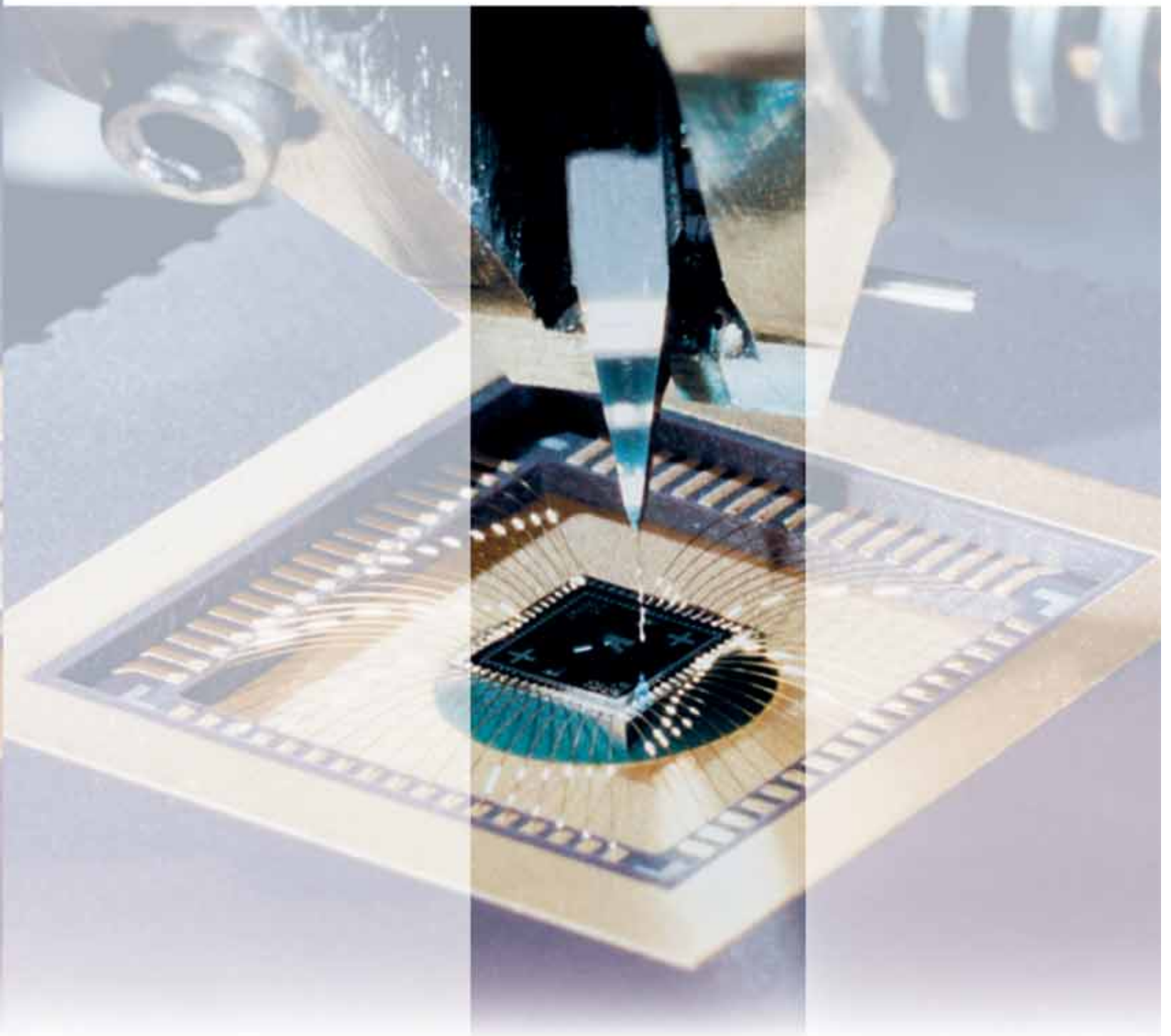


# Bonding Wedge Catalog

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## ABOUT MICRO POINT PRO

Micro Point Pro, a world-leader in semiconductor equipment manufacturing, materials and technology. MPP Bonding Tools creates innovative process solutions using internally designed state-of-the-art MPP brand bonding tools for a broad range of applications within the semiconductor industry.

Micro Point Pro is a pioneer in the development of solutions for Fine Pitch applications and a world leader in Ultra Fine Pitch solutions for complex packages such as BGAs and CSPs.

With over 30 years of design and manufacturing expertise in bonding tools, wire, and equipment, K&S offers its customers the best bonding solutions for their needs.

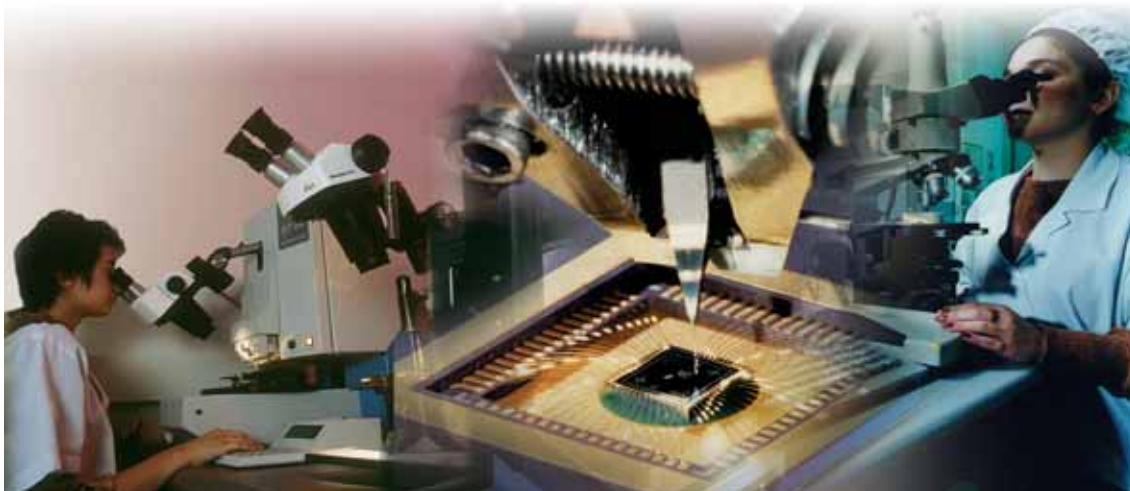
MPP sales representatives and application development facilities around the world are ready to support your need for bonding solutions.



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## MPP MANUFACTURING SYSTEM

Micro Point Pro has developed a “parametric” manufacturing process that produces every feature of the bonding tool separately. This flexible process accommodates both standard and special configurations. This flexibility is coupled with maintaining the highest quality standards, including ISO 9001 certification for on-going improvement.

MPP wedges are manufactured using Electric-Discharge Machining (EDM) processes that are unique in their precision. This technology enables the manufacture of wedges with high repeatability and consistency in dimensions and quality that can meet current and future industry requirements.

The standard wedge options presented in this catalog are stocked at MPP distribution centers worldwide and are easily ordered and supplied. Custom-made options are available upon request.

For custom tools please contact your local representative listed at [www.micro-pointpro.com](http://www.micro-pointpro.com)



*Electric-Discharge Machining (EDM) Process Room*

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## INDUSTRY TRENDS

The semiconductor industry has seen many changes over the past few years. The increased need for finer applications has posed multiple challenges to the success of the wire bonding process, and specifically to the manufacture of appropriate bonding tools.

Micro Point Pro has proved its mastery in developing Fine Pitch bonding tools to meet these industry challenges. Micro Point Pro has set the industry bar higher by providing the tightest tolerances to assure high yields for any mass production wire bonding process.

As a multinational corporation, Micro Point Pro has the advantage of employing the leading machine, wire and tool experts using the most advanced wire bonding equipment in the world. This unique human element provides our customers with an integrated solution for any wire bonding process.

## WEDGES AND OTHER BONDING SOLUTIONS

The wedge bonding process is a common interconnection technology among other interconnection methods such as ball bonding (using capillaries), TAB, Flip-Chip and others.

Although there have been significant breakthroughs in the development of innovative bonding solutions, wedge bonding remains the most popular method for applications that use Aluminum wire.

To assure the highest bonding standards and compatibility with specific process requirements, Micro Point Pro has developed a unique manufacturing method based on EDM (Electro Discharge Machining) technology using automatic EDM machines and advanced inspection equipment to create all wedge geometries.

The bonding process relies on the successful optimization of the bonding machine, the wire and the bonding tool. Each of these three factors needs to suit the application requirements and be inter-compatible with the other two. The ability to design a complete process solution through the optimization of all affecting factors is the key to the success of the wire bonding process.

