

# SV11-R1M

Styrene Free Vinyl Ester Resin Base Carbon Fiber Sheet Molding Compound  
(CF SMC)



## Product benefits

- High Stiffness
- Light weight
- Formability
- Dimensional Stability
- Chemical resistance

| MATERIAL                                   | Test Standard | English       |                    | Metric        |                   |
|--------------------------------------------|---------------|---------------|--------------------|---------------|-------------------|
|                                            |               | Typical Value | Unit               | Typical Value | Unit              |
| Nominal Fiber Length                       | MCG method    | 1.0           | inch               | 25.4          | mm                |
| Nominal Fiber Content by weight            | MCG method    | 53            | %                  | 53            | %                 |
| Nominal Sheet Weight                       | MCG method    | 5.71          | lb/yd <sup>2</sup> | 3100          | gsm               |
| <b>MECHANICAL</b>                          |               |               |                    |               |                   |
| Density                                    | ASTM D792     | 91.3          | lb/ft <sup>3</sup> | 1.46          | g/cm <sup>3</sup> |
| Tensile Strength                           | ISO527-4      | 22,000        | psi                | 152           | MPa               |
| Tensile Modulus of Elasticity              | ISO527-4      | 4,350         | ksi                | 30            | GPa               |
| Flexural Strength                          | ISO 14125     | 54,300        | psi                | 320           | MPa               |
| Flexural Modulus of Elasticity             | ISO 14125     | 3,620         | ksi                | 25            | GPa               |
| Compressive Strength                       | ASTM D6484    | 32,632        | psi                | 225           | MPa               |
| Compressive Modulus of Elasticity          | ASTM D6484    | 4,152         | ksi                | 29            | GPa               |
| Notched Izod Impact                        | ASTM D256     | 13.7          | ft-lb/in           | 730           | J/m               |
| Unnotched Izod Impact                      | ASTM D4812    | 25.1          | ft-lb/in           | 1341          | J/m               |
| <b>THERMAL</b>                             |               |               |                    |               |                   |
| Glass Transition (Tg)                      | ASTM D4065    | 291           | °F                 | 144           | °C                |
| Deflection Temperature at 1.8 MPa (264psi) | ASTM D648     | 536           | °F                 | 280           | °C                |
| <b>DIMENSIONAL</b>                         |               |               |                    |               |                   |
| Molding Shrinkage                          | MCG method    | -0.050        | %                  | -0.050        | %                 |
| <b>TYPICAL SHELF LIFE</b>                  |               |               |                    |               |                   |
| At 73°F (23°C)                             | MCG method    | 60            | days               | 60            | days              |
| < 0°F (-18°C)                              | MCG method    | 365           | days               | 365           | days              |

## STORAGE PROCEDURE

- 1) Store cool place if it is used within the shelf life and avoid being exposed to sunlight.
- 2) Store the material in the refrigerator or freezer unless it is used within the shelf life.
- 3) The material should be stored in the original plastic bag. Close the bag tightly by zip tie.

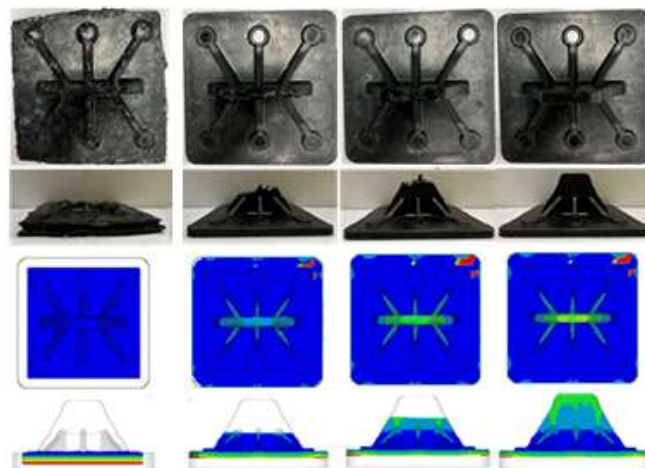
FMC is lightweight carbon fiber composites material which has excellent formability, dimensional stability with excellent mechanical performance. Typically, FMC parts can be around 60% lighter than steel or 40% lighter than aluminium with equivalent stiffness. FMC has comparable specific strength, and higher specific modulus than common lightweight metals.

FMC has good environmental and thermal resistance, so parts can be used in severe atmosphere. If the part is exposed to direct sunlight regularly, some UV light protection is recommended to prevent discoloration.

FMC is a snap cure material. The material cures in short cure time, which is suitable for high volume applications.

FMC has isotropic fiber orientation. There is no need to make time-consuming net shape preform before molding the part. Material flows well in the mold cavity and can make complex geometry.

Parts design suitable for composites is completely different from metal parts design. Simple material substitution of metal parts design may not work. Material flow during compression molding may make fiber orientation, which can have influence on parts property. Appropriate parts design and molding process optimization is recommended. Mitsubishi Chemical Group has advanced simulation technology to use FMC material and can support engineering works necessary for FMC parts development.



Example of flow simulation

## Processing Guidelines

|                        |                                                           |
|------------------------|-----------------------------------------------------------|
| Molding pressure;      | 750 – 1450 psi (5 – 10 MPa)                               |
| Mold Temperature;      | 275 – 300 °F (135 – 150 °C)                               |
| Cure time;             | 1 minutes for 0.04" (1.0 mm) thick part @ 285 °F (140 °C) |
| Minimum part thickness | 0.06" (1.5 mm) is recommended.                            |

Metal Mold with tight shear edge and appropriate ejector system is recommended. The minimum draft angle is 0.5 degree, and larger angle is better to easier ejection.

Large mold coverage (such as 75% or larger) is recommended.

Vacuum assist molding is recommended.

Processing guideline shown above is typical value. It is recommended to determine the optimum molding condition by the molding test in advance.

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1 Does not represent actual testing conducted by MCG but is an estimated rating based on available data.