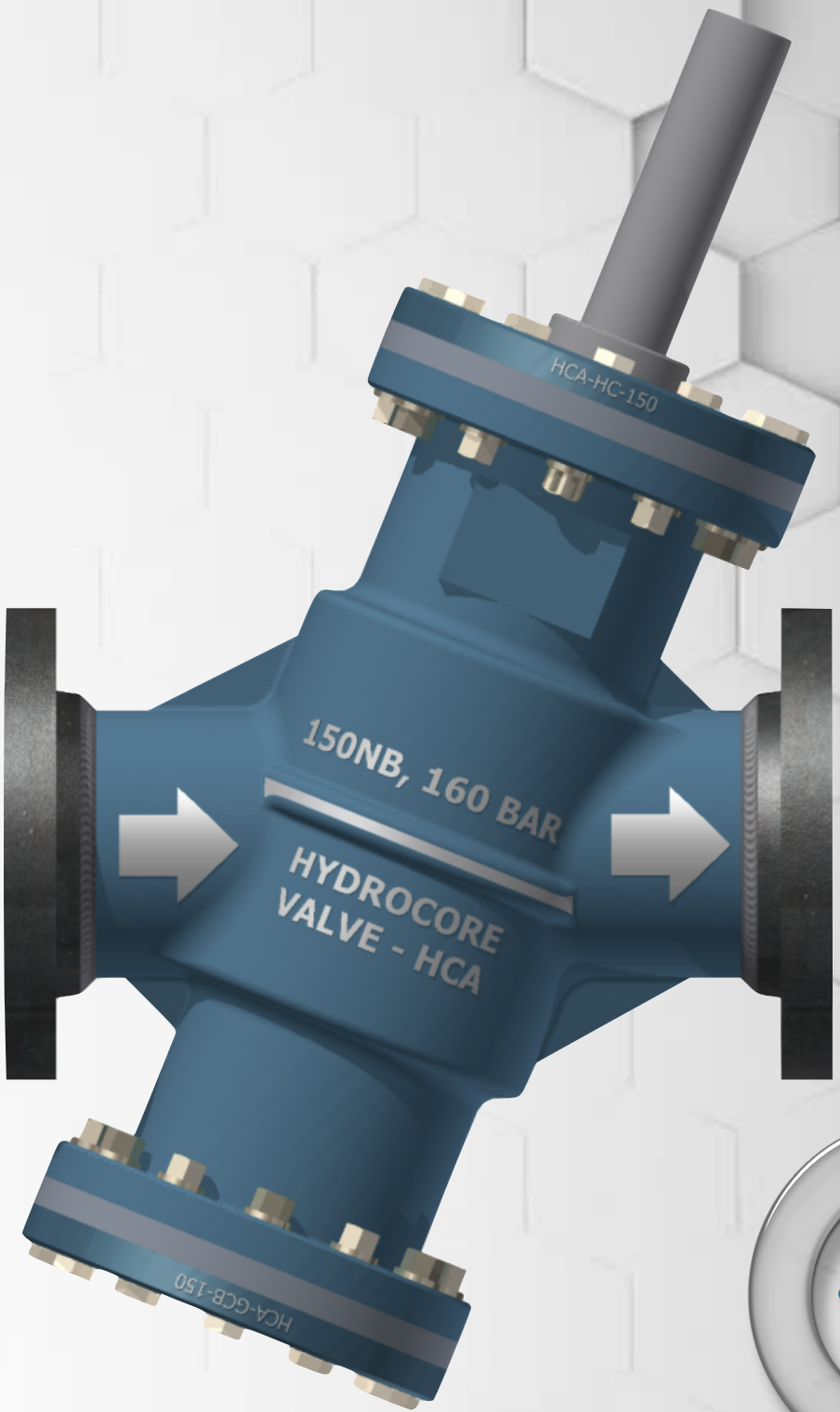
Hydrocore Limited Presents

Hydrocore™ Angular Tamper Proof Isolating Valve



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HISTORY OF THE HYDROCORE™ VALVE

The concept of the Hydrocore™ isolating valve was developed from the tried and tested NGD™ isolating valve. For fourteen years the NGD™ isolating valve has been a simple and reliable solution for isolating line fluid in a piping system. But, due to the rising running costs, the valve needed a new and revised way of isolation. With the new Hydrocore™ design there is a substantial drop in the differential pressure due to the inclined bores. This in turn increases the valves flow coefficient and thereby reduces the running costs of the valve.

