An introduction to

# Fluoropolymer coating for the reliable protection of electronic circuits and assemblies

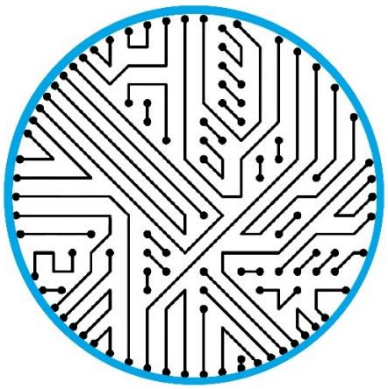
<u>Why should assemblies be protected?</u>

Water and condensate lead to:

- direct functional failures
- long-term corrosion

Other trouble makers are:

- dirt
- oil
- fuel
- solvents and cleaning agents
- dust
- air pollution



➔ **These problems can be avoided by coating your assemblies**

<u>Common available varnishes:</u>

- resins
- paints
- acrylics
- urethanes
- epoxides
- silicones

<u>Conventional painting process:</u>

- covering contacts, plugs, switches, etc.
  → usually a manual process
- application of the paint by spraying, dipping, brushing or partial dispensing
- drying for up to 1 hour in air or in a drying oven
- removing the covers → usually a manual operation
- curing by heat, storage, UV light, etc.

## Compared to the conventional painting processes, the protective coating with fluoropolymers offers many interesting advantages!



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## Eigenschaften der Fluorpolymerbeschichtung

Advantages of the fluoropolymer coating:

- masking is only necessary in exceptional cases, what reduces the process time significantly
- due to very short coating times and no curing times, a process time of 3-6 minutes is achieved
- the handling is straightforward as no safety precautions are required and the storage and disposal of the material is very easy
- no separate premises or extraction units are needed

Properties of the fluoropolymer coating:

- reduces the surface energy to 11 - 12 dynes /cm (less than PTFE)
- rejects liquids efficiently
- has very good adhesion on all surfaces
- gives a very thin layer, typically 500nm, absolutely transparent and UV resistant
- provides many years of durability, both on the assemblies, as well as when it's stored

The coating process

- manual or fully automatic loading of the baskets
- diving in the immersion bath
- immersion time 10-30 seconds (at room temperature)
- drying time approx. 3-5 minutes in the plant (at approx. +4°C)
- no post-curing is needed

➔ Including the loading and unloading of the basket, this average process time is approx. 6-7 minutes.

**This is a very fast, clean and cost effective process!**

## Plus there is the appropriate plant technology from Puretecs for high performance and process reliability.

**For smaller quantities, the process can of course also be carried out without system technology**



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Safety/ Health/ Environment

Fluorochemical carrier fluid (HFE) and fluoropolymers:

- have no ozone-depleting effect
- are non-flammable (UL registered)
- are not harmful to health
- have no labelling requirements
- are PFOS-free
- are REACH registered and RoHS compliant
- are almost odorless
- are easy to store in closed containers, but should not be exposed to extreme heat

Properties of the coating:

- repair friendly (solderable)
- the coating process can be repeated
- contactability of plugs, switches, potentiometers,... is given
- low refraction index → optical components such as LCDs can be covered
- insoluble in conventional solvents and fuels

Limitations of the coating:

- no voltage insulation
- can't protect the components against mechanical forces
- can't make assemblies submersible in water

Reliability:

- complies with the 1000h HAST 85/85 test
- meets the 14 days air humidity test with 95% RH at 40° C
- meets the temperature cycle test IEC-68-2-14
- passes the common corrosive gas tests
- resists 10% acids and alkalis
- complies with the approval of several international telecommunications network providers

**Summary**

**Our fluoropolymer coatings give you an**

- **easy**
- **fast and therefore cost effective**
- **solid**
- **clean**
- **environmentally friendly**

**process, which protects your assemblies and PCBs reliably against condensation, dripping water, high air humidity, tropical climate, oil films etc.**

## You increase the reliability and quality of your products, even if no conformal coating is mandatory!



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