

Technical Datasheet



WARTON METALS LIMITED



Product Name:

Omega Rosin Free Cored Solder Wire

Manufactured By:

Warton Metals Limited
Grove Mill Commerce Street
Haslingden Lancashire
ENGLAND

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Description

Omega Rosin Free Cored Solder Wire is a flux 'core' contained in Warton High Purity Cored Solder Wire. Omega contains no rosin (colophony), resin acids, pine oil or other naturally occurring derivatives from pine trees and has been specifically designed to reduce the number of world-wide cases of industrial asthma, related to rosin usage within a cored solder wire. Omega provides excellent wetting whilst leaving a minimal no clean, clear residue. Cleaning by batch or in-line processes is not suitable, however, if residues need to be removed use Warton Total Clean 130 cleaner.

Omega Flux Type & Specification

Omega is rosin free and formulated without the use of halides and is supplied as a 3%, 2% and 1% flux content wire.

Omega is rated as an M-OR-L0 flux type in accordance with J-STD-004 and passes Bellcore TR-NWT-000078 / J-STD-004 copper mirror corrosion requirements.

Omega passes Bellcore TR-NWT-000078 / J-STD-004 surface insulation resistance requirements.

Bellcore surface insulation resistance requirement
Hand Soldered test coupons, 35 C/85%RH. 5day test. 4 days with bias voltage. Min req.2x10(4)Megohms.
Omega - 1x10(8)Megohms

JSTD-004 surface insulation resistance requirement

Wave soldered solution, 85 C/85%RH.7Days with bias voltage min req. 100 Megohms.

Omega - 96 hours 1.1Gohms 168 hours 1.2 Gohms

High Purity Solder Alloy

In 1994 a single European standard, EN 29453 (ISO 9453), superseded all other European national standards, BS 219, DIN 1707, NFC 90-550. Other equivalent international standards include QQS 571E, ASTM B32 and JIS-Z-3382.

Warton Part No:	EN 29453	QQS 571E	BS 219 *DIN 1707
63/37	1a	Sn63Pb37	AP
60/40	2a	Sn60Pb40	KP
50/50	3a	Sn50Pb50	F
45/55	4	-	R
40/60	5	Sn40Pb60	G
35/65	6	Sn35Pb65	H
30/70	7	Sn30Pb70	J
20/80	-	Sn20Pb80	V
15/85	-	-	W
99C	23	-	99C
97C	24	-	-
Alloy No 1	26	-	*Sn50PbCu
Alloy No 2	25	-	*Sn60PbCu2
HMP 5S	34	-	5S
LMP 62S	30	Sn62Pb36Ag2	62S
96S	28	Sn96Ag04	96S
95A	18	Sn95Sb5	95A
TLS/5	-	-	-
TIN	-	-	-
TSC	-	-	-

The table above illustrates the equivalent **Warton High Purity Solder Alloy** in relationship to EN 29453, QQS-571E, BS-219 and DIN-1707.

Warton High Purity Solder Alloys are manufactured using only the 'Highest Purity Virgin Materials' this being part of Warton's simple philosophy that the best raw materials lead to the best finished products.

Typical batch analysis: High Purity Tin

Sn	Sb	Pb	Cu	Zn
99.95	0.009	0.002	0.0002	0.0001
Fe	As	Ag	Bi	In
0.002	0.002	0.0001	0.0001	0.0003

Typical batch analysis: High Purity Lead

Sn	Sb	Pb	Cu	Zn
0.001	0.002	99.99	0.003	0.0001
Fe	As	Ag	Bi	In
0.002	0.0005	0.002	0.005	0.0003

Typical batch analysis: Warton High Purity 63/37

Sn	Sb	Pb	Cu	Zn
63.0	0.0095	rem	0.0007	0.0002
Fe	As	Ag	Bi	In
0.002	0.001	0.0005	0.0003	0.0003

These consistent high standards apply to all **Warton High Purity Solder Alloys**.

