



## RO-948 Radio Opaque Ink

### Description

RO-948 Radio Opaque Ink is a solvent-based, heat-dried ink designed for use in applications requiring high contrast visible tags on devices exposed to X-ray and other imaging technologies. The ink image is easily seen on film or using a fluoroscope as a visible reference point.

### Features

- Fine grind provides excellent crease resistance and optimal screen printing results
- Tungsten-filled, solvent-based and heat dried
- 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 our UV curable dielectrics, conductive epoxy adhesives and UV curable component encapsulants.

### 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 syringes 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

### Typical Properties

Appearance	Thick dark gray liquid
Hegman Gauge	<10 µm
Total % NV Solids	86 - 90%
Viscosity: Brookfield SC4-14 spindle @ SR 20, 25°C	As tested
No crack on crease test	Pass

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 to redisperse it into the material. It is essential to mix thoroughly before use to redisperse any settled particles and to return the ink to a more desirable viscosity.

A monofilament polyester (157 to 230 mesh) or a stainless steel (165 to 325 mesh) screen are recommended with emulsion thickness between .001" and .004". A polyurethane squeegee with a Shore 'D' durometer between 60 and 90 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. Alternatively, two or more print layers can be made between drying cycles to build up the dry film to a suitable thickness.



## Drying

The drying process will take 90 seconds to 5 minutes at 130°C depending on air flow, humidity and print thickness.

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.

If solvent-based inks are left on screens for any length of time, the ink will gradually thicken as solvent evaporates. If the ink is to be left on an inactive press for any length of time, solvent evaporation can be minimized by pooling the ink to reduce the surface 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.

## Thinning & Cleanup

If necessary, use Solvent 10 to thin the ink. Solvent should only be added to the amount of ink that will be used at that time and not to the entire container. 1 part per 100 is the recommended starting point with smaller increments added if more is needed. Mix well after each addition. Use Solvent 20 or suitable screen cleaner for cleaning the surface of a screen or tools.

## Storage & Shelf Life

Proper storage is important. Store in a dry area at 25°C (room temperature). Shelf life is 6 months in unopened container.

During 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 the material sit undisturbed for long periods before printing.

## Disposal

The material and its container must be disposed in accordance with all local, state, federal and/or international regulations.

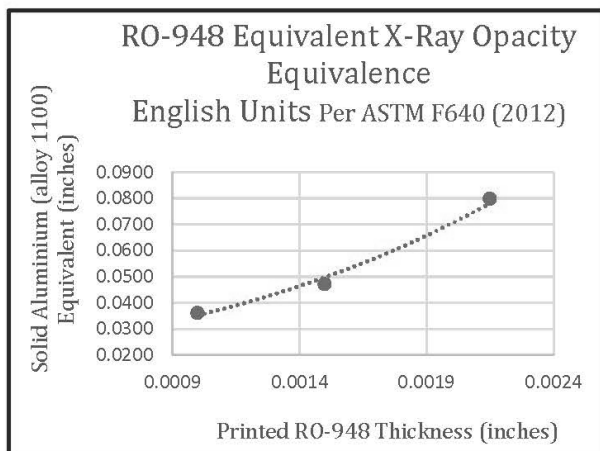
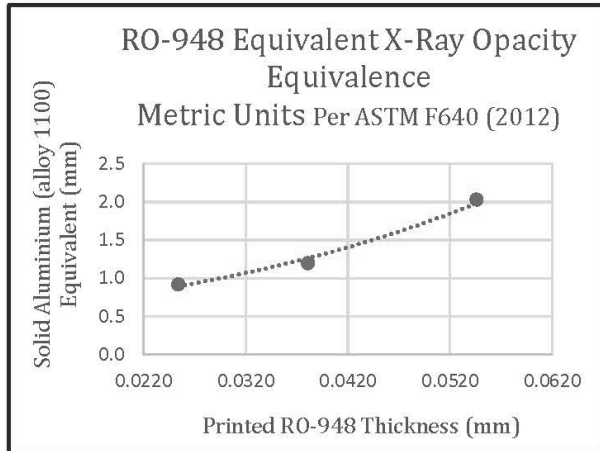
## Handling

Consult Safety Data Sheet (SDS) for details on the handling procedures and product hazards prior to use. If you have any questions regarding handling precautions or product hazard, please email [productsafety@kayakuAM.com](mailto:productsafety@kayakuAM.com).

