

ATLAS SCT Barrel Module FDR/2001

ATLAS Project Document No.
SCT-BM-FDR-5.5

Institute Document No.

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Modified: **05/12/01**

Rev. No.: **B**

SCT Barrel Module FDR Document

Adhesives for the barrel modules

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Distribution List

History of Changes

<i>Rev. No.</i>	<i>Date</i>	<i>Pages</i>	<i>Description of changes</i>
A	10/05/01	All	First version
B	05/12/01		Boron-Nitride filler change

1 Introduction

The barrel modules are made of three major components: silicon microstrip sensors, baseboards, and hybrids. These components are fitted together with epoxy adhesives both thermally conductive and electrically conductive. In smaller parts, the readout ASICs are attached to the hybrids with an electrically conductive epoxy adhesive.

Both thermally and electrically conductive adhesives are used to adhere the baseboard and the sensors. A thermally conductive adhesive is required in order to transfer the heat generated in the sensors to the baseboard, especially after accumulating a large fluence of particles which damage the silicon bulk and induce many order of magnitude larger leakage current, together with increased full depletion voltage. Without an efficient transfer of heat from the sensors to the baseboard, the sensors may run away thermally through positive feedback of the leakage current and the temperature. An electrically conductive epoxy is required as the baseboard, made of carbon, is used for the electrical conductive path from the bias line on the hybrid to the back-plane of the sensors.

Epoxy adhesives are chosen since they are known to be radiation-tolerant up to a very high fluence [1]. Although generally accepted radiation-tolerant, it is important that the electrical and thermal properties are demonstrated after receiving the full irradiation of 2×10^{14} 1 MeV-neutron equivalent/cm² fluence expected during the 10 years operation of detectors. To this end, the barrel community has adopted the epoxy adhesives, which have shown to work throughout the prototype modules and irradiation of the sub- and full modules.

In applying the epoxies, it is important to establish consistent quality among the module assembly sites. The barrel module community has arranged to acquire one each product for thermally and electrically conductive and provide the products to all sites, together with an appropriate documentation of specification, application procedure, curing schedule, and special precautions.

2 Thermally conductive epoxy

The thermally conductive epoxy of the choice is a 2 part, room temperature curing epoxy, supplied by Ciba-Geigy. The product is AW106/HV953U, known as its part number as Araldite 2011.

In order to enhance the thermal conductivity, a boron nitride filler is added, which is supplied by DENKA, grade GP. The boron-nitride (BN) filler is chosen, over the alumina filler, after the test of the sensitivity in increasing the leakage current in the sensors [2]. The boron-nitride has a high thermal conductivity which helps to enhance the thermal conductivity of the epoxy mixture. The thermal conductivity of the mixture is estimated to be an order of 1 W/m/K.

The thermally conductive epoxy is used in the interfaces of

- (1) the sensors and the baseboard, and
- (2) the BeO facings of the baseboard and the steps of the hybrids.

The specification document is given in the appendix 4.1 for Araldite2011 and DENKA BN filler.

3 Electrically conductive epoxy

The electrically conductive epoxy of the choice is a 2 part, low temperature curing, supplied by Eon Chemie Co. Ltd. The product is Eotite p-102. Although the curing schedule listed is above 50 °C, the epoxy is shown to cure at the room temperature. A caution is that it takes a long time in the room temperature, and it may not cure below 20 °C. A test data from the vendor in the appendix shows that the full curing takes 24 hrs. or more at 23 °C.

The thermal conductivity is good because of the silver filler and is measured to be 30 to 40 W/m/K, according to the vendor.

The electrically conductive epoxy is used in the interfaces of

- (1) the sensors and the baseboard, and
- (2) the ASICs and the hybrids.

The specification document is given in the appendix 4.2.

4 Appendix

4.1 ATLAS Barrel and Forward Module Structural Epoxy Specification, by M. Gibson and F.S. Morris, supplemented with the datasheets of DENKA BORON NITRIDE

4.2 Conductive Epoxy Adhesive - Low Temperature Curing Type - Eotite P-102, by Eon Chemie Co. Ltd.

References

- [1] E.g., H. Schönbacher, Radiation tests on epoxy resin NR 172, CERN LabII-RA-37.40-TM-74-6 (or any other better reference?)
- [2] M. Gibson, Evaluation of Thermally Conductive Adhesive on the 'p' Side of Hamamatsu ATLAS Specified Silicon Detectors

8-12-98
issue 1

ATLAS Barrel and Forward Module Structural Epoxy Specification

M.Gibson
F.S.Morris

RAL, Didcot, Oxon OX11 0QX, UK

Abstract

This document aims to specify the storage, handling, mixing and safety aspects of the approved ATLAS structural epoxy to be used in the construction of barrel and forward modules. The 2 part, room temperature curing epoxy (AW106/HV953U), has Boron Nitride (BN) additive to increase the thermal conductivity.

