Available materials

There are six thermoplastic materials in common use for pressure piping systems:

- PVC-U (Unplasticised Polyvinyl Chloride)
- PVC-C (Post-chlorinated Polyvinyl Chloride)
- ABS (Acrilonitrile Butadiene Styrene)
- PP (Polypropylene)
- PE (Polyethylene)
- PVDF(Polyvinylidene Fluoride)

In addition, developments in raw material formulation has provided new variations of some of these materials with specifically enhanced properties, such as flame retardency or electrical conductivity. The following pages provide more detailed information on each material and on the range of products that are available.

PVC-U: Unplasticised Polyvinyl Chloride

Unplasticised Polyvinylchloride (PVC-U) is one of the oldest and most widely used plastics for piping systems worldwide. It is a highly versatile material that is used for both pressure and drainage piping systems for above and below ground applications. It is an amorphous thermoplastic material with good tensile, flexural and mechanical strength, low moisture absorption, good flammability characteristics, and exceptional dimensional stability.

PVC-U has excellent chemical resistance across its operating temperature range of 0°C to 60°C, with a broad band of operating pressures. In addition, because of its long term strength characteristics, high stiffness and cost effectiveness, PVC-U systems typically account for a large proportion of thermoplastic piping installations.

Consequently, PVC-U systems feature the widest range of pipe sizes, fitting configurations, valves choices and ancillary items compared to all other thermoplastic piping materials.

PVC-U piping systems are joined by solvent cement welding, whilst transition joints can be made using flanges, threaded connections, mechanical fittings, and compression fittings.

PVC-U piping systems are available from IPS in both inch and metric dimensions, according to BS, ASTM and ISO standards. Systems are available in inch sizes up to 24', and metric sizes up to 630mm. Pipes, fittings and valves are available in grey, white and clear PVC-U.

General properties of PVC-U

PVC-U exhibits thermal stability in the temperature range 0°C to 60°C, however at low temperatures the impact strength of PVC-U decreases. It is therefore not recommended for use at very low temperatures unless there is no likelihood of the piping materials being disturbed or subjected to impact damage. PVC-U is free from toxic metals thus ensuring that it is physiologically harmless for drinking water and foodstuffs applications.

Some important advantages of PVC-U are:
- Extensive choice of component parts
- Wide range of applications
- Good chemical and corrosion resistance
- Safe for potable water applications
- Low friction loss - Self extinguishing
- High mechanical strength - Simplified installation techniques using solvent cement welding
- Approved for potable water applications

PVC-U: Unplasticised Polyvinyl Chloride

Materials

PVC-U piping systems are produced without plasticizers and fillers, however for injection moulding purposes lubricants are added to assist in the production of complex parts, and to combat the effects of UV light, stabilisers are added.

PVC-U is produced by the polymerisation of vinylchloride, a gaseous monomer. Technical products manufactured from PVC-U can have a monomer content of 0.1ppm, which is considerably less than the specified limits. Owing to the high chlorine content of PVC-U, it does not support combustion after removal of a flame, and thus PVC-U falls into the class V-0 according to UL94.

Properties of PVC-U (Average values)		
Property	Vlaue	Unit
Density	1.38	g / cm^3
Tensile Strength	55	N / mm^2
Elongation at Break	> 30	%
Impact Strength	No crack	kJ / m^2 (23°C)
Modulus of Elasticity (Young's Modulus)	3000	N / mm / m^2
Coefficient of Linear Expansion	0.08	mm / m °C
Maximum Operating Temperature	60	°C
Minimum Operating Temperature	0	°C
Vicat Softening Point	> 76	°C(VST / B 50)
Water Absorption	< 4	mg / cm^3
Surface Resistance	Approx. 10	Ω
Thermal Conductivity	0.140	w / m · K
Flammability	v-0	UL_{94}
Colour 3000	7011 Dark Grey	RAL

Chemical resistance

PVC-U displays excellent chemical resistance to a wide variety of commonly encountered industrial chemicals, such as acids, bases and salt solutions. Resistance to sodium hypochlorite solutions is also very good. PVC-U is not resistant to aromatic and chlorinated hydrocarbons, solvents, esters and ketones. The chemical resistance of PVC-U should be checked with our technical department for applications involving varnish, oils or fats, and PVC-U is not recommended for use with compressed air or gases. For guidance on the suitability of PVC-U for your application, consult the chemical resistance tables or our technical department.

