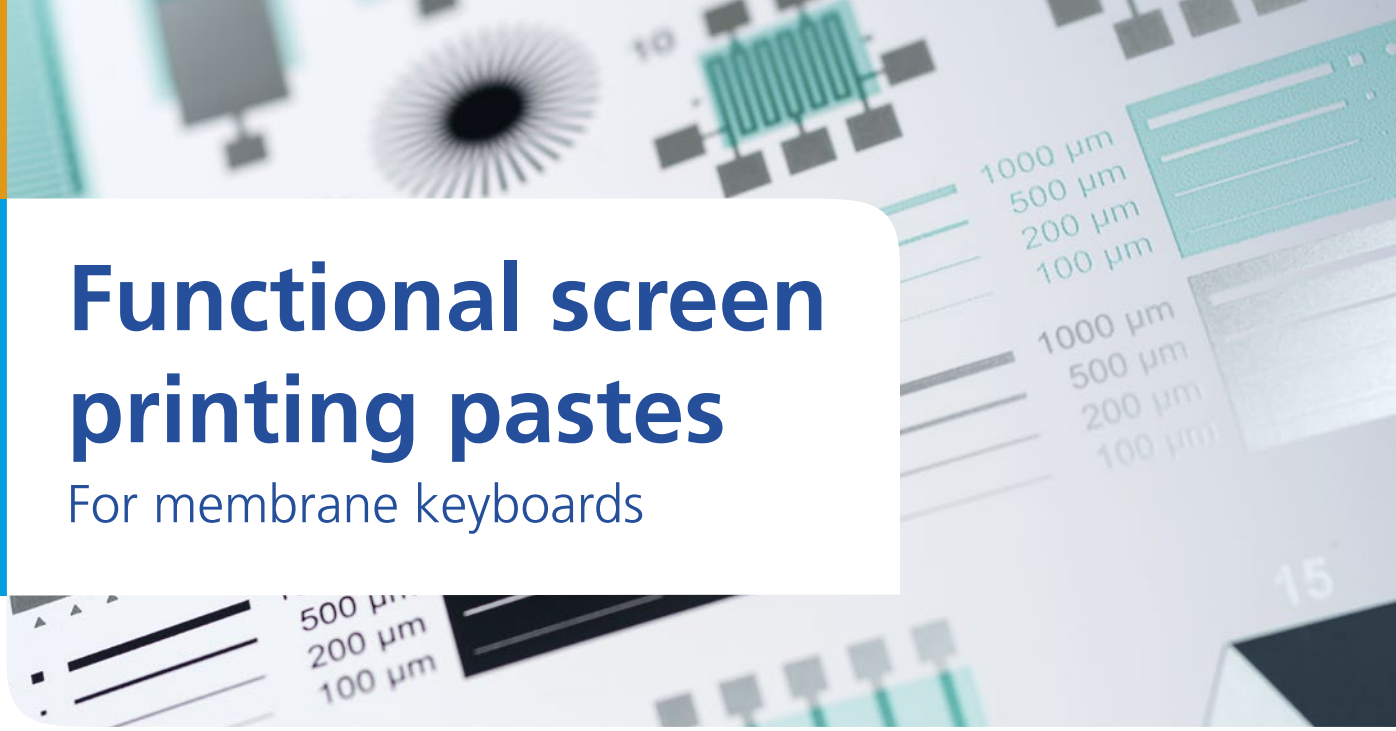
ELANTAS Technical Note



Functional screen printing pastes

For membrane keyboards

The membrane keyboard exists in various variations and for decades has been the input interface in diverse applications. Medical technology, tool and machine building and also consumer electronics without membrane keyboards are now hardly conceivable. In addition to cost-effectiveness, of course reliability also plays a decisive role for the proliferation of such systems. Membrane keyboards are comprised of a number of materials, such as the carrier foil (as a rule a PET film), functional screen printing pastes, spacer films and laminated films, metallic switch wafers, graphical colours, and LEDs. Due to the constantly increasing additional functions in modern input systems, it is necessary to accommodate as many circuit paths as possible in the smallest possible space without compromising the performance capability.

The Printed Electronics product line of ELANTAS Europe develops and produces functional screen printing pastes and matched material systems under the brand name Bectron®. As a member of the Fachgemeinschaft Eingabesysteme (Association of Input System Specialists), ELANTAS Europe profits from many years of experience in this range of applications.

The Printed Electronics product line offers different silver and carbon-based conductive pastes, along with insulating pastes, which are distinguished by their ruggedness, cost-effectiveness and flexibility.