Materials.

Table 1 lists the basic constituents and the manufacturers of the loaded room temperature cure epoxy that has been agreed as the ATLAS standard for barrel and forward module construction. Table 2 lists the world suppliers for the boron nitride. Table 3 lists some of the Ciba-Geigy world offices who will supply the name of your local supplier.

TABLE 1

<i>use</i>	<i>item description</i>	<i>manufacturer</i>
structural epoxy	AW106/HV953U 2Kg pack part number 2011	Ciba-Geigy
filler	boron nitride grade PT140S	Advanced Ceramics

TABLE 2
boron nitride

European office	US Headquarters	UK office
Advanced Ceramics 54 Route de Clementy CH -1260 Nyon Switzerland	Advanced Ceramics PO box 94924 Cleveland Ohio USA 44101-4924	Advanced Ceramics Unit 3 Vale Business Park Cow Bridge Glamorgan CF71 7PF
Phone (41) 22 361 50 08 Fax (41) 22 361 50 43	Phone (1) 703 426 0320	Phone (44) 1446 773826 Fax (44) 1446 773932

TABLE 3
Araldite

Australia	Germany	Japan	Spain
Ciba-Geigy Australia Ltd po box 332 Au-Thomastown Vic 3074	Ciba-Geigy GmbH Postfach 1160/1180 D-79662 Wehr/Baden	Ciba-Geigy Japan Ltd 66-10 Miyuki-cho Takarazuka-city 665	Ciba-Geigy Sa Apartado 744 E-08080 Barcelona
phone (61) 3 282 0600 Fax (61) 3 282 0729	phone (49) 7762 820 fax (49) 7762 3727	phone(81) 797742439 Fax (81) 797742557	Phone (34) 3404 0300 Fax (34) 3404 0301
UK	USA		
Ciba-Polymers Duxford Cambridge CB2 4QA	Ciba-Geigy Corporation Formulated Systems Group 4917 Dawn Ave East Lansing Mi48823		
phone (44) 1223 83211	Phone (1) 517 3515900		

Preparation.

Fig 1 shows a typical mixing station, with P3 filters to limit dust, covered weighing station to protect the operative against splashes and extraction system to remove vapour. The resin, hardener and filler are mixed by weight in the following ratios.

Resin	Hardener	Filler
38.5 %	30.75 %	30.75 %
2.5 gm	2.0 gm	2.0 gm

Mixing.

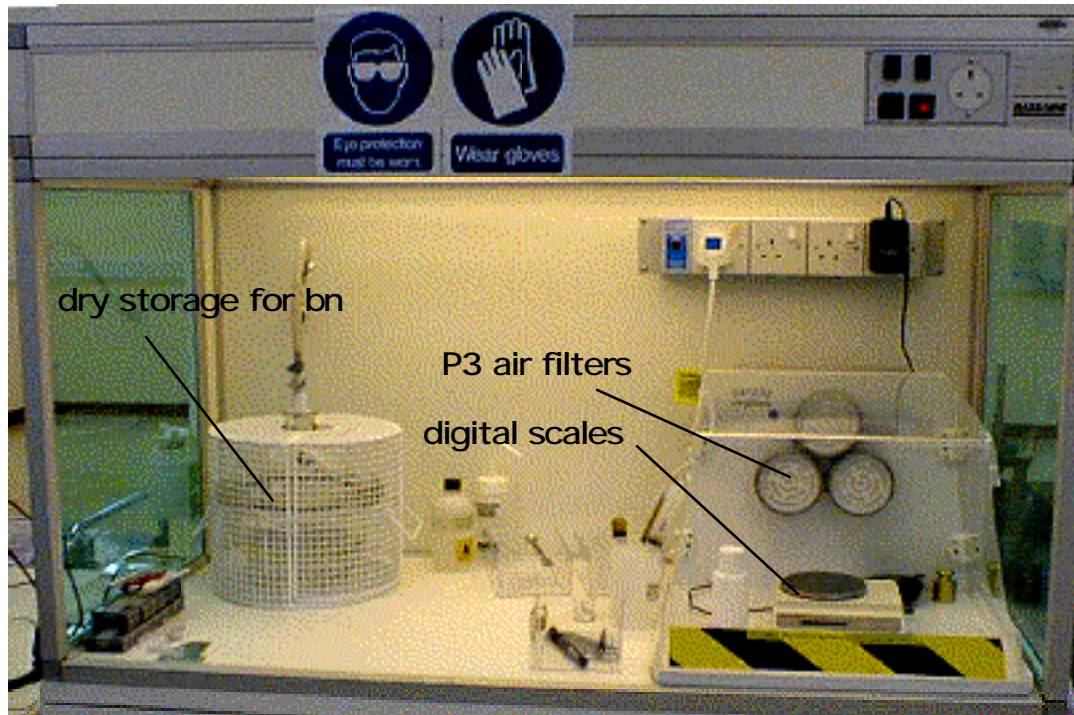
Pour the required weight of resin and hardener into a small tall container and add the boron nitride. Mix by hand for about 2 minutes. At present there is no indication that it is necessary to evacuate the mixture to remove any dissolved air. The mix has a pot life of about 1 hour.

