

SOLDER CONNECTION

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QUALITEK® Technical Bulletin

NC601E SAC305 SOLDER WIRE

DESCRIPTION

A no clean cored solder wire that is available with both lead-containing alloys and lead-free tin/silver copper alloys, such as SAC305 and SAC405. It provides the fluxing activity levels that promote fast-wetting action and maximum wetting spread. NC601 contains purely organic acid activators so leaves minimal residue and spreads like an RA type cored solder wire. NC601 exhibits virtually no spattering and conforms to IPC-J-STD-004B.

FEATURES AND BENEFITS

- Excellent wettability
- Non-tacky residues
- RoHs compliant
- Colophony/Rosin Free

FEATURES AND BENEFITS

	Specification	Test Method
Color & Appearance	Light yellow solid	Visual
Flux Classification	ORLO	J-STD-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 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 (mgKOH/g)	280 - 330	IPC-TM-650 2.3.13
Spitting of Flux-Cored Solder	0.3%	IPC-TM-650 2.4.48
Solder Spread	130 mm ²	IPC-TM-650 2.4.46

WIRE DIAMETER

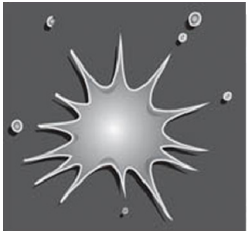
Delta Solder Wire NC601 with tin/silver copper alloys is available in a variety of diameters. The chosen diameter is based on application methods, pad size, and desired solder joint volume. Generally, the diameter of the wire should be slightly larger than the width/diameter of the joint or connection to be soldered. Below is a list of standard diameters.

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	11	13	16	18	19	21	22	23	25	28	31
Gauge											
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

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 continual monitoring of flux percentage to ensure minimal flux voids and irregular wire. Typical flux percentage for high temperature lead-free SAC-containing alloy solder is 1.1 – 3.3%.

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PHYSICAL PROPERTIES

A no clean resin based core flux with tin/silver/copper (SAC) alloys. SAC alloys conform to and exceed the impurity requirements of IPC-J-STD-006C.

TYPICAL ANALYSIS

Typical Analysis														
	Sn	Ag	Cu	Pb	Sb	Bi	In	As	Fe	Ni	Cd	Al	Zn	Au
LF955-38	Bal	3.6-4.0	0.5-0.9	0.070 Max	0.200 Max	0.100 Max	0.100 Max	0.030 Max	0.020 Max	0.010 Max	0.002 Max	0.005 Max	0.003 Max	0.050 Max
LF958-35	Bal	3.3-3.7	0.5-0.9	0.070 Max	0.200 Max	0.100 Max	0.100 Max	0.030 Max	0.020 Max	0.010 Max	0.002 Max	0.005 Max	0.003 Max	0.050 Max
LF965-30	Bal	2.8-3.2	0.3-0.7	0.070 Max	0.200 Max	0.100 Max	0.100 Max	0.030 Max	0.020 Max	0.010 Max	0.002 Max	0.005 Max	0.003 Max	0.050 Max
LF217	Bal	3.8-4.2	0.3-0.7	0.070 Max	0.200 Max	0.100 Max	0.100 Max	0.030 Max	0.020 Max	0.010 Max	0.002 Max	0.005 Max	0.003 Max	0.050 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 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

FLUX RESIDUES & CLEANING

NC601 is a no clean formulation; therefore, residue removal is not required 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) de-ionized water will aid in residue removal.

STORAGE & SHELF LIFE

Solder wire storage should be in a 65-80 °F environment away from direct heat. We recommend using gloves when handling solder wire directly. Solder wire has an indefinite shelf life.

DISPOSAL

SAC alloy NC601 lead-free solder should be disposed of in accordance with federal, state & local authority requirements.

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