

Summary of Test Data

Material: Clock Spring Contour
Resin: CS600A/B
Fabric: Two layer, 0/90 glass fibre fabric

CLOCK SPRING CONTOUR ISO TS 24817 QUALIFICATION DATA		
QUALIFICATION REQUIREMENT	RESULT	RESULT
Ply or layer thickness	2.1mm	0.0827 inch
Tensile modulus (axial)	9.1 GPa	1.32 x 10 ⁶ psi
Tensile modulus (circumferential)	14.4 GPa	2.09 x 10 ⁶ psi
Tensile Strain to failure (axial)	2.7 %	2.7 %
Tensile Strain to failure (circumferential)	1.8 %	1.8 %
Tensile Strength (axial)	138 MPa	20.1 ksi
Tensile Strength (circumferential)	153 MPa	22.3 ksi
Thermal expansion coefficient (axial)	25.6 x 10 ⁻⁶ °C ⁻¹	13.9 x 10 ⁻⁶ F ⁻¹
Thermal expansion coefficient (circumferential)	20.0 x 10 ⁻⁶ °C ⁻¹	11.0 x 10 ⁻⁶ F ⁻¹
Poisson's ratio (axial)	0.07	0.07
Poisson's ratio (circumferential)	0.11	0.11
Shear Modulus (resin)	1.1 GPa	0.159 x 10 ⁶ psi
Barcol/Shore Hardness	82.5 shore D	82.5 shore D
Glass Transition	99°C	210°F
Lap Shear Strength to Steel	10.0 MPa	1450 psi
Aged Lap Shear Strength (1000 hours in 93 °C water)	9.3 MPa	1349 psi
Fracture Toughness, γ_{LCL}	149 Jm ⁻²	0.851in lbf/in ²

Note: material directional properties referrer to pipe axes

Summary of Test Data

Material: Clock Spring Contour
Resin: CS600A/B
Fabric: Four layer, stitched glass fibre fabric

CLOCK SPRING CONTOUR ISO TS 24817 QUALIFICATION DATA		
QUALIFICATION REQUIREMENT	RESULT	RESULT
Ply or layer thickness	2.1mm	0.0827 inch
Tensile modulus (circumferential)	11.0 GPa	1.60 x 10 ⁶ psi
Tensile modulus (axial)	10.8 GPa	1.57 x 10 ⁶ psi
Tensile Strain to failure (circumferential)	1.8 %	1.8%
Tensile Strain to failure (axial)	1.9 %	1.9%
Tensile Strength (circumferential)	147 MPa	21.3 ksi
Tensile Strength (axial)	149 MPa	21.6 ksi
Thermal expansion coefficient (circumferential)	15.7 x 10 ⁻⁶ °C ⁻¹	8.7 x 10 ⁻⁶ F ⁻¹
Thermal expansion coefficient (axial)	15.7 x 10 ⁻⁶ °C ⁻¹	8.7 x 10 ⁻⁶ F ⁻¹
Poisson's ratio (circumferential)	0.29	0.29
Poisson's ratio (axial)	0.30	0.30
Shear Modulus (resin)	1.1 GPa	0.159 x 10 ⁶ psi
Barcol/Shore Hardness	82.5 shore D	82.5 shore D
Glass Transition	99°C	210°F
Lap Shear Strength to Steel	10.0 MPa	1450 psi
Aged Lap Shear Strength (1000 hours in 93 °C water)	9.3 MPa	1349 psi
Fracture Toughness, γ_{LCL}	149 Jm ⁻²	0.851in lbf/in ²