

## High Performance Toughening Agent for Thermosetting Resins

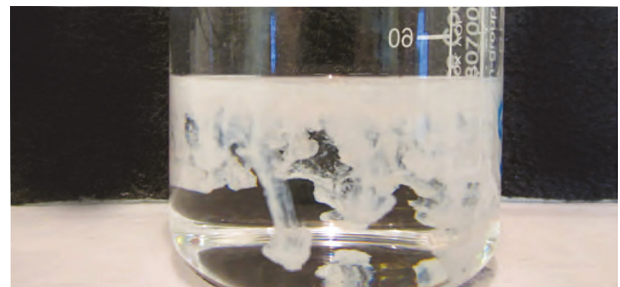
- Methylmethacrylate-Butadiene-Styrene (**MBS**) core shell
- **Easily dispersible powder**
- Tailored for **thermosetting resins**
- Optimized for **(meth) acrylic, epoxy and polyesters**
- Matching high **technical requirements**

- TOUGHENING
- COLD TEMPERATURE
- LOW VISCOSITY
- EASILY PROCESS
- ENERGY SAVINGS
- WIDE VERSATILITY WITH MONOMERS

### 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

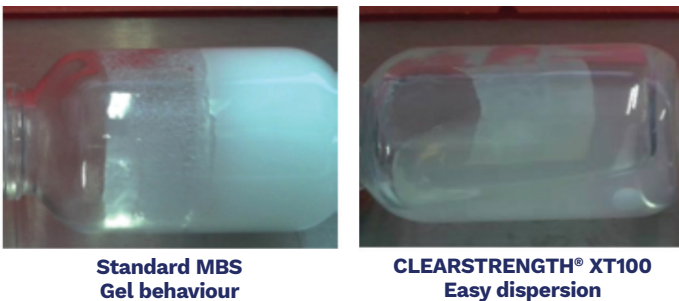
### EASY POWDER PROCESSING



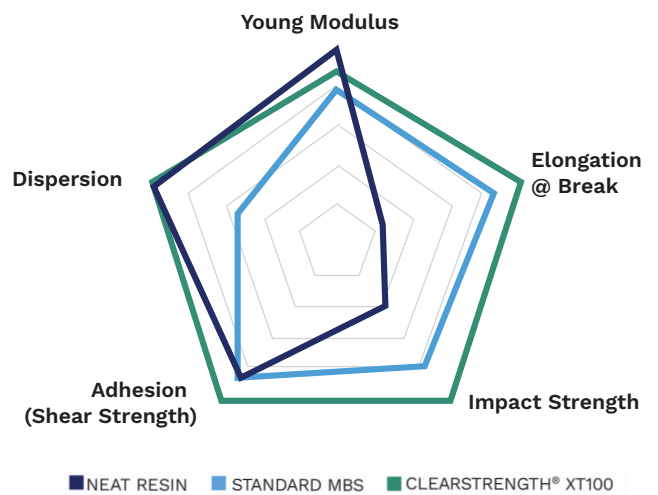
**CLEARSTRENGTH® XT100 spontaneous dispersion into MMA monomer, without shear**

## BENEFITS IN (METH) ACRYLICS

### COMPARATIVE DISPERSION INTO MMA MONOMER (15WT% - Room Temperature)

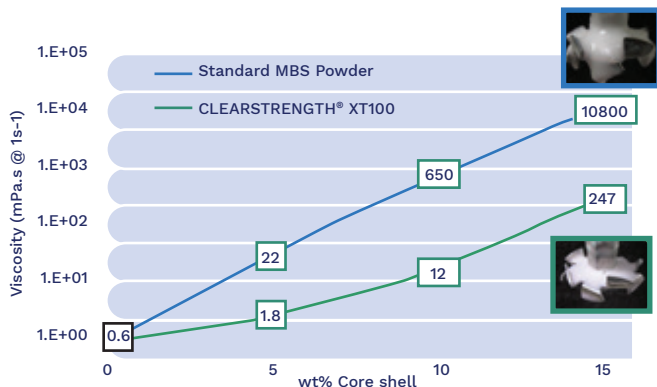


### APPLICATIVE PROPERTIES IN METHACRYLATE STRUCTURAL ADHESIVE FORMULATION (15WT%)



**CLEARSTRENGTH® XT100 into a methacrylate structural adhesive formulation**

### VISCOSITY EFFECT OF CS IN MMA MONOMER



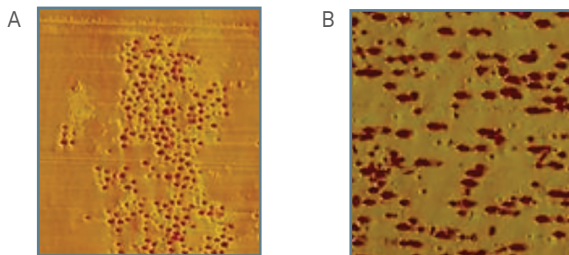
# CLEARSTRENGTH® XT 100

## BENEFITS IN EPOXY

### In high Tg epoxy system

	K1C (MPa√m)	G1C (J/m2)
Neat	0,6	88
Standard MBS Powder (5wt%)	1,1	380
CLEARSTRENGTH® XT100 (5wt%)	1,4	490

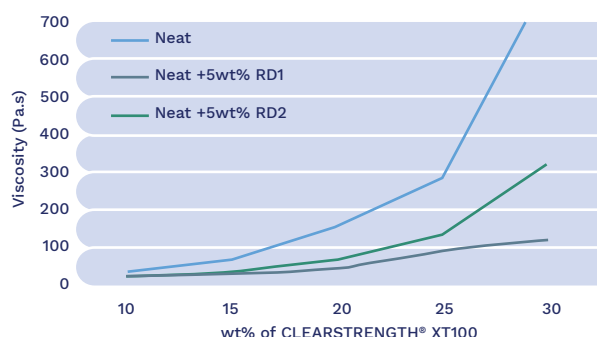
CLEARSTRENGTH® XT100 yields **superior toughness** and **shear adhesion** strength in high Tg epoxy (Tg>200°C) than Standard MBS powder.



Core shell particle dispersion of cured high Tg system  
A) Standard MBS powder B) CLEARSTRENGTH® XT100

**Enhancing compatibility** reaching dispersion at the individual core shell in **most epoxy systems**.

### In DGEBA/DDA combined with reactive diluent



### Epoxy System DGEBA/DDA

	K1C (MPa√m)	G1C (J/m2)	Tg (°C)
Neat	0,68	0,53	136
10wt% XT 100	1,1	2,1	135
10wt% XT 100 with 5wt% RD1	1.5	3	130
10wt% XT 100 with 5wt% RD2	1,3	2,5	133

**Classical Reactive Diluents** like 1,6-hexanediol diglycidyl ether (RD1) or 1,4-cyclohexanedi-methanol diglycidyl ether (RD2) are excellent solvent for CLEARSTRENGTH® XT100 powder. They allow a **great decrease of the viscosity** and a **new compromise of toughness** versus Tg is achievable.

### DISPERSION GUIDELINE

- CLEARSTRENGTH® XT100 powder can be dispersed with low to medium shear conditions in acrylic and polyesters at room temperature.
- Medium shear conditions in temperature can be used for dispersion in epoxy resins.

### SUGGESTION FOR USE

- CLEARSTRENGTH® XT100 is particularly recommended to increase the toughness of thermoset systems such as structural adhesives (e.g. methacrylates, epoxies, etc.) and composites.
- Recommended loading levels depend on final application and associated technical performance requirements.
- CLEARSTRENGTH® XT100 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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