



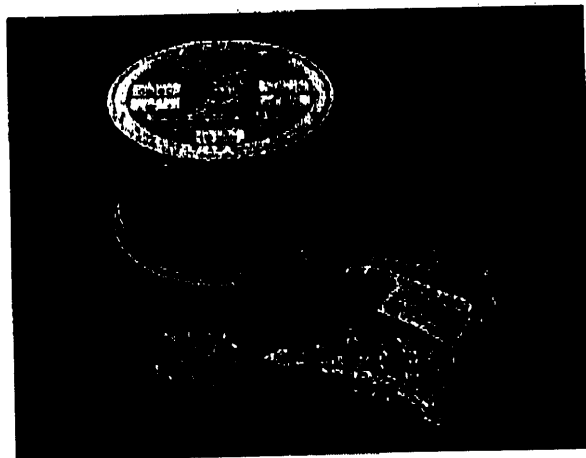
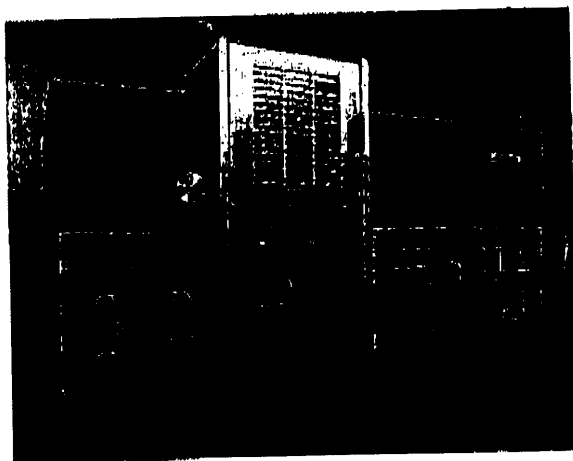
THE QUEEN'S AWARD FOR
ENVIRONMENTAL ACHIEVEMENT

454-618



EXTRUSOL®

BARS, STICKS, WIRE & PELLETS



Free Analysis Service ▲

EXTRUSOL® solder is EXTRUDED UNDER VACUUM on unique new plant designed and built within our company. This provides VACUUM-ALLOY PLUS at no extra cost. Not only is the solder free from entrapped oxide which promotes dross formation and reduces the wetting of parts by solder but also the exterior surface is clean and free from all contamination and oxidation that is unavoidable in cast solders.

- High purity extruded solid solder for high performance soldering
- Alloys exceed the requirements of relevant international standards
- Low impurity levels increase the life of the solder in the bath

EXTRUSOL solders are manufactured by Multicore Solders only from the highest purity metals. We could save a considerable amount of money in a year by using lower purity metals for solder alloys which, when subsequently assayed, would meet the B.S.I., American, DIN or JIS standards for the respective alloys. However, our research has shown that many impurities present at levels permitted by these specifications reduce the mobility and wetting force of the molten solder thus reducing soldering speed, increasing the weight of solder used per joint and reducing the strength of the adhesion. It should be clear therefore that the cheapest solder per kg or lb conforming to a particular specification is not necessarily the most economical in terms of overall solder usage, productivity or reliability.

MULTICORE SOLDERS LIMITED

Kelsey House • Wood Lane End • Hemel Hempstead
 Hertfordshire • HP2 4RQ • UK
 Telephone: +44 (0) 1442 233233 • Fax: +44 (0) 1442 269554



Revision

Material Safety Data Sheet

Product Information

1. IDENTIFICATION OF THE SUBSTANCE / PREPARATION AND OF THE COMPANY / UNDERTAKING

Product Name Multicore Tin/Lead Solder Alloys

Multicore solder wire is identified by the alloy codes shown below.

Alloys:

- Tin/Lead: 5/95, 10/90, 15/85, 20/80, 25/75, 30EN, 35EN, 40EN, Sn40, 45EN, 50EN, 60EN, Sn60, 63EN, Sn63, 70/30, 80/20, 85/15, 90/10
- Tin/Lead/Silver: 2.5S, HMP, Sn10, Sn62, 45D, 59S, TLS4
- Tin/Lead/Copper: SAV1, SAV6, GS60B
- Tin/Lead/Bismuth: Bi3, Bi8, Bi14
- Tin/Lead/Bismuth/Silver: Bi10
- Tin/Lead/Antimony: 29Ant, GRDD
- Tin/Lead/Phosphorus: 60P, Multiflow

Manufacturer Multicore Solders Ltd, Kelsey House, Wood Lane End,
 Hemel Hempstead, Herts, HP2 4RQ, United Kingdom
 Telephone +44 (0)1442 233233

2. COMPOSITION / INFORMATION ON INGREDIENTS

Note: Solder wire and bar is considered to be an article and is not subject to the Classification (Hazard Information and Packaging for Supply) Regulations 1994, because it is not hazardous as supplied. However, this product may become hazardous in use and the information included in this data sheet reflects the hazards associated with solder reflow operations.

