



Qualitek Group Of Companies

free  
halogen®

## NC600 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
<b>LF955-38</b>	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
<b>LF965-30</b>	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
<b>LF217</b>	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, °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 <sup>2</sup> at 0.1mm/min 20 °C	13.0	3.3
Creep Strength, N/mm <sup>2</sup> 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**

Diameter/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 synthetically refined resin and very effective activator, NC600 wets and spreads like an RA type. NC600 exhibits virtually no spattering. NC600 conforms to J-STD-004, RELO.

**Main Features**

- Excellent wettability
- Hard non-conductive residues

<b>Flux Classification</b>	<b>Specification</b>	<b>Test Method</b>
	RELO	JSTD-004
<b>Copper Mirror</b>	No removal of copper film	IPC-TM-650 2.3.32
<b>Silver Chromate</b>	Pass	IPC-TM-650 2.3.33
<b>Corrosion</b>	Pass	IPC-TM-650 2.6.15
<b>SIR</b>		
JSTD-004, Pattern Down	$2.33 \times 10^{11}$	IPC-TM-650 2.6.3.3
Bellcore (Telecordia)	$6.12 \times 10^{11}$ ohms	Bellcore GR-78-CORE 13.1.3
<b>Electromigration</b>	Pass	Bellcore GR-78-CORE 13.1.4
<b>Post Reflow Flux Residue</b>	55%	TGA Analysis
<b>Acid Value</b>	190-210	IPC-TM-650 2.3.13
<b>Flux Residue Dryness</b>	Pass	IPC-TM-650 2.4.47
<b>Spitting of Flux-Cored Solder</b>	0.3%	IPC-TM-650 2.4.48
<b>Solder Spread</b>	130 mm <sup>2</sup>	IPC-TM-650 2.4.46

**CLEANING**

NC600 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 °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**

NC600 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

200/Cs – Dispenser Paks  
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