

### ENERGY CURABLE WATERBORNE URETHANE ACRYLATE FLEXIBILIZER

#### INTRODUCTION

UCECOAT® 7210 is an energy curable flexible urethane acrylate supplied as emulsion in water, which can be mixed in all proportions with UCECOAT® 7200 and thereby allows to formulate protective UV coatings with adjustable flexibility as well as high abrasion and chemical resistances. UCECOAT® 7210 can be blended (with prior pH adjustment if required) with other waterborne UV resins to increase solid content and/or flexibility.

#### PERFORMANCE HIGHLIGHTS

UCECOAT® 7210 is characterized by:

- white appearance
- high solids content
- good colloidal stability
- low viscosity

UV/EB cured formulations based on UCECOAT® 7210 are characterized by the following performance properties:

- flexibility
- direct adhesion onto common plastic substrates.

The actual properties of UV cured formulations also depend on the selection of other formulation components such as additives and photo initiators.

The following table shows a generic formulation for flexible coatings obtained from a combination of UCECOAT® 7200 (hardcoat resin) and UCECOAT® 7210 (flexibilizer):

Ingredient	Content (parts)
UCECOAT® 7200	100-x
UCECOAT® 7210	x
Liquid photo-initiator for WB UV coatings <sup>(1)</sup>	2.8
Tego™ Wet 280 <sup>(2)</sup>	0.75
Demineralised water	To be adjusted

<sup>(1)</sup> CAS 118690-08-7

<sup>(2)</sup> supplier: Evonik

This generic formulation can be applied by rollercoater or spray application by adjusting the dilution with demineralised water. Typical application for a protective coating with 10 g/m<sup>2</sup> dry target coat weight will involve a water evaporation step (typically a few minutes between 50 to 80°C) followed by UV curing with typically 1 to 2 J/cm<sup>2</sup> total energy (UVA, UVB, UVC and UUV).

Gradually increasing the UCECOAT® 7210 content in the formulation above will lead to protective coatings with increasing flexibility.

#### TYPICAL PHYSICAL PROPERTIES

Appearance	white liquid
Solid content, % by weight	approx. 65
Brookfield viscosity at 25°C, mPa.s	max. 1000
pH	3.0 - 5.0
Density, g/cm <sup>3</sup>	approx. 1.1

#### FORMULATION RECOMMENDATIONS

It is always recommended to stir UCECOAT® 7210 prior to use. After prolonged storage, product can settle and may require agitation to re-disperse. UCECOAT® 7210 can be further diluted with water. Further formulation with additives and/or blending with other waterborne UV resins may require to adjust the pH of UCECOAT® 7210 (before formulation) to neutrality by addition of a solution of sodium hydroxide or of an amine solution like triethylamine or Advantex™.

If necessary, the aspect of the coating can benefit from the addition of a wetting agent like Tego™ Wet 280 (supplier: Evonik), added for instance at a concentration of 0.5 to 1 % in the wet formulation.

#### STORAGE AND HANDLING

Care should be taken not to expose energy curable products like UCECOAT® 7210 to temperatures exceeding 40°C for prolonged periods or to direct sunlight. This might cause the colloidal destabilisation or the uncontrollable polymerization of the product with generation of heat. Due to the presence of water, UCECOAT® 7210 needs to be stored above 4°C.

Storage and handling should make use of stainless steel, amber glass, amber polyethylene or baked phenolic lined containers. Do not store this material under an oxygen free atmosphere. Use air to displace material removed from the container. This material should not be stored for more than 6 months.

#### PRECAUTIONS

The following is a summary of the precautions to be taken when handling this product. Please refer to the Safety Data Sheet for further details.

The toxicological properties of this material have not been fully determined. Appropriate precautions should be taken to avoid eye and skin contact and to avoid inhalation of the aerosols or vapours. Consult the relevant Safety Data Sheet for appropriate handling procedures and protective equipment prior to using this or any other material referred to in this bulletin.

See Safety Data Sheet for emergency and first aid procedures.

#### STATUTORY LABELING

Please refer to the Safety Data Sheet.