LOW TORQUE, LOW CLOSING FORCES

The Hydrocore™ isolating valve is hydrostatically balanced, requiring very low operating torque or operating forces at all valve positions and for all valve sizes and all pressure ratings.

NO GEARBOX

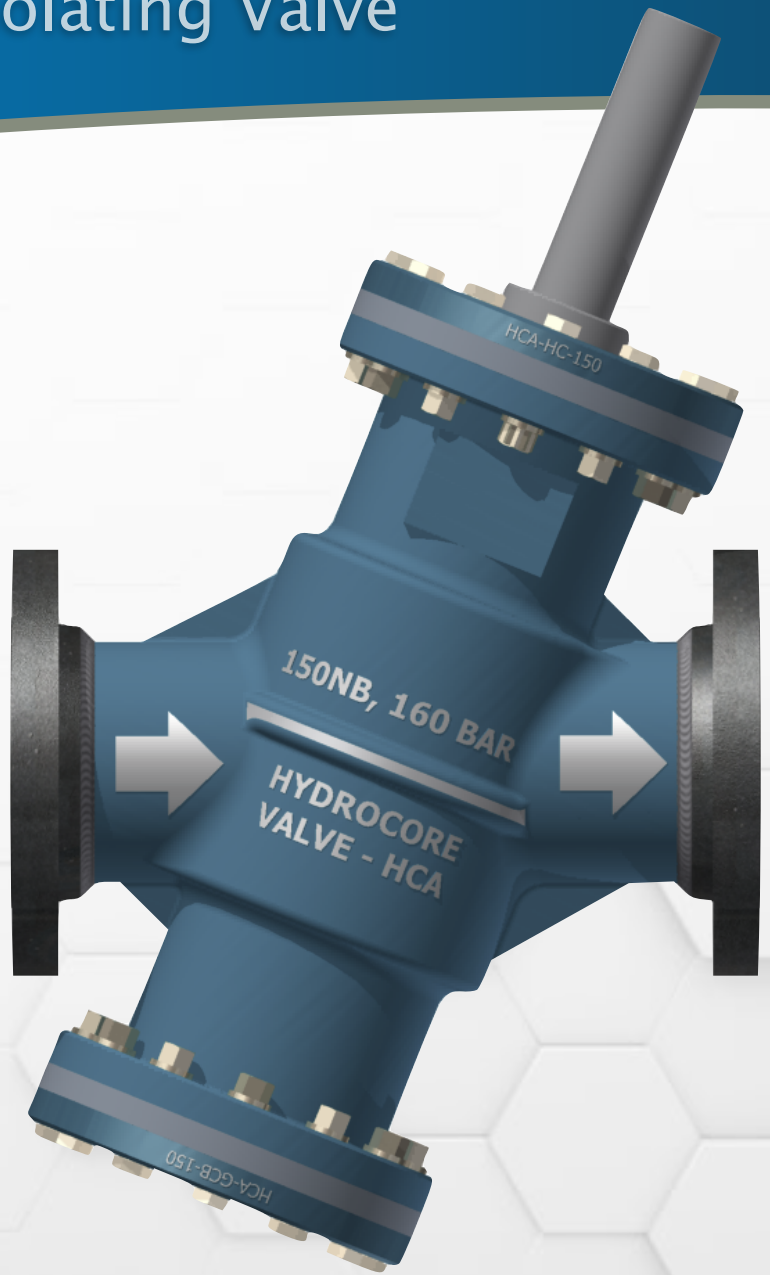
No gearbox is required to assist in the valve's opening and closing for the handwheel operated valves. The valve derives its actuating power directly from the line fluid pressure.

MAINTENANCE

The Hydrocore™ isolating valve is simple and reliable with a robust construction. Very little maintenance is required, it can be undertaken by semi-skilled personnel and with a short downtime period.

INSTALLATION POSITION

The valve can be installed in any position.



MEDIA

Liquid and gas with low content of suspended solids.

PIPE SIZES

2”(50NB) to 16”(400NB)

FLANGES

SABS 1123, BS4504, BS10,
ASME B16.34, ANSI B16.5

COUPLINGS

Tapered shoulders and other pipe couplings

PRESSURE

Up to 3750 psi (25MPa) pressure rating.

TEMPERATURE RATINGS

Up to 85°C with standard seals.

