



## MATERIAL APPLICATION & SAFETY DATASHEET



### Product Name:

Autosol High Speed Cored Solder Wire for Manual and Automated Soldering

### Manufactured By:

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### Description

Autosol is a unique flux "core" contained in Warton's High Purity Solder Wire. Autosol is a precision manufactured solder wire dedicated for manual (hand soldering), automated and high speed soldering applications. Autosol is available in three flux formulations:- SRA (1% Halide), RA (0.5% Halide) & RMA (Trace Halide). All three formulations offer efficient soldering of Copper, Brass, Nickel and Zinc. Applications include lamp and Component technology and sensitive electronic assembly. Autosol is available in all Warton High Purity Solder Alloys and offers three

flux percentages to allow the user to balance flow rate with residue levels. All flux residues are clear and conform with the most stringent of international and commercial specifications.

### 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 In 1994 a single European standard, EN 29453 (ISO 9453), superseded all other European national standards, BS 219, DIN 1707, NFC 90-550.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	-	-	-
Sn10Pb88Ag2	-	-	-
SAC3	-	-	-
SAC2	-	-	-
SAC1	-	-	-

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

### 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

Warton High Purity 63/37 offers the final step in production consistency and no clean solder alloy technology. 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	-
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	.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	-
SAC2	Rem	0.5-0.7	1.8-2.2	-
SAC1	Rem	0.5-0.7	0.3	-

Rem – Remainder

Apart from the purity of the solder 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 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.

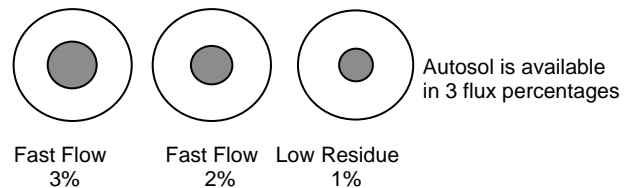
Warton Part No	Melting range °C	Min junction temp °C	N/mm <sup>2</sup>	Tons/In <sup>2</sup>
63/37	183	245	67	4.3
60/40	183-188	248	48	3.1
50/50	183-212	272	47	3.1
45/55	183-224	284	47	3.1
40/60	183-234	294	47	3.1
35/65	183-244	304	-	-
30/70	183-255	315	49	3.2
20/80	183-275	335	51	3.3
15/85	227-288	348	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	-	-	-
SAC2	217-219	-	-	-
SAC1	217-219	-	-	-

## Autosol Flux Type

Flux Name	Flux Type	Halide Max. %	Specification IPC J STD 004
Autosol SRA	HA	1	ROM1
Autosol RA	RA	0.5	ROM1
Autosol RMA	RMA	Trace	ROL1

## Autosol Flux Percentage

Warton Autosol is available with three variations of flux percentage ( 3% - 1% ) offering an improved level of control and greater flexibility when balancing the level of residue after soldering and the speed at which the solder will flow.



## Wire gauge ( Diameter )

The wire gauge (diameter) for Warton Autosol 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

## Packaging

Automated & High Speed Soldering supplied on 0.25Kg, 0.5Kg, 2.5Kg, 3Kg, 5Kg, 10Kg, 15Kg and 25Kg reels.