



Qualitek Group Of Companies

NC600 (Sn96/Ag4) LEAD FREE NO CLEAN SOLDER WIRE

CORPORATE HEADQUARTERS USA: 315 Fairbank St. Addison, IL † 630-628-8083 or 1-800-365-3750 † FAX 630-628-6543

EUROPE UK: Unit 9 Apex Ct. Bassendale Rd. Bromborough, Wirral CH62 3RE † 44 151 334 0888 † FAX 44 151 346 1408

ASIA-PACIFIC HEADQUARTERS SINGAPORE: 6 Tuas South St. 5 Singapore 637790 † 65 6795 7757 † FAX 65 6795 7767

PHILIPPINES: Phase 1 Qualitek Ave. Mariveles, Bataan Philippines C-2106 † 6347 935 4163 † FAX 63475613717

CHINA: 3B/F, YiPa Print Bldg. 351 # JiHua Rd., Buji Shenzhen, China 518112 † 86 755 28522814 † FAX 86 755 28522787

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Physical Properties

Solder Composition

Qualitek Sn96/Ag4 is designed as a lead-free alternative for Sn/Pb alloys for electronics assembly operations. The Qualitek Sn96/Ag4 alloy conforms and exceeds 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
Bal	3.5 – 4.5	0.050 Max	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

	Sn96/Ag4	Sn63/Pb37		Sn96/Ag4	Sn63/Pb37
Melting Point, ° C	221E	183 E	Yield Strength, psi	3256	3950
Hardness, Brinell	15HB	14HB	Total Elongation,%	24	48
Coefficient of Thermal Expansion	Pure Sn= 30.2	24.7	Joint Shear Strength, at 0.1mm/min 20 C	27	23
Tensile Strength, psi	3873	4442	Joint Shear Strength, at 0.1mm/min 100 C	17	14
Density, g/cc	7.5	8.42	Creep Strength, N/mm ² at 0.1mm/min 20 C	13.7	3.3
Electrical Resistivity , (μohm-cm)	12.3	14.5	Creep Strength, N/mm ² at 0.1mm/min 100 C	5	1
Electrical Conductivity, %IACS	14.0	11.9	Thermal Conductivity, W/m.K	55.3	50.9

Wire Diameter

Sn96/Ag4 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

Flux Classification	Specification	Test Method
	RELO	JSTD-004
Copper Mirror	No removal of copper film	IPC-TM-650 2.3.32
Corrosion	Pass	IPC-TM-650 2.6.15
SIR		
JSTD-004, Pattern Down	2.33 x 10 ¹¹	IPC-TM-650 2.6.3.3
Bellcore (Telecordia)	6.12 x 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	190-210	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	130 mm ²	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

- 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