



**COLORMATRIX™
SMARTHEAT RHC**

Process Aid for rPET and PET bottles

ColorMatrix™ SmartHeat RHC is an APR* accredited, patent protected, liquid dispersion process aid, available to rPET producers and converters to help improve recycling and sustainability of PET bottles. It enables:

- Increased rPET content
- Reduced CO₂ emissions

When added to rPET and PET preforms and bottles, SmartHeat RHC helps to:

- Improve rPET quality
 - Better thermal stability, reduced yellowing
- Improve bottle quality
 - Greater processability
 - Lightweighting
- Reduce energy consumption during the blow molding process

SmartHeat RHC has minimal impact on final product color or aesthetics.

For applications requiring color or toning, SmartHeat RHC is also available as a range of recycle-friendly tints or toners for both rPET producers and converters.

Note to converters: This product is compatible solely with transparent bottles produced in a two-stage injection stretch blow molding process.

SmartHeat RHC is APR* accredited for both Critical Guidance and Bottle-to-Bottle.

“Impressive colour performance”

Wei Chang
PTI APR test feedback March 2019

* EPBP submitted, pending approval.

PRODUCT RANGE

	SmartHeat RHC	SmartHeat Tint	SmartHeat Tone
User	<ul style="list-style-type: none"> • Convertors • rPET producers 	<ul style="list-style-type: none"> • Convertors 	<ul style="list-style-type: none"> • rPET producers
Application	<ul style="list-style-type: none"> • Colorless 	<ul style="list-style-type: none"> • Colored 	<ul style="list-style-type: none"> • Toned
Product Options	<ul style="list-style-type: none"> • Liquid dispersion • Clear/Colorless 	<ul style="list-style-type: none"> • Liquid dispersion • A range of water blue colors • Custom color solutions 	<ul style="list-style-type: none"> • Liquid dispersion • Available as 2 blue shades • Custom color solutions
Recycling	<ul style="list-style-type: none"> • Recycle friendly • APR accredited 	<ul style="list-style-type: none"> • Recycle friendly • Contains APR accredited SmartHeat RHC 	<ul style="list-style-type: none"> • Recycle friendly • Contains APR accredited SmartHeat RHC

INCREASED rPET CONTENT & IMPROVED QUALITY

Due to heat exposure and subsequent thermal degradation, PET commonly yellows during the recycle process. A typical remedy, adding toners and colorants, can have a detrimental effect on the brightness of the final product. SmartHeat RHC improves the thermal stability of PET and helps to minimize yellowing, which can help reduce the amount of toner or color required in rPET and PET bottles. Over time, as the level of SmartHeat RHC in the recycle stream begins to rise, the overall quality of rPET is improved, contributing towards increased levels of rPET content in PET bottles by addressing the root cause, rather than masking the issue.

Improved Thermal Stability & Reduced Yellowing
Based on APR Critical Guidance Test Data

