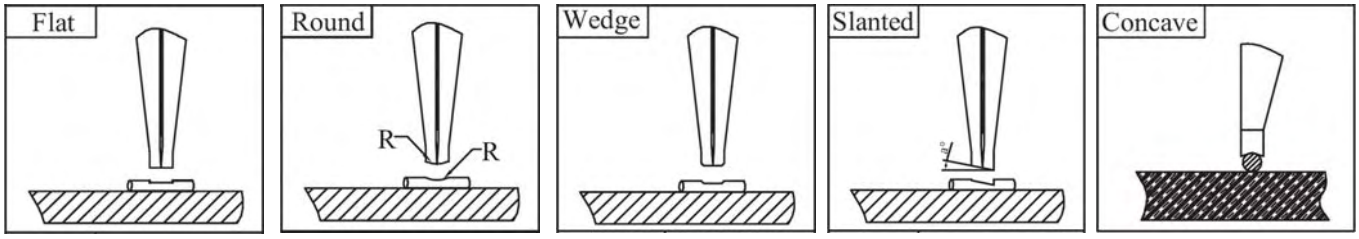
General Introduction

(Parallel Gap Welder Electrodes)

Parallel gap welder electrodes are the key components in the gap welding process. The electrode tip shape, insulator and the material are the critical factors to produce quality electrodes.

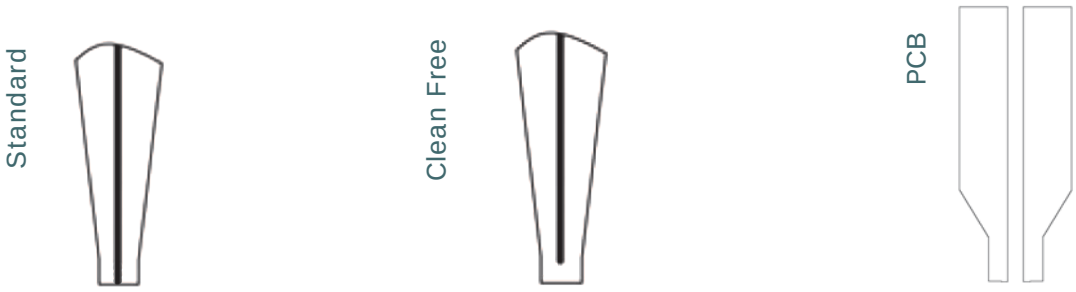
SW Tech Equipment offers three types of electrodes, namely, standard electrodes, clean free electrodes and PCB repair machine electrodes. The materials utilized are High Temperature Molybdenum Alloy (HTM), High Purity Molybdenum Alloy (HPM) and Molybdenum Tungsten Alloy (MTA). There are various tip shapes available for performing different ribbon and enameled wire welding tasks. The following figures illustrate the tip shapes that **SW Tech Equipment** offers.



Parallel Gap Welder Standard Electrode: The standard electrodes are built in two halves. The two halves are bonded together with a thin adhesive insulator layer. The tips of these electrodes are "open", i.e., the insulator layer is extended to the tip. See figure below for details. Therefore, the electrical current flows from the left half to right half must be completed through the ribbon or wire to be welded. In other words, there is no heat generated if the two halves of the electrode do not contact a conductor simultaneously. The advantage of this type of electrode is that it requires relative lower power to generate the welding heat. On the other, the tip is easier to be contaminated due to its open end nature.

Parallel Gap Welder Clean Free Electrode: The clean free electrodes are built in two halves. The two halves are bonded together with a thin adhesive insulator. However, the tips of these electrodes are "closed", i.e., there is a metal bridge crossing the two halves at the tip. See figure below for details. Therefore, the electrical current flow from the left half to right half can be completed without contacting any conductor. In other words, the heat is generated at the tip once there is a current flow. The advantage of this type of electrode is that it is hard to become contaminated due to its closed tip nature. Therefore, this type of electrode is more durable and hardly requires cleaning. On the other hand, they require relative higher power to generate the welding heat since there is extra mass requiring to be heated at the tip.

PCB Repair Machine Electrode: The PCB repair machine electrodes are consist of two pieces. Unlike parallel gap welders' electrodes, they are separate pairs.



