

LIQUID COLOURS, ADDITIVES AND
DOSING UNITS
FOR THERMOPLASTICS PACKAGING

Company Profile and Organisation



Technical Organisation

PRODUCTION

Liquids

LABORATORY

Quality Control

Masterbatches

Colour matching

Dosing Units

Innovation and R&D

Quality

- Inspection of incoming goods
- Production monitoring/Quality control
- Special testing
 - ✓ Additive efficiency
 - ✓ Product/packaging compatibility tests
 - ✓ Permeability tests
 - ✓ Sensorial analysis
 - ✓ Shelf-life tests
 - ✓ Taste test: panel of trained REPI employees

Tech Area

- Prototyping, Automa ISBM - 1,5L and 0,5L (3 shapes)
- Material validation
- Technical development on auxiliaries
- Training

PET PRODUCT LINE

- Liquid colours
- Additives
- Barrier solutions
- Specialty masterbatches
- Dosing units



Colour Technology

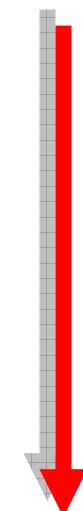
Why use liquid colours in PET packaging?

Liquid colours enable to obtain a complete range of shades/effects to enhance the appeal of the packaging and protect the content.

There is no limitation in using liquid colours in all the packaging applications
(mineral water, beer, dairy, wine, soft drinks, juices, detergents and edible oil)

Colour Technology

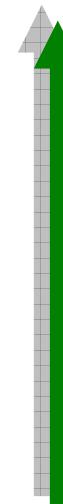
Why use liquid colours in PET packaging?



Masterbatch

- Low addition rates/max concentration
- Improved dye and pigment dispersions
- Can be formulated with additives
- Quick colour changes
- Reduction of colouring cost
- Reduction of storage cost
- Reduction of transport cost

Liquid colour



Additives are developed to improve the final product performance, to reduce manufacturing costs, to optimise the processing parameters and to enhance the product quality.

PERFORM

- ✓ Process stability Enhancement
- ✓ Energy Saving
- ✓ Static Charge Reduction
- ✓ Preform Storage Optimisation

**PROTECT
packaging content against**

- ✓ UV
- ✓ Visible Light
- ✓ Oxygen negative Impact
- ✓ AA taste

RECYCLE

- ✓ Intrinsic Viscosity Enhancement
- ✓ Colour shade tuning
- ✓ Yellow index reduction

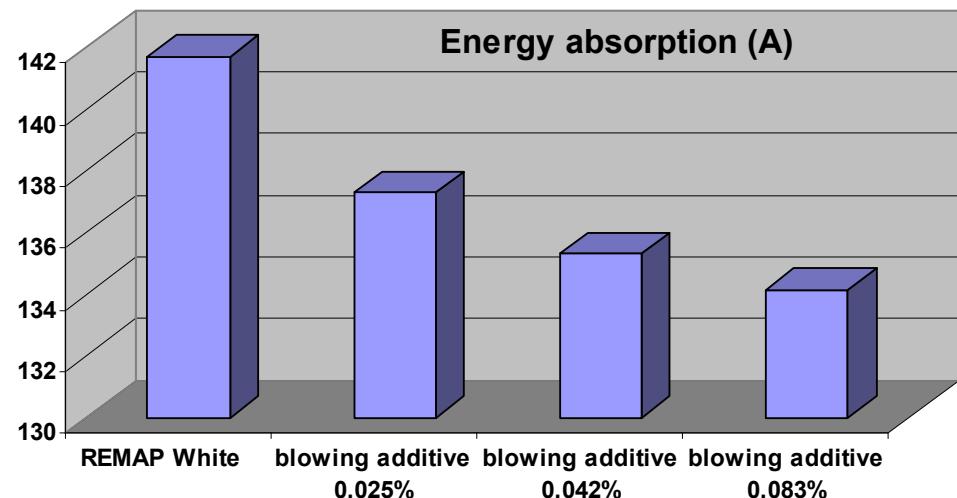
PROCESS AID

- Optimises preform storage
- Reduces scratches
- Enhances process parameter stability
- Improves process productivity
- Reduces static charge
- Low viscosity liquid
- Suitable for standard liquid dosing units
- Can be blended with liquid colours and additives
- Meets EU and FDA food contact regulations
- Let Down Ratio: 0,12%



