



MATERIAL APPLICATION & SAFETY DATASHEET

High Purity™ SOLDER ALLOYS



Product Name:

High Purity Soldering Products
Incorporating: Bar, Tinnans, Blowpipe, Ingot Solder, Pellets,
Chunks and Chips (all alloys).

Manufactured By:

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Description

High Purity Soldering Products are manufactured from a grade of solder alloy with purity levels far exceeding the requirements of all national and international standards. Warton Metals Ltd manufacture all high purity solder alloys using the finest raw materials available world-wide.

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In 1994 a single European standard, EN 29453 (ISO 9453), superseded all other European national standards, BS 219, DIN 1707, NFC 90-550.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

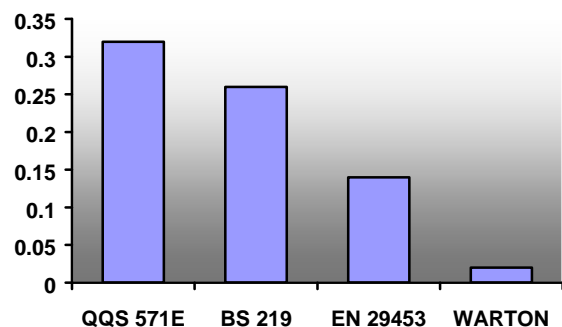
| Warton Part No: | EN 29453 | QQS 571E | BS 219 *DIN 1707 |
|-----------------|----------|-------------|------------------|
| 63/37 | 1a | Sn63Pb37 | AP |
| 60/40 | 2a | Sn60Pb40 | KP |
| 60/40 DIS* | - | - | - |
| 50/50 | 3a | Sn50Pb50 | F |
| 45/55 | 4 | - | R |
| 40/60 | 5 | Sn40Pb60 | G |
| 35/65 | 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 | - | - | - |
| SAC3 | - | - | - |
| SAC2 | - | - | - |
| SAC1 | - | - | - |

*DIS dross inhibiting solder

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

Purity of solder alloy

The chart below compares the impurity levels permitted by Warton in relation to BS EN 29543, BS 219 and U.S. QQS 571E.



Warton High Purity Solder Alloys are manufactured using only the 'Highest purity raw materials' available world-wide.

Typical batch analysis: High Purity Virgin 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 Virgin 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 | - | - | - |
| 60/40 DIS* | 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 | - |

*DIS Dross Inhibiting Solder

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 | - |
| SAC! | Rem | 0.5-0.7 | 0.3-0.7 | - |

Working temperatures & strengths

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. The solder alloys were tested at 20°C at 1/16 inch per minute strain rate.

| Warton Part No | Melting range °C | Min junction temp °C | N/mm² | Tons/In ² |
|----------------|------------------|----------------------|-------|----------------------|
| 63/37 | 183 | 245 | 67 | 4.3 |
| 60/40 | 183-188 | 248 | 48 | 3.1 |
| 60/40 DIS* | 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 |
| TLS/5 | 296-301 | 361 | - | - |
| 95A | 236-243 | 303 | 31 | 2.0 |
| TIN | 232 | - | - | - |
| TSC | 217 | - | - | - |
| SAC3 | 217-219 | - | - | - |
| SAC2 | 217-219 | - | - | - |
| SAC1 | 217-219 | - | - | - |

*DIS dross inhibiting solder

Analytical Service

Warton Metals Ltd. offer customers the opportunity of regularly monitoring the quality of the solder in use, with Wartons skilled technical personnel advising on the analytical results if required. For customer assays **Warton Metals Ltd** use an independent, Namas approved test facility (Testing No: 0012/0963). This provides accurate unbiased results traceable to international standards.

Waste Removal

Agitation of solder by wave soldering or dipping will cause oxidation (known as 'dross'). Dross must be regularly removed and placed carefully into metal containers supplied free from Warton Metals on request. Contact Customer Services for more information.

Duty Of Care

Under the Environmental Protection Act 1990, it is necessary to complete a Duty Of Care Transfer Note with all waste solder from your company. Rather than complete a transfer note every time we collect your waste, you can save administration costs by simply signing one transfer note. We then hold all relevant details on our central database, which is open to inspection by the regulatory authorities to help you meet your legal obligations. This service is free to all customers.

Packaging

High Purity Bar Solder is supplied in nominal weights of 60 grams (Blowpipe), 0.25 kilo (Tinman sticks), 0.5 kilo bar, 1 kilo bar and 5 kilo Ingots.