

### PRELIMINARY PRODUCT INFORMATION

#### TYPE

Non-self-curing o-cresol/formaldehyde novolak.

#### FORM OF DELIVERY (f.o.d.)

60% in n-butanol (60B)

### USES

ALNOVOL PN 650/60B has been developed for the usage in heat curable phenolic/epoxy- resin combinations as well as in epoxy-free formulas for interior and exterior coatings of metal packaging containers. **ALNOVOL PN 650/60B intentionally does contain neither Bisphenol A nor Bisphenol F and has a very low content of free formaldehyde of < 0.1%.**

**As a Novolak type, Alnovol PN 650/60B emits a much lower amount of formaldehyde vs. typical phenolic resoles and therefore, it can be used to reduce formaldehyde emission.**

### TENTATIVE PRODUCT DATA

#### Determined per batch:

#### Dynamic Viscosity (Ubbelohde) DIN 53177

|                   |         |             |
|-------------------|---------|-------------|
| dynamic viscosity | [mPa.s] | 1500 - 3500 |
| (23°C)            |         |             |

#### Non-Volatile Matter DIN EN ISO 3251

|                      |     |         |
|----------------------|-----|---------|
| non-volatile matter  | [%] | 58 - 62 |
| (1 h; 135°C; 2 g; B) |     |         |

#### Iodine Colour Number DIN 6162

|                      |  |       |
|----------------------|--|-------|
| iodine colour number |  | ≤ 150 |
|----------------------|--|-------|

### PHYSICAL PROPERTIES

#### Density (Liquids) DIN EN ISO 2811-2

|         |                      |      |
|---------|----------------------|------|
| density | [g/cm <sup>3</sup> ] | 1.03 |
| (20°C)  |                      |      |

### PROPERTIES AND USES

ALNOVOL PN 650/60B is designed to act as a modifier of heat curable phenolic/polyester resin combinations (BADGE-free & BPA-NI systems) and phenolic/epoxy resin formulas. An addition of 20 - 40% of ALNOVOL PN 650/60B as solid on total dry film solid improves the flexibility of the coating by maintaining the chemical resistance. Positive effects in regards to leveling and substrate adhesion could be observed as well. Application areas are the interior and exterior layer of metal packaging goods like collapsible tubes, cans and drums for water, oils and food.

Alnovol PN 650/60B helps to reduce formaldehyde emission significantly, when typical quantities of a phenolic resin of the resole type are replaced by it. A recommended ratio is 1/3 of PN 650/60B as solid and 2/3 of the resole phenolic resin as solid.

### DILUTABILITY AND COMPATIBILITY

Glycol ethers, esters, alcohols and higher ketones are suitable as solvents and diluents. Aromatic hydrocarbons can be used as thinners. ALNOVOL PN 650/60B is limited dilutable with aliphatic hydrocarbons. ALNOVOL PN 650/60B is compatible with high molecular weight epoxy resins of type # 7 and type # 9, polyvinylbutyral (PVB) and with polyester resins like e.g. the food contact compliant types of our DUROFTAL product family.

### PROCESSING

The used concentration of ALNOVOL PN 650/60B as solid calculated on total dry film solid can vary between 20 - 40%. The formulated lacquers have to be applied for 10 - 20 min. at 190 - 210°C to be fully cured. Since ALNOVOL PN 650/60B is a non-self-curing phenolic resin of the novolak type and since co-crosslinking with the common functional groups in backbone binders namely hydroxyl, carboxyl or glycidyl, is very limited at the above mentioned curing conditions, or does not take place at all, ALNOVOL PN 650/60B can't be used as single crosslinker, but needs to be combined either with an amino resin or a phenolic resole type.

The additives ADDITOL XL 480, MODAFLOW Resin and MODAFLOW 2100 can help to improve flow & leveling.

The color of the cured lacquer film can be tinted with a coloring resin like PHENODUR PR 308 towards a so called "gold lacquer".

### DISTINGUISHING FEATURES

ALNOVOL PN 650/60B is a Bisphenol A - and Bisphenol F - free o-cresol novolak resin with a very low free formaldehyde content of < 0.1% and a very low free monomer content of 0.1% as well. It has been especially developed for coatings application and is unique in our product portfolio therefore.

### STORAGE

At temperatures up to 25°C the product can be stored standard for 730 days in the original container.

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.