

Water based UV protection varnish

Frequently asked Questions

1. How much varnish should be applied?

In order to achieve a sufficient protection against aggressive UV radiation, it is necessary to apply a varnish layer of at least 30µm~dry film (so that destroying UV rays will be absorbed). With this layer thickness (30g/m²~dry film) good water and mechanical resistances are ensured as well as the protection against common chemicals and solvents.

These 30g/m²~dry film require a varnish layer~wet of about 100g/m². This can be achieved by rolling without contact pressure. If there are no experience values yet it is recommended to balance out corresponding test varnishings (weighing material before and after the varnishing (dry film), make out the surface and convert it into m²).

2. How productive are the varnishes?

According to the recommendations it should be worked with a varnish layer thickness of about 100g/m². From this you can derive that for a surface of 10m² about 1kg varnish is needed. Small differences result from the kind of application (manual or automatically, rolled or sprayed).

3. How can the resistance of the prints be improved by varnishing?

It must be considered that a generally binding warranty cannot be issued. Depending on the material and how/where/when it will be varnished as well as under which conditions the end product will be deployed, there are various criteria:

- A cheap tarpaulin material with a high percentage of monomeric plasticizers reacts different than a high quality, polymeric plasticized tarpaulin
- The stress of an applied self-adhesive foil in a mountain area 2000 m above sea level is completely different than the one of the same foil applied in a moderate, Middle-European area
- Applications on vehicles will be subject to much more stress than stationary applications

If the processing is carried out professionally and with the above mentioned varnish layer thickness it can be assumed that printed materials:

- with 1-Component varnishings show an indoor resistance of several years
- with 2-Component varnishings show an outdoor resistance of up to 5 years.

4. Which chemical resistances show these varnishings?

Based on extensive laboratory tests and practical experience we can confirm good resistances with the 2-Component varnish Series 482 against following substances:

- water - diluted acids + alkaline solutions
- alcohol - common cleaning agents etc.

Tests with further chemicals are carried through continuously and confirm the already known facts. Own tests under individual laboratory conditions are always recommendable and necessary.

5. When will the resistances of the varnished substrates be reached?

1-Component systems are touch-proof after approximately 3 hours, before further processing these systems need a minimum of 24 hours of drying in the air (in relation to layer thickness, material, temperature, air circulation and humidity), the complete curing can be completed after 3-5 days.

2-Component systems are also touch-proof after approximately 3 hours, but under no circumstances "resilient", which means they cannot be rolled, before further processing these systems need 24-48 hours of drying at

room temperature. The complete crosslinking resp. curing of 2-Component varnishes is only completed after about one week – only then it can be counted on the mentioned resistances.

6. Can I varnish prints with oil-based inks as well?

A varnishing with water-based varnishes is not possible; the varnish will be rejected by the oil-based inks and will not dry. Previous tests and the consultation of our Technical Dpt. are absolutely necessary in case of varnishing Ecosol and UV inks as well as in case of Indigo-, Thermal Transfer and every other special printing method! (s. also question/answer 25)

7. Why is it that important to varnish edges as well?

The surface of a varnished medium is protected by the varnish layer. In many cases the edges are forgotten or the varnishing is destroyed by new cuts. Such "open" spots are weak points for water, solvents and mechanical stresses, which can penetrate resp. weaken the whole film.

8. How can the drying of the varnishing be accelerated?

Rolled varnishes need at least 3 hours at room temperature, this means 20-25°C, until the surface is touch-proof. They need a further 12-16 hours until they can be coiled or piled up. If the varnish is applied automatically, a heating is integrated, that means, that the varnish layer is dried by 50-55°C with air circulation, cooled and immediately coiled up again. The drying of rolled varnishes can be accelerated with a circulating air dryer under the same conditions. This way an earlier processing is possible; but it should be noted, that the final resistances, especially the chemical resistance of the varnish layer, have not yet been reached (s. point 5).

For a drying of the wet varnish layer 50-55°C are ideal; with higher temperatures the melting point (deformation level) of the varnished material (soft PVC) is reached quickly. The same applies to the dry varnish layer; in order to apply a film a hair dryer can be used.