Weathering resistance

With the use of additives such as ultraviolet absorbers, PVC-U systems display excellent weathering resistance to the long-term effects of sunlight, wind and rain. Over time, grey PVC-U will lose some of its colour because of exposure to UV light, and it will have slightly reduced impact strength. In extreme cases, the use of insulation or an application of a UV absorbent coating such as AGRU Coat, or the use of a water or latex based paint will help to minimise the effects of solar radiation. Solvent based paints should not be used on PVC-U piping. For outdoor installations, or where the aesthetic appearance of the piping system is important, a fully matched system of UV stabilised white PVC pipes and fittings is also available.

Electrical characteristics

PVC-U is non-conductive, therefore systems will remain free from electrolytic corrosion. Precautions should be taken to avoid static discharge should any part of a PVC-U piping system pass through an area where explosive gases may be present.

Physiological characteristics

PVC-U piping systems from IPS are free from lead, cadmium or other poisonous heavy metals. They are suitable for use in contact with cold potable water, and are WRAS listed for this application.

PVC-U: Unplasticised Polyvinyl Chloride

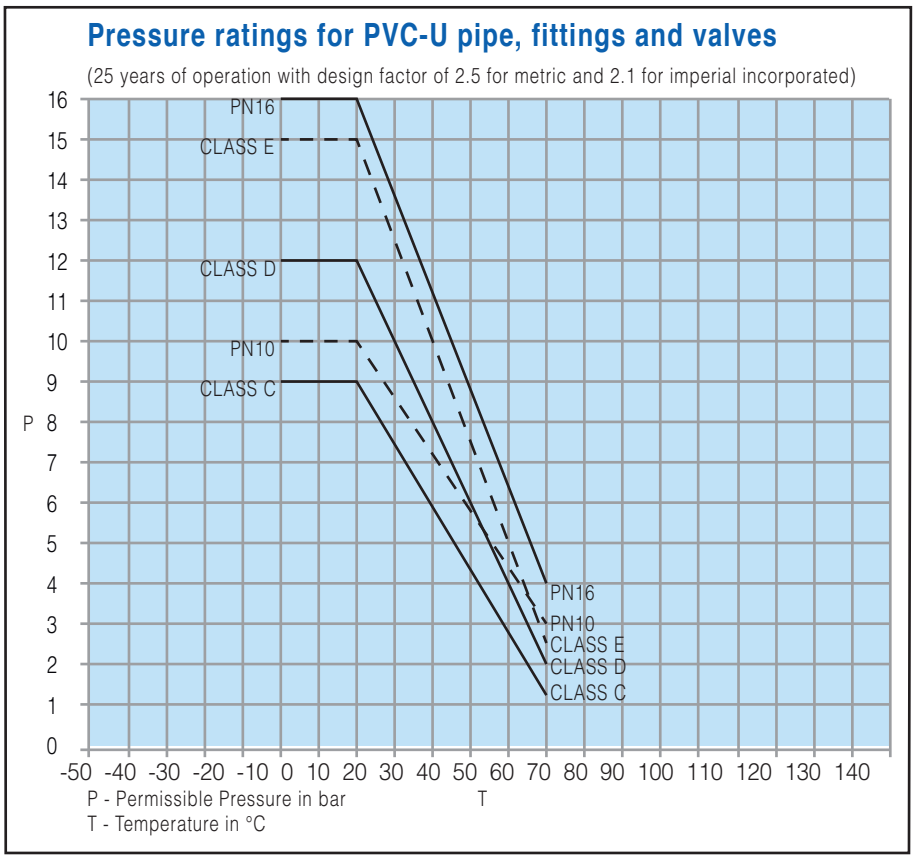
Pressure ratings for PVC-U pipe, fittings and valves

For guidance, the following table gives an indication of the pressure ratings for PVC-U pipes, fittings and valves. The pressure rating of individual items should always be verified with our technical department before installation.

