

FR-2 FR-3 EN-1 EN-3 Flexible Cu-Clad

## FR-2 COPPER-CLAD LAMINATE

### COBRISOL 607 OF - Antimonium free

(Code 606)

#### DESCRIPTION

NEMA FR-2 UL-V0 paper-phenolic laminate, possessing low odour, with very good thermal behaviour, flame stability, and balanced x,y,z-linear thermal expansion coefficients. Room temperature punching grade, with outstanding quality. The base laminate complies to IEC-249-2-7. Ecological antimonium free grade.

| PROPERTIES                                                   |                    | TEST CONDITIONS | UNITS                    | TYPICAL VALUES |
|--------------------------------------------------------------|--------------------|-----------------|--------------------------|----------------|
| Flammability UL-94, 1,5 mm                                   | Sx/x max.<br>Class | A               | sec                      | 28/6<br>V-0    |
| Time to blister at 260°C                                     |                    | A               | sec                      | 40             |
| Peel strength, after heat shock 10 sec/260°C                 |                    | A               | N/mm                     | 2,3            |
| Pull-off strength                                            |                    | A               | N                        | 150            |
| Water absorption, 1,5 mm                                     |                    | D-24/23         | mg                       | 39             |
| Flexural strength, Lengthwise                                |                    | A               | Mpa                      | 180            |
| Crosswise                                                    |                    | A               | Mpa                      | 160            |
| Surface resistance after damp heat and recovery              |                    | C96/40/92       | Mohm                     | 5,0E+03        |
| Volume resistivity after damp heat and recovery              |                    | C96/40/92       |                          | 5,0E+04        |
|                                                              |                    | C96/40/92       | -                        | 4,7            |
| Disipation factor after damp heat and recovery 1MHz          |                    | C96/40/92       | -                        | 0,045          |
| Corrosion at the edges                                       |                    |                 |                          | A/B 1,2        |
| Punchability DIN 53488 at 25°C,<br>Lengthwise/Crosswise      |                    | A               |                          | 0,5/0,5        |
| Bow and twist, 1,5 mm<br>(etched)                            |                    | B 0,5/150       | %                        | 1,4            |
| Punching force, 1,3 mm punch diameter                        |                    | A               | N/mm thick.              | 450            |
| Stripping force, 1,3 mm punch diameter                       |                    | A               | N/mm thick.              | 190            |
| Dimensional stability, Lengthwise                            |                    | E-0.5/150       | ppm                      | -800           |
| Crosswise                                                    |                    | E-0.5/150       | ppm                      | -850           |
| Comparative Tracking Index (CTI)                             | Laminate side      | A               | V                        | 200            |
|                                                              | Copper side        | A               | V                        | 225            |
| Odour release at 20 °C (1)                                   |                    | A               | o.u./m <sup>2</sup> /day | <165           |
| x,y,z-linear thermal expansion coefficients (TMA, 50 + 90°C) |                    | A               | ppm/°C                   | 14/20/260      |

Tests according IEC-249-1

(1) Tested on 900 cm<sup>2</sup> sample, clad one side, after 3 days, according TNO (o.u. = odour unit)

The data is based on typical values of standard production and should be considered as a general information. Our Company reserves the right to future change. It is the responsibility of the user to ensure that the product complies with his requirements.

**AVAILABILITY**

Standard sheet sizes, mm :    2144 x 1160; 1070 x 1160  
                                     2540 x 1070; 1270 x 1070  
                                     2760 x 1270; 920 x 1270  
                                     2090 x 1060; 1025 x 1060

Tolerance:    +5/-0 mm  
Squariness:    3 mm maximum, as differential  
                     between diagonal measurements

Also available in cut to size panels

Standard size tolerance in cut panels:  $\pm 0,3$  m

Material marked by red logo: V0 - VR, underlined

Colour: Light brown

  
**PRODUCT SAFETY DATA SHEET ACCORDING TO EEC/91/155 RULES**

ISSUE DATE: 3/0/97  
DATE: 1/2/99  
PRODUCT: VERSION: 2

**COBRISOL 607 OF****1. PRODUCT AND COMPANY DATA**

PRODUCT NAME (OR TRADE NAME): COBRISOL 607 OF

**PRODUCT DESCRIPTION:**

*Cellulose paper-thermosetting phenolic resin laminate, cladded one or both sides with copper foil. Main intended use: base material for printed circuits.*

**COMPANY ADDRESS:**

**AISMALIBAR S.A.**  
Carreter de Ripollat n° 1  
E-08110 Montcada i Reixac (Barcelona)

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**2. CHEMICAL COMPOSITION. DATA ON COMPONENTS**

*Roughly percentage excluding copper:*

|     |                            |
|-----|----------------------------|
| 50% | Cellulose paper            |
| 50% | Plasticised phenolic resin |

*Copper content in standard laminate 1,5 mm, 1 side clad 35 µm, is around 13 %*

**DANGEROUS COMPONENTS:****DANGER CLASS:****SAFETY PHRASES:****3. HAZARDS IDENTIFICATION**

*None*

#### **4. FIRST AID MEASURES**

*Not applicable*

#### **5. FIRE FIGHTING MEASURES**

*All the available fire-extinguishing systems could be used. The material is rated as fire resistant. In the even of fire, cautions must be taken with the fumes. Heavy fumes containing phenols, formaldehyde, and hydrogen bromide will be released at temperatures higher than 300°C*

#### **6. MEASURES IN CASE OF SPILLAGE**

*Not applicable*

#### **7. HANDLING AND STORAGE**

*Can be stored in any indoor clima conditions*

#### **8. PERSONAL PROTECTION AND LIMITS OF EXPOSURE**

##### **INHALATION:**

**THRESHOLD LIMIT VALUE:**

*Not applicable*

*Work in good ventilated rooms during machining or heating processes  
Provide of dust safety suction systems during machining processes  
Use personnel dust mask in systemic or prolonged dust exposures*

**EYES:**

*Not applicable*

**SKIN AND HANDS:**

*Not applicable*

#### **GENERAL HYGIENIC RECOMMENDED RULES**

*Keep working clothes clean of dust, by some safety suction device  
Wash the hands before eat or drink during working breaks*

**9. PHYSICAL AND CHEMICAL PROPERTIES**

NATURE: *Solid, polymeric matrix*  
COLOR: *Yellowish*  
ODOR: *Slightly aromatic*

SPECIFIC GRAVITY:

1,54 kg/m<sup>3</sup>

(BULK  
MASS)

SOLUBILITY IN WATER:

*insoluble*

IGNITION POINT:

>250 °C

THERMAL DECOMPOSITION FUMES:

*See paragraph 5.*

**10. STABILITY AND REACTIVITY**

*The product is stable and unreactive in the normal storage and process conditions*

**11. TOXICOLOGICAL INFORMATION**

*N/A*

**12. ECOLOGICAL INFORMATION**

*The product is not easily biodegradable*  
*Standard lixiviation tests over material in granular form gives levels lower than 20 mg of free phenol/liter*

**13. DISPOSAL CONSIDERATIONS****WASTE DISPOSAL**

*Material could be disposed in underground allowed sites, or incinerated under controlled conditions. The product is free from dibenzodioxines and dibenzofuranes precursor components, and antimony compounds. Checking of the local environmental regulations is strongly recommended*

**14. TRANSPORT REQUIREMENTS**

*None*

**15. REGULATORY INFORMATION**

*N/A*

**16. OTHER INFORMATION**

*International standards covering the product:*

**IEC-249-2-7**

**NEMA FR-2**