Storage.

The boron nitride is supplied by the manufacturer in sealed containers. The user should decant it into smaller, daily use containers and store in a dry atmosphere (e.g. in a sealed container with silica gel providing an atmosphere of approximately 23% RH @ 21deg C). The resin and hardener may be stored at room temperature (e.g. 45% RH @21deg C).

Safety.

Attached are copies of material safety data sheets as supplied by the manufactures. Users should obtain their own local versions.



Ciba Polymers

SAFETY DATA SHEET

Araldite 2011

August 1993

1 SUBSTANCE/PREPARATION AND COMPANY IDENTIFICATION

CHEMICAL NATURE

Resin Component: Bisphenol A epoxy resin containing fillers
Hardener Component: Mixture of polyaminoamide and aliphatic polyamine
Preparations

COMPANY

Ciba Polymers
Duxford, Cambridge
England CB2 4QA

Tel: (0223) 832121
Fax: (0223) 838690

EMERGENCY TELEPHONE:

+44 (0223) 832121

2 COMPOSITION/INFORMATION ON INGREDIENTS

RESIN COMPONENT CONTAINS

75-87% Bisphenol A epoxy resin (CAS No: 25068-38-6)
EEC-Symbol: Xi R phrases: 36/38-43

HARDENER COMPONENT CONTAINS

7-13% N(3-Dimethylaminopropyl)-1,3-propylenediamine (CAS No: 10583-29-8)
EEC-Symbol: Xi R phrases: 36/38-43

3 HAZARDS IDENTIFICATION

Irritating to eyes and skin. May cause sensitisation by skin contact.

4 FIRST-AID MEASURES

Skin Contact

Wipe with absorbent paper disposable towels. Wash with plenty of soap and water. Do not use organic solvents. In case of dermatitis get medical attention.

Eye Contact

Rinse immediately with water for at least 15 minutes and seek medical attention.

Inhalation

Move affected person to fresh air. In case of irritation of respiratory system or mucous membranes, or if you feel unwell or in case of prolonged exposure, get medical attention.

Ingestion

Immediately rinse the mouth repeatedly with water. If swallowing has occurred drink plenty of water. Seek medical attention promptly.

REPRODUCTION COPY ISSUE DATE: 21/1/94
DO NOT REMOVE OR APPROVED.

WH



5 FIRE-FIGHTING MEASURES

Suitable Extinguishing Media

Water mist; Carbon dioxide; Foam; Dry powder

Unsuitable Extinguishing Media

High pressure water jet

Exposure Hazards

Do not release chemically contaminated water into drains, soil or surface water. Sufficient measures must be taken to retain water used for extinguishing. Dispose of contaminated water and soil according to local regulation.

6 ACCIDENTAL RELEASE MEASURES

Personal Precautions

Avoid contact with skin, eyes and clothing

Environmental Precautions

Prevent contamination of soil, drains and surface waters.

Methods for Cleaning

Take up with absorbent, inert material and place in suitable and closable container for disposal.

7 HANDLING AND STORAGE

Handling

Irritant, sensitising. Ensure good ventilation and local exhaust. Do not eat, drink or smoke at the workplace.

Storage

Keep away from food and drink. Store in the original container securely closed and at room temperature.

8 EXPOSURE CONTROLS/PERSONAL PROTECTION

Technical Protective Measures

No special measures required

Exposure Control Limits

None

Respiratory Protection

Not normally necessary. Work in well ventilated area.

