

CLEARSTRENGTH®XT100

High Performance Toughening Agent for Thermosetting Resins

PRODUCT DESCRIPTION

Clearstrength® XT100 is a Methylmethacrylate-butadiene-styrene (MBS) core-shell toughening agent designed to meet the demanding technical requirements of thermoset applications such as structural adhesives and high performance composites.

Thanks to its unique and patented technology, and contrary to standard core/shell tougheners, Clearstrength® XT100 powder is easily dispersible in most liquid resin systems and exhibits a limited impact on their viscosity while providing an outstanding toughening effect in a wide range of service temperatures.

TYPICAL PHYSICAL PROPERTIES

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

PRODUCT BENEFITS

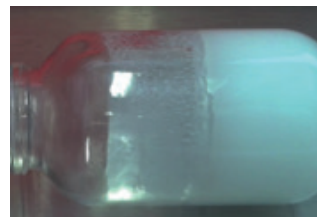
❖ **Wide versatility with monomers**

Clearstrength® XT100 has demonstrated an outstanding compatibility with various monomers. This has the advantage of using a single toughening agent reference in several systems, such as Epoxy, Methylmethacrylate (MMA), etc.

❖ **Easy dispersion**

Thanks to its unique and patented technology, Clearstrength® XT100 powder can be easily dispersed into most liquid thermosetting resins at very low shear rates, combined with lower mixing temperature or shorter mixing time. (Fig. 1 and 2).

Clearstrength® XT100 can even disperse spontaneously without shear in some liquid systems (Fig. 3).

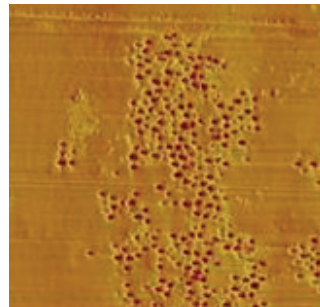


15 wt% of standard MBS into MMA monomer → strong agglomeration

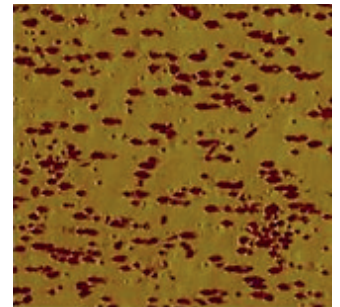


15 wt% of Clearstrength® XT100 into MMA monomer → easy dispersion

Fig. 1: Comparative dispersion into MMA monomer



Poor dispersion level of standard MBS



High dispersion level of Clearstrength® XT100

Fig. 2: Core-shell particle dispersion into high Tg system, by Atomic Force Microscopy (AFM)

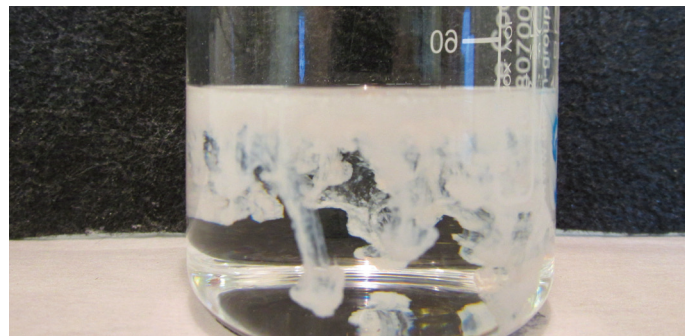


Fig. 3: Clearstrength® XT100 spontaneous dispersion into MMA monomer, without shear

Limited impact on host resin viscosity

The introduction of any rubber based toughener into a liquid resin system is well-known to significantly increase the viscosity of the host system. This effect is dramatically reduced when using Clearstrength® XT100 (Fig. 4).