3mm Plaque	Actual	APR Tolerance
L*	91	>82
da*	-0.61	>-3
db*	-0.38	1.5

Sample	Delta L*	Delta b*
Reference	-7.5	11.3
Reference + RHC	-5.6	8.6

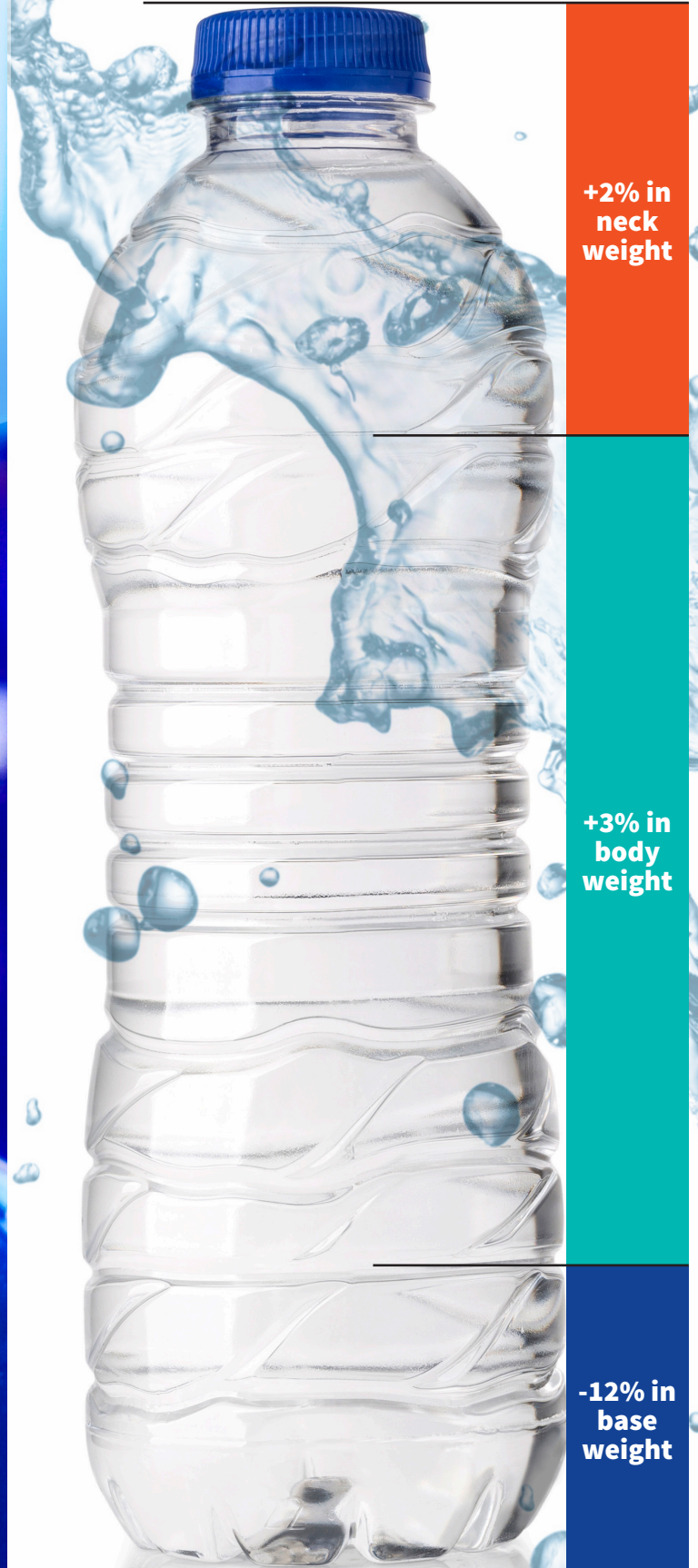


IMPROVED BOTTLE QUALITY

SmartHeat RHC allows for optimization of polymer weight distribution within the PET bottle. This can help improve the strength and quality of the bottle, allowing for further lightweighting, and improved blowing performance, which can contribute to further lightweighting, increased levels of rPET and improved process ability of PET bottles.

