

### 1. CHARACTERISTICS

**NORESTER® 3000** is an unsaturated polyester resin based on vinyl ester, especially formulated for producing composite moulds for applications where high thermal and chemical resistance are required. **NORESTER® 3000** is a ready to use product, filled and pre-accelerated. Moulds made with **NORESTER® 3000** give perfect plug replication.

- **NORESTER® 3000** has been designed to polymerize at room temperature following addition of normal MEKP catalysts.
- Resin pre-accelerated and promoted, permits a fast curing and a rapid manufacture of the moulds.
- An easy to use product.
- Low shrinkage.
- Fast build up of Barcol hardness.
- Improvement of the mould rigidity and low cost of mould realization.
- Low exotherm curing system.
- Low viscosity.

### 2. PROPERTIES OF LIQUID RESIN

Appearance	Beige - Brown liquid
Flammability	Inflammable
Brookfield Viscosity (ISO 2555 - 23°C - sp4)	50 rpm : 1300 - 1700 cP
Specific gravity (ICON 012)	1.43 - 1.47 g/cm <sup>3</sup>
Gel time (ICON 002) (20°C – 1% MEKP on 100 g)	20 - 26 minutes
Peak exotherm (20°C – 1% MEKP on 100 g)	> 110 °C
Non volatile content (ICON 003)	72%

### 3. MECHANICAL PROPERTIES OF THE CURED RESIN

Temperature of deflection under load* (HDT) (ISO 75)	100 - 110°C (cast resin) †
Tensile strength* (ISO 527)	90 MPa
Elongation at break* (ISO 527)	7.6%
Flexural strength* (ISO 178)	200 MPa
Flexural modulus* (ISO 178)	6.25 GPa
Barcol hardness* (934-1)	40 - 45 after 24 hours

\*Tests realized on laminate with 26% fiberglass.

† Post cured (cast resin) 3 hours at 80°C followed by 2 hours at 100°C.

If conditions of post curing are different, NORD COMPOSITES do not give any guarantee regarding the final results.

#### IMPORTANT

All of the results obtained according to trials in our laboratory. However, we don't be responsible of manufactured parts with the resin **NORESTER® 3000**, if the application conditions specified are not respected.

It is imperative that the user must also ensure that his application and his process are appropriate for this product to be used. We hereby the conformity of our products with the above specifications. We cannot be responsible for any damage caused by misuse of this product or use of the product for an application not covered in the design.

#### 4. VERSIONS

Available in long gel time version: **R 3000LGT** with a gel time of 40 - 50 min (20°C - 1% MEKP M50 on 100 g).

#### 5. RECOMMENDATIONS BEFORE USE

As the **NORESTER® 3000** resin is a filled product, the user must absolutely well mix the resin for each new application before using it to have a homogenous product.

#### 6. PROCEDURE FOR MOULD PRODUCTION

- **Application of the gel coat**

Apply 800µ of tooling vinyl ester **GC 206 / GC 207** with several thin layers from 150µ to 200µ. The gel coat must be applied at a temperature between 18°C and 25°C and catalyzed with Butanox M50 at a level between 1,5% and 2%.

- **Application of the resin **NORESTER® 3000****

The day after, on the well cured gel coat (for optimum condition, wait at least 4 hours before starting lamination) laminate with **NORESTER® 3000**.

Before laminating, make sure that the temperature of the resin, of the mould and of the room is between 18°C and 25°C. Low temperature will affect the curing and the properties of the resin, and high temperature will give a too short gel time.

Before use, mix the resin well to achieve a homogeneous product. We recommend to catalyze the **NORESTER® 3000** at 1% of MEKP.

Don't catalyze under 1% of MEKP to avoid undercutting of the laminate.

Don't catalyze over 1,5% of MEKP to avoid distortion of the laminate.

- **Hand lay up**

- When the gel coat is well cured, apply some catalysed resin to wet the surface. This will aid the wetting out of the glass fiber.
- Apply a layer of 100 g/m<sup>2</sup> or 200 g/m<sup>2</sup> or 300 g/m<sup>2</sup>. Remove air voids with a roller.
- Apply then 6 layers of 300 g/m<sup>2</sup> (40 tex) to obtain a thickness of 3 to 4 mm. It is very important to laminate a layer of 3 mm at 4 mm at once, wet on wet, in order to generate enough exotherm to activate the anti shrink components in the resin.
- After the whiteness of the resin, wait approximately 1 h - 1h30 before realized the second thick.
- For the second laminate, use 4 layers of 450 g/m<sup>2</sup> (40 tex). Remove air voids with a roller between each layer and wait for the laminate to reach peak exotherm again and turn white.
- Repeat the process 2 or 3 times until the required thickness is achieved.

- **Spray up**

Tests were made using equipment from **GLAS-CRAFT LPAIS/SP 85 EC**.

System pump = 11:1, diameter nozzle 43, angle 40.

Gun with Air Assist Containment.

- Like in the hand lay-up, apply some catalysed resin on the polymerised gel coat to wet the surface.
- Spray a layer of 3 to 4 mm of resin and chopped fibres.
- After it has turned white and the exotherm has died down (about 1 hour), apply the following layer of **NORESTER® 3000**.
- Proceed like this until you achieve the thickness you require.

**NB :** To avoid problem of adhesion between the layers of 4 mm, do not wait more than 12 hours between the different layers. Avoid contaminating the surface of the mould with dust between laminates as this will affect the interlaminar adhesion.

**The regular and homogeneous whitening of the laminate ensures that the product is being used carefully.**

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- **Post curing**

In most cases, when the resin **NORESTER® 3000** is used at normal temperatures (between 18 and 25°C), it is not necessary or possible to post cure, in case of very high molds.

A good Barcol hardness is obtained after 24 hours at ambient temperature.

However in some cases it may be necessary to post cure the mold. In this case, it is imperative to make the post cure gradually and follow the recommendations:

- 24 hours at ambient temperature,
- Then 6 hours at 40°C
- Then 6 hours at 60°C
- Then 6 hours at 80°C
- Then 4 hours at 100°C and 4 hours at 120°C.

The resin **NORESTER® 3000** should not be cured at a temperature than 120°C.

## **7. RECOMMENDATIONS FOR DEMOULDING**

According to the size, and application of the mould, it is strongly recommended to reinforce the mould with ribs and to demould between 2 and 5 days after laminating, to avoid any marks from the ribs.

If the installation of the ribs is not necessary, then release of the mould can be carried out 24 hours after the peak exotherm of the last layers of **NORESTER® 3000**.

## **8. PACKAGING**

Available in 25 kg can or 250 kg drum.

## **9. STORAGE CONDITIONS AND HANDLING**

Storage life: **NORESTER® 3000** resin is stable for 4 months from date of production. The product must be stored in original closed packaging at a temperature between 15°C and 25°C, away from direct sunlight.

It is the responsibility of the customer to assure that the product is used in good conditions overall before the date limitation mentioned on the keg.

This resin is subject to the Highly Flammable Liquids Regulations.

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