]

MATERIAL APPLICATION & SAFETY DATASHEET

Hydro Flux™

WATER WASH CORED SOLDER WIRE

Product Name:

Hydro Flux Water Wash Cored Solder Wire

Manufactured By:

Warton Metals Limited
Grove Mill Commerce Street
Haslingden Lancashire,
BB4 5JT
ENGLAND

Tel: + 44 (0) 1706 218888
Fax : + 44 (0) 1706 221188

Description

Hydro Flux Water Wash Cored Solder Wire is a colophony free water wash cored solder wire, formulated so the majority of flux sublimes at soldering temperatures, leaving the absolute minimum water soluble residue on the assembly. Properly processed and cleaned boards can surpass the cleanliness requirements of MIL-C-28809B 13/5/88 (Superseding MIL-P-28809A 5/10/81).

Hydro Flux Water Wash Cored Solder Wire is available as organic activated formulations (for rapid cleaning action), with a Halide Free Formulation exhibiting minimum contamination after cleaning. Hydro Flux Water Wash Cored Solder Wire offers rapid efficient soldering of even the most difficult of assemblies.

Hydro Flux is a superior wetting water wash cored solder wire with no offensive odour or spatter during soldering. Water soluble flux residues must be removed. Hydro Flux is available in all Warton High Purity Solder Alloys.

Warton Hydro Flux Water Wash Cored Solder Wire is a complete, versatile product range. A product range designed to meet individual requirements.

Typical Applications

Hydro Flux Water Wash Cored Solder Wire is suitable for hand soldering applications where components can withstand the necessary washing procedures.

Selection Criteria

1. High Purity solder alloy.
2. Flux Type.
3. Wire gauge (diameter).
4. Material Safety.

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 In 1994 a single European standard, EN 29453 (ISO 9453), superseded all other European national standards, BS 219, DIN 1707, NFC 90-550.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

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	-	-	-
TSC	-	-	-
SAC3	-	-	-

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

Warton Hydro Flux Cored Solder Wire is available in all **Warton High Purity Solder Alloys** including: Improved quality 63/37, Non toxic (lead free), Low melting point alloys, High melting point alloys and all alloys to EN 29453, BS 219, DIN 1707 & QQS 571E.

Warton High Purity Solder Alloys are manufactured using only the 'Highest purity raw materials' available world-wide. Below shows a typical batch analysis of the High Purity Tin/Lead used in manufacturing **High Purity 63/37**.

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

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	-
SAC3	Rem	0.5-0.7	2.8-3.2	-

Flux Type

Warton Hydro Flux is available as two different flux types. Each of the flux types has a level (0 - 2%) of halide activation, offering greater control over rate of flow and contamination levels after

soldering. The level of contamination after cleaning is dependent on the activity of flux used, quantity of flux residue and method of cleaning.

Flux Name	Flux Type	Halide %	Description
Hydro Flux OA2	OA	2	2% flux content organically activated wire exhibiting excellent wetting ability
Hydro Flux HF	HF	Zero	Halide Free 2% flux content wire ensuring the absolute minimum of contamination after cleaning.

Wire gauge (Diameter)

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

Swg	10	11	12	13	14	16	18	19
mm	3.25	2.95	2.64	2.34	2.03	1.63	1.22	1.02
Inch	0.128	0.116	0.104	0.092	0.080	0.064	0.04	0.040

Swg	20	21	22	24	26	28	30	32
mm	0.914	0.813	0.711	0.599	0.457	0.376	0.315	0.274
Inch	0.036	0.032	0.028	0.022	0.018	0.014	0.012	0.010

The optimum thickness of solder wire will depend on the size of soldering iron being used.

Soldering Iron Size	Solder Gauge
Up to 20 watts, bit size up to 4.5 mm	22 Swg
20 watts to 40 Watts	18 Swg
40 watts to 100 watts	16 - 18 Swg
100 watts upwards, bit sizes from 9 - 5 mm	16 Swg

Packaging

Hydro Flux Water Wash Cored Solder Wire is supplied on 0.25 Kg, 0.5 Kg, 2.5 Kg, 3 Kg, 5 Kg, 10 Kg, 15 Kg and 25 Kg reels.

