

Milliken®  
**Millad® NX® 8000 ECO**   
 Sustainable Clarifying Agent for Polypropylene

CASE STUDY

## Clarify your TWIM food packaging with Milliken additive

### Millad® NX® 8000 ECO clarifier delivers transparent, energy-saving results

Consumers want to clearly see the packaged food products they are buying, and those making the packages want a cost-efficient way to manufacture lightweight, transparent containers that retain a bright, consistent look regardless of the retail setting in which they are sold.

Thin-wall injection molders using polypropylene (PP) formulated with Milliken Chemical's Millad® NX® 8000 ECO additive not only will realize crystal-clear transparency in the end product, but will save energy and money in the process.

But don't take our word for it. Underwriters Laboratories (UL) has independently verified that injection molding products using NX UltraClear™ PP resin — which can be made only by using the Milliken clarifier — results in average energy savings of 10%. Compared with processing PP made using traditional clarifiers, NX UltraClear PP also has been shown to enable up to 14% faster cycle times, as well as 14.9% lower CO<sub>2</sub> emissions.



The savings achieved by processing 1,000 metric tons of PP with Millad NX 8000 ECO versus traditional clarifiers can result in some 1,224 hours saved in manufacturing — equal to an estimated value of €48,800 or \$57,800. Using the same baseline of 1,000 metric tons processed, our research indicates that this translates to a lowering of such emissions by 14.9 percent, or the equivalent of running 10.8 cars per year, powering 6.9 domestic houses per year, or 11.8 acres of forest.

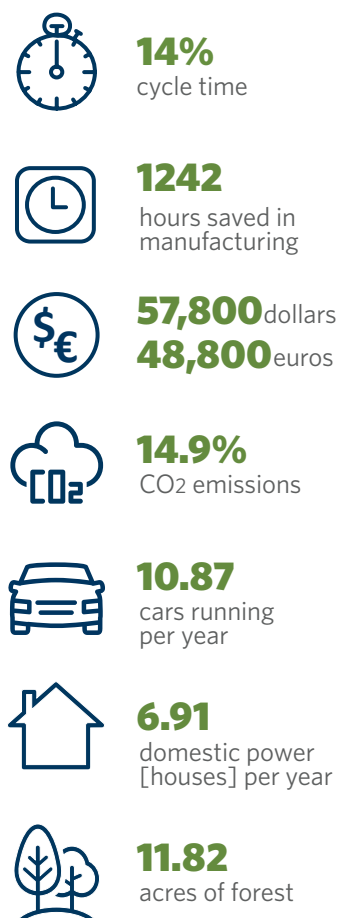
These features enable brand owners to apply the coveted UL Environmental Claim Validation label to their product's package, providing a marketing advantage by helping to communicate the company's sustainability commitment to its customers.

In addition to the clarity and energy saving, one of the key values of using Milliken's ECO additive is the clean, consistent appearance of the end products that it yields in the retail shops, regardless of the light source. Milliken's ClearTint colorants also can be used to add bright, colorful shades to the packaging.

NX UltraClear PP resin also meets a number of key requirements, including being safe for use in contact with food, in microwaves, freezers, and dishwashers, while also being airtight, leak-proof and having good impact resistance. For a clear advantage, use Millad NX 8000 ECO for your thin-wall injection molded parts.



#### SAVINGS/1000MT PP EXPRESSED AS



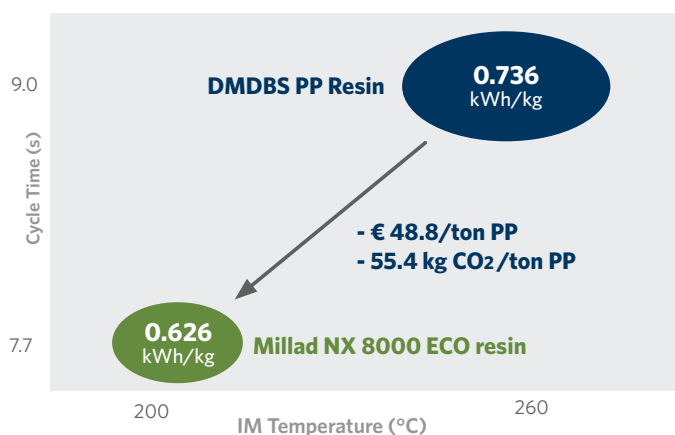
SAVINGS ACHIEVED BY PROCESSING PP WITH MILLAD NX 8000 ECO VERSUS TRADITIONAL CLARIFIERS

