

KIWOPRINT® D 141

Acrylic based, screenable pressure sensitive adhesive

KIWOPRINT D 141 is a high quality, screenable pressure sensitive adhesive for the production of self-adhesive components for the automotive and electronic industry (touch panels, visual instrument panels, front panels, electrical devices). Materials bonded with KIWOPRINT D 141 can be used at temperatures of between -35°C and +120°C and can be stored for a minimum of 1 year without any decrease of adhesive strength, if covered with a suitable silicone paper and kept dry and dark at room temperature. KIWOPRINT D 141 has very good ageing and UV-resistance. The dried adhesive film is colourless and does not turn yellow.

PRECAUTIONS

For the production of self-adhesive materials the following facts have to be considered:

1. Check requirements like adhesion strength, climatic load, temperature and UV-resistance.
2. Choose a suitable substrate and test for compatibility with KIWOPRINT D 141 (e.g. soft PVC may interact with the adhesive layer).
3. If direct contact between printing ink and adhesive may occur, test for compatibility, as some inks may interact with the adhesive layer. For technical applications usually a mesh of 21-140 (T) is being used.
4. When screen printing, the selection of the mesh type is essential for the desired result. The coarser the mesh count, the thicker the adhesive layer and the higher the adhesive values.
5. When screen printing, water resistant emulsions of the AZOCOL range must be used. Ask KIWO for advice.
6. Choose a suitable release liner. Very smooth silicone paper or siliconized film should be used. The adhesive layer orients itself to the release liner and the smoother the release liner is, the smoother the adhesive layer will be after 24 hours. Also, the silicone layer must be compatible to assure a proper release from the adhesive.

The suitability of the adhesive together with each component i.e. substrate, ink, liner, adhesion partner etc. must be tested before production parts are made. Special attention should be made for long-term compatibility with the component materials. Also one must check the influences of the liner material and the state or nature of the substrate's structure or roughness. Silicone release agents, plasticizer migration etc. must be checked for and ruled out before one continues.

APPLICATION

When screen printing, optimal adjustment of the printing machine can determine the print result. Best printing results can be achieved with a high mesh tension (25 - 30 N/cm). The snap-off should be high (5 - 10 mm), the printing speed also high (from 400 mm/min.). This largely prevents the formation of bubbles. High air humidity facilitates the application of dispersion adhesives. During short breaks the stencil should be flooded with adhesive. If the breaks are longer than 5 -10 min. the screen has to be cleaned. Water can be used to clean fresh adhesive. Dried adhesive can be removed with PREGAN 1014 E.

Stir well prior to use. KIWOPRINT D 141 should not be thinned for application. Thinning with water is possible, however, it reduces the solids content, coating thickness and consequently the adhesive strength.

The adhesive can be dried by room temperature or by tunnel dryer for industrial production. Drying temperatures up to +70°C do not have any influence on the adhesive. Drying time depends on the quantity of adhesive to be dried, substrate type, drying temperature and air movement. Best values have to be determined or optimized by yourself.

Only properly dried adhesive layers (transparent film) give highest bond values. For further processing the applied adhesive must be completely dry, only then should the silicone paper or film be applied. Avoid air traps between release liner and adhesive as trapped air will influence the adhesive surface.

