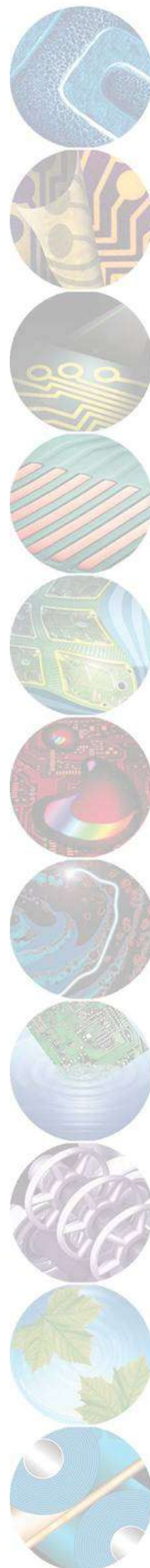




Coates Circuit Products

Technical Information

UK and Corporate Headquarters
Norton Hill, Midsomer Norton, Bath, BA3 4RT, England
Telephone: (44) 1761 414471 Fax: (44) 1761 416609.
www.coates.com



XZ302-1 SERIES

LOW RESISTANCE CURING CARBON INKS

PRODUCT REFERENCE

XZ302-1HV	Low resistance curing carbon ink High Viscosity	CHSN8032
XZ302-1MV	Low resistance curing carbon ink Medium Viscosity	CHSN8033

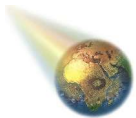
CONTENTS

1. Description
2. Substrates
3. Pre-Cleaning
4. Mixing and Thinning
5. Printing
6. Washing Up
7. Curing
8. Chemical Resistance
9. Physical Resistance
10. Typical Liquid Properties
11. Typical Cured Film Properties
12. Health and Safety
13. Storage and Shipping
14. Packing
15. Support
16. Disclaimer

ISO9001

ISO14001

imaging@ion



1) DESCRIPTION

Coates XZ302-1 is supplied at two viscosities.

XZ302-1HV has the highest viscosity.

XZ302-1MV has 40% lower viscosity than HV.

Both inks have 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.

XZ302-1 HV and MV give a hard resistant film, which can be applied to a variety of substrates. They have good compatibility with peelable soldermasks such as Coates XZ93-S. They meet typical loop resistance specifications, e.g. <100 ohms/square, for push button operated circuits when activated with a graphite loaded pill. They are expected to withstand 1 million operations; to verify this, customers are advised to carry out their own investigations.

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

2) SUBSTRATES

XZ302-1 is suitable for rigid substrates such as copper clad epoxy laminate FR4.

3) PRE-CLEANING

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, intermetallic layers will have a detrimental effect.

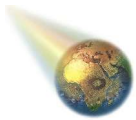
4) MIXING & THINNING

XZ302-1HV is supplied as a single part ink and should be used from the can without thinning. If viscosity is too thick, XZ302-1MV is the recommended alternative.

XZ302-1MV can be used from the can without thinning. If a lower viscosity is required then Retarder XZ42 may be added up to a maximum of 2%

The inks must be mixed thoroughly before printing.

Please note that Coates Conductive Inks XZ302-1HV & XZ302-1MV tend to 'set' with time, but the viscosity will rapidly return to normal when stirred and during printing.



5) PRINTING

Coates Conductive Inks XZ302-1 HV and MV are 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.

6) WASHING UP

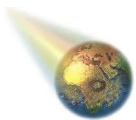
Cleaner XZ46 or Coatazol Universal Screenwash 11-00 can be used for washing up.

As Conductive Ink XZ302-1 is based on a curing system, it cannot be removed after stoving. It is therefore advisable to check boards carefully before stoving for misprints etc. It can be removed with Cleaner XZ46 or Coatazol Universal Screenwash 11-00 only before stoving.

7) 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.



8) 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 but will occur.

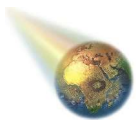
9) PHYSICAL RESISTANCE

When fully cured, XZ302-1 series inks will give a hard film with good tape adhesion and abrasion resistance.

10) TYPICAL LIQUID PROPERTIES

XZ302-1 SERIES	HV	MV
Pigment	Carbon	Carbon
Medium	Thermoset Resins	Thermoset Resins
Viscosity* @25°C		
Haake VT02 & VT04 (Poise)	700 - 1000	400 - 600
Haake VT550 (Pas)	55 - 65	30 - 40
Viscosity Stability; 30 days @ 40°C / 104°F (% Change in viscosity)	<6	<6
Shelf Life in months @ 10 - 25°C (50 - 77°F), in sealed containers	12	12
Screen Life; drying time on screen in minutes @ 25°C (77°F); 15µm. d.f.t.	>210	>210
Solids (%)	64	61
S.G. (g/cm³)	1.15	1.15
Coverage (m²/kg. @ 15µm. d.f.t)	~38	~38

*Viscosity will vary according to conditions, including temperature, viscometer type, and sample size.



11) TYPICAL CURED PROPERTIES (Cure of 60 mins. @ 150°C / 302°F)

XZ302-1 SERIES	HV	MV
Sheet Resistance (Ohms/Sq. @ 25µm. / 1mil. d.f.t)	≤11	≤11
Resistivity (mOhms.cm.)	<27	≤27
Resistance to soldering; 5 sec. solder dip - nil Peelable (% change in resistance).	≤13	≤13
Resistance to soldering; 5 sec. solder dip - with Peelable XZ93-S (% change in resistance)	≤6	≤6
Flexibility; change in resistance; 100 folds on 3mm. Mandrel (% change in resistance)	<15	<15
Chemical Resistance (double rubs with MeCl ₂)	>200	>200
Pencil Hardness	3H	3H
X Hatch Adhesion (1=nil, 10=complete removal)	1	1

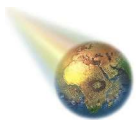
The above information is provided for guidance only and does not form a specification.

12) HEALTH & SAFETY

XZ302-1 inks and Retarder XZ42 have been specifically formulated to be free of control by the 1972 Highly Flammable Liquids Regulations. Detailed Health and Safety Sheets are available on request.

13) STORAGE AND SHIPPING

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



14) PACKING

XZ302-1HV	Low Resistance Curing Carbon Ink High Viscosity	1 kg.	CHSN8032
XZ302-1MV	Low Resistance Curing Carbon Ink High Viscosity	1 kg.	CHSN8033
XZ42	Reducer / Retarder	5 L.	CDSN4004
XZ46	Screen Cleaner	5 L.	CDSN4008
11-00	Coatazol Universal Screenwash	5 L.	CDSN4000

15) SUPPORT

Coates are an international company, and as such can offer technical, engineering and sales support to our customers worldwide. If you require more information regarding this product, or any of our extensive range of materials for PCB fabrication, please contact our local sales offices.

16) DISCLAIMER

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.