Alloy	Lead Content %	Alloy	Lead Content %
5/95	95.0	50EN	50.0
HMP	93.7	SAV1	48.5
2.5S	92.6	Bi3	47.3
10/90	90.0	Bi8	46.0
Sn10	88.4	Bi14	43.0
15/85	85.5	GS60B	40.4
20/80	80.7	60EN, Sn60, 60P	40.0
45D	80.1	59S	39.0
25/75	76.0	SAV6	38.2
29Ant	70.6	63EN, Sn63, Multiflow	37.3
30EN	70.6	TLS4	36.5
GRDD	69.2	Sn62	36.1
35EN	65.0	70/30	30.1
Bi10	63.5	80/20	20.3
40EN, Sn40	60.7	85/15	15.0
45EN	55.0	90/10	10.3

Issue No: 7	Number: HS WB010	Page 1 of 5
Date: 19 February 1999	Prepared by: Barry Chase	
	Authorised by: B Watson	
This is an uncontrolled copy within Multicore Solders' ISO 9001 system. Recipients are advised to check that they have the current version after 12 months from the issue date.		

Component	CAS No.	Classification Symbol	Risk Phrases
Lead metal	7439-92-1	-	-
Antimony metal	7440-36-0	-	-

3. **HAZARDS IDENTIFICATION**

Solder alloys containing lead give off negligible lead fume at normal soldering temperatures and at temperatures up to 500°C. Lead is harmful if absorbed into the body and can cause lead poisoning, birth defects and other reproductive harm.

4. **FIRST-AID MEASURES**

Inhalation

Providing soldering temperatures are kept below 500°C these products will not give off harmful fumes. Any flux used with the products may generate irritating or harmful fumes. The Safety Data Sheet for the flux should be read to ascertain health hazards and appropriate first aid measures.

Ingestion Seek medical advice.

Skin Contact The constituents of the alloys are not absorbed through the skin.

Contamination of the skin during handling should be removed by washing hands with soap and warm water particularly before eating, drinking or smoking.

Eye Contact Fluxes used with these products may generate fumes which may irritate the eyes. Fluxes may spit during soldering. Contact with molten or hot solder will cause severe eye damage.

Flush *immediately* with plenty of water. In cases where spitting flux has entered the eye seek medical attention.

Inhalation Not relevant.

5. **FIRE FIGHTING MEASURES**

Extinguishers Suitable - dry chemical, carbon dioxide, water spray or foam.
Unsuitable - water jet.

Temperatures above 500°C may produce heavy metal dust, fumes and /or vapours. Fire fighters should wear full protective clothing and positive pressure breathing apparatus.

6. **ACCIDENTAL RELEASE MEASURES**

Not applicable.

7. **HANDLING AND STORAGE**

Avoid inhaling the fumes emitted by the fluxes used with these products. Ensure that the general area is well ventilated. Wash hands with soap and water after handling solder, particularly before eating, drinking or smoking. The products should be stored in a cool, dry area. Keep out of reach of children and away from food and drink.

8. **EXPOSURE CONTROLS / PERSONAL PROTECTION**

In normal soldering operations where the temperature is below 500°C the exposure to lead will be minimal and the risks from the toxic effects of lead insignificant. (Ref: *Approved Code of Practice supporting the Control of Lead at Work Regulations 1998.*) Extraction should be provided to control exposure to flux fumes. Suitable examples include bench top, soldering iron tip extraction or an extraction arm.

Occupational Exposure Limits

Substance	Long-term exposure limit (8 hour TWA)	Short term exposure limit (15 minute)
Lead *	0.15 mg/m ³ (MEL)	-

* From Appendix 1 of the *Approved Code of Practice supporting the Control of Lead at Work Regulations*

Employees should be under medical surveillance if the risk assessment made under the Control of Lead at Work Regulations indicates they are likely to be exposed to significant concentrations of lead, or if an Employment Medical Advisor or appointed doctor so certifies.

