

## A10, A20 and A30 Hydrophobic coatings



A10, A20 and A30 are coatings with superior hydrophobic properties, which can be applied to most surfaces and materials. The coatings can be used for many applications but is developed to prevent water droplets wetting a coated surface.

A10, A20 and A30 are the same coating but in different concentration and different solvents.

### Coating features

- Very hydrophobic coating (water contact angle  $\sim 100^\circ$ )
- Optimized for superior water roll-off rather than high water contact angle
- Long functional life (3+ years) thus easily supporting a 2 year shelf life of the coated device
- Simple and flexible coating process (5 seconds coating and 60 seconds drying)
- Coating tolerant to storage without temperature and humidity control
- Excellent adhesion to most materials

### Material compatibility

For any material we have tested A10, A20, A30 give excellent adhesion and left the surface very hydrophobic.

Tested materials; Polycarbonate, polystyrene, Acrylic/PMMA, COC/COP, glass, epoxy, aluminium. The contact angle is  $100^\circ \pm 5^\circ$  for the tested materials.

Incompatible materials are those that cannot withstand a 60 second exposure to diluted xylene.

### Differences between A10, A20 and A30

- A10: Formulated with high concentration of xylene. 1% solids.
- A20: 80% of the xylene is replaced with isopropanol. 0.1% solids.
- A30: All xylene is replaced with isopropanol. 0.01% solids.

A10, A20 and A30 will all give the same very hydrophobic dry coating. The choice between them should be made on the basis of solvent compatibility with the device to be coated.

A20 and A30 may have precipitates in the bottle. These are resolubilized by heating the closed bottle to  $40-50^\circ\text{C}$  and then inverting the bottle several times.

## Processing guidelines

### Surface preparation

The surface to be coated with A10, A20, A30 should be clean and free of dust, oil, water and volatiles. Other than this the surface does not need any preparation.

### Coating methods

A10, A20, A30 can be applied to most substrates by spray, dip, spin, brush, roller or ink-jet coating. The available equipment and the device to be coated will determine the best coating method.

The internal surfaces of a finished device can also be coated by filling channels etc. with the coating solution by capillary force, and then letting it dry from the device openings or blowing the device dry by compressed air. A word of caution on this coating method; during drying the coating solution will concentrate at locations of high capillarity (small geometry), and the coating at these locations may thus be unacceptably thick.

### Drying

At room temperature the solvent will evaporate very quickly, often the surface will be dry in 30-60 seconds after coating. No additional drying is needed. It is necessary to ensure proper ventilation to remove the evaporating solvent.

### Coating thickness

The optimum coating thickness is 25 nanometer. The minimum coating thickness is 10 nanometer, below this the coating is less hydrophobic and may have shorter functional life. The coating can have any thickness greater than 25 nanometers, but the coating does not become more hydrophobic and with great thickness it also becomes more hazy. A coating at 25 nanometer thickness will have a faint hazy appearance. If the coating is very hazy, then it is thicker than it need be.

### Removal

If needed an A10, A20, A30 coating can be removed by oxygen plasma, or washing the coated surface in warm xylene.

### Initial R&D work

For initial R&D work it is recommended to coat a device by an airbrush with a fine nozzle. If no airbrush is available a quick dip coat works as well. After coating simply leave the device in air to dry.

## Functional life of A10, A20, A30 coatings

The coatings have a very long functional life. If stored as recommended a coated device will stay very hydrophobic for years, and the hydrophobic coating thus easily support a 2 year product shelf life.

### Accelerated functional life study

An accelerated functional life study (ASTM-F1980) is being made in normal humid air. No change in water contact angle is observed over the first 3 years. The contact angle stays in the range  $100^{\circ} \pm 5^{\circ}$ .



## Storage, disposal and safety

### Storage

#### Liquid A10, A20 & A30 solutions

Store upright and in tightly closed containers in a cool, dry environment away from direct sunlight at a temperature of 4-27°C (40-80°F). Shelf life is 24 months from date of manufacture.

#### Dry coating

A coated device can be stored at normal room temperature and without humidity control, provided these conditions do not cause condensation of water on the coated surface.

The coated device should be stored so it is not exposed to;

- Temperatures above 60°C
- UV radiation
- Abrasion

### Disposal

A10, A20 & A30 may be included with other waste containing similar organic solvents to be discarded for destruction or reclaim in accordance with local state and federal regulations. It is the responsibility of the customer to ensure the disposal is done in observance of all applicable environmental regulations.

### Environmental, Health and Safety

#### Liquid A10 solution

A10, A20, A30 solution is mainly xylene and Isopropanol, use the same precautions you would when handling these solvents. Handle with care. Wear chemical goggles, chemical gloves and suitable protective clothing when handling the coating solution. Do not get into eyes, or onto skin or clothing. Use with adequate ventilation to avoid breathing vapors or mist. In case of contact with skin, wash affected area with soap and water. In case of contact with eyes, rinse immediately with water and flush for 15 minutes lifting eyelids frequently. Get emergency medical assistance.

#### Dry coating

When dried the coating is biocompatible and safe. No precautions are needed.

### Warranty

The information in this datasheet is based on our experience and is, we believe to be reliable, but may not be complete. We make no guarantee or warranty, expressed or implied, regarding the information, use, handling, storage, or possession of this product, or the application of any process described herein or the results desired, since the conditions of use and handling of the product is beyond our control.