Solder Alloys Containing Lead

Warton Part No	Sn % Tin	Pb % Lead	Cu % Copper	Ag % Silver	Sb % Antimony
63/37	62.5-63.5	Rem	-	-	-
60/40	59.5-60.5	Rem	-	-	-
50/50	49.5-50.5	Rem	-	-	-
45/55	44.5-45.5	Rem	-	-	-
40/60	39.5-40.5	Rem	-	-	-
35/65	34.5-35.5	Rem	-	-	-
30/70	29.5-30.5	Rem	-	-	-
20/80	19.0-20.0	Rem	-	-	-
15/85	14.0-15.0	Rem	-	-	-
Alloy No 1	49.5-50.5	Rem	1.2-1.6	-	-
Alloy No 2	59.5-60.5	Rem	1.6-2.0	-	-
HMP 5S	4.8 - 5.2	Rem	-	1.2-1.8	-
LMP 62S	61.5-62.5	Rem	-	1.8-2.2	-
TLS/5	4.8-5.2	Rem	-	0.8-1.2	-

Lead Free Solder Alloys

In response to increasing environmental awareness and the drive for new legislation (forcing greater end of product life responsibility), Warton Metals offer a complete range of 'lead free' alloys to suit all applications. See table below.

Warton Part No	Sn % Tin	Cu % Copper	Ag% Silver	Sb % Antimony
99C	Rem	.45 - .9	-	-
97C	Rem	2.5-3.5	-	-
96S	Rem	-	3.5-4.0	-
95A	Rem	-	-	4.5-5.5
TIN	100	-	-	-
TSC	95.5-96	0.5-1	3.3-4	-

The table above shows the elements included in each alloy.

Other important properties when selecting the correct alloy are the working temperatures and the ultimate strength of the soldered joint.

The following table shows both working temperatures and ultimate tensile strength of Warton material. The table indicates that a maximum in tensile strength exists in the eutectic composition. The ultimate tensile strengths listed below refer to the bulk solder. The values are only a guide to the relative strength of identical joints made with the solder alloys at room temperature. The table should not be used to calculate exact joint strengths, which depend on a number of factors.

Warton Part No	Melting range °C	Min junction temp °C	N/mm ²	Tons/in ²
63/37	183	245	67	4.3
60/40	183-188	248	48	3.1
50/50	183-212	272	47	3.1
45/55	183-224	284	47	3.1
40/60	183-234	294	47	3.1
35/65	183-244	304	-	-
30/70	183-255	315	49	3.2
20/80	183-275	335	51	3.3
15/85	227-288	348	49	3.2
99C	227	287	-	-
97C	230-250	310	-	-
Alloy No. 1	183-215	275	55	3.5
Alloy No.2	183-190	250	-	-
HMP 5S	296-301	361	36	2.3
LMP 62S	179	239	92	5.9
96S	221	281	54	3.5
95A	236-243	303	31	2.0
TLS/5	296-301	361	-	-
TIN	232	-	-	-
TSC	217	-	-	-

Wire gauge (Diameter)

The wire gauge (diameter) for **Warton Omega** is represented as SWG. (Standard wire gauge) The equivalent imperial and metric values are shown below.

Swg	10	11	12	13	14
mm	3.25	2.95	2.64	2.34	2.03
Inch	0.128	0.116	0.104	0.092	0.080

Swg	16	18	20	21	22
mm	1.63	1.22	0.914	0.813	0.711
Inch	0.064	0.04	0.036	0.032	0.028

Swg	24	26	28	30	32
mm	0.599	0.457	0.376	0.315	0.274
Inch	0.022	0.018	0.014	0.012	0.010

Packaging

Warton Omega Rosin Free Cored Solder Wire is supplied on 0.25Kg, 0.5Kg, 2.5Kg, 3Kg, 5Kg, 10Kg, 15Kg and 25Kg reels.

Material Health & Safety Datasheet



Section 1. Identification of the substance / preparation and of the company / undertaking

Product Name:	Omega Rosin Free Cored Solder Wire
Manufactured By:	Warton Metals Limited Grove Mill, Commerce Street. Haslingden. Lancashire. BB4 5JT. ENGLAND.
Emergency Telephone:	+44 (0)1706 218888
Emergency Fax:	+44 (0)1706 221188

Section 2. Composition / Information on Ingredients

Warton's product coding system precisely defines the features of a particular type of solder wire.
For example: Omega Rosin Free Fast Flow 2% 63/37 22 swg No Clean Cored Solder Wire. 'Omega Rosin Free' denotes the product name, 'Fast Flow 2%' is the flux percentage, '63/37' is the alloy (please see table below) and '22swg' is the standard wire gauge.