There is a significant stage in bonding process optimization which necessitates the inspection of several tool designs when selecting the appropriate bonding tool. In analyzing the performance differences between tools, it is critical to identify the wedge parameters that affect bonding the most. The parameters that vary the most from one application to another are Front Radius, Back Radius, Bond Length, Wire Feed Angle, and Hole Diameter. The ability to customize these features to provide a form-fitting solution relies heavily on a flexible manufacturing system that supports frequent modifications to the wedge's features. Micro Point Pro' manufacturing is predicated on maximum customization abilities and higher flexibility, especially when specific configurations are required.

Micro Point Pro' manufacturing is subject to the strictest quality inspection standards in the industry, and is compliant with international standards (ISO and QS), thus assuring uniform and repeatable bonding tools.

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## AN INTRODUCTION TO WEDGE BONDING

Making electrical interconnections is a critical step in semiconductor production. Since over 60% of production costs are incurred before wire bonding, yield loss at this stage is very significant. Sophisticated machines, wedges and quality assurance techniques must be employed to obtain a satisfactory product.

Within the integration of bonder, wire and tool, the bonding tool plays a vital role in achieving a robust, reliable and reproducible process.

The following section presents a short introduction to the wedge bonding cycle and addresses some of the critical issues in designing or selecting a new bonding tool.

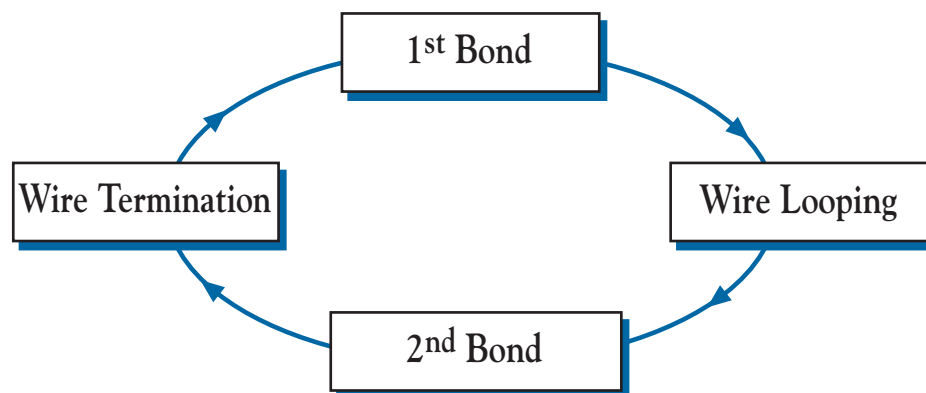
### THE WEDGE BONDING CYCLE

Wedge bonding is a process that creates an electrical connection between the silicon die and the package lead in a microelectronic device. The process employs a bonding machine (bonder) a bonding wire (Gold or Aluminum) and a bonding tool (wedge).

Initially, the wire is fed into the wedge at an angle from the back funnel, exiting from it's hole down to the foot (see fig. 1 on page 10). This design enables the wedge to bond wires in the feeding direction only. Therefore, either the device or the wedge (with the bonding head) should be rotated so that in most cases wires are bonded over the entire perimeter of the device.

The bonding process consists of applying ultrasonic energy to form a strong, reliable, intermetallic connection between the wire and the pad, as well as between the wire and the lead. This is accomplished by mounting the wedge in an ultrasonic transducer, which is coupled to a precision ultrasonic generator.

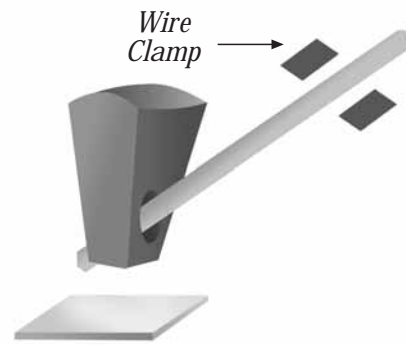
The four main phases of the cycle are:



Each phase is the result of several operations performed by the wedge. These operations can be presented as seven stages that complete the bonding cycle.

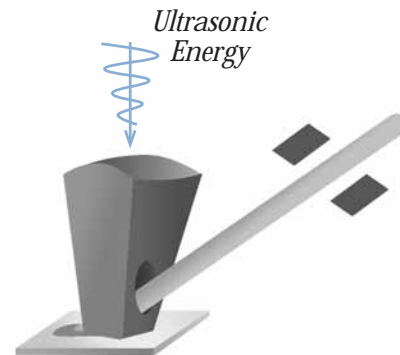
► **Stage 1**  
**Descent to the bonding pad**

The wedge is accurately targeted and aligned with the die's bond pad by the machine while the wire protrudes from the hole, just beneath the wedge foot.



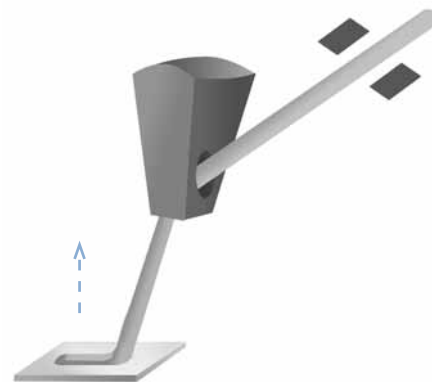
► **Stage 2**  
**1<sup>st</sup> bond creation**

The wedge is moved downwards, and the foot deforms the wire while force and ultrasonic vibrations are transmitted through the wedge (in the Gold wire process heat is applied throughout).



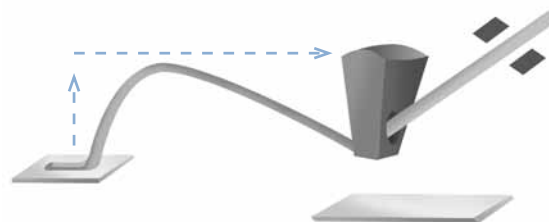
► **Stage 3**  
**Rise to loop height position**

After the 1<sup>st</sup> bond is deformed, the wedge rises above the pad. The opening of the clamp allows the wire to slide through.



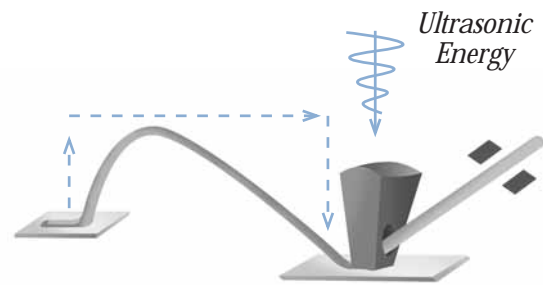
► **Stage 4**  
**Formation of the Loop**

While the clamps remain open the wedge tool moves towards the position of the 2<sup>nd</sup> bond. This free feeding of the wire through the wedge hole creates the loop formation, which in turn is based on the machine bondhead motion profile (most common are Square and Triangle).



► **Stage 5**  
**2<sup>nd</sup> bond creation**

The wedge now descends towards the 2<sup>nd</sup> bond pad, pressing the wire against the lead with the foot. All the while force and ultrasonic energy are applied creating the 2<sup>nd</sup> bond.



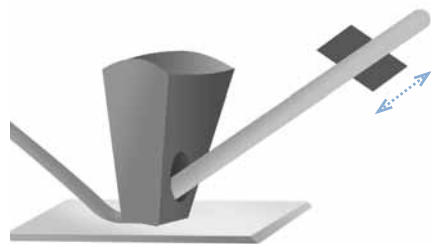
► **Stage 6**  
**Wire termination**

The wire clamps retract at the end of the 2<sup>nd</sup> bond, pulling the wire and causing it to break at its weakest point. A clean termination of the wire at this stage is a critical factor for tail length consistency.

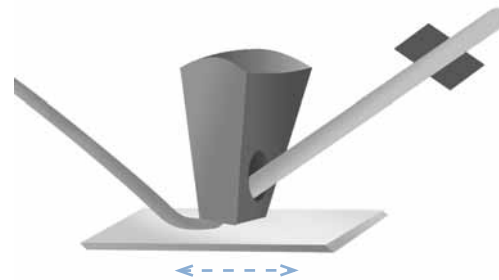


Wedge bonding is performed utilizing two wire tear methods, the clamp tear and the table tear.

The table tear system differs from the clamp tear mainly in the way the wire breaks after the formation of the 2<sup>nd</sup> bond. Instead of the clamps retracting, the table moves and breaks the wire. The clamps are stationary and simply open or close. This method is used mainly at elevated feed angles for more consistent tail and bond positioning.