Product	Size	Pressure Rating at 20°C
PVC-U Pipes Class C	2" - 24"	9.0 bar
PVC-U Pipes Class D	1 ¼"- 18"	12.0 bar
PVC-U Pipes Class E	3/8" - 16"	15.0 bar
PVC-U Pipes Sch 40	1/8" - 16"	55.5 bar - 9.0 bar
PVC-U Pipes Sch 80	1/8" - 18"	84.5 bar - 15.2 bar
PVC-U Pipes PN10	25mm - 500mm	10.0 bar
PVC-U Pipes PN16	12mm - 400mm	16.0 bar
PVC-U Standard Inch Fittings	3/8" - 24"	15.0 bar - 6.0 bar
PVC-U Industrial Inch Fittings	1/8 " - 24"	15.0 bar - 10.0 bar
PVC-U Standard Metric Fittings	20mm - 400mm	10.0 bar - 6.0 bar
PVC-U Industrial Metric Fittings	12mm - 500mm	16.0 bar - 6.0 bar
PVC-U Ball Valves	3/8" - 16mm - 6" / 160mm	16.0 bar - 10.0 bar
PVC-U Diaphragm Valves	1/8" - 20mm - 8" - 200mm	10.0 bar - 5.0 bar
PVC-U Butterfly Valves	1½" / 50mm - 12" / 315mm	10.0 bar

* Pressure rating dependant on diameter

Pressure ratings for thermoplastic pipes are determined in a water environment at a temperature of 20°C. As the temperature of the media (and/or the piping environment) increases, the thermoplastic material becomes more ductile, causing a decrease in the tensile strength. Because of this, the pressure rating of the system must be reduced as the temperature rises to allow for safe operation. The application limits for PVC-U piping materials are shown in the following diagram:



