

# R-TECH

Tried & trusted technology

## A GUIDE TO SOLDER

# Why Use R-TECH Solder

The R-TECH cored solder wire is a complete range of lead-free and leaded solder suited to industrial applications. The selection is carefully selected to deliver high-quality and reliable solder. The range comprises various flux options to suit a large variety of applications. Included are low residue fluxes, halide-free fluxes, and rosin-free fluxes. R-TECH rosin-free solder contains no resin acids, pine oil, or other naturally occurring derivatives, specifically designed to reduce cases of industrial asthma. As with all R-TECH products, we provide advice, recommendations, and samples to help you choose the correct solder. Rapid's Sales Support team is available to put together prices that support you.

## Standards

J-STD 004B is the standard produced by the IPC that controls and regulates the flux used in cored solder wire and solder paste. J-STD 004B is the industry standard used by all manufacturers in the UK and Europe and is similar to DIN EN 61190-1-1. Four characters (two letters, then one letter, and last a number) represent flux composition, flux activity, and whether activators include halides

## Virgin Material

The R-TECH J-Std range is all made from 100% virgin material ensuring consistent results, particularly important for applications where the product is used in harsh environments or safety-critical applications.

## Metallic Compounds

### SC100e

#### Pros:

- **Low cost – Significantly cheaper than compounds containing Silver**

#### Cons:

- Wettability (the ability to flow between both surfaces) is poor compared to other compounds
- Joint formation takes longer
- As a result of the longer formation time, if soldering to gold PCB pads, the joint becomes very dull

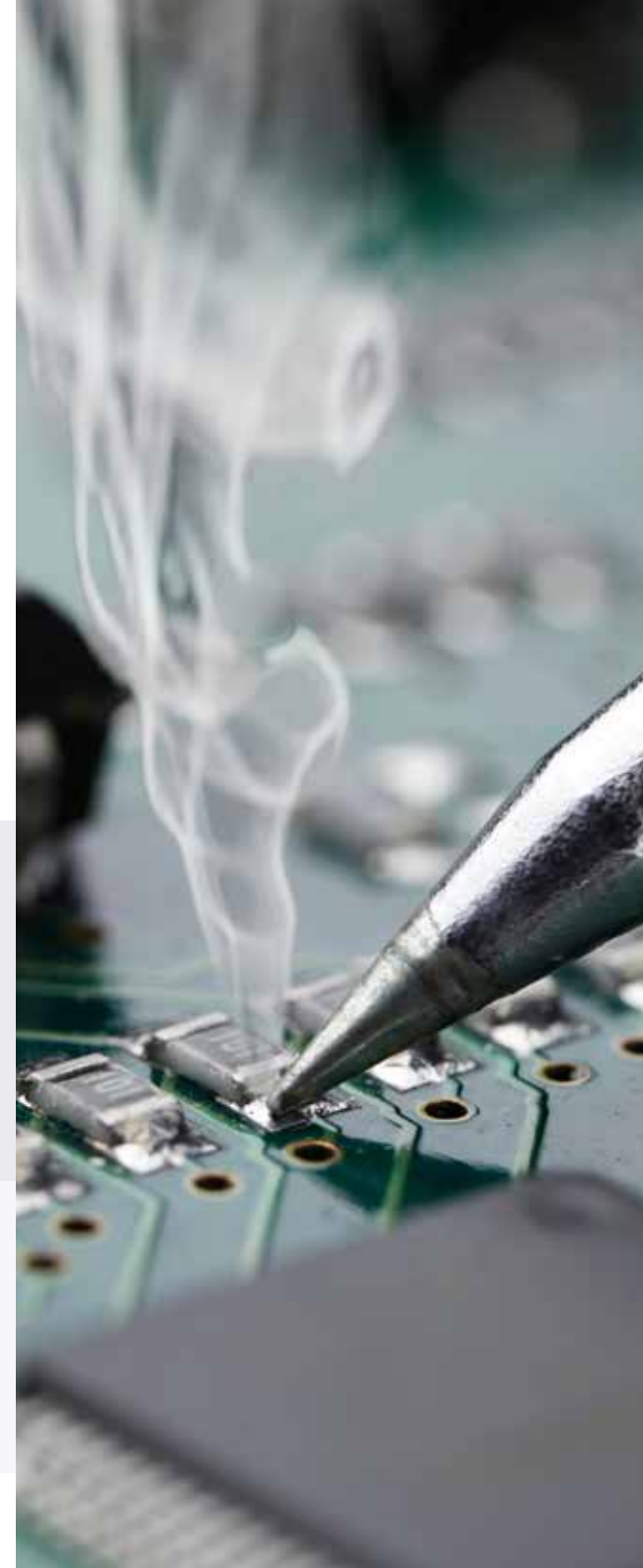
### SAC305

#### Pros:

- **Silver improves joint strength**
- **Improved resistance to thermal fatigue**
- **Improved wetting and faster jointing**