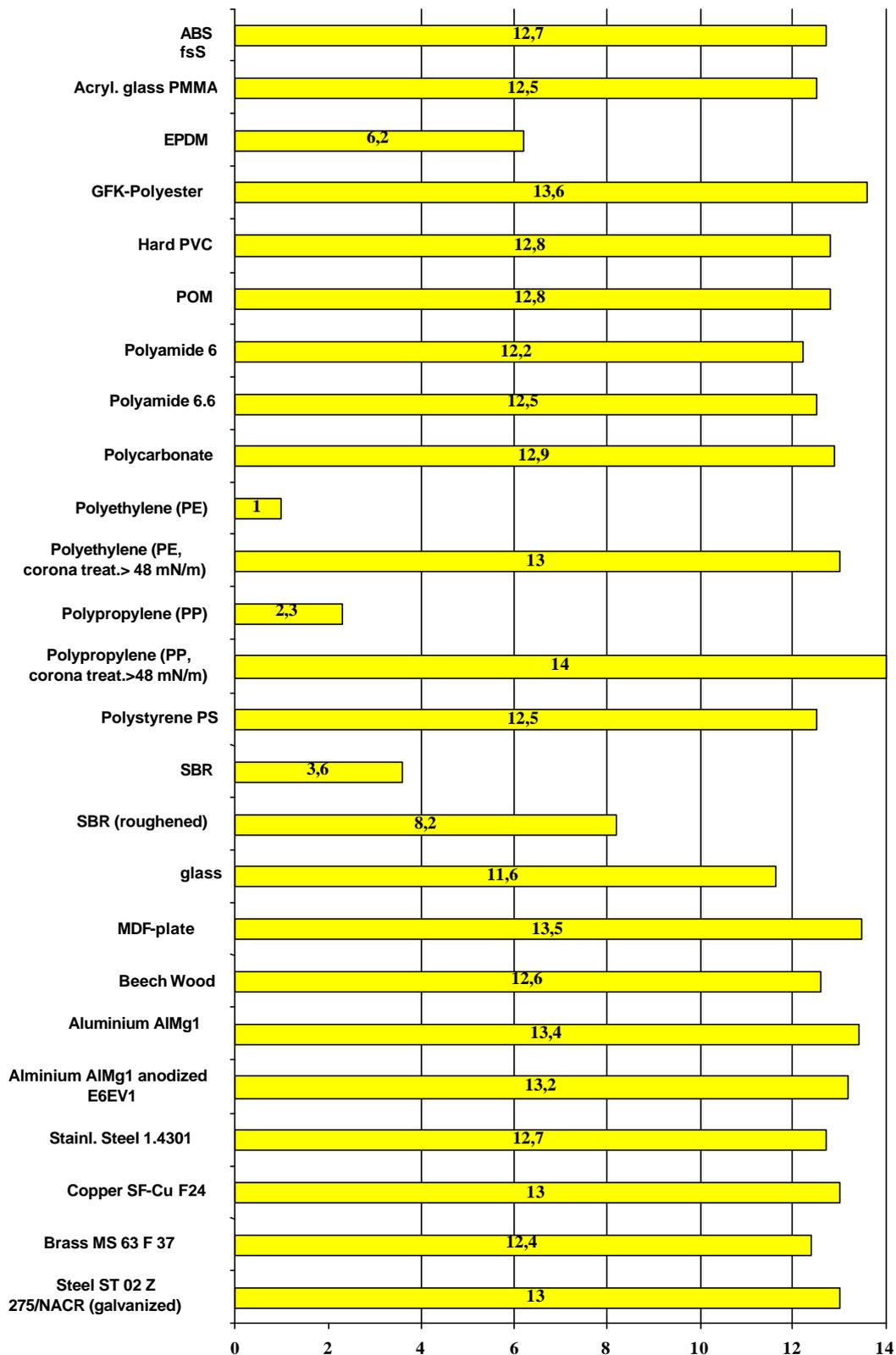
To avoid die cutting problems, the adhesive layer should end 0,5 - 1,0 mm in front of the punch line. Back-lit areas will not be printed as the adhesive film has an influence on the light intensity.

ADHERING

The bond of self-adhesive components produced using KIWOPRINT D 141 can be improved by:

1. Dust and oil free parts.
2. Optimum application temperature: 20 - 60°C.
3. Additional pressure (approx. 20 N/ cm²) with a heated silicone rubber pad (40 - 50°C).
4. Preventing air bubbles and stretching the substrate during application.
5. Flat and smooth substrate (i.e. pressure molding parts without burrs or sprue marks).
6. Sufficient adhesion surface area relative to total surface area.

Peel strength of KIWOPRINT D 141 on various substrates:



Peel strength measured as per PSTC 1 with peel tester type L 500 of Lloyd Instruments, load cell 100 N, class 1, DIN EN ISO 7500-1 for tension and pressure, 180°C peel test, printed with a 350 µm steel mesh onto 50 µm PET film, measured after 72 hours storage at ambient temperature (as per DIN 50014-20/65-1), in N/cm. Peel speed 300 mm/min. Adhering with hand roller (as per PSCT standard, roll weight 10 pounds, 5 x in each direction). Adhering area: 2,5 x 10 cm.