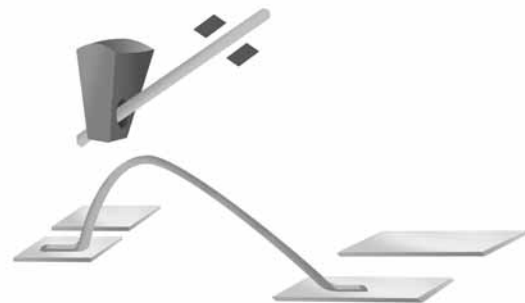
*Clamp Tear Methods*



*Table Tear Methods*

► **Stage 7**  
**Bond next wire**

The bond head raises the wedge to the initial height and the clamps push the wire through the hole, underneath the foot. In this way, a new tail is formed and the wedge is ready for a new cycle.





## WEDGE DESIGN CONSIDERATIONS

Each of the wedge parameters plays a specific role in over all bonding process performance. The compatability of wedge parameters to the application requirements defines the process quality.

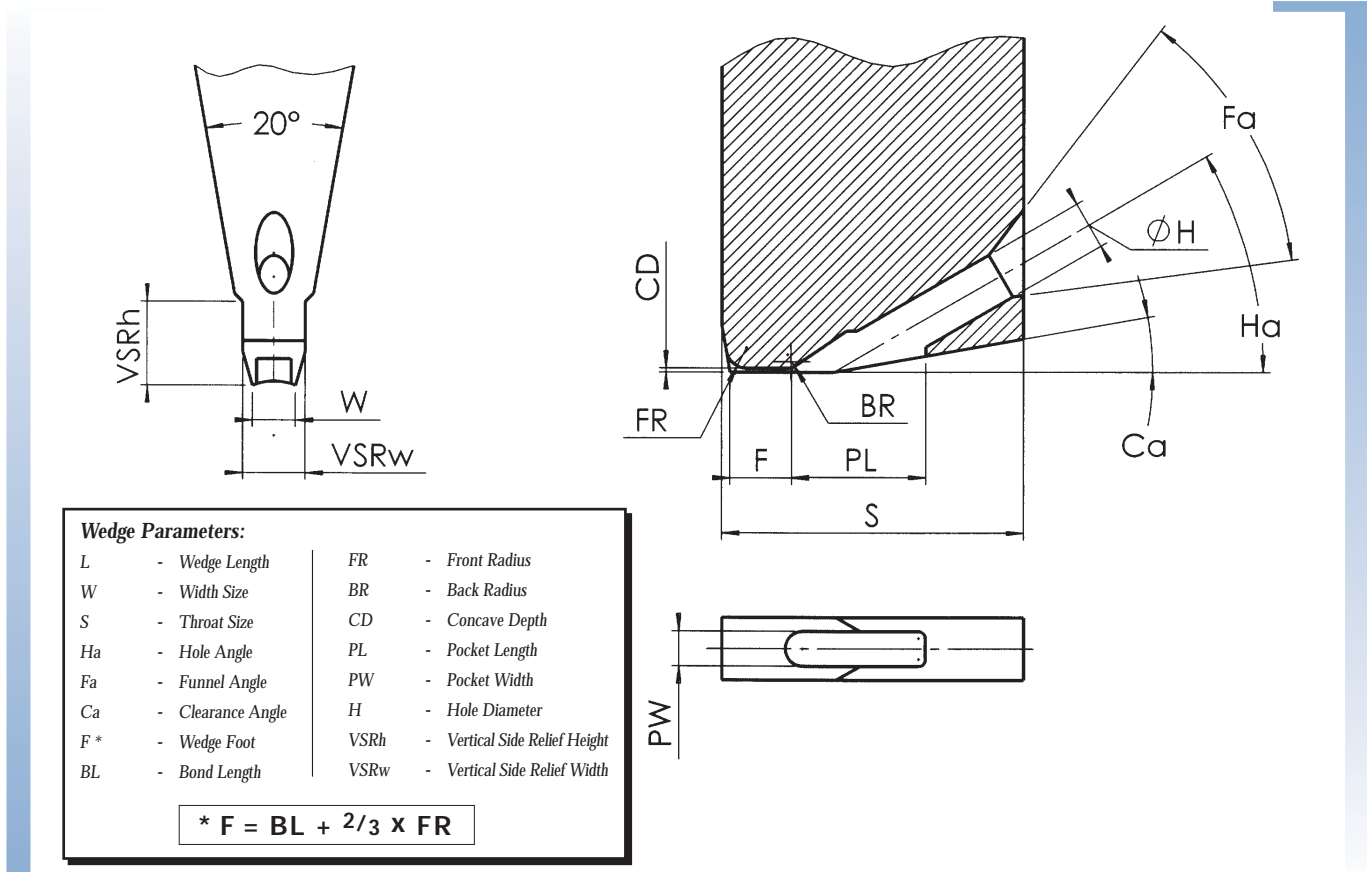


Fig. 1 - Wedge Parameters

### 1. Bond Pad Pitch

The Bond Pad Pitch is the defined distance between the centers of two adjacent pads. The desired pad pitch, derived from the application's constraints, prescribes the type of wedge that should be used.

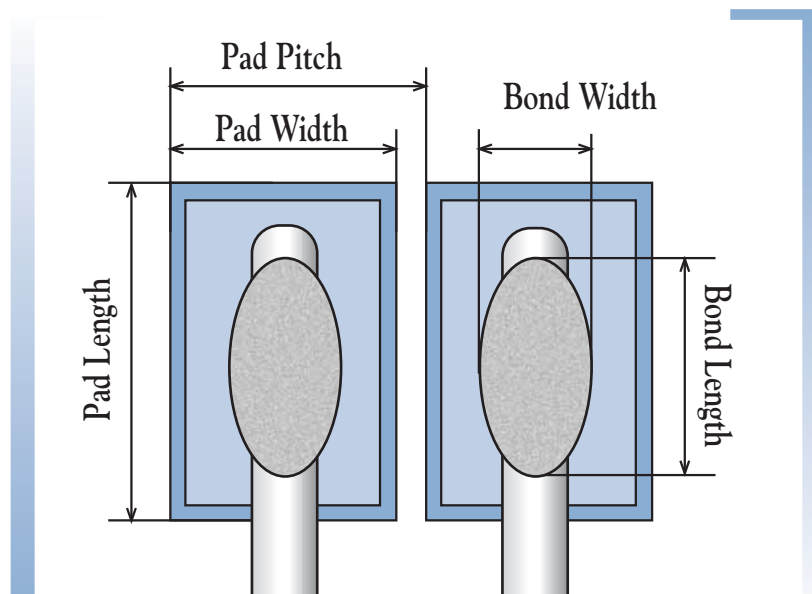


Fig. 2 - Basic Bond Parameters

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## 2. 1<sup>st</sup> Bond Width

The 1<sup>st</sup> bond width and length are derived from the die pad opening. Most applications require 100% of the bond on the die pad. The 1<sup>st</sup> bond is mostly affected by two wedge parameters: BL (Bond Length) and W (Bond Width). These parameters determine the size of the 1<sup>st</sup> bond and should be considered with regard to the 1<sup>st</sup> bond target.

## 3. Wire Diameter

The wire diameter is defined by application requirements. Finer processes naturally employ thinner wires. The wedge hole, therefore, is defined by the desired wire diameter.

Generally, thick wires are preferable due to their strength and better resistance to sweep during molding. However, there is a delicate balance between hole and wire that needs to be observed in order to maintain the critical gap that allows the free and uninhibited movement of the wire. This critical gap is vital for the success of the process and the elimination of cases of wire sway and wire friction.

### MPP Wedge Design Recommendations

Wire Diameter (mil)	Round Hole		Oval Hole	
	Recommended (inches)	Minimum (inches)	Hole Width (inches)	Hole Height (inches)
2.00	.0035	.0032	.0030	.0040
1.50	.0030	.0025	.0025	.0035
1.25	.0025	.0020	.0022	.0028
1.00	.0020	.0016	.0017	.0023
0.70	.0015	.0013	.0013	.0017

## 4. Looping

Various device structures (flat package, deep access package, etc.) require different loop profiles, heights and lengths. The loop height determines the wire feed angle (see fig. 3 below). Additionally, stable looping relies on other internal wedge dimensions such as Hole shape, Hole diameter and Pocket length (see fig. 5 on page 14).