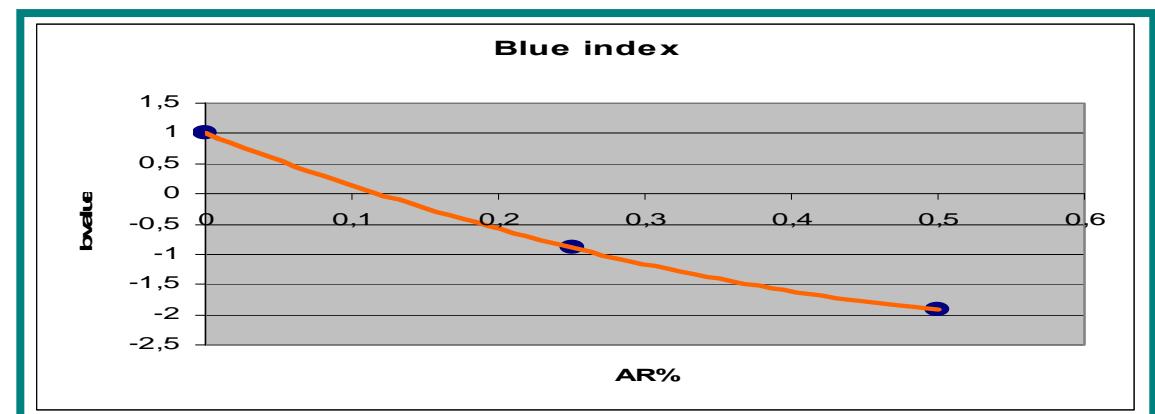
BLOWING ADDITIVE

- Improves preform heat absorption
- Reduces scrap (blowing stage)
- Improves productivity (blowing stage)
- Energy saving (3-5%)
- Low viscosity liquid
- Suitable for standard liquid dosing units
- Can be blended with liquid colours and additives
- Meets EU and FDA food contact regulations
- Let Down Ratio: 0,03 %



OPTICAL BRIGHTENER

- Increases the glossy (bright shades)
- Enhances the whiteness
- Low viscosity liquid
- Suitable for standard liquid dosing units
- Can be blended with liquid colours and additives
- Meets EU and FDA food contact regulations
- Let Down Ratio: 0,2 - 0,3%

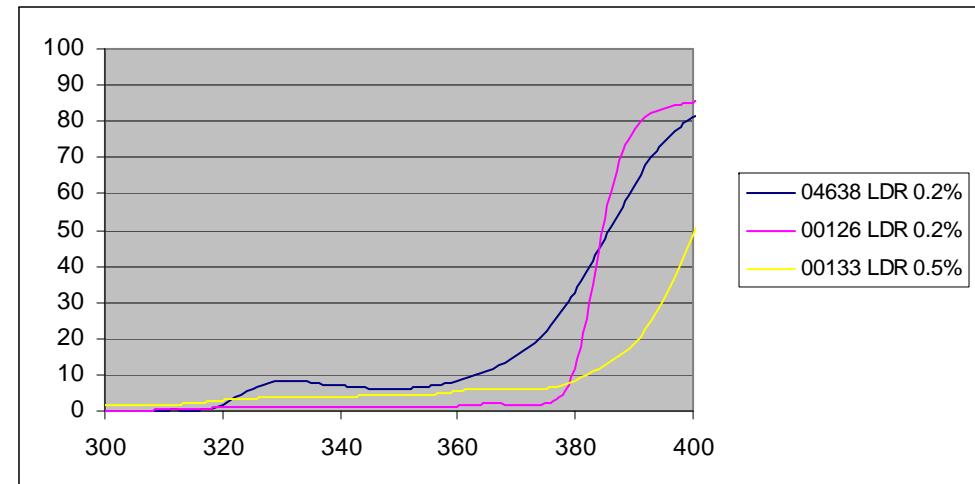


UV ABSORBER

- **UV radiation absorption: 300-400 nm**
- Low viscosity liquid
- Suitable for standard liquid dosing units
- Can be blended with liquid colours and additives
- Meets EU and FDA food contact regulations
- Let Down Ratio: 0,2 - 0,5%

