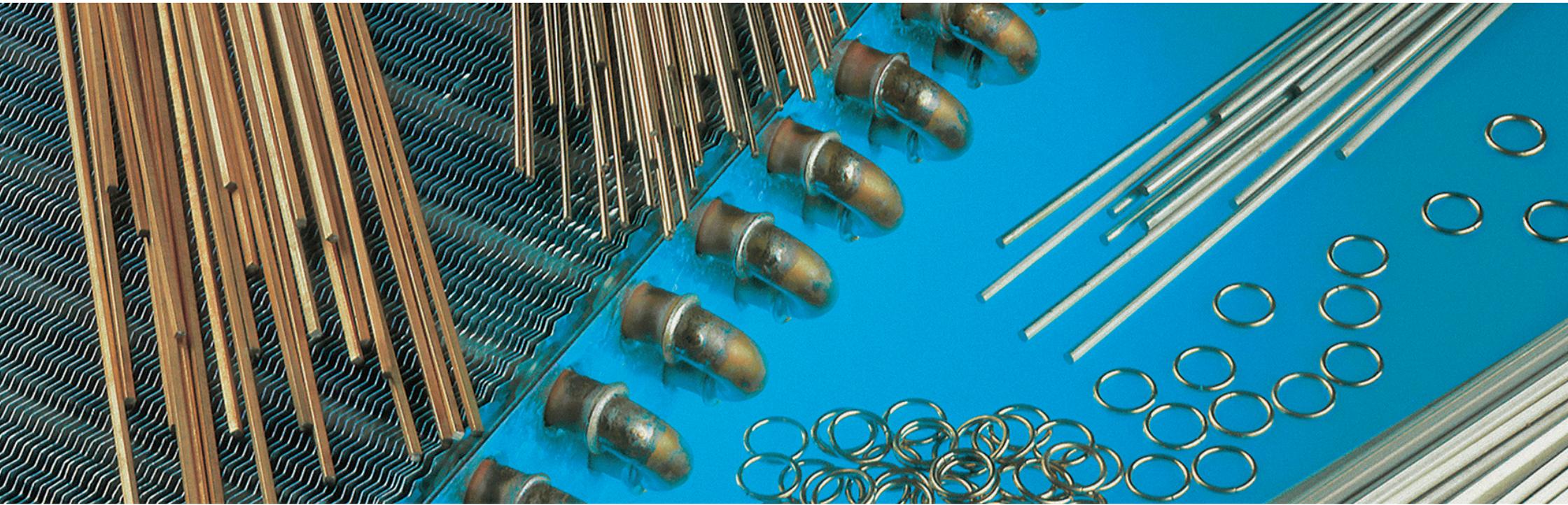




Johnson Matthey



---

BRAZING SOLUTIONS FOR  
REFRIGERATION  
AIR-CONDITIONING  
HEAT EXCHANGERS

# BRAZING SOLUTIONS FOR REFRIGERATION, AIR-CONDITIONING & HEAT EXCHANGERS

## Copper Phosphorus Brazing Rods

Copper phos rods such as Sil-fos™ 5 or Copper-flo™ No.3 are suitable for flux free brazing of copper pipes and tubes. Follow the technique shown below:-

**Step 1**

When joining copper to copper no flux is required. Heat the inserted component first then heat evenly.



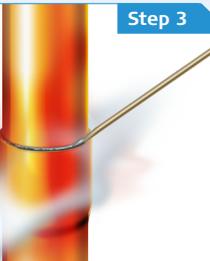
**Step 2**

Transfer the flame to heat all around the base of the socket.



**Step 3**

When the components are a dull cherry red colour touch the rod onto the joint. Use the heat from the torch to pull the filler metal into and around the joint. Cool in air after brazing.



**Step 4**

Brazing is possible in different joint configurations.



## Silver-flo™ 40 – Silver Brazing Filler Metal

Silver-flo™ 40 is a cadmium-free general-purpose filler metal with medium flow and melting properties. Use either as a bare rod with Easy-flo™ Flux Powder or as a flux coated rod. Will join common engineering metals- steel, brass, bronze, copper etc. Silver-flo™ 55, 38 and 302 can also be used for this purpose.

<b>Melting Range</b>	650-710°C
<b>EN1044:1999</b>	AG 105
<b>ISO 17672:2010</b>	Ag 140

## Easy-flo™ Flux Powder – Silver Brazing Flux

Easy-flo™ Flux Powder is the industry standard silver brazing flux suitable for use with Silver-flo™ 40 and other low temperature silver brazing filler metals.

