Nuvochem

Data sheet Certonal FC742 (Certonal FC742, Certonal FC742 10%)

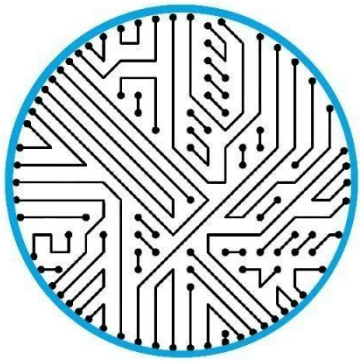
The Certonal 742 surface coating is a ready-to-use, clear liquid of a fluoroacrylate polymer (fluoropolymer) which is dissolved in a Certonal 746 hydrofluoroether solvent.

Certonal 742 is made to replace 1:1

- **Acota Certonal FC-742**
- **3M™ Novec™ 1700**

As the above it consists of the same chemistry, using a C4 fluoroacrylate polymer dissolved in HFE (CAS 163702-08-7 and CAS 163702-07-6).

It can be used in the same way, having the same properties and can be also mixed with the former products Acota Certonal FC-742, 3M™ Novec™ 1700.



The use of Certonal coatings in body-invasive assemblies is not permitted! Certonal must not be used for products that are introduced into the human body (for medical purposes), such as syringe needles.

Certonal contains fluorine; Sale and use is only for professional, commercial users! Not intended for private use! Certonal is a PFAS-material.

Purocoat as liquid for application

Typical physical properties

Appearance	Clear, colorless, bright liquid	Fluoropolymer percentage	0 — 10% mass (0% for Certonal 746; 2% for Certonal 742 10% for Certonal FC742 10%)

Fluoropolymer percentage typical for application	2.0% mass
Fluoropolymer percentage upper limit for application	2.2% mass
Fluoropolymer percentage lower limit for application	1.8% mass
Solvent:	Certonal FC 746
Specific density at 23 °C	1.52 g/cm³
Boiling point of the solvent	61 °C
Flash point	Not flammable

Environmental properties

Ozone depletion potential[1] (ODP)	0.0 (for solvent Certonal FC 746)
Global warming potential[2] (GWP)	320 (for solvent Certonal FC 746)
Atmospheric lifetime	4.1 years (for solvent Certonal FC 746)
Identification	No hazardous substance
Dangerousness	Not toxic
Exposure of people to solvent vapors in the air	max 750 ppm (8 hours average)

1 CFC-11 = 1.0
2 GWP 100 years integrated time horizon (ITH) Multiples of the CO_2 equivalent

Processing instructions

Method	Dipping in liquid
Dipping time	No minimum time, wait for no bubbles coming up
Ascent rate	Minimum 10mm/s
Drying time	approx. 2-10 minutes. Depend on the shape
Particularities	Avoid scooping components
Fluoropolymer concentration control	Weighing a test quantity or density measurement

Natural change in concentration

Certonal FC 742 is supplied in a ready-to-use concentration of 2%. By filling Certonal into a container or bath that is not tightly closed, the solvent content in the Certonal is lost over time through evaporation. The contained solvent Certonal FC 746 evaporates very easily and quickly.

Fluoropolymers are also removed from Certonal during application in order to finally coat the modules, but in most cases the proportion of the evaporating solvent Certonal FC 736T by far predominates. This means that over time the concentration increases from the original 2% fluoropolymer content to higher values. The total amount of Certonal liquid becomes less.

Concentration measurement manually

What do we use?

1. Precision balance with a display accuracy of 0.001 g
2. Weighing dish - disposable items made of aluminum foil with a diameter of approx. 70 mm
3. 5 or 10 ml withdrawal syringe, reusable

How do we proceed?

1. The balance is turned on for at least 5 minutes. Without loading the tare display, press 0.000 g.
2. Place the dish and empty syringe and note the weight. (Result 2)
3. Fill the syringe, place it on the scale together with the dish and note the total weight. (Result 3)
4. Carefully empty the contents of the syringe into the dish and set the syringe aside.
5. Let the dish dry out for about 10 hours - preferably overnight - at room temperature.
6. Place the dry dish and syringe back on the zeroed scale and note the weight. (Result 6)

How do we get the result?
The calculation is carried out in such a way that the tare weight from result 2 is deducted from the gross weights from result 3 and result 6, and the two results are set in relation to one another in order to determine the percentage.

$$\frac{result\ 6 - result\ 2}{result\ 3 - result\ 2} x\ 100 = Percentage\ of\ the\ solid\ content$$ w

When emptying the syringe into the dish, a little liquid tends to splash over the edge of the dish. To avoid this, you can pierce a small hole in the top of the syringe and then pull the syringe plunger up over the hole to allow the liquid to drain slowly into the dish.

ℹ The automated measurement device „MST-2.0" is not compatible with Purocoat 17/02 MST2.

Refilling of Certonal in an existing coating bath

After the current concentration w has been determined, an existing coating bath can be adjusted to the desired target concentration of 2% by refilling with Certonal 742 10% (10% concentrate) or Certonal FC 746 (pure solvent).