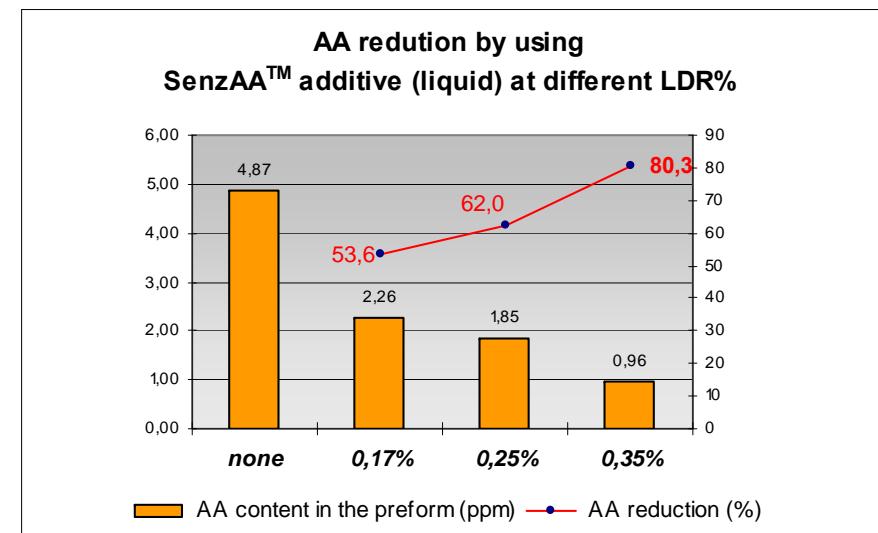
Overlay

(PET bottles, thickness 250 µm)



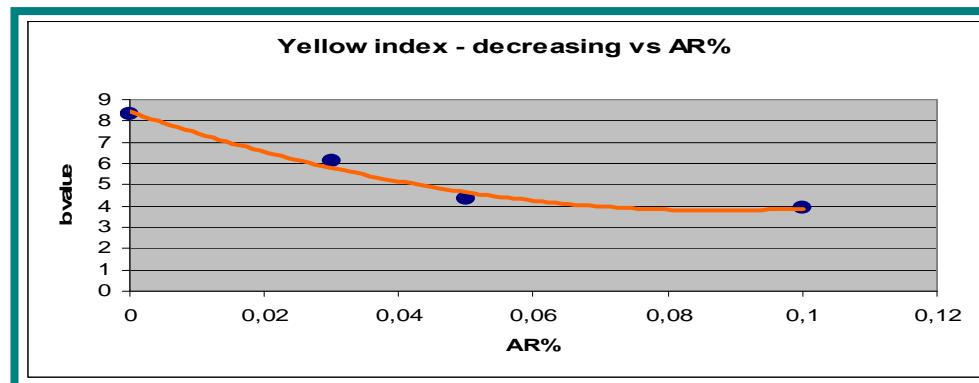
AA REDUCER

- AA reduction over 75%, meeting the requirement of $\leq 1\text{ppm}$ of AA in the preform, at the recommended loadings level
- Preserves natural taste of water
- No black specks, no plate-out, no sublimation
- Bottle-to-bottle recycling (meets PETCORE standards for recycling)
- Suitable for standard liquid dosing units
- Can be blended with liquid colours
- Meets EU and FDA food contact regulations
- Let Down Ratio:
 - liquid: 0,35%
 - masterbatch: 1%



