

Enhancing Plastics with Performance. Together.

Milliken™



## Committed to Performance

*with*

Hyperform<sup>®</sup> HPN<sup>™</sup> Performance Additives

DeltaMax<sup>™</sup> Performance Modifiers

ClearShield<sup>™</sup> UV Absorbers

Boosting productivity

Maintaining balance

Creating opportunities

# THE MILLIKEN STORY

Several Milliken additives serve to improve the performance of the polymers they modify, including: Hyperform® HPN™ Performance Additives for both PP and PE which help make stronger, lighter parts; DeltaMax™ Performance Modifiers which enhance the strength and melt-flow properties of both virgin and recycled PP; and ClearShield™ UV Absorber which provides the ultimate protection from damaging UV light to PET packaged materials.



*Our promise is to deliver plastic additives that result in faster, more efficient production, improved part quality, excellent UV protection.*

# NO HYPE ... JUST PERFORMANCE

Hyperform HPN performance additives for PP embrace the key sustainability- and performance-related challenges affecting today's plastics processing industry by enabling lightweighting, while also enhancing productivity and optimizing processing. Easy to use and reliable, Hyperform HPN maximizes the performance of PP by reducing productivity problems.



*Hyperform HPN aids processing PP productivity while also offering balanced and tuneable properties.*



*Delivering reliable  
performance in PP*

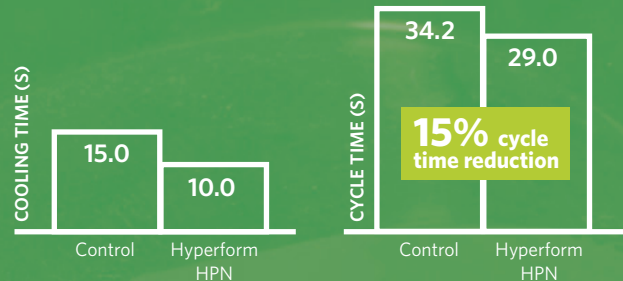
# GET UP TO SPEED, TROUBLE-FREE

Adding Hyperform HPN performance additives to PP increases the crystallization temperature and the rate of crystallization. This benefits users by reducing both cooling time and cycle time, which results in higher processing productivity. UL, e.g., just validated that Hyperform HPN provides energy savings of 5-8% when injection molding thin-wall container lids and similar PP products.



## VALIDATED

- MILLIKEN HYPERFORM® HPN PRODUCTS ENABLE 5% TO 8% ENERGY SAVINGS WHEN USED AS A NUCLEATOR FOR PRODUCTION OF THIN-WALL INJECTION MOLDED CONTAINER LIDS DR SIMILAR POLYPROPYLENE PRODUCTS ULCOM/ECV







# SAVE ENERGY WITH UL-VALIDATED HYPERFORM HPN

Milliken Hyperform HPN products enable 5% to 8% energy savings when used as a nucleator for production of thin-wall injection molded container lids or similar PP products.

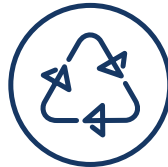
UL Environment & Sustainability's verification services assessed several grades of the Hyperform HPN additive, and all earned recognition for their energy-related sustainability performance.

Lower your carbon footprint, use Hyperform HPN!



## VALIDATED

- MILLIKEN HYPERFORM® HPN PRODUCTS ENABLE 5% TO 8% ENERGY SAVINGS WHEN USED AS A NUCLEATOR FOR PRODUCTION OF THIN-WALL INJECTION MOLDED CONTAINER LIDS OR SIMILAR POLYPROPYLENE PRODUCTS ULCOM/ECV

