

TYPE

Curable unplasticized phenolic resin

FORM OF DELIVERY (f.o.d.)

72 % in butanol (72B)

USES

For coating the interior and exterior surfaces of packaging containers and cans; as high adhesion, chemically resistant protective coatings for apparatus, vessels, pipelines, etc.; for heatcuring phenolic/epoxide resin combinations; for heatcuring phenolic/polyvinylbutyral combinations and for physically drying paints with resistance to fuel and oil.

PRODUCT DATA

Determined per batch:

Dynamic Viscosity (Ubbelohde) DIN 53177

dynamic viscosity [mPa.s] 200 - 1000
(23 °C)

Non-Volatile Matter DIN EN ISO 3251

non-volatile matter [%] 70 - 74
analogue DIN EN ISO 3251
(1 h; 125 °C; 1 g)

Iodine Colour Number DIN 6162

iodine colour number <= 2

Not continually determined:

Density (Liquids) DIN EN ISO 2811-2

density [g/cm³] 1,03
approx.
(20 °C)

Flash Point DIN EN ISO 1523

flash point [°C] 34
approx.

DILUTABILITY

white spirit	○	ethyl acetate	●
xylene	●	butyl acetate	●
solvent naphtha	●	methoxypropyl acetate	●
acetone	●	methoxypropanol	●
methyl ethyl ketone	●	ethanol	●
methyl isobutyl ketone	●	butanol	●
cyclohexanon	●		
● = substantial dilutability	○ = very limited or no dilutability		
● = unlimited dilutability	⊙ = limited dilutability		

COMPATIBILITY

% PHENODUR® PR 401	90	75	50	25	10
% other binder	10	25	50	75	90

Phenolic resins

PHENODUR® PR 217, PR 285, PR 308 ● ● ● ● ●

PHENODUR® PR 373, PR 401, PR 404 ● ● ● ● ●

PHENODUR® PR 722, PR 897, PR 515 ● ● ● ● ●

Epoxy resins

BECKOPOX EP 301, EP 304 ● ● ● ● ●

BECKOPOX EP 307, EP 309 ● ● ● ● ●

Other binders

Butvar B-79, B-90, B-98 ● ● ● ● ●

● = definite compatibility ○ = very limited or no compatibility

PROPERTIES AND USES

Can coating

After stoving, combinations of 20 - 40% PHENODUR® PR 401 and 80 - 60% BECKOPOX EP 307 or EP 309 (each calculated on the solids content) yield high-adhesion, chemically resistant films with good flexibility for the internal and external coating of cans, tubes and other packaging containers used in the food and luxury commodity industries.

Chemically resistant protective coatings

PHENODUR® PR 401 can be used as sole binder in high resistant stoving enamels. The stoved films are comparatively brittle and can only be used on rigid substrates. Polyvinyl butyrals can be employed as plasticizing agents. The main products suitable for combination with epoxide resins is PHENODUR® PR 401. Since plastification reduces the general resistance of the stoving enamel coatings against chemicals, the mixing ratios have to be adjusted according to the resistance and film qualities required. Epoxide resin combinations with a predominant phenolic resin constituent have proved successful for coatings exposed to acid agents. Good film flexibility and resistance to alkalis are achieved by using rather large amounts of epoxide resin. Systems being employed for protective coatings of this type can be pigmented with inert fillers and pigments. In multi layer coatings, the first coats applied are not fully cured, but dried at relatively low temperatures only. The coating system as a whole is cured together with the last coat applied (e.g. 30 min/180 - 210°C). Coatings based on this principle are used for chemical resistant interior linings of vessels, apparatus and pipelines in the chemical and allied industries.

PROCESSING

Preparing the resin solution and diluents

The phenolic resin solutions are mixed with the other resin solutions at room temperature. Glycol ethers, esters, diacetone alcohol and higher ketones are suitable as solvents. Aromatic hydrocarbons can be used as thinners. PHENODUR® PR 401/epoxide resin combinations can also be influenced to a considerable degree in their film properties by a preliminary precondensation process. The precondensation of the two components in their solution has to be carried out in closed containers, under reflux condenser and constant agitation. At a temperature of 110 - 120°C this reaction is completed after about 2 hours. Precondensation in this way effects flow properties and lacquer stability.

Stoving conditions

Depending on the application and film thickness, stoving condition lie between the limits of 30 to 10 minutes at 180 to 210°C. Higher temperatures may cause a loss of flexibility. For relatively thin films, as applied for can coating, 10 to 15 min/190 - 200°C is sufficient.

Catalysis

The use of acid catalysts as ADDITOL® XK 406 is recommended.

STORAGE

At temperatures up to 25°C storage stability packed in original containers amounts to at least 730 days.

The expiration date may be extended and COA updated after QC testing of retained samples, only for material in allnex possession.

SAFETY AND HANDLING

Please consult the Safety Data Sheet (SDS) for safety, health, and environmental data available from allnex.

DISTINGUISHING FEATURES

Films based on PHENODUR® PR 401 are almost colourless. The PHENODUR® grades suitable for combination with epoxide resins are PR 217, PR 285, PR 401, PR 722, PR 723 and PR 897.