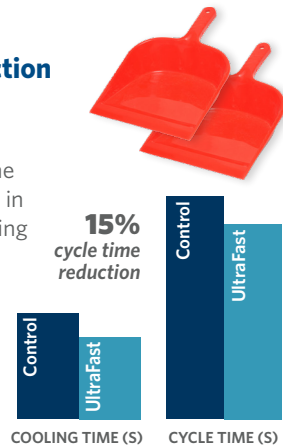


Solutions by Milliken® Concentrates for Polypropylene

Faster, trouble-free production

Adding **UltraFast™ Solutions** to polypropylene increases the crystallization temperature and the rate of crystallization. This results in processing benefits: reduced cooling and cycle times.

- High crystallization temperature
- Reduced processing times
- Higher productivity



Isotropic shrinkage

Polypropylene is a semi-crystalline polymer, which shrinks after molding. The nucleator influences the absolute shrinkage and the ratio of MD/TD shrinkage. **UltraBalance Solutions** imparts excellent isotropy resulting in reduced warpage.

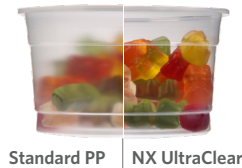
- Isotropic shrinkage
- Stable dimensions
- Quality & less waste
- Faster, trouble free production



Superior aesthetics

Adding **NX™ UltraClear™ Solutions** gives PP parts a transparency boost that overcomes the undesirable milky appearance of PP in injection molded, blow molded, and thermoformed applications creating highly-attractive transparency similar to glass-like materials.

- Heat resistant & microwavable
- Superior aesthetics
- Replacement of other crystal-clear materials



Impact solution for clear PP

NX® UltraClear™ MaxImpact® is a high-performance impact solution for clear polypropylene and can be used in all injection, blow molding and sheet applications to provide the best balance of clarity, impact and stiffness.

- The best balance of Clarity | Impact | Stiffness

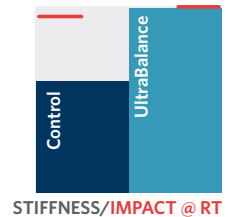


Improved stiffness/ impact balance

Nucleators often increase stiffness at the expense of impact strength. **UltraBalance™ Solutions** improve the stiffness while retaining the same impact behavior.



- Improved stiffness/impact balance
- Stronger, thinner products
- Stable at high temperature



Color independent shrinkage

Pigments nucleate polypropylene to different degrees which makes it difficult to mold parts with identical dimensions. Part warpage may also arise from the anisotropic shrinkage properties of certain pigments. **UltraFit™ Solutions** allows converters to produce a variety of colored parts with identical dimensions in the same mold.

- Overriding the nucleation effect of pigments
- 1 set of production conditions for all different colors
- Reduced design complexity



Clear and bright colorants

Adding **ClearTint™ Colorants** to NX UltraClear polypropylene offers the clearest and brightest colors. **ClearTint colorants** enhance aesthetics while maintaining the glass clarity look of Millad® NX® 8000 clarified polypropylene.

- Polymeric Nature
- No haze
- Excellent transparency
- Non- nucleating technology
- Easy to purge



Solutions by Milliken®

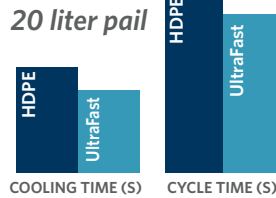
Concentrates for Polyethylene

Faster, trouble-free production

Adding **UltraFast™ Solutions** to polyethylene increases the crystallization temperature and the rate of crystallization. This results in processing benefits: reduced cooling and cycle times.



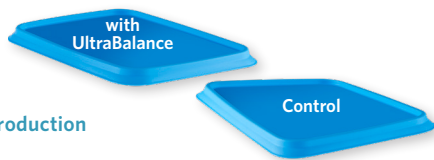
- High crystallization temperature
- Reduced processing times
- Higher productivity
- No change in dimensions



Isotropic shrinkage

HDPE is prone to warpage resulting in compromised part quality and manufacturing challenges. **UltraBalance™ Solutions** enables lower and balanced shrinkage, providing opportunities for warpage reduction and productivity enhancement.

- Isotropic shrinkage
- Stable dimensions
- Quality & less waste
- Faster, trouble free production

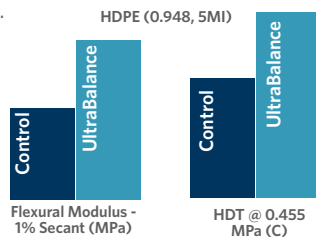


Improved stiffness

UltraBalance™ Solutions can enhance the stiffness of PE providing the potential for improved part performance or weight reduction.



- Improved stiffness/impact balance
- Stronger, thinner products
- Increased stiffness at elevated temperature



Improved barrier properties

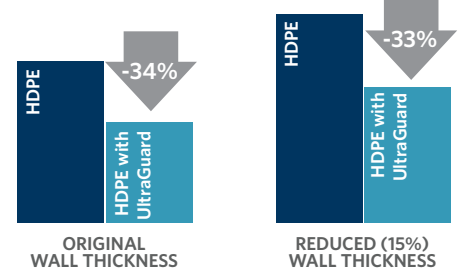
Adding **UltraGuard™ Solutions** to polyethylene creates a torturous path via crystallization, reducing the transmission rate of substances (e.g., H₂O, O₂, CO₂, grease, VOC's, solvents) by 20-60%. This results in increased shelf life or allows for downgauging while maintaining critical barrier properties.



- Enhanced barrier properties
- Enables part lightweighting
- Increased shelf life



WVTR of HDPE Bottles



Color independent shrinkage

Pigments nucleate polyethylene to different degrees which makes it difficult to mold parts with identical dimensions. Polyethylene with **UltraFit™ Solutions** allows converters to produce a variety of colored parts with identical dimensions using the same molds.

- 1 set of production conditions for all different colors
- Overriding the nucleation effect of pigments
- Greater design flexibility
- Faster & trouble free production



Please contact your Milliken representative for further product information including chemical registrations, food contact status, and other regulatory details.

PLEASE NOTE: As each customer's use of our product may be different, information we provide, including without limitation, recommendations, test results, samples, care/labeling/processing instructions or marketing advice, is provided in good faith but without warranty and without accepting any responsibility/liability. Each customer must test and be responsible for its own specific use, further processing, labeling, marketing, etc. All sales are exclusively subject to our standard terms of sale posted at www.milliken.com/terms (all additional/different terms are rejected) unless explicitly agreed otherwise in a signed writing.

NORTH AMERICA
Spartanburg, SC, USA
Tel: 800-910-5592
Fax: 864-503-2430
millichem@milliken.com

EUROPE
Gent, Belgium
Tel: 32-9-265-1100
Fax: 32-9-265-1195
eurochem@milliken.com

LATIN AMERICA
Sao Paulo, Brazil
Tel: 55-11-3043-7942
Fax: 55-11-3043-7096
lachem@milliken.com

ASIA
Singapore
Tel: 65-6377-0770
Fax: 65-6377-0990
asiachem@milliken.com

ASIA
Shanghai
Tel: 86-21 6145-5555
Fax: 86-21 6145-5558
asiachem@milliken.com

ASIA
Pune, India
Tel: 91.20.6730.7501
Fax: 91.20.6730.7514
asiachem@milliken.com