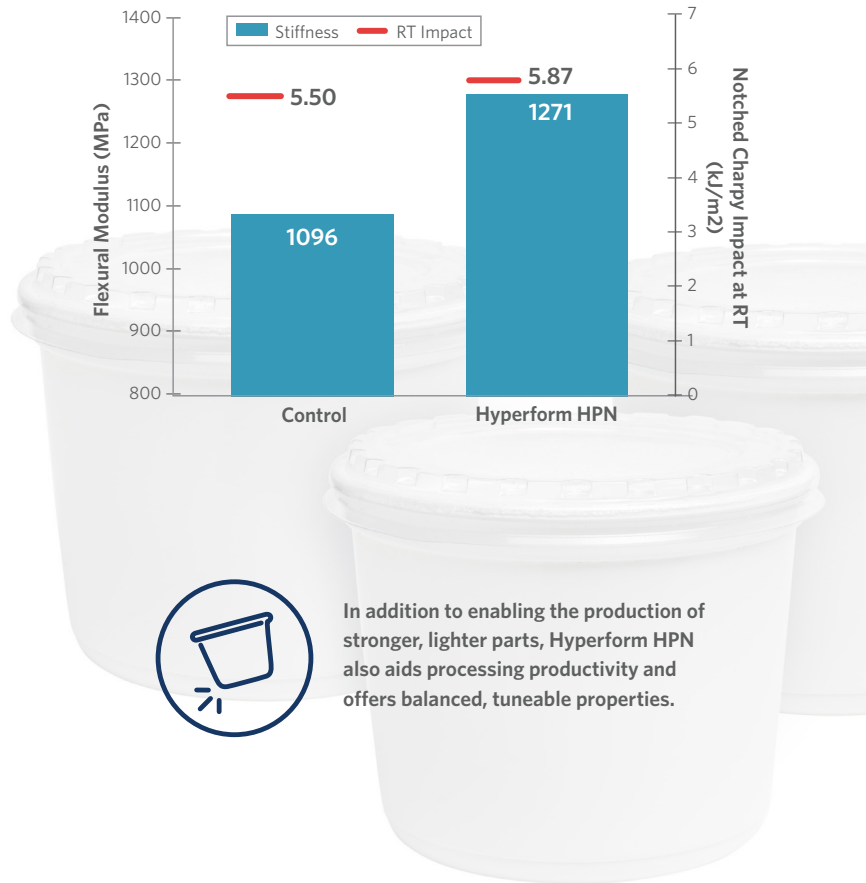


Hyperform HPN reflects Milliken's care for the environment by offering injection molders UL-certified energy savings



# KEEP YOUR BALANCE: STIFFNESS/IMPACT

Traditional additives often increase stiffness at the expense of impact strength. Hyperform HPN performance additives for PP, however, strike a key performance balance by improving the stiffness while retaining the same impact behavior. This enables the production of stronger, thinner parts, and promotes stability at high temperatures.

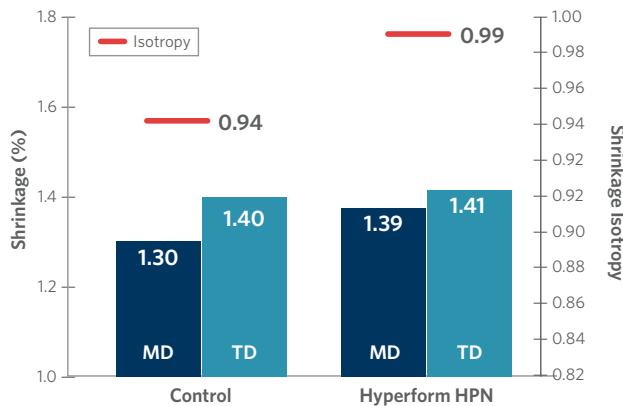


In addition to enabling the production of stronger, lighter parts, Hyperform HPN also aids processing productivity and offers balanced, tuneable properties.

# RETAIN STABILITY, IN EVERY DIMENSION

PP is a semi-crystalline polymer, which shrinks after molding. This complicates processing since repeatability and consistency is vital.

Hyperform HPN performance additives for PP promote isotropic shrinkage, which improves dimensional stability and reduces part warpage. This, in turn, enhances final part quality, limits waste and contributes to faster, more efficient processing.



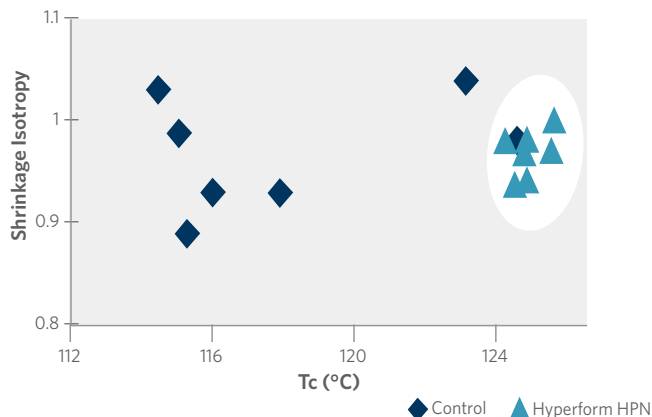
*Reduce your warp-related waste with Hyperform HPN, which promotes consistent shrinkage.*

# COLOR ME STABLE

Pigments add vital color but their impact on PP formulations also can make it difficult to mold parts with identical dimensions, and may contribute to increased part warpage.

Hyperform HPN performance additives for PP override the nucleation effect of pigments, allowing converters to produce a variety of colored parts with identical dimensions in the same mold. This simplifies processing and design since only one set of production conditions is needed for various colors.

*Different pigments tend to nucleate PP at different rates, but Hyperform HPN helps to level the playing field, simplifying production.*



# WELCOME OUR NEWEST FAMILY MEMBER

Our newest grade – Hyperform HPN-715 for PP – offers new opportunities for PP to replace more-expensive engineering resins in demanding applications. The nucleator enables downgauging and reduces filler requirements to improve design freedom, reduce weight and cut material costs. Hyperform HPN-715 delivers an optimized balance of various key factors, while also providing higher heat-deflection temperatures compared to other advanced performance additives. This allows PP to be used in microwaveable containers, under-hood vehicle components, and in household appliance parts.