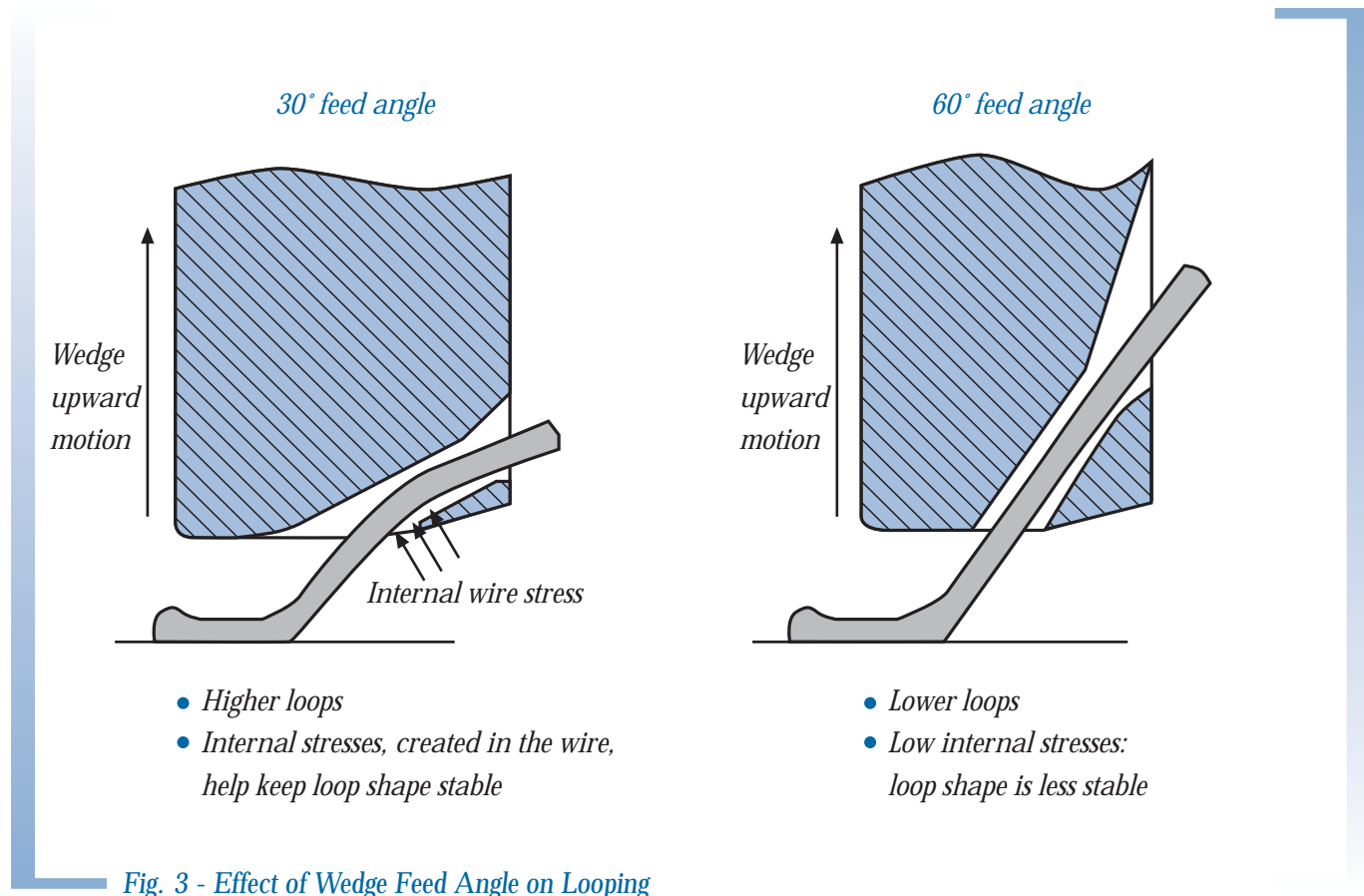


Fig. 3 - Effect of Wedge Feed Angle on Looping

## 5. Second Bond Quality

Design considerations related to the 2<sup>nd</sup> bond are very similar to that of the 1<sup>st</sup> bond. The 2<sup>nd</sup> bond is equally affected by the Front and Back Radius (FR and BR), which impact the 2<sup>nd</sup> bond heel strength and bond termination point, respectively.

## TECHNICAL GUIDE

Each of the wedge parameters plays a specific role in the bonding process. The proper value of each parameter defines the process quality.

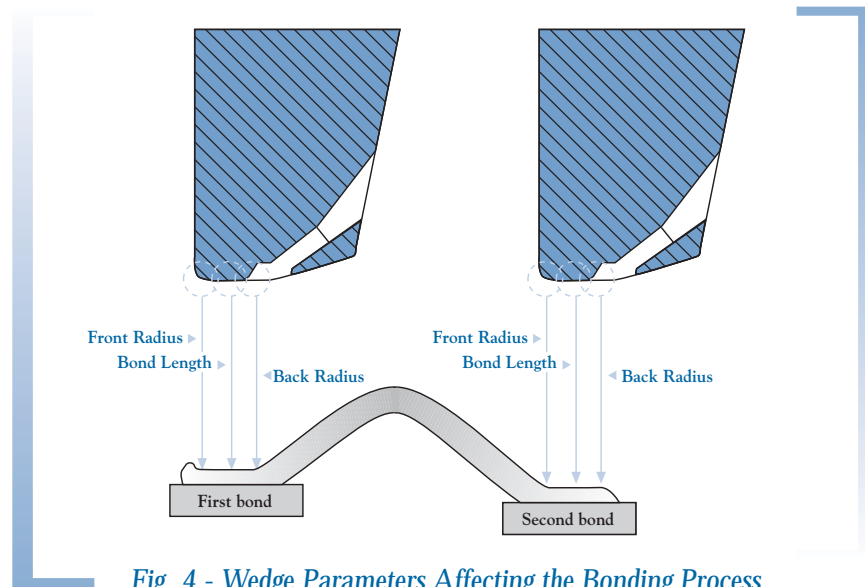


Fig. 4 - Wedge Parameters Affecting the Bonding Process

### 1<sup>st</sup> BOND RELATED ISSUES

The 1<sup>st</sup> bond is characterized mainly by its repeatable location on the pad, tail consistency, bond squash, and bond strength. Here, the foot comes to play major role:

- 1) The foot deforms the wire at a length equal to the Bond Length (BL);
- 2) it transmits the ultrasonic energy to the bond.
- 3) and it helps control bond placement accuracy.

The foot is characterized by length (BL), shape (flat, concave, or groove), and surface finish (polish or matte):

- Concave foot is appropriate for most automatic AI wire applications.
- Flat foot is used mainly with Au wires (see section 1 on page 15) or Aluminum wires, to obtain extremely small bonds.
- Cross Groove (CG) option is used mainly for Au wire applications to improve the wedge-to-wire grip.

The 1<sup>st</sup> bond pull strength is greatly affected by the Back Radius (BR). If the transition area is too sharp, the heel of the bond becomes too weak, and breaks when pulling the wire. To strengthen this area, a proper BR size should be carefully selected.

Hole size (H) influences the 1<sup>st</sup> bond's location. The smaller the hole, the tighter the control on the location. On the other hand, care should be taken not to deteriorate tail consistency by making the hole too small.

The 1<sup>st</sup> bond's tail length consistency is affected to a great extent by wire feeding, namely by the feed angle, the hole shape and surface quality.

## THE EFFECT ON LOOPING

The main wedge parameters that affect looping are hole size, shape and feed angle.

Micro Point Pro provides two standard options for the hole. The first is the round hole, whose control on tail length is satisfactory for most applications.

For more demanding applications, like Fine Pitch bonding, the second standard - the oval hole - is more suitable because of its better control on bond location and the reduction of stress on the wire.

The internal shape of the hole, together with the surface quality, are key factors for smooth streaming of the wire on one hand, and for reducing the build-up rate on the other.

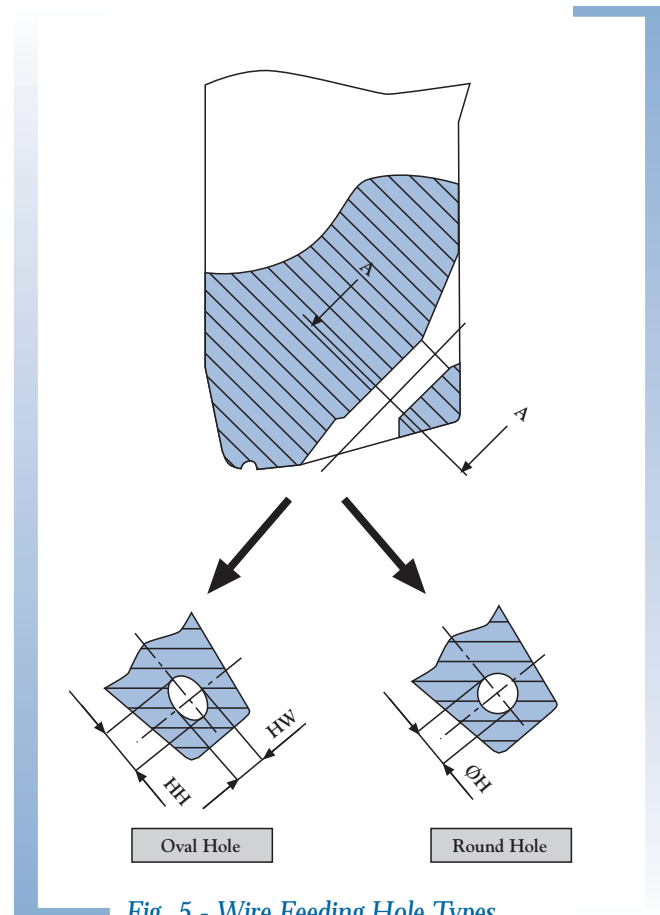


Fig. 5 - Wire Feeding Hole Types

## 2<sup>nd</sup> BOND RELATED ISSUES

As compared to the 1<sup>st</sup> bond, the Front Radius (FR) and the Back Radius (BR) switch their functions. The FR and the bond length chiefly define the strength of the 2<sup>nd</sup> bond. At this point, the BR affects tail consistency only by providing a stress concentration point where the wire would break.