A woman employed on work which exposes her to lead should notify her employer as soon as possible if she becomes pregnant. The Employment Medical Advisor/Appointed Doctor should be informed of the pregnancy.

Under the Management of Health and Safety at Work (Amendment) Regulations, employers are required to assess the particular risks to health at work of pregnant workers and workers who have recently given birth or who are breast feeding.

Respiratory Protection: Necessary if there is a risk of exposure to flux fumes.

Eye Protection: Operators should wear safety glasses or goggles to protect the eyes from spitting flux or if there is a risk of contact with molten or hot solder.

Hand Protection: Heat resistant leather gloves should be worn if there is a risk of contact with molten or hot solder.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	Silver-white to grey bars, anodes, sticks, pellets or solid wires
Odour	Odourless at ambient temperatures
Boiling range	The vapour pressure of lead may be significant above 500°C
Solubility in water	Insoluble

Alloy	Liquidus °C	Solidus °C	Density	Alloy	Liquidus °C	Solidus °C	Density
5/95	315	300	10.8	Bi10	220	136	10.1
HMP	301	296	11.1	SAV1	215	183	8.9
2.5S	300	300	11.1	50EN	212	183	8.9
10/90	299	275	10.5	85/15	212	183	7.7
Sn10	299	268	10.5	80/20	200	183	7.9
15/85	288	227	10.2	Bi3	195	175	8.9
20/80	275	183	10.0	Bi8	190	170	9.1
45D	270	178	10.3	SAV6	190	183	8.5
25/75	265	183	9.8	60EN, Sn60, 60P	188	183	8.5
30EN	255	183	9.6	GS60B	188	183	8.5
29Ant	248	185	9.7	70/30	188	183	8.2
GRDD	248	183	9.6	59S	183	183	8.5
35EN	245	183	9.5	63EN, Sn63, Multiflow	183	183	8.4
40EN, Sn40	234	183	9.3	TLS4	182	179	8.2
45EN	224	183	9.1	Sn62	179	179	8.5
90/10	224	183	7.5	Bi14	168	136	9.2

10. STABILITY AND REACTIVITY

Conditions to Avoid

If solder is exposed to temperatures above 500°C then lead dust, fume and/or vapour may be produced. Contact of water with molten solder will cause molten metal to be violently ejected.

Materials to Avoid

Solder will react with concentrated nitric acid to release toxic fumes of nitric oxide, which oxidises to nitrogen dioxide, a red gas with a pungent odour. If personnel are exposed to these gases then immediate medical attention should be sought, as symptoms can be delayed for a considerable time and can be fatal.

Under reducing conditions antimony containing alloys may form the toxic gas stibine (antimony trihydride.)

11. TOXICOLOGICAL INFORMATION

Acute Toxicity

Lead can cause weakness, pains in the joints, vomiting, loss of appetite and stupor.

Chronic Toxicity

Lead can cause weakness, insomnia, headache and possible paralysis. Chronic overexposure to lead may result in damage to the blood forming, nervous, urinary and reproductive systems. Lead is classified as a 2B carcinogen by the IARC (1987), i.e. evidence for carcinogenicity is adequate in animals but inadequate for humans. Severe lead toxicity has long been known to cause sterility, abortion and neonatal mortality and morbidity.

12. ECOLOGICAL INFORMATION

Lead is not degradable and will persist in the environment. Lead is insoluble in water and is not attacked by most inorganic acids and bases.

13. DISPOSAL CONSIDERATIONS

Wherever possible unwanted solder should be recycled for recovery of metal. Otherwise disposal should be in accordance with local and national legislation. In the UK this is the Control of Pollution Act 1974, the Environmental Protection Act 1990 and regulations made under them.

14. TRANSPORT INFORMATION

Solder alloys are not classified as hazardous for transport.

15. REGULATORY INFORMATION

Classification according to the Chemicals (Hazard Information and Packaging for Supply) Regulations 1994:

Tin/lead solder alloy is considered to be an article and is not subject to the above regulations. However, it is recommended that the following information be included on labels:

- Contains lead which may harm your health. Lead can cause birth defects and other reproductive harm.
- Regulations forbid the use of lead containing solder in any private or public drinking water supply system.
- After handling solder wash hands with soap and water before eating drinking and smoking.
- Keep out of reach of children.