PVC-U pipe availability: inch sizes

		ASTM D 2241				ASTM D 1785			BS EN 1452 / BS 3505				
	Class Colour	SDR 41 White	SDR 26 White	SDR 21 White	SDR 13.5 White	Sch 40 Wh&Grey	Sch 80 Grey	Sch 120 Grey	Class B Grey	Class C Grey	Class D Grey	Class E Grey	Class 7 Grey
1/8"	O.D (mm)					10.3	10.3						
	Wall (mm)					1.7	2.4						
	Max WP (bar)					55.5	84.5						
	Weight/m (kg)					0.1	0.1						
1/4"	O.D (mm)					13.7	13.7						
	Wall (mm)					2.2	3.0						
	Max WP (bar)					53.8	77.9						
	Weight/m (kg)					0.1	0.2						
3/8"	O.D (mm)					17.1	17.1					17.1	
	Wall (mm)					2.3	3.2					1.9	
	Max WP (bar)					42.8	63.5					15.0	
	Weight/m (kg)					0.2	0.2					0.1	
1/2"	O.D (mm)				21.3	21.3	21.3	21.3				21.3	21.3
	Wall (mm)				1.6	2.8	3.7	4.3				2.1	4.0
	Max WP (bar)				21.7	41.4	58.6	70.0				15.0	12.0
	Weight/m (kg)				0.2	0.2	0.3	0.3				0.2	0.3
3/4"	O.D (mm)				26.7	26.7	26.7	26.7				26.7	26.7
	Wall (mm)				1.5	2.9	3.9	4.3				2.5	4.2
	Max WP (bar)				13.8	33.1	47.6	53.3				15.0	12.0
	Weight/m (kg)				0.2	0.3	0.4	0.4				0.2	0.7
1"	O.D (mm)		33.4	33.4		33.4	33.4	33.4				33.4	33.4
	Wall (mm)		1.5	1.6		3.4	4.5	5.1				2.7	4.8
	Max WP (bar)		11.0	13.8		31.0	43.5	49.5				15.0	12.0
	Weight/m (kg)		0.3	0.3		0.5	0.6	0.7				0.3	0.5
1"1/4"	O.D (mm)		42.2	42.2		42.2	42.2	42.2			42.2	42.2	42.2
	Wall (mm)		1.6	2.0		3.6	4.9	5.5			2.7	3.2	5.2
	Max WP (bar)		11.0	13.8		25.5	35.9	41.0			12.0	15.0	12.0
	Weight/m (kg)		0.3	0.4		0.6	0.8	0.9			0.4	0.5	0.7
1"1/2"	O.D (mm)		48.3	48.3		48.3	48.3	48.3			48.3	48.3	48.3
	Wall (mm)		1.9	2.3		3.7	5.1	5.7			3.0	3.7	5.5
	Max WP (bar)		11.0	13.8		22.8	32.4	37.0			12.0	15.0	12.0
	Weight/m (kg)		0.4	0.5		0.8	1.0	1.1			0.5	0.7	0.9
2"	O.D (mm)		60.3	60.3		60.3	60.3	60.3		60.3	60.3	60.3	60.3
	Wall (mm)		2.3	2.9		3.9	5.5	6.4		3.0	3.7	4.5	6.0
	Max WP (bar)		11.0	13.8		19.3	27.6	32.5		9.0	12.0	15.0	12.0
	Weight/m (kg)		0.6	0.8		1.0	1.4	1.6		0.7	0.8	1.0	1.4
21/2"	O.D (mm)		73.0	73.0		73.0	73.0	73.0		75.0*		75.0*	
	Wall (mm)		2.8	3.5		5.2	7.0	7.6		3.6		5.6	
	Max WP (bar)		11.0	13.8		20.7	29.0	32.1		10.0		16.0	
	Weight/m (kg)		0.9	1.1		1.6	2.1	2.3		1.2		1.8	
3"	O.D (mm)		88.9	88.9		88.9	88.9	88.9	88.9	88.9	88.9	88.9	88.9
	Wall (mm)		3.4	4.2		5.5	7.6	8.9	3.1	4.1	5.3	6.5	4.2
	Max WP (bar)		11.0	13.8		17.9	25.5	30.6	6.0	9.0	12.0	15.0	12.0
	Weight/m (kg)		1.4	1.7		2.1	2.8	3.3	1.2	1.4	1.8	2.2	0.4
3"1/2"	O.D (mm)		101.6	101.6		101.6	101.6						
	Wall (mm)		3.9	4.8		5.7	8.1						