Hand Protection

Wear suitable gloves

Eye Protection

Wear suitable goggles or face protection

Skin Protection

Wear overalls and closed footwear

9 PHYSICAL AND CHEMICAL PROPERTIES**RESIN COMPONENT**

Appearance: Cream liquid
 Odour: Slight
 Density: 1.15 - 1.26 g/cm³ at 25°C
 Flashpoint: > 200°C DIN 51758
 Ignition: Not available
 pH value: 6 - 7 at 1:1 mixture with water
 Viscosity: 24 - 45 Pa s at 25°C

Melting point/range: Not applicable
 Boiling point/range: Not available
 Oxidizing properties: Not available
 Autoflammability: Not available
 Solubility in water: Pract. insoluble at 20°C
 Vapour pressure: 0.1 Pa at 20°C
 Partition coeff.: Not available
 Explosive properties: Not available

HARDENER COMPONENT

Appearance: Brownish yellow liquid
 Odour: Slight
 Density: 0.94 - 0.98 g/cm³ at 25°C
 Flashpoint: > 110°C DIN 51758
 Ignition: Not available
 pH value: 12 at 1:1 mixture with water
 Viscosity: 20 - 30 Pa s at 25°C

Melting point/range: Not applicable
 Boiling point/range: Not available
 Oxidizing properties: Not available
 Autoflammability: Not available
 Solubility in water: Pract. insoluble at 20°C
 Vapour pressure: ca. 4 Pa at 20°C
 Partition coeff.: Not available
 Explosive properties: Not available

10 STABILITY AND REACTIVITY

Thermal Decomposition: > 200°C

Conditions to Avoid: Static discharges

Materials to Avoid: Strong acids, strong bases and strong oxidizing agents

Hazardous Decomposition Products

Thermal decomposition or burning may release oxides of carbon and other toxic gases or vapours.

11 TOXICOLOGICAL INFORMATION

	RESIN COMPONENT	HARDENER COMPONENT
LD ₅₀ Acute oral toxicity in rats:	> 5000 mg/kg	> 5000 mg/kg
Eye irritation tested in rabbits:	Not irritant	Not irritant
Skin irritation tested in rabbits:	Not irritant	Not irritant
Skin sensitisation in guinea pigs:	May cause sensitisation by skin contact	May cause sensitisation by skin contact

12 ECOLOGICAL INFORMATION

Prevent contamination of soil, drains or surface water.

	RESIN COMPONENT	HARDENER COMPONENT
LC ₅₀ Zebra fish (96h):	Not available	Not available
LC ₅₀ Rainbow trout (96 h):	Not available	Not available
EC ₅₀ Daphnia magna (24 h):	Not available	Not available
Biodegradability (Sturm test):	Not available	Not available
Algae Inhibition Test:	Not available	Not available
Sludge toxicity:	Not available	Not available

13 DISPOSAL CONSIDERATION

Incineration or landfill in accordance with local regulations. Contaminated packaging materials should be disposed of identically to the product itself. Packaging materials that are not contaminated should be treated as household waste or as recycling material. For easy disposal any unmixed resin and hardener can be mixed and allowed to cure. Once fully cured Araldite 2011 can be disposed of as normal household waste.

14 TRANSPORT INFORMATION

RID/ADR: Free
IMDG-Code: Free
IATA: Free
Flashpoint: > 110°C DIN 51758

15 REGULATORY INFORMATION**RESIN COMPONENT**

Symbol: Xi
Contains: Bisphenol-A epoxy resin
R 36/38: Irritating to eyes and skin.
R 43: May cause sensitisation by skin contact.
S 24/25: Avoid contact with skin and eyes.

HARDENER COMPONENT

Symbol: Xi
Contains: N (3-Dimethylamino propyl)-1, 3-propylenediamine
R 36/38: Irritating to eyes and skin
R 43: May cause sensitisation by skin contact
S 24/25: Avoid contact with skin and eyes

16 OTHER INFORMATION

Product Use: Araldite 2011 is a two-component, room temperature curing epoxy industrial adhesive.

Note: Araldite 2011 is available in larger pack sizes under designation Araldite AW 108 and Hardener HV 953U.

Edition: 01 according to Directive 91/155/EEC
Editor: Product Safety & Registration Fax +44 (0)223 838690

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○ Properties of DENKA BORON NITRIDE Powder (Typical data)

Items	Grade	GP	SGP	FP-1
BN	(%)	99	99	90
B ₂ O ₃	(%)	0.1	0.1	<0.1
T-O	(%)	0.8	0.3	6.5
C	(%)	0.1	<0.1	<0.1
Particle Sizes	(μm)	7	19	13
Surface Area	(m^2/g)	9	2	2
Tapped Density	(g/cm^3)	0.5	0.8	0.5
Fe	(ppm)	10	30	20
Cr	(ppm)	4	10	≤ 3
Ni	(ppm)	≤ 2	5	≤ 2
Cu	(ppm)	≤ 3	≤ 3	≤ 3
Mn	(ppm)	≤ 4	≤ 4	≤ 4
Cl ⁻	(ppm)	10	3	≤ 1
Na ⁺	(ppm)	12	10	11
Fe ⁺⁺	(ppm)	3	3	32
EC	($\mu\text{s}/\text{cm}$)	1266	190	1970
p h		9.3	9.0	9.5
Melting Point		Sublimate at about 3,000°C		
Appearance		White or Light Yellow Powder		