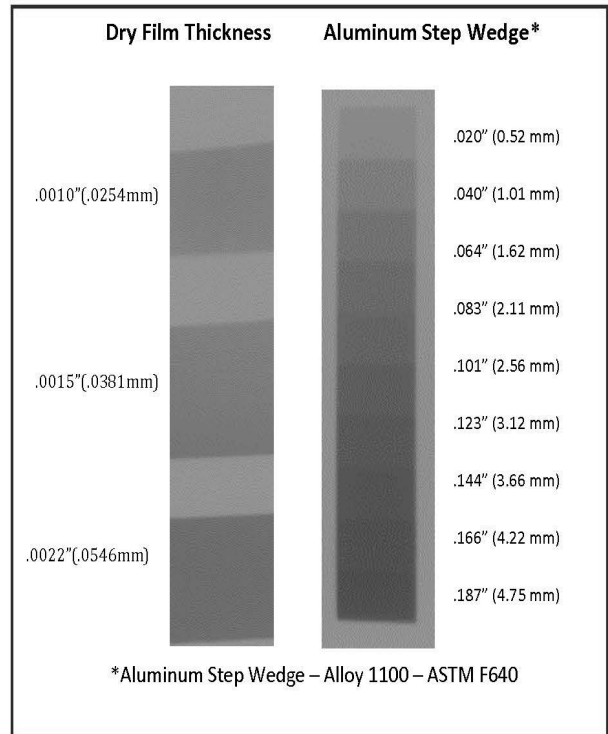


## RO-948 X-Ray Opacity Equivalence Test Data

Printed RO-948 Thickness		Solid Aluminum (alloy 1100) Equivalent		Ratio
Inches	mm	Inches	mm	
0.0010	0.0254	0.0362	0.920	36.2
0.0015	0.0381	0.0472	1.200	31.5
0.0022	0.0546	0.0799	2.030	37.2



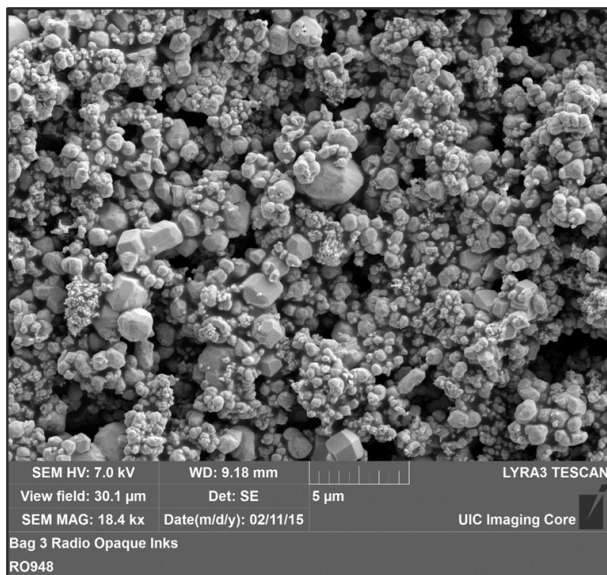
## RO-948 Printed Film vs. Aluminum Step Wedge



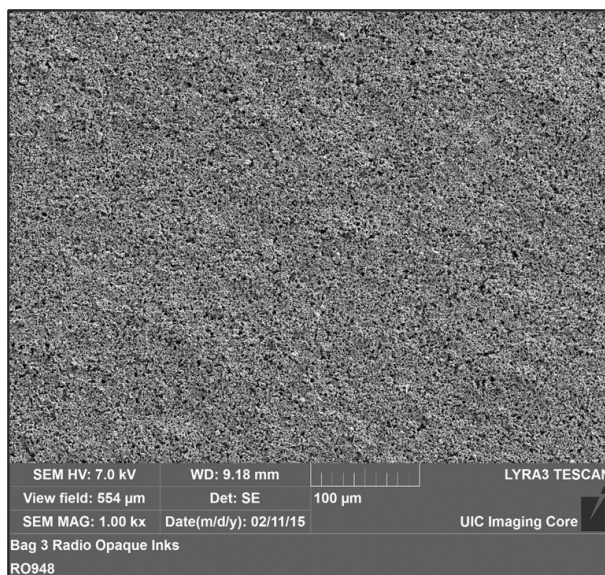
In the X-ray imaging on the aluminum step wedge above, at a given thickness, RO-948 is equivalent to over 30x the thickness of solid aluminum in terms of image opacity when viewed by X-ray.



## Images Under Scanning Electron Microscope



18.4 kx image



1.00 kx image

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