

KIWOPRINT® L 4000

Solvent based screenable pressure sensitive adhesive

KIWOPRINT L 4000 is a high-quality pressure sensitive adhesive for the production of self-adhesive materials made of cardboard, rigid PVC, glass, metal and industrial foams as well as films made of polycarbonate, polyester and pre-treated polyethylene and polypropylene. Materials bonded with KIWOPRINT L 4000 are very difficult to remove or even irremovable, depending on the substrate type. KIWOPRINT L 4000 is slow drying. Materials bonded with KIWOPRINT L 4000 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. They can be used at temperatures of approx. -20°C to +60°C. Recommended for use in areas where the adhesive is exposed to light e.g. for displays behind glass, transparent films etc. Bondings are resistant to water, reduced aqueous acids and alkalis, as well as to many mineral oils. Also suitable for the application at higher room temperatures.

PREPARATION

Observe the following advice when producing self-adhesive materials:

1. Check the requirements, such as e.g. requested adhering strength, climatic strain, temperatures and UV resistance.
2. Choose the correct substrate and test compatibility with KIWOPRINT L 4000 (e.g. soft PVC film influences the adhesive layer).
3. In case of a direct contact of KIWOPRINT L 4000 with the printing inks, check compatibility of the inks. Kind and type of ink can influence the adhesive.
4. The correct choice of the mesh count is decisive for screen printing applications. The coarser the mesh, the higher is the build-up thickness and therefore the adhesion strength. For technical applications usually a mesh of 21-120(T) is used.
5. For screen printing applications, solvent resistant emulsions of the AZOCOL range can be used. Ask KIWO for advice.
6. Chose the correct covering material. For surfaces of KIWORINT L 4000, silicone liners with medium separation values are suitable.

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 the 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, optimum adjustment of the printing machine determines the print result. Best results are achieved with stencils with high tension (25-30N/cm). Snap-off should be medium (2-4 mm), print velocity average to high (from 400 mm/s). This largely prevents the formation of bubbles. During short printing breaks the stencil should be flooded with adhesive. If the printing breaks are longer than 5 - 10 min. the screen has to be cleaned.

Stir well before use. KIWOPRINT L 4000 should not be thinned for application. Thinning with KIWOSOLV L 14 is possible, however, thus solids content, coating thickness and consequently the adhesive strength is reduced.

The ideal temperature for printing KIWOPRINT L 4000 is approx. 20°C. At higher temperatures the adhesive might become thready.

For clear recognition of the printed adhesive outline, KIWOPRINT L 4000 can be dyed with pigments of the KIWOMIX C-series. Add up to max. 5%, depending on the desired colour depth. When using critical inks, foaming or levelling disturbances, usually can be eliminated by adding 0,5-2% KIWOMIX ZL 1059.

The adhesive can be dried at room temperature or in tunnel dryer for industrial production. Temperatures of up to +70°C can be applied without damaging the adhesive. Drying time depends on the applied adhesive thickness, kind of substrate, drying temperature and air flow. Test and optimize the most suitable values at your facility.

Only completely dry adhesives achieve highest bonding values. For further processing the applied adhesive must completely be dry; only then should the silicone paper be applied. A bubble-free laminating of the liner is recommended, as enclosed air influences the adhesive layer.