Ingredient	CAS No:	Classification	Symbol	Risk phrases	Safety Phrases	% Present
Lead (dusts, heated vapours, fumes)	7439-92-1	T		33-61		See alloy table below
Lead Risks				R33 - Danger of cumulative effects. R61 - May cause harm to unborn child.		
Tin	-	-	-	-	-	See alloy table below
Activators and Inhibitors:	-	-	-	-	-	<0.5

Alloy Table

Warton Part No	Tin (Sn) %	Lead (Pb) %	Copper (Cu) %	Silver (Ag) %	Antimony (Sb) %
63/37	62.5-63.5	Rem	-	-	-
60/40	59.5-60.5	Rem	-	-	-
50/50	49.5-50.5	Rem	-	-	-
45/55	44.5-45.5	Rem	-	-	-
40/60	39.5-40.5	Rem	-	-	-
35/65	34.5-35.5	Rem	-	-	-
30/70	29.5-30.5	Rem	-	-	-
20/80	19.0-20.0	Rem	-	-	-
15/85	14.0-15.0	Rem	-	-	-
99C	Rem	-	45 - 9	-	-
97C	Rem	-	2.5-3.5	-	-
Alloy No 1	49.5-50.5	Rem	1.2-1.6	-	-
Alloy No 2	59.5-60.5	Rem	1.6-2.0	-	-
HMP 5S	4.8 - 5.2	Rem	-	1.2-1.8	-
LMP 62S	61.5-62.5	Rem	-	1.8-2.2	-
96S	Rem	-	-	3.5-4.0	-
TIN	100	-	-	-	-
95A	Rem	-	-	-	4.5-5.5
TLS/5	4.8-5.2	Rem	-	0.8-1.2	-
TSC	95.5-96	-	0.5-1	3.3-4	-

Flux cored solder wire 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 be hazardous in use and the information in this datasheet - reflects the hazards associated with the solder reflow operations.

Section 3. Hazards Identification

Main Hazards:	Thermal burns from contact with molten product. Danger of cumulative effects. See hazardous decomposition products.
Health Effects: Inhalation:	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 birth defects and other reproductive harm. Exposure to dust of processing fumes may have the following effects:- gastrointestinal irritation. Vomiting, systematic effects similar to those resulting from ingestion. Because of slow elimination from the body repeated exposure may result in accumulation.
Health Effects: Ingestion	Contains lead which is a cumulative poison. Long term effects may include: anaemia, fatigue, abdominal pain, anorexia, constipation or diarrhoea, reduction in the oxygen carrying capacity of the blood. Hot material will cause thermal burns.
Health Effects: Skin	Molten metal may cause severe damage to skin tissue.
Health Effects: Eyes	Molten metal may cause severe damage and may result in loss of vision.

Section 4. First Aid Measures

Inhalation:	In case of exposure to processing fumes: Remove from exposure. Keep warm and at rest. Obtain medical attention urgently.
Skin Contact:	Wash hands with soap and water after handling solder wire. If any skin irritation develops seek medical attention. In case of contact with molten metal immediately flood affected area with cold water. Obtain medical attention.
Eye Contact:	Flux fumes may irritate the eyes. The flux may spit during soldering. Flush immediately with plenty of water. for at least 15 minutes, holding the eye open. In cases where spitting flux has entered the eye seek medical attention.
Ingestion:	Do not induce vomiting. Keep warm and at rest. Obtain medical attention urgently.

Section 5. Fire Fighting Measures	
Suitable extinguishing media:	Not combustible. Select extinguishing agent appropriate to other materials involved.
Do not use:	Water jet
Exposure hazards:	High temperatures above 500°C may produce heavy metal dust, fumes and/or vapours. The medium will give rise to irritating fumes in a fire.
Protective measures:	Fire fighters should wear full protective clothing and breathing apparatus operated in positive pressure mode.

Section 6. Accidental Release Measures	
Personal precautions:	Refer to Section 8, Personal Protection. Wear appropriate protective clothing.
Environmental precautions:	Refer to Section 13, Disposal. Try to prevent the material from entering drains or water courses.
Methods of clearing up:	Place in closed container for subsequent disposal or recovery by Warton. Avoid creating a dust.

