

CYMEL® 303 LF resin

May 2018



PRODUCT DESCRIPTION

CYMEL 303 LF resin is a highly methylated, monomeric melamine crosslinker supplied in liquid form at $\geq 98\%$ solids content. Its high extent of alkylation and low tendency to self-condense make CYMEL 303 LF resin a highly effective crosslinking agent for a broad range of applications such as can, container, automotive and general industrial coatings. While CYMEL 303 LF resin is insoluble in water, it shows excellent compatibility with water-soluble backbone polymers and provides very good stability in amine-stabilized waterborne formulations.

BENEFITS

- Solvent free
- Excellent balance of hardness and flexibility
- Fast catalyzed cure response
- Excellent stability
- Low free formaldehyde

APPLICATION AREAS

- Coil coatings
- Can and container coatings
- Automotive finishes
- High solids and waterborne coatings
- General industrial finishes
- Inks

PHYSICAL/CERTIFIED PROPERTIES

Property	Range	Method
Appearance	Clear Liquid	ASTM E284
Non-volatile by wt.	$\geq 98\%$	DIN 55671 (Foil, 45 min/45°C)
Dynamic Viscosity, 23°C	3000 – 6000 mPa·s	DIN EN ISO 3219
Free formaldehyde	$< 0.1\%$	Sulfite Titration
Color, APHA	≤ 70	DIN EN ISO 6271
Standard Solvent Tolerance	≥ 100	Titration

ALTERNATE METHODS/RANGES (NON-STD VARIANTS)

Property	Range	Method
Dynamic Viscosity, 25°C	2600 – 5000 mPa·s	DIN EN ISO 3219
Gardner-Holdt Viscosity, 25°C	Y-22	ASTM D1545
Color, Gardner	≤ 1	DIN EN ISO 4630-1

TYPICAL PROPERTIES (NOT CONTINUALLY MEASURED)

Property	Range	Method
Density, 25°C	9.8 – 10.1 lbs/gal 1.192 – 1.202 g/cc	ASTM D1475-13

SOLUBILITY

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

COMPATIBILITY

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

BACKBONE POLYMER SELECTION

CYMEL 303 LF 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 result in films with high flexibility and formability when paired with inherently flexible polymers, such as polyester resins. The effective equivalent weight of CYMEL 303 LF is typically 130-190 g/eq, 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 303 LF 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 303 LF 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 to 7.5-8.5 to achieve optimum stability.

STORAGE STABILITY

CYMEL 303 LF resin has a shelf life of 1800 days from the date of manufacture when stored at temperatures below 32°C. Although low 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. **WARNING:** CYMEL 303 LF resin may turn hazy when cold due to crystallization of hexamethoxymethylmelamine (HMMM). Warming will return the product to normal with no adverse impact on performance.

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