#### Cons:

- Silver content over 3% (I.e, our Premium Lead Free) can lead to cracks in joints and poor shock/ drop reliability
- Causes oxidation and dross formation which reduces solder tip life (\*Note: Dross is a serious issue during wave soldering, less so for hand soldering using solder wire) the joint becomes very dull



# Flux Types

The 'core' of the solder wire consists of contained flux, which removes oxidation from the surfaces, aids wetting, and helps with joint flow. Without flux, solder joints would be difficult, or impossible to make.

Without flux, it is difficult to make a solder joint.

Modern lead-free compounds flow at higher temperatures and are less effective at wetting than leaded compounds. Therefore, modern lead-free compounds require more active fluxes.

First two letters: **Base**

RO: rosin

RE: resin

OR: organic

IN: inorganic

Third letter: **Activity**

L: low

M: moderate

H: high

Number: **Halide content**

0: less than 0.05% in weight ("halide-free")

1: halide content depends on activity:

less than 0.5% for low activity

0.5% to 2.0% for moderate activity

greater than 2.0% for high activity

Any combination is possible, e.g. ROL0, REM1 or ORH0.

<b>RO</b>	<b>ME</b>	<b>1</b>
BASE	ACTIVITY	HALIDE CONTENT

## BASE

### Rosin Fluxes

The terms resin flux, and rosin flux are ambiguous and somewhat interchangeable, with different vendors using different assignments. Generally, fluxes are labelled as rosin if the vehicle they're based on is primarily natural rosin. Some manufacturers reserve "rosin" designation for military fluxes based on rosin (R, RMA and RA compositions) and label others as "resin."

Prolonged exposure to rosin fumes released during soldering can cause occupational asthma (formerly called colophony disease) in sensitive individuals, although it's unknown which component of the fumes causes the issue.

### Synthetic Resins

Fluxes can be prepared from synthetic resins, often based on esters of polyols and fatty acids. Such resins have improved fume odour and lower residue tack, but their fluxing activity and solubility tend to be lower than that of natural resins.

#### LO:

Used mostly for Class 3 electronics (High Performance / Harsh Environment Electronic Products) and Class 2 electronics (Dedicated Service Electronic Products)

#### L1:

Contains a small amount of Halide, up to 0.5% halide.

Used mostly for Class 2 electronics (Dedicated Service Electronic Products)

#### M1:

Contains between 0.5 – 2% Halide.

Used for Class 1 electronics (General Electronic Products)



# General Electronic Products

## (M1 Rosin)

### CLASS 1

Includes products suitable for applications where the major requirement is function of the completed assembly. E.g., play stations/mobile phones.

**ROM1**  
BASE  
ACTIVITY  
HALIDE CONTENT



### SC100e Solder

3% M1 Flux 0.5-2% Halide

- Flux (J-std 004B) - ROM1
- No Clean

Order code	Gauge (SWG)	Reel Size (g)
85-6987	22	500
85-6988	18	500
85-7001	18	250
85-7002	20	500
85-7003	22	250
85-7004	26	250
85-7005	26	500