T-O : Total Oxygen

Surface Area : Measured by BET Method

Particle Sizes : Measured by Laser Diffraction and Scattering Method (Micro-track Method)

Material Safety Data Sheet

Date of alteration: 22,May,2001

Version: 3

BORON NITRIDE

1. Identification of the substance/preparation and the company

Product name : DENKA BORON NITRIDE

Company name : Denki Kagaku Kogyo Kabushiki Kaisya

Head office :

Address : 4-1,yuraku-cho 1-chome,Chiyoda-ku,Yokyo 100-8455, JAPAN

Division: Electronics & Functional Materials Department, Ceramics Section

Work time : AM 9:10 ~ PM 5:55

Telephone No. : +81-3-3507-5268 Fax No. : +81-3-3507-5078

In case of emergency : Omuta factory

Address : 1 Sinkai-cho,Omuta-shi,Fukuoka 836-8510 JAPAN

Division :3rd Production Department Functional Materials Products Section

Work time: AM 8:40 ~ PM 5:30

Telephone No.: +81-944-52-1079 Fax No.: +81-944-52-9779

2. Composition/information on ingredients

Boron Nitride (BN) : Grade(s) : SGP, GP, HGP, SP-2

CAS No. : 10043-11-5

EINECS No. : 233-136-6

3. Hazards identification

Hazard description : Not applicable.

4. First-aid measures

Treat the same as ordinary dust.

Symptoms and disposals in case of over-inhalation :

Cough or throat irritation by over-inhalation of much dust.

Move to fresh air and consult physician for observation and treatment.

Eye contact : Flush eyes well with running water.

Get medical help if irritation persists.

Skin contact : Shake off and wash well with water. Basically non-irritation,
but if feel special sensitivity, get medical help.

5. Fire-fighting measures

Suitable extinguishing media : No restriction in fire situations.

For reasons of security unsuitable extinguishing media : Not applicable.

Special risk due to the substance or the preparation itself, its combustion product or the gas being produced : Unknown.

Special protective equipment when fighting fires : None.

Further information : None.

6. Accidental release measures

Precautionary measures regarding persons : Avoid formation and deposition of dust.

Environmental protection measures : No special measures required.

Methods for cleaning up/taking up : Take up mechanically by vacuum cleaners; avoid dust distribution.

Further information : None.

7. Handling and storage

(1) Handling

Information on safe handling : Handle in a place well ventilated.

It is desirable to use respirator for safety.

If possible handling In the open air dose at windows.

Information on fire and explosion prevention : None.

(2) Storage

Requirements on storeroom and containers : None.

Further information on storage condition :

Store in tightly closed containers in a dry area away from incompatibles.

8. Exposure controls/Personal protection

Ventilation : Equip a local exhaust ventilation, and hood or equip enclosure to avoid dispersal of dusty particulate into workplace air.

Where dust is not controlled, use approved particle filter.

Ingestion : May cause gastrointestinal disturbances .

Symptoms may include irritation, nausea and vomiting.

Eye protection : Avoid unnecessary eye contact with this material.

Use side shields glasses or goggles when handling.

Skin protection : Avoid unnecessary skin contact with this material.

Use appropriate chemical protective gloves when handling.

Respiratory protection : If irritation is experienced or exposure limits are exceeded, respiratory protection should be worn.

9. Physical and chemical properties

Appearance	: White or light yellow fine powder
Odor	: Weak odor of NH ₃
pH value	: 7 – 9 (100g/L water at 20°C)
Melting point	: Decomposition at Approx. 3,000°C
Boiling point	: Not determined
Flash point	: Not applicable
Specific gravity	: 2.26
%Volatile	: Not applicable
Vapor pressure	: Not applicable
Evaporation rate	: Not applicable
Vapor density	: Not applicable
%Solubility in water	: Hardly soluble
Fat solubility	: Not determined
Octanol/water	: Not determined
Viscosity	: Not applicable
Inflammability	: method : directive 92/69 EEC, A.10.: Not applicable method : directive 92/69 EEC, A.12.: Not applicable
Ignition temperature	: Value not determined.
Spontaneous flammability	: method : directive 92/69 EEC, A.16.: Not determined
Fire-promoting properties	: method : directive 92/69 EEC, A.17.: Not applicable
Explosive limits	: Limits not determined.

