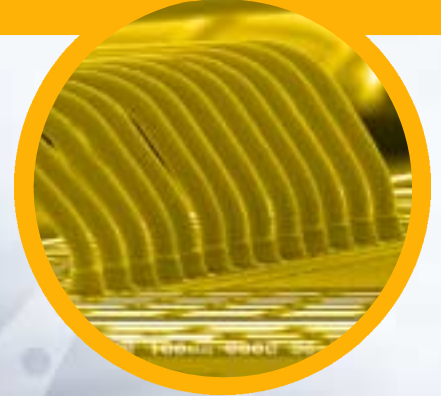
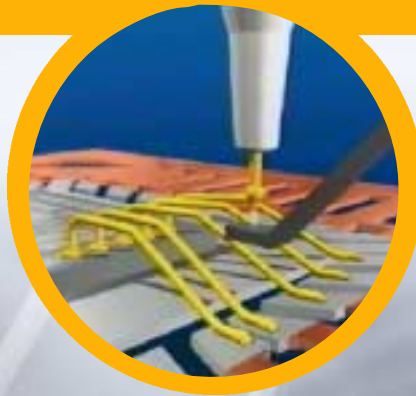


# EFO Wands

Superior Sparking Performance



- **Consistent free air ball formation**
- **Consistent ball size control**
- **Ball shape uniformity**
- **Longer Life up to 3x standard EFO wands**
- **New proprietary process for superior sparking performance**

Advancements in wire bonding technology and today's fine pitch (FP) and ultra fine pitch (UFP) bonding applications have resulted in innovations over recent years in bonding equipment and tools, bond processes and bonding materials.

Aside from the wire metallurgy and bonding tool improvements, another area of material development has been the EFO wand. The importance of consistent free air ball (EFO) for FP and UFP bonding applications has led to the development of new alloy material to improve the performance of the EFO wand. Together with a new proprietary process, consistent EFO sparking effect can be achieved with SPT new EFO wands.

SPT is capable of making customized EFO wands used on different types of bonder with precise dimensions and accuracy.



## How is a FAB created?

To create a FAB, the wire bonder uses an EFO wand, where high voltage is connected. The high voltage running through the EFO wand has a closed loop connection with the gold wire, which is connected to the ground. In addition, an EFO gap is maintained between the tip of the EFO wand and the gold wire.

During operation, the EFO gap is breached by the high current, creating a high voltage spark, which melt the gold wire to form a spherical ball as shown.

Typically, a dirty or worn off EFO wand can affect the consistency of the FAB formation resulting in ball size and ball height variations during bonding. SPT has formulated new alloy material to extend the life of the EFO wand for better ball size control and ball shape uniformity for a wide range of bonders.

## EFO Wand

When a new EFO wand is first installed on the bonder, inconsistent sparking effect normally occurs, causing inconsistent FAB formation. It was also noticed that the spark, during firing tends to sway to the left or right during the initial sparks. This has the tendency to produce a tilted FAB as shown. This effect is mainly due to the inability of the new EFO to lead the current to flow from the same point.

To eliminate such adverse effect, SPT has introduced a proprietary process whereby new EFO wands are subjected to continuous sparking similar to those seen on the bonder. Such process will ensure that the new EFO wands can achieve its desired performance without having to "season" them, thus causing production delay and yield loss.

This process can be performed for a wide variety of EFO wands used for different types of bonders currently available in the market.

## How To Order

EFO - Model - Option

*Refer to range of EFO Wand Models available in separate leaflet.*



*FAB formation during wire bonding process*



*Tilted FAB*



*Effect of the tilted FAB*



*Consistent firing of the EFO*

## EFO WAND MODELS

### ASM

**ASM0309**  
For Bonder  
AB309



**ASM0339**  
For Bonder  
AB339  
Eagle 60



**ASM339C**  
For Bonder  
AB339  
Eagle 60



**ASM339D**  
For Bonder  
iHawk



### K&S

**KNS1484**  
For Bonder  
1484



**KNS1488**  
For Bonder  
1488



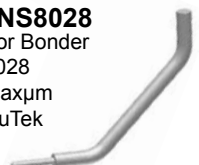
**KNS1489**  
For Bonder  
1488



**KNS8021**  
For Bonder  
8020



**KNS8028**  
For Bonder  
8028  
Maxµm  
NuTek



**KNS8098**  
For Bonder  
8098 Ball  
Bumper



**KNS8128**  
For Bonder  
8028



### SHINKAWA

**SHK025A**  
For Bonder  
ACB-25



**SHK0035**  
For Bonder  
SDW-35



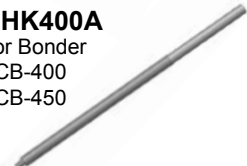
**SHK0200**  
For Bonder  
UTC-200  
UTC-205



**SHK0300**  
For Bonder  
UTC-300



**SHK400A**  
For Bonder  
ACB-400  
ACB-450



**SHK1000**  
For Bonder  
UTC-1000



**SHK2000**  
For Bonder  
UTC-2000



### KAIJO

**KAJ0118**  
For Bonder  
FB-118



**KAJ131B**  
For Bonder  
FB-131



**KAJ137A**  
For Bonder  
FB-137



**KAJ0170**  
For Bonder  
FB-170  
FB-180  
FB-190



**KAJ1000**  
For Bonder  
FB-1000



### ESEC

**ESE3000**  
For Bonder  
3006  
3008  
3018  
3088



**ESE3100**  
For Bonder  
3100



**ESE3101**  
For Bonder  
3100  
(Cu + Au Wire)



### DELVOTEC

**DEL6200**  
For Bonder  
6200  
6210



### RHOM

**RHMBW01**  
For Bonder  
ZWBC1



### KEC

**KEC180B**  
For Bonder  
KWB2100



### TOSHIBA

**TOS0943**  
For Bonder  
HN943