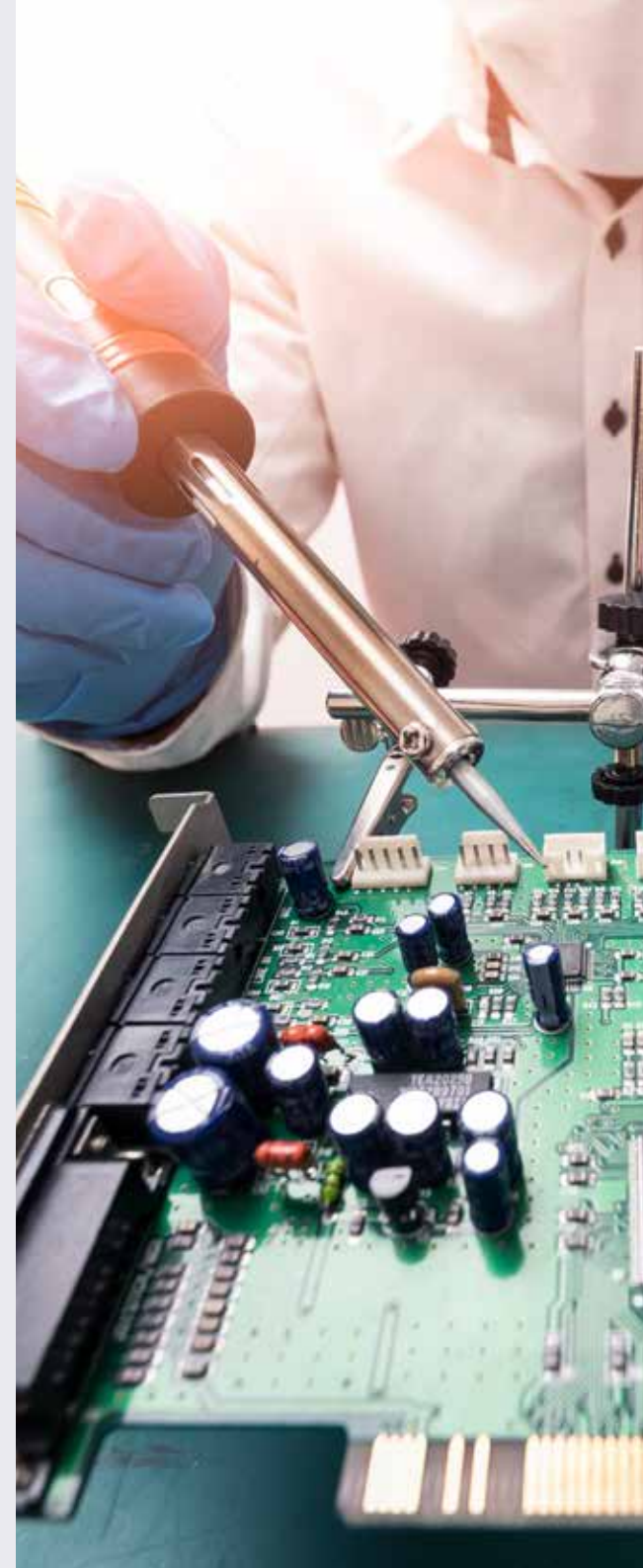


### SAC305 Solder

3% M1 Flux 0.5-2% Halide

- Flux (J-std 004B) - ROM1
- No Clean

Order code	Gauge (SWG)	Reel Size (g)
85-6989	22	500
85-6990	18	500
85-7006	18	250
85-7007	20	500
85-7008	22	250
85-7009	26	250
85-7013	26	500



# Dedicated Service Electronic Products (L1 Rosin)

## CLASS 2

Includes products where continued performance and extended life is required, and for which uninterrupted service is desired but not critical. E.g., alarms



### SC100e Solder

2% L1 Flux <0.5% Halide

- Flux (J-std 004B) - ROL1
- No Clean

Order code	Gauge (SWG)	Reel Size (g)
85-6991	22	500
85-6992	18	500
85-7014	18	250
85-7015	20	500
85-7016	22	250
85-7017	26	250
85-7018	26	500



### SAC305 Solder

2% L1 Flux <0.5% Halide

- Flux (J-std 004B) - ROL1
- No Clean

Order code	Gauge (SWG)	Reel Size (g)
85-6993	22	500
85-6994	18	500
85-7019	18	250
85-7020	20	500
85-7021	22	250
85-7022	26	250
85-7023	26	500

# High Performance/Harsh Environment Electronic Products (L0 Resin)

## CLASS 3

Includes products where continued high performance or performance-on-demand is critical, equipment downtime is not tolerated, the end-use environment may be uncommonly harsh, and the equipment must function when required. E.g., Life support or other critical systems.

RELO

BASE  
ACTIVITY  
HALIDE CONTENT



### SC100e Solder

2% Rosin-Free HF Flux Halide-Free

- Flux (J-std 004B) - RELO
- No Clean

Order code	Gauge (SWG)	Reel Size (g)
85-6995	22	500
85-6996	18	500
85-7029	18	250
85-7030	20	500
85-7031	22	250
85-7032	26	250
85-7033	26	500



### SAC305 Solder

2% Rosin-Free HF Flux Halide-Free

- Flux (J-std 004B) - RELO
- No Clean

Order code	Gauge (SWG)	Reel Size (g)
85-6997	22	500
85-6998	18	500
85-7034	18	250
85-7035	20	500
85-7036	22	250
85-7037	26	250
85-7038	26	500







# High Performance/Harsh Environment Electronic Products (L0 Rosin)

## CLASS 3

Includes products where continued high performance or performance-on-demand is critical, equipment downtime cannot be tolerated, end-use environment may be uncommonly harsh, and the equipment must function when required. E.g., Life support or other critical systems.