Usually, 2<sup>nd</sup> bonds are performed on the leads, which are, in many cases, less restricted in space than the pads, making conditions less demanding than in the case of the 1<sup>st</sup> bond.

## WEDGE MATERIAL

An important aspect of wedge design is the definition of the material from which it is made. Micro Point Pro now offers several types of carbide materials for wedges:

- ≠ Tungsten Carbide (WC), for Aluminum wire applications.
- ≠ Titanium Carbide (TiC), extremely useful for gold wire wedge bonding.

New grades of TiC materials are also available for special Fine Pitch Au wire applications. (For more information on these materials, please consult your local MPP representative).

## WEDGE BONDING APPLICATION TYPE

Wedge bonding includes two main application types:

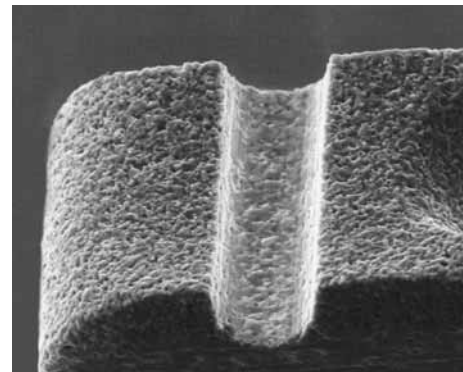
- 1) Gold (Au) Wire Applications
- 2) Aluminum Silicon (AlSi) Wire Applications

### 1) GOLD WIRE WEDGE BONDING

One of the major challenges facing wedge bonding is the use of gold wires.

In the gold wedge bonding process the devices need to be heated, normally to 150°C (medium-low range), using a heated workhold.

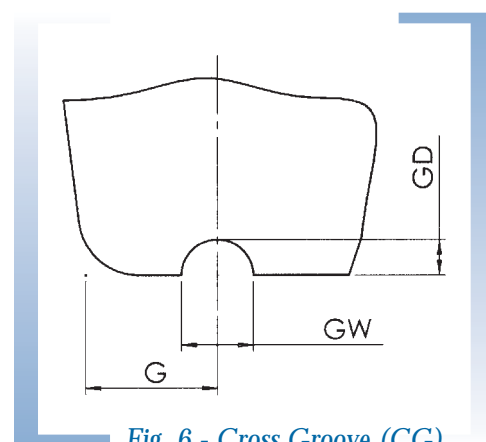
Wedges for gold wire bonding should be made out of a TiC (Titanium Carbide) material, and a Cross Groove (CG) feature needs to be added on the wedge foot for better coupling between the wire and the wedge during ultrasonic bonding.



*Cross Groove Tip Feature*

### Cross-Groove Option for Gold Wire Applications (Reference Table)\*

BL *** (inches)	GW (inches)	GD (inches)	G ** (inches)
.0015	.0006	.0003	.0011
.0020	.0006	.0003	.0016
.0025	.0008	.0003	.0018
.0030	.0010	.0004	.0021
.0035	.0012	.0004	.0023
.0040	.0014	.0005	.0026
.0045	.0016	.0005	.0028
.0050	.0018	.0006	.0031



*Fig. 6 - Cross Groove (CG)*

\* Other groove dimensions available upon request.

\*\* G dimensions in the above table are applicable when FR= .0010". Otherwise the groove is located at the center of the Bond Length.

\*\*\* Cross Groove feature is available for BL ≥ .0015".

## 2) ALUMINUM WIRE WEDGE BONDING

Wedge bonding is traditionally used with Aluminum wire. During this process, room temperature is sufficient and suitable for devices that can not be heated.

The wedge for Aluminum wire bonding should be made out of WC (Tungsten Carbide) material and have a concave foot feature for better wire placement underneath the foot.

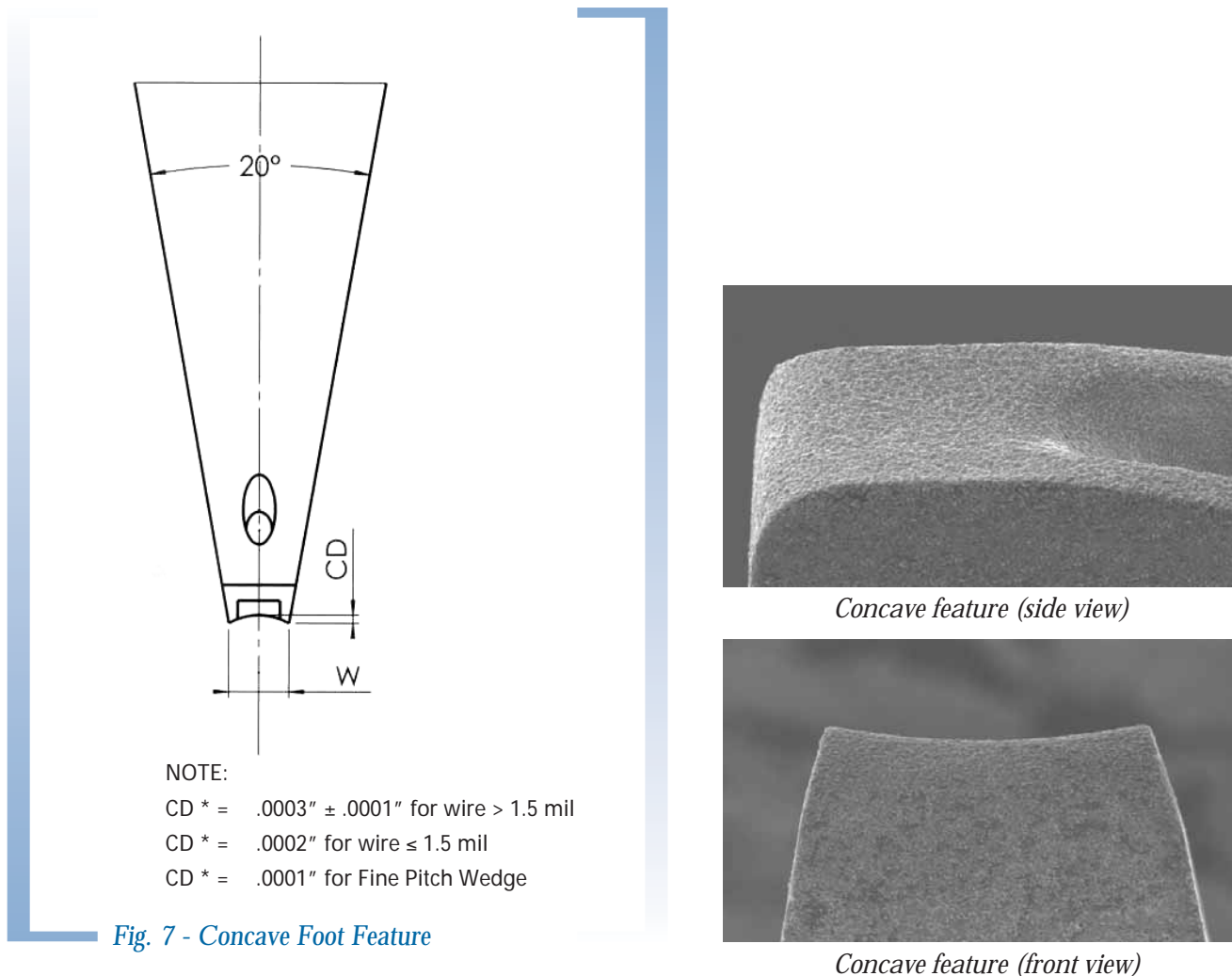
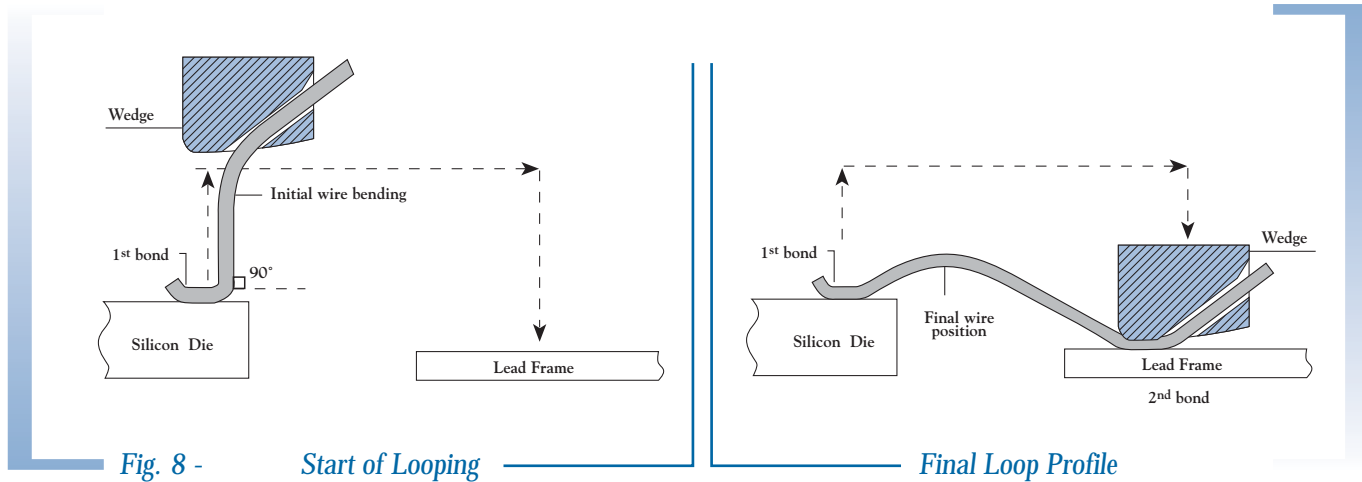


