Gelcoat trouble shooting

Composites

Application Procedure

- ✓ Temperature of gelcoat, mould and workshop between 16°C-30°C. Ideally 20-25°C
  - It takes at least 24h for cold gelcoat to warm up in your workshop!
- ✓ Humidity below 80 %.
- ✓ Stir gelcoat before use.
- ✓ Catalyse with standard MEK-peroxide at a level of 1.5-2.5 % (i.e. Butanox M50)
- ✓ Apply an even layer at thickness 500-700 microns wet.
  - Use of a thickness gauge
- ✓ When spraying, build thickness in 2 – 4 passes.

Gelcoat Application

Gelcoat Curing (gelation and overlamination time)

- Workshop conditions (Temperature, Humidity)
- Thickness of 500-700µm
- Catalyst level
- Ventilation in deeper areas of a mould

Thickness of the gelcoat – Constant layer thickness

- Below 400µm: higher risk on fiber print through, alligatoring, osmosis
- Above 1000µm: higher risk on cracks, pre-release, more yellowing

Trouble Shooting

Elephant Skin

Peroxide underfed

Layer too thin

Geltime too long

Material and mould too cold

Styrene and hardener fumes can not flow off

Wrong peroxide

Curing with ISO/NPG MEKP takes too long

Laminating resin is open too long if the gelcoat is too fresh

Trouble Shooting

Cow eyes/Fish eyes

Wrong release agent or incompatibility

Too much release agent

Release agent not applied properly o polished out

Gelcoat not properly formulated

- **Viscosity**
- **Thixotropy**

Too much spray thinner

Contamination with water, oil, silicon or solvents

Trouble Shooting

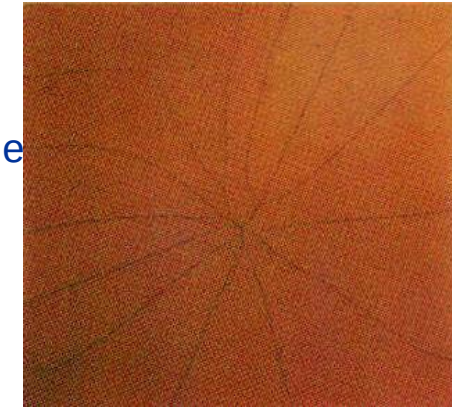
Pinholes

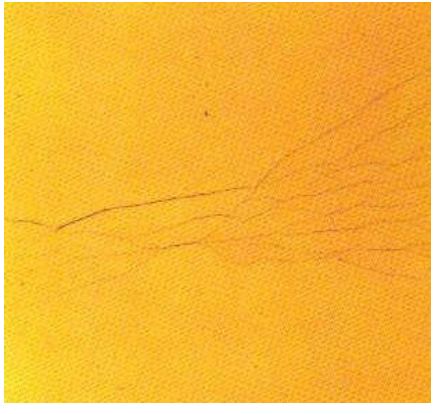
Material too cold, viscosity too high
Water in the sprayed air or in the peroxide
Wrong peroxide (forms micro-pores)
Wrong release agent or not worked properly
Sprayed too thick in one layer
Sprayed with too much mist (thick drops are better)
Gun held too close to the mould
Geltime too fast

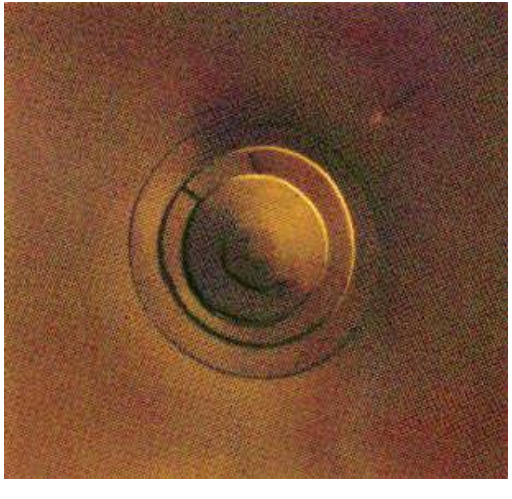
Trouble Shooting

Cracks

Too much forces when the part is demoulde
The part adheres to the mould too tightly
Laminate too elastic
Gelcoat too brittle for application
Cracks in the mould are transferred to the article







Trouble Shooting

Pigment float

Contaminates in the Gelcoat (water, solvents, oil, etc.) brought in with a brush or spray gun

The gelcoat runs

Uneven distribution of peroxide

Poor misting when spraying caused by:

- **spraying pressure too low**
- **spraying nozzle too large**
- **high viscosity**