Your advantages:

- The requirements of the membrane keyboard provider are completely fulfilled.
- High flexibility (80 double crease < 10% bending)
- Fine-line printing for superior accuracy and efficiency. Very high conductivity (< 10 mΩ/sq/mil)
- Excellent adhesion to pre-treated and untreated PET films

In order to offer the best possible quality, in addition to the established tests for adhesion, flexibility and viscosity we also utilise the newest and most reliable measurement methods for film thickness measurements and electrical characterisation. Furthermore, for the development of screen printing pastes we place particular emphasis on processability and runnability and also on cost -effectiveness.

Due to the large number of available substrates it is not possible to utilise a single colour system for all carrier foils. Two basic systems are therefore available, for pre-treated and untreated PET substrates. The interdisciplinary competence within the ALTANA Group was brought together at the Hamburg site. This enables the development of products with very specific requirement profiles, such as pastes with good adhesive properties for films, and metallic or ceramic surfaces.

The hardening and drying mechanisms also play an important role for the choice of product when, for example, production is to take place on a background with limited drying capacities.

Product	Description	Curing	Benefit
Bectron® CP 6662	Conductive silver ink	10 min at 120°C	Optimized for fine line printing, very flexible, long screen open time, good adhesion to untreated and treated PET films, <0.010 Ω/sq/mil
Bectron® CP 6619	Conductive silver/ carbon ink	10 min at 120°C	Long screen open time, long screen open time, <0.025 Ω/sq/mil
Bectron® GP 9552	Conductive carbon ink	10 min at 120°C	Silver top-coat with good adhesion to treated PET films, <40 Ω/sq/mil
Bectron® GP 9553	Conductive carbon ink	10 min at 120°C	Good adhesion to silver and untreated PET films, <40 Ω/sq/mil
Bectron® DP 8442	Insulating ink green	5 m/min at >600 mJ/cm² UVA	Good adhesion to silver, untreated and treated PET films
Bectron® DP 8443	Insulating ink blue	5 m/min at >600 mJ/cm² UVA	Good adhesion to silver, untreated and treated PET films
Bectron® DP 8444	Insulating ink colorless	5 m/min at >600 mJ/cm² UVA	Good adhesion to silver, untreated and treated PET films

Here, we offer fast-drying pastes and variants which are particularly insensitive to drying and consequently exhibit a so-called long screen service life.

For new projects, unknown substrates can be tested for paste compatibility in our own pressure laboratory. Alternatively, we can also make paste samples available for initial testing in order to assess the behaviour under real conditions. Our Applications Engineering will be happy to support you and provide training on-site.

As a rule, the conductive Bectron® CP silver screen printing pastes have a high silver content, enabling very fine lines and at the same time a high film thickness. Compared with many competitors' products claiming to have good conductivity values, Bectron® pastes excel by their greater coating thicknesses, ultimately resulting in higher current carrying capacity and signal accuracy. These pastes can therefore also be used beyond the membrane keyboard application for printing antennas, feed cables for heating systems, and other sensor-based applications. Suitable modification of the screen can reduce the ink consumption and the film thickness to no more than the required value for the particular application, generating an excellent cost-performance ratio compared with many existing silver pastes.

The Bectron® GP graphite pastes and the UV-hardening Bectron® DP insulation pastes complement the Bectron® silver inks. Bectron® GP graphite pastes serve to protect the silver paste at sites with mechanical loading, e.g. at contact points, in order to prevent metal-to-metal abrasion. The graphite serves as a lubricant, while the special formulation prevents stirring up dust from graphite particles, which could cause short circuiting. The graphite can, however, also serve as a series resistor for LEDs or as a touch electrode.

In addition to their insulating capability, Bectron® DP insulation pastes enable bridge printing in order to realise printed conductor crossings. Multilayer constructions are therefore no problem for the matching Bectron® material system.

With the optimally chosen product properties, throughput times can be shortened and investments in new equipment made unnecessary. The functional Bectron® pastes fulfil the wish for a higher integration density for modern input systems at attractive prices without having to comprise quality.

Contact us, convince yourself and do not hesitate to ask for a sample. For any questions about the selection of materials or applications please get in touch with us.

ELANTAS Europe is a leading manufacturer of insulating and protective materials for the electrical and electronics industry. The Product Line Printed Electronics offers a wide range of conductive, insulating and functional screen printing inks for applications such as membrane switches, touch surfaces, in-mold electronics, hybrid electronics, sensors, RFID antennas and electroluminescent lighting.

ELANTAS Europe GmbH
Grossmannstr. 105 · 20539 Hamburg, Germany
Tel. +49 40 789460
advancedPrinting@altana.com

www.elantas.com/europe

12/2021