Fig. 7 - Concave Foot Feature

## Heel Crack Control

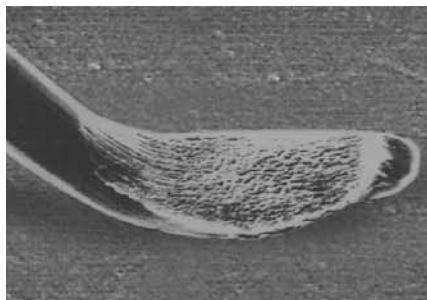
Heel cracks were considered for many years to be the number one problem in Aluminum wedge bonding. The poor bending properties of Aluminum wire essentially cause heel cracks. When creating the loop shape, the wedge is usually moved in a square or triangular profile by the machine. This movement causes a cyclic bending of the wire, which creates heel cracks. Note that in the first stage of looping the wire is bent almost 90° to the die surface, while in the final loop, the angle is much smaller.

The CBR feature significantly reduces the amount of this initial wire bending and eliminates heel cracks by strengthening the heel area. (The CBR option may affect tail consistency.)

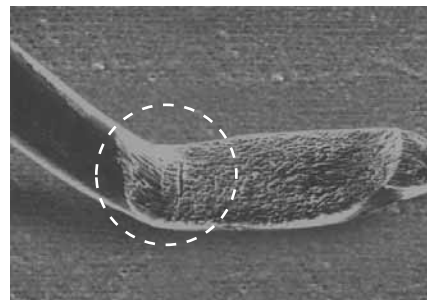


The CBR feature can be added to almost any wedge design and implemented in most applications. Tests performed to validate the CBR design showed superior parameter stability (a wider window of parameters).

Since the heel cracks phenomenon is related to Al wire, the CBR option is recommended mainly for these kind of applications.



*1<sup>st</sup> Bond created with CBR feature*



*1<sup>st</sup> Bond Heel Cracks*

## PROCESS OPTIMIZATION

The key to a strong and reliable bond is a set of optimization, controlled wedge and machine parameters. It is important to understand that this process is characterized by the combination of its many component systems, starting with the die, the package, the wire, the wedge and the machine settings. Good bonding performance is the result of proper wedge selection and the selection of optimal machine parameters.

As the application becomes more demanding, the range of possibilities narrows. Adjustments to machine parameters requires thorough expertise to find parameter windows that generate a robust manufacturing process. Micro Point Pro engineers are highly qualified to help you select a specific wedge and define the optimal parameter windows for your application.



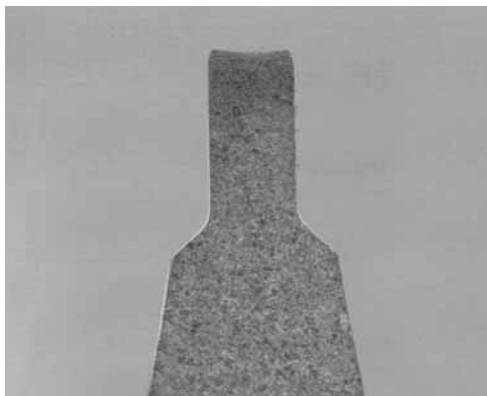
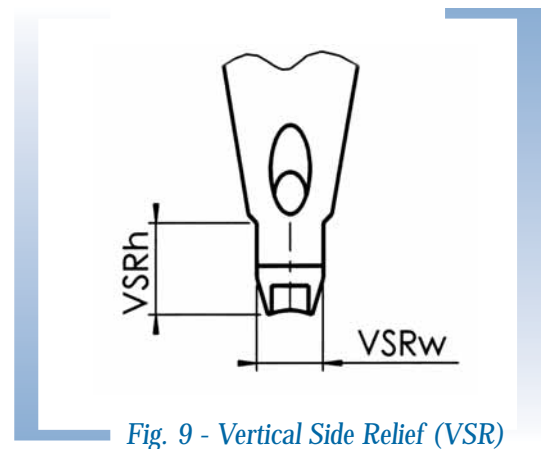
## THE CHALLENGES OF FINE PITCH WEDGE BONDING

### AVOIDING CONTACT BETWEEN THE WEDGE AND THE ADJACENT WIRE

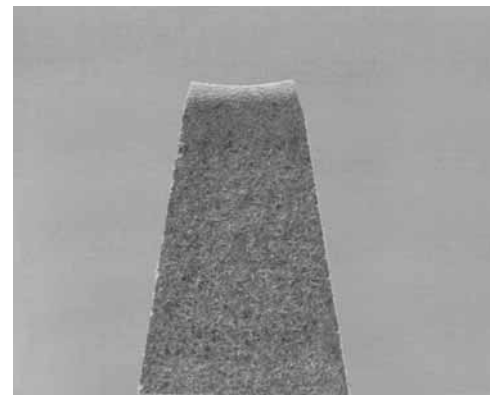
Fine Pitch wire bonding applications have an additional vertical side relief (VSR) that cuts into the wedge's sides. This relief is intended to increase the clearance between the loop and the adjacent wire. The VSR contains two basic features: the height (VSRh) and the width (VSRw). These features depend on the application's pad pitch, wire diameter and effective loop height. Higher feed angle enables an increase in the VSR height (see table below). Therefore, feed angles of 45° and above are recommended for Fine Pitch applications. The VSRw is limited only by the wall thickness of the material on both sides of the hole.

#### Available VSRh Per Wedge Feet Angle

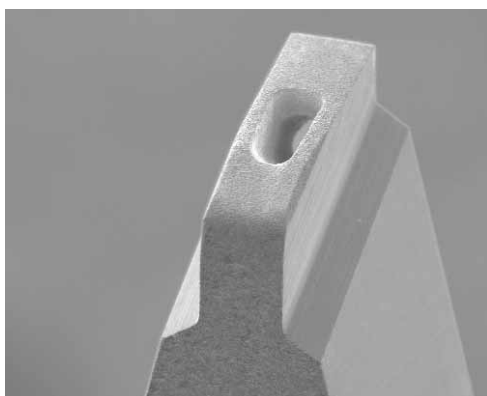
Feed Angle (°)	VSRh (inches)
30	.0045
38	.0060
45	.0060
60	.0075



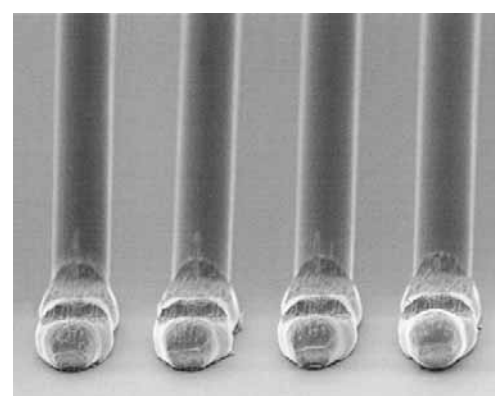
*Fine Pitch Wedge*



*Standard Wedge*



*Wedge With VSR Configuration*



*Fine Pitch Wedge Bonding*

## KEEPING BOND WIDTH TIGHTER

As Fine Pitch wire bonding applications feature extremely tight pad pitches, bond width size becomes critical. Therefore, 1<sup>st</sup> bond width should be as close to the wire diameter as possible. Micro Point Pro has developed a special tip feature; the Linear Groove (LG), which maintains the actual bond width at 1.2 times wire diameter.

