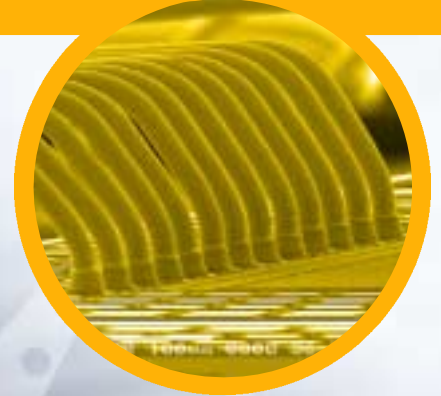
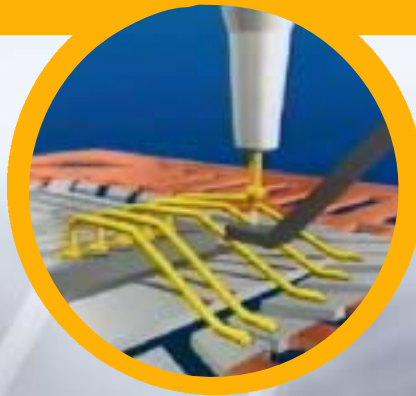


EFO Wands

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.

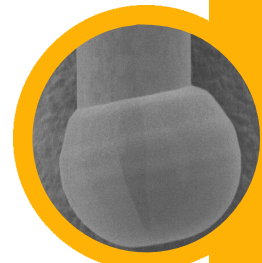
How To Order

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



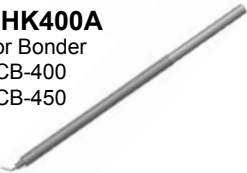
SHK0200
For Bonder
UTC-200
UTC-205



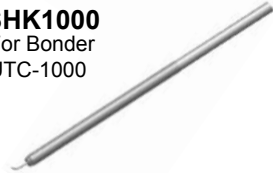
SHK0300
For Bonder
UTC-300



SHK400A
For Bonder
ACB-400
ACB-450



SHK1000
For Bonder
UTC-1000



SHK2000
For Bonder
UTC-2000



KAIJO

KAJ0118
For Bonder
FB-118



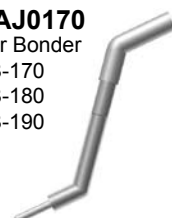
KAJ131B
For Bonder
FB-131



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

