



## Materials Safety Data Sheet

### 1. Product Name: Silver-flo™ & Argo-braze™ Cadmium Free Filler Metals

Product Description & Use: General purpose and special purpose cadmium free silver brazing filler metals.

### 2. Nominal Composition

#### Silver-flo™ Filler Metals

Filler Metal Name	Ag %	Cu %	Zn %	Sn %	Others %	Melting Range°C	BS EN 1044:1999
Silver-flo™ 67E	67	23	10	-	-	705 - 723	-
Silver-flo™ 60	60	26	14	-	-	695 - 730	AG202
Silver-flo™ 56	56	22	17	5	-	618 - 652	AG102
Silver-flo™ 56S	56	22	16.8	5	0.2 Si	618 - 652	-
Silver-flo™ 55	55	21	22	2	-	630 - 660	AG103
Silver-flo™ 453	45	27	25	3	-	645 - 680	-
Silver-flo™ 453S	45	25	26.8	3	0.2 Si	640 - 680	-
Silver-flo™ 452	45	27.75	25	2.25	-	640 - 680	AG104
Silver-flo™ 45	45	25	30	-	-	680 - 700	-
Silver-flo™ 44	44	30	26	-	-	675 - 735	-
Silver-flo™ 43	43	37	20	-	-	690 - 775	-
Silver-flo™ 40	40	30	28	2	-	650 - 710	AG105
Silver-flo™ 38	38	31	29	2	-	660 - 720	-
Silver-flo™ 34	34	36.75	27	2.25	-	630 - 730	AG106
Silver-flo™ 33	33	33.5	33.5	-	-	700 - 740	-
Silver-flo™ 302	30	36	32	2	-	665 - 755	AG107
Silver-flo™ 30	30	38	32	-	-	695 - 770	AG204
Silver-flo™ 25	25	41	34	-	-	700 - 800	AG205
Silver-flo™ 252	25	40	33	2	-	680 - 760	AG108
Silver-flo™ 24	24	43	33	-	-	740 - 800	-
Silver-flo™ 20	20	44	35.9	-	0.1	776 - 815	AG206
Silver-flo™ 18	18	45.75	36	-	0.25	784 - 816	-
Silver-flo™ 16	16	50	34	-	-	790 - 830	-



2. Nominal Composition Continued.

Silver-flo™ Filler Metals Continued

Filler Metal Name	Ag %	Cu %	Zn %	Sn %	Others %	Melting Range°C	BS EN 1044:1999
Silver-flo™ 12	12	48	40	-	-	800 - 830	AG207
Silver-flo™ 5	5	55	40	-	-	830 - 870	-
Silver-flo™ 4	4	56	39.8	-	0.2 Si	870 - 890	-
Silver-flo™ 2	2	57.75	40	-	0.25 Si	875 - 895	-
Silver-flo™ 1	1	58.75	40	-	0.25 Si	880 - 890	-

Argo-braze™ Filler Metals

Filler Metal Name	Ag %	Cu %	Zn %	Mn %	Ni %	Others %	Melting Range°C	BS EN 1044:1999
Argo-braze™ 64	64	26	-	2	2	6In	730 - 780	-
Argo-braze™ 56	56	27	-	-	2.5	14In	600 - 711	AG403
Argo-braze™ 49H	49	16	23	7.5	4.5	-	680 - 705	AG502
Argo-braze™ 49LM	49	27.5	20.5	2.5	0.5	-	670 - 710	-
Argo-braze™ 49LM Tri-foil*	49	27.5	20.5	2.5	0.5	-	670 - 710	-
Argo-braze™ 502	50	20	28	-	2	-	660 - 750	-
Argo-braze™ 40	40	30	28	-	2	-	670 - 780	-
Argo-braze™ 27	27	38	20	9.5	5.5	-	680 - 830	AG503
Argo-braze™ 25	25	38	33	2	2	-	710 - 810	-

\*Product is a tri-laminated material, the central pure copper core being sandwiched between layers of the Argo-braze™ 49LM filler metal.

CAS Numbers For Chemical Elements Used in the Filler Metals Identified

Symbol	Element	CAS Number
Ag	Silver	7440-22-4
Cu	Copper	7440-50-8
In	Indium	7440-74-6
Mn	Manganese	7439-96-5
Ni	Nickel	7440-02-0
Si	Silicon	7440-21-3
Sn	Tin	7440-31-5
Zn	Zinc	7440-66-6





3. Hazard Identification

The products covered by this data sheet are not hazardous as supplied.

The main health hazards associated with these products arise from their use as brazing filler metals and the information in this data sheet reflects the hazards associated with the use of the products as brazing filler metals.

On heating, metal and metal oxide fumes could be evolved, but are unlikely to exceed the stated WELs under normal conditions. However, overheating could lead to the emission of fumes in harmful concentrations.

Metal fume fever can be caused by exposure to excessive fumes of copper and zinc oxide. Symptoms are similar to those of influenza and often appear after a latent period of up to 10 hours. They normally disappear after 24 hours with rest.

