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Halide Determination of NC258-T754 Solder Paste

Purchase Order #: 2010-3353
PAL Report Number: 1119-026 Data Only

AIM Solder

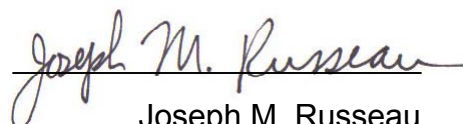
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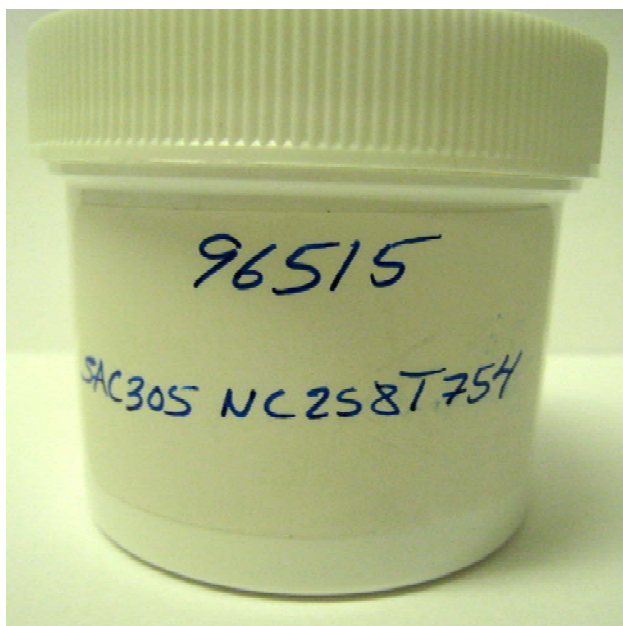
Objective

The client desired to evaluate the halide content of one solder paste using ion chromatography per IPC-TM-650, method 2.3.28.1.

Sample Identification:

1119-026-01: NC258-T754 (96515)

Photo Documentation:



Paste sample sent by the client

Equipment and Materials Used:

- Dionex ICS2500 Ion Chromatograph with Chromeleon software
- 18 Megohm-cm Deionized Water
- NIST Traceable Anion Standards (PAL Lot #: PAL-AN5-183)
- Clean Monoject 3cc Syringes
- Omni-Solv 99.9% HPLC Grade Isopropanol (PAL Lot #: PAL-EX-1033)
- 500 Series Kapak® 4mm Heat-sealable pouches
- Precision® High Temperature Circulating Water-bath
- Clean powder-free Vinyl Gloves
- Dionex AS14 analytical column/AG14 guard column/ASRS Self-Regenerating Suppressor
- 4.5 mM Sodium Carbonate / 1.5mM Sodium Bicarbonate Eluent (Lot #: AN-EL-1096)

Ion Chromatography Procedure:

1. Approximately 1 gram of the paste sample was weighed and placed into a clean Kapak heat-sealable pouch.
2. Fifty milliliters (50mL) of 10% isopropanol and 90% deionized water was added to the Kapak pouch. The Kapak pouch was then heat-sealed.
3. The Kapak pouch was placed into an 80°C water bath for sixteen hours. After the extraction period expired, the sample was taken from the bath and mixed for fifteen seconds by shaking the contents.
4. The sample was then allowed to cool to room temperature.
5. Three milliliters of the sample extract solution was drawn into an ionically clean syringe and injected into the ion chromatograph for analysis per IPC-TM 650, method 2.3.28.1. No additional dilutions were performed on the sample.

Ion Chromatography Data:

Table #1: Halide Chromatography Data for Solder Paste

Sample Number	Sample Description	Extract Vol (mL)	Mass (g)	Dilution Factor	Chloride Cl	Bromide Br
1119-026-01	NC258-T754	50.00	1.001	N/A	0.05	7.56

Table #1: All values reported in the table are in parts per million. ND = None Detected. N/A = Not Applicable. All bag blank contaminants were subtracted from the sample amounts. No additional dilutions were performed on the solder paste sample.

Calculations:

IPC-TM-650, method 2.3.28.1 - Per Section 5.5.2: Solder paste

5.5.2.1: Determine weight of each halide ion in the flux

Equation:

Weight of halide ion (g) in solder paste = [ppm from IC ($\mu\text{g/mL}$)] x [Dilution factor (if needed)] x [Volume of extract solution (mL)] x $[10^{-6}]$

Note: No dilution factor was used for the sample.

For the Solder Paste Sample

$$\text{Cl ion (g)} = [0.05 \mu\text{g/mL}] \times [50.00 \text{ mL}] \times [10^{-6}] = \underline{2.50 \times 10^{-6} \text{ g}}$$

$$\text{Br ion (g)} = [7.56 \mu\text{g/mL}] \times [50.00 \text{ mL}] \times [10^{-6}] = \underline{3.78 \times 10^{-4} \text{ g}}$$

5.5.2.2: Determine weight of flux solids in the flux

Equation:

Weight of flux solids (g) in solder paste flux = [Weight of solder paste sample (g)]
x [% Flux in solder paste / 100] x [% solids in paste flux / 100]

% Flux

100% total flux material – 88.5% metal load = 11.5% flux

For the Solder Paste Sample

Weight flux solids (g) = [1.001 g paste] x [11.5 / 100] x [100.0% / 100] = 0.115 g

5.5.2.3: Calculate the percentage of each halide ion in the non-volatile solid portion of the liquid flux

Equation:

% Halide ion in solid portion of solder paste flux = {[Weight halide ion (g) in
solder paste] / [Weight of flux solids (g) in solder paste]}{100}

For the Solder Paste Sample

Cl ion = $[2.50 \times 10^{-6} \text{ g} / 0.115 \text{ g}][100] = \underline{0.002\%}$

Br ion = $[3.78 \times 10^{-4} \text{ g} / 0.115 \text{ g}][100] = \underline{0.33\%}$

Table #2: Halide Ion Content Results

Paste	Ion	Weight Halide ion (g)	Weight flux solids (g)	% Halide Ion Solder Paste Flux
NC258-T754	Cl	2.50×10^{-6}	0.115	0.002
	Br	3.78×10^{-4}		0.33