PH LEVELS & CHLORIDES

Parts of the valve are made from stainless steel and can withstand a low level of chlorides.

INSTALLATION POSITION

The valve can be installed in any position.

SEATING

Seat Leakage - B16.104 class III, IV, V or VI, depends on valve type and application.

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ADVANTAGES OF THE HYDROCORE™ VALVE OVER BALL VALVES

Crippled gearboxes, cavitation from high differential pressures and longer lead times are three serious flaws of ball valves that the Hydrocore™ valves are spared from.

GEARBOX MALFUNCTIONING

A common frailty of ball valves occurs in chilled water sections, where condensation enters the gearbox, and removes the grease within. This in turn causes the gearbox internal parts to corrode and prevents the ball valve from isolating. In contrast, the Hydrocore™ and NGD™ isolating valves have fewer working parts than ball valves, are hydrostatically balanced and do not require a gearbox. They, therefore have no such flaw, even when these valves have been inactive for a long period of time. This was evident when an audit of the cooling coils was conducted on the VCR below 120 Project. Every single NGD™ and Hydrocore™ isolating valve seated completely, even after many years of standing idle in the system. Some NGD™ isolating valves with broken spindles had to be isolated by means of a vice grip, and even under these conditions, the valves could be isolated.

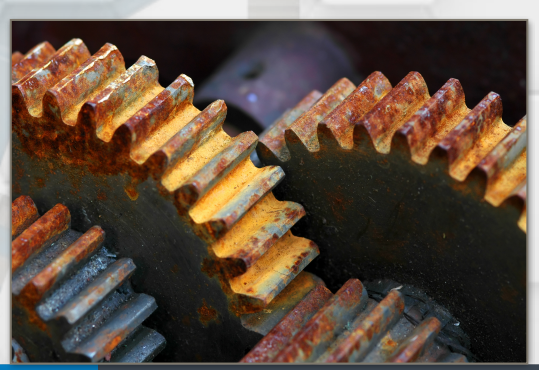
BALL VALVE ILLUSTRATION

HIGH DIFFERENTIAL PRESSURES

When the ball valve is in a closed position and there is a high differential pressure between the upstream and downstream, and the valve is initially opened, the seat of the ball valve cavitates tremendously. Within a few operations the ball valve has to be decommissioned and the body and ball seat need to be repaired or replaced.

In contrast, both the NGD™ and Hydrocore™ isolating valves have a natural anti-cavitation area above the seat preventing this from happening. Furthermore, the moving parts of Hydrocore™ and NGD™ isolating valves are manufactured from stainless steel. Their body seat is also made from stainless steel thus increasing the valves durability and longevity.

Furthermore, in the audit, it was proven that the NGD valve did not cause excessive flow loss and after some simple maintenance



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HOW MUCH DOES IT COST?

This question is probably the only question posed to any marketing personnel when a high pressure valve is being inquired. However, there are several more questions that should be asked when considering a high pressure valve in a mining setting:

- Valve Flow Co-efficient (Cv)
- Simplicity of Design
- Maintenance and Servicing
- Valve Longevity

Below is a comparison of these points between the Hydrocore™ Isolating Valve versus a Standard Isolating Globe Valve (**SIGV**)

