

## ABS plastic properties



**Acrylonitrile Butadiene Styrene, or ABS** plastic, is an opaque thermoplastic. It is an amorphous polymer comprised of three monomers, acrylonitrile, butadiene and styrene. ABS is most commonly polymerised through the emulsification process or the expert art of combining multiple products that don't typically combine into a single product.

When the three monomers are combined, the acrylonitrile develops a polar attraction with the other two components, resulting in a tough and highly durable finished product. The different amounts so f each monomer can be added to the process to further vary the finished product.

The versatility of ABS plastic **properties** contributes largely to its popularity across several industry sectors. From computer keyboard keys to LEGO, products made from ABS can be found all around the world in multiple domestic, commercial and specialist settings.

## ABS material Properties

The acrylonitrile in ABS plastic provides chemical and thermal stability, while the butadiene adds toughness and **strength**. The styrene gives the finished polymer a nice, glossy finish.

ABS has a low melting point, which enables its easy use in the **injection moulding process** and 3D printing. It also has high tensile strength and is very resistant to physical

impacts and chemical corrosion, which allow the finished **plastic** to withstand heavy use and adverse environmental conditions.

ABS can be easily moulded, sanded and shaped, while its glossy surface finish is highly compatible with a wider range of paints and glues. **ABS plastics** takes colour easily, allowing finished products to be dyed in exact shades to meet precise project specifications.

## ABS applications



**Lego Colour Bricks are made from ABS** By Alan Chia – Lego Color Bricks, CC BY-SA 2.0,

As well as its uses in computer keyboard components and LEGO bricks, ABS is commonly used to make plastic face guards for wall sockets and protective housing for power tools. It is commonly used in the automotive field too, for items such as plastic alloys and decorative interior car parts. In the construction industry, ABS comes into its own in the manufacture of plastic tubing and corrugated plastic structures. It can be cut to size and comes in a wide range of colours and finishes. It also comes in handy in the manufacture of protective headgear such as hard hats and helmets. Other common uses for the ABS thermoplastic polymer include printers, vacuum cleaners, kitchen utensils, faxes, musical instruments (recorders and plastic clarinets, to name just two) and plastic toys.

Plastic items designed to live outside are often made from ABS as well since the versatile thermoplastic can stand up well to rain, storms and winds. However, to prolong its life outdoors, it must be adequately protected from UV rays and exposure to more extreme weather conditions. Its relatively cheap production costs also enable it to be used cost-effectively for producing prototypes and plastic preview models.



More recently, ABS has been playing a key role in the rise and rise of **3D printing**. ABS parts are readily available and can be easily moulded to create a desired form and effect. ABS can also be electroplated to enable even more options for its use. 3D printers are fast

becoming a commonplace sight across manufacturers, educational institutes and even home-based printing businesses and other entrepreneurial initiatives.

## Advantages

There are many ABS plastic advantages, from the reasonable production costs to its sturdy, aesthetically pleasing structure. Its ability to withstand being heated and cooled multiple times make it highly suitable for recycling. ABS is versatile in the range of colour and surface texture options that can be achieved and it can be manufactured to a very high-quality finish. It is lightweight and suitable for a vast range of applications. Finally, ABS has low heat and electricity conductivity that is especially helpful for products requiring electrical insulation protection. It also offers excellent impact resistance and can absorb shock effectively and reliably.

## Disadvantages

To counterbalance these advantages, some ABS plastic disadvantages do exist. Its low melting point renders it inappropriate for high-temperature applications and medical implants. It has poor solvent and fatigue resistance too and doesn't stand up so well to UV exposure and weathering unless it is properly protected. Its low conductivity means that it cannot always be used in situations where this would prove a hindrance to the overall design. When burned, the ABS material gives off a high smoke generation, which could cause concerns around air pollution. While disadvantages like these do exist, if ABS is used in applications where it is not vulnerable to the limitations listed above, it can prove a cost-effective, attractive and top-performing thermoplastic with a wide variety of benefits and uses.



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