

# Milliken® UltraGuard™ Solutions

For improved barrier properties  
in HDPE Pharmaceutical Bottles

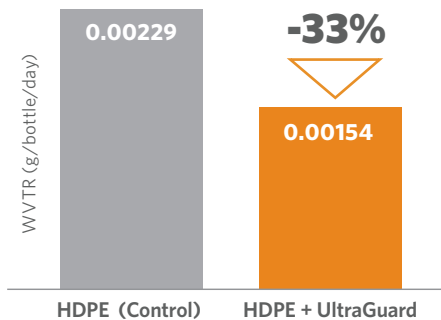
Polyethylene with UltraGuard™ Solutions provides controlled crystallization allowing for enhanced properties.

UltraGuard™ Solutions is a line of performance additives that brings value to polyethylene parts by improving the resin's barrier properties. These additives cut by up to 70% the transmission rate of any substance (such as moisture or oxygen) that passes through the polyethylene bottle.

White opaque HDPE bottles are commonly used for OTC (over-the-counter) drugs, prescription drugs and nutraceutical products because they have good moisture barrier and light protection properties. Barrier enhancement in HDPE pharma bottles is particularly valuable because it can help to extend the potency of drugs toward the end of their shelf life.

As an added benefit, UltraGuard Solutions also provide sustainability benefits. To meet the barrier requirements, pharma bottles typically have much thicker walls than needed from a purely functional point of view. PE resin formulated with these additives enables bottle makers to reduce the weight of these bottles by up to 20% while still providing enhanced barrier properties. These lighter-weight bottles, therefore, use significantly less material and lessen their overall impact on the environment.

## UltraGuard realigns the PE crystalline structure to create a torturous path



IBM bottles made from bimodal HDPE (density: 0.958 g/cm<sup>3</sup>, MFI: 0.3 g/10 min)



- Lower bottle weight
- Less environmental impact
- Enhanced barrier properties
- Longer shelf life



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

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