Printing & Packaging Industrial Coatings

Technical Data Sheet

Laromer® PR 9000

(old: Laromer® LR 9000)

We create chemistry

Product Description

Laromer® PR 9000 is a low-viscous, isocyanate-functional, unsaturated acrylic ester resin, based on allophanated hexamethylene diisocyanate, for dual-cure coatings resistance to light and weathering. It can also be used in printing ink and OPV applications.

Key Features & Benefits

- Dual-cure applications
- Pigment coating
- Excellent weather and scratch resistance
- Can be used as a sole binder
- Improves adhesion

Chemical Composition

Isocyanate acrylate

Properties

Typical Properties

Appearance	low viscous liquid
Viscosity at 23°C (DIN EN ISO 3219)	~ 1,400 cps
Sheer rate D	6,700 s^{-1}
Color value, platinum cobalt (Hazen, ISO 6271)	≤ 150
NCO content (DIN EN ISO 11909)	~ 15.5%
NCO equivalent weight (quantity of Laromer LR 9000 as supplied containing 1 mol of active NCO)	289.7 – 271.0
Density at 50°C (DIN 51757, method 4.3)	~ 1.133 g/cm^3

Solubility, diluent tolerance

Can be thinned with the solvents common to the coatings industry (except for aliphatic hydrocarbons) and reactive thinners such as low-viscous acrylic esters and vinyl ethers such as Laromer® BDDA and Laromer® HDDA. Note: a possible increase in viscosity can be caused by components reacting with isocyanate, such as water and alcohols.

Compatibility

Can be thinned with esters such as butyl acetate, ketones such as methyl ethyl ketone, glycol ether acetates such as methoxypropyl acetate, and aromatic hydrocarbons such as xylene.

These typical values should not be interpreted as specifications.

Applications

Laromer® PR 9000 is an isocyanate-functional, aliphatic acrylic ester and its reactivity recommends it as both an isocyanate and an acrylic ester component for dual-cure applications. It is commonly used in combination with resins containing hydroxyl groups or with other energy curable resins, mostly in two-pack formulations.

Dual-cure applications formulated with Laromer® PR 9000 produce weatherable- and scratch-resistant coatings. For pigmented coatings that cannot be cured by UV, thermal pre-curing is required. The subsequent UV curing produces a coating with excellent resistance to weathering and scratching.

Laromer® PR 9000 is recommended for applications such as:

- Automotive OEM or refinish applications
- Interior/exterior general industrial metal coating applications
- Interior/exterior plastic components coating applications
- Interior/exterior wood coatings for floor, furniture, or millwork applications
- Printing inks for flexographic, gravure, digital, or silk-screen applications
- Overprint varnishes for commercial, publication, or packaging applications

A low-viscous resin, Laromer® PR 9000 may also be used as a sole binder. After exposure to UV energy, the isocyanate groups react with both ambient and the substrate's inherent moistures to form a blister-free coating. Most notably, this one-pack application is suitable for both porous substrates and those with poor adhesion properties.

The stoichiometrical reaction of the polyisocyanate component and the polyol (NCO:OH = 1) is computed based on the NCO content:

$$\frac{0.075 \times [\text{OH value}] \times [\text{non volatile fraction of polyol}]}{[\text{NCO}]}$$

Some manufacturers state the content of hydroxyl groups as OH%, in which case the formula for a stoichiometrical reaction changes to:

$$\frac{0.075 \times [\text{OH\%}] \times [\text{non volatile fraction of polyol}]}{17 \times [\text{NCO}]}$$

example: Laromer® PO 33

OH value (mg KOH/g polyol on solids)	30
Non volatile fraction (nvf) (%)	100
Laromer® PO 33, NCO content (%)	15

For a stoichiometrical reaction, the addition rate for Laromer® PR 9000 for each 100 grams of Laromer® PO 33 F is:

$$\frac{0.075 \times 100 \times 30}{15} = 15 \text{ g}$$

Processing

Laromer® PR 9000 can be diluted further for processing with suitable low-volatile monomers such as mono-functional, di-functional, or tri-functional acrylic esters. The monomers are incorporated into the film and thus influence its properties. Mono-functional monomers increase the flexibility; di-functional monomers have little effect on hardness and flexibility; tri-functional monomers increase hardness of the cured film.

Inert solvents can be used if an adequate flash-off zone is available. However, these solvents have to be removed completely from the film prior to exposure to UV energy.

A suitable photoinitiator must be used to photocure Laromer® PR 9000. The photoinitiator types include, for example, α-hydroxy ketone, benzophenone, acyl phosphine oxide, and blends thereof, for typical coating applications.

Crosslinking

Laromer® PR 9000 is used in combination with hydroxy-functional resins (hydroxy-acrylic resins, hydroxy polyesters, hydroxy polyethers), aliphatic polyols or hydroxy-functional unsaturated acrylic resins.

Safety

General

The usual safety precautions when handling chemicals must be observed. These include the measures described in Federal, State, and Local health and safety regulations, thorough ventilation of the workplace, good skin care, and wearing of protective goggles.

Safety Data Sheet

All safety information is provided in the Safety Data Sheet for Laromer® PR 9000.

Important

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U.S & Canada
BASF Corporation
24710 W Eleven Mile Road
Southfield, MI 48034
ph: 1(800) 231-7868
fax:1(800) 392-7429
Email: DispersionsPigmentsCC@basf.com
Email: edtech-info@basf.com
www.basf.us/dpsolutions

Mexico
BASF Mexicana, S.A. de C.V.
Av. Insurgentes Sur # 975
Col. Ciudad de los Deportes
C.P. 03710
Mexico, D.F.
Phone: (52-55) 5325-2756
Fax: (52-55) 5723-3011