

One of our core competencies is the design and manufacture of non-metallic electric enclosures. Various insulation materials are used in our production process:

The two main families of materials can be separated into:

- Plastics - Injection Moulded
- Glass Reinforced Polyester (GRP) - Compression Moulded

Plastics

18 Injection moulding machines up to 400T.

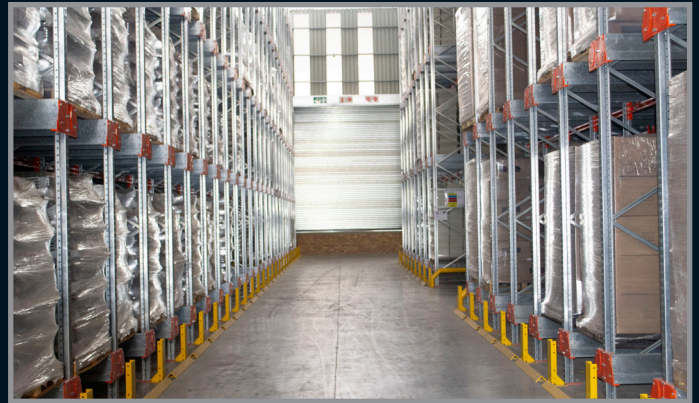


GRP - Compression moulding 120 machines up to 800T.





* Assembly



* Bulk Storage warehouse

Enclosures

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Glass Reinforced Polyester (GRP)

Modern industries demand structural materials that are lightweight, strong and versatile. Materials that resist corrosion and temperature extremes and which deliver freedom of design and low system costs. The ideal solution is a family of structural, fibre reinforced thermosets: SMC (Sheet Moulding Compound) and DMC (Dough Moulding Compound). These materials combine mechanical and physical properties with the lowest system cost, without compromising quality.

Exceptional electrical and UV properties make GRP the material of choice for outdoor electrical enclosures.

Allbro compounds its own SMC and DMC. Numerous formulations have been engineered to address different technical application challenges. Since DMC and SMC are composite materials, we are able to dramatically change aspects like strength, conductivity, surface finish, colour, chemical compatibility etc..

Dough Moulding Compound (DMC) (Also known as BMC)



Sheet Moulding Compound (SMC)



DMC compared to SMC

DMC



Fibre lengths 6, 12, 18 mm

SMC



Fibre lengths 25-50mm

* See Material Properties on Page 14 for detailed information

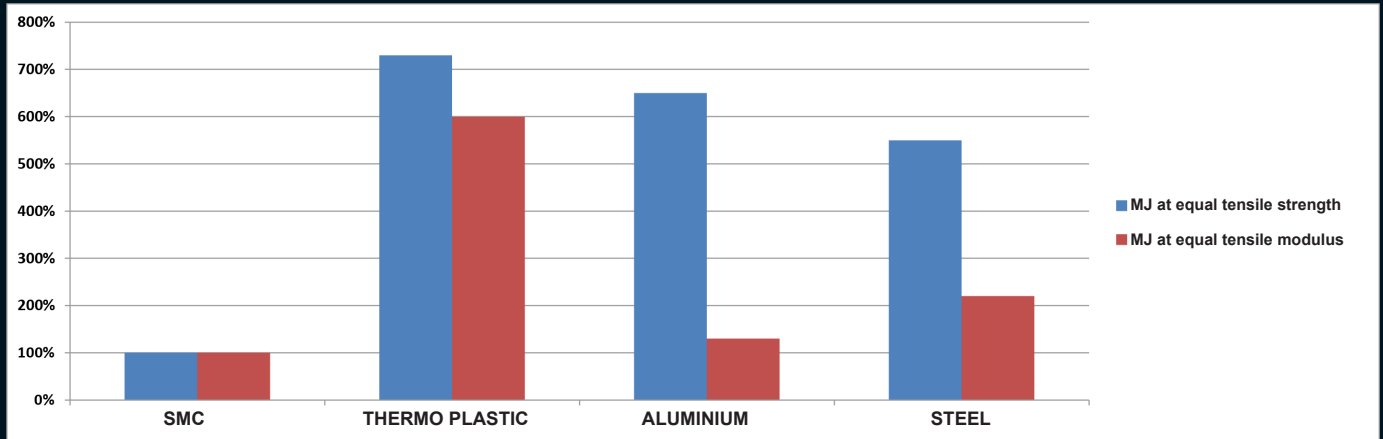
Enclosures

“GRP is Green”

Hinges

Energy use is an important element in the total environmental impact of a product. Producing materials from base materials requires energy in each step of the process. A way to compare the energy use for the production of a part is to calculate back to equal properties. In the graph below the relative use for producing a part with equal tensile strength and equal tensile stiffness is represented:

Locks



Handles

Accessories

“ a part produced in SMC requires 5-7 times less energy to be produced than producing the same part in steel, aluminium or thermoplastic materials at equal strength”

Rotary Operating Handles



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* SMC manufacturing line



* DMC manufacturing line



* DMC mixing Z blades

SMC and DMC manufacturing process

SMC is made as a continuous sheet. The resin paste is transferred to a doctor box where it is deposited onto a moving carrier film passing directly beneath. The doctor box controls the amount of the resin paste applied. Simultaneously, glass fibre rovings are fed into a rotary cutter above the resin-covered carrier film. Fibres are chopped to length (generally 25mm or 50mm) and randomly deposited onto the resin paste. The amount of glass is controlled by the cutter and by the speed of the carrier film. Downstream from the chopping operation, a second carrier film is coated with resin paste and is laid, resin side down, on top of the chopped fibres. This stage of the process creates a resin paste and glass fibre 'sandwich' which is then sent through a series of compaction rollers where the glass fibres are consolidated with the resin paste and air is squeezed out of the sheet.

Sheet dimensions are normally 2-4 mm thick and 1.1 mm wide. The length and weight of the SMC sheet is determined by moulder preference for handling and is usually stored on a 350kg (standard) up to 1500kg rolls or bi-folded (like computer paper) into large bins. Modern SMC production is a highly automated and computer regulated process. Before the SMC can be used for moulding it must mature. This maturation time is necessary to allow the relatively low-viscosity resin to chemically thicken. The SMC will be kept in a maturation room at a controlled temperature (normally 48 hours at 30°C) and typically requires two to five days to reach the desired moulding viscosity. Usually SMC has a shelf life ranging from several weeks to several months from the date of manufacture. The time frame can be extended or reduced depending on the SMC formulation and storage conditions.

Like SMC, DMC is a fibre reinforced composite material which primarily consists of an amalgam of thermosetting resin, chopped glass fibre reinforcement and filler in the form of a bulk material. Additional ingredients such as low profile additives, cure initiators, thickeners and mould release agent are added to enhance processing performance. DMC is less loaded with glass fibres than SMC and fibre length is shorter at 6 to 12mm. Filler loadings are higher than for SMC. There are several techniques for the batch production of DMC. The most common mixing process involves a Z-blade mixers which amalgamates the resin paste, fillers, additives and reinforcements into a mass material with a dough-like consistency. The bulk product is packed in plastic bags impermeable to styrene diffusion and supplied in bins. Like with SMC, it can be supplied in pre-weighed charges according to customer needs.

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