9. What must be considered if a self-adhesive foil shall be applied on (coated) tarpaulin material?

A subsequent application of self-adhesive foils on varnished areas is only possible under certain conditions. Either the corresponding parts are covered or omitted before varnishing or the varnish layer is roughened with sandpaper after drying and then the self-adhesive foil can be applied.

10. How can equipment be cleaned after processing the 2-Component varnish?

It is very important that the cleaning takes place right after the processing of the varnish! If you do so, a cleaning with tap water is already successful. In case of dry varnish residues an 1:1 alcohol/water mixture will help. Please never use any other solvents (f. e. thinner on nitro base or similar)! This would block the pipelines, pumps and valves!! (s. also question/answer 24)

11. How long are varnishes and hardeners storable without losing their quality?

The varnish, 1-Component as well as 2-Component, is storable longer than 1 year in case it is stored in the closed original container (s. also question 27). But the hardener (Series 482-HDA) has to be processed within 6 months. Additionally it must be considered that the tubes / cans are closed again carefully after use; the hardener will otherwise react with the air humidity and polymerize!

12. When can I use 1-Component protection varnish?

1-Component varnishes protect the print against mechanical stresses, light influences and short-time weather influences and humidity. In case of long-term outdoor use the prints can turn yellow, milky or become brittle; other undesired reactions can occur as well. For outdoor use we recommend therefore the resistant 2-Component varnishes of Series 482.

13. How can prints, based on EcoSol inks, be varnished?

Because of the special solvent formula of the EcoSol inks ordinary aqueous standard varnishes cannot achieve sufficient adhesion. But with the especially for this purpose developed 1-Component varnish Series 480-5900 we have had positive results (ideal drying assumed; free of solvent). But the resistances for outdoor applications are moderate in comparison with other 1-Component varnishes.

14. What does the viscosity tell about a varnish? How can it be measured?

The viscosity is a measure for the tenaciousness of a liquid; water has a low viscosity, honey has a high viscosity. For practice the measurement with a Ford D4-cap 4mm is usual: the flow time which a liquid needs to flow out of the cap is measured in seconds. For our varnishes these are 30-60 seconds, depending on the way of processing (spray, roll, and application with squeegee).

The viscosity influences decisively the application quantity, flow and drying and shall therefore be kept according to the work instruction.

15. The varnish separates from the material, resp. does not wet ideally – Why?

Plastics, this means the films and foils which shall be varnished, are optimized with plasticizers and other additives regarding the demanded properties. These substances can „sweat“ to the surface of the substrate (they migrate) over time and cause a rejecting reaction against the varnish.

- With a careful “cleaning” of the foil material, using a soft rag soaked with an alcohol/water mixture, in most cases it can be still achieved a perfect varnishing afterwards.

- If you roll up and down several times during the varnishing, troubles on the surface can partly be neutralized.

16. By varnishing of coated foils extremely many bubbles have resulted, which are still visible even after drying. What can be done?

Such coatings base mostly on an especially modified mica primer and have an effect on the ideal absorption of the inkjet inks. In the (porous) spaces of the coating is much air, which will be displaced during the varnishing in the form of small bubbles. If the foil is wetted with a clean wet rag prior to the varnishing, the bubbles can be avoided (attention regarding resolving of inks!).

17. Can the protection varnish be diluted?

The protection varnishes are delivered with a viscosity of about 50 seconds (Ford D4-cap 4mm). This is the ideal viscosity for rolling, this means the varnish must resp. should not be diluted, otherwise the necessary resin concentration in the dry film (about 25m μ), which is needed for an ideal protective effect, will not be achieved.

The same applies to an application by squeegee; the undiluted varnish is processed with a suitable squeegee, so that also a wet film of about 100m μ is achieved, which corresponds to a dry film of about 25m μ . In contrast the varnish must be diluted in case of spray application; for this purpose we recommend spray thinner Series 400-377. It contains small amounts of solvent which affect the wetting and drying speed positively. The experience shows that about 5% thinner is enough to achieve a spray viscosity of 25-30 seconds (Ford D4-cap 4mm).