Metal oxide fume can be irritating to the upper respiratory tract, nose and throat. In powder form, metal dust will irritate the eyes and is harmful if ingested.

Nickel metal is classified as a Category 3 Carcinogen with the following risk phrases: -

- R40 Possible risk of irreversible effects.
R43 May cause sensitisation by skin contact.

Users should note that under oxidising conditions the formation of nickel oxide is possible and that this compound is classified as Category 1 Carcinogens and exposure to fumes MUST be avoided.

4. First Aid Treatment

Table with 2 columns: Hazard (Inhalation, Ingestion, Eyes, Skin) and First Aid Treatment.

5. Fire Fighting Measures

Non flammable. Care with water jet where molten metal is present. Recommended extinguishing medium – foam, dry chemical carbon dioxide, waterspray. In the event of high temperatures, metal fume dust and / or vapours may be formed. Fully self-contained breathing apparatus and protective clothing should be worn.

6. Accidental Release Measures

Material may be collected for re-use or scrap as required. If alloy is in powder form avoid getting dust in the eyes or breathing metal dust.



**7. Handling & Storage**

**Handling** Use in a well-ventilated area with local extraction. Do not inhale any fumes or dust evolved during use or handling. Wash hands thoroughly with soap and water after handling the brazing alloy, particularly before eating or smoking.

**Storage** No special requirements – store in cool, dry conditions.

**8. Exposure Controls**

United Kingdom Workplace Exposure limits (EH40/2005) For The Elements Used In The Filler Metals

Element	Long Term (8 hour) *TWA Value	Short Term (15 minutes) *TWA Value
Copper Fume	0.2 mg / m <sup>3</sup>	-
Indium & Compounds (as In)	1.0 mg / m <sup>3</sup>	0.3 mg / m <sup>3</sup>
Manganese & its inorganic compounds	0.5 mg / m <sup>3</sup>	-
Nickel & its inorganic compounds (except nickel carbonyl) : water soluble Nickel compounds (as Ni)	0.1 mg / m <sup>3</sup>	-
Silicon total inhalable dust	10.0 mg / m <sup>3</sup>	-
Silver (metallic)	0.1 mg / m <sup>3</sup>	
Tin compounds, inorganic except SnH <sub>4</sub> (as Tin)	2.0 mg / m <sup>3</sup>	4.0 mg / m <sup>3</sup>
* Time Weighted Average		

**PERSONAL PROTECTION**

Avoid exposure to fume with good ventilation or local extraction. If risk of inhalation exists, personal respiratory protection should be worn. Safety glasses should be worn as well as gloves if required. Wash hands after using these products. The use of protective clothing is recommended.

**9. Physical & Chemical Properties**

**Appearance** Silver/Copper/Brass coloured metal depending on composition.

**pH** Not applicable

**Melting Point** See Section 2

**Flash Point** Not applicable

**Flammability** Not flammable

**Solubility** Insoluble in water





10. Stability & Reactivity

No reaction with air or water. Avoid contact with acids and oxidising agents.

11. Toxicological Information

Materials not classified as toxic. No data available.

12. Ecological Information

As far as is known, no threat is posed to the environment by these materials.

13. Disposal Considerations

Dispose of waste in accordance with local and national regulations. Recommended method: As scrap for refining.

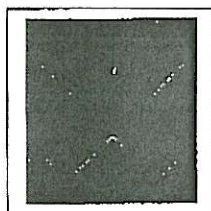
14. Transport Information

Not classified for transport by road, sea or air. No UN numbers have been issued for these materials.

15. Regulatory Information

EC Supply

Harmful



Risk Phrases

R20

Harmful by inhalation

Safety Phrases

S20/21

When using do not eat, drink or smoke

S23

Do not breathe fumes

S36/37/39

Wear suitable protective clothing, gloves, and eye/face protection

S38

In case of insufficient ventilation wear suitable respiratory equipment

16. Other Information

This Material Safety Data Sheet conforms to 91/155/EEC – 2001/58/EC

Cadmium and Lead impurity levels are controlled to 0.025% Maximum for Lead and 0.010% for Cadmium

For additional guidance see:

Johnson Matthey Metal Joining Materials Safety Data Sheet "Health and Safety in Brazing".

Health & Safety Executive Guidance Notes Nos.:

EH60"Nickel and its inorganic compounds: "Health Hazards & Precautionary Measures" HSE 1997.



**16. Other Information Continued:**

Former Occupational Exposure Limits EH40/2004

Element	Long Term (8 hour) *TWA Value	Short Term (15 minutes) *TWA Value
Manganese, fume (as Mn)	1.0 mg / m <sup>3</sup>	3.0 mg / m <sup>3</sup>
Zinc oxide, fume	5 mg / m <sup>3</sup>	10.0 mg / m <sup>3</sup>
* Time Weighted Average		

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