Applicable EC Directives

Directive 82/605/EEC on the protection of workers from the risks related to the exposure to metallic lead and its ionic compounds at work

Directive 80/1107/EEC on the protection of workers from the risk related to exposure to physical, chemical and biological agents at work

Directive 92/85/EEC on the introduction of measures to encourage improvements in the safety and health at work of pregnant workers and workers who have recently given birth or are breastfeeding

Applicable UK Legislation

The Health and Safety at Work etc. Act 1974

The Control of Lead at Work Regulations 1998

The Control of Substances Hazardous to Health Regulations 1994

The Management of Health and Safety at Work Regulations 1992

The Management of Health and Safety at Work (Amendment) Regulations 1994

The information presented in this safety data sheet is accurate to the best of knowledge and belief of Multicore Solders Ltd. As we cannot anticipate all conditions under which this information and our products, or the products of other manufacturers in combination with our products, are used this safety data sheet cannot constitute the user's assessment of workplace risk. Users are advised to make their own tests to determine the safety and suitability of each product or product combination for their own purposes.

16. OTHER INFORMATION

Recommended Uses

This safety data sheet covers a range of tin/lead solder alloys in the form of wires, bars, pellets and anodes for use in the electronics industry and for metal joining.

Reference should be made to the Multicore Technical Data Sheets or to the Multicore Technical Sales Team for further information.

Further Detailed Guidance from the UK Health and Safety Executive

HS(G) 37: An Introduction to Local Exhaust Ventilation
HS(G) 53: Respiratory Protective Equipment - a Practical Guide for Users
HS(G) 97: A Step by Step Guide to the COSHH Regulations

Approved Code of Practice to the Control of Lead at Work Regulations
Approved Code of Practice - Management of Health and Safety at Work
General Approved Code of Practice to the COSHH Regulations

EH40: Occupational Exposure Limits (revised annually)

This safety data sheet is based on the requirements of the Chemicals (Hazard Information and Packaging for Supply) Regulations 1994, (Commission Directive 91/155/EEC, as amended by Directive 93/112/EEC.)

Reason for revision: To add Multiflow alloy and to reflect the current product range.

% Impurities permitted by major international specifications in tin/lead solders are shown below compared with typical analysis of EXTRUSOL tin/lead solder. Most popular alloys are 60/40 and 63/37 tin/lead.

Element	Chemical Symbol	U.K. BS.219 Grade KP max	U.S.A. ASTM Grade A max	Germany DIN 1707 max	Japan JIS Z-3282 max	EXTRUSOL Typical
Arsenic	As	0.03	0.02	0.02	0.03	0.001
Bismuth	Bi	0.10	0.25	0.25	0.05	0.01
Iron	Fe	0.02	0.02	0.02	0.03	0.002
Copper	Cu	0.08	0.08	0.08	0.05	0.002
Silver	Ag	No limit	No limit	No limit	No limit	0.002
Aluminium	Al	0.001	0.005	0.005	0.005	0.0001
Cadmium	Cd	0.005	No limit	total	No limit	<0.0005
Zinc	Zn	0.003	0.005		0.005	<0.0005
Antimony	Sb	0.20	0.12	0.12	0.30	0.02
Phosphorus	P	Not specified but deleterious				<0.0005
Sulphur	S					<0.0001
Oxide	O	0.08				<0.001
Total of all others (Gold, Indium, Nickel etc)						No limit

EXTRUSOL solders are manufactured in a wide range of solder alloys (data sheet available). Alloys surpass B.S. 219, QQ-S-571E, ASTM, DIN and JIS specifications and are on the QPL of U.S. Fed. Spec. QQ-S-571E. Most popular is 63/37.

QUALITY CONTROL

Multicore has always aimed to supply products of guaranteed reliability. This cannot be achieved without process control and Q.C. testing.

All EXTRUSOL solders are made with tested discrete batches of alloys. The batch number of the alloy appears on every bar and shipping carton. They also appear on a batch card included in every shipping carton which shows the personnel number of every person in our factory who handled the material through the various stages of its manufacture and packing. We keep retain samples of every batch of solder for a considerable period and test records for ever. If you have already used the solder and thrown away the packaging, our computer can identify the batch number if you can quote our invoice number and require further technical information.

