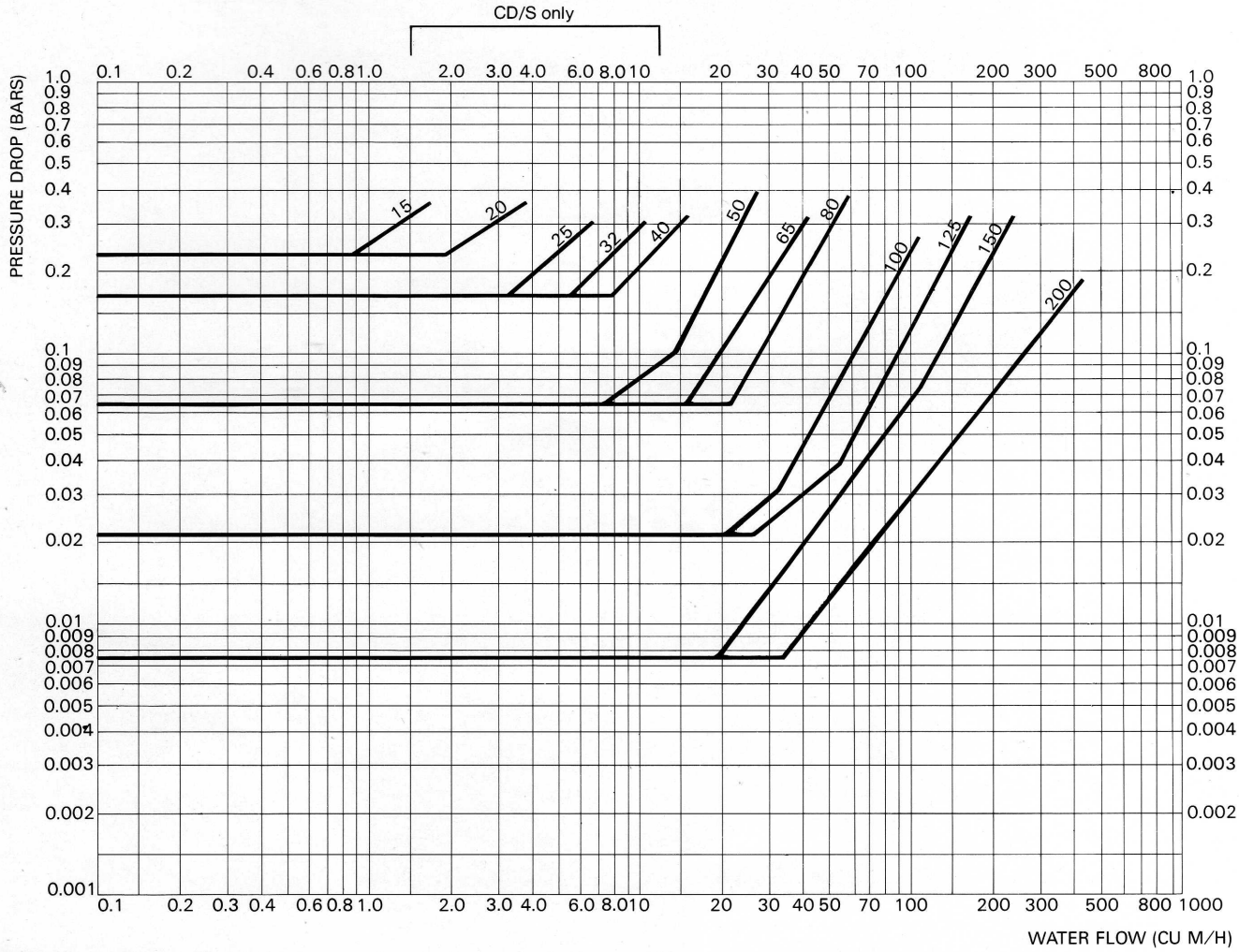
d	mm	40	50	65	80	100	125	150	200
L	mm	57	78	95	120	170	218	265	353
D F T	Flange details to suit BS4504, NP16								



Type CD/M

d	mm	250	300	350	400	450	500	600
L	mm	600	700	800	900	1000	1100	1300

Performance characteristics EPDM diaphragms with water



***Note: For fluids other than water and diaphragms other than EPDM please consult our Technical Sales Department.**

The above pressure drop chart gives performance characteristics m^3/hr against bar. We have selected some of the more widely used units and present them in a conversion table for your convenience.

Pressure Units

	kPa	psi	m head	ft head
bar	100	14.51	10.20	33.46

Flow Units

	L/S	gpm	ft^3/min
m^3/hr	0.2778	3.666	0.5886

*With the Company's continuous product development programme, we reserve the right to change specification and technical details without prior notice.