With the LG, the wire is maintained inside a groove during bond creation, limiting wire deformation and allowing the bonding energy to create better intermetallic connections between the bonding pad and the bonded wire.

Another important advantage of the LG is bond placement accuracy on the pad. The LG eliminates any undesired wire movements underneath the wedge foot, thanks to its special groove design. This dramatically increases the bond placement accuracy on the pad, and reduces the quantities of bond-off-pads, which are considered to be the major cause of yield loss in Fine Pitch applications (see fig. 10 below).

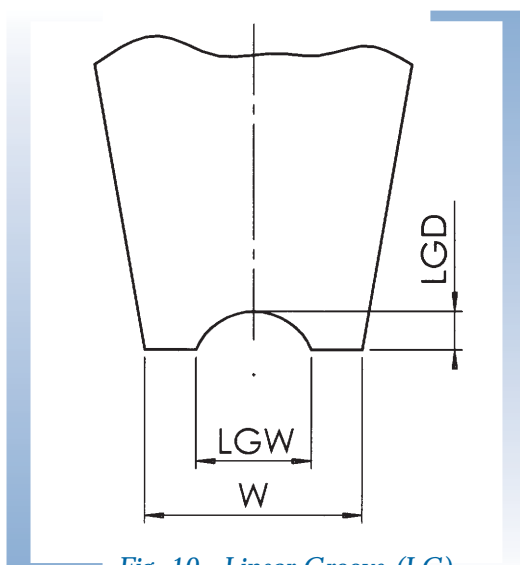
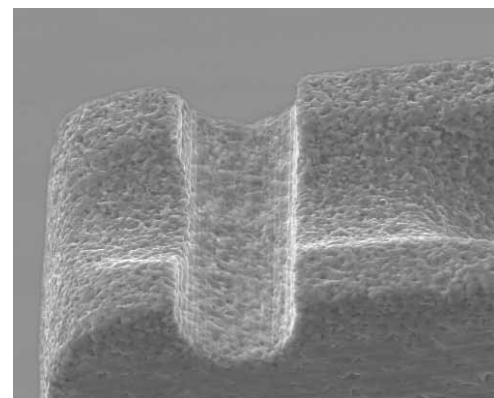
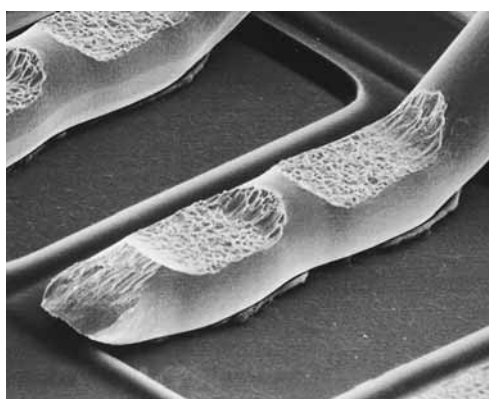


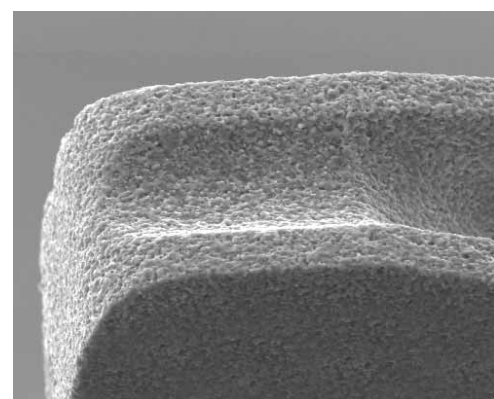
Fig. 10 - Linear Groove (LG)



Linear and Cross Groove Tip Configuration



1<sup>st</sup> Bond with Linear & Cross Groove Wedge Configuration



Linear Groove Tip Configuration

## WEDGE FOR FINE PITCH APPLICATIONS

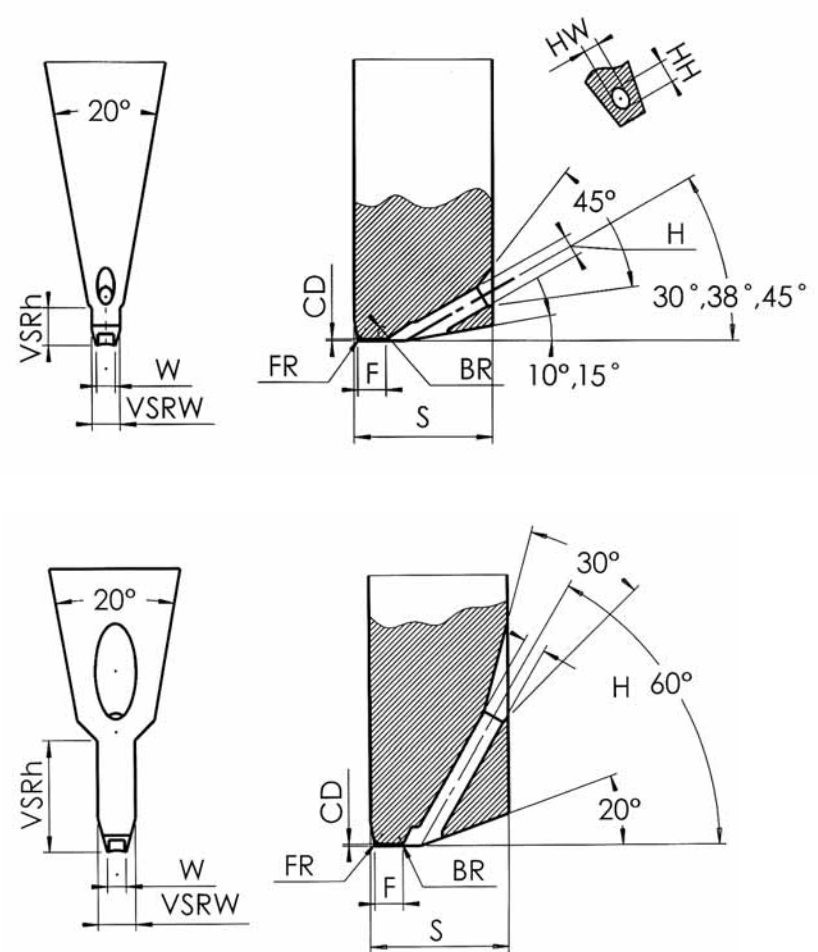
The 4WF wedges model are designed for Fine Pitch applications, usually performed on automatic machines.

They feature the full range of dimensions that appear in common wedges, but in addition they include a VSR (Vertical Side Relief) to avoid wedge interference with the adjacent wires. The 4WF model has an oval hole and 30°, 45° or 60° feed angles to allow for smaller wire pitch.

When using gold wires, a cross groove is used and TiC material is recommended.

To improve wire placement control in Fine Pitch gold wire applications, a combined concave and cross groove foot design is recommended.

A variety of standard finished tips are also available for this model.



Wire Feed Angle		Material		Surface Finish	
6	60°	C	Cermet	R	Polished FR
4	45°	K	Tungsten Carbide	P	Polished Foot (for BL ≥ .0020")
1	38°	W	Tungsten Carbide	F	Polished FR & BR & CBR
0	30°	T	Titanium Carbide	B	Polished BR & CBR
				M	Matte

Bond Length (Tenth of a mil)		Hole Diameter (Tenth of a mil)		Tip Options	
4	W	F		00	Oval Hole
A		C		02	Polish EHR, Hole & Funnel
B		D		04	Polish Hole
V		E		05	Polish EHR
S		F		06	Polish Funnel
M		G		07	Polish EHR & Funnel
		H		08	Polish Hole & Funnel
		J		10	Polish Back Side Funnel + Funnel
		K		11	Polish Back Side Funnel + Funnel + Hole + EHR
				XX	From 21 - 99 special options, please consult factory

Wedge Length		Other Options	
1.078"	0	F	Flat
.540"	1	C	Concave
.437"	3	G	Cross Groove
.625"	4	L	Linear Groove
.750"	5	H	CBR & Concave
.828"	6	D	Concave & Cross Groove
1.000"	7	E	Linear Groove & Cross Groove
.650"	8		
1.200"	A		

