

APPLICATION NOTE

Converting a SAC387 Solder Pot to SAC305 without Dumping the Entire Pot

Introduction

This application note will provide easy-to-follow instructions for converting a SAC387 solder pot to SAC305 without dumping the entire pot.

1. Determine the amount of solder in the pot by weight. We will call this value Y.
2. Calculate 28.57% by weight of the solder in the pot. We will call this value X.
3. Remove X amount of solder from the pot. (Do not discard the solder that you remove.***)
4. Multiply Y by 20.57%. Add this amount of pure Sn (tin) to the pot.
5. Multiply Y by 8%. Add this amount of Indalloy®121 (96.5Sn/3.5Ag) to the pot.

Here is how it works:

Let us assume we have a pot that holds 500 kilograms of solder alloy.

500 kilograms = 500,000 grams

28.57% of 500,000 = 142,850 grams.

This is the amount that needs to be removed from the pot.

* 20.57% of 500,000 = 102,850 grams.

This is the amount of pure Sn (tin) that needs to be added back into the pot.

** 8% of 500,000 = 40,000 grams.

This is the amount of Indalloy®121 (96.5Sn/3.5Ag) that needs to be added back into the pot.

Mathematically, this is what is happening:

500,000 grams of SAC387 contains:

- 477,500 grams of Sn (tin)
- 19,000 grams of Ag (silver)
- 3,500 grams of Cu (copper)

After removing 142,850 grams (28.57%) of SAC387, the pot contains:

- 341,078.25 grams of Sn (tin)
- 13,571.7 grams of Ag (silver)
- 2,500.05 grams of Cu (copper)

Looking back at the earlier calculations, we see that we now need to add 102,850 grams of pure Sn*. This brings the amount of Sn (tin) in the pot to 443,928.25 grams.

Next, we add 40,000 grams of Indalloy®121 (96.5Sn/3.5Ag)** which contains 38,600 grams of Sn (tin) and 1,400 grams of Ag (silver). That brings the amount of Sn (tin) in the pot up to 482,528.25 grams and the amount of Ag (silver) to 1,4971.7 grams. So the total pot composition is:

- 482,528.25 grams of Sn (tin)
- 14,971.7 grams of Ag (silver)
- 2,500.05 grams of Cu (copper)

To determine weight percent, we need to divide each of these by 500,000.

- $482,528.25/500,000 = 96.506\% \text{ Sn}$
- $14,971.7/500,000 = 2.994\% \text{ Ag}$
- $2,500.05/500,000 = 0.500\% \text{ Cu}$

Given the allowable tolerances in J-STD-006, we can call this SAC305.

*** The solder that you removed from the pot is SAC387. It is not necessary to discard this material. The process detailed in this application note can be used to convert the removed material, as well, until it is consumed; thereby, reducing/eliminating the waste generated by this pot conversion.

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