	Max WP (bar)		11.0	13.8		16.6	24.1						
	Weight/m (kg)		1.8	2.2		2.5	3.5						
4"	O.D (mm)		114.3	114.3		114.3	114.3	114.3	114.3	114.3	114.3	114.3	
	Wall (mm)		4.4	5.4		6.0	8.6	11.1	3.6	5.2	6.8	8.3	
	Max WP (bar)		11.0	13.8		15.2	22.1	29.7	6.0	9.0	12.0	15.0	
	Weight/m (kg)		2.2	2.7		3.0	4.2	5.3	1.8	2.3	3.0	3.6	
5"	O.D (mm)		141.3	141.3		141.3	141.3		140.0*	140.0*	140.0*	140.0*	
	Wall (mm)		5.4	6.7		6.6	9.5		4.0	6.3	8.3	10.1	
	Max WP (bar)		11.0	13.8		13.1	20.0		6.0	9.0	12.0	15.0	
	Weight/m (kg)		3.4	4.2		4.1	5.8		2.5	3.5	4.5	5.5	
6"	O.D (mm)		168.3	168.3		168.3	168.3	168.3	168.3	168.3	168.3	168.2	
	Wall (mm)		6.5	8.0		7.1	11.0	14.3	4.8	7.5	9.9	12.2	
	Max WP (bar)		11.0	13.8		12.4	19.3	25.6	6.0	9.0	12.0	15.0	
	Weight/m (kg)		4.8	5.9		5.3	7.9	10.1	3.4	5.0	6.5	7.9	
8"	O.D (mm)		219.1	219.1		219.1	219.1		219.1	219.1	219.1	219.1	
	Wall (mm)		8.4	10.4		8.2	12.7		5.6	8.8	11.6	14.1	
	Max WP (bar)		11.0	13.8		11.0	16.6		6.0	9.0	12.0	15.0	
	Weight/m (kg)		8.2	10.0		7.9	12.0		5.3	7.7	10.0	12.1	
10"	O.D (mm)		273.0	273.0		273.0	273.0		273.0	273.0	273.0	273.0	
	Wall (mm)		10.5	13.0		9.3	15.1		7.0	10.9	14.3	17.5	
	Max WP (bar)		11.0	13.8		9.7	15.9		6.0	9.0	12.0	15.0	
	Weight/m (kg)		12.7	15.5		11.2	17.8		8.2	11.9	15.5	18.8	
12"	O.D (mm)		323.9			323.9	323.9		323.9	323.9	323.9	323.9	
	Wall (mm)		12.5			10.3	17.5		8.2	2.9	17.0	20.8	
	Max WP (bar)		11.0			9.0	15.9		6.0	9.0	12.0	15.0	
	Weight/m (kg)		17.8			14.8	24.5		11.5	16.8	21.8	26.5	
14"	O.D (mm)		355.6			355.6	355.6		355.6	355.6	355.6	355.6	
	Wall (mm)		13.7			11.1	19.1		9.0	14.1	18.6	22.8	
	Max WP (bar)		11.0			9.0	15.2		6.0	9.0	12.0	15.0	
	Weight/m (kg)		21.5			17.6	29.6		13.4	20.1	26.3	31.9	
16"	O.D (mm)		406.4			406.4	406.4		406.4	406.4	406.4	406.4	
	Wall (mm)		15.6			12.7	12.7		10.2	16.2	21.1	26.0	
	Max WP (bar)		11.0			9.0	15.2		6.0	9.0	12.0	15.0	
	Weight/m (kg)		28.1			23.0	37.9		17.9	26.4	34.2	41.2	
18"	O.D (mm)	457.2	457.2				457.2		457.2	457.2	457.2		
	Wall (mm)	11.2	17.6				23.8		11.9	18.2	23.8		
	Max WP (bar)	6.9	11.0				15.2		6.0	9.0	12.0		
	Weight/m (kg)	23.5	35.6				47.5		21.8	33.3	43.3		
20"	O.D (mm)	508.0	508.0						508.0	508.0			
	Wall (mm)	12.4	19.5						13.2	20.2			
	Max WP (bar)	6.9	11.0						6.0	9.0			
	Weight/m (kg)	28.2	44.0						26.9	41.2			
24"	O.D (mm)	609.6	609.6						609.6	609.6			
	Wall (mm)	14.9	23.4						15.7	24.1			
	Max WP (bar)	6.9	11.0						6.0	9.0			
	Weight/m (kg)	40.76	63.4						38.6	59.3			