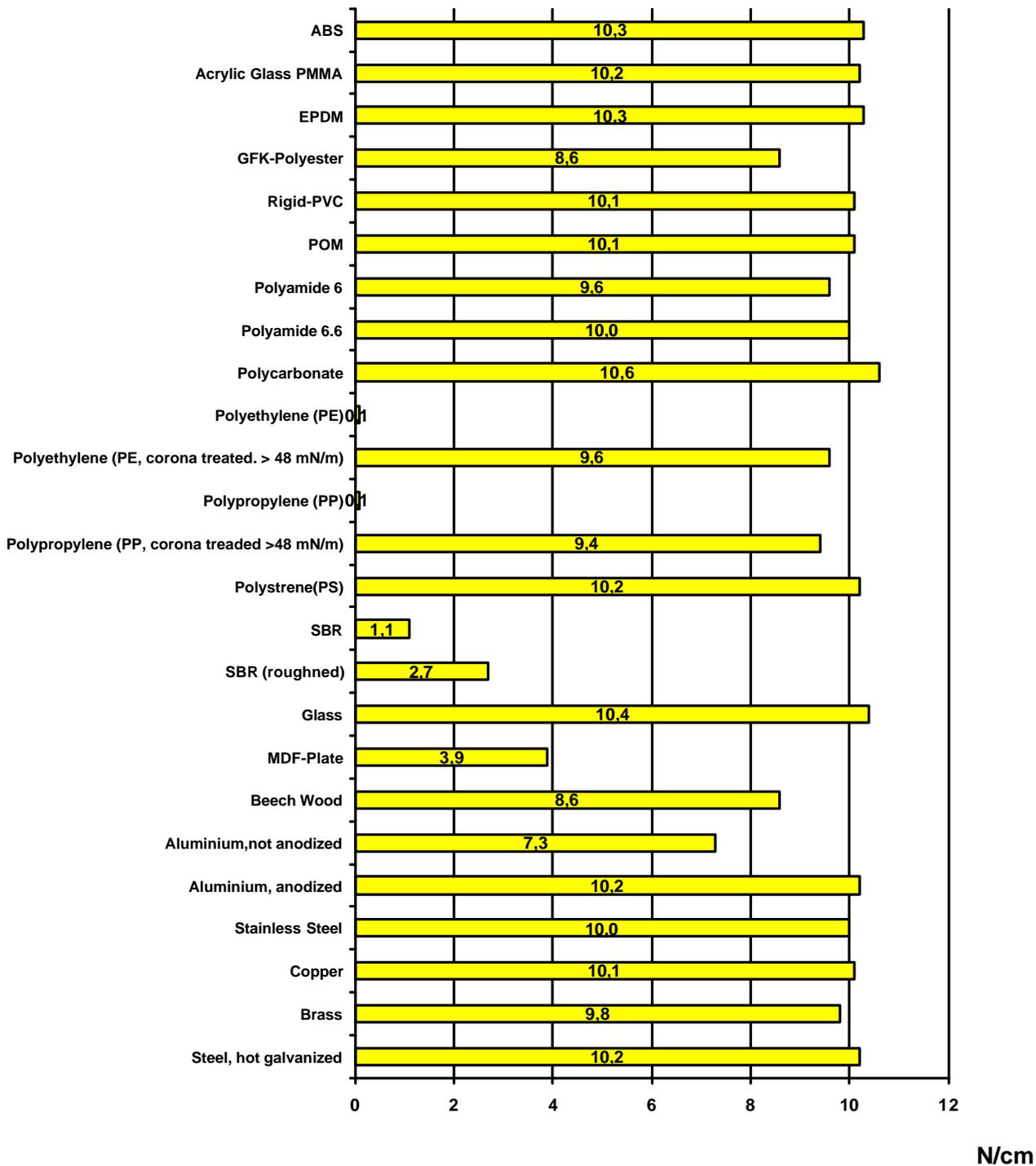
To avoid die cutting problems, the adhesive layer should end 0,5 – 1,0 mm in front of the punch line. Back-lit areas will not be printed as the adhesive film has an influence on the light intensity.

ADHERING

Adhesion of self-adhesive products with KIWOPRINT L 4000 can be promoted by the following factors:

1. Substrate and adhering partners should be free of dust and stripping agents.
2. Optimum adhering temperature: 20-50°C.
3. Additional contact pressure (approx. 20 N/ cm²) with a heated silicone-rubber stamp (40-50°C).
4. Tension- and bubble free adhesion.
5. Even and smooth substrate (e.g. injection moulding part without holes and edges).
6. Sufficient adhesion area, compared to the total area.

Peel values of KIWOPRINT L 4000 on different substrates:



Tested according to PSTC 1. Measured 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 angle: 180°, printed with 21-120(T) on 50 µm polycarbonate film, measured after 72 h-storage at normal climate (according DIN 50014-23/50-1). Peel speed 300 mm/min. Applied with a hand roller (according to PSTC standard: 10 pounds, rolled 5x in each direction). Adhesion area: 2,5 x 10 cm

TECHNICAL DATA

BASIS	Acrylate in solvent
COLOUR	Wet: colourless to light yellowish Dry: transparent
VISCOSITY	Approx. 49 s (Cuptimer according to DIN EN ISO 2431, 6 mm nozzle, 23°C)
SOLIDS CONTENT	Approx. 38%
DENSITY	Approx. 0,93 g/cm ³
FLASH POINT	Approx. +25°C
DRYING/ CONSUMPTION	Applied on a 50 µm polyester film by screen printing:

Mesh	36-90 (T)	43-80 (T)	77-55 (T)
Drying (at 20°C)	Approx. 60 min	Approx. 50 min	Approx. 30 min
Drying (at 70°C)	Approx. 2,2 m	Approx. 2 min	Approx 1 min
Thickness of the dry layer*	Approx. 9 µm	Approx. 8 µm	Approx. 6 µm
Theoretic consumption	Approx. 24 g/m ²	Approx. 21 g/m ²	Approx. 16 g/m ²

*Measuring according to DIN 50981, with stencil thickness gauge Permascope M11 of Helmut Fischer GmbH & Co.

PEEL VALUE	Approx. 12 N/ inch (after 1 min bonding time) Approx. 19 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 5 x in each direction) and measured after the corresponding bonding time at 23°C. Adhesion area: 2,54 x 10 cm.

DYNAMIC SHEAR STRENGTH	Approx. 132 N/ inch ² 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.
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**STATIC
SHEAR STRENGTH**

Approx. 60 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. 1000 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. +60°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. +100°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 RESISTENCE

Very good

**REDUCING/
CLEANING**

KIWOSOLV L 14

**HEALTH HAZARDS/
ENVIRONMENTAL
PROTECTION**

When working with KIWOPRINT L 4000 ensure sufficient ventilation of the working areas.

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

STORAGE

9 months (at 20 - 25°C and tightly closed original container)