18. By spray application of the varnish the drying is too fast?

The problem of a too fast drying by spraying can occur during winter time, in heated, not air-conditioned rooms; a relative humidity of 25-30% is no rarity. An ideal humidity would be about 50% rh. The varnish can be diluted with special retarder Series 400-018/09 instead of water. Because of the massive retarding effect only 3-5% shall be added. Adding of more retarder is not recommended, as the solid content in the varnish will be reduced and the varnish layer cannot protect the print sufficiently anymore (s. also our Technical Leaflet Series 480/482).

19. Bad wetting on PVC self-adhesive foils – what's the reason?

Above mentioned problem can have many reasons. We would like to concentrate now on reasons which are caused by the varnish, as troubles caused by criteria such as plasticizers, additives etc. have already been discussed in question 15.

Exaggerated canniness by applying the varnish can cause wetting problems:

- the varnish is delivered „ready-to-roll“. Therefore it should not be diluted, because otherwise the mentioned (wetting) problems will occur (for spray application dilute slightly acc. to our Technical Leaflet);
- you will receive the same undesirable result, if the roll is pressed (too) hardly during the varnishing;
- the demanded application quantity of 100m μ cannot be achieved this way and can cause the same troubles as mentioned above (s. also question 17).

20. Is it possible to work on embossed PVC self-adhesive foils?

Of course a previous, corresponding die-cutting of the material is required. Application tests in practice have shown, that this is possible – and easier for the processing - with the 1-Component varnish Series 480-5900 (Ecosol). But previous tests with the job substrate are always essential!

Working on embossed PVC self-adhesive foils is connected with the problem that silicone components of the silicone paper come off because of the varnish and affect the varnish layer negatively with regard to wetting and bloating.

21. Is it possible to varnish welded and/or eyed tarpaulins?

A varnishing after these treatments is still possible; it must be considered, that also on eyelets and edges a closed varnish layer will be resulting, this means, that it is important that sufficient varnish is homogeneously applied. A (mechanical) damage of the varnish film during equipping cannot be excluded!

22. When shall be varnished – before or after applying a self-adhesive foil on a vehicle or tarpaulin?

In practice a previous varnishing is preferred most of the time, because

- the varnish is as flexible as the foil, so that a foil can be applied in grooves with the aid of a hair dryer.
- spray application on vertically affixed foils requires more ability than the horizontal roll application.
- additionally the vehicle must be covered partially in case of a varnishing afterwards and
- an inevitable varnish mists will be caused.

23. Can banners, which are varnished with 1-Component varnish, be used several times for short outdoor applications (f. e. perimeter advertising for sports occasions)?

The outdoor resistances of 1-Component protection varnishes are, as already known, relatively moderate, especially regarding water and humidity (s. also questions 12 and 13). 1-Component varnished banners shall therefore be hanged up outside only for short periods. But they can be placed outside several times (f. e. several times over the weekend or always when a semester or school year starts etc.) – but only if the banners are rolled up (not folded) and stored in dry condition; if there are any wet parts left, a blocking cannot be avoided!

24. How can dry varnish be removed from equipment and installation parts?

Accessible installation parts as f. e. varnish containers in the machinery, squeegees and the like are embrocated with paste-like „paint remover“ (available in Do-it-yourself stores). After 5-10 minutes application time it can be hosed with high pressure, together with the dry varnish. Attention: For closed and delicate parts (hosepipes, pumps, valves and the like) we do not recommend this method (s. also question/answer 10).

25. Can water-based inkjet prints also be varnished?

In numerous large format inkjet printers water-based inkjet inks are applied (f. e. Epson, HP, Encad etc.). These prints are made on untreated substrates (s. also question/answer 16). The protection varnishes Series 480 (1-Component) and Series 482 (2-Components) are also water-based; therefore it is possible, that the inkjet print will be resolved. The resolving is highly depending on the used inkjet inks (water-resistant) and substrates and shall be tested previously on a production sample.

26. If the storage room for the varnish is quite cold – can this cause any problems?

Water-based varnishes are naturally frost-susceptible. Temperatures under 10°C can already result in a thickening resp. jelling of the varnishes; in case of even lower temperatures a not reversible crystalizing of formula components (additives) has already been noticed. This may affect the application and resistances of the applied varnish layer negatively! These problems can be avoided if the storage room is heated and the temperatures do not fall below 15°C. The processing temperature shall, as described in the Technical Leaflet, lie between 18 and 25°C.