Poor mixing

Spray gun too close to the mould

Influence of air on the gelcoat while spraying

Trouble Shooting

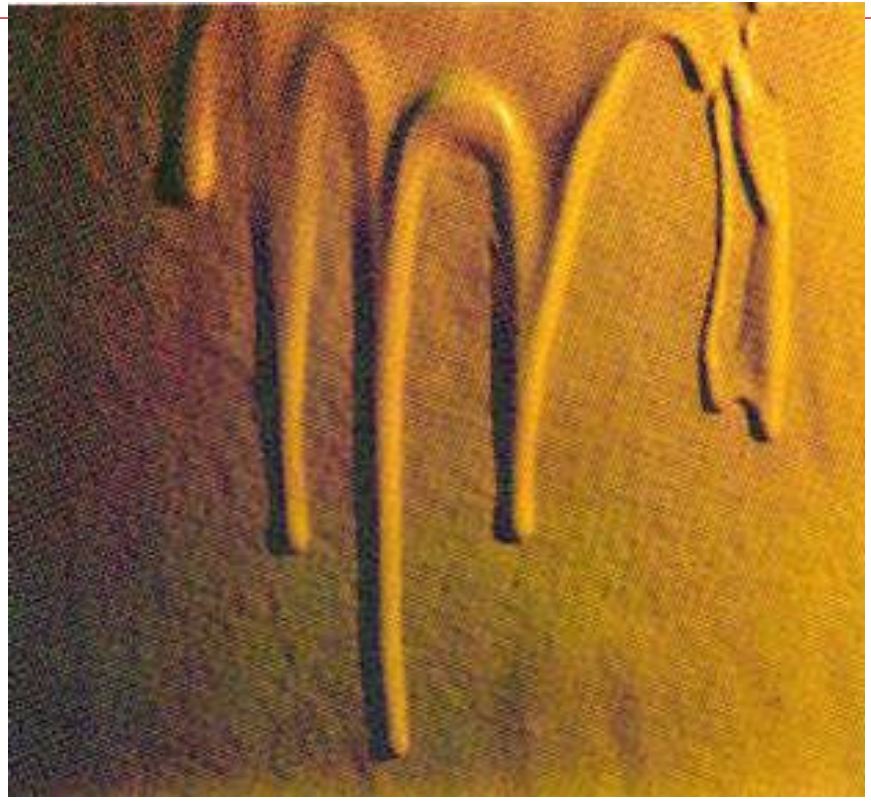
Running and Slipping

Layer is too thick

Viscosity too low

Thixotropy too low

Wrong release agent (too much release effect)



Trouble Shooting

Separation of pure resin

Water in the gelcoat

Poor distribution of peroxide or not enough peroxide

Geltime too long (e.g. through influence of temperature, inhibition of styrene)

Dynamic loads too high during the spraying process

Layer too thick with viscosity or thixotropy too low

Trouble Shooting

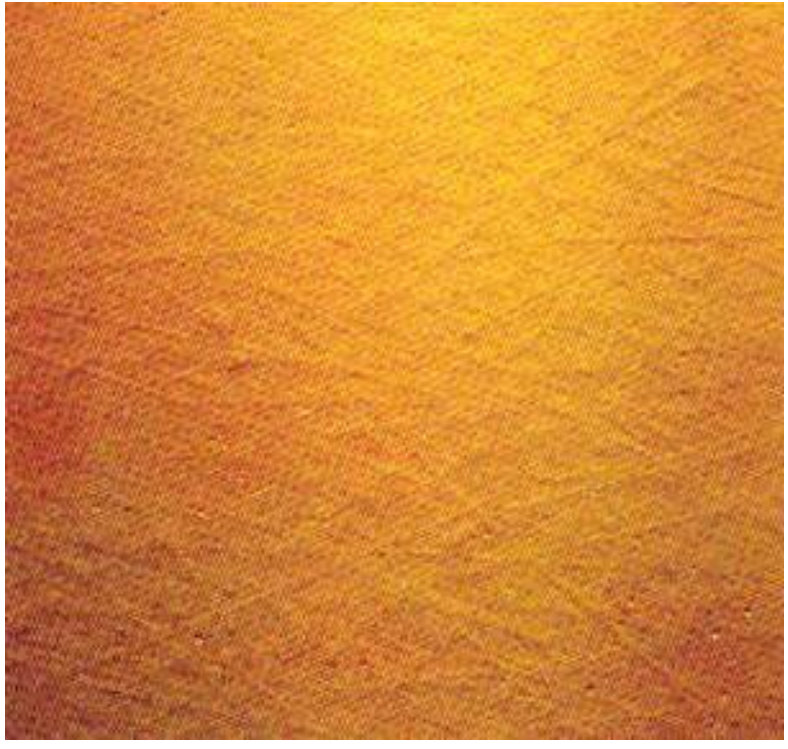
Vertical Seperation

Peroxide overspray
Spray gun too close to the mould
Poor distribution of peroxide in the gelcoat

Trouble Shooting

Fiber print

Gelcoat not fully cured
Demoulding too early
Layer of gelcoat too thin
High Tmax development of the laminate
Wrong reinforcement material used for the first layer



Examples of surface defects

Defects can be splitted into two groups

- Short-term distortions (< 0.5 mm)
- Long-term distortions (> 0.5 mm)

Some effects come from the gelcoat layer itself, others are induced by the reinforcement layers behind the gelcoat

