



PANADUR

coating your ideas



Technical Data Sheet
PANADUR CLEAR FAST

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PANADUR CLEAR FAST

PANADUR CLEAR FAST is a highly transparent, UV-stable and solvent-free gel coat material used for carbon and glass fibre laminates in in-mold coating processes. The product is distinguished by its high mechanical resistance, chemical resistance and by its abrasion resistance, which is characteristic of polyurea products. The product also offers a high level of transparency and its hardness may be customised to suit your needs.

PANADUR CLEAR FAST is a premium product from the PANADUR range of polyurea products.

Product Benefits

- UV resistant, i.e. no additional UV protective coating necessary
- Light-fast
- High chemical resistance
- High mechanical strength
- High abrasion resistance
- Short curing time
- Rapid subsequent workability
- Solvent free
- Individually customisable hardness

Range of Applications

PANADUR CLEAR FAST is a versatile and solvent-free 2K polymeric material, e.g. used as a gelcoat for composite parts or as in-mold coating, and is particularly distinguished by its transparency. The use of carbon fibre or glass fibre fabrics as well as pre-pregs makes it possible to produce transparent laminates in a quality as never seen before while also providing UV stability. We would be happy to offer our assistance in choosing the most appropriate materials for the intended purpose.

Technical Data

Processing method	2K systems with variable mixing ratio or by hand with brushes (note the pot life)
Mixing ratio	See label on container
Processing temperature range	10 to 35 °C ambient temperature (non-condensing, relative humidity < 90 %, at least 3 °C above dew point, note dew point chart)
Permissible surface temperature for application	10 to 30 °C (in order to avoid condensation, keep as close to ambient temperature as possible)
Permissible surface temperature during processing	20 to 70 °C (both components alike)
Consumption component mixture	Approx. 1.7 kg/m ² (with a film thickness of 1.5 mm, depending on the substrate)
Minimum film thickness	1500 – 3000 µm (depends on specific use)
Shelf life	At least 6 months (applies to unopened original containers at 5 – 30 °C; protect from lower temperatures, direct sunlight, humidity; store upright and tightly sealed)



Density of PANADUR CLEAR FAST component (DIN EN ISO 1183-3 at 23 °C)	1.0 to 1.1 g/cm ³
Dynamic Viscosity PANADUR CLEAR FAST component (DIN 53019, measuring system 13, at 20 °C)	1300 to 2000 mPa·s

Curing Times

	Hardener XP 100 / Hardener XP 110	Hardener 82	Hardener 55	Hardener NN 38
Time frame for handling	15 min	20 min	25 min	29 min
Dust dry after approx.	70 min	70 min	75 min	130 min
Completely cured after approx.	72 h			

These data are applicable at 23 °C / 50 % relative humidity; lower temperatures lengthen the curing times (the time frame for handling is not lengthened).

Physico-Chemical Properties

Raw material base	Aliphatic amino-funtional aspartic acid ester, cross-linked with polyisocyanate
Color	Colorless, transparent
Volume solids content	At least 99 %
Gloss level (DIN EN ISO 2813, 60°)	Matt to high-gloss (depends on the surface of the mold in IMC process; high-gloss when used as a top-coat)
UV stability	Very high gloss level and color stability
Max. thermal stress for coating	80 °C
CO ₂ diffusion resistance number μ_{CO_2} (DIN EN 1062-6) *	Infinite (no measurable CO ₂ diffusion)
CO ₂ diffusion-equivalent air layer thickness s_{D,CO_2} (with a 600 μ m film thickness) *	> 200 m (calculated from μ_{CO_2}) => impermeable
Water vapour diffusion resistance factor μ_{H_2O} (DIN EN ISO 7783-2) *	4.660
H ₂ O diffusion-equivalent air layer thickness s_{D,H_2O} (with a 600 μ m film thickness)	7.8 m (calculated from μ_{H_2O})
Water penetration test (adapted from DIN EN 12390-8, 72 hours) *	No penetration recorded
Impermeability to chloride ion penetration (adapted from DIN EN 13369; 90 d) *	No measurable increase in chloride ion concentration
Artificial weathering adapted from DIN 50021 / EN ISO 9227 (3 Months; Continuous rain (50 g/l NaCl); 45 °C)	No perceptible change in color, brightness or gloss level (dE, dL, da, db, GE 60°)

* Measurements were taken in a certified testing laboratory.



Hardness acc. to Shore (after 72 h)	Hardener XP 100 / Hardener XP 110	Hardener 82	Hardener 55	Hardener NN 38
D (ISO 868 / DIN 53505)	Approx. 78	Approx. 73	Approx. 67	Approx. 60

Processing Guidelines

General information:

Before processing starts, all provided documents must be entirely read and understood.

Preliminary tests with original materials under comparable conditions are necessary to ensure material compatibility and adhesion.

It is absolutely necessary to keep detailed process records for every process step and the entire duration of the construction site, especially equipment maintenance logs (material temperatures and pressures, mass output during processing and measuring equipment tracing) and listed data for processing conditions (temperature deviations and air moisture). In addition the correct operation of the 2K system measuring devices are checked regularly and documented in a verifiable manner.

Uses which have not been specifically mentioned in this technical data sheet may only be performed after consultation and written confirmation by PANADUR GmbH.