10. Stability and reactivity

Condition to avoid : None known
Substances to avoid : None known
Hazardous decomposition product : None
Further Information : None

11. Toxicological information

Acute toxicity : No statements available

12. Ecological information

Aquatic toxicity : Ecotoxicological data are not available
As the product is practically insoluble in water, it is separated in almost any filtration and sedimentation process.

13. Disposal considerations

This material, as supplied, when discarded or disposed of, is not a hazardous waste. This material could become a hazardous waste if it is mixed with or otherwise comes in contact with hazardous waste, if chemical additions are made to this material, or if the material is processed or otherwise altered.

The storage, treatment, and disposal of this material as a waste be conducted in compliance with all applicable local regulations, and in such a manner as to assure no discharge to a source of drinking water.

14. Transport information

Avoid drop and falling down, and avoid to damage the package.

Declaration for land shipment : - -

Declaration for shipment by sea : - -

Declaration for shipment by air : - -

Other information : Not dangerous cargo

15. Regulatory information

SARA Title III information : (1) 40 CFR part 370 : Not applicable

(2) 40 CFR part 372 : Not applicable

(3) 40 CFR part 355 : Not applicable

(4) 40 CFR part 302 : Not applicable

Proposition 65 : (1) Chemicals known to the state to cause cancer : Not applicable

(2) No significant risk levels on for carcinogens : Not applicable

16. Other information

Notice : The information submitted in this publication is based on current knowledge and experience. In view of the many factors that may affect processing and application, these data do not relieve processors from the responsibility of carrying out their own tests and experiments, neither do they imply any legally binding assurance of certain of properties or of suitability for a specific purpose. It is the responsibility of those to whom we supply our products to ensure that any proprietary right and existing laws and legislation are observed.

Conductive Epoxy Adhesive

- Low Temperature Curing Type -

E O T I T E P - 1 0 2

EOTITE P-102 is a two-component type Epoxy resin adhesive with fine-grained silver cured under a low temperature. Two parts of the hardner shall be added to 100 parts of the resin by weight for curing.

The adhesive is applicable for bonding metals, ceramics, plastics, carbon, glass, phenolic resin, epoxy resin, ferite, etc. requiring a perfect electroconductivity of the adhesive to be used for bonding .

Characteristics

1. Cured at low temperature of 50°C - 80°C.
2. Easy to mix the resin and the hardner with a creamy paste resin.
3. No shrinkage with cure. Suitable for filling and potting.
4. High bond strength. No sagging.
5. Excellent storage stability of one year at an ordinally temperature.

Specifications

	Resin	Hardner
Main Component	Silver / Epoxy	Polyamine
Mix Ratio (% by weight)	100	2
Specific Gravity (@20°C)	3.0 - 3.2	1.0
Viscosity (@20°C)	creamy paste	30 - 40 cps.
Purity (% of Ag)	99.5 or more	-
Particle Size (μ m,diameter)	0.5 - 1.2	-
Condition for Curing	50°C x 2 hrs - 80°C x 15 min.	
Volume Resistivity	$5 \times 10^{-4} \Omega \cdot \text{cm}$	
Surface Resistivity	0.05 Ω / \square	
Pot Life after Mixed	3 - 5 hrs. at 25°C	
	100 - 120 hrs. at -20°C	
Storage Stability (@20°C)	approx. 1 year	

Curing Condition (100 pts of resin / 2 pts of hardner by weight)

Condition		Volume Resistivity ($\Omega \cdot \text{cm}$)
Temperature (°C)	Time Heating	
50	2 hrs.	1.5×10^{-2}
60	2 "	1.0×10^{-2}
70	20 min.	8.0×10^{-3}
80	15 "	5.0×10^{-4}
100	10 "	5.0×10^{-4}