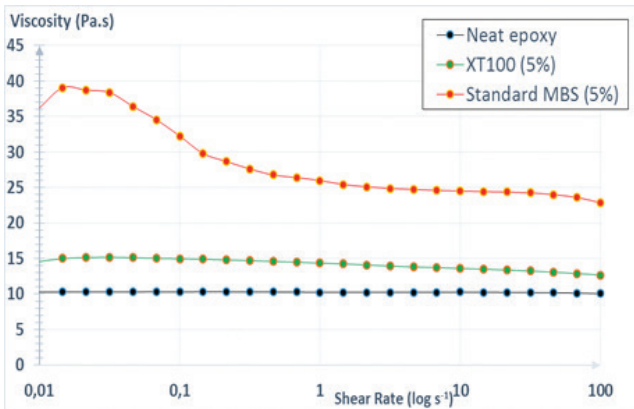


Fig. 4: Clearstrength® XT100 effect on the rheology of a high T_g epoxy system

Superior Mechanical Performances

The following graphs demonstrate the performance of Clearstrength® XT100 in a methacrylate structural adhesive formulation (Fig. 5) as well as in a high T_g epoxy system (Tab. 1). Moreover, because Clearstrength® XT100 is a non-reactive toughening agent, the final glass transition temperature of the host thermoset matrix is not affected.

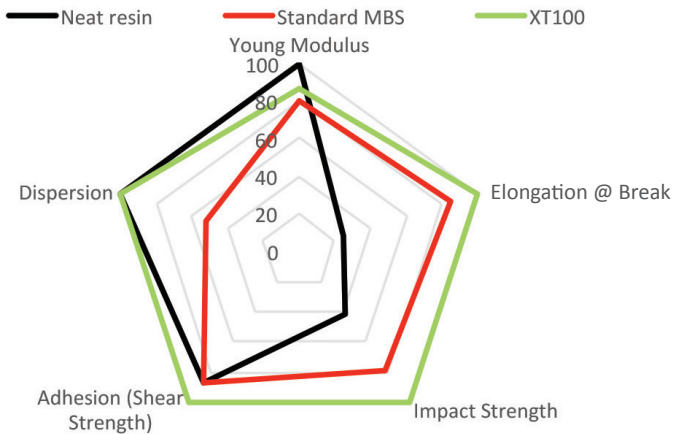


Fig. 5: Clearstrength® XT100 into a methacrylate structural adhesive formulation

	Neat epoxy	Standard MBS (5%)	XT100 (5%)
K1C (MPa√m)	0,6	1,1	1,4
G1C (J/m^{2±2})	88	380	490

Tab 1: Clearstrength® XT100 toughening effect in a high T_g epoxy system

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. Prospective customers should evaluate Clearstrength® XT100 toughener in their own laboratories to establish optimum conditions for use in their process and applications. Arkema's Technical Service Team is available to discuss your application requirements, provide formulation guidance and laboratory testing upon request.

Clearstrength® XT100 can be advantageously used to replace standard core/shell modifier powders but also liquid masterbatches of pre-dispersed core/shell particles.

PACKAGING

Clearstrength® XT100 toughening agent is available in 18 kg bags (450 kg per pallet), and 450 kg bulk bags (450 kg per pallet).

ENVIRONMENTAL AND SAFETY INFORMATION

BEFORE HANDLING THIS MATERIAL, READ AND UNDERSTAND THE MSDS (MATERIAL SAFETY DATA SHEET) / SDS (SAFETY DATA SHEET) FOR ADDITIONAL INFORMATION ON SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION. The MSDS/SDS are available on our Website www.arkema.com or upon request at our Customer Service Department. Arkema believes strongly in Responsible Care® as a public commitment.

MORE TECHNICAL INFORMATION AVAILABLE

Ask your Arkema account manager for further information on high quality Arkema additives for use in PVC, PC, PBT, ABS, PLA and other polymer systems. Arkema produces a full line of impact modifiers, processing aids and epoxidized vegetable oils. In addition, Arkema's Technical Service staff is also available to assist compounders and processors with formulation and processing advice.

Durastrength® Impact Modifiers

Durastrength® acrylic impact modifiers deliver outstanding impact characteristics for outdoor durable applications in PVC and Engineering Resins.

Plastistrength® Process Aids

Plastistrength® process aids offer producers a complete line of melt strengtheners and metal release agents for PVC and Engineering Resins. Plastistrength® process aids can improve fusion, surging, and aesthetics.

Clearstrength® Impact Modifiers

Clearstrength® MBS impact modifiers are designed for extreme impact or impact/clarity combination in PVC and Engineering Resins.

Biostrength® Additives

Biostrength® product line of impact modifiers, melt strengtheners and metal release agents are designed to improve properties and enhance processability of polylactic acid (PLA) and other biopolymers compounds.

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