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**Energy savings & allowing for UL label**

Thin wall packaging made with NX UltraClear PP offer superb clarity, while also being lightweight, durable and highly recyclable. Additionally, injection molders using the material can save both energy and money, due to lower processing temperatures and cycle times that can be as more than 7% faster than with resin formulated using traditional clarifiers.



| Part                        | Food Packaging                |
|-----------------------------|-------------------------------|
| Machine                     | Hydraulic                     |
| Shot weight                 | 147.5 g/part ; 2 cavity mould |
| Traditional clarifier resin | 40 MFR RCP                    |
| Millad NX 8000 ECO resin    | 100 MFR RCP                   |

| Parameter      | Assumptions                        |
|----------------|------------------------------------|
| Energy cost    | € 0.11/kWh                         |
| Machine Cost   | € 25/hour                          |
| Labour cost    | € 5/hour (1 person per 4 machines) |
| Sustainability | 0.308 kg CO <sub>2</sub> /kWh      |

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CASE STUDY

## Durable, reusable polypropylene (PP) cups help reduce single-use plastics

### Millad® NX® 8000 ECO clarifier for PP yields clear, lightweight end products

Those wishing to lower their environmental impact and overall carbon footprint aim to find ways to reuse products over and over again, as a means of reducing the amount of single-use plastics that get used once and tossed in the trash.

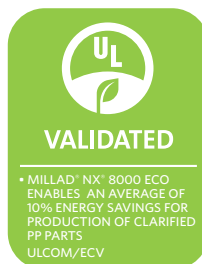
Milliken Chemical wants to play its part. Helping molders to manufacture durable drinking cups that have a clean, bright, clear appearance help to make those products more likely to be retained and reused. Cups produced with NX UltraClear™ PP resin — which can only be made with Milliken's Millad NX 8000 ECO clarifier — do just that. The highly recyclable material yields products that are strong, transparent and lighter weight than those made of many competitive materials.

As an added bonus, injection molders running NX UltraClear PP also will save energy and money in the process. This is because the clarifier used has been shown to help shorten cycle times by up to 7 percent, which in turn reduces energy use and CO2 emissions compared. In fact, the savings achieved by processing 1,000 metric tons of PP with Millad NX 8000 versus traditional clarifiers can save a molder 730 hours in manufacturing — equal to an estimated value an \$46,800 or €39,500.

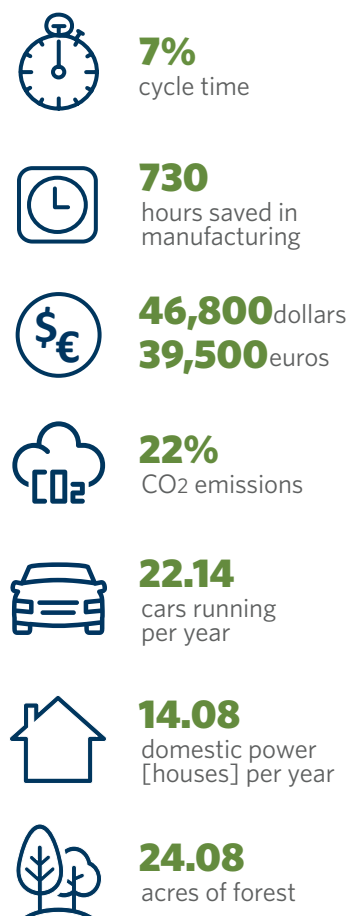
Using the same baseline of 1,000 metric tons processed, our research indicates that this translates to a lowering of such emissions by 22 percent, or the equivalent of running 22 cars per year, powering 14 domestic houses per year, or 24 acres of forest.

These eco-advantages allow brand owners, if they wish, to apply the much desired UL Environmental Claim Validation label to their product's package, providing a marketing advantage by helping to communicate the company's sustainability commitment to its customers.

In addition to the clarity and energy savings, brand owners also can brighten up their range of reusable cups with Milliken's ClearTint colorants, which lend bright hues while retaining the end product's clarity and transparency.



