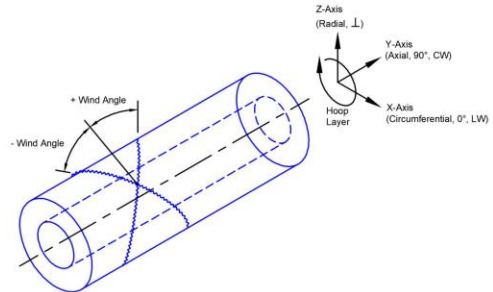


# FW251

## TECHNICAL DATA BULLETIN

**DESCRIPTION:** FW251 is a filament wound tube with an epoxy resin system on a glass filament. Helical wind angles of 15° - 75° are possible and circumferential (hoop) layers can be placed at various points in the tube's construction. FW251 is designed to have excellent strength at elevated temperatures and formulated to facilitate the production of tubes for use in downhole applications.



**TUBE TESTED:** ID = 1.00", OD = 2.50" and ID = 1.50", OD = 3.25"

### TYPICAL PROPERTIES

Property	Test Method	Conditioning**	Unit	Typical Value	
				1.00" x 2.50"	1.50" x 3.25"
Density	ASTM D792	A	g/cm <sup>3</sup>	2.0	2.0
Axial Tensile Strength	ASTM D3039	A	psi	9,000	9,100
		E-1/300 T300	psi	7,000	7,100
Axial Tensile Modulus	ASTM D3039	A	Msi	2.2	2.1
		E-1/300 T300	Msi	1.7	0.6
Axial Compressive Strength	ASTM D695	A	psi	29,200	29,800
		E-1/300 T300	psi	18,600	18,200
Axial Compressive Modulus	ASTM D695	A	Msi	0.6	0.6
		E-1/300 T300	Msi	0.4	0.4

Property	Test Method	Conditioning**	Unit	Typical Value	
				1.00" x 2.50"	1.50" x 3.25"
Radial Compressive Strength	ASTM D695	A	psi	82,400	102,700
		E-1/300 T300	psi	65,200	61,700
Radial Compressive Modulus	ASTM D695	A	Msi	0.6	0.7
		E-1/300 T300	Msi	0.5	0.5
Flexural Strength	ASTM D790	A	psi	23,700	20,900
		E-1/300 T300	psi	16,700	15,200
Flexural Modulus	ASTM D790	A	Msi	2.2	2.1
		E-1/300 T300	Msi	1.8	1.8
Short Beam Shear Strength	ASTM D2344	A	psi	4,500	3,500
		E-1/300 T300	psi	3,800	3,000
Combined Loading Compression (CLC)	ASTM D6641	A	psi	24,800	23,600
		E-1/300 T300	psi	21,400	19,600
Glass Transition Temperature (T <sub>g</sub> ) via DMA onset ***	ASTM E1640	A	°F	400	
Glass Decomposition Temperature (T <sub>d</sub> ) via TGA ****	ASTM E1131-08	2% weight loss	°F	485	
Glass Decomposition Temperature (T <sub>d</sub> ) via TGA ****	ASTM E1131-08	5% weight loss	°F	580	

\*\* Coupons related to elevated temperature testing were conditioned in an oven for one hour at 300°F temperature, (e.g. E-1/300) followed by testing at the same temperature, 300°F, (e.g. T300).

\*\*\* Glass transition temperature (T<sub>g</sub>): The temperature at which the material begins to exhibit viscoelastic behavior. Below the T<sub>g</sub>, the material will generally exhibit elastic behavior. T<sub>g</sub> is not a maximum use temperature, as the maximum use temperature will depend on many application specific factors as well as the T<sub>g</sub>. Consult with an applications engineer for assistance.

\*\*\*\* Decomposition Temperature (T<sub>d</sub>): The temperature at which the polymer resin matrix begins to breakdown and is irreversibly degraded. T<sub>d</sub> values reported here are based on a limited number of samples via TGA at the 5% weight loss point. Operation for extended periods of time at or above the T<sub>d</sub> is not recommended. Consult with an applications engineer for assistance.

This data, while believed to be accurate and based on reliable analytical methods, is for informational purposes only. The terms and conditions of the agreement under which it is sold will govern any sales of this product. Data supplied above are "typical values"; not to be considered "specification values".

To assure the material's performance is adequate for a specific application; customers should verify, independent of Norplex-Micarta, performance characteristics of interest.

It is the responsibility of the users of this information to make sure that they have the latest version of this TDB, and are urged to check with Customer Service or, preferably our web site, [www.norplex-micarta.com](http://www.norplex-micarta.com), to determine if information is most current available.

Specification writers: Contact Norplex-Micarta for specification values before submission.