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| Technical data sheet RS 126<br>Space department<br>Creation : September 1998 | DATE<br><br>01.02.02 | REVISION<br><br>N° 4 |
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# SVH1 WHITE SILICONE PAINT FOR MANNED FLIGHTS

**CNES approval : NT-98-013/T/TS/AE/MTE/TH**  
**ESA approval : QM/97L446/JAQ**

## **DEFINITION**

White paint providing excellent thermo-optical properties so as a high resistance under UV irradiation.  
White satin aspect  
AFNOR classification NFT 36005 : Family I Class 10c.

## **COMPOSITION**

Binder : silicone  
Pigment : Titanium dioxide  
Solvent : Aromatics

## **PROPERTIES AND CHARACTERISTICS OF THE COATING**

Substrate : metallic alloys and composites  
Adhesion by squaring + adhesive tape 92 (3M) : very good (0/5)  
Solar absorptance  $\alpha_s = 0.30 \pm 0.04$   
Normal IR emittance  $\epsilon_{pN} = 0.86 \pm 0.04$

| <b>Curing</b>                             | <b>Room temperature</b> | <b>1 hour at 200°C<br/>(for metallic alloys only)</b> |
|---|-------------------------|---|
| Flexibility on mandrel $\varnothing$ 5 mm | Complete                | Complete  |
| Impact test 4 heads at 40 cm high         | Good                    | Good  |
| Scratching test (500 g)                   | Good                    | Very good   |

### **Flammability test** (ESA-PSS-01-721 standard)

#### Conditions of the test

Temperature : 1000 +/- 100°C  
Duration of exposure : 25 +/- 5 secondes  
Pressure : atmospheric  
Oxygen concentration : 24.5 % volume

⇒ Result : Good, the flame is not propagated after extinguishing.

### **Toxicity test** (ESA-PSS-01-729 standard)

#### Conditions of the test

The sample is placed in an air tight room at 50°C during 3 days.  
The extracted gas are tested by chromatography in aqueous phase.

⇒ Result : The SVH1 paint shows a "total organics" of 0.075  $\mu\text{g}/\text{cm}^2$  lower than the maximum tolerable limit which is 100  $\mu\text{g}/\text{cm}^2$ .

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**Ageing test**

Thermal cycling in a vacuum

Pressure :  $10^{-6}$  torr

Temperature : -30°C to +50°C

Number of cycles : 60

| Sample                                    | $\alpha_p$  |            | $\epsilon_{pN}$ |            | Visual aspect | Adhesion by squaring + adhesive tape 92 |            |
|---|-------------|------------|-----------------|------------|---------------|---|------------|
|   | Before test | After test | Before test     | After test |               | Before test                             | After test |
| AU4G aluminium<br>24 h air + 1 h at 200°C | 0.30        | 0.30       | 0.86            | 0.86       | RAS           | 0/5                                     | 0/5        |
| AU4G aluminium<br>Room temperature        | 0.29        | 0.29       | 0.86            | 0.86       | RAS           | 0/5                                     | 0/5        |
| Glass epoxy<br>Room temperature           | 0.27        | 0.29       | 0.89            | 0.89       | RAS           | 0/5                                     | 0/5        |

**Moisture test**

Atmospheric pressure

Temperature : 50°C

Relative humidity : 90 %

Test duration : 5 days

| Sample                                    | $\alpha_p$  |            | $\epsilon_{pN}$ |            | Visual aspect | Adhesion by squaring + adhesive tape 92 |            |
|---|-------------|------------|-----------------|------------|---------------|---|------------|
|   | Before test | After test | Before test     | After test |               | Before test                             | After test |
| AU4G aluminium<br>24 h air + 1 h at 200°C | 0.30        | 0.30       | 0.86            | 0.86       | RAS           | 0/5                                     | 0/5        |
| AU4G aluminium<br>Room temperature        | 0.29        | 0.30       | 0.87            | 0.86       | RAS           | 0/5                                     | 0/5        |
| Glass epoxy<br>Room temperature           | 0.28        | 0.29       | 0.89            | 0.89       | RAS           | 0/5                                     | 0/5        |