SAVINGS/1000MT PP EXPRESSED AS



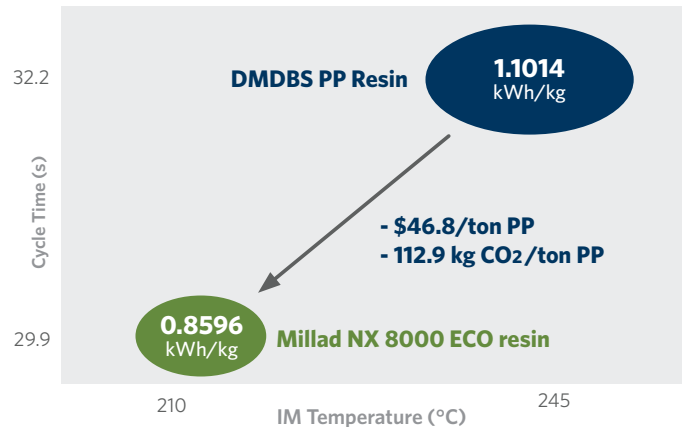
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CASE STUDY

**Savings achieved by processing PP with Millad NX 8000 versus traditional clarifiers**

Reusable cups made with NX UltraClear PP offer superb clarity, while also being lightweight, durable and highly recyclable. Additionally, injection molders using the material can save both energy and money, due to lower processing temperatures and cycle times that can be as more than 7% faster than with resin formulated using traditional clarifiers.



| Part                        | Cup                           |
|-----------------------------|-------------------------------|
| Machine                     | Hydraulic                     |
| Shot weight                 | 54.7 g/part ; 16 cavity mould |
| Traditional clarifier resin | 12 MFR RCP                    |
| Millad NX 8000 ECO resin    | 12 MFR RCP                    |

| Parameter      | Assumptions                   |
|----------------|-------------------------------|
| Energy cost    | \$0.10/kWh                    |
| Machine Cost   | \$25/hour                     |
| Labour cost    | \$6/hour                      |
| Sustainability | 0.467 kg CO <sub>2</sub> /kWh |

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CASE STUDY

## Milliken clarifier yields clear, strong PP storage containers

### Millad® NX® 8000 ECO additives also help molders save energy, money

Transparent, plastic storage containers, in various sizes and styles, have been receptacles for all types of items — from tools to toys and office supplies to clothing — for years. Consumers want strong, durable containers with crystal-clear clarity, so that they can see the contents inside.

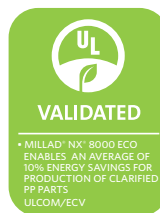
Polypropylene (PP) is ideal for this application — but one type is better suited than all the others. NX UltraClear™ PP resin, made with Milliken Chemical’s Millad NX 8000 ECO clarifier, checks all those boxes, and more.

Containers made with NX UltraClear PP offer superb clarity, while also being light-weight, durable and highly recyclable. Additionally, injection molders using the material can save both energy and money, due to lower processing temperatures and cycle times that can be as more than 16% faster than with resin formulated using traditional clarifiers. The savings achieved by processing 1,000 metric tons of PP with Millad NX 8000 versus traditional clarifiers can result in some 1,177 hours saved in manufacturing — equal to an estimated value an €41,000 or \$48,580.

This in turn boosts productivity and reduces CO2 emissions, thereby helping users to lower their overall carbon footprint. Using the same baseline of 1,000 metric tons processed, our research indicates that this translates to a lowering of such emissions by 11.3 percent, or the equivalent of running 3 cars per year, powering 2 domestic houses per year, or 3.4 acres of forest.

These features enable brand owners to apply the much-desired UL Environmental Claim Validation label to their product, providing a marketing advantage by helping to communicate the company’s sustainability commitment to its customers.

Another key value derived from using Milliken’s Millad NX 8000 ECO additive is that the containers molded from NX UltraClear PP deliver a clean, consistent appearance on store shelves, regardless of whether the shop is using fluorescent or more modern LED lighting.



SAVINGS/1000MT PP EXPRESSED AS



**16%**  
cycle time



**1177**  
hours saved in manufacturing



**48,580** dollars  
**41,000** euros



**11.3%**  
CO2 emissions



**3.12**  
cars running per year



**1.99**  
domestic power [houses] per year



**3.40**  
acres of forest

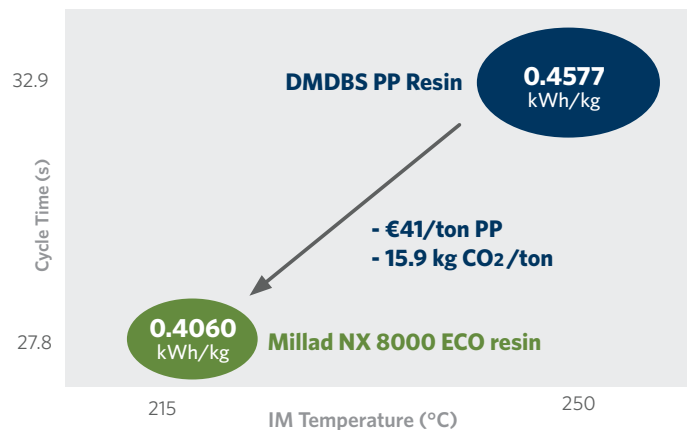
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CASE STUDY

