

# about: abs

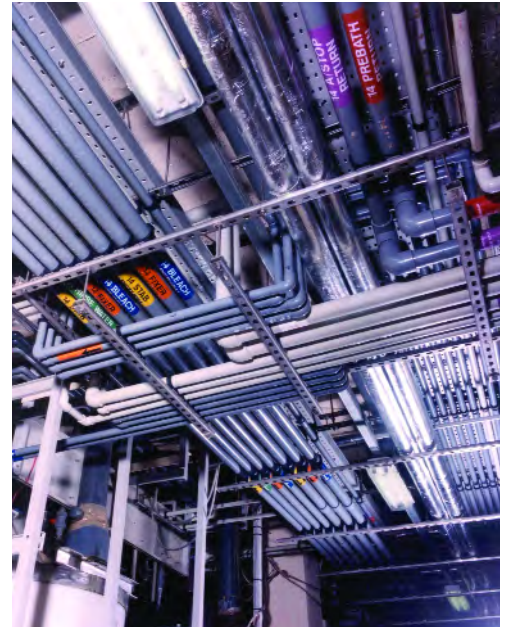
Acrylonitrile Butadiene Styrene (ABS) has been manufactured as a pressure piping system for more than 30 years. It is a widely used versatile material that can also be found in car parts, household goods and DIY tools as well as thermoplastic piping.

ABS is a copolymer of Styrene and Acrylonitrile grafted to Polybutadiene. The chemical resistance of Acrylonitrile, added to the impact strength of Butadiene, combined with the processing properties of Styrene, produce a homogenous material with chemical resistance, ductility and tensile strength.

The Butadiene content of ABS provides exceptional resistance to impact damage at temperatures as low as -40°C and up to 70°C. ABS offers good abrasion resistance to aggressive slurries, and its smooth bore allows high flow velocities whilst inhibiting the formation of scale.

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

ABS piping systems are available from IPS in both inch and metric dimensions, according to BS and ISO standards. Systems are available in inch sizes from 3/8" to 12" and metric sizes from 16mm to 315mm. ABS products are mid grey in colour in accordance with BS5252.



## General properties of abs

With the benefit of low temperature handling characteristics down to -40°C, ABS is used extensively for applications in conditioning and chilled water piping systems. Another key benefit is the high impact strength of the material, making ABS ideal for piping systems in exposed situations where potential damage may occur. ABS does not contain metallic stabilisers making it physiologically harmless and therefore suitable for use with food and water applications.

Some of the important advantages of ABS are:

- Low specific weight 1.04g/cm<sup>3</sup>
- Wide range of applications
- Good chemical and corrosion resistance
- Safe for potable water applications
- High impact strength at low temperatures
- Good abrasion resistance

Properties of ABS (Average values)	
Property	Value
Density	1.03 g/cm <sup>3</sup>
Tensile Strength	> 737 N/mm <sup>2</sup>
Elongation at Break	> 10%
Impact Strength	44 kJ/m <sup>2</sup> (23°C)
Modulus of Elasticity (Young's Modulus)	2100 N/mm <sup>2</sup>
Coefficient of Linear Expansion	0.1mm/m °C
Maximum Operating Temperature	70°C
Minimum Operating Temperature	-40°C
Vicat Softening Point	90°C (VST/B 50)
Water Absorption	< 1%
Surface Resistance	Approx. 10 <sup>13</sup> Ω
Thermal Conductivity	0.170 W/m · K
Flammability	HB UL94
Colour	Mid Grey

## Characteristics

### Chemical resistance

ABS displays good chemical resistance to a wide range of chemicals including salt solutions, and most dilute acids and bases. ABS is not resistant to concentrated mineral acids, organic acids and solvents such as esters, ketones and chlorinated and aromatic hydrocarbons. For detailed guidance on the chemical resistance of ABS, consult the chemical resistance tables or our technical department.

### Weathering resistance

Over time, ABS will suffer some loss of properties when exposed to UV light. The surface of the material will lose shine and experience some colour change. 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 based paint will help to minimise the effects of solar radiation.

### Electrical characteristics

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

### Physiological characteristics

ABS 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.

## Pressure ratings for abs systems

### Maximum continuous pressure ratings

Pipes, fittings and valves are designed to operate continuously for 50 years at their maximum rated pressure at 20°C as follows, unless otherwise stated.

#### Inch sizes

ABS pipes according to BS 5391 and ABS fittings according to BS 5392 use the 'class' system of pressure rating their components. Regardless of size, pipes and fittings are rated for use at a maximum working pressure according to the 'class'. Care must be taken to ensure that the integrity of the system is not compromised through the incorrect match of pipes and fittings from different pressure 'classes'. The pressure ratings of inch sized ABS pipes and fittings according to the pressure 'class' system is as follows:-

Pipe	Class	Size Range	Max. Operating Pressure
	Class B	10" to 12"	6 Bar
	Class C	1" to 8"	9 Bar
	Class D	6"	12 Bar
	Class E	3/8" to 4"	15 Bar
	Class T	3/8" to 2"	12 Bar
	PN10*	2 1/2" and 5"	10 Bar
* 2 1/2" and 5" ABS pipes are manufactured to DIN 8062			
Fittings	Class	Size Range	Max. Operating Pressure
	Class B	10" to 12"	6 Bar
	Class C	8"	9 Bar
	Class D	6"	12 Bar
	Class E	3/8" to 4"	15 Bar (3" & 4" socket unions 9 Bar)
	Threaded	3/8" to 4"	12 Bar (3" & 4" barrel nipples 9 Bar)
	PN10*	2 1/2" and 5"	10 Bar
* 2 1/2" and 5" ABS fittings are manufactured to DIN 8063			

#### Metric sizes

The pressure rating for ABS pipes according to DIN 8062 and ABS fittings according to DIN 8063 is defined by the 'nominal pressure' method, whereby pipes, fittings and valves are grouped together according to a single nominal pressure rating. The PN rating is the maximum permitted operational pressure in bars calculated at 20°C, for example PN6 indicates a maximum working pressure of 6 bars. According to this method the pressure ratings of metric sized ABS pipes and fittings according to the nominal pressure system is as follows:-

		Size Range	Max. Operating Pressure
Pipe	PN10	16mm to 315mm	10 Bar
Fittings	PN10	16mm to 315mm	10 Bar (315mm 8 Bar)



ABS piping systems from IPS are available in both industrial and economy ranges.

The Durapipe industrial system has a proven 30 year track record as an industrial grade system. It is approved under DWI (Drinking Water Inspectorate) Regulation 31 and by WRAS (Water Regulations Advisory Scheme). It is appropriate for all ABS applications.

Economy ABS systems are ideal for applications involving water and/or weak chemicals.