

WARTON METALS LIMITED

MATERIAL APPLICATION & SAFETY DATASHEET



No Clean Cored Solder Wire



Product Name: Future No Clean Cored Solder Wire

Manufactured By:

Warton Metals Limited Grove Mill Commerce Street Haslingden Lancashire England

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Description

Future is a flux "core" contained within a **Warton High Purity Solder Wire**. The Future range of No Clean Cored Solder is available in a halide free formulation and two flux percentages:- fast flow 2% and low residue 1%. Future types exhibit the absolute minimum of clear residue after soldering with no offensive odours generated during the soldering operation.

Future Flux Types.

Future flux type HF is formulated and manufactured using a unique modified rosin. Future HF (Halide Free)

Available as 2% and 1% flux content. Future HF is formulated without the use of halides, suitable for

applications where a products long term reliability requires the use fluxes to the RMA specification. Future HF eliminates any long term corrosion potential.

Future HF RMA Zero DTD 599A, QC DIN 8511 Type	Class 5B, QS 571E-RMA e F-SW32.
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High Purity Solder Alloy

Standardisation is important to reduce variety and to promote the quality of products by defining features and characteristics governing their fitness for purpose. The standards promote clear unambiguous communication between purchasers and suppliers for quotation ordering and supply purposes.

In 1994 a single European standard, EN 29453 (ISO 9453), superseded all other European national standards, BS 219, DIN 1707, NFC 90-550.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.

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

Warton Part	EN	QQS 571E	BS 219
No:	29453		*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	Н
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	-	-	-
SAC3	-	-	-
TSC	-	-	-

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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.

Below shows a typical batch analysis of the High Purity Tin/Lead used in manufacturing **High Purity 63/37**.

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 Tin

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	Sn %	Pb %	Cu %	Ag %	Sb %
Part No	Tin	Lead	Copper	Silver	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	-
Sn10Pb88Ag2	10	88	-	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	.459	-	-
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	-
SAC3	Rem	0.4-0.6	2.8-3.2	-

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 ºC	Min junction	N/mm²	Tons/In 2
		temp °C		
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
95A	236-243	303	31	2.0
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
TLS/5	296-301	361	-	-
TSC	217	-	-	-
Sn10Pb88Ag2	268-290	-	-	-
SAC3	217-219	-	-	-

Wire gauge (Diameter)

The wire gauge (diameter) for **Warton Future** 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 Future Cored Solder Wire is supplied on 0.25Kg, 0.5Kg, 2.5Kg, 3Kg, 5Kg, 10Kg, 15Kg and 25Kg reels.



Material Safety Datasheet Future No Clean Cored Solder Wire

	(All alloys, gauge	es and flux perce	ntages)		
Section 1. Identification of the substance	Section 1. Identification of the substance / preparation and of the company / undertaking				
Product Name: Futu	re No Clean Cored Solder Wi	re			
Manufactured By: Wart	Warton Metals Limited				
Grov	e Mill, Commerce Street. Ha	slingden. Lancashire. Bl	34 5JT. ENGLAND.		
Emergency Telephone: +44	hone: +44 (0)1706 218888				
Emergency Fax: +44	(0)1706 221188				
Warton's product coding system precisely de	fines the features of a particu	lar type of solder wire.			
For example: Future HF Fast Flow 2% 63/37	22 swg No Clean Cored Solo	der. `Future HF No Clear	n Cored Solder Wire' (denotes the product	
name and flux type, 'Fast Flow 2%' is the percentage of flux in the wire, `63/37' is the alloy (please see table below) and '22swg' is the standard					
wire gauge size.					
Section 2 Composition / Information on	narodionte				
Elux, cored solder wire is considered, to be	ingreatents	the classification (Haza	d Information and Pa	ekaging for Supply)	
Regulations 1994 because it is not bazardo	in anticle and is not subject to	product may be bazardo	us in use and the info	rmation in this datasheet	
- reflects the bazards associated with the sol	der reflow operations	product may be nazardo			
Ingredient	CAS No: Classific	ation Symbol Risk phras	ses Safety Phrases	% Present	
Lead (dusts, heated vapours, fumes).	7439-92-1	T 20/22-33	8-61 See	allov table below	
Modified Rosins:	8050-09-7	Xn 42/	43 dependent or	n flux %	
R20/22 - Harmful by inhalation and if					
swallowed.					
R33 - Danger of cumulative effects.					
R42/43 - May cause sensitisation by inhalation	on and				
skin contact.					
R61 - May cause harm to unborn child.	Please use table	below to determine the e	lements present in the	e alloy.	
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	-	.459	-	-	
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	-	
TLS/5 4.8-5.2	Rem	-	0.8-1.2	-	
95A Rem	-	-	-	4.5-5.5	
TSC 95.5-96	-	0.5-1	3.3-4		

Inhalation of the flux fumes given off at soldering temperatures will irritate the nose and throat. Repeate or prolonged exposure to flux fumes may cause an allergic reaction leading to occupational asthm Solder alloys containing lead give of negligible lead fume at normal soldering temperatures and	Section 3.	Hazards Identification	
temperatures up to 500°C. Lead is harmful if absorbed into the body and can cause birth defects and other reproductive harm.			Inhalation of the flux fumes given off at soldering temperatures will irritate the nose and throat. Repeated or prolonged exposure to flux fumes may cause an allergic reaction leading to occupational asthma. Solder alloys containing lead give of 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.