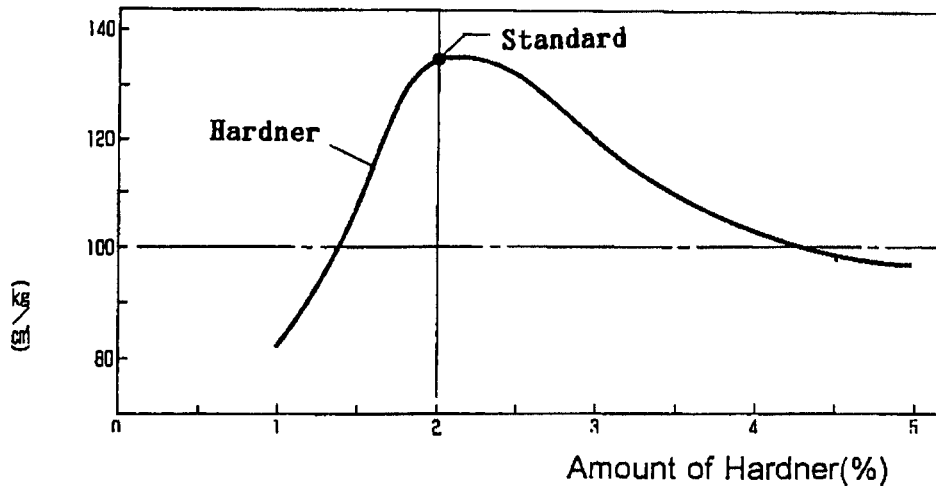
Cautions on Handling

1. Allowed to be stored at room temperature avoiding a direct sunlight.
2. Keep the cap of the container tightly protect against moisture after use.
3. Avoid to contact with skin. Preferable to wear a mask and gloves.
4. Wash hands thoroughly after use.

Correlation between Amount of Hardner and Bond Strength

(Result by change of amount of hardner to 100 pts. resin by weight)

Tensile Shear Strength (kg / cm)



(Bonded Steel to Steel)

Bond Strength

Substrates	Tensile Shear Strength	Remark
Steel / Steel	140.0 kg · cm ²	Cohesive Failure
Epoxy / Epoxy	83.5 "	Broken Substrate
Phenolic / Phenolic	66.5 "	" "

Mix Ratio: 100 pts of Resin / 2 pts of Hardner
 Curing Condition: 80°C x 15min.
 Measured after aged for 24 hours at room temperature.

Heat Resistance

- Heated for 1 hour at 190°C -

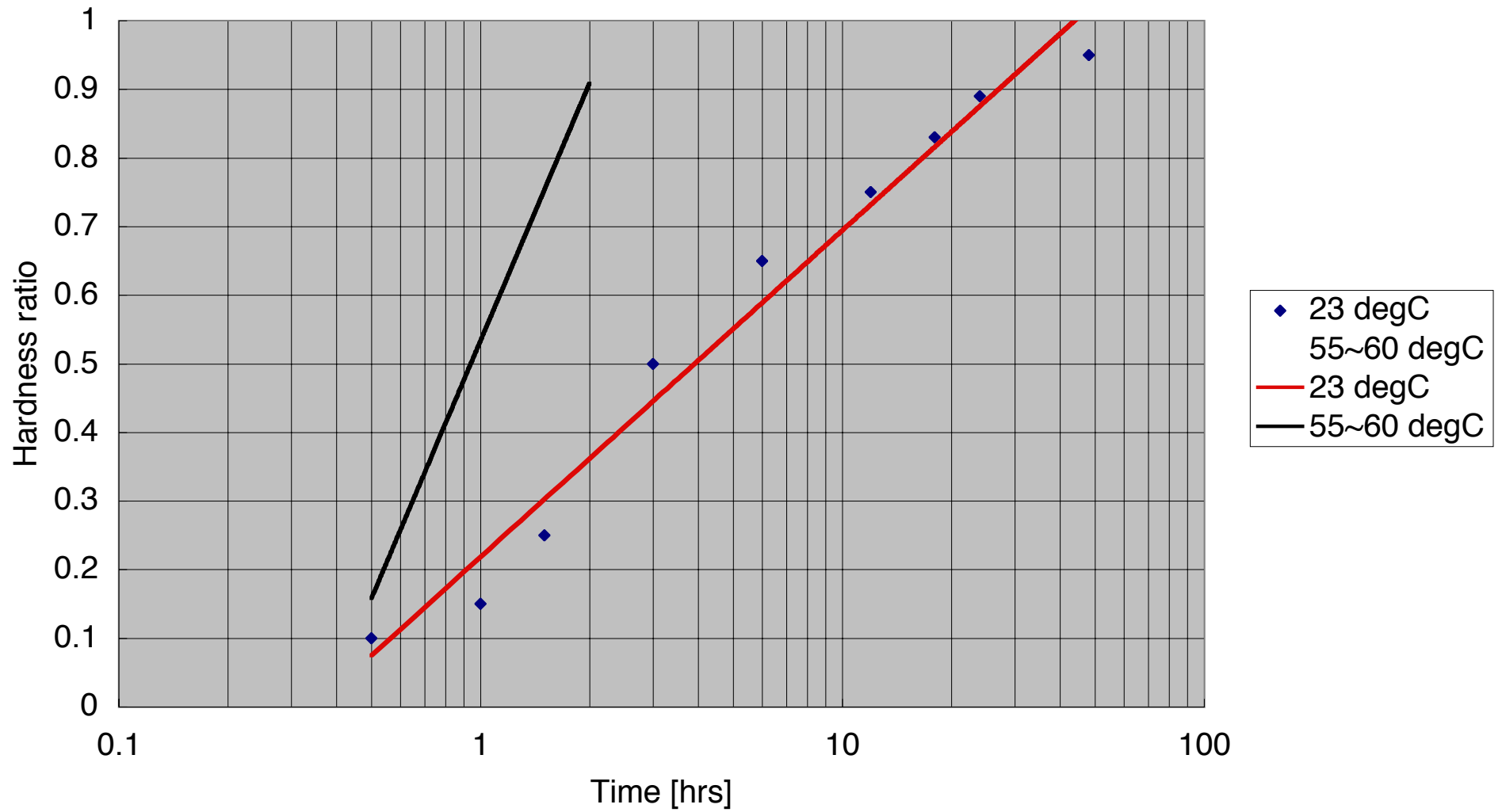
Aging Time after Cured	Tensile Shear strength	Volume Resistivity
0 min.	145 kg / cm ²	---
15 "	135 "	5 x 10 ⁻⁴ Ω · cm
24 hrs.	145 "	5 x 10 ⁻⁴ "