*Our newest grade offers excellent heat resistance for longer-lasting parts*

# GO WITH THE FLOW

Milliken created DeltaMax Performance Modifiers to help converters enhance the impact strength and flow properties of PP impact copolymers (ICPs), blends and recycled PP (rPP) resins.

The DeltaMax melt-flow modifier can increase melt flow levels never achieved while maintaining impact and stiffness properties. This allows converters to increase operating efficiencies and create more innovative part designs with easier flow through molds.

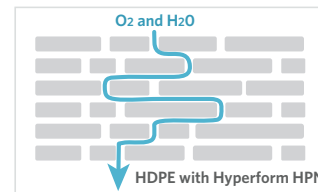
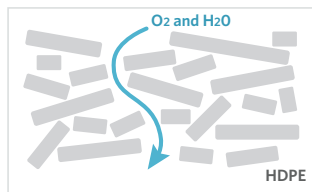
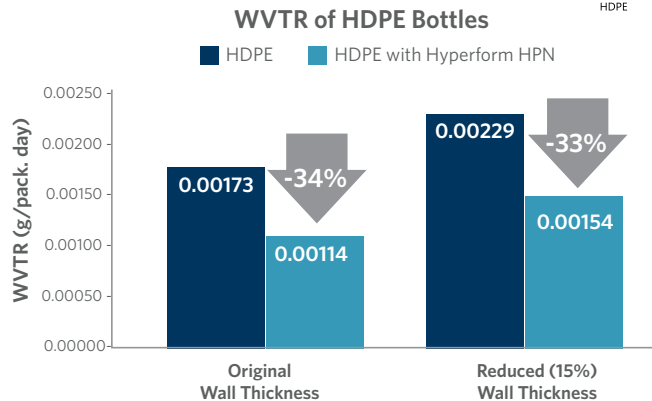
*Better melt flow increases operating efficiency and can aid in the creation of more innovative part designs.*





# CREATE DESIRABLE BARRIERS

Adding Hyperform HPN performance additives to PE improves barrier properties, resulting in increased product shelf life. It does so by reducing the transmission rate of undesirable substances (e.g., moisture, oxygen, CO<sub>2</sub>, solvents, etc.) by some 20-60%. This also enables lightweighting by allowing for downgauging while not sacrificing critical barrier properties.

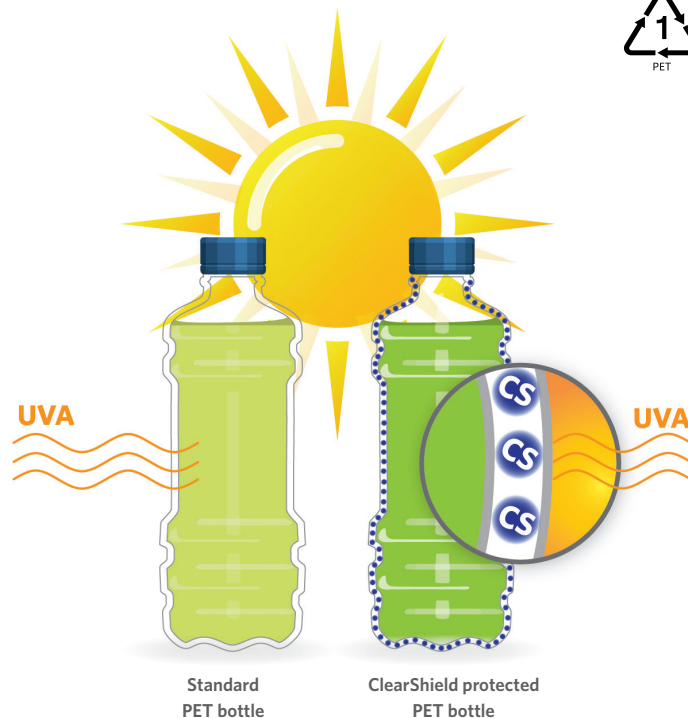


*By creating a more torturous path via crystallization, Hyperform HPN improves barrier properties.*

# TAKE GOOD CARE OF YOUR PET

ClearShield offers an efficient way to protect against exposure to harmful ultraviolet light by incorporating the UV absorber into the PET package itself. PET modified with ClearShield is a simple, cost-effective alternative that is approved for food contact. It doesn't require any changes to your product formulation and maintains the clarity of the packaging.

ClearShield allows you to store and display products in crystal-clear packaging, protecting your products – and your reputation – from degradation.



*Protecting your products from  
harmful UV light*



## Committed to Performance

Milliken™

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