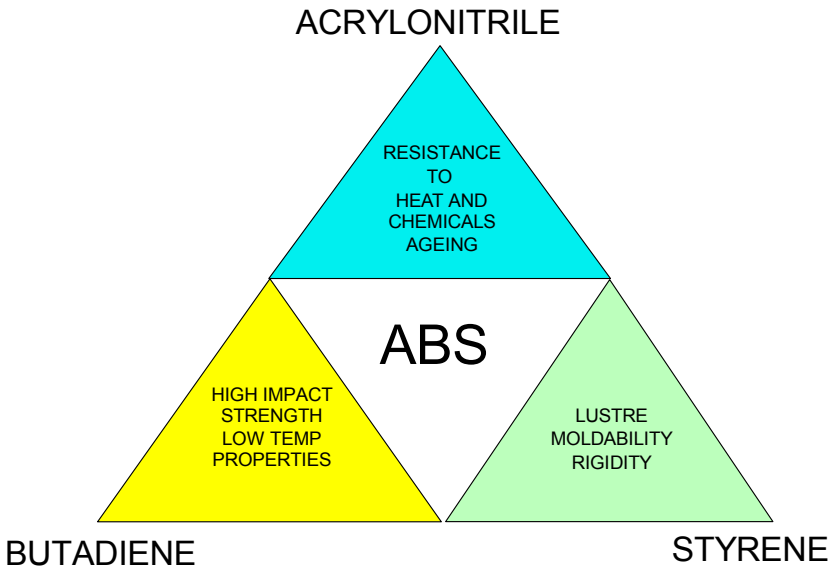
Resin Portrait

ABS

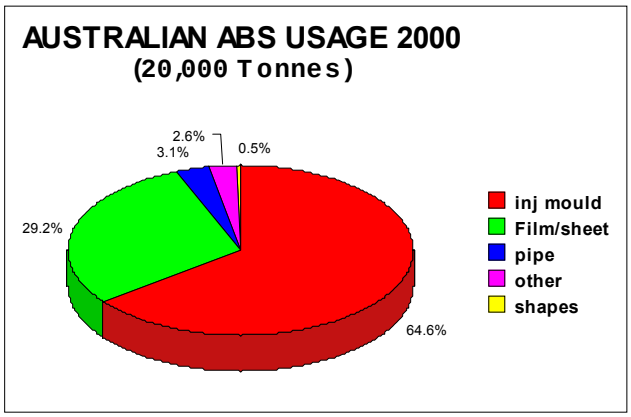
ABS is a three component polymer made from **A**crylonitrile, **Butadiene** and **S**tyrene.

Properties

ABS is a tough, rigid thermoplastic, resistive to stress cracking and creep with a high impact strength which is maintained at low temperatures (-40^{o}C). It is resistive to moisture and chemicals (inorganic salts, alkalies and many acids). It possesses excellent electrical properties, is heat resistant and flame retardant. When exposed to the weather there is a reduction in the surface gloss (a greying in colour).
The three constituent polymers impart specific qualities to this terpolymer which makes ABS a very useful product.



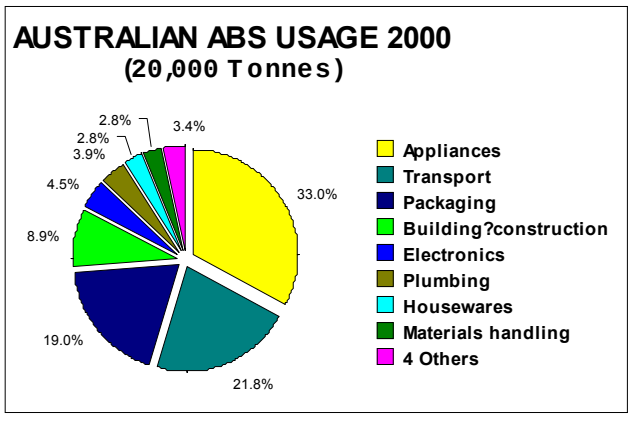
These properties make ABS suitable for injection moulding, extrusion, blow and foam moulding and thermoforming. It can be easily processed through machined, bored turned, milled, sawed, die cut, routed, filed, sanded, ground buffed and polished.
ABS may be pigmented and though they are usually translucent to opaque, they may be produced in transparent grades.



ABS Uses

Its high mechanical strength makes it ideal for use in tough consumer applications Worldwide, the automotive industry is the largest user accounting for 25%-30% of demand. It is also used in the construction industry and for making large recreational products such as boats and mobile homes. Because of its high resistance to abrasion it is a suitable material for pipelines particularly in carrying slurries from mines. In the food industry, it has been demonstrated to outlast steel and stainless steel pipes. Other applications include luggage, office accessories, machine parts and covers.
ABS can be given a metal finish. This is utilised in the chrome like finish of items such as automotive grilles, taps and handles.

