XZ302-1 Conductive Carbon

From the Sun Chemical family of Thermosetting Conductive Inks

1. Description

XZ302-1 has been formulated as a screen-printing polymer thick film for printing over copper tracks to replace the costly process of gold plating contacts and edge connectors, and printing crossovers to replace soldered jumper wires

This Technical Information Leaflet (TIL) and the relevant Material Safety Data Sheet (MSDS) should be read carefully prior to using this product.

2. Product features

- RoHS & WEEE Directive Compliant
- High viscosity
- Gives a hard resistant film
- Good compatibility with Peelable soldermasks such as the EPR5000 Range
- Meets typical loop resistance specifications, e.g. <100 ohms/square, for push button operated circuits when activated with a graphite loaded pill
- Is expected to withstand 1 million operations

ISO9001
FM 09568

ISO14001
EMS 40768

3. Product Range

CHSN8032	XZ302-1HV	Conductive Curing Carbon Ink	1.00 kg.
CDSN4041	XZ42	Reducer / Retarder	5.00 L.
CDSN4008	XZ46	Screen Cleaner	5.00 L.

4. General Handling

4.1 Storage and Shipping

When stored in sealed containers in a cool, dry place (10 - 25°C / 50 - 77°F), XZ302-1 has a shelf life of at least 18 months. Storage at lower temperatures in a refrigerator will assist in maintaining ink properties.

4.2 Waste disposal

Care should be exercised in the disposal of printing ink waste. This should be carried out in accordance with good industrial practice, observing all the appropriate regulations and guidelines.

For more specific handling advice refer to the detailed Safety Data Sheet (SDS), supplied by your local Sun Chemical Circuits representative.

5. Application / Processing Conditions

5.1 Thinning

XZ302-1HV is supplied as a single part ink and should be used from the can without thinning. If thinning is required, the use of up to 2% then Retarder XZ42 is recommended.

Please note that Sun Chemical Circuits Conductive Inks XZ302-1HV tends to 'set' with time, but the viscosity will rapidly return to normal when stirred and during printing.

N.B. The ink should be stirred well before use.

5.2 Pre-Clean

To ensure good electrical continuity and adhesion between XZ302-1 and copper, the surface should be free of all contaminants. The presence of dust, oxide, organic coatings and residues, inter-metallic layers will have a detrimental effect.

5.3 Application

XZ302-1HV is suitable for use on hand, semi-automatic or fully automatic screen printing machines.

Conductivity is governed to a large extent by print thickness. This is governed by a number of factors including mesh count, stencil thickness, squeegee hardness and print speed.

Monofilament meshes of 49 - 77T/cm. (125 - 200T/inch) are recommended. A typical print thickness of 11 - 18µm. (0.44 - 0.72mil) is required, but will depend on copper track height.

Finer meshes give thinner prints and higher actual (as printed) resistance values. The smaller mesh hole area is unable to allow as much ink through.

For optimum results a polyurethane squeegee of 65° Shore hardness should be used.

All screens, squeegees, and other equipment must be cleaned and thoroughly dried before use and be free from residues of screen cleaner and ink.

5.4 Washing Up

Screen Cleaner XZ46 is recommended for washing up.

Alternative cleaners and screenwashes are available to suit customers' particular requirements. Your local Sun Chemical Circuits representative will be pleased to advise on product selection.

5.5 Curing

This ink should be stoved at 150°C (302°F) for 60 minutes.

Under curing may adversely affect electrical resistance, solvent rub resistance, and adhesion.

5.6 Chemical Resistance

It should be remembered that, whilst initial electrical properties may be satisfactory, if the cure is inadequate then the ink will have reduced resistance to other PCB production processes, such as overprinting with further layers of ink and solvent cleaning, which may alter the final electrical properties.

A fully cured print will withstand 200 rubs with a cotton bud saturated in Methylene chloride, although slight pigment staining of the cotton butt will occur.

5.7 Physical Resistance

When fully cured, XZ302-1 will give a hard resistant film that will offer good tape and abrasion resistance.

6. Health and safety

Detailed material safety data sheets will be supplied by your local Sun Chemical Circuits representative.

The products detailed hereon have been tested in accordance with, and meet the requirements of, the RoHS Directive 2002/96/EC and 2011/65EU, and the European Directive 2003/11/EC, regarding the presence of the metals - Pb (Lead / Lead compounds), Hexavalent Chromium, Cd (Cadmium), Hg (Mercury), and Poly Brominated Flame Retardants.

Conforms to Regulation (EC) No. 1907/2006 (REACH), Annex II – Europe.

As the world's foremost producer of inks, pigments and colour technology, Sun Chemical is leading our industry in developing and producing products which minimise our impact – and our customers' impact – on the environment and striving to maximise the use of renewable resources. We consider it our responsibility to be involved in the communities in which we live and work and to offer direction in meeting today's needs without compromising the ability of future generations to meet theirs.

7. Typical Properties

7.1 Typical Liquid Properties of XZ302-1

Pigment	Carbon
Medium	Thermoset Resins
Viscosity* @25°C Haake VT02 & VT04 (Poise) Anton Par MCR101 (Pas)	 700 - 1000 45 - 55
Viscosity Stability; 30 days @ 40°C / 104°F (% Change in viscosity)	<6
Shelf Life in months @ 10 - 25°C (50 - 77°F), in sealed containers	18
Screen Life; drying time on screen in minutes @ 25°C (77°F); 15µm. d.f.t.	>210
Solids (%)	64
S.G. (g/cm3)	1.15
Coverage (m^2/kg @ 15µm d.f.t)	~38

7.2 Typical Dry Film Properties of XZ302-1 (Cured – 60 mins @ 150°C)

Sheet Resistance (Ohms/Sq. @ 25µm. / 1mil. d.f.t)	<11
Resistivity (mOhms.cm.)	<27
Resistance to soldering; 5 sec. solder dip - Without Peelable (% change in resistance).	<13
Resistance to soldering; 5 sec. solder dip - With Peelable XZ93-S (% change in resistance)	<6
Chemical Resistance (double rubs with MeCl2)	>200
Pencil Hardness	3H
X Hatch Adhesion (1=nil, 10=complete removal)	1

The above information is provided for guidance only and does not form a specification.
* Viscosity will vary according to conditions, including temperature, viscometer type, and sample size.

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8. Disclaimers

This information has been carefully compiled from experience gained in field conditions and extensive laboratory testing. However the products' performance and its' suitability for the customers' purpose depend on the particular conditions of use and the material being printed. We recommend that customers satisfy themselves that each product meets their requirements in all respects before commencing a production run. Since we cannot anticipate or control the conditions under which our products are used, it is impossible to guarantee their performance. All sales are also subject to our standard terms and conditions.

9. Technical Assistance / Contacts

Sun Chemical Circuits are an international company, and as such can offer technical, engineering and sales support to our customers worldwide.

For further information regarding this product, or any of our extensive range of materials for PCB fabrication, please contact your local Sun Chemical team or visit the Technical Help Desk at website: http://www.sunchemicalhelpdesk.com

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