- If the value is lower than the desired target concentration of typically 2%, then Certonal 742 10% (10% concentrate) is refilled to add more fluoropolymer solids to the existing coating bath and raise the value:

  nk: Amount of Certonal 742 (concentrate) to be refilled in liters **b**: Amount of the existing coating bath in liters **w**: Value of the concentration in the existing coating bath in % **z**: Target concentration (typical 2) in %

$$\boldsymbol{nk} = \boldsymbol{b} * \frac{\boldsymbol{z} - \boldsymbol{w}}{\boldsymbol{10}(\%) - \boldsymbol{z}}$$

- If the value is higher than the desired target concentration of typically 2%, then Certonal 746 (pure solvent) is refilled to dilute the existing coating bath and lower the value:

  nv: Amount of Certonal FC 746 (thinner) to be refilled in liters **b**: Amount of the existing coating bath in liters **w**: Value of the concentration in the existing coating bath in % **z**: Target concentration (typical 2) in %

$$\boldsymbol{nv} = \boldsymbol{b} * \left(\frac{\boldsymbol{w}}{\boldsymbol{z}} - \boldsymbol{1} \right)$$

If you measure the weight with a scale instead of the calculated volume with a liter measure for refilling, note that 1 liter corresponds to ≈ 1.52 kg!

Certonal as dried coating layer

Typical physical properties

Heat stability of the dried coating	-50°C to **+175°C** Repellent to chlorinated silicone oil after 24 hrs at 175°C

Surface energy of the dried coating	11-12 mN/m
Layer thickness /Coating thickness (dipping process)	~ 500 nm
Dielectric constant at 30% RH, 25 °C at 1 kHz	3.1 - 3.4 Dielectric
strength at 35% RH, 25 °C	0.0088 - 0.0089
Aging and UV resistance	Very good; minimum 15 years
Refractive index	1.37 - 1.38
Flammability according to UL-94	V-0

Handling of the coated modules

Modules coated with Certonal FC 742 are covered with an approx. 500 nm thin protective film. This is permanently flexible and to a certain extent also mechanically resilient. After it has completely dried (a few minutes), the module can easily be touched by hand or held with clamping tools. Avoid scratching, vigorous rubbing and bulk material.

There is no curing or post-curing time, the assemblies can already be fully loaded after drying.

Test the coating layer

A simple test of whether the coating has been applied can be made with a test ink. The test ink is set to a specific surface energy and shows whether the surface is above or below this value.

Use a test ink with a value of 28mN/m in order to have a good distinction between the uncoated and coated surface.

Use the brush to apply some of the test ink to the surface.

- **If the test ink contracts and cannot form a closed film, the surface is coated**
- **If the test ink remains on the surface as a closed film, the surface is not coated** The test ink can then simply be wiped off with a dry, soft cloth.

Layer thickness measurement

A dried layer of Certonal FC 742 which was applied in an immersion bath with a 2% fluoropolymer concentration, has an average layer thickness of 500 nm. The layer thickness is not exactly the same everywhere, but varies between about 400 and 600 nm. This is mainly due to the run-off effects when withdrawing from the dipping bath.

In practice (manufacturing), it has proven useful not to measure the layer thickness, as this is too time-consuming and expensive. Since there is a direct relationship between the layer thickness and the fluoropolymer concentration of the Certonal FC 742, **it is entirely sufficient to continuously monitor the fluoropolymer concentration as a process variable**.

General

Certonal disposal

Liquid Ceronal FC 742 must be disposed of properly. It must not be discharged into sewage or water. Remnants, Certonal mixtures without a sufficient fluoropolymer concentration and discharged solvents from the drying zone of the coating systems will be taken back by the supplier. The Certonal mixtures can always be topped up. A complete replacement is not necessary, the material does not age. This means that there are no large amounts of material to be disposed of. Water from the water separator contaminated with Certonal or solvents can be disposed of by evaporating it in an open container. Dried up Certonal can be disposed of with the residual waste.

Packaging and bottles disposal

The packaging and bottles are recyclable. Please dispose of the outer cardboard packaging with the waste paper and the aluminum bottles with the aluminum or non-ferrous metal scrap.
Please note that Certonal cannot refill the bottles. Unfortunately, the return transport, checking and rinsing of the bottles is uneconomical. However, the bottles can be used to store Certonal FC 742 at a later date, e.g. when a machine is emptied.

Safe handling of the material

Before using the material Certonal FC 742 electronics surface coating and Certonal FC 746solvent, please read the relevant current safety data sheet. Follow all precautionary information given there. Before using the material, please make sure that it is suitable for your intended purpose.

Containers and storage

The bottles can be closed again.
It can be stored in the bottles.
The storage room should be ventilated.
The shelf life of the material is not limited in time.
Avoid heating above 50°C (boiling point).
Cerrtonal is not flammable!
No dangerous goods storage!

Shelf life of the container: 5 years (because of the seal)
Certonal FC 742 never has to be completely replaced when applied in dipping bath.

Order #	Name	Contains	1:1 Replacement for
100047	Certonal FC 742	7kg	Acota Certonal FC-742 2% | 3M™ Novec™ 1700
100048	Certonal FC 742 10%	7kg	Acota Certonal FC-742 10% | 3M™ Novec™ 1710
100041	Certonal FC 746	7kg	Acota Certonal FC-746 | 3M™ Novec™ 7100

If you have any questions about the material and its processing, please contact:

Nuvochem Limited
Phone: +44 (0)1260 228364 Sales@nuvochem.co.uk