Bonded Substrates: steel / steel
 Curing Condition: 80°C x 15 min.
 Tested after aged for 24 hours at room temperature.

How to Use EOTITE P-102

1. Weigh correctly the resin and the hardner.
2. Mix well.
3. Use the mixed adhesive within 2 - 3 hours after mixed.
 Preferable to weigh an adequate quantity to finish to use within a time of pot life.

Eotite p-102 curing time
(reproduced from company's data)



MATERIAL SAFETY DATA SHEET

EON CHEMIE CO.,LTD.

82-8, Plaza, Saitama-shi, Saitama, Japan

Phone: 81-48-624-9582

Fax: 81-48-624-9592

Trade Name **EOTITE P-102**
 Conductive Epoxy Adhesive

Material Identification and Information

Main Component:

Resin Epoxy (Ordinary Chemicals No.7-1283)

Conductive Filler Fine, flat Silver Particles

CAS No.7440-22-4 (Silver Compound)

Im- and Export Item No.7106 (Silver Compound)

Stabilizer

Hardner Polyamine

Physical / Chemical Characteristics

EOTITE P-102 is a conductive adhesive of a soluble prepolymer having more than two epoxy groups. It is designed to be cured with a hardner, polyamine, at heating to get a high bond strength without any shrinkage.

Appearance:	Silver Paste
Viscosity, @20 °C:	25 ± 30 ps.
Specific Gravity, @20 °C:	3.0 ~ 3.2
Odor:	very slight
Boiling Point:	---
Vapor Pressure:	less than 0.1mmHg.
Melting Point:	----
Solubility in Water:	not soluble
Solubility in Organic Solvents:	soluble

Fire and Explosion Hazard Data

Extinguisher Media: Powder ABC, Alcohome
Fire Fighting Procedure: Use the extinguishant

Health Hazard Data

Eye Contact: Flash with a plenty of water and take a medical treatment
Skin Contact: Wash with soap.
Becoming inflamed, get a medical treatment
Ingestion: Making vomit it and get a medical treatment immediately
Inhalation: Ventilate completely and lay the person down and get a medical treatment

Precautions for Safe Handling and Use / Leak Procedures

1. Steps to be Taken if Material is Spilled:
 - # In case of Small Quantity Wipe off with a piece of cloth and clean with benzine or an alcohol.
 - # In case of Large QuantitySweep off with a Floor-wiper or Spatula and clean with the solvents.
2. Precautions to be Taken in Handling and Storage:
 - # Allowed to be stored at room temperature avoiding a direct sunlight.
 - # Keep the cap of the container tightly protect against moisture after us.
 - # Avoid to contact with skin. Preferable to wear a mask and gloves.
 - # Wash hands thoroughly after use.

Prevention to Exposure

Controlled Density none
Tolerance Density none
Equipment for Prevention preferable to equip a ventilation at work
Protection preferable to wear a mask, glasses and gloves

Impurities' Ionic Density

Na : less than 10 ppm at 100 °C x 20 hrs.
Cl: less than 10 ppm at 100 °C x 20 hrs.

Content of Enviromental Burden Chemicals

PRTR (Enviromental Law on Chemicals) : none

Cautions in Transit

- # Before to transport, inspect any leak the contained out from a container bottle.
- # Keep out of any water while in transit.

Cautions at Abandonment

- # At abandonment, must to be stored in the container and ask to a licensed abandonment trader.
- # Need the same treatment for used containers of the resin and hardner.

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