



Comsol™ – Soft Soldering Alloy

Johnson Matthey Comsol™ is a high melting point (296°C) silver-tin-lead soft solder. It can be supplied as a solid wire, as a flux cored wire with rosin, synthetic resin or acid type fluxes and as a specially formulated solder paste.

The principal characteristic of Comsol™ is that it offers an improvement in creep resistance in comparison with standard tin-lead type soft solders, both at normal and at elevated temperatures. For example, at 150°C a 50-50 tin-lead solder (JM5050) will fail under a load of 0.7 N/mm² in approximately 10 hours. Comsol™, however, shows no creep at the same temperature. Tests undertaken by Johnson Matthey show that at greater loads of 1.7 and 3.5 N/mm² Comsol™ takes 1 year and 250 hours respectively to fail. The high melting point of this solder also makes it useful in step soldering operations.

Due to its tin content Comsol™ shows improved wetting and flow on copper and copper alloys compared with silver-lead soft soldering alloys such as Johnson Matthey A25™ and A5™. The optimum joint gap for Comsol™ is 0.075mm.

Composition: 1.5% Silver, 5% Tin, 93.5% Lead

Specification: EN ISO 9453:2006 Alloy No. 191, formerly EN 29453 No34 MS99 9500/145

Melting range: 296°C

Uses for This Product

Comsol™ is specified for joints where increased strength and creep resistance at elevated temperatures up to 150°C are required. E.g. attaching electric motor winding to their commutator segments and for the “corking” of leaks in model steam boilers. It is also specified in certain aerospace applications where solder joints will be exposed to moderately high service temperatures.

The alloy's high melting temperature, also provides for step or sequential soldering operations when JM6040™ or JM6337™ tin-lead or JMP40™ or JM99C™ lead-free solders are used as the second step.

With the correct choice of flux Comsol™ will join copper and copper alloys, carbon steels and stainless steels.

Conditions for Use

Comsol™ can be supplied either in a solid form, as a flux cored wire or as a specially formulated soldering paste. In the case of a solid form a separate flux must be selected. Flux cored wires and solder pastes contain a limited amount of flux in the product.

Solder Fluxes

With the correct choice of flux this alloy will join copper and copper alloys, carbon steels and stainless steels. For solid form products (as opposed to flux cored products) a suitable flux should be selected from the table below.

Solder Flux	Recommended for use on	Flux Corrosive/ Non-corrosive	Working Range °C	Product Availability
Soft Solder No.1S Liquid Flux	Carbon steel / stainless steel	Corrosive	350°C	1 litre container
Soft Solder No.2S Liquid Flux	Copper / brass	Intermediate	350°C	0.5 litre container
Soft Solder No.3S Flux Paste	Copper / brass / carbon steel / Stainless steel	Corrosive	350°C	1kg container

Flux Cored Wire

Comsol™ is commonly supplied with a mildly activated (RA / 0.5% halide max / ROM1) single rosin (colophony) flux core with a solder to flux core ratio of 2% w/w or with a single “acid core” (Ammonium chloride based) flux with a 3% solder to core ratio.

The product is also available with RMA / ROL1 and HA / ROM1 (1% halide max.) type flux cores and with flux core ratios of 1% or 3% w/w. and with colophony, rosin free type fluxes.



Johnson Matthey

Metal Joining York Way, Royston, Hertfordshire, SG8 5HJ, UK

Telephone: +44 (0) 1763 253200

Fax: +44 (0) 1763 253168

email: mj@matthey.com

www: jm-metaljoining.com



Soft Solder Pastes

Comsol™ is available in the form of a solder paste supplied in pots or for application from syringes. (It is not available in screen printing grade paste). Solder paste formulated around paste binder systems that contain rosin, intermediate, corrosive type fluxes can be supplied. All solder pastes are formulated to meet the requirements of the application and reference to Johnson Matthey Metal Joining technical department should be made with regard to the most suitable grade.

Health and Safety – Rosin based fluxes

Consult the safety data sheet before use. Fume from rosin containing fluxes present a risk to health and safety. They are known sensitizers and can cause allergic reactions; in particular they can cause asthma. Fumes should be controlled to prevent exposure to operators.

For more information refer to the relevant national health and safety authorities. In the UK consult the UK HSE publications listed below:-

1. *COSHH WL17 - Soldering: Hand-held with lead-base, rosin-cored solders* - <http://www.hse.gov.uk/pubns/guidance/wl17.pdf>
2. *Controlling health risks from rosin (colophony) based solder* - <http://www.hse.gov.uk/pubns/indg249.pdf>

Lead in Solders

The use of lead in products is increasingly recognised as being undesirable both in terms of the long-term environmental impact and recyclability of products.

EU Directive 2000/53/EC of the European Parliament and of the Council of 18 September 2000 on end-of-life vehicles (ELV) restrict the use of lead in any materials to a maximum of 0.1% by weight.

Directive 2002/95/EC of the European Parliament and of the Council of 27 January 2003 on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS) and directive 2002/96/EC of the European Parliament and of the Council of 27 January 2003 on waste electrical and electronic equipment (WEEE) prevents the use of certain hazardous substances including lead containing materials. However, Schedule 3 Regulation 4 (2) allows for the use of "Lead in high melting type solders (i.e. tin-lead solder alloys containing more than 85% lead)". This exemption recognises that there are no lead-free high temperature solders that exhibit the high temperature properties and creep resistance of the high lead containing solder alloys.

The use of lead in potable water systems has also been prohibited in Europe and in many countries worldwide. Despite these considerations many companies continue to use lead containing solders.

Lead-free alternatives such as 99C™, 97C™ and P40™ should be considered wherever possible.

Product Availability

Wire	2mm, 2.5mm, 3mm dia in stock other sizes on request
Flux cored wire	Comsol RA 2% 2.5 / 2.7mm dia in stock other sizes on request
Soldering paste	On request
Other forms	On request

Johnson Matthey Plc cannot anticipate all conditions under which this information and our products or the products of other manufacturers in combination with our products will be used. This information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process. Such information is given in good faith, being based on the latest information available to Johnson Matthey Plc and is, to the best of Johnson Matthey Plc's knowledge and belief, accurate and reliable at the time of preparation. However, no representation, warranty or guarantee is made as to the accuracy or completeness of the information and Johnson Matthey Plc assumes no responsibility therefore and disclaims any liability for any loss, damage or injury howsoever arising (including in respect of any claim brought by any third party) incurred using this information. The product is supplied on the condition that the user accepts responsibility to satisfy himself as to the suitability and completeness of such information for his own particular use. Freedom from patent or any other proprietary rights of any third party must not be assumed. The text and images on this document are Copyright and property of Johnson Matthey. This datasheet may only be reproduced as information, for use with or for resale of Johnson Matthey products. The JM logo®, Johnson Matthey name® and product names referred to in this document are trademarks of Johnson Matthey. Easy-flo® and Silver-flo® are registered to JM in the EU. Sil-fos™ is registered to JM in the UK and certain other countries but is marketed as Mattiphos™ in Germany and the USA.



Johnson Matthey

Metal Joining York Way, Royston, Hertfordshire, SG8 5HJ, UK

Telephone: +44 (0) 1763 253200

Fax: +44 (0) 1763 253168

email: mj@matthey.com

www.jm-metaljoining.com