### SAC305 Solder

2% L0 Flux Halide-Free

- Flux (J-std 004B) - ROL0
- No Clean

Order code	Gauge (SWG)	Reel Size (g)
85-6999	22	500
85-7000	18	500
85-7024	18	250
85-7025	20	500
85-7026	22	250
85-7027	26	250
85-7028	26	500

Order code	Gauge (SWG)	Reel Size (g)	R-TECH Range	Compound	Flux (J-Std)	Halide	Flux Percentage
85-6987	22	500	SC100e Solder 3% M1 Flux 0.5-2% Halide 0.7mm 500g Reel	SC100e	ROM1	0.5-2%	3%
85-6988	18	500	SC100e Solder 3% M1 Flux 0.5-2% Halide 1.2mm 500g Reel	SC100e	ROM1	0.5-2%	3%
85-7001	18	250	SC100e Solder 3% M1 Flux 0.5-2% Halide 1.2mm 250g Reel	SC100e	ROM1	0.5-2%	3%
85-7002	20	500	SC100e Solder 3% M1 Flux 0.5-2% Halide 1.0mm 500g Reel	SC100e	ROM1	0.5-2%	3%
85-7003	22	250	SC100e Solder 3% M1 Flux 0.5-2% Halide 0.7mm 250g Reel	SC100e	ROM1	0.5-2%	3%
85-7004	22	250	SC100e Solder 3% M1 Flux 0.5-2% Halide 0.5mm 250g Reel	SC100e	ROM1	0.5-2%	3%
85-7005	26	500	SC100e Solder 3% M1 Flux 0.5-2% Halide 0.5mm 500g Reel	SC100e	ROM1	0.5-2%	3%
85-6989	22	500	SAC305 Solder 3% M1 Flux 0.5-2% Halide 0.7mm 500g Reel	SAC305	ROM1	0.5-2%	3%
85-6990	18	500	SAC305 Solder 3% M1 Flux 0.5-2% Halide 1.2mm 500g Reel	SAC305	ROM1	0.5-2%	3%
85-7006	18	250	SAC305 Solder 3% M1 Flux 0.5-2% Halide 1.2mm 250g Reel	SAC305	ROM1	0.5-2%	3%
85-7007	20	500	SAC305 Solder 3% M1 Flux 0.5-2% Halide 1.0mm 500g Reel	SAC305	ROM1	0.5-2%	3%
85-7008	22	250	SAC305 Solder 3% M1 Flux 0.5-2% Halide 0.7mm 250g Reel	SAC305	ROM1	0.5-2%	3%
85-7009	26	250	SAC305 Solder 3% M1 Flux 0.5-2% Halide 0.5mm 250g Reel	SAC305	ROM1	0.5-2%	3%
85-7013	26	500	SAC305 Solder 3% M1 Flux 0.5-2% Halide 0.5mm 500g Reel	SAC305	ROM1	0.5-2%	3%
85-6991	22	500	SC100e Solder 2% L1 Flux <0.5% Halide 0.7mm 500g Reel	SC100e	ROL1	<0.5%	2%
85-6992	18	500	SC100e Solder 2% L1 Flux <0.5% Halide 1.2mm 500g Reel	SC100e	ROL1	<0.5%	2%
85-7014	18	250	SC100e Solder 2% L1 Flux <0.5% Halide 1.2mm 250g Reel	SC100e	ROL1	<0.5%	2%
85-7015	20	500	SC100e Solder 2% L1 Flux <0.5% Halide 1.0mm 500g Reel	SC100e	ROL1	<0.5%	2%
85-7016	22	250	SC100e Solder 2% L1 Flux <0.5% Halide 0.7mm 250g Reel	SC100e	ROL1	<0.5%	2%
85-7017	26	250	SC100e Solder 2% L1 Flux <0.5% Halide 0.5mm 250g Reel	SC100e	ROL1	<0.5%	2%
85-7018	26	500	SC100e Solder 2% L1 Flux <0.5% Halide 0.5mm 500g Reel	SC100e	ROL1	<0.5%	2%
85-6993	22	500	SAC305 Solder 2% L1 Flux <0.5% Halide 0.7mm 500g Reel	SAC305	ROL1	<0.5%	2%
85-6994	18	500	SAC305 Solder 2% L1 Flux <0.5% Halide 1.2mm 500g Reel	SAC305	ROL1	<0.5%	2%
85-7019	18	250	SAC305 Solder 2% L1 Flux <0.5% Halide 1.2mm 250g Reel	SAC305	ROL1	<0.5%	2%