27. How can be recognized how old the delivered varnishes are?

On the container label the expiry date is mentioned: Exp.: 12/07 (s. also question 11). In the origin container the varnish may still be usable after this date – but without any warranty! In order to ensure a complete traceability, you will find a small sticker on the lid of every container, which states the Series no. and the corresponding batch of the varnish, f. e. 482-5700 / 197964; please always indicate these data in case of any requests.

28. Why can result surface irritations in case of manual spray application?

If we exclude formula errors because of the positive practice experiences, there are especially unsuitable application conditions which should be mentioned below:

- unsuitable thinners (drying too fast)
- humidity too low, especially during the winter months (varnish particles will dry partially)
- pistol distance is not ideal, too long (partial drying of varnish drops)
- the viscosity is not ideal (also „drying“ of the varnish particles)
- pistol / nozzle adjustment is not ideal

29. Can mesh materials be varnished?

Also mesh material can be varnished! Because of the open spaces, which of course shall be still permeable after varnishing, a special method needs to be considered. This special method is described in our leaflet “Processing advices for the varnishing of mesh materials“

30. Can plotted foils be applied on a varnished tarpaulins?

Because of the (dirt-)resistant varnishing the adhesive power of the foil can be insufficient on the tarpaulin. Possible correlations between tarpaulin-ink-varnish-adhesive-foil are far more unpredictable. Despite of a plasticizer barrier unpredictable migrations may occur.

31. Can UV prints on plastic panels also be varnished?

With the use of UV flatbed printers the spectrum of printable substrates has been amplified notably (glass, wood, PVC, metals and a variety of plastics). For a successful varnishing a perfect adhesion of the UV ink on the substrate (cross hatch test) is required! The practice shows that this is not always the case – an insufficient ink adhesion cannot be improved resp. “concealed“ by varnishing. Therefore we always recommend previous tests under own laboratory conditions.

32. Why are there bubbles in the varnish layer?

Besides the already mentioned reasons (f. e. question 16) climatic conditions can be a further one: During the summer months, in case of high temperatures and dry air, the surface of the varnish layer dries quickly; therefore an elimination of the air bubbles is even more difficult or completely impossible (the same problem occurs in winter, if the rooms are very dry – relative humidity 40% and below):

1. If a small quantity (3-5%) of special retarder Series 400-018/09 is added, the drying can be decelerated and the elimination of bubbles facilitated (s. also question 18). Naturally the tendency of blocking increases, if the varnished materials are not dried ideally!
2. Therefore in a first step an anti-flow additive, Series 400-VMS/482, should be used (max. 0,5% according to the Technical Leaflet)

Such additives are normally not necessary – they should only be used in case of extreme climatic conditions (according to the corresponding Technical Leaflet/s)!

33. Can easyPROTECT mat and gloss varnishes be mixed?

Mat and gloss varnishes of the same Series, namely 482-5700 (gloss) and 482-5700/MT (mat) or 480-5700 (gloss) and 480-5700/MT (mat), can be mixed in every desired mixing ratio. The user can therefore directly regulate the gloss/mat/semi-mat effect.

34. Can the protection varnish Series 482-5700 also be applied by screen printing?

Above mentioned protection varnish Series 482-5700 has been rheologically modified in a way, that under the article number Series 482-05/600 a screen printing version is available. The 1-Component varnishes Series 480-5800 can be adjusted for screen printing application.

35. Which nozzle diameter shall be used for spray application?

In case of a small nozzle diameter a fine varnish mist results, which dries before it „arrives“ on the substrate; so never a homogeneous varnish layer can be achieved. Therefore nozzle diameters >1.5 mm should be used. Of course the result depends also on further parameters (pressure, etc.).

36. Can the anti-slip varnish (Series 482-5700/AR) also be applied on already affixed floor graphics?

Principally YES! But the drying could be problematic. Because the drying needs, depending on the temperature, 4-6 days; during this time the floor graphic must not be stressed resp. walked on! So it would be better to varnish, dry and harden it before the affixing.

37. How long the above mentioned anti-slip effect (Series 482-5700/AR) is efficient?

A statement in „days, weeks or months“ is almost impossible. The abrasion is first of all depending on the way and frequency of its use: A floor graphic at the entrance of an exhibition hall is certainly more stressed as a corresponding „floor advertisement“ in a company's best (reception) room. The exhibition advertisement has on the other hand fulfilled its task after 10-14 days, as from the company advertisement a significantly longer life-time will be expected.

