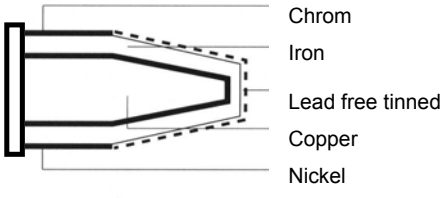
Weller

Product Information

Soldering Tips for Lead Free

Soldering is based on the ability of different metals to dissolve or diffuse into each other and to cause an electrical connection at lowest resistance and mechanical fixing. Flux is used to dissolve metal-oxygen layers on the surface of the different metals being connected with each other due to the dissolving of tin into them.

A soldering tip has two major tasks. First one is to transfer thermal energy with lowest loss as possible and secondly carrying the solder on the joint in combination with flux. Due to Physics, the tip turns out being a wear part. Those tasks have to be done in combination of long lifetime and at lowest cost.



For the ability of excellent thermal conductivity, a soldering tip consists of a Copper core. I.e. Silver would be better, but is much more expensive.

The wettability of copper with solder tin is extremely good, which means the solubility of copper in solder tin is extremely high, causing the tip being used up quickly. The tip must be wettable to carry properly the heat and the tin on the soldering joint. Iron is also wettable with tin, but the solubility is far less. Unfortunately iron has a very low thermal conductivity and is hindering the thermal flow. The thicker the iron layer, the lower the heat transfer from the tip towards the soldering joint. The thinner the iron layer, the shorter the lifetime due to the solubility of iron in tin. Using other materials that are not soluble in tin are causing a non wettable tip and bad solder results.

Heating a soldering tip to high temperatures. The aggressiveness of the solubility of iron into tin is increasing with rising temperature. Thus also the mechanical resistance of the tip's iron layer is being reduced. When soldering, the tip is somehow always touching some part of the component and is in contact with the aggressive tin. Now with the upcoming lead free soldering, the content of tin in the solder is increased by 35%. Thus results in 35% more aggressiveness of the solder towards the iron layer, causing simply a life reduction.

Now standard tips have an average iron layer of 200µm depending the geometrical form. Our new LF tips carry an optimised layer of twice as much iron. More of iron would cause a lower heat transfer and hindering the soldering process. Influence of the temperature to the lifetime and iron layer can be seen on the following diagram.

A general recommendation is using a tip as big as possible and if necessary to improve the process by a thinner solder-wire. For lead free solder the adjusted soldering temperature at the station should be in the range of 340 – 360°C, depending the geometry of the tip. For further enhancement of tip lifetime Stop+Go stands should be used.

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The graph shows that the LT-LF Soldering-Tips provide a cost reduction and the main influence of lifetime is the soldering temperature.

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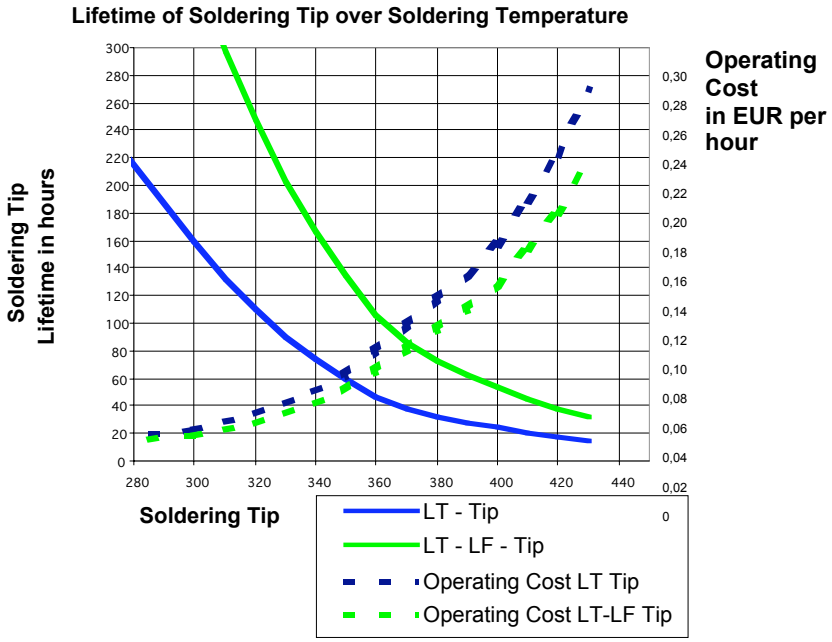
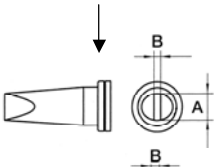
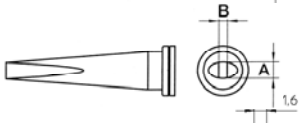
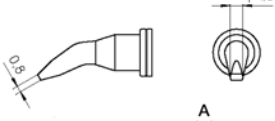
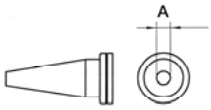
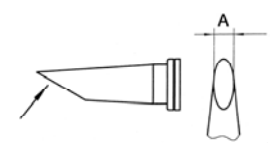


Available Lead Free Tips of the LT series:

Description	LF-Tip mark	Width A	Thickn. B	Model	Order No.
Chisel tip		1,6 mm	0,7 mm	LT A	005 44 440 99
		2,4 mm	0,8 mm	LT B	005 44 405 99
		3,2 mm	0,8 mm	LT C	005 44 407 99
		4,6 mm	0,8 mm	LT D	005 44 409 99
Long chisel tip		2,0 mm	1,0 mm	LT L	005 44 414 99
		3,2 mm	1,2 mm	LT M	005 44 415 99
Chisel bent		1,6 mm	-	LT AX	005 44 480 00
		3,2 mm	-	LT MX	005 44 469 00
Round tip		0,6 mm	-	LT T	005 44 482 00
		0,8 mm	-	LT O	005 44 481 00
		1,6 mm	-	LT AS	005 44 404 99
		3,2 mm	-	LT CS	005 44 411 99
Round tip		1,6 mm	4,0 mm	LT AA	005 44 487 00
		2,4 mm	4,0 mm	LT BB	005 44 444 99
spade		3,2 mm	6,0 mm	LT CC	005 44 445 99
		4,6 mm	6,0 mm	LT DD	005 44 478 99
Gullwing		2,3 mm	3,2 mm	LT GW	005 44 410 99
Knife tip		6,3 mm	-	LT KN	005 44 479 00