Section 7. Handling & Storage	
Handling:	The fumes produced during use should be extracted away from the breathing zone of the operators. Ensure that the general area is well ventilated. Wash the hands with soap and warm water after handling soldering products, particularly before eating and drinking or smoking. Avoid contact with eyes, skin and clothing. Avoid breathing metal fumes from heated material.
Storage:	These products should be stored in a cool dry area. Keep out of the reach of children and away from food and drink.

Section 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).	
Occupational Exposure Limits:- Substance Activators & Inhibitors, Tin, Lead: Control of Lead at Work Regulations: 0.15mg/m ³ 8h TWA	
Personal Protection:- Respiratory protection:	Not generally required unless there is inadequate extraction during use. Dust respirator if conditions are dusty. Respiratory protection if there is risk of breathing mists or vapours from heated material.
Eye Protection:	Operators should wear safety glasses or goggles to protect the eyes from spitting flux.
Body Protection:	Normal work wear
Hand protection:	Leather, thick textile or other thermal gloves. If handling hot material.
Biological Standards:	Employees should be under medical surveillance if the risk assessment made under the Control of lead at Work regulations indicate they are likely to be exposed to significant concentration of lead, or if an employment medical adviser or appointed doctor certifies that an employee should be under medical surveillance. 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 & Safety at Work (Amendment) Regulations 1994, employers should assess the risks at work to the health of pregnant workers and workers who have recently given birth or are breast feeding.
References:	EH40 Occupational Exposure Limits (published annually).
Engineering Control Measures:	Fumes from the soldering process should not be breathed. Ventilation should always be used.

Section 9. Physical & Chemical Properties.			
Appearance / colour:	Grey wire	pH/Concentration:	N/D
Odour:	-	Melting Range°C:	See table below
Boiling point °C:	N/A	Auto ignition temperature °C:	N/A
Flash point °C:	N/A	Explosive limits (% vol):	N/A
Explosive / oxidising:	N/A	Solubility/miscibility:	Insoluble in water
Viscosity:	N/D	Volatile content (V.O.C):	N/D
Vapour pressure:	N/A	Vapour density (air = 1):	N/A
Evaporation rate:	N/A	Conductivity	N/D
Flammability:	N/A	Specific Gravity:	N/A
Warton Part No	Melting range °C	Warton Part No	Melting range °C
63/37	183	99C	227
60/40	183-188	97C	230-250
50/50	183-212	Alloy No. 1	183-215
45/55	183-224	Alloy No.2	183-190
40/60	183-234	HMP 5S	296-301
96S	221	LMP 62S	179
TIN	232	TLS/5	296-301
95A	236-243	TSC	217

Section 10. Stability & Reactivity	
Conditions to avoid:	If solder is exposed to temperature over 500°C lead dust, fume and /or vapours may be produced. Solder will react with concentrated acid to release poisonous fumes of nitric oxide. This will in turn oxidise to nitrogen dioxide, a red gas with a pungent odour. If personnel are extensively exposed to these gases then immediate medical attention should be sought, as symptoms can be delayed for a considerable time period and can be fatal.
Materials to avoid:	Solder may react with other strong acids to release highly flammable / explosive hydrogen gas.

Section 5. Fire Fighting Measures	
Suitable extinguishing media:	Not combustible. Select extinguishing agent appropriate to other materials involved.
Do not use:	Water jet
Exposure hazards:	High temperatures above 500°C may produce heavy metal dust, fumes and/or vapours. The medium will give rise to irritating fumes in a fire.
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Respiratory protection:	Not generally required unless there is inadequate extraction during use. Dust respirator if conditions are dusty. Respiratory protection if there is risk of breathing mists or vapours from heated material.
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Body Protection:	Normal work wear
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Biological Standards:	Employees should be under medical surveillance if the risk assessment made under the Control of lead at Work regulations indicate they are likely to be exposed to significant concentration of lead, or if an employment medical adviser or appointed doctor certifies that an employee should be under medical surveillance. 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 & Safety at Work (Amendment) Regulations 1994, employers should assess the risks at work to the health of pregnant workers and workers who have recently given birth or are breast feeding.
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Boiling point °C:	N/A	Auto ignition temperature °C:	N/A
Flash point °C:	N/A	Explosive limits (% vol):	N/A
Explosive / oxidising:	N/A	Solubility/miscibility:	Insoluble in water
Viscosity:	N/D	Volatile content (V.O.C):	N/D
Vapour pressure:	N/A	Vapour density (air = 1):	N/A
Evaporation rate:	N/A	Conductivity	N/D
Flammability:	N/A	Specific Gravity:	N/A
Warton Part No	Melting range °C	Warton Part No	Melting range °C
63/37	183	99C	227
60/40	183-188	97C	230-250
50/50	183-212	Alloy No. 1	183-215
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Materials to avoid:	Solder may react with other strong acids to release highly flammable / explosive hydrogen gas.

