RO-948 is a solvent based, heat dried ink designed for use in applications requiring visible tags on devices exposed to X-ray and other imaging technologies.

**DESCRIPTION**

- Fine grind provides excellent crease resistance and optimal screen printing results.
- Tungsten filled, solvent based, heat dried ink
- Applied by screen or high speed roll printing processes, coating, dipping, or manual processes such as brush or syringe for making prototypes
- Cured films exhibit excellent adhesion to glass, metal and most plastic substrates.
- Very flexible for use on printed substrates requiring bending or flexing
- Can be overprinted with other protective inks or coatings, and is compatible with Parylene overcoats
- Compatible with other silver conductive inks, carbon resistive inks, silver conductive epoxy adhesives, UV curable encapsulants and conformal coatings

**TYPICAL PROPERTIES**

<table>
<thead>
<tr>
<th>Property</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>Thick gray opaque ink</td>
</tr>
<tr>
<td>Viscosity: Brookfield @25°C</td>
<td>SC4-14 Spindle, 20 Shear</td>
</tr>
<tr>
<td></td>
<td>3,000-7,500 cps</td>
</tr>
<tr>
<td>Density (Wet) @25°C</td>
<td>5gm/cm³</td>
</tr>
<tr>
<td>Total NV Solids</td>
<td>88% +/-2%</td>
</tr>
<tr>
<td>Flashpoint, PMCC</td>
<td>171°C</td>
</tr>
<tr>
<td>Shelf Life @ 25°C</td>
<td>6 months, per storage guidelines</td>
</tr>
<tr>
<td>Dry Time</td>
<td>90 seconds to 5 minutes at 130°C depending on air flow, humidity &amp; print thickness</td>
</tr>
</tbody>
</table>
RO-948 RADIO OPAQUE INK

Application Guidelines

RO-948 is optimized for screen printing but can be applied by high speed roll printing processes, coating or dipping. It can also be applied by manual processes such as brush or syringe for making prototypes.

The solid filler in RO-948 will settle quickly when left in storage, and the material will thicken towards the bottom of the container. When left undisturbed for long periods, the dense filler will settle to a "hard pack" in the bottom of the container and the material will require very aggressive mixing in order to break up the hard pack and re-disperse it into the material. It is essential to mix the material thoroughly before use to re-disperse any settled particles and to return the ink to a more desirable viscosity.

Screening

A monofilament polyester (157 to 230 mesh) or a stainless steel (165 to 325 mesh) screen is recommended, with emulsion thickness between .001” and .004”. A polyurethane squeegee with a Shore ‘A’ durometer between 60 and 70 is recommended. In order to obtain optimal opacity under emissions, a wet-wet print cycle will allow for more filler density in the final print pattern. Alternately, two or more print layers can be made between drying cycles to build up the dry film to a suitable thickness.

Thinning & Cleanup

Use 1-methoxy-2-propanol acetate (PM acetate) or dibasic ester solvents. If faster drying time is required, contact Applied Ink Solutions for solvent recommendations. If solvent based inks are left on screens for any length of time, the ink will gradually thicken as solvent evaporates. If ink is to be left on an inactive press for any length of time, solvent evaporation can be minimized by pooling the ink into a small area instead of leaving it spread out over a large area. Pooling the ink reduces the surface area, thus slowing the drying process. Always check the viscosity of ink that has been recovered from a screen and add small amounts of solvent while mixing thoroughly to restore viscosity. Solvent can be added to reclaim thickened ink as long as the ink has not dried and hardened completely.

Drying

It is essential that all residual solvent be removed from this ink once it is applied. Incomplete drying will cause the ink to appear dry on the surface while trapping solvent underneath the surface. Over time, this trapped solvent will migrate out of the ink, and can cause adhesion problems with any material (such as dielectrics) applied over the ink.

Storage

For storage, slowly roll the container of ink continuously or for 2 to 3 hours minimum daily. If this is not possible, then the container should be turned over in storage so that the container end with the lid, sits on the bottom after one or two days and then turned over once again in one or two days. Do not let material sit undisturbed for long periods before printing.

Health & Safety

Products manufactured by Applied Ink Solutions are intended for use in an industrial environment by trained personnel. Please follow proper health/safety processes regarding storage, handling and processing of the products.
**RO-948 RADIO OPAQUE INK**

**Dry Film Thickness**

.0010″ (.0254mm)

.0015″ (.0381mm)

.0022″ (.0546mm)

**Aluminum Step Wedge**

.020″ (0.52 mm)

.040″ (1.01 mm)

.064″ (1.62 mm)

.083″ (2.11 mm)

.101″ (2.56 mm)

.123″ (3.12 mm)

.144″ (3.66 mm)

.166″ (4.22 mm)

.187″ (4.75 mm)

*Aluminum Step Wedge – Alloy 1100; ASTM F640

**X-Ray Imaging**

At a given printed thickness, RO-948 is equivalent to over 30x the thickness of solid aluminum in terms of image opacity when viewed by x-ray.

**RO-948 X-Ray Opacity Equivalence Test Data**

<table>
<thead>
<tr>
<th>Printed RO-948 Thickness</th>
<th>Solid Aluminum (alloy 1100) Equivalent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inches</td>
<td>mm</td>
</tr>
<tr>
<td>Solid Aluminum (alloy 1100) Equivalent</td>
<td>mm</td>
</tr>
<tr>
<td>---------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>0.0010</td>
<td>0.0254</td>
</tr>
<tr>
<td>0.0015</td>
<td>0.0381</td>
</tr>
<tr>
<td>0.0022</td>
<td>0.0546</td>
</tr>
</tbody>
</table>

**RO-948 Equivalent X-Ray Opacity Equivalence**

**Metric Units Per ASTM F640 (2012)**

**English Units Per ASTM F640 (2012)**