Section 4. First Aid Measures	
Inhalation:	Flux fumes emitted during soldering will irritate the nose and throat and may cause an asthmatic type reaction. Remove affected person to fresh air, obtain medical attention if there is any respiratory distress.
Skin Contact:	Rosin and rosin derivatives can cause a rash to develop. If any skin irritation develops seek medical advice. Wash hands with soap and warm water after handling solder wire.
Eye Contact:	Flux fumes may irritate the eyes. The flux may spit during soldering. Flush immediately with plenty of water, ensure that the eyeball and the inside of the eyelids are properly bathed by gently prising open the eyelids.
Ingestion:	Not relevant

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Section 5. Fire Fighting Measures	
Suitable extinguishing media:	Dry chemical, carbon dioxide, water spray or foam.
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.
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.	
Environmental precautions:	Refer to Section 13, Disposal.	
Methods of clearing up:	Place in closed container for subsequent disposal.	
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.
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		
Maximum Exposure Limits (MEL's)	:- · · · · · · · · · · · · · · · · · · ·	
Substance: Lo	ng Term Exposure Limits (8 Hour TWA) Short Term Exposure Limit (15 min)	
Rosin based solder flux fume	0.05 mg/m ³ 0.15 mg/m ³ Sen	
Lead *	0.15 mg/m³ -	
Personal Protection:-		
Respiratory protection:	Necessary if there is a risk of exposure to high concentrations of flux fumes.	
Eye Protection:	Operators should wear safety goggles to protect the eyes from spitting flux.	
	Suitable work wear should be worn to protect clothing.	
Skin Protection:	For blood lead monitoring and medical surveillance requirements, refer to the HSC Approved code of	
	Practise 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 indicate they are	
	likely to be exposed to significant concentrations 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.	
	Adequate extraction methods to remove fumes from work area where this product is being used.	
References:	EH40 Occupational Exposure Limits (published annually).	
	Sen - denotes material capable of causing respiratory sensitisation.	
	* - From Appendix 1 of the HSC Approved Code of Practice Supporting The Control of Lead at Work	
	Regulations.	
	Cases of occupational asthma caused by exposure to rosin fume are negotiable under the reporting Of	
	injuries, Diseases and Dangerous Occurrences Regulations.	

Section 9. Physical & Chemica	Section 9. Physical & Chemical Properties.		
Appearance / colour:	Grey alloy wire	pH/Concentration: N/D	N/D
Odour:	odourless at ambient temperatures	Melting Range ^o C:See table below	See table below
Boiling point °C:	N/A	Auto ignition temperature °C: N/A	N/A
Flash point ºC:	N/A	Explosive limits (% vol):N/A	N/A
Explosive / oxidising:	N/A	Solubility/miscibility:N/A	Insoluble in water
Viscosity:	N/D	Volatile content (V.O.C): N/A	N/D
Vapour pressure:	N/A	Vapour density (air = 1):N/A	N/A
Evaporation rate:	N/A	Conductivity: N/A	N/D
Flammability:	N/A	Specific Gravity:N/A	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
35/65	183-244	LMP 62S	179
30/70	183-255	96S	221
20/80	183-275	TLS/5	296-301
15/85	227-288	95A	236-243
SAC3	217-219		

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.
Materials to avoid:	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. Solder may react with other strong acids to release highly flammable / explosive hydrogen gas.

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Section 11. Toxicological Information (toxic effects arising from exposure based on experimental and non		
experimental data)		
Acute Toxicity:	The flux fumes produced during soldering will irritate the nose and throat. For personnel that have	
-	become sensitised to rosin fumes, exposure can cause symptoms of asthma attacks of wheezing),	
	chest tightness and breathlessness - alveolitis breathlessness and flu like symptoms), or rhinitis and	
	conjunctivitis (runny or stuffy nose and watery or prickly eyes typical of hay fever). Rosin can also cause	
	sensitisation by skin contact causing dermatitis.	
	Lead can cause weakness, vomiting, loss of appetite, convulsions and stupor.	
	Prolonged and / or repeated exposure to flux fumes may cause some workers to develop an allergic	
	reaction to them (become sensitised).	
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 carcinogenity 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.	
	Modified rosin >2500mg/Kg.	
LD50 (Oral rat):		

(Passible opvironmental offects and I ead is not degradable and will parsist in the opvironment I ead is insoluble in water and is not att	
behaviour /ODP/aquatic toxicity): by most inorganic acids and bases. (See section 13. Disposal Considerations).	cked

Section 13. Disposal Consideration	S
(Safe disposal of product, its	Waste solder wire (if any) should be put in metals tins and returned to Warton for disposal. Disposal
residues and packaging materials):	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.

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.

Section 16. Other Information	
Recommended uses and restrictions:	Use only as directed.
Publications references:	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. EH26: Occupational Skin Diseases:
	health and safety Precautions. EH40: Occupational exposure limits. Revised annually.
	MS24: Health Surveillance of Occupational Skin Disease. MS25: Medical aspects of
	occupational asthma. IND (G) 95 (L) Respiratory Sensitises: A Guide For Employers.
	Health Surveillance under COSHH: Guidance for employers Approved Code of Practise -
	Management of Health & Safety at Work.

Section 17. Revision Dates	
Revised Date / Initials:	10/05 / 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, information and 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 own particular purposes.

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