

CLEARSTRENGTH® XT 151

High Performance Toughening Agent Tailored for **Epoxy Thermosetting Resins**

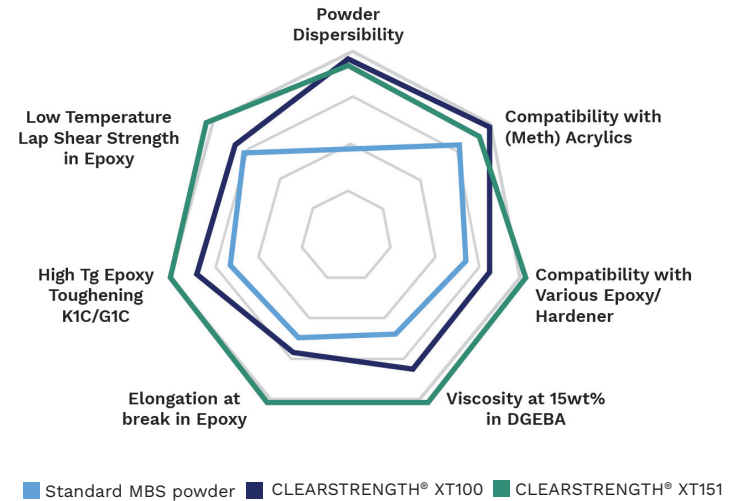
- Methylmethacrylate-Butadiene-Styrene (**MBS**) core shell
- Tailored for **epoxy thermosetting resins**
- Optimized to the **most demanding applications**
- Matching **low temperature requirements** (toughening, elongation, lapshear)

-  TOUGHENING
-  COLD TEMPERATURE
-  LOW VISCOSITY
-  EPOXY FORMULATION
-  EASY PROCESS
-  ENERGY SAVINGS

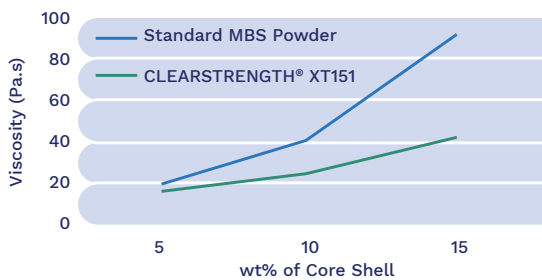
TYPICAL PHYSICAL PROPERTIES

Physical Form	White Powder
Specific Gravity	1.02
Bulk Density	0.3
Average Powder Particle Size	200µm
Percent Volatiles	< 1 wt%
Core Shell Average Particle Size	<200 nm

OVERALL SUPERIOR PERFORMANCE IN EPOXY

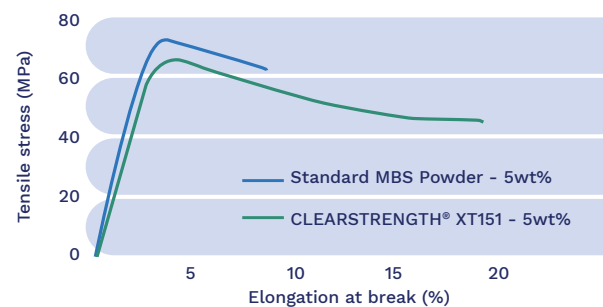


VISCOSITY INFLUENCE IN DGEBA RESIN (23°C)



Lower viscosity in epoxy at high dosage of core shell particles allows **higher additive concentration** in applications where solution viscosity could be a limitation like in composite infusion, prepreg, and coatings.

TENSILE PROPERTIES (23°C) – CURED EPOXY



Example of higher elongation at break reached in medium Tg Epoxy system

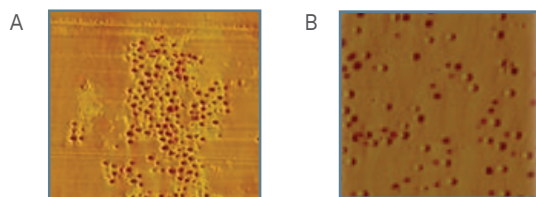
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TOUGHENING OF HIGH Tg EPOXY

	Tg (°C)	Lap Shear (MPa)	K1C (MPa/m)	GIC (J/m2)
Neat			0,6	88
Standard MBS Powder (5 wt %)	No shift	6,2	1,1	380
CLEARSTRENGTH® XT151 (5 wt %)	No shift	7,9	1,7	650

CLEARSTRENGTH® XT151 yields **superior toughness** and **shear adhesion strength** than Standard MBS powder in high Tg epoxy (Tg>200°C).

Comparison of the mechanical properties in high Tg epoxy system



A) Standard MBS powder B) CLEARSTRENGTH® XT151

Enhancing compatibility reaching dispersion at the individual core shell in **most high Tg and more polar epoxy systems**.

DISPERSION GUIDELINE

- CLEARSTRENGTH® XT151 powder can be dispersed in epoxy preferably with a medium shear mixer in temperature.
- Dilution of high core shell content preparation can be achieved with standard anchor blade homogenization.

EXAMPLE OF DISPERSION CONDITIONS

Doseage	15-20 wt%
Temperature	80°C
Mixing Time	1 h
Mixing Shear	Medium

Example of dispersion conditions with dispersive blade

SUGGESTION FOR USE

- CLEARSTRENGTH® XT151 is particularly recommended to Increase the toughness of epoxy thermoset systems such as structural adhesives and composites.
- Loading levels depend on final application and associated technical performance requirements.
- CLEARSTRENGTH® XT151 can be advantageously used to replace standard core shell modifier powders but also liquid masterbatches of pre-dispersed core shell particles.



Contact Arkema's Technical Service Team:

- Discuss your application requirements
- Provide formulation guidance and laboratory testing upon request
- Discuss dispersion process optimization

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