A new ABS resin (DOW Plastics Emerge 5100) is excellent for thin walled parts such as smart cards. Because of its high opacity it is well suited for laser marking.



How ABS is Made

The three components of ABS can be used in different amounts to generate ABS with different properties. Usually ABS is made with more than 50% styrene and varying amounts of acrylonitrile and butadiene. The three component polymers are combined

through several methods - emulsion, suspension and the continuous mass polymerisation process. Because the absence of water in the last process, there is less effluent to dispose and is becoming the preferred method. Further, it has lower energy requirements than the others, however the capital costs is higher and is less flexible.

The suspension process involves blending a high rubber content medium (butadiene) with styrene acrylonitrile.

The emulsion process is the oldest method but the least clean process. Batch emulsion methods are used to produce high impact grades. Styrene acrylonitrile (SAN) resins can be produced in most emulsion plants.

Special properties may be achieved through blending ABS with other resins. For example a better balance of heat and impact properties results from compounding with polycarbonate.

Health and safety

ABS contains no heavy metal stabilizers such as lead which is often used in the processing of other thermoplastics, hence it is safe for carrying potable water. For many years has been used to carry distilled water for medical use and renal dialysis fluid. It is considered to be taint free, this makes it very suitable for packaging food and beverages.

Under recommended handling conditions ABS, which is in the form of pellets, is not chemically active. However, during processing small traces of monomers including acrylonitrile and styrene, both suspected of being carcinogens, may be released.

ABS is slow burning, but gives off carbon monoxide, carbon dioxide and nitrous oxides. Inhaled vapour may be harmful. Dust from grinding etc can cause irritation to the skin and eyes and is an explosion hazard.

Producers

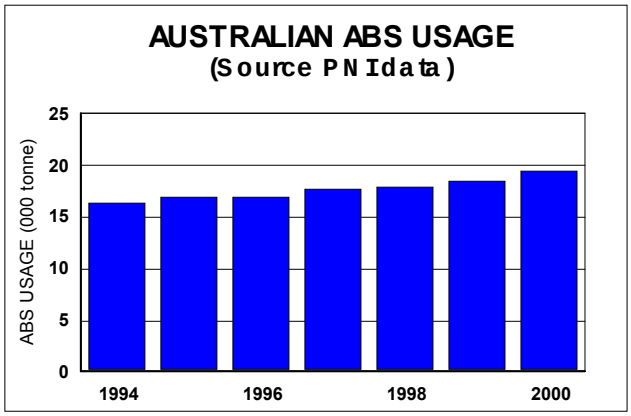
The major ABS producers globally are BASF, Bayer, Dow, GE Plastics, Polidux, and Polimeri Europa. Of these BASF with a plant capacity of 200 thousand tonne/year and Bayer with 70 thousand tonne /year have operations in the Australasian region: BASF at Ulsan, South Korea and Bayer at Mab Ta Phut in Thailand.

Suppliers in Australia include:

AGC Plastics
Amtrade
BASF
Duromer Products
GE Polymerland
General Polymers
Marlex
Martogg
Orica Australia
Polymers International Australia
Primplas
Swift and Company
Toyota Tsusho (Australia)

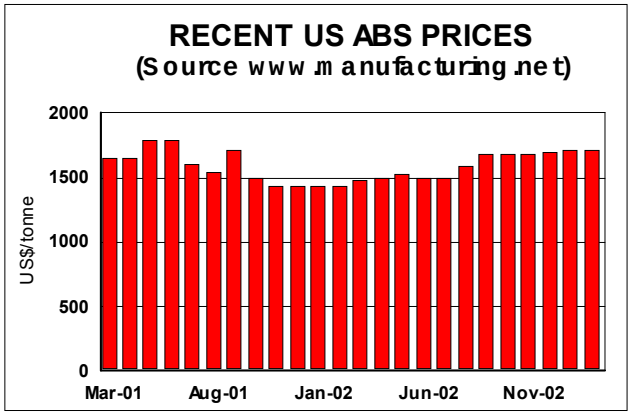
Usage 1994 –2000 (thousand tonnes)

Australian usage has shown steady growth over the past decade with an annual growth of over 3% per year.



ABS Prices

US prices have fluctuated in the range $US 1433/t to 1720/t during 2001. Current prices are at the top of the range at about the US$1720/t mark. Industry forecasts to 2005 suggest a small increase up to$US1741/t may occur. In Europe prices reached a peak of ca. 1700 euro /tonne in mid 2001 before dropping to ca. 1200 euro/t in early 2002.



Further Information
ECN News "Product Profile" 15th April 2002
www.maunfacturing.net
www.cityplastics.com.au (ABS Technical Data and Information Sheet)
Europipe "ABS Material"