VALVE FLOW CV

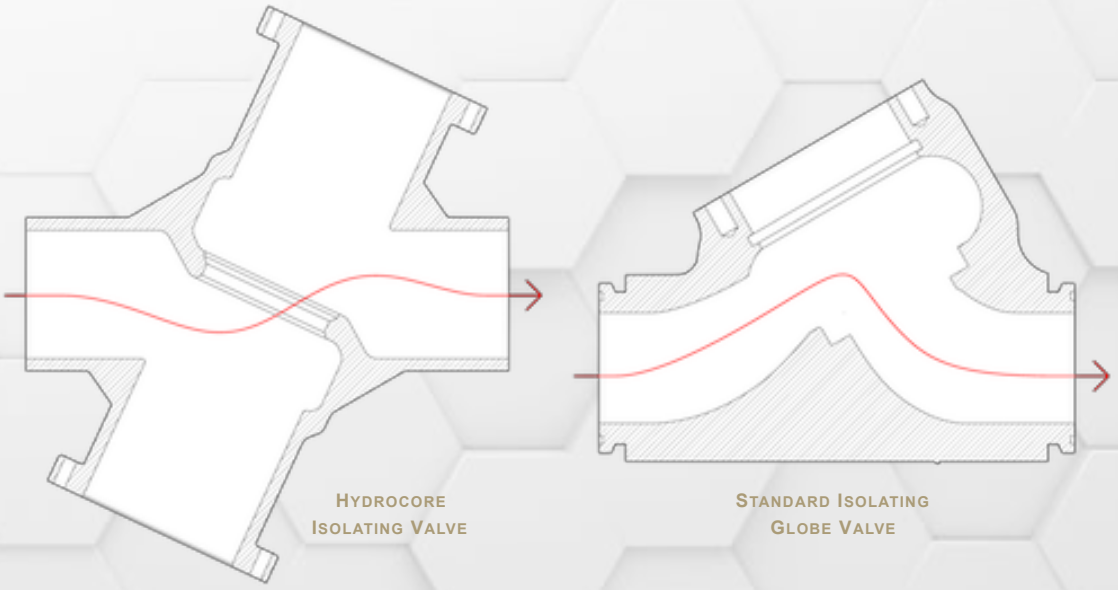
One of the primary costs after the initial capital outlay is running costs, especially in a pump station. A valve's Cv determines the pressure drop between the inlet and outlet ports of the valve. The lower the pressure drop the higher the Cv, which in turn results in lower power consumption of the pump.

We have modelled a SIGV to determine its Cv (see figures below).

The table below shows the power penalty cost of a Hydrocore Isolating Valve versus a SIGV.

As is evident, the cost savings using a Hydrocore Isolating Valve versus a SIGV are astronomical even within the first couple of years. Assuming that the price of electricity is not going to go down in the future, those cost savings will only increase.

PARAMETERS	UNIT	HYDROCORE	SIGV
Nominal Working Pressure	Bar	100	100
Flow Rate	Lit/Sec	106	106
Flow Coefficient	**Cv**	**1086**	**360**
Cost of penalty per hour	R/kWh	0.82	0.82
Cost of penalty per hour	$/kWh	0.06	0.06
Pump efficiency (%)	%	84%	84%
RESULTS	**UNIT**	**HYDROCORE**	**SIGV**
Differential Pressure Losses	Bar	0.166	1.515
Valve Power Losses	kW	1.942	17.673
Annual Penalty (operating 24 hours per day)	**Rand**	**13,950**	**126,947**
	USD	**996**	**9,068**



HYDROCORE ISOLATING VALVE

STANDARD ISOLATING GLOBE VALVE

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SIMPLICITY OF DESIGN

A complicated valve is a valve that invariably will have issues once the valve is commissioned. The simpler the design the better. This should also be taken into account when considering a Hydrocore Isolating Valve versus a standard globe valve.

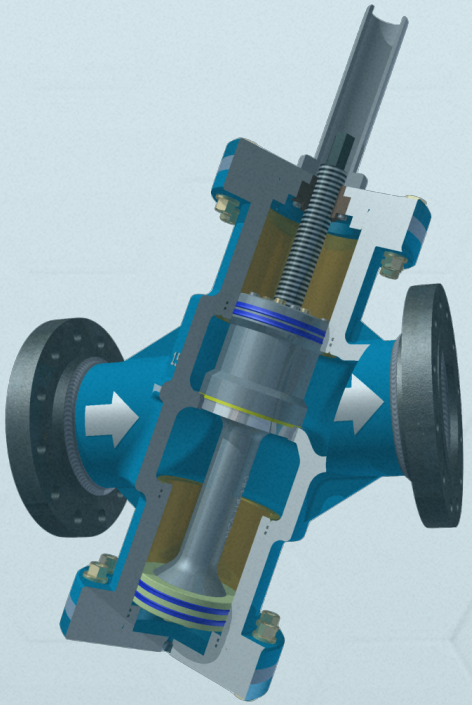
MAINTENANCE AND SERVICING

The more moving parts in any valve design the more prone the valve will be to constant maintenance and servicing. This is even more of a concern in a mining setting where conditions are not optimal for smooth valve functioning. The Hydrocore Isolating Valve is simple to maintain and service compared with a SIGV.

VALVE LONGEVITY

This point is built on the previous two points. If a valve keeps on breaking down and requires constant servicing and maintenance, then the valve is no more an asset. In fact, it is now an obstacle to the smooth running of a mine. Inevitably, the valve gets replaced by another brand. The Hydrocore Isolating Valve, if maintained on a regular basis, will be keep on functioning indefinitely.

