
1. GENERAL DESCRIPTION

Liquid photo-positive resist based on o-naphto-chinon-diazide and Novolack, used in the production of printed circuit boards.

2. FEATURES

POSITIV 20 is a classic liquid photo-resist that transfers patterns directly onto working materials for processing by etching. The lacquer resists strong acidic etching products however can be easily be removed by solvents (ester, ketone) or aqueous alkalines.

The lacquer is at its most photo-sensitive at close ultra-violet range (UVA). The lacquer should therefore be applied in yellow light or darkened daylight.

3. APPLICATIONS

The main application for POSITIV 20 is the production of printed circuits boards. The transparent positive-pattern from the circuit diagram is accurately transferred. Surfaces impervious to light e.g. the electrical circuits, do remain present after etching.

Other application include photo-lithographics on metal or glass.

4. DIRECTIONS

Directions in producing printed circuits**4.a. Surface preparation**

Surfaces must be free of grease and oxide. A water-based cleaning process is available. When preparing metal surfaces manually, household scouring powders are ideal. Solvents are only used when dirty, oily stains have to be removed. The last step in the cleaning process should be rinsing with demineralized water.

At this stage the cleaned surface should be fully wettable and hence no water repellant areas should be left. The cleaned board should be left drying in a dust-free environment.

4.b. Coating

Following the cleaning stage, the horizontally positioned copper plate is coated by spraying (aerosol) from a distance of 20 cm. Best result in getting a uniform coating is obtained by continuously spraying in a zigzag pattern. A typical coat thickness is 6-8µm and has a bluish colour. To overcome discontinuities while spraying, the aerosol can should not be held too tilted.

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The lacquer is sensitive to UV-light and hence exposure to direct sunlight or bright day light should be avoided. Coated materials can be stored in the dark at 25°C for up to 4 weeks.

4.c. Drying

After application of the film, boards must be dried immediately in the dark. The drying temperature should be increased slowly to 70°C and kept at that temperature for approximately 15 minutes. Infrared or forced air drying is possible. When air drying at ambient temperature is used (24 hrs minimum), the quality of the film will only allow very simple work. The adhesion is poor and the danger for dust entrapment and pinholes is high.

4.d. Exposure

The transparent circuit diagram must be placed flat and error free on the copper plate. Paper based diagrams can be made transparent using Kontakt Chemie TRANSPARENT 21. The spectral sensitivity for the photo resist POSITIVE 20 lacquer lies in the wave length range 340 to 420 nm, so one can use UV-lamps to expose the film/copper plate. At an exposure strength of 100 mJ/cm² the exposure time will be approximately 10 seconds for a film thickness of 8µm.

In practice the exposure time is between 60 and 120 seconds when lamps are used from a distance of 25-30 cm. It is recommended to allow the lamps to warm-up for approximately 3 minutes.

4.e. Developing

The exposed plate is being developed by immersion in a sodium hydroxide bath (10 g/l sodium hydroxide in water) at ambient temperature for approximately 60 seconds. The exposed lacquer dissolves. The developing process can be assisted by minor bath agitations. After developing, the plates are rinsed thoroughly with water.

4.f. Etching

Etching of copper and brass plates is best done with an iron-3-chloride solution (400 g/l water). The required time is between 30 and 60 minutes. Warming-up the solution to 40°C plus minor bath movements will assist the etching. At the end of the etching process, plates should be rinsed excessively under running water.

4.g. Stripping of remaining lacquer

Following the etching, the remaining lacquer is to be removed from the circuits. This is best done with acetone at ambient temperature.

We do recommend to apply a film of Flux SK10 to the PCB's, in case these are not being processed immediately. The Flux SK10 lacquer protects the circuits from oxidation plus acts at the same time as a highly effective flux during subsequent soldering.

Finished PCB's can be coated with PLASTIK 70 to protect these from environmental humidity.

Possible deficiencies and their cause during application

Bad adhesion, blisters or dot formations

- Product shelf life (18 months) has expired, see date on aerosol can
- Presence of anti-cross linking impurities: cleaning with scouring powder and rinse.
- Summer hot temperature during application: Decreases spray distance.
- Aerosol can too cold, just out of fridge: leave at ambient temperature.
- Too high drying temperature: to not exceed 70°C.

Pin-holes formation

- Insufficient drying: dry at the recommended temperature of 70°C.
- Too fast drying: gradually increase over a period of 15 min. the temperature to 70°C.
- Too long a development time: do not exceed 2 minutes.

Other applications of POSITIV 20

- **Etching of glass:** the lacquer also resists 40% strong hydro fluoro acid hence making it possible to etch glass. The adhesion can be improved by a temperature treatment at approximately 120°C.
- **Production of durable inscriptions or graphics:** A temperature treatment of the lacquer at 190°C will result in durable inscriptions or graphics having a blackish-brown color.

Safety precautions

While working with the above mentioned chemicals, it is necessary to strictly adhere to the safety and handling instructions. Skin and eye contact are strictly to be avoided. We

recommend the use of protective clothing, gloves and safety spectacles. Use only in well ventilated areas.

A safety data sheet (MSDS) according to EU directive 91/155/EEC and amendments is available for all CRC products.

5. TYPICAL PRODUCT DATA (without propellant)

Color	: blue, transparent
Flashpoint spray	: <0°C
Coverage at film thickness of 8µm	: ±1m ² /200 ml aerosol
Maximum spectral photo-sensitivity	: 340-420 nm (UV-A)
Shelve life	: 18 months following aerosol production (see aerosol can)

6. PACKAGING

Aerosol: 25 x 100 ml; 12 x 200 ml

All statements in this publication are based on service experience and/or laboratory testing. Because of the wide variety of equipment and conditions and the unpredictable human factors involved, we recommend that our products be tested on-the-job prior to use. All information is given in good faith but without warranty neither expressed nor implied.

This Technical Data Sheet may already have been revised at this moment for reason such as legislation, availability of components and newly acquired experiences. The latest and only valid version of this Technical Data Sheet will be sent to you upon simple request or can be found on our website: www.crcind.com.

We recommend you to register on this website for this product so you will be able to receive any future updated version automatically.

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