Roving print

Slight golf ball effect

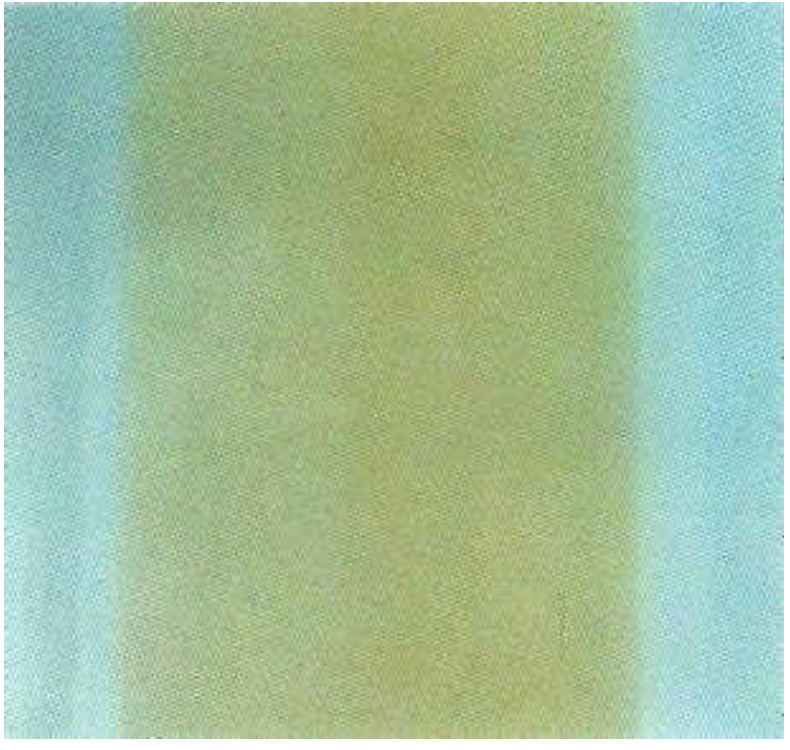
Trouble Shooting

Yellowing

Peroxide concentration too high
Peroxide mixed in poorly
Gelcoat too thick
Local undercuring caused by:

- too little peroxide
- Working temperature too low
- Inhibition of styrene
- Separation of resin

Polystyrene of remains of release agent loosen from the mould stick to the gelcoat
Moulded articles are cleaned with amin or an alkaline cleaning agent
Temperature too high



Trouble Shooting

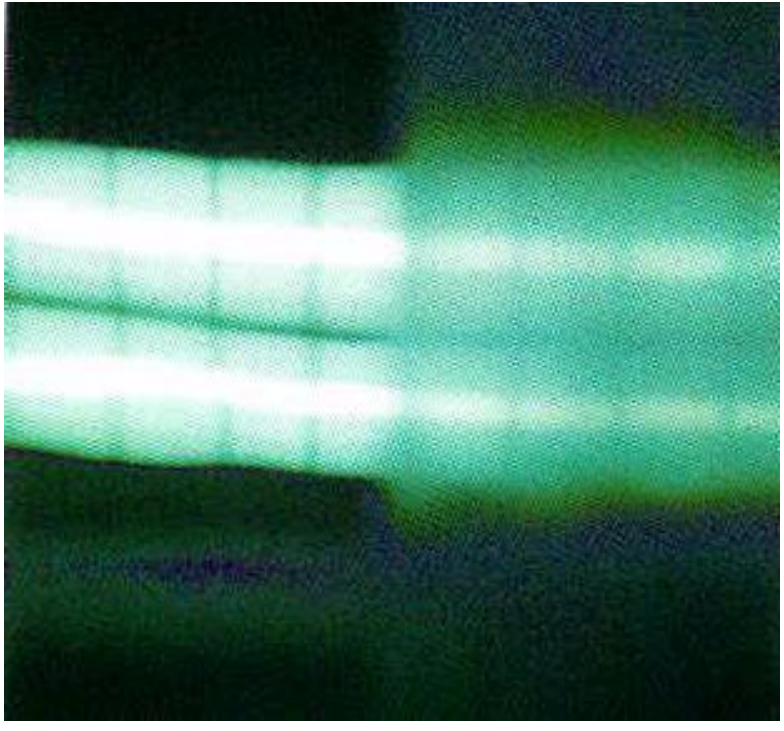
Gelcoat shrinks from the mould

Gelcoat too thick
Material too fast
Temperature of the material or the mould too high
Problems with the release agent
Left in the mould too long without having built up the laminate

Trouble Shooting

Matt Surface

Surface of mould is matt
Not properly polished
Polystyrene or wax on the surface of the mould
Waterbased release agent had not completely dried
Mould not cleaned
Gelcoat has shrunk from the mould
Demoulding too early



Trouble Shooting

Osmosis

Wrong type of gelcoat selected
Wrong back filling resin selected
Wrong reinforcement material selected
Drops of peroxide on the surface
Contamination of the surface of the gelcoat
Layer of gelcoat not thick enough
Full curing is not good

Trouble Shooting

Demoulding Problems

Wrong application of release agent
Mould not clean
Too long time between applying the release agent and application of gelcoat
Wrong release agent selected
Layer of gelcoat too thin

Trouble Shooting

Orange Skin

Viscosity or thixotropy too high

Spray gun to close to the mould

Incorrect spraying angle

Spraying pressure not adjusted correctly