**Accumulated tests : moisture + thermal cycling**

(the tests are performed in the same conditions as previously)

| Sample                                    | $\alpha_p$  |            | $\epsilon_{pN}$ |            | Visual aspect | Adhesion by squaring + adhesive tape 92 |            |
|---|-------------|------------|-----------------|------------|---------------|---|------------|
|   | Before test | After test | Before test     | After test |               | Before test                             | After test |
| AU4G aluminium<br>24 h air + 1 h at 200°C | 0.29        | 0.29       | 0.86            | 0.86       | RAS           | 0/5                                     | 0/5        |
| AU4G aluminium<br>Room temperature        | 0.29        | 0.29       | 0.86            | 0.86       | RAS           | 0/5                                     | 0/5        |
| Glass epoxy<br>Room temperature           | 0.28        | 0.29       | 0.89            | 0.89       | RAS           | 0/5                                     | 0/5        |

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## USES

White silicone new paint for application on equipments or experiments on board of manned flights.

## INSTRUCTIONS FOR USE

**Any further sticking on the paint being absolutely forbidden, masked areas must be provided for sticking.**

### Surface preparation

- **Metallic surfaces – light alloys** : eliminate traces of oxides, grease, demoulding agents by immersion or rubbing with acetone then with Forane 141-b (or similar).  
The polished metals must be abraded first. The cleaned materials must be handled with gloves.
- **Composite surfaces** : abrade before cleaning with acetone then with Forane 141-b (or similar).

### Application procedure

Application conditions :  $18^{\circ}\text{C} \leq T \leq 25^{\circ}\text{C}$        $40\% \leq \text{HR} \leq 70\%$   
Thoroughly mix the product before using.

- . On aluminium surface, first apply WP PRIMER (RS010) followed by SVH1 paint.
- . On composite surface, first apply PSI PRIMER (RS104) + followed by SVH1 paint.

### Application of the SVH1 white topcoat

Dilution : about 10 to 20 % of SVH1 thinner  
Application viscosity : 20s to 25s AFNOR cup n° 4 at 20°C  
Filtration : through nylon filter 80 µm  
Theoretical consumption : 58 to 72 g dry/m<sup>2</sup> for 40 to 50 µm thickness  
Dry film thickness : about 40 µm to 50 µm.

SVH1 paint is delivered in two components which must be mixed perfectly before use. Mix the base with mechanical device at medium speed then add the catalyst. Mix the two components and then add SVH1 thinner so as to get the right viscosity.

Pot life of the mixture : 2 h at 20°C  
Weight ratio : Base : 95  
Catalyst : 5

### Application equipment

- KREMLIN J4 type spray gun. Gravity alimentation or similar
- Nozzle n° 12 – AM head – Low output
- Vector gas : compressed air, pressure : 2 bars, oval jet

Application of one mist coat with a paint output of 1 ½ turn letting evaporate the solvent (2 to 3 mn).  
Then application of 1 crossed coat with a paint output of 2 turns. Evaporation of the solvent 8 to 10 mn and then application of a second crossed coat with an output of 2 turns ½.

- Thoroughly mix before each crossed coat.

### Curing conditions

The SVH1 paint needs 48 h for curing at room temperature minimum or 24 h at room temperature plus 4 hours more at 80°C or 24 h at room temperature plus 2 h at 140°C.

### Cleaning of the dry film

With ethyl alcohol. Chlorinated, fluorochlorinated and aromatics based solvents are prohibited.

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## **PRECAUTIONS**

General precautions in use for the application of paints containing solvents. Flammable product. Never handle near a flame. Store away from all source of heat or spark.

## **PHYSICAL CHARACTERISTICS** (as indicative)

|                               | <b>SVH1<br/>white topcoat</b> | <b>SVH1<br/>catalyst</b> | <b>SVH1<br/>thinner</b> |
|-------------------------------|-------------------------------|--------------------------|-------------------------|
| Density at 20°C               | 1.20 +/- 0.1                  | 0.86 +/- 0.05            | 0.92 +/- 0.05           |
| Density of the mixture        |                               | 1.20 +/- 0.1             |                         |
| Solids content                | 60 +/- 2%                     | 14 +/- 2%                |                         |
| Solids content of the mixture |                               | 57 +/- 2 %               |                         |
| Density of solids content     |                               | 1.5 +/- 0.1              |                         |
| ABEL flash point NFT30050     | 25°C                          |                          | 25°C                    |
| Solids content volumic ratio  | 50 +/- 3%                     |                          |                         |

## **REGULATION INFORMATIONS**

See corresponding safety data sheets.

## **TRANSPORT**

UN1263 – Class 3.

## **STORAGE**

3 months in original unopened packagings at 20°C +/-2°C away from humidity.

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