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Bringing Solutions to the Surface

The information herein is to assist customers in determining whether our products are suitable for their applications. Our products are intended for sale to industrial and commercial customers. We require customers to inspect and test our products before use and to satisfy themselves as to contents and suitability for their applications. We warrant that our products will meet our written specifications. Nothing herein shall constitute and other warranty, express or implied, including any warrant of merchantability or fitness for a particular purpose, nor is any protection from any law or patent to be inferred. All patent rights are reserved. The exclusive remedy for all proven claims is replacement of our material and in no event shall we be liable for incidental or consequential damages.

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Norpel Gelcoat Guide to Better Quality





**COLOUR,
SURFACE PROTECTION,
GREAT AESTHETICS,
NOVEL LOOKS,
PERSONAL TOUCH**

and you want to Get it Right!

Your Solution Provider

Norpol gelcoats supplied by Reichhold can provide you with an almost unlimited colour range and with special surface aesthetics, while offering a tailored protection level depending on the performance

weathering resistance, colour and gloss retention, scratch resistance, and other. Moreover the Norpol gelcoats are designed to optimise part manufacturing, and minimise release of volatiles.

This Norpol Gelcoat Guide to Better Quality will help ensuring that you part manufacturing is done right, deficiencies in application are recognised in an early stage, and you have a solution on hand for further improving robustness of operations. You will find specific examples of surface defects, with our recommendations for resolution.





Storage

Our standard gelcoats have a storage stability of at least 6 months from date of manufacture provided that:

- Storage temperature is 23°C or below.
- The gelcoat is stored in a closed, factory sealed and opaque container.
- The gelcoat is stored out of direct sunlight.

If storage of Norpol gelcoats is not according to our recommendations then the usage life will have potential to be decreased.

If the material has a temperature below 18°C after storage, it should be heated to 18–23°C before usage. The heating of the material can be done by bringing the container(s) into the workshop. This procedure of heating might take several days.



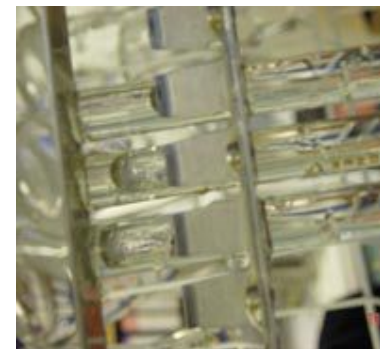
Gelcoat Preparation

- Stir the content before use.
- Products with different production numbers should be mixed before use to prevent colour differences.
- Check that the gelcoat temperature is 18–23°C before use.
- Gelcoat is supplied for two types of application. Spraying (marked S) and brush (marked H). Use the right gelcoat to the right type of application.



Applying the Gelcoat

- Before use, add 1.2–2.0% MEK-peroxide 50% or equivalent. Mix the peroxide thoroughly and carefully into the gelcoat. Too vigorous mixing may cause air entrapment in the gelcoat and hence micro pores in the cured gelcoat film.
- Recommended gelcoat film thickness is 500–800µm wet.
- Observe that the gelcoat as well as the mould and the workshop should have a temperature of 18–23°C.
- Always check the film thickness with a wet film thickness gauge.





Identifying the Problem (Troubleshooting)

Even though the plant temperature is ideal; the ratio of peroxide to gelcoat has been measured; the spray pattern has been tested and the spray equipment has been checked thoroughly and that the operator is an experienced technician, problems can still arise even under ideal conditions. The problem can be a result of unintentional oversights, unexpected changes or by accident. In order to prevent the same problems reoccurring we have made some key questions to give the applicator a basis for identifying the cause of the problem. A series of pictures will show what the most common defects look like. What causes the different defects will be described and this will give the operator an indication on how to solve the problem.

Questions to Ask

The series of questions which follows, give the applicator a basis for identifying the cause of the problem.

- What does the defect look like?
 - When did it first occur?
 - Does it appear all over the part, or is it localised to a specific area?
 - Can the defect be traced to the mould, in which the product was casted?
 - At what time of the day was the gelcoat applied, and by whom (shift, operator)?
 - Under which conditions(*) did the application take place?
- * Temperatures (room, materials), humidity, dust/ air pollution etc...
- Does the defect only show up on the demoulded product?
 - * Is the problem visible on the gelcoat (in mould), prior to laminating.
 - Were any changes made during the operation? (*)
 - * Temperatures, post-curing, gelcoat quality, peroxide quality/ amount, application equipment, application method.
 - Did the defect show up on all products produced, or only one?
- Is there a general agreement on the nature of the defect?
 - Have all incoming materials been checked? (*)
 - * Mould condition, wax/ release agent, gelcoat and peroxide quality, other reinforcement, topcoat..