<b>Working Range</b>	550-800°C
<b>EN1045:1997</b>	FH10

## Sil-fos™ 5 and Copper-flo™ No.3 – Copper Phosphorus Brazing Filler Metals

Sil-fos™ 5 is the filler metal of choice for flux-less brazing of copper pipes, tubes and fittings in refrigeration, air-conditioning and heat-exchanger applications. It provides reasonable filler metal flow and joint ductility.

<b>Melting Range</b>	714-810°C
<b>EN1044:1999</b>	CP104
<b>ISO 17672:2010</b>	CuP 281

Copper-flo™ No 3 is a popular, economical, medium-flowing filler metal. It has a higher melting range and is less ductile than Sil-fos™ 5. It is suitable for use on copper joints that will see little or no mechanical stress.

<b>Melting Range</b>	714-890°C
<b>EN1044:1999</b>	CP203
<b>ISO 17672:2010</b>	CuP 179

NB: Sil-fos™ 5 and Copper-flo™ No.3 should not be used on iron (steel) or nickel based materials

## Product Selector Guide

	Copper to Copper	Copper to Brass	Copper to Steel*	Steel* to Brass	Steel to Steel*
<b>Recommended Product</b>	Sil-fos™ 5 or Copper-flo™ No.3	Silver-flo™ 40 or Sil-fos™ 5 or Copper-flo™ No.3	Silver-flo™ 40	Silver-flo™ 40	Silver-flo™ 40
<b>Flux Required</b>	X	✓	✓	✓	✓

\* Stainless steel brazed joints that will subsequently be exposed to water or a wet environment in service can suffer interfacial corrosion. Consult JM for advice on alloy selection

## Silver Brazing Filler Metal with a Separate Flux

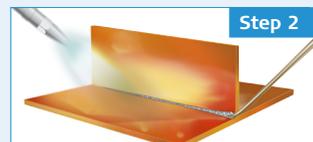
Silver brazing with a separate brazing flux is widely used for joining components of dissimilar size, shape and metal composition. Follow the technique shown below:-

**Step 1**



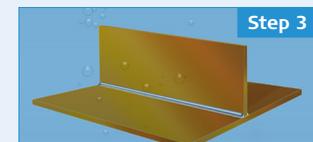
Ensure that the components are clean and free of oil etc. Make the flux into a creamy paste using water and apply to the joint area.

**Step 2**



Heat the components evenly to brazing temperature when the flux will be clear and watery. Touch the rod onto the joint. Apply heat to the opposite end to encourage the filler metal to flow through the joint. Feed the filler metal into the joint.

**Step 3**



Remove heat source and allow the joint to cool in air. Residues from Easy-flo™ Flux Powder or a flux coated rod are soluble in warm water and should require little mechanical removal.

## Flux Coated Silver Brazing Rods

Flux coated rods are convenient for working onsite and for use on refrigeration systems where water should not be introduced into the pipework. Follow the technique shown below:-

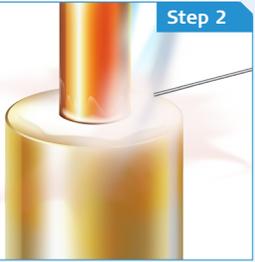
**Step 1**

Warm the joint area of the component.



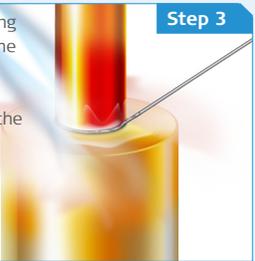
**Step 2**

Transfer flux from the flux coated rod by wiping and rotating it on the pre-warmed joint area.



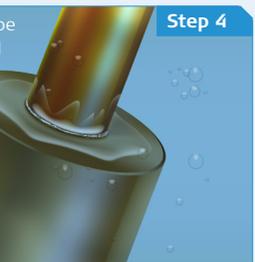
**Step 3**

Heat evenly to brazing temperature. Feed the bare end of the flux coated rod into the joint whilst heating the component evenly.



**Step 4**

Flux residues must be completely removed with a warm water wash.





**Johnson Matthey**  
Metal Joining

---

**Johnson Matthey Metal Joining**  
York Way, Royston, Hertfordshire SG8 5HJ UK  
Tel: +44 (0)1763 253200  
Fax: +44 (0)1763 253168  
Email: [mj@matthey.com](mailto:mj@matthey.com)  
[www.jm-metaljoining.com](http://www.jm-metaljoining.com)

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 Plc, Royston, United Kingdom 2014.