Section 11. Toxicological Information (toxic effects arising from exposure based on experimental and non experimental data)	
Inhalation:	Main route of exposure for flux fumes. Providing soldering temperature is below 500°C the amount of lead in the fume should be negligible.
Eye contact: Flux fume	The flux fumes may irritate the eyes.
Skin contact:	Not normally regarded as an industrial hazard, but lead can be transferred from the skin onto food, cigarettes etc., if a high standard of personal hygiene is not exercised.
Ingestion:	Not applicable
Acute toxicity:	Lead can cause weakness, vomiting, loss of appetite, convulsions and stupor.
Chronic Toxicity:	Lead can cause weakness, insomnia, hypertension, headaches and pains in the joints. Chronic exposure 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). Evidence for carcinogenicity is adequate in animals but inadequate in humans.
Reproductive Toxicity:	The placenta offers no barrier to the transport of lead from the mothers blood stream to that of the foetus.

Section 12. Ecological Information	
(Possible environmental effects and behaviour /ODP/aquatic toxicity):	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. For this reason lead in small quantities is often disposed of in landfill sites, however this is not recommended. (See section 13. Disposal Considerations).
Bio-accumulation	Limited information indicates a potential to bioaccumulate.
Ecotoxicity:	The product is rated as non hazardous to aquatic species.
Degradability:	This product is expected to be resistant to biodegradation.

Section 13. Disposal Considerations	
(Safe disposal of product, its residues and packaging materials):	Waste solder wire should be put in metals tins (supplied free of charge) and returned to Warton for disposal. Disposal should be in accordance with the relevant 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. See also Sections 7 & 8 for handling precautions and personal protection where applicable. Wastes containing high levels of lead oxides are classified as a 'special waste' under the COPA (Special Waste Regulations 1996 and must be disposed of in accordance with those regulations.

Section 14. Transport Information	
	Solder Wire is not classified as hazardous for transportation.

Section 15. Regulatory Information	
	Flux cored solder wire 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 be hazardous in use and the information in this datasheet reflects the hazards associated with the solder reflow operations. S37 Wear suitable gloves Contains lead

Section 16. Other Information	
Recommended uses and restrictions: Publications references:	Use only as directed. Compiled in accordance with CHIP 2 Regulations 1994. HSE Approved Code Of Practise, document L62. Dangerous Substances Directive 57/548/EEC as amended by directive 92/32/EEC. Dangerous Preparations Directive 88/379/EE as amended by Directive 90/492/EEC. Lead at Work Directive 82.605/EEC. The Health & Safety at Work Act 1974. The Control Of Lead at Work Regulations 1980. 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. HS (G) 37: An Introduction to Local Exhaust Ventilation. HS (G) 53: Respiratory Protective Equipment - A practical guide for users. HS (G) 65: Successful Health & Safety Management's. HS (G) 97: A Step by step Guide to the Coshh Regulations. MS24: Health Surveillance of Occupational Skin Disease. COSHH: Guidance for employers Approved Code of Practise - Management of Health & Safety at Work.

Section 17. Revision Dates	
Revised Date / Initials:	2/03/ VHM
Replacing:	All previous health and safety datasheets
Legend:	N/A = Not applicable or available at time of printing. N/D = Not determined or not determinable. Est. = Estimated Rem: Remainder

The information and recommendations on this sheet relate to the specific material designated and may not be valid for such material used in combination with any other materials or in any process. The information is given in good faith and the best of Warton Metals Ltd knowledge. The information is believed accurate and reliable at the time of preparation. Nothing herein is to be construed as a guarantee, express or implied - in all cases it is the responsibility of the user to determine the applicability of this information or the suitability of the products for his/her own particular purpose.

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