ILLUSTRATION OF THE HYDROCORE VALVE WITH ONLY ONE MOVEABLE PART



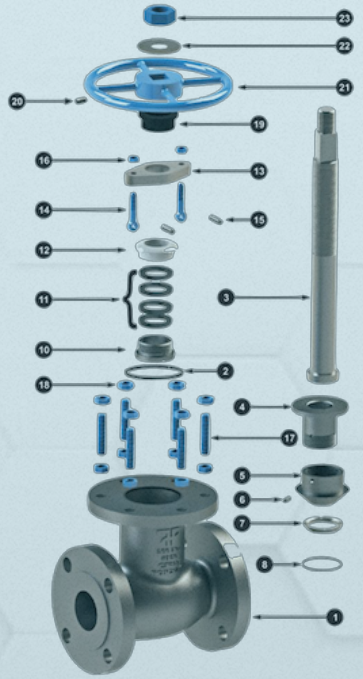
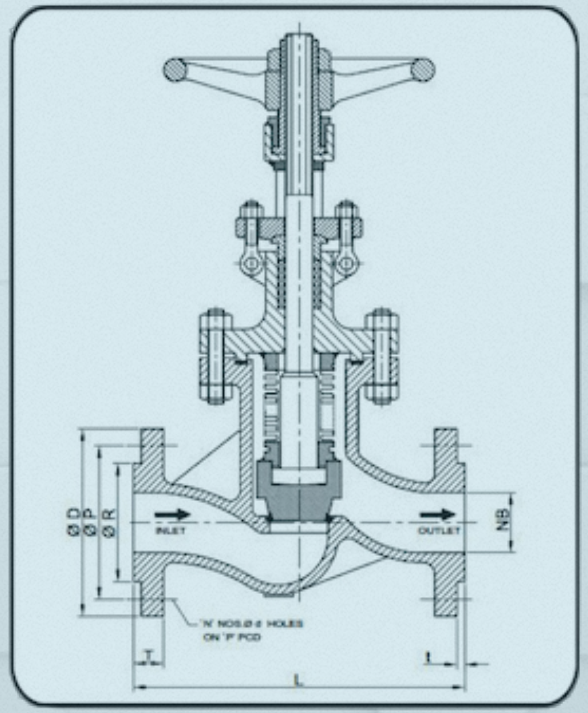
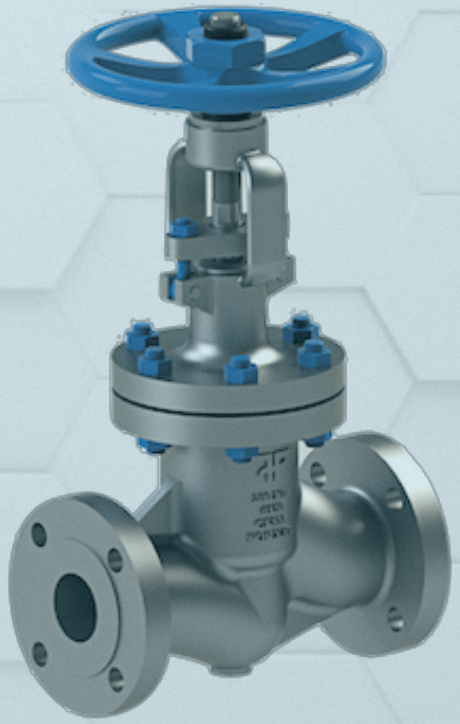


