All About Resins

TECHNICAL DATA SHEET

Crosslinkers

CYMEL® 301 resin

PRODUCT DESCRIPTION

CYMEL 301 resin is a highly methylated melamine crosslinker supplied at >98% solids. Relative to CYMEL 303 LF resin, CYMEL 301 resin is slightly higher in both monomer content and extent of alkylation resulting in a product with lower viscosity that exhibits fast cure response and imparts excellent flexibility to the film. Its high functionality and low tendency to self-condense makes CYMEL 301 resin suitable for a wide range of applications like can, container, automotive and general industrial coatings.

BENEFITS

- Very high solids content
- Excellent deformation and flexibility
- Fast cure response at short dwell time

APPLICATION AREAS

- Coil coatings
- Can and container coatings
- High solids and waterborne coatings

PHYSICAL PROPERTIES

Property	Range	Method
Appearance	Clear Liquid	Visual
Non-volatile by wt.	> 98%	Foil, 45 min/45°C
Viscosity, 25°C	1500 – 3800 mPa-s	Dynamic Viscosity
Free formaldehyde	≤ 0.3%	Sulfite Method
Color, APHA	< 70	ISO 6271

SOLUBILITY

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

COMPATIBILITY

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

BACKBONE POLYMER SELECTION

CYMEL 301 resin contains mainly methoxymethyl functional sites making it a highly effective crosslinker for backbone polymer resins containing hydroxyl, carboxyl, or amide functional groups, such as those found on alkyd, polyester, or acrylic resins. Its high monomer content and low tendency to self-condense results in films with high flexibility and formability when paired with inherently flexible polymers, such as polyester resins. The effective equivalent weight of CYMEL 301 typically ranges from 130-190, however, its optimum loading should be determined experimentally for each formulation with consideration of the performance properties to be optimized.

CATALYSIS

Because of its high extent of alkylation, CYMEL 301 resin responds best to sulfonic acid catalysts, like CYCAT® 4040 catalyst or CYCAT® 600 catalyst. Generally, 0.5 to 1.0% of CYCAT® 4040 catalyst on total resin solids of the formulation is sufficient to provide good cure at normal baking schedules (15-20 minutes at 120-150°C) in solvent-borne systems. Water-borne systems generally require temperatures of 150°C or higher to effect cure. Higher concentrations of catalyst might be necessary if there are basic pigments or additives present in the formulation.

FORMULATION STABILITY

The stability of formulated systems containing CYMEL 301 resin can be enhanced by the addition of primary alcohols, amines or a combination of these. Low molecular weight primary alcohols, such as ethanol and n-butanol, are most effective. Recommended amines are DMEA or 2-AMP at a concentration of 0.5-1.0% on total resin solids. Package stability can also be enhanced by the use of a blocked acid catalyst, such as CYCAT 4045 catalyst. For waterborne systems, pH should be adjusted between 7.5-8.5 to acheive optimum stability.

STORAGE STABILITY

CYMEL 301 resin has a shelf life of 5 years from the 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 an irreversible increase in viscosity.

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