Parallel Gap Welder Electrodes Standard, Model # SW-ETD-XXX

FEATURES:

- Durable configuration
- Various head shapes and sizes
- Various material selection
- Cost effective
- Custom build available

APPLICATIONS:

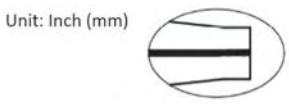
- SW Tech Equipment parallel gap welders
- Industry standard parallel gap welders
- Gold and silver ribbon welding
- Enameled wire welding
- Bare metal strip and wire welding

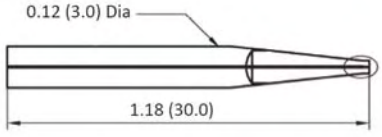
DESCRIPTION:

Model SW-ETD-XXX series parallel gap electrodes are built in two halves, typically oriented in left and right positions in the electrode holder. They are bonded together with a thin adhesive insulator. The material used for these standard electrodes are High Temperature Molybdenum Alloy (HTM) and High Purity Molybdenum Alloy (HPM). While HTM electrodes are designed for iron-nickel alloy and/or gold finished surface or material, HPM electrodes can be used for tin and/or silver plated surface and material in addition to what HTM electrodes can perform on.

The standard models are grouped into 5 families according to their tip sizes and type of material to suit different types of applications and different wire diameters or strip sizes. Each family has 5 different head shapes for user to choose. The diameter and length of these standard electrodes are 0.12” x 1.18” (3.0 mm x 30.0 mm). The outlines of these electrodes are designed to meet the industry standard and can be used in many other manufacturers’ welders. The detailed outline drawings and tip shapes of these electrodes are shown in the introduction section and here. While standard models can cover most of customers’ needs, custom designs are also available.

- **Flat :** Mainly used for gold, silver, metal ribbons and wires. It is recommended for softer base material, such as FR4 and Duroid boards. It has moderate durability.
- **Wedge:** Mainly used for gold, silver, metal ribbons and wires. It is designed for large diameter wires and bigger ribbon strips. It has good durability.
- **Round:** Mainly used for gold, silver, metal ribbons and wires. It is the most durable electrode.
- **Slanted:** Mainly used for wires and ribbons when cutting is needed at the finish.





- **Concave:** It is also known as “V” shaped electrode sometimes. It is mainly designed for capturing the round shaped wires. It may have the shortest longevity among all five shapes.

SPECIFICATIONS:

Model No.	Head Shape	Head Size (A x B)	Material	Recommended Setting
SW-ETD-Q1R	Round	20 x 22 mils^2 (0.50 x 0.55 mm^2)	HTM	Amplitude (Power): 0.60 V Time (Duration): 5.0 ms Force: 10±3 ounces (300±100 grams)
SW-ETD-Q1F	Flat	19 x 21 mils^2 (0.47 x 0.53 mm^2)		
SW-ETD-Q1S	Slanted	19 x 20 mils^2 (0.47 x 0.50 mm^2)		
SW-ETD-Q1W	Wedge	17 x 19 mils^2 (0.42 x 0.48 mm^2)		
SW-ETD-Q1C	Concave	N/A		
SW-ETD-E2R	Round	21 x 22 mils^2 (0.53 x 0.64 mm^2)	HTM	Amplitude (Power): 0.70 V Time (Duration): 6.0 ms Force: 13±3 ounces (400±100 grams)
SW-ETD-E2F	Flat	20 x 24 mils^2 (0.50 x 0.62 mm^2)		
SW-ETD-E2S	Slanted	20 x 26 mils^2 (0.50 x 0.67 mm^2)		
SW-ETD-E2W	Wedge	18 x 23 mils^2 (0.45 x 0.60 mm^2)		
SW-ETD-E2C	Concave	N/A		
SW-ETD-E4R	Round	26 x 24 mils^2 (0.65 x 0.62 mm^2)	HPM	Amplitude (Power): 0.80 V Time (Duration): 7.0 ms Force: 20±3 ounces (600±100 grams)
SW-ETD-E4F	Flat	24 x 23 mils^2 (0.62 x 0.60 mm^2)		
SW-ETD-E4S	Slanted	24 x 25 mils^2 (0.62 x 0.65 mm^2)		
SW-ETD-E4W	Wedge	22 x 23 mils^2 (0.56 x 0.58 mm^2)		
SW-ETD-E4C	Concave	24 x 23 mils^2 (0.62 x 0.60 mm^2)		
SW-ETD-E7R	Round	29 x 28 mils^2 (0.73 x 0.72 mm^2)	HPM	Amplitude (Power): 1.10 V Time (Duration): 8.0 ms Force: 30±3 ounces (1,000±100 grams)
SW-ETD-E7F	Flat	27 x 27 mils^2 (0.70 x 0.70 mm^2)		
SW-ETD-E7S	Slanted	27 x 30 mils^2 (0.70 x 0.75 mm^2)		
SW-ETD-E7W	Wedge	23 x 26 mils^2 (0.60 x 0.68 mm^2)		
SW-ETD-E7C	Concave	27 x 29 mils^2 (0.70 x 0.73 mm^2)		
SW-ETD-E9R	Round	33 x 37 mils^2 (0.83 x 0.94 mm^2)	HPM	Amplitude (Power): 1.10 V Time (Duration): 8.0 ms Force: 60±3 ounces (1,800±100 grams)
SW-ETD-E9F	Flat	32 x 36 mils^2 (0.80 x 0.92 mm^2)		
SW-ETD-E9S	Slanted	32 x 38 mils^2 (0.80 x 0.96 mm^2)		
SW-ETD-E9W	Wedge	30 x 34 mils^2 (0.75 x 0.85 mm^2)		
SW-ETD-E9C	Concave	32 x 36 mils^2 (0.80 x 0.92 mm^2)		

Note: Contact factory for other models and customers' own models.

OUTLINE:

For dimension "A" and "B", see detailed outline on Page 30.

Parallel Gap Welder Electrodes Clean Free, Model # SW-ETD-NXX

FEATURES:

- Durable configuration
- Various head shapes and sizes
- Various material selection
- Cost effective
- Custom build available

APPLICATIONS:

- SW Tech Equipment parallel gap welders
- Industry standard parallel gap welders
- Gold and silver ribbon welding
- Enameled wire welding
- Bare metal strip and wire welding

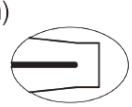
DESCRIPTION:

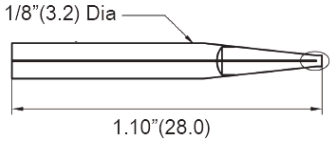
Model SW-ETD-NXX series parallel gap electrodes are built in two halves, typically oriented in left and right positions in the electrode holder. They are bonded together with a thin adhesive insulator. Unlike standard electrodes, the tip of the clean free electrodes is closed. The advantage of this type of electrodes is that it prevents the residual material build up during the welding process. Therefore, it is also referred as “clean free” electrodes. The material used for these clean free electrodes is Molybdenum Tungsten Alloy (MTA).

The standard models of clean free electrodes are also grouped into 5 families according to their tip sizes and type of material to suit different types of applications and different wire or strip sizes. Each family has 5 different head shapes for user to choose. The diameter and length of these standard electrodes are 1/8”” x 1.10” (3.2 mm x 28.0 mm). The outlines of these electrodes are designed to meet the industry standard and can be used in many other manufacturers’ welders. The detailed outline drawings and tip shapes of these electrodes are shown in the introduction section and here. While standard models can cover most of customers’ needs, custom designs are also available.

- **Flat :** Mainly used for gold, silver, metal ribbons and wires. It is recommended for softer base material, such as FR4 and Duroid boards. It has moderate durability.
- **Wedge:** Mainly used for gold, silver, metal ribbons and wires. It is designed for large diameter wires and bigger ribbon strips. It has good durability.
- **Round:** Mainly used for gold, silver, metal ribbons and wires. It is the most durable electrode.
- **Slanted:** Mainly used for wires and ribbons when cutting is needed at the finish.

Unit: Inch (mm)





- **Concave:** It is also known as “V” shaped electrode. It is mainly designed for capturing the round shaped wires. It may have the shortest longevity among all five shapes.

