

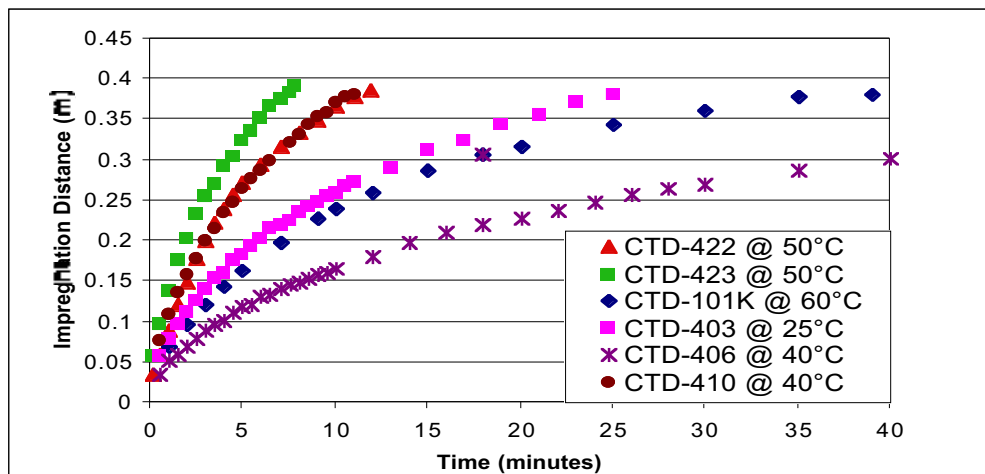
## **CTD-400 Series Cyanate Ester Resins for RTM** **High Performance, Easy Processing**

- Excellent performance from cryogenic to elevated temperatures
- Low temperature processing
- Low dielectric loss characteristics
- Good fracture toughness
- Excellent resistance to various harsh environments including high levels of radiation
- Low outgassing

### **Resin Characteristics**

Resin System	Processing Temperature	Viscosity at Processing Temperature	Pot-Life at Processing Temperature	Cure Schedule	Glass Transition Temperature T <sub>g</sub>
CTD-403	77°F (25°C)	90 - 100 cP	>10 hrs.	24 hrs. at 125°C	318°F (159°C)
CTD-406	104°F (40°C)	150 - 200 cP	8 hrs.	1 hr. at 150°C + 3 hrs. at 200°C	448°F (231°C)
CTD-410	104°F (40°C)	100 - 150 cP	8 hrs.	3 hrs. at 170°C + 12 hrs. at 210°C	460°F (238°C)
CTD-421 (1X)	70°F (20°C) 122°F (50°C)	400 cP 89 cP	7.3 hrs.	4 hrs. at 177°C	NA
CTD-422 (1Xb)	70°F (20°C) 122°F (50°C)	530 cP 56 cP	24 hrs.	4 hrs. at 90°C + 4 hrs. at 177°C	387°F (197°C)
CTD-423 (2x)	70°F (20°C) 122°F (50°C)	740 cP 133 cP	9 hrs.	2 hrs. at 177°C	415°F (213°C)

#### **Results of one-dimensional flow tests using 50 v/o S-2 glass fabric**



**COMPOSITE TECHNOLOGY DEVELOPMENT, INC.**

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## Mechanical Performance

### Summary of Compression Test Results at 76 and 4 K

Resin System	76 K Compressive Strength (GPa)	76 K Compressive Modulus (GPa)	4 K Compressive Strength (GPa)	4 K Compressive Modulus (GPa)	76 K Dielectric Strength (kv/mm)
CTD-403	1.15	17.9	1.50	22.4	65.4 *
CTD-406	1.00	15.0	1.42	21.1	69.4 *
CTD-410	1.20	15.0	1.39	19.8	71.5 *
CTD-422	1.33	17.9	1.28	22.4	87.4 **
CTD-423	1.21	14.0	NA	NA	92.1**

\* Nominal Specimen Thickness 0.9 mm; \*\* Nominal Specimen Thickness 0.5 mm

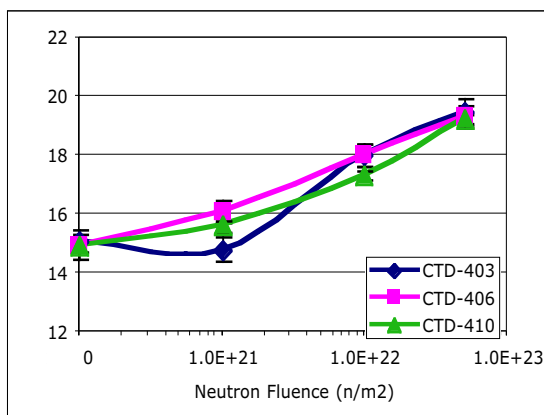
### Summary of Shear Test Results at 76 and 4 K

Resin System	76 K Shear Strength (MPa)	76 K Flexural Modulus (GPa)	4 K Shear Strength (MPa)	4 K Flexural Modulus (GPa)
CTD-403	100.0	NA	109	NA
CTD-406	77.0	NA	107	NA
CTD-410	83.0	NA	90	NA
CTD-422	81.2	22.8	87.0	24.4
CTD-423	77.0	19.6	NA	NA

## Performance after Radiation Exposure

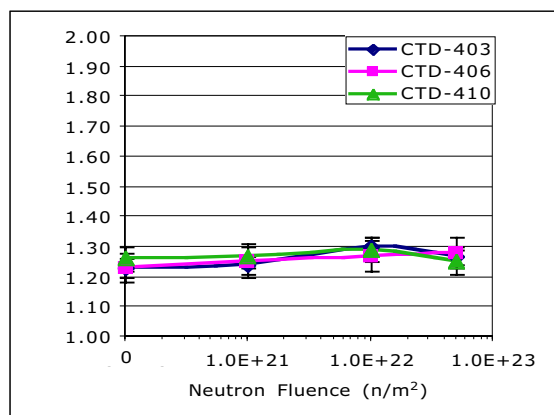
### Compressive Modulus (GPa)

Maximum Dose  $5.0 \times 10^{22} \text{ n/m}^2 \approx 6.4 \times 10^{10} \text{ Rads}$



### Compressive Strength (GPa)

Maximum Dose  $5.0 \times 10^{22} \text{ n/m}^2 \approx 6.4 \times 10^{10} \text{ Rads}$



Disclaimer: The information and recommendations contained herein are based upon data believed to be accurate. No guarantee or warranty of any kind, expressed or implied, is made with respect to the information contained herein.

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