Solder Bar

Raw Materials:

Grosvenor pure alloy bar solder is manufactured exclusively from high grade materials
We are aware that re-cycled material can be used, but in our opinion reclaimed scrap metal leaves too many impurities to satisfy the quality demands of today's electronics industry

Specifications:

The most common purchasing specification used in the UK is BS 219 (1977 / 1984)
We illustrate below a typical independent analysis of Grosvenor Solder when compared with BS 219
The comparison clearly shows that grosvenor solder contains a far lower level of impurities than allowed in the British or other national standards
(We believe most national standards have to give excessively high impurity levels to allow for the re-cycling of scrap metal)

Typical Batch Analysis : High Purity Virgin Tin

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

Typical Batch Analysis : High Purity Virgin Lead

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

Typical Batch Analysis : Grosvenor Pure Alloy 63 / 37 (BS 219)

Sn	Sb	Pb	Cu	Zn	Fe	As	Ag	Bi	In
63.5	0.0095	REM	0.0007	0.0002	0.002	0.001	0.0005	0.0003	0.0003

BS 219. 63 / 37 AP

Sn%	Sb%	Pb%	Cu%	Zn%	Fe%	As%	Ag%	Bi%	In%
63 to 64	0.2	REM	0.08	0.003	0.02	0.03	-	0.1	0.0005

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Analytical Service:

A regular check on bath composition and impurity levels is advisable
A full analytical report enables problems to be solved quickly which means a more constant through-put of flow solder production
A 3 month check is normally found sufficient, but this depends on workload

Dross Service:

Agitation of solder by wave soldering or dipping will cause oxidisation (know as dross)
Dross must be regularly removed and placed carefully into the free of charge containers supplied on request, for return to grosvenor

Specification Table

BS 219	Tin	Lead	Melting Range
-	AP 63 to 64%	REM	183 to 185°C
-	KP 59 to 60%		183 to 188°C
QQ-S-571E	SN 62.5 to 63.5%		183°C

Impurity Levels (Maximum) as Specified			KP and AP (Maximum) Typical		
BS219		QQ-S-571E	BS219		QQ-S-571E
AP		Sn63	AP / KP		Sn63
Sb Cd	0.2% 0.005%	0.2% to 0.5% 0.001%	Sb Cd	<0.02% <0.001%	<0.2 to 0.5% <0.001%
Bi	0.1%	0.25%	Bi	<0.005%	<0.005%
As	0.03%	0.03%	As	<0.001%	<0.001%
Fe	0.02%	0.02%	Fe	<0.001%	<0.001%
Cu	0.08%	0.08%	Cu	<0.001%	<0.001%
Zn	0.003%	0.005%	Zn	<0.001%	<0.001%
Al	0.001%	0.005%	Al	<0.0001%	<0.0001%
Others	0.08%	0.08%	Ag	<0.0005%	<0.0005%

Technical Information :

All soldering operations will introduce contaminates to the solder bath
Unfortunately different materials and operations will introduce differing levels of contaminants
Listed are typical contaminants found

Aluminium* : As little as 0.005% may increase dross rate without affecting joint formation. 0.001% may result in a sluggish or gritty solder

Antimony : Certain of the specification require the intentional additional of antinomy. Ostensibly this to retard the transformation of tin into its grey state, sometimes known as ‘tin pest’, however this argument no longer appears to have validity in a eutectic or near eutectic alloy

Arsenic	: 0.03% can cause dewetting but arsenic is not usually a contaminant in electronic applications
Bismuth	: 0.5% has been observed to cause discoloration and oxidation of solder, but appreciable grade alloys or finishes
Cadmium*	: At levels of 0.002% joint formulation will be noticeably affected. At 0.005% there will be a high incidence of bridging and icicling, together with a deterioration in joint strength
Copper**	: Generally, at levels of 0.25% copper or even less, joint formulation will deteriorate
Gold**	: At levels of 0.1% and quite often even less, the solder becomes sluggish and dull joints are formed
Iron	: 0.02% of iron can make joint formulation gritty
Sulphur	: As little as 0.001% may inhibit wetting and may produce grittiness
Zinc	: The presence of zinc can cause dulling and increase bridging and icicling 0.005% can cause lack of adhesion and grittiness

Notes:

** When copper and gold in combination add to 0.2% joint formulation will usually have deteriorated
* The effects of aluminium, cadmium and zinc are cumulative. If more than one element is present the following lower maxima are suggested 0.005%, 0.002% and 0.001%

Solder Alloys:

Solder used in electronic process contains principally tin and lead. Special solders may contain silver, antimony or copper. A potential health risk from solder is associated with its lead content, the other components are not usually regarded as hazardous in this context. The metal can give rise to lead fumes at temperatures above 500°C, but this level is rarely met with in electronic soldering. Oxide can be transferred to the hands while using these products and we recommended that eating, drinking and smoking should not be permitted at work stations. Hands should be washed with soap and warm water before eating. Oxide evolved as dross on a wave soldering machine should be handle with care to avoid raising dust. Dross should be stored in a metal container with a sealed lid and returned to grosvenor for disposal. Bar solder should be kept dry to avoid the risk of violent splashing that can occur if wet solder is added to a hot molten solder bath. Grosvenor recommend that gloves should be used for handling wire and bar and suitable eye protection should be worn when adding solder to the machine, bath and when hand soldering

Health and Safety at Work Act 1974:

Product	: Bar solder, ingot, solid wire, tinmans, blowpipe and pellets	
Nature of hazards	: Contains lead-absorption can arise from the oxide which forms on the surface of molten alloys	
Physical data	: Lustrous metal	
Fire and explosion data	: Flash point-none Non-flammable Store in a dry place	
Health hazard	: Molten metals can cause burns	
Emergency first aid	: Treat all burns Get medical help	
Spillage	: Allow to cool, collect and return to supplier	
Reactivity	: Do not place wet or damp metal into a molten bath-could cause explosion	
Special protection info	: Personal hygiene is important, wash hands after contact and before meals	
Special information	: Further details are given in the lead code of practice for health precautions, issued by the department of employment	
C.O.S.H.H. limits	: **Lead**	: A cumulative poison, moderate to high toxicity Possible systemic and long term effects
	: **Maximum exposure limit**	: 0.15 mg per cubic metre (T.W.A 8 hours)
	: **Antimony**	: Moderate toxicity, a severe irritant Possible systemic and long term effects

C.O.S.H.H. limits	: **Maximum exposure limit**	: 0.5 mg per cubic metre (T.W.A 8 hours)
	: **Cadmium**	: High toxicity, irritant to nasal passages, carcinogenic and possible systemic effects
	: **Maximum exposure limit**	: 0.05 mg per cubic metre (T.W.A 8 hours)
	: **Copper**	: High toxicity, possible systemic and long term effects
	: **Maximum exposure limit**	: 1 mg per cubic metre (T.W.A 8 hours)

Part Number Table

Description	Part Number
Solder Bar, Extrusol, 1kg	MS249