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Luwipal® 012

General

Luwipal® 012 is a low butanol etherified formaldehyde melamine resin based crosslinker for 1K stoving top coats

Key features & benefits

- High temperature reactive
- Good performances in under cure baking conditions
- High hardness
- High solvent resistance
- High weather resistance
- Good light fastness

Chemical nature

Low butylated formaldehyde melamine resin (Imino-type), solved in n-butanol 3/2 xylene

Properties

Appearance

Colorless clear liquid

Typical characteristics
(should not be interpreted as specifications)

Non-volatile fraction 2h at 125 °C	DIN EN ISO 3251	56-60 %
Viscosity at 23 °C, shear rate D=21 s^{-1}	DIN EN ISO 3219 B	600-1000 mPa·s
Platin Cobalt Color number	DIN EN ISO 6271	≤ 50 Hazen
Acid value	DIN EN ISO 2114	≤ 1 mg KOH/g
Free formaldehyde content	DIN EN ISO 11402	≤ 0.5%

Application

Luwipal® 012 is mainly used for high solvent resistant and very hard solvent-based 1K stoving clear coats for Automotive OEM.

Luwipal® 012 is generally recommended to be used for any solvent-based 1K stoving clear and opaque top coats.

Formulation Guidelines

Diluent tolerance

methanol	limited thinnability
ethanol	limited thinnability
butanol	thinnable
ethyl acetate	thinnable
butyl acetate	thinnable
Solvenon® PM[1]	thinnable

Solvenon® DPM[2]	thinnable
methyl ethyl ketone	thinnable
white spirit	limited thinnability
toluene	thinnable
xylene	thinnable
butyl glycol	thinnable
water	not thinnable

Binder compatibility ratio 1:1, solids on solids

alkyd resins with drying fatty acids	compatible
alkyd resins with non-drying fatty acids	compatible
alkyd resins with synthetic fatty acids	compatible
acrylic resins	compatible
acrylic dispersions/aqueous polyester reins	incompatible
HF resins (Plastopal®) plasticized	incompatible
HF resins (Plastopal®) unplasticized	compatible
cellulose nitrate	compatible
Epicote®[3] 828	*compatible in a 9:1
Epicote®[3] 1001	*compatible in a 9:1
Epicote®[3] 1004	*compatible in a 9:1
Epicote®[3] 1007	incompatible
MF resins (Luwipal®)	compatible

1 methoxy-1,2-propanol
2 methoxypropoxy propanol (mixture of isomers)
3 registered trademark of Hexion Specialty Chemicals, USA

*compatible in a 9:1 epoxy resin: Luwipal® ratio

The information above can only serve as a guide.
The compatibility should be tested for each individual combination.

Luwipal® 012 is a low butanol etherified melamine resin with a non-volatile content of ~ 58% in n-butanol 3/2 xylene.

Luwipal® 012 - combined with heat- and weather resistant alkyd, acrylic (Joncryl® Polyols) and Polyesters (Basonol® HPE) - is primarily intended to be used for the formulation of solvent-based high gloss, hard baking finishes, which are resistant to weathering.

Luwipal® 012 could also crosslink with epoxy and carboxyl-based binders to form hard and resistant coatings.

Luwipal® 012 gives particularly good results in Automotive finishes in form of appearance, resistance to fluids used in Automotive industry and forms a high surface hardness at an acceptable elasticity.

The molecular structure mix of Luwipal® 012 tends to a high level of self-crosslinking, which leads to high hardness and superior solvent resistance. The high amount of free Imino and methylol groups limits the non-volatile content.

Luwipal® 012 is solved in a solvent mix of n-butanol 3:2 xylene as best compromise in storage stability, handling and coatings compatibility. Due to the free formaldehyde content of 0.5 % it is recommended to use Luwipal® 012 below 20% (supply form) in the total formulation to avoid additional labeling.

The recommended ratio for the best mechanical and chemical performance

with no additional labeling is: Main binder 80:20 Luwipal® 012 (50 % resin solid clear coat).

The mechanical properties change, if more amino resin is added to the formulation to increase hardness and solvent resistance. However, coatings flexibility and adhesion could be reduced.

Coatings based on Luwipal® 012 are very resistant to solvents, which leads to superior petrol resistance in Automotive clear coats. For better chemical resistance, Luwipal® 016 or 018 RF are preferred to use.

Melamine resins in general offer distinct advantages over formulations based on urea formaldehyde resins.

Melamine resins are highly stable at high temperatures and UV radiation. Long time temperature stress beyond the typical curing conditions could shift the coatings properties to reduced mechanical performances like reduced elasticity, reduced gloss, reduced interlayer adhesion. Melamine based crosslinkers will not discolor, unless a critical temperature (> 350 °C) or strong UV radiation degrades the molecule structure.

Luwipal® 012 develops sufficient crosslinking for good mechanical and chemical properties at low stoving temperatures (15 min 110 °C) to secure acceptable properties at under cure conditions.

The additional use of blocked organic acids is not necessary but could increase the reactivity slightly.

Recommended stoving conditions for coatings based on Luwipal® 012 are 15 - 30 min at 120 - 130 °C.

Storage

According to our experience, Luwipal® 012 has sufficient storage stability at temperatures between 4 °C and 30 °C if kept in tightly sealed containers.

For further detailed application information please contact our Technical Support Department.

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