

Technical Information Bulletin



CuLox Lead-Free - Solder Powder

CuLox Fines
2103, 2105, 2405

CuLox Intermediates
2110, 2120, 2410, 2420

Description

High purity, high density gas atomized powder made principally for the electrical and electronic industry. High cooling rates eliminate micro-segregation commonly found in powders processed by traditional ultrasonic methods. Lack of segregation as seen in the SEM images of powders improve sintering and re-flow characteristics. Standard fluxes can be used in paste formulations without compromising re-flow characteristics.

Purity

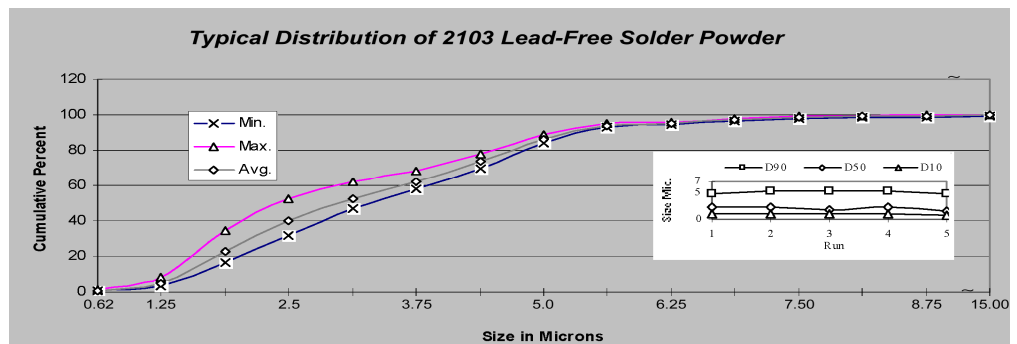
Overall chemistry, and purity are tightly controlled as are oxygen levels which vary as function of size.

Typical impurities	P	Pb	Sb	Zn	C	N	O ₂
	<0.001	<0.005	<0.005	<0.009	<0.005	<0.005	0.02-0.2

Size and Properties

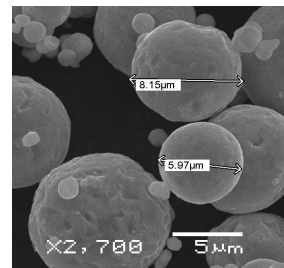
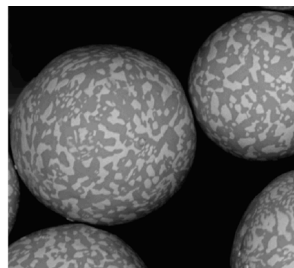
Physical Properties	21xx	24xx
Particle Shape	Sphere	Sphere
Med. Size (Micron) (Refer to Main Document)	By Size 3, 5, 10, 20 By Type 8, 7, 6, 5	By Size 5, 10, 20 By Type 7, 6, 5
Size Distribution	Narrow	Narrow
Surface Area (m ² /g)	0.05-0.4 m ² /g	0.05-0.4 m ² /g

Typical Distribution Chart



Typical SEMs

Conventional Powder - Shows Micro-segregation



CuLox Powder - Shows Lack of Micro-segregations

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Solder Powders Used in Electronics (Lead-Free)

The trend in the electronic industry towards increased packaging density requires the use of solder pastes that can be deposited at fine pitch with greater dimensional control. This requirement dictates the size of powders to be used for solder paste formulations. Physical attributes of powders such as its shape, morphology and size distribution affect metal loading, paste rheology and its reflow characteristics. Control of chemical impurities and oxygen content is required as these can adversely affect the metallurgical quality of the bond formed after the reflow operation.

CuLox offers most commonly used lead-free solder powder compositions for paste formulations. Our powders are spherical and practically satellite free. The size cuts for all the grades are sharp and narrow. Overall chemistry, and particularly, the oxygen content are tightly controlled at various stages of manufacturing. Special care is taken in packaging, storage and transportation.

Lead-Free Nominal Compositions (actual composition based upon customer specification)

Type 2100: Sn/ 3.0 Ag/ 0.5 Cu (SAC 305)
 Type 2400: Sn/Bi-- (42Sn-58Bi) Type 2400M: Sn/Bi-- (60Sn-40Bi)

Size Distribution

Sieve analysis method of determining particle size distribution lacks the accuracy and precision that is required to adequately characterize powders for solder paste applications. This is especially true as particle size gets smaller (45 micron and finer). CuLox uses a Laser Diffraction Technique (Microtrac analysis) to determine powder particle size distribution.

The chart below shows CuLox designations based on median size (D50) for solder powders using Microtrac analysis and the equivalent powder type per IPC standard J-STD-006A.

