

# CYMEL<sup>®</sup> U-93-210 resin

## PRODUCT DESCRIPTION

CYMEL U-93-210 resin is an n-butylated urea formaldehyde resin supplied in a mixture of n-butanol and xylene. It has excellent compatibility with epoxy resins and is recommended in primer formulations which are to be topcoated and rebaked.

## BENEFITS

- Excellent compatibility with hydrophobic resins
- Very good hydrocarbon tolerance
- Very good flow properties

## APPLICATION AREAS

- Coil coatings
- Can coatings
- Epoxy metal deco finishes

## PHYSICAL PROPERTIES

Property	Range	Method
Appearance	Clear Liquid	Visual
Non-volatile by wt.	60 - 64%	Pan, 90 min/105°C
Viscosity, 25°C	V - Y	Gardner-Holdt
Free formaldehyde	1.0%	Sulfite
Color	≤ 1	Gardner 1963

## SOLUBILITY

Alcohols	Complete
Esters	Complete
Ketones	Complete
Aromatic hydrocarbons	Complete
Aliphatic hydrocarbons	Complete
Water	Insoluble

## COMPATABILITY

Acrylic resins	Good
Alkyd resins	Very good
Polyester resins	Very good
Epoxy resins	Good

## BACKBONE POLYMER SELECTION

CYMEL U-93-210 resin not only reacts with the hydroxyl and carboxyl functionalities of the other binders in the formulation, but it also has a tendency for self-condensation. Therefore, its practical equivalent weight on a solids basis is typically 200 - 280. The resulting films are harder and more resistant to chemical attack with increasing levels of CYMEL U-93-210 resin, but they may also be more brittle. The optimum level of the resin in a given formulation should be determined experimentally.

## CATALYSIS

CYMEL U-93-210 resin may not need the addition of an acid catalyst to the formulation to obtain effective cure. In many instances the acidity of other formulation components is sufficient to catalyze the reaction. If catalyst addition is required, then 0.5%-1.0% of either CYCAT<sup>®</sup> 4040 catalyst or CYCAT 296-9 catalyst, based on total binder solids, is recommended for bake schedules of ~125°C for 15 minutes. Higher concentrations are required for lower temperature cure.

## FORMULATION STABILITY

Formulation stability can be enhanced by the addition of primary alcohols and/or amines. Either triethylamine or 2-AMP is recommended at a concentration of 0.5% - 1% on total binder solids.

## STORAGE STABILITY

CYMEL U-93-210 resin has a shelf life of minimum 6 months from date of manufacture when stored at temperatures between 5°C and 30°C. Although lower temperatures are not detrimental to stability, its viscosity will increase, possibly making the resin difficult to pump or pour. The viscosity will reduce again on warming, but care should be taken to avoid excessive local heat, as this can cause polymerization.

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