Surface preparation:

A careful preparation of the surface is absolutely essential for a durable coating. It is required to use a suitable PANADUR Primer. Its suitability should be verified by preliminary tests.

The following applies in general: See German VOB, Part C, DIN 18363, Section 3.

The substrate must be stable and have a minimum tensile adhesive strength of 1.5 N/mm². The substrate must be dry, clean, flat and without ridges, defects or loose material. It must also be free of other materials or substances that may separate or impede adhesion (oil, grease, silicone, release agent residue or other impurities). Verified compliance with these requirements (e.g. in daily construction records) must be documented.

Processing:

It is not allowed to dilute the material with any type of additives, e.g. solvents. It is only permitted to use the PANADUR Hardener component in the exact mixing ratio (see label on container).

The material containers should only be opened right before use. Stir PANADUR CLEAR FAST intensively shortly before use with appropriate technical equipment until the material is homogeneous. After material withdrawal a protection against surrounding moisture (nitrogen or argon fumigation) is highly required for the opened containers. After fumigation, close tightly and use the material promptly.

Keep to the exact mixing ratio given on the container label.

Processing with technical equipment	Processing by hand	Preparation of molded parts by In-Mold-Coating-processing
<p>PANADUR CLEAR FAST can be applied with 2K hot spray machineries with separate material feeds to the spray head and to the mixing chamber of the heated hose assembly and adjustable mixing ratio.</p> <p>The appropriate spray parameters must be determined through preliminary tests based on the used system. The components are to be stirred continuously during processing.</p> <p>In order to achieve optimal results it is recommended to process the material on the machinery at 60 - 70 °C component tem-</p>	<p>It is also possible to apply the material manually by brush or roller (note the time frame for handling).</p> <p>After having intensively mixed the PANADUR CLEAR FAST and PANADUR Hardener component it is recommended to pour the mixture into a new, clean container in order to prevent mixing errors.</p>	<p>Evaluate the suitability of the mold before coating with PANADUR CLEAR FAST. Depending on the material of the mold, PANADUR Release Agent T1 is recommended. Use the mold release agent according to the directions in the technical data sheet. After application, thoroughly buff out the mold release agent T1 to avoid affecting the part surface. A</p>



Processing with technical equipment	Processing by hand	Preparation of molded parts by In-Mold-Coating-processing
perature. Use cross-coat application until the desired thickness is attained. Due to the long gel time an application of overspray is not possible.		preliminary test is recommended. Further information may be found in the technical data sheet for PANADUR Release Agent T1.

After application, the coating must not be exposed to moisture for three days in order to achieve the end properties as listed above.

Tool cleaning:

The used 2K hot spray machinery and tools must be thoroughly cleaned immediately after use, and, if necessary, also occasionally, depending on the system type. A proper cleaning agent must be chosen based and tested according to the used system. Please also observe the instructions of the equipment manufacturer.

Note: If the curing process has started, it is no longer possible to clean any used tools.

Cleaning the Coating

Abrasive or aggressive cleaning agents/equipment (e.g. dichloromethane, cellulose thinner, ozone) must not be used.

Cleaning the coating with pressure washers is only permitted with moderate water pressure. The use of any type of grinding brush is not permitted.

Supplemental Products

- PANADUR Primer (substrate dependent)
- PANADUR Release Agent T1

Storage

Protect from heat (T > 30 °C), frost (T < 5 °C) and humidity. Already opened containers must be protected against surrounding moisture (nitrogen or argon fumigation). After fumigation, immediately close tightly and use the material promptly. Do not expose uncured components to direct sunlight. Store and transport containers upright and tightly closed.

Further information may be found in the corresponding safety data sheets.

Protective Measures

The relevant protective measures are to be observed during processing and application. This is to be determined by risk assessment. Suitable protective clothing including respiratory must be worn during processing. The instructions and safety advice on the containers should be observed during application. Further details may be found in our corresponding safety data sheets for each component.

Environmental Information

Uncured components are harmful to aquatic organisms and may cause longer-term adverse effects in water. Do not allow individual components and uncured material mixtures to enter water, sewers or groundwater.



The instructions and safety advice on the containers should be observed during processing. Further details may be found in our corresponding safety data sheets for each component.

Important:

When handling our products, the essential physical, safety-related, toxicological and ecological data are to be taken from the appropriate material safety data sheets. Relevant provisions, such as the ordinance of hazardous substances, are to be observed.

Disclaimer:

The information above, in particular the suggestions for processing and use of our products, is based on our knowledge and experience under normal circumstances, provided that the products have been properly stored and used. Due to differences in materials and surfaces as well as diverging operating conditions, it is not possible to guarantee a particular result or to be held liable, regardless of the legal relationship, based on these references or on a verbal consultation unless we are found guilty of intention or gross negligence. In such a case, the user must prove that he/she transmitted all information in writing in a timely and accurate manner to PANADUR GmbH which was necessary for PANADUR GmbH to make an appropriate and promising assessment. The user must evaluate the suitability of a product for its intended purpose. Product specifications are subject to change. Proprietary rights of third parties must be observed. Furthermore, our respective current terms and conditions of sale and delivery apply. Only the latest version of each technical data sheet and the corresponding safety data sheets apply which are to be requested from us.