85-7020	20	500	SAC305 Solder 2% L1 Flux <0.5% Halide 1.0mm 500g Reel	SAC305	ROL1	<0.5%	2%
85-7021	22	250	SAC305 Solder 2% L1 Flux <0.5% Halide 0.7mm 250g Reel	SAC305	ROL1	<0.5%	2%
85-7022	26	250	SAC305 Solder 2% L1 Flux <0.5% Halide 0.5mm 250g Reel	SAC305	ROL1	<0.5%	2%
85-7023	26	500	SAC305 Solder 2% L1 Flux <0.5% Halide 0.5mm 500g Reel	SAC305	ROL1	<0.5%	2%
85-6995	22	500	SC100e Solder 2% Rosin-Free HF Flux Halide-Free 0.7mm 500g Reel	SC100e	REL0	Halide Free	2%
85-6996	18	500	SC100e Solder 2% Rosin-Free HF Flux Halide-Free 1.2mm 500g Reel	SC100e	REL0	Halide Free	2%
85-7029	18	250	SC100e Solder 2% Rosin-Free HF Flux Halide-Free 1.2mm 250g Reel	SC100e	REL0	Halide Free	2%
85-7030	20	500	SC100e Solder 2% Rosin-Free HF Flux Halide-Free 1.0mm 500g Reel	SC100e	REL0	Halide Free	2%
85-7031	22	250	SC100e Solder 2% Rosin-Free HF Flux Halide-Free 0.7mm 250g Reel	SC100e	REL0	Halide Free	2%
85-7032	26	250	SC100e Solder 2% Rosin-Free HF Flux Halide-Free 0.5mm 250g Reel	SC100e	REL0	Halide Free	2%
85-7033	26	500	SC100e Solder 2% Rosin-Free HF Flux Halide-Free 0.5mm 500g Reel	SC100e	REL0	Halide Free	2%
85-6997	22	500	SAC305 Solder 2% Rosin-Free HF Flux Halide-Free 0.7mm 500g Reel	SAC305	REL0	Halide Free	2%
85-6998	18	500	SAC305 Solder 2% Rosin-Free HF Flux Halide-Free 1.2mm 500g Reel	SAC305	REL0	Halide Free	2%
85-7034	18	250	SAC305 Solder 2% Rosin-Free HF Flux Halide-Free 1.2mm 250g Reel	SAC305	REL0	Halide Free	2%
85-7035	20	500	SAC305 Solder 2% Rosin-Free HF Flux Halide-Free 1.0mm 500g Reel	SAC305	REL0	Halide Free	2%
85-7036	22	250	SAC305 Solder 2% Rosin-Free HF Flux Halide-Free 0.7mm 250g Reel	SAC305	REL0	Halide Free	2%
85-7037	26	250	SAC305 Solder 2% Rosin-Free HF Flux Halide-Free 0.5mm 250g Reel	SAC305	REL0	Halide Free	2%
85-7038	26	500	SAC305 Solder 2% Rosin-Free HF Flux Halide-Free 0.5mm 500g Reel	SAC305	REL0	Halide Free	2%
85-6999	22	500	SAC305 Solder 2% L0 Flux Halide-Free 0.7mm 500g Reel	SAC305	ROL0	Halide Free	2%
85-7000	18	500	SAC305 Solder 2% L0 Flux Halide-Free 1.2mm 500g Reel	SAC305	ROL0	Halide Free	2%
85-7024	18	250	SAC305 Solder 2% L0 Flux Halide-Free 1.2mm 250g Reel	SAC305	ROL0	Halide Free	2%
85-7025	20	500	SAC305 Solder 2% L0 Flux Halide-Free 1.0mm 500g Reel	SAC305	ROL0	Halide Free	2%
85-7026	22	250	SAC305 Solder 2% L0 Flux Halide-Free 0.7mm 250g Reel	SAC305	ROL0	Halide Free	2%
85-7027	26	250	SAC305 Solder 2% L0 Flux Halide-Free 0.5mm 250g Reel	SAC305	ROL0	Halide Free	2%
85-7028	26	500	SAC305 Solder 2% L0 Flux Halide-Free 0.5mm 500g Reel	SAC305	ROL0	Halide Free	2%