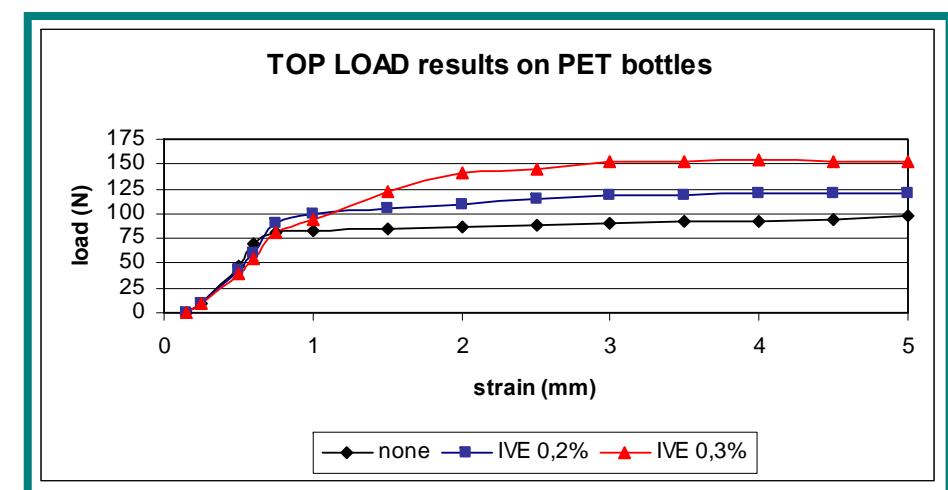
ANTI YELLOW

- Reduces yellow index
- Improves aesthetics on recycled PET preform
- Suitable for R-PET chip production technologies
- Low viscosity liquid
- Suitable for standard liquid dosing units
- Can be blended with liquid colours and additives
- Meets EU and FDA food contact regulations
- Let Down Ratio: 0,02 - 0,05%



INTRINSIC VISCOSITY ENHANCER

- **IV increase from 0.05 to 0.10 dl/g**
- **Balance of the IV “peak”**
- **No cross link: MW and mechanical properties increase accordingly**
- Low viscosity liquid
- Suitable for standard liquid dosing units
- Can be blended with liquid colours and additives
- Meets EU and FA food contact regulations
- Let Down Ratio: 0,2 - 0,3% (masterbatch)



Colour Barrier Technology

REPI Colour Barrier solutions are developed to protect the packaging content from

UV light

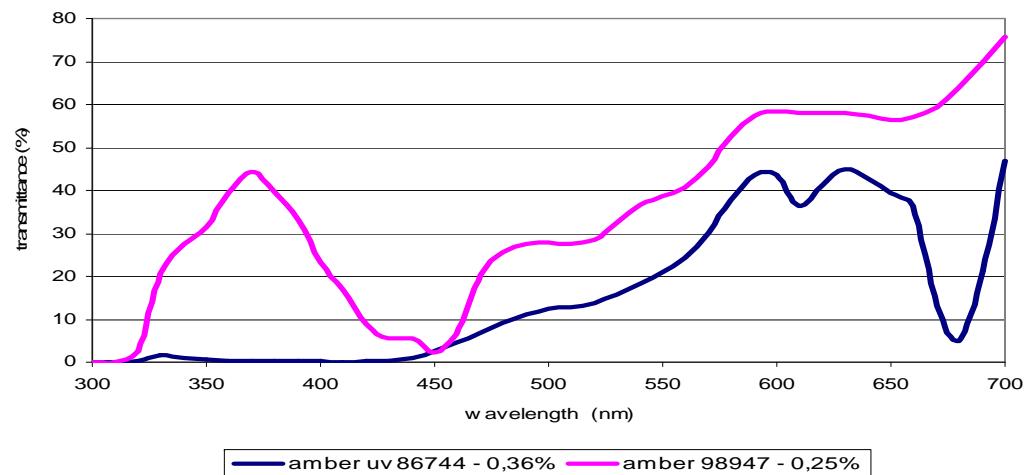
Visible light

Negative Oxygen Impact

Colour Barrier Technology

REMAP UVS

Colourants, pigments and specific additives used for these formulations work in synergy to protect the packaging and its content from UV degradation.



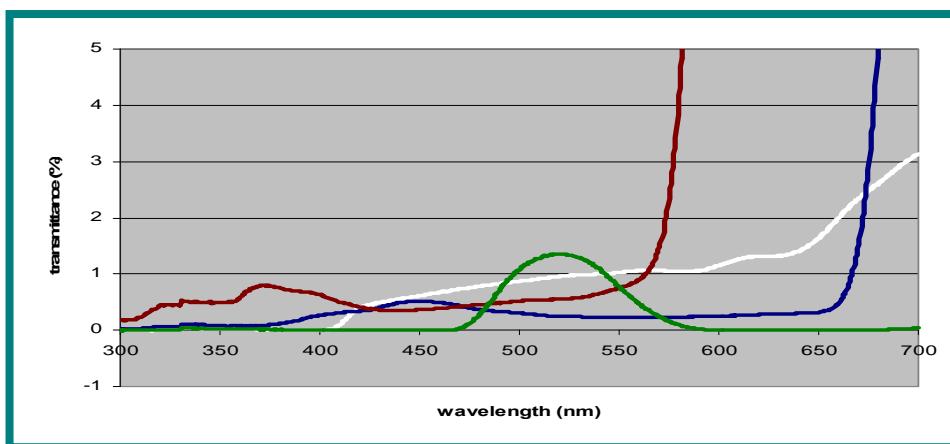
Application: beer, wine, juice.

