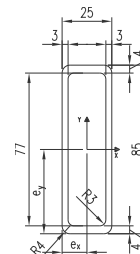


**26\_53R85253I**  
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Rev. 4

## PULTRUDED PROFILES

**Profile type "R" (53R85253I)**

|                                  |               |               |                                            |                |                 |         |
|----------------------------------|---------------|---------------|--------------------------------------------|----------------|-----------------|---------|
| Height                           | mm            | 85            | Area                                       | A              | mm <sup>2</sup> | 656     |
| Width                            | mm            | 25            | Weight                                     | P              | Kg/m            | 1,1     |
| Thickness 1                      | mm            | 4             | Moment of inerzia with respect to x - axis | J <sub>x</sub> | mm <sup>4</sup> | 543.858 |
| Thickness 2                      | mm            | 3             | Moment of inerzia with respect to y - axis | J <sub>y</sub> | mm <sup>4</sup> | 65.412  |
| Radius 1                         | mm            | 3             | Section Modulus with respect to x - axis   | W <sub>x</sub> | mm <sup>3</sup> | 12.797  |
| Radius 2                         | mm            | 4             | Section Modulus with respect to y - axis   | W <sub>y</sub> | mm <sup>3</sup> | 5.233   |
| Standard Color (RAL approximate) | Gray RAL 7035 |               | Centroid in x direction                    | e <sub>x</sub> | mm              | 12,5    |
| Standard Length                  | mm            | 6000 (±10 mm) | Centroid in y direction                    | e <sub>y</sub> | mm              | 42,5    |



|                                                                          |                                                                              |
|--------------------------------------------------------------------------|------------------------------------------------------------------------------|
| Raw materials                                                            | Isophthalic polyester resin                                                  |
|                                                                          | Roving glass fiber type “E” – Continuous strand mat – Polyester surface veil |
| For other colors, resins or reinforcements, contact M.M. S.r.l. directly |                                                                              |

|                   |                                                                                                                                                                                                                                                                                                                                              |  |
|-------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| Ageing resistance | Ageing test made with UV lamp according to ASTM G154-06 and passed with 5 points on the gray range and without evident defects (test made with 1500 hours of exposure to 4 hours alternate cycles at a UV temperature of 60°C and 4 hours at a condensed temperature of 50°C irradiated by UVB 313 nm lamp, radiance 0,71 W/m <sup>2</sup> ) |  |
|                   | After the exposure to heat, cold and humidity cycles according to UNI EN ISO 9142/04 norm (n° 21 cycles type D3) there are no evidence of defects                                                                                                                                                                                            |  |

| Mechanical properties                    |                  | Unit | Average value | Test method    | Mechanical properties                    |                 | Unit | Average value | Test method |
|------------------------------------------|------------------|------|---------------|----------------|------------------------------------------|-----------------|------|---------------|-------------|
| Bending effective elastic modulus        | E <sub>eff</sub> | GPa  | 22 ÷ 30       | UNI EN 13706-2 | Longitudinal pin bearing strength        | f <sub>Lr</sub> | MPa  | 100 ÷ 200     | ASTM D953   |
| Shear effective elastic modulus          | G <sub>eff</sub> | GPa  | 1,2 ÷ 3,8     | UNI EN 13706-2 | Transversal pin bearing strength         | f <sub>Tr</sub> | MPa  | 30 ÷ 70       | ASTM D953   |
| Longitudinal tensile strength            | f <sub>Lt</sub>  | MPa  | 300 ÷ 500     | ASTM D638      | Longitudinal tensile elastic modulus     | E <sub>Lt</sub> | GPa  | 22 ÷ 30       | ASTM D638   |
| Transversal tensile strength             | f <sub>Tt</sub>  | MPa  | 20 ÷ 40       | ASTM D638      | Transversal tensile elastic modulus      | E <sub>Tt</sub> | GPa  | 5 ÷ 10        | ASTM D638   |
| Longitudinal compressive strength        | f <sub>Lc</sub>  | MPa  | 180 ÷ 300     | ASTM D695      | Longitudinal compressive elastic modulus | E <sub>Lc</sub> | GPa  | 16 ÷ 21       | ASTM D695   |
| Transversal compressive strength         | f <sub>Tc</sub>  | MPa  | 40 ÷ 100      | ASTM D695      | Transversal compressive elastic modulus  | E <sub>Tc</sub> | GPa  | 5 ÷ 9         | ASTM D695   |
| Longitudinal bending strength            | f <sub>Lf</sub>  | MPa  | 300 ÷ 500     | ASTM D790      | Longitudinal Poisson ratio               | v <sub>LT</sub> | -    | 0,28          | ASTM D638   |
| Transversal bending strength             | f <sub>Tf</sub>  | MPa  | 40 ÷ 100      | ASTM D790      | Transversal Poisson ratio                | v <sub>TL</sub> | -    | 0,12          | ASTM D638   |
| Longitudinal interlaminar shear strength | f <sub>LV</sub>  | MPa  | 20 ÷ 36       | ASTM D2344     |                                          |                 |      |               |             |

The values are referred to tests made on different thickness and resin types – given values are reliable but we refuse any responsibility of their use.  
For further information and support to the use of values for design please contact M.M. S.r.l. offices.

| Physical properties                  |                | Unit              | Average value           | Test method           | Physical properties                 |  | Unit              | Average value                      | Test method           |
|--------------------------------------|----------------|-------------------|-------------------------|-----------------------|-------------------------------------|--|-------------------|------------------------------------|-----------------------|
| Specific weight                      |                | g/cm <sup>3</sup> | 1,75÷1,9                | ASTM D792             | Surface Resistivity                 |  | Ω                 | 10 <sup>9</sup> ÷ 10 <sup>12</sup> | EN 61340              |
| Fiberglass weight ratio              |                | %                 | 60                      | ASTM D2584            | Dielectric resistance               |  | kV/mm             | 3 ÷ 7                              | ASTM D149             |
| Fiberglass volume ratio              |                | %                 | 42,5                    | ASTM D2584            | Thermal conductivity                |  | W/mk              | 0,35                               | EN 12667<br>EN 12664  |
| Glass transition temperature         | T <sub>g</sub> | °C                | 100                     | ISO 11357             | Water absorption (H <sub>2</sub> O) |  | %                 | 0,40                               | ISO 1172              |
| Linear thermal expansion coefficient |                | K <sup>-1</sup>   | 8 ÷ 11x10 <sup>-6</sup> | ISO 11359-2           | Barcol hardness                     |  |                   | 50                                 | ASTM 2583             |
| Elongation to break                  |                | %                 | 1,5                     | ASTM D638<br>UNI 5819 | Impact strength (Charpy)            |  | kJ/m <sup>2</sup> | 230                                | ASTM D256<br>UNI 6062 |

### Advices for design

1. For a correct design of FRP structures, we recommend to pay particular attention to the local and global buckling of the profiles. Contact M.M.'s technical department for further assistance.

2. Avoid to apply tensile/compressive concentrated loads on the flanges of the profiles as illustrated in the below drawings.