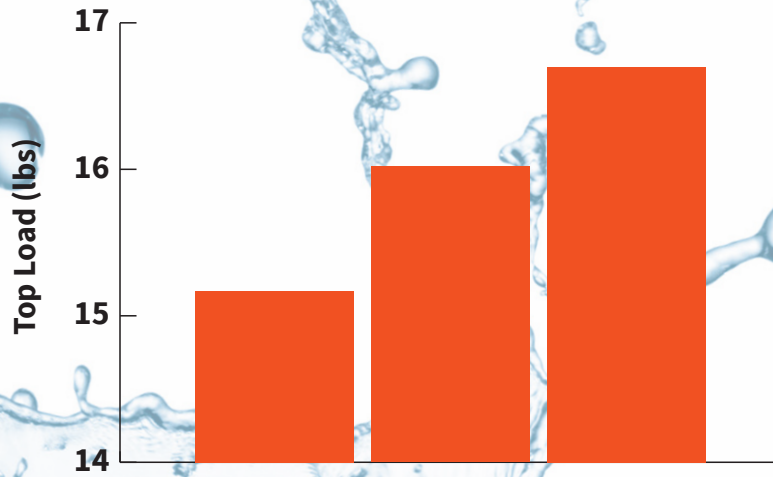
Polymer Weight Distribution

8.5g 0.5L bottle, 60% rPET



Based on commercially produced water bottles, 51,000bph

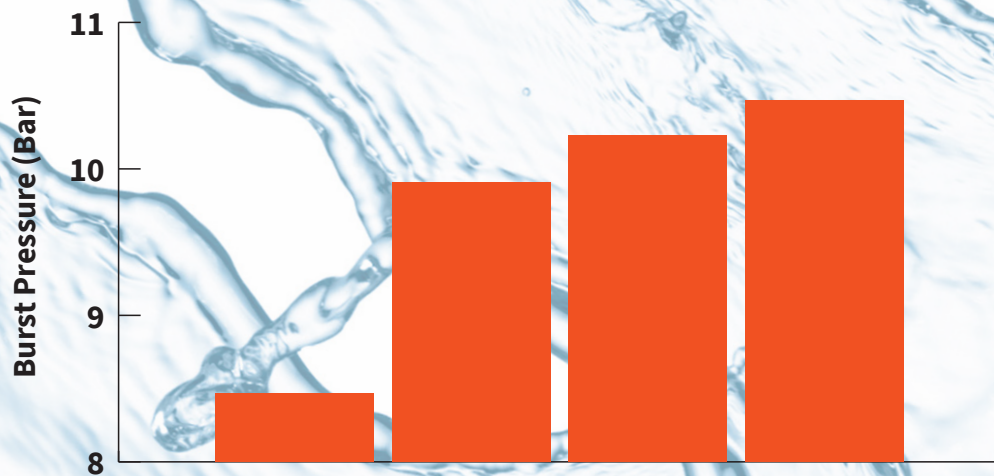
Mechanical Strength



Increasing SmartHeat RHC Concentration

Based on PTI 14.4g 0.5L water bottles, Instron testing

Burst Pressure



Increasing SmartHeat RHC Concentration

Based on 8.5g, 0.5L commercially produced water bottles

REDUCED CO₂ EMISSIONS

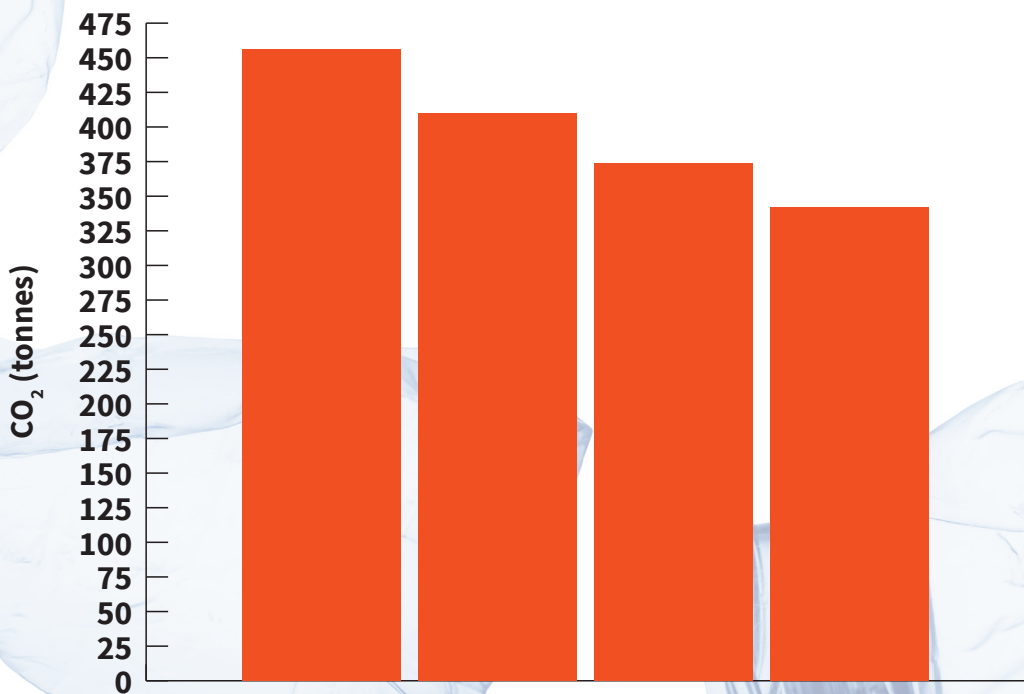
Reduce Energy Consumption

SmartHeat RHC increases the heat-up rate for preforms, enabling energy reductions for the heating lamps used during the bottle blowing process. This effect contributes towards reducing CO₂ emissions.



Increasing SmartHeat RHC Concentration

Based on a commercial process producing 8.5g 0.5L water bottles as 51,000bph
25% reduction in energy consumed during the bottle blowing process



Increasing SmartHeat RHC Concentration

Translates to 25% CO₂ reductions based on energy savings reducing CO₂ emissions by 114 tonnes per year on one commercial blowing line

PROCESSING AND HANDLING

SmartHeat RHC products are supplied in ColorMatrix™ approved packaging and are active as supplied. They are metered into the PET stream just above the feed throat of the injection molding machine or extruder, using a Avient supplied ColorMatrix liquid metering system. The product should not be used in combination with any other dosing systems.

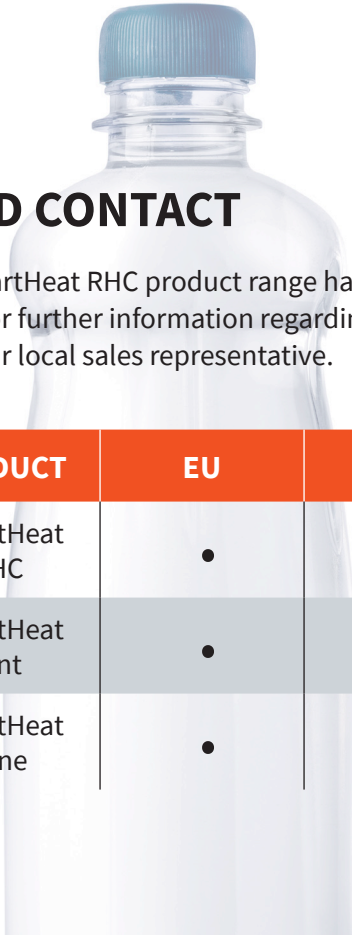
Melt processing of SmartHeat RHC products is carried out at typical PET processing conditions at recommended dose rates, which range from 0.02% to 0.10%. Once incorporated into the preform, no further action is necessary. Care must be taken to optimize the bottle blowing process due to the increased heat-up rate of the preform, to take advantage of the many benefits offered by this product range.



FOOD CONTACT

The SmartHeat RHC product range has food contact approvals defined in the below table. For further information regarding food contact approvals, please get in touch with your local sales representative.

PRODUCT	EU	FDA	MERCOSUR	CHINA
SmartHeat RHC	•	•	Q4 2019	2022
SmartHeat Tint	•	•	Q4 2019	2022
SmartHeat Tone	•	•	Q4 2019	2022





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