Qualitek Group Of Companies

QUALITEK
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NC601 LEAD FREE NO CLEAN SOLDER WIRE

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Physical Properties

Solder Composition

Qualitek Sn/Ag/Cu (Tin/Silver/Cu) Alloys are designed as a lead-free alternative for Sn/Pb alloys for electronics assembly operations. The Qualitek Sn/Ag/Cu alloys conform and exceed the impurity requirements of J-Std-006 and all other relevant international standards.

Typical Analysis

	Sn	Ag	Cu	Pb	Sb	Bi	In	As	Fe	Ni	Cd	Al	Zn	Au
LF955-38	Bal	3.6-4.0	0.6-0.8	0.050 Max	0.050 Max	0.050 Max	0.050 Max	0.010 Max	0.010 Max	0.005 Max	0.001 Max	0.001 Max	0.001 Max	0.002 Max
LF958-35	Bal	3.3-3.7	0.6-0.8	0.050 Max	0.050 Max	0.050 Max	0.050 Max	0.010 Max	0.010 Max	0.005 Max	0.001 Max	0.001 Max	0.001 Max	0.002 Max
LF965-30	Bal	2.8-3.2	0.4-0.6	0.050 Max	0.050 Max	0.050 Max	0.050 Max	0.010 Max	0.010 Max	0.005 Max	0.001 Max	0.001 Max	0.001 Max	0.002 Max
LF217	Bal	3.8-4.2	0.4-0.6	0.050 Max	0.050 Max	0.050 Max	0.050 Max	0.010 Max	0.010 Max	0.005 Max	0.001 Max	0.001 Max	0.001 Max	0.002 Max

	Sn/Ag/Cu	Sn63/Pb37
Melting Point, ^{o} C	217-221	183 E
Hardness, Brinell	15HB	14HB
Coefficient of Thermal Expansion	Pure Sn= 23.5	24.7
Tensile Strength, psi	4312	4442
Density, g/cc	7.39	8.42
Electrical Resistivity , (μohm-cm)	13.0	14.5
Electrical Conductivity, %IACS	16.6	11.9

	Sn/Ag/Cu	Sn63/Pb37
Yield Strength, psi	3724	3950
Total Elongation,%	27	48
Joint Shear Strength, at 0.1mm/min 20 C	27	23
Joint Shear Strength, at 0.1mm/min 100 C	17	14
Creep Strength, N/mm^2 at 0.1mm/min 20 C	13.0	3.3
Creep Strength, N/mm^2 at 0.1mm/min 100 C	5	1
Thermal Conductivity, W/m.K	58.7	50.9

Wire Diameter

SnAgCu alloy wire is available in a variety of diameters. The chosen diameter is based on application methods, pad size, and desired solder joint volume. Generally, the diameter of the wire should be slightly larger than the width/diameter of the joint or connection to be soldered. Below is a list of standard diameters.

Standard wire diameters

Diamter/Inch	0.125	0.092	0.062	0.050	0.040	0.032	0.028	0.025	0.020	0.015	0.010
Diameter/mm	3.18	2.33	1.57	1.27	1.01	0.81	0.71	0.63	0.51	0.38	0.25
Std.Wire Gauge	11	13	16	18	19	21	22	23	25	28	31
Tolerance, in.	+/-0.006	+/-0.005	+/-0.003	+/-0.003	+/-0.002	+/-0.002	+/-0.002	+/-0.002	+/-0.002	+/-0.002	+/-0.002

Flux Percentage

Qualitek utilizes a state-of–the-art automatic wire extrusion and wire drawing machines to manufacture consistent solder. The introduction of flux core in the wire extrusion process involves constant monitoring of flux percentage to ensure minimal flux voids and irregular wire. Typical flux percentage for lead free solder is **2.0-4.0%.**

Flux Core

Qualitek has developed a unique flux system designed specifically for high temperature lead free alloys. It provides the fluxing activity levels that promote fast wetting action and maximum wetting spread. Utilizing purely organic acid activators which virtually leaves minimal residues NC601 wets and spreads like an RA type. NC601 exhibits virtually no spattering. NC601 conforms to J-STD-004, 0RL0.

Main Features

- Excellent wettability
- Non-tacky residue

	Specification	Test Method
Flux Classification	ORL0	JSTD-004
Copper Mirror	No removal of copper film	IPC-TM-650 2.3.32
Silver Chromate	Pass	IPC-TM-650 2.3.33
Corrosion	Pass	IPC-TM-650 2.6.15
SIR		
JSTD-004,Pattern Down	2.33×10^{11}	IPC-TM-650 2.6.3.3
Bellcore (Telecordia)	6.12×10^{11} ohms	Bellcore GR-78-CORE 13.1.3
Electromigration	Pass	Bellcore GR-78-CORE 13.1.4
Post Reflow Flux Residue	55%	TGA Analysis
Acid Value	350-370	IPC-TM-650 2.3.13
Flux Residue Dryness	Pass	IPC-TM-650 2.4.47
Spitting of Flux-Cored Solder	0.3%	IPC-TM-650 2.4.48
Solder Spread	140 mm^2	IPC-TM-650 2.4.46

CLEANING

NC601 is a no clean formulation therefore the residues do not need to be removed for typical applications. If residue removal is desired, the use of Everkleen 1005 Buffered Saponifier with a 5-15% concentration in hot 60 C (140 F) will aid in residue removal.

Storage & Shelf Life

Solder wire storage should be in a 65-80^{o}F environment away from direct heat. When directly handling solder wire it is recommend to use appropriate gloves. Solder wire has an indefinite shelf life.

Disposal

NC601 Lead Free solder should be disposed of in accordance with state & local authority requirements.

Packaging

Qualitek flux-core wire and solid wire are packed in
12.5lb -box of ½ lb spools
25 lb -box of 1 lb spools
12.5kg -box of ½ kg spools
8 kg -box of 1kg spools
40 lb -box of 5 lb spools
20 lb -box of 20 lb spools