Material Safety Datasheet

Hydro Flux Water Wash Cored Solder Wire

(All alloys, gauges and flux percentages)

WARTON METALS LIMITED

Section 1. Identification of the substance / preparation and of the company / undertaking	
Product Name:	Hydro Flux Water Wash Cored Solder Wire
Manufactured By:	Warton Metals Limited Grove Mill, Commerce Street. Haslingden. Lancashire. BB4 5JT. ENGLAND.
Emergency Telephone:	+ (0)1706 218888
Emergency Fax:	+ (0)1706 221188
Warton's product coding system precisely defines the features of a particular type of solder wire. For example: Hydro Flux Water Wash 63/37 22 swg No Clean Cored Solder. `Hydro Flux' denotes the product name , `63/37' is the alloy (please see table below) and '22swg' is the standard wire gauge size.	

Section 2. Composition / Information on Ingredients

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.

Ingredient	CAS No:	Classification Symbol	Risk phrases	Safety Phrases	% Present
Lead (dusts, heated vapours, fumes).	7439-92-1	T	20/22-33-61		See alloy table below
Activators and Inhibitors: R20/22 - Harmful by inhalation and if swallowed. R33 - Danger of cumulative effects. R61 - May cause harm to unborn child.					<20

Please use table below to determine the elements present in the 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	-	.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	-
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	-
SAC3	REM	-	0.5-0.7	2.8-3.2	-

Section 3. Hazards Identification	
Main Hazards:	Thermal burns from contact with molten product. Danger of cumulative effects. See Hazardous decomposition products.
Inhalation:	Inhalation of the flux fumes given off at soldering temperatures may irritate the nose and throat. Solder alloys containing lead give off negligible lead fume at normal soldering temperatures and at temperatures up to 500ºC. 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.
Ingestion:	Contains lead which is a cumulative poison. Long term effects include: anaemia, fatigue, abdominal pain, anorexia, constipation or diarrhoea, reduction in the oxygen carrying capacity of the blood. Hot material will cause thermal burns.
Skin	Molten metal may cause severe damage to skin tissue.
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:	Flux fume may cause a rash to develop. Wash hands with soap and water after handling solder wire. If any skin irritation develops seek medical attention.
Eye Contact:	Flux fumes may irritate the eyes. The flux may spit during soldering. Flush immediately with plenty of water. 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:	Dry chemical, carbon dioxide, water spray or foam
Do not use:	Water jet
Exposure hazards:	High temperatures above 500ºC 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

In normal soldering operations where the temperature is below 500ºC the exposure to lead will be minimal and the risks from the toxic effects of lead insignificant. (Ref: Approved Code Of Practise Supporting the Control of Lead at Work Regulations).

Occupational Exposure Limits:-

Substance:	Long Term Exposure Limits (8 Hour TWA)	Short Term Exposure Limit (15 min)
Activators & Inhibitors	N/D	N/D
Lead *	0.15 mg/m³	-

Personal Protection:-	
Respiratory protection:	Not generally required unless there is inadequate extraction during use.
Eye Protection:	Operators should wear safety glasses or goggles to protect the eyes from spitting flux.
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). * - From Appendix 1 of the HSC Approved Code of Practice Supporting The Control of Lead at Work Regulations.

Section 9. Physical & Chemical Properties.			
Appearance / colour:	Grey wire	pH/Concentration:	N/D
Odour:	N/A	Melting RangeºC:	See table below
Boiling point ºC:	N/A	Auto ignition temperature ºC:	N/A
Flash point ºC:	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 ºC**	**Warton Part No**	**Melting range ºC**
63/37	183-185	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
TSC	217	SAC3	217-219

Section 10. Stability & Reactivity	
Conditions to avoid:	If solder is exposed to temperature over 500ºC 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 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 500ºC 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 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.

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).

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.

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. 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:	March 2007 / 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.

Sales & Technical Enquiries Tel: +44 (0)1706 218888 Fax: + 44 (0)1706 221188