ILLUSTRATION OF A STANDARD GLOBE VALVES WITH THEIR MANY MOVEABLE PARTS





For more information please visit our website www.hydrocore.tech

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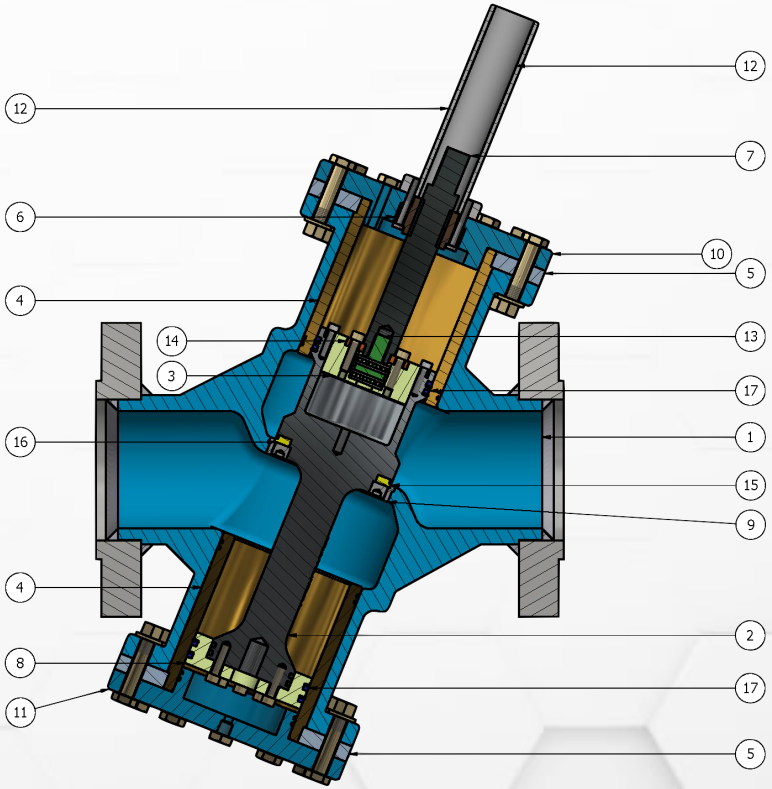
PART	DESCRIPTION	50NB - 100NB	150NB - 300NB
1	BODY CASTING	431SS	BS-3100 GRADE A2
2	SHUTTLE	431SS	431SS
3	SHUTTLE TOP	-	EN-8
4	SLEEVE	-	431SS
5	SLEEVE COVER	-	EN-8
6	BUSH	-	LG-2
7	SPINDLE	431SS	431SS
8	SHUTTLE BOTTOM	431SS	431SS
9	BODY SEAT	-	309SS
10	TOP COVER	LG-2*	EN-8
11	BOTTOM COVER	EN-8	EN-8
12	SPINDLE ENCLOSURE	EN-8	EN-8
13	SPINDLE HOLDER	431SS	431SS
14	WASHER	431SS	431SS
15	SHUTTLE SEAT	UHMPWE	UHMPWE
16	SHUTTLE HOLDER	431SS	431SS
17	U-SEALS	POLYURETHANE	POLYURETHANE



FLOW COEFFICIENTS

NB	CV	ΔP (PSI)
50	63	5.1
80	161	6.1
100	235	6.6
150	525	12.5
200	1086	1.4
250	1433	6.7
300	1936	7.9

PRESSURE & FLOW RATES

NB	MAX PRESSURE	MAX FLOW RATE
50	250 bar	9 ℓ/sec
80	250 bar	25 ℓ/sec
100	250 bar	38 ℓ/sec
150	250 bar	117 ℓ/sec
200	160 bar	152 ℓ/sec
250	160 bar	233 ℓ/sec
300	160 bar	337 ℓ/sec

DIMENSIONS & WEIGHTS

NB	A	B	C	#150 F-T-F	#300 F-T-F	#600 F-T-F	#900 F-T-F	#1500 F-T-F
50	367 - 427 mm	164 mm	234 - 280 mm	292mm / 19kg	292mm / 21kg	292mm / 22kg	368mm / 35kg	368mm / 35kg
80	541 - 618 mm	226 mm	331 - 400 mm	356mm / 47kg	356mm / 50kg	356mm / 52kg	381mm / 62kg	470mm / 71kg
100	574 - 662 mm	262 mm	326 - 405 mm	432mm / 72kg	432mm / 81kg	432mm / 90kg	457mm / 105kg	546mm / TBD
150	776 - 893 mm	381 mm	458 - 574 mm	559mm / 229kg	559mm / 245kg	559mm / 270kg	610mm / 297kg	705mm / TBD
200	1013 - 1163 mm	494 mm	602 - 749 mm	660mm / 405kg	660mm / 429kg	660mm / 460kg	737mm / 509kg	832mm / TBD
250	1160 - 1327 mm	573 mm	659 - 834 mm	787mm / 744kg	787mm / 778kg	787mm / 840kg	838mm / 891kg	991mm / TBD
300	1309 - 1504 mm	652 mm	746 - 939 mm	838mm / 1052kg	838mm / 1098kg	838mm / 1164kg	965mm / 1277kg	1130mm / TBD