TECHNICAL DATA

BASE	Aqueous acrylic dispersion
COLOUR	Wet: white Dry: colourless, transparent
VISCOSITY	Approx. 27.500 mPas (Brookfield RVT, spindle 6, 20 r/min., 20°C)
SOLIDS CONTENT	Approx. 69%
pH-VALUE	Approx. 5
DENSITY	Approx. 1,01 g/cm ³
DRYING / CONSUMPTION	Screen printed on 50 µm polyester film:

Mesh	21-140 (T)	36-90 (T)	43-80 (T)	77-55 (T)
Drying (at 20°C)	Approx. 45 min	Approx. 25 min	Approx. 20 min	Approx. 10 min
Drying (at 70°C)	Approx. 7 min	Approx. 3,5 min	Approx. 2,5 min	Approx. 1,5 min
Thickness of the dry adhesive layer*	Approx. 45 µm	Approx. 25 µm	Approx. 20 µm	Approx. 10 µm
Theoretic consumption	Approx. 70 g/ m ²	Approx. 40 g/ m ²	Approx. 30 g/ m ²	Approx. 15 g/ m ²

* Difference measurement per DIN 50981, measured with thickness gauge Permascope M11 of Helmut Fischer GmbH & Co.

PEEL STRENGTH	Approx. 13 N/inch (after 1 min bonding time) Approx. 24 N/inch (after 24 h bonding time)
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90 µm adhesive thickness onto 50 µm polyester film. Tested according to PSTC 1. Measured at 23°C with peel tester type L 500 from Lloyd Instruments. Load cell 100 N, class 1, DIN EN ISO 7500-1 for tension and pressure, peel speed 300 mm/min., peel angle: 180°. Applied to polished stainless steel using a hand roller (10 pounds, rolled 5x in each direction) and measured after the corresponding bonding time at 23°C. Adhesion area: 2,54 x 10 cm.

**DYNAMIC
SHEAR STRENGTH**

Approx. 115 N/ inch²

90 µm adhesive thickness onto 50 µm polyester film. Measured at 23°C with peel tester type L 500 from Lloyd Instruments, load cell 2500 N, class 1, DIN EN ISO 7500-1 for tension and pressure, peel speed 0,1 inch/min. Bonded onto a 50 µm polyester film using a hand roller (10 pounds, rolled 5x in each direction). Adhesion area: 1 x 1 inch. Measurement after 24 hours.

**STATIC
SHEAR STRENGTH**

Approx. 800 s

90 µm adhesive thickness onto 50 µm polyester film. Bonded onto a 50 µm polyester film using a hand roller (10 pounds, rolled 5x in each direction). Adhesion area: 1 x 1 inch. Measurement after a bonding time of 24 hours. After 15 min. tempered in a drying cabinet at +105°C the shear stress was tested by hanging an extra weight of 1 kg onto the sample.

TACK VALUE

Approx. 1100 g

90 µm adhesive thickness onto 50 µm polyester film. Measured with Polyken Tack-Tester at 23°C, adhesion: 1 s, peel speed; 0,5 cm/s. Measured with specimen holder „A“.

**HEAT PEEL
RESISTANCE**

Approx. +120°C

90 µm adhesive thickness onto 50 µm polyester film. Applied to polished stainless steel using a hand roller (10 pounds, rolled 5x in each direction), adhesion area: 2,54 x 10 cm. The bond is stabilised in a drying cabinet headfirst, temperature induced stress was tested by hanging a 30 g weight onto the sample (peel angle: 90°). Measurement at 40°C, temperature is then increased every 15 min. by 10°C until the sample falls off of the polished stainless steel.

**HEAT SHEAR
STRENGTH**

Approx. +135°C

90 µm wet adhesive thickness on 50 µm polyester film and dried at 50°C. Tested according to ASTM D 4498 (SAFT = Shear Adhesion Failure Temperature). Bonded onto a 50 µm polyester film using a hand roller (10 pounds, rolled 5x in each direction). Adhesion area: 1 x 1 inch. Test after 24 h earliest. After drying for 15 min in a drying cabinet at +40°C, shear strength is tested by hanging a 500 g weight onto the sample. Test is started at 40°C, temperature is then increased every 10 min. by 5°C until the sample falls off the substrate.

UV-RESISTANCE

Very good

**HEALTH HAZARDS/
ENVIRONMENTAL
PROTECTION**

Please follow further information given in the material safety data sheet.

STORAGE

1 year (at 20 - 25°C and tightly closed original container). Protect against freezing. KIWOPRINT D 141 should not come into contact with unprotected metal for a longer period.