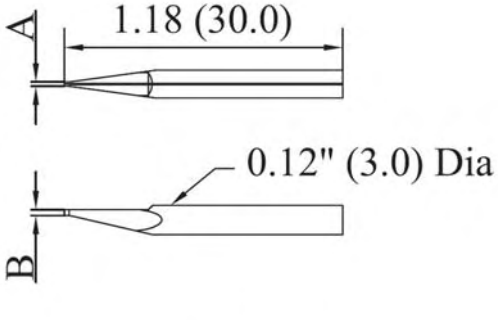
SPECIFICATIONS:

Model No.	Head Shape	Head Size (A x B)	Material	Recommended Setting
SW-ETD-N0R	Round	41 x 41 mils^2 (1.05 x 1.05 mm^2)	MTA	Amplitude (Power): 1.30 V Time (Duration): 8.0 ms Force: 64±3 ounces (2,000±100 grams)
SW-ETD-N0F	Flat	39 x 39 mils^2 (1.00 x 1.00 mm^2)		
SW-ETD-N0S	Slanted	39 x 43 mils^2 (1.00 x 1.10 mm^2)		
SW-ETD-N0W	Wedge	31 x 35 mils^2 (0.80 x 0.90 mm^2)		
SW-ETD-N0C	Concave	39 x 39 mils^2 (1.00 x 1.00 mm^2)		
SW-ETD-N1R	Round	32 x 32 mils^2 (0.82 x 0.82 mm^2)	MTA	Amplitude (Power): 1.20 V Time (Duration): 8.0 ms Force: 20±3 ounces (600±100 grams)
SW-ETD-N1F	Flat	31 x 33 mils^2 (0.80 x 0.85 mm^2)		
SW-ETD-N1S	Slanted	31 x 33 mils^2 (0.80 x 0.85 mm^2)		
SW-ETD-N1W	Wedge	28 x 31 mils^2 (0.70 x 0.75 mm^2)		
SW-ETD-N1C	Concave	31 x 31 mils^2 (0.80 x 0.80 mm^2)		
SW-ETD-N2R	Round	28 x 28 mils^2 (0.72 x 0.72 mm^2)	MTA	Amplitude (Power): 1.00 V Time (Duration): 6.0 ms Force: 16±3 ounces (500±100 grams)
SW-ETD-N2F	Flat	27 x 27 mils^2 (0.70 x 0.70 mm^2)		
SW-ETD-N2S	Slanted	27 x 29 mils^2 (0.70 x 0.75 mm^2)		
SW-ETD-N2W	Wedge	24 x 26 mils^2 (0.60 x 0.65 mm^2)		
SW-ETD-N2C	Concave	27 x 27 mils^2 (0.70 x 0.70 mm^2)		
SW-ETD-N3R	Round	24 x 24 mils^2 (0.62 x 0.62 mm^2)	MTA	Amplitude (Power): 0.80 V Time (Duration): 5.0 ms Force: 13±3 ounces (400±100 grams)
SW-ETD-N3F	Flat	23 x 23 mils^2 (0.60 x 0.60 mm^2)		
SW-ETD-N3S	Slanted	23 x 25 mils^2 (0.60 x 0.65 mm^2)		
SW-ETD-N3W	Wedge	20 x 22 mils^2 (0.50 x 0.55 mm^2)		
SW-ETD-N3C	Concave	23 x 23 mils^2 (0.60 x 0.60 mm^2)		

Note: Contact factory for other models and customers' own models.

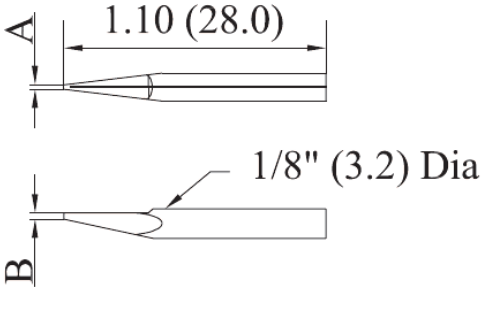
OUTLINES:

Unit: Inch (mm)



Standard

Unit: Inch (mm)



Clean Free