

FRONT VIEW:

INKS FOR PRINTING FRONT PANELS OF WHITE GOODS



Washing machines, dishwashers, ovens, microwaves are essential appliances in our homes. They all offer a huge variety of different programs. We generally use the front panels to choose the required washing or cooking programs. Nowadays digital displays and touch screens are increasingly used; screen printing again as part of these applications to cover the margins. Still there are buttons and switches with printed scales, descriptions of operation, type designation and company logos. For high quality appliances with displays and touch screens usually the whole area around the displays and touch screens is printed on the reverse side of transparent front panels, the front of the display is either dyed with transparent inks or the touch controls are covered with decorative inks.

Substrates used for these applications are mostly white or transparent injection-moulded plastics, glass, and stainless steel or coated sheet metal. Whether printers use screen or pad printing for these applications, mostly depends on the form of the panels (flat, bended, 3D elements) and the size of the motive or the individual images. Choice of ink system is primarily subject to the type of substrate, the required resistances, which may be quite different from manufacturer to manufacturer.



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WHITE PLASTIC PANELS

Conventional panels of domestic appliances are generally white injection-moulded parts made of a mixture of PC/ABS, which are usually printed on the front side. These are often bulky and complex, slightly bended form parts, sometimes with openings or gaps or possibly even protruding elements at the front side and with boards and roots on the reverse. Therefore, these parts are often pad printed.

TP 313 is the preferred ink range of Coates Screen Inks GmbH for these applications. This ink type is mostly used as 1-component ink. If necessary, however, addition of hardener TP 219 will enhance the already high specific resistances of this ink range. Basically, ink range TP 313 shows good printability, quick drying and although being a 1-component ink especially high mechanical resistances. As printed front panels often have to show high scratch and abrasion resistance, printers can further enhance the high mechanical resistance of TP 313 with the addition of anti-abrasion agent LAB-N 560469, addition approx. 1-3% (stir with dissolver).

In addition to the commonly used TP 313, our ink type TP 247, mostly as 2-component ink, is also suitable for these applications. This ink range shows equally good printability and high specific resistances.

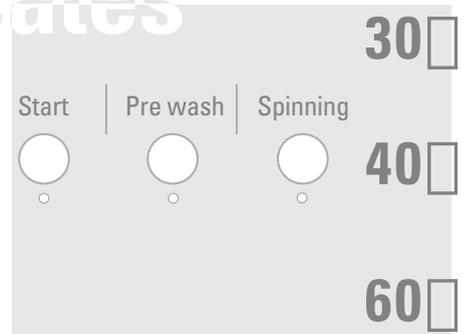
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TRANSPARENT PLASTIC PANELS

These are injection-moulded panels, however mostly flat without any deep and bulky supporting brackets. Such panels are usually built-in later, either clamped and/or pasted to the front of the appliance. Plastics used are often PMMA (acrylic glass), polycarbonate (PC), sometimes also plastic blends or mixtures. Decorations on such materials are applied on the reverse side. If material is flat and does not have any disturbing protruding elements printers prefer the screen process as, except for the display motives, a full and opaque layer is often applied on these panels as a final step. Sometimes a highly transparent filter ink is applied on the display motives in order to achieve a certain coloration and/or dead front effect.

Again, choice of ink type depends on requirements. Reverse prints have to show a certain degree of mechanical and scratch resistance for the following assembly. Additional requirements are tape resistance (double adhesives) and resistance against liquid adhesives. Another important criterion is resistance against vapour and condensation humidity. In addition, inks applied on touch screens have to be non-conductive.

Suitable for these applications are our 1-component screen inks PK for prints requiring medium resistances. For applications requiring high or very high qualities our 2-component ink type Z for prints on PMMA and ZMN for prints on PC are suitable. UV inks are not often used for PMMA as this plastic material is still quite difficult in combination with UV and the necessary special requirements. On the other hand, our ink range UVE is sometimes used for PC panels, if requirements of motive images and ink curing are met.

GLASS PANELS

Glass panels are frequently used for top-quality panels of ovens, steamers, microwaves and the like. Because of special requirements such as temperature resistances of $> 200\text{ }^{\circ}\text{C}$ ceramic oven curing inks are frequently used for such applications. By changes in construction and design aimed to significantly reduce impact of temperature on the panels, often one can try to substitute the time-consuming ceramic inks with organic inks such as our Z/GL. If requirements for temperature resistances are not extremely high - e.g. front glass of coffee machines - Z/GL is already the better choice, also in combination with touch-screen areas.

METAL PANELS

There is quite a vast variety of products. Aluminium, steel sheets, both often coated, high-quality stainless steel, the latter partially with treated surfaces. These substrates are mainly screen printed on the front side and prints have to be highly resistant. Such applications are mostly done with 2-component ink systems, lately also more and more with UV inks.



For metal panels, basically the following ink systems are suitable:

Z

2-component epoxy system, processed with hardener ZH. Suitable for aluminium, steel sheets, coated surfaces.

Z/GL

2-component epoxy system. Preferred for stainless steel. Mostly processed with hardener ZH/03-GL and oven cured for 20 minutes at $140\text{-}160\text{ }^{\circ}\text{C}$.

LAB-N 331213

System based on polyester resins. Highly weather and chemical resistant, final drying by oven curing at $140\text{-}160\text{ }^{\circ}\text{C}$ for 20-30 minutes (intermediate drying at room temperature). As this is an elastic ink system forming (e.g. bending of edges) of the material is possible.

UV/K

UV-curing epoxy system. This system can be processed with hardener additive UV/H as an option (addition 5%). Preferred application on stainless steel.

It is essential that print surfaces are free of grease and clean. Surface coatings are another critical aspect such as anti-fingerprint coatings on the materials.

The essential requirement again is an extremely high abrasion resistance. To enhance this resistance optional additives are available, e.g. LAB-N 560469 (addition 1-3%) which can be added to these ink types.

COMPREHENSION

Preferred Coates Screen Inks for Front Panels:

PC/ ABS: **TP 313, TP 247**

PMMA and PC: **PK, Z, UVE**

Glass: **Z/GL**

Metals: **Z, Z/GL, LAB-N 331213, UV/K**