* DIN 8061/2

PVC-U pipe availability: mm sizes

		EN 1452						DIN 8016 / 2				
	Type	PN 6	PN 7.5	PN 10	PN 6	PN 7.5	PN 10	PN 4	PN 6	PN 10	PN 16	PN 20
12 mm	O.D (mm)						12.0				12.0	12.0
	Wall (mm)						1.5				1.0	1.4
	Max WP (bar)						20.0				16.0	20.0
	Weight/m (kg)						0.1				0.1	0.1
16 mm	O.D (mm)						16.0				16.0	16.0
	Wall (mm)						1.5				1.2	1.8
	Max WP (bar)						20.0				16.0	20.0
	Weight/m (kg)						0.1				0.1	0.1
20 mm	O.D (mm)					20.0	20.0				20.0	20.0
	Wall (mm)					1.5	1.9				1.5	2.3
	Max WP (bar)					16.0	20.0				16.0	20.0
	Weight/m (kg)					0.1	0.2				0.1	0.2
25 mm	O.D (mm)				25.0	25.0	25.0			25.0	25.0	25.0
	Wall (mm)				1.5	1.9	2.3			1.5	1.9	2.8
	Max WP (bar)				12.5	16.0	20.0			10.0	16.0	20.0
	Weight/m (kg)				0.2	0.2	0.2			0.2	0.2	0.3
32 mm	O.D (mm)			32.0	32.0	32.0	32.0			32.0	32.0	32.0
	Wall (mm)			1.6	1.9	2.4	2.9			1.8	2.4	3.6
	Max WP (bar)			10.0	12.5	16.0	20.0			10.0	16.0	20.0
	Weight/m (kg)			0.3	0.3	0.3	0.4			0.3	0.3	0.5
40 mm	O.D (mm)		40.0	40.0	40.0	40.0	40.0		40.0	40.0	40.0	40.0
	Wall (mm)		1.5	1.9	2.4	3.0	3.7		1.8	1.9	3.0	4.5
	Max WP (bar)		7.5	10.0	12.5	16.0	20.0		6.0	10.0	16.0	20.0
	Weight/m (kg)		0.3	0.4	0.5	0.5	0		0.4	0.4	0.5	0.8
50 mm	O.D (mm)	50.0	50.0	50.0	50.0	50.0	50.0		50.0	50.0	50.0	50.0
	Wall (mm)	1.5	1.6	2.4	3.0	3.7	4.6		1.8	2.4	3.7	5.6
	Max WP (bar)	6.0	7.5	10.0	12.5	16.0	20.0		6.0	10.0	16.0	20.0
	Weight/m (kg)	6.5	0.5	0.6	0.7	0.8	1.0		0.4	0.6	0.8	1.2
63 mm	O.D (mm)	63.0	63.0	63.0	63.0	63.0	63.0		63.0	63.0	63.0	63.0
	Wall (mm)	1.9	2.0	3.0	3.8	4.7	5.8		1.9	3.0	4.7	7.0
	Max WP (bar)	6.0	7.5	10.3	12.5	16.0	20.0		6.0	10.0	16.0	20.0
	Weight/m (kg)	0.6	0.6	0.9	1.1	1.3	1.7		0.6	0.6	1.3	1.8
75 mm	O.D (mm)	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0	75.0
	Wall (mm)	2.2	2.3	3.6	4.5	5.6	6.8	1.8	2.2	3.6	5.6	8.4
	Max WP (bar)	6.0	7.5	10.0	12.5	16.0	20.0	4.0	6.0	10.0	16.0	20.0
	Weight/m (kg)	0.8	0.8	1.3	1.6	1.9	2.3	0.6	0.8	1.2	1.8	2.6
90 mm	O.D (mm)	90.0	90.0	90.0	90.0	90.0	90.0	90.0	90.0	90.0	90.0	90.0
	Wall (mm)	2.7	2.8	4.3	5.1	6.7	8.2	1.8	2.7	4.3	6.7	10.0
	Max WP (bar)	6.0	7.5	10.0	12.5	16.0	20.0	4.0	6.0	10.0	16.0	20.0
	Weight/m (kg)	1.2	1.2	1.8	2.3	2.7	3.2	0.8	1.1	1.8	2.6	3.7
110 mm	O.D (mm)	110.2	110.0	110.0	110.0	110.0	110.0	110.0	110.0	110.0	110.0	110.0
	Wall (mm)	2.7	3.2	4.2	5.3	6.6	8.1	2.0	3.2	5.3	8.2	12.3
	Max WP (bar)	6.0	7.5	10.0	12.5	16.0	20.0	4.0	6.0	10.0	16.0	20.0
	Weight/m (kg)	1.4	1.7	2.1	2.7	3.2	4.0	1.2	1.6	2.6	3.9	5.6
125 mm	O.D (mm)	125.0	125.0	125.0	125.0	125.0	125.0	125.0	125.0	125.0	125.0	
	Wall (mm)	3.1	3.7	4.8	6.0	7.4	9.0	2.5	3.7	6.0	9.3	
	Max WP (bar)	6.0	7.5	10.0	12.5	16.0	20.0	4.0	6.0	10.0	16.0	
	Weight/m (kg)	1.8	2.2	2.8	3.4	4.1	5.1	1.5	2.1	3.3	5.0	