Colour Barrier Technology

REMAP LS

Four LS colours are specifically developed to protect the packaging from visible light. High UV barrier .Very low transmittance in visible light with all barrier colours formulation till 600 nm.

Different protection using the LS white at various addition rates according to the application requirement.



Application: milk (ESL, UHT), dairy products, juice

Technological Innovations

How to control the colour consistency in barrier preforms?

Obtaining the measurement of the light transmission directly from the PET preform, before the blowing stage, is important to guarantee the right protection in the final container.

Visual check is generally used, but there is a limitation with opaque preforms, so that the reliability of the test results depends mainly on the expertise of the production people.

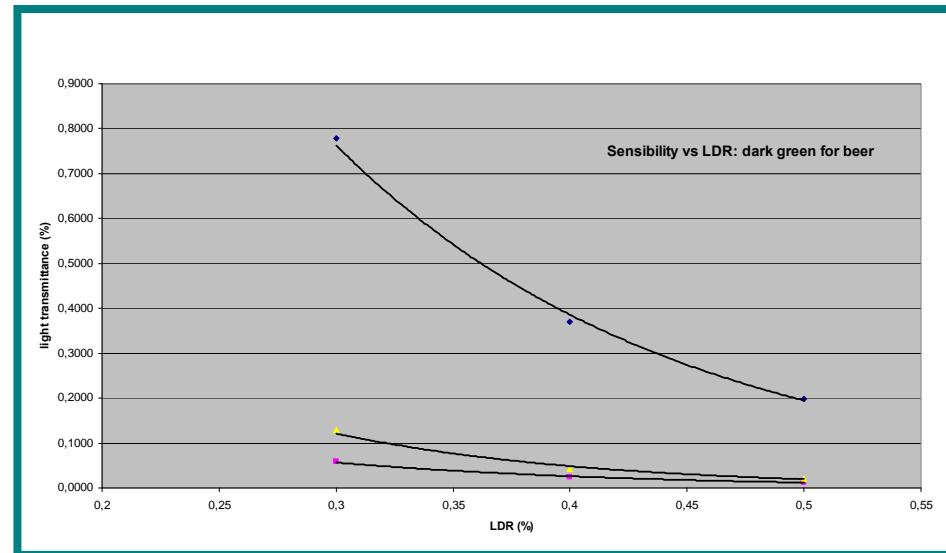
REPI has developed the **LIGHT METER**, an instrument able to measure all types of preforms, allowing a more scientific control for all coloured preform ranges.





Technological Innovations

LIGHT METER is available in two different versions, where different light sources are applied: model FLASH/201 (Patent Pending) and model RGB/101 (Patent Pending). Using the RGB model, according to the different pigments used, the LM allows a very precise colour consistency control on amber and green “beer” preforms.



Constant dosing and precision

Use of gear pumps

Encoder-guided dosage allowing high precision starting at 1 rpm

Load cell sensibility : 1g

Reliable

More than 500 REPI dosing units installed in the last 5 years, working worldwide

Easy to use

New colours can be programmed while the unit is in operation

Memory for a limitless number of programs

Easily accessible LOG memory allows to transfer past operational history

Automatic calibration of the colour/additive

Automatic pump speed adjustment

Fast colour changes and easy to clean pumps

USB, SD and LAN options

Versatile

Different capacity pumps (gear = 0,06 – 0,2 – 1 – 2 – 5 cc; screw = 1,1 cc)

Alarms

Pressure gauge and liquid level

Technical service

A team of REPI technicians gives assistance worldwide, installs the dosing units and trains the operators for their use

**U2011 Dosing Unit**

The approach to the final packaging application directly involves REPI in challenging projects.

The REPI mission is to provide complete support by working in synergy together with the customer, from the idea to the realisation of the final package.