

carbon fibres type HM

Carbon fibres type HM (high modulus) are carbon fibres with a value of Young's modulus (tensile modulus) larger than 300 GPa (nearly 30% of the C_{11} elastic constant of a graphite single crystal).

Note:

The level of the tensile modulus of carbon fibres is controlled by the degree of preferred orientation of the layer planes in the direction parallel to the fibre axis. C_{11} , the elastic constant of graphite single crystals in the direction of the layer planes, is 1060 ± 20 GPa. In general, the ratio of tensile strength to tensile modulus is smaller than 1×10^{-2} for carbon fibres type HM (but the tensile strength is influenced by flaws in the fibres and may be improved in the future). Carbon fibres type UHM (ultra-high modulus) have moduli of elasticity in excess of 600 GPa, surpassing 50% of the theoretical C_{11} number. Such high values of Young's modulus can be achieved most readily in mesophase pitch-based carbon fibres (MPP-based carbon fibres).

Source:

PAC, 1995, 67, 473 (*Recommended terminology for the description of carbon as a solid (IUPAC Recommendations 1995)*) on page 481