38. What happens if I use the 2-Component-varnish without cross linking agent / hardener?

The visual result is ok, which means the varnish looks good and is glossy. Please note that you then just have a 1-Component-protection-varnish and therefore also a modest resistance, which is not suitable for a long-term outdoor use!

39. What happens if I have applied the 1-Component-varnish with cross linking agent / hardener?

In many cases you will not even reach the processing, as the varnish thickens relatively quickly (within 2-5 minutes), so you will immediately notice that something is wrong. But even in the case that you cannot notice a visible damage; the varnish layer will be affected by the hardener / cross linking agent in an unpredictable way.

40. The matt effect of the applied MT-Varnish is rather moderate – why?

Same as pigments of color inks the matting agent particles tend to deposit. This can already slightly be noted after a storage time of 2-3 weeks, after a storage time of 2-3 months it is even more noticeable. An intensive stirring of the matt varnishes before the application is therefore essential.

41. How can I clean varnished substrates?

Depending on the used varnish (1- or 2-component) a different resistance in regard to the cleaning can be expected:

- With the use of 1-Component varnishes (for example Series 480-5800) you are limited in regards to the cleaning. A brief cleaning/wipe with a damp cloth or a cloth moistened with a mild household detergent is possible without damage. If the exposure to moist lasts longer or alcohol or other organic solvents are being used for the cleaning, the varnish layer will be softened, whitening may occur and also the glossiness and protective function will be lost.

- Considering a professional application including using the recommended quantity of the 2-Component varnish (for example Series 482-5700), the varnished materials can be manually cleaned with normal household detergents or water/alcohol mixtures under normal conditions without any visible effects. The cleaning in automatic washing systems is easily possible.

This recommendation is in reference to a normal use of cleaning equipment and a normal cleaning processes; scrubbing, use of rubbing materials and pads will affect the varnish layer. The use of aggressive solvents should be tested beforehand with original material.

42. Do I have to take special precautions for high frequency welding regarding the varnish?

For an optimal adhesion the parts to be welded should not be varnished. The varnish layer would prevent a perfect welding and the adhesion would not be stable (possible to peel off).

43. While varnishing with a short hair roller initially the varnish gets significantly thinner. Why?

As mentioned in the application guide the cleaned roller should be soaking in water if not in use (to prevent it from hardening and drying out) It has been noted that water remains in the cylinder of the big and wide short hair roller even after squeezing the roller, which will then drain out while varnishing. Therefore the roller should be placed upright before usage to allow the water to drain out.

44. After varnishing the color of the print has changed. Why?

This phenomenon is well known. In many cases the over varnished printed colors get more colourful, which is happily accepted (regardless of the printing procedure or type of used varnish). Some shades (especially light or grey shades but also a black full surface printing) react with a color shift, which direction cannot be predicted. The color shift can mostly not be prevented or only through lengthy and systematic testing. Please consider also metamerism effects, such as color shade differences due to different sources of light (day light or several artificial light sources).

45. Are the water based varnishes resistant against alkaline cleaners?

Both 1-Component and 2-Component varnishes are short-term resistant against alkaline cleaners (pH 9-11) for a normal cleaning procedure with a cloth and cleaner. The usage of strongly alkaline cleaners (for example a sodium hydroxide solution pH >11) and/or a heavy mechanical scrubbing and brushing will affect especially the 1-Component varnish. Do not leave the strongly alkaline cleaner on for more than 5-10 minutes.

Also manufacturer of cleaners recommend performing preliminary trials.

Important Information

Our technical advice whether spoken, written, or through test trials corresponds to our current knowledge to inform about our products and their use. This is not meant as an assurance for certain properties of the products nor for their suitability for each application. You are, therefore, obliged to conduct your own tests with our supplied products to confirm their suitability for the desired process or purpose. The selection and testing of the ink for specific applications is exclusively your responsibility. Should, however, any liability claims arise, such claims shall be limited to the value of the goods delivered by us and utilized by you with respect to any and all damages not caused intentionally or by gross negligence.