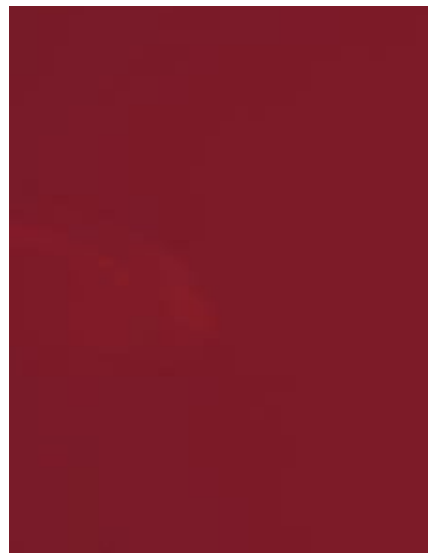


Yellowing Exposed to Sunlight

CAUSE:

- Usually due to too high gelcoat film thickness in corners/ deep areas
- Undercured gelcoat
- Uneven gelcoat film thickness
- Film cure inhibited by styrene vapours
- Type of gelcoat (see data sheets)

to the product when demoulded



Dull Surface

CAUSE:

- Dull spots in the mould
- Insufficient preparation of mould
- Dust and dirt on mould prior to gelcoat application
- Undercured gelcoat film
- Pre-released film (will be dull in released areas)
- Premature demoulding



Print Through

CAUSE:

- Can see through gelcoat film due to poor covering of unevenly applied or too thin gelcoat film



Sagging

CAUSE:

- Too high gelcoat film thickness
- Gelcoat viscosity too low
- Wrong spray tip
- Too long geltime



Dust in Mould

CAUSE:

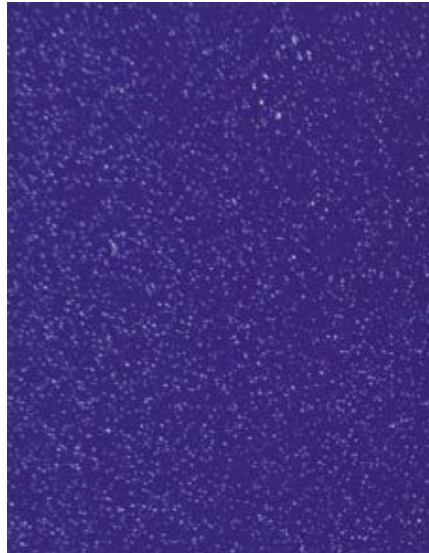
- Dust and dirt on mould prior to gelcoat application, in some case due to static electricity



Bleeding

CAUSE:

- Poor film cure of "striping" gelcoat
- The second coating "dissolving" back of strip coating



Porosity

CAUSE:

- Gun too close to mould
- Gelcoat viscosity too high
- Wrong type or contaminated peroxide
- Peroxide level too high
- Gelcoat film too thick
- Gellime too fast
- Water or solvent contamination
- Too high spraying capacity (too big tip) compared to shape of mould



Fading or Bleaching

CAUSE:

- Undercured gelcoat film
- Water exposure to dark colours
- Exposure to harsh chemicals



Pre-Release

CAUSE:

- Peroxide level too high
- Gelcoat film too thick
- Uneven film-thickness around radius causing uneven cure and shrinkage
- Uneven cure due to styrene vapour in deep areas of the mould
- Gelcoat film allowed to stand too long before laminating
- Wrong type/ application of mould release agent
- Contamination on mould surface
- Laminate excessively resin rich



Fibre Pattern

CAUSE:

- Insufficient cure of product
- Pattern transferred from mould surface
- Glass texture too coarse
- Gelcoat film too thin
- Wrong laminating/ demoulding cycle



Pigment/ Colour Separation

CAUSE:

- Possible water or oil contamination
- Too thick gelcoat film causing sagging
- Flooding gelcoat onto the mould surface



Fisheyes

CAUSE:

- Contamination of mould surface
- Gelcoat film too thin
- Viscosity too low
- Low atomisation pressure
- Excessive wax on mould
- Worn tip
- Pump pressure too low (airless)
- Inadequate mixing of gelcoat
- Type of wax/ release agent



Cracking

CAUSE:

- Stress on the gelcoat surface from bending, impact or excessive force used to demould part
- Gelcoat film too thick
- Improper curing times or curing cycle
- Weak laminate
- Defect in mould



Poor Levelling

CAUSE:

- Viscosity too high
- Gun held too close to surface or at improper angle
- Atomisation pressure too low (air support systems)
- Low fluid pressure (airless systems)



Poor Adhesion

CAUSE:

- Contamination
- Unevenly applied or wrong type of wax/ release agent migrating to gelcoat surface
- Over-cured gelcoat.
- Peroxide level too high or too long time before backup lamination was done.
- Laminating resins containing too much wax



Blisters Spot after Sun/ Heat Exposure

CAUSE:

- Poorly rolled laminate (air pockets)
- Peroxide droplets on gelcoat or in the glass fibre
- Solvent, water or oil present on gelcoat or glass fibre



Alligatoring/ Wrinkling

CAUSE:

- Insufficient cure of the gelcoat film prior to application of back-up resin.
- Insufficient film thickness to resist attack of styrene in back-up resin
- Too long geltime



Blisters Observed on Boats, Tanks and Spas after Water Exposure

CAUSE:

- Type of gelcoat (see data sheets)
- Undercured gelcoat
- Gelcoat film too thin
- Wrong type of laminating resin
- Wrong type of glass fibre