SOLDER BATH ANALYSIS SERVICE

Unlike many competitors Multicore Solders provides a free analysis service for our bar solder customers to monitor impurities picked up from components dipped into the solder bath. Depending on the application our Laboratory Report will provide advice on whether any impurity has reached an unacceptable level. We are not a scrap metal company but we can, through our knowledge of the trade, often buy your contaminated solder and dross at more advantageous terms and dispose of it in bulk quantities with similar material purchased from our other customers.

To take advantage of our Analysis Service it is necessary for a small sample to be taken by the correct method. Please ask for details of the Multicore Solder Bath Sampling Kit

SUPPLY FORMS (Approximate sizes)

Trapezium Bars	1 kg bars (with hole) Approx 16" x 1" x 1/2" (406 x 25 x 12.7 mm) Packed 20kg per case 1/2 kg bars Approx 8" x 1" x 1/2" (203 x 25 x 12.7 mm) Packed 10kg per case
Oval Sticks	12" x 1/2" x 1/4" (305 x 12 x 6 mm) Packed 25kg (in USA : 50 lb) per case.
Round Sticks	12" x 1/4" diam. (305 x 6 mm diam.) Packed 10kg (in USA : 20 lb) per case.
Solid Wire	1/8" diam. (3mm) for topping up solder baths and pots automatically with minimum loss of temperature. 10kg per reel (in USA : 20 lb) packed in individual carton.
Pellets	Supplied for the initial charge of a soldering machine to protect the elements from overheating. 10kg (in USA : 20 lb) per case.

HEALTH AND SAFETY

Comprehensive Health and Safety data sheets are available.



MULTICORE SOLDERS

U.K. & World Headquarters: Wood Lane End, Hemel Hempstead, Hertfordshire HP2 4RD.
Tel: +44 (0) 1442 259293 Telex: 82363 KELSEY G Fax: +44 (0) 1442 69554.

AUSTRALIA: 2 Hume Road, Shellfield, NSW 2164.
Tel: (02) 725-1277 Telex: AA 176434MSAP Fax: (02) 725-2896.

CANADA: 12,320 April, Montreal, Quebec, H1R 5N5.
Tel: (514) 645-2375 Fax: (514) 645-7574.

CHINA: 1356-A Longjium Road, Xie Guan District, Nanjing 210011.
Tel: (025) 8765666 Fax: (025) 8751656.

GERMANY: Postfach 20 12 45, 42212 Wuppertal.
Tel: 0202-586166 Telex: 8591330 Fax: 0202-985111.

JAPAN: Nakua Building, 24-1 Anasaku, Minato-ku, Tokyo 107.
Tel: 03-3586-8046 Telex: 2426738 MICON J Fax: 03-3586-3689.

MALAYSIA: Lot 62040 Jalan Paritland, Tesoh Industrial Estate, 31400 Ipoh.
Tel: 05-9476811 Telex: SOLDER MA 44059 Fax: 05-9471868.

SINGAPORE: No. 2, Corporation Road, Unit #05-15, Corporation Place, Singapore 2261.
Tel: 2614766/2614768 Fax: 2614449.

TAIWAN: Multicore Soldering Technology, No. 22, Lane 57, Nan-Yang Street, Shi-Jy Town, Taipei Hsien, R.O.C. Tel: (02) 694-5418 Fax: (02) 694-2434.

U.S.A.: 1751 Jay @ Drive, Richardson, Texas 75081.
Tel: 214-238-1224 Telex: 792451 Fax: 214-437-0288.

This data is based on information believed to be reliable and is offered in good faith, but MULTICORE MAKES NO WARRANTIES EITHER EXPRESS OR IMPLIED AS TO ITS ACCURACY AND ASSUMES NO LIABILITIES ARISING OUT OF ITS USE BY OTHERS as conditions and methods of use of the products are beyond MULTICORE'S control. The prospective user should determine the suitability of the product before using it on a commercial scale. MULTICORE warrants only that the product will conform to its physical descriptions. MULTICORE MAKES NO OTHER WARRANTIES EXPRESS OR IMPLIED AND EXPRESSLY DISCLAIMS ANY IMPLIED WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE. IN NO EVENT SHALL MULTICORE BE RESPONSIBLE FOR SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES, WHETHER THE CLAIM IS IN CONTRACT, NEGLIGENCE OR OTHERWISE