**Saving energy and improved productivity with Millad NX 8000 ECO**

Containers made with NX UltraClear PP offer superb clarity, while also being lightweight, durable and highly recyclable. Additionally, injection molders using the material can save both energy and money, due to lower processing temperatures and cycle times that can be as more than 17% faster than with resin formulated using traditional clarifiers.



| Part                        | Cup                          |
|-----------------------------|------------------------------|
| Machine                     | Hydraulic                    |
| Shot weight                 | 1204 g/part ; 1 cavity mould |
| Traditional clarifier resin | 70 MFR RCP                   |
| Millad NX 8000 ECO resin    | 85 MFR RCP                   |

| Parameter      | Assumptions                        |
|----------------|------------------------------------|
| Energy cost    | € 0.11/kWh                         |
| Machine Cost   | € 25/hour                          |
| Labour cost    | € 5/hour (1 person per 4 machines) |
| Sustainability | 0.308 kg CO <sub>2</sub> /kWh      |

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CASE STUDY

## Milliken brings clarity to Yonghui's new storage container

### Leading Chinese supermarket's USong brand benefits from use of strong, transparent, eco-friendly NX® UltraClear™ polypropylene resin

When Yonghui Superstores Co. Ltd., one of China's leading supermarket chain operators, wanted to launch a strong, transparent, high-quality storage container recently, it opted to use polypropylene (PP) modified with Milliken's Millad® NX® 8000 ECO clarifier.

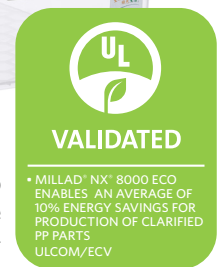
Sinopec produced the NX® UltraClear™ PP resin that Yonghui chose to use in the storage container it launched in late 2019 under its own, private-label USong brand. Yonghui says the USong brand is available in most of its 900+ grocery stores nationwide.

While NX UltraClear PP resin is well known in China, especially in the housewares sector, this represented the first such collaboration between Yonghui and Milliken to develop this type of storage application. The clear container, with handles and a clear lid, not only offered Yonghui the performance properties it desired, including crystal-clear transparency, good load-bearing strength, a smart design and good sealing, it also came with a notable additional benefit.

Products injection molded from NX UltraClear PP resin — which is made exclusively using Milliken's Millad NX 8000 ECO clarifier — have been certified to display a UL Environmental Claim Validation label on their packaging. This is because injection molders who use this resin typically experience faster production rates and realize average energy savings of 10% when producing clarified PP parts.

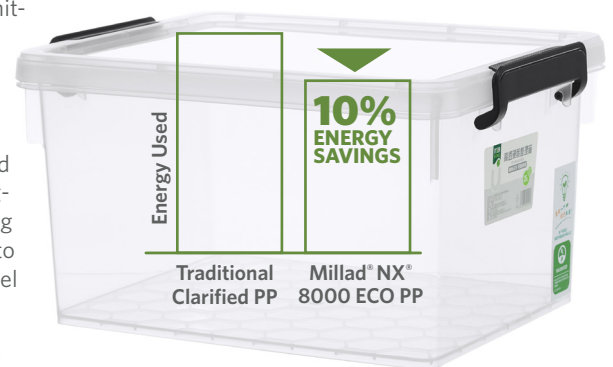
As a result, brand owners such as Yonghui can apply the much-desired UL label to their product's packaging, providing a marketing advantage by helping to communicate the company's sustainability commitment to its customers.

"We were pleased to achieve exactly the aesthetic and performance results we wanted for this product by using this resin modified with Milliken's clarifier," said Yonghui's [Helen Wang, Head of USong Brand]. "It was an extra bonus to also be able to use the UL eco-label



on this container, to further demonstrate our environmental sensitivity."

Franky Hu, downstream sales manager for Milliken who worked with Yonghui on this project, noted that, "We were delighted to partner with Yonghui, one of the most famous supermarket chains in China, on this project, and we're pleased that this new storage container is getting positive feedback in the market, due to its fresh appearance, attractive design and eco-friendly profile."



For more information, contact Crystal Xia, [80794998@yonghui.cn](mailto:80794998@yonghui.cn)

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