140 mm	O.D (mm)	140.0	140.0	140.0	140.0	140.0	140.0	140.0	140.0	140.0	140.0	
	Wall (mm)	3.5	4.1	5.4	6.7	.3	10.3	2.8	4.1	6.7	10.4	
	Max WP (bar)	6.0	7.5	10.0	12.5	16.0	20.0	4.0	6.0	10.0	16.0	
	Weight/m (kg)	2.3	2.7	3.5	4.3	5.2	6.4	1.8	2.7	4.2	6.3	
160 mm	O.D (mm)	160.0	160.0	160.0	160.0	160.0	160.0	160.0	160.0	160.0	160.0	
	Wall (mm)	4.0	4.7	6.2	7.7	9.5	11.8	3.0	4.7	7.7	11.9	
	Max WP (bar)	6.0	7.5	10.0	12.5	16.0	20.0	4.0	6.0	10.0	16.0	
	Weight/m (kg)	3.0	4.5	4.6	5.7	6.7	8.4	2.4	3.4	5.5	8.2	
180 mm	O.D (mm)	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0	
	Wall (mm)	4.4	5.3	6.9	8.6	10.7	13.3	3.6	5.3	8.6	13.4	
	Max WP (bar)	6.0	7.5	10.0	12.5	16.0	20.3	4.0	6.0	10.0	16.0	
	Weight/m (kg)	3.0	4.5	5.7	7.1	8.5	10.6	3.0	4.4	6.9	10.4	
200 mm	O.D (mm)	200.0	200.0	200.0	200.0	200.0	200.0	200.0	200.0	200.0	200.0	
	Wall (mm)	4.9	5.9	7.7	9.6	11.9	14.7	4.0	5.9	9.6	14.9	
	Max WP (bar)	6.0	7.5	10.0	12.5	16.0	20.0	4.0	6.0	10.0	16.0	
	Weight/m (kg)	4.6	5.6	7.1	8.8	10.5	13.0	3.7	5.4	8.5	13.2	
225 mm	O.D (mm)	225.0	225.0	225.0	225.0	225.0	225.0	225.0	225.0	225.0	225.0	
	Wall (mm)	5.5	6.6	8.6	10.8	13.4	16.6	4.5	6.6	10.8	16.7	
	Max WP (bar)	6.0	7.5	10.0	12.5	16.0	20.0	4.0	6.0	10.0	16.0	
	Weight/m (kg)	5.8	7.0	8.9	11.1	13.4	16.6	4.7	5.4	10.8	16.1	
250 mm	O.D (mm)	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	
	Wall (mm)	6.2	7.3	9.6	11.9	14.8	18.4	4.9	7.3	11.9	18.0	
	Max WP (bar)	6.0	7.5	10.0	12.5	16.0	20.0	4.0	6.0	10.0	16.0	
	Weight/m (kg)	7.4	8.7	11.0	13.6	16.2	20.1	5.7	8.3	13.2	20.6	
280 mm	O.D (mm)	280.0	280.0	280.0	280.0	280.0	280.0		280.0	280.0	280.0	
	Wall (mm)	6.9	8.2	10.7	13.4	16.6	20.6		8.2	13.4	20.8	
	Max WP (bar)	6.0	7.5	10.0	12.5	16.0	20.0		6.0	10.0	16.0	
	Weight/m (kg)	9.1	10.9	13.8	17.3	20.6	25.6		10.2	16.6	25.8	
315 mm	O.D (mm)	315.0	315.0	315.0	315.0	315.0	315.0	315.0	315.0	315.0	315.0	
	Wall (mm)	7.7	9.2	12.1	15.0	18.7	23.2	23.2	9.2	15.0	23.4	
	Max WP (bar)	6.0	7.5	10.0	12.0	16.0	20.0	20.0	6.0	10.0	16.0	
	Weight/m (kg)	11.5	13.7	17.5	21.7	26.1	32.3	32.3	13.2	20.9	32.6	
400 mm	O.D (mm)	400.0	400.0	400.0	400.0	400.0	400.0		400.0	400.0	400.0	
	Wall (mm)	9.8	11.7	15.3	19.1	23.7	29.4		11.7	19.1	29.7	
	Max WP (bar)	6.0	7.5	10.0	12.5	16.0	20.0		6.0	10.0	16.0	
	Weight/m (kg)	18.6	22.2	27.7	34.5	39.3	48.8		19.6	31.7	49.3	
500 mm	O.D (mm)	500.0	500.0	500.0	500.0	500.0	500.0		500.0	500.0		
	Wall (mm)	12.3	14.6	19.1	23.9	29.7	36.8		14.6	23.9		
	Max WP (bar)	6.0	7.5	10.0	12.5	16.0	20.0		6.0	10.0		
	Weight/m (kg)	29.4	34.9	41.3	51.7	64.3	79.6		31.6	51.7		
630 mm	O.D (mm)	630.0	630.0	630.0	630.0				630.0			
	Wall (mm)	15.4	18.4	24.1	30.0				18.4			
	Max WP (bar)	6.0	7.5	10.0	12.5				6.0			
	Weight/m (kg)	41.0	49.0	64.2	79.9				49.0			