Other Options  
For Internal use only

Suggested Wire	HD BL	For AISi Wires		For Au Wires		Width W $\frac{\text{inches}}{\mu\text{m}}$	VSR Width $\frac{\text{inches}}{\mu\text{m}}$	S (Throat size)			
		FR $\frac{\text{inches}}{\mu\text{m}}$	BR $\frac{\text{inches}}{\mu\text{m}}$	FR $\frac{\text{inches}}{\mu\text{m}}$	BR $\frac{\text{inches}}{\mu\text{m}}$			For 30' $\frac{\text{inches}}{\mu\text{m}}$	For 38' $\frac{\text{inches}}{\mu\text{m}}$	For 45' $\frac{\text{inches}}{\mu\text{m}}$	For 60' $\frac{\text{inches}}{\mu\text{m}}$
.0007 - .0008 inches 18 - 20 $\mu\text{m}$	-1510-	.0005 13	.0005 13	.0005 13	.0003 8	.0023 58	.0025 54	.0160 406	.0150 381	.0140 356	.0120 305
	-1515-	.0008 20	.0008 20	.0008 20	.0005 13	.0023 58	.0025 54	.0160 406	.0150 381	.0140 356	.0120 305
	-1520-	.0008 20	.0008 20	.0008 20	.0005 13	.0023 58	.0025 54	.0160 406	.0150 381	.0140 356	.0120 305
	-1525-	.0008 20	.0008 20	.0008 20	.0005 13	.0023 58	.0025 54	.0160 406	.0150 381	.0140 356	.0120 305
.0010 - .0012 inches 25 - 30 $\mu\text{m}$	-2010-	.0005 13	.0005 13	.0005 13	.0003 8	.0026 66	.0030 76	.0150 381	.0150 381	.0140 356	.0120 305
	-2015-	.0010 25	.0010 25	.0010 25	.0005 13	.0026 66	.0030 76	.0180 457	.0180 457	.0140 356	.0120 305
	-2020-	.0010 25	.0010 25	.0010 25	.0005 13	.0026 66	.0030 76	.0180 457	.0180 457	.0140 356	.0120 305
	-2025-	.0010 25	.0010 25	.0010 25	.0005 13	.0026 66	.0030 76	.0180 457	.0180 457	.0140 356	.0120 305
	-2030-	.0010 25	.0010 25	.0010 25	.0005 13	.0026 66	.0030 76	.0180 457	.0180 457	.0140 356	.0120 305
	-2035-	.0010 25	.0010 25	.0010 25	.0005 13	.0026 66	.0030 76	.0180 457	.0180 457	.0140 356	.0120 305
.0012 - .0015 inches 30 - 38 $\mu\text{m}$	-2515-	.0010 25	.0010 25	.0010 25	.0005 13	.0031 79	.0036 91	.0180 457	.0180 457	.0140 356	.0120 305
	-2520-	.0010 25	.0010 25	.0010 25	.0005 13	.0031 79	.0036 91	.0200 508	.0180 457	.0140 356	.0120 305
	-2525-	.0010 25	.0010 25	.0010 25	.0005 13	.0031 79	.0036 91	.0200 508	.0180 457	.0140 356	.0120 305
	-2530-	.0010 25	.0010 25	.0010 25	.0008 20	.0031 79	.0036 91	.0200 508	.0180 457	.0140 356	.0140 356
	-2535-	.0010 25	.0010 25	.0010 25	.0008 20	.0031 79	.0036 91	.0200 508	.0180 457	.0140 356	.0140 356

\* Dimensions in this table refer to the most common shank styles. For other options please contact your local MPP representative

The  $\mu\text{m}$  dimensions in the table above are for reference only

## Round Hole-to-Oval Hole Conversion Table

Suggested Wire Diameter inches/ $\mu\text{m}$	Round Hole HD inches/ $\mu\text{m}$	Oval Hole HD	
		HW inches/ $\mu\text{m}$	HH inches/ $\mu\text{m}$
.0007 / 18-.0008 / 20	.0015 / 38	HD - .0002 / 5	HD + .0003 / 8
.0010 / 25-.0012 / 30	.0020 / 51	HD - .0003 / 8	HD + .0003 / 8
.0012 / 30-.0015 / 38	.0025 / 64	HD - .0003 / 8	HD + .0003 / 8
.0015 / 38-.0018 / 46	.0030 / 76	HD - .0005 / 12	HD + .0005 / 12
.0018 / 46-.0020 / 51	.0035 / 89	HD - .0005 / 12	HD + .0005 / 12

HD - Hole Diameter, HW - Hole Width, HH - Hole Height

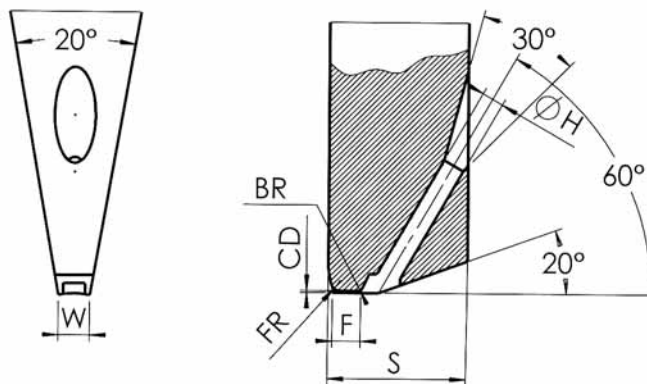
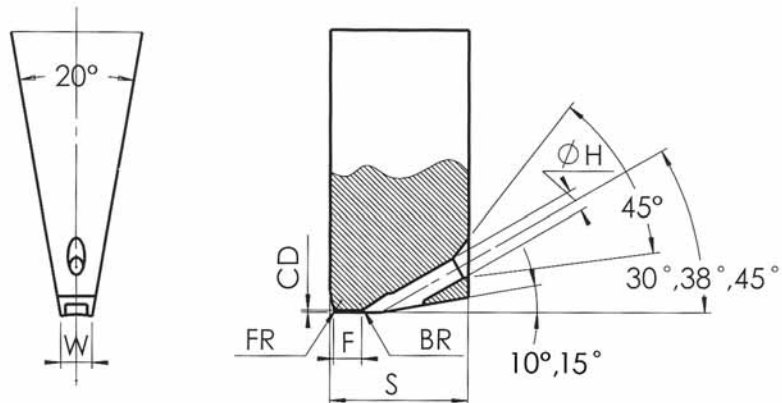
## WEDGE FOR STANDARD AUTOMATIC BONDING

The 4WA wedges model are designed to fit the majority of common applications as well as most of the automatic wedge bonders employed in the industry. The standard wedge features a full range of feed angles to cover a wide spectrum of automatic wedge bonding requirements.

A number of standard features are available for this model, such as:

- Concave for Aluminum wire application
- CBR feature to strengthen the heel area of the 1<sup>st</sup> bond
- CG (Cross Groove) for Gold wire applications

A variety of standard finished tips are also available for this model.



Wire Feed Angle		Material		Surface Finish	
6	60°	C	Cermet	R	Polished FR
4	45°	K	Tungsten Carbide	P	Polished Foot (for BL ≥ .0020")
1	38°	W	Tungsten Carbide	F	Polished FR & BR & CBR
0	30°	T	Titanium Carbide	B	Polished BR & CBR
				M	Matte

Bond Length (Tenth of a mil)		Hole Diameter (Tenth of a mil)		Tip Options		Other Options	
4	W	A				00	Standard
						01	Oval Hole
						02	Polish EHR, Hole & Funnel
						04	Polish Hole
						05	Polish EHR
						06	Polish Funnel
						07	Polish EHR & Funnel
						08	Polish Hole & Funnel
						10	Polish Back Side Funnel + Funnel
						11	Polish Back Side Funnel + Funnel + Hole + EHR
						XX	From 21 - 99 special options, please consult factory

Standard Shanks (see page 34)		Wedge Length	
A		1.078"	0
B		.540"	1
V		.437"	3
S		.625"	4
M		.750"	5
		.828"	6
		1.000"	7
		.650"	8
		1.200"	A

Suggested Wire	HD BL	For AISi Wires		For Au Wires		Width W $\frac{\text{inches}}{\mu\text{m}}$	S (Throat size)			
		FR $\frac{\text{inches}}{\mu\text{m}}$	BR $\frac{\text{inches}}{\mu\text{m}}$	FR $\frac{\text{inches}}{\mu\text{m}}$	BR $\frac{\text{inches}}{\mu\text{m}}$		For 30° $\frac{\text{inches}}{\mu\text{m}}$	For 38° $\frac{\text{inches}}{\mu\text{m}}$	For 45° $\frac{\text{inches}}{\mu\text{m}}$	For 60° $\frac{\text{inches}}{\mu\text{m}}$
.0007 - .0008 inches 18 - 20 $\mu\text{m}$	-1510-	.0010 25	.0005 13	.0010 25	.0005 13	.0030 76	.0120 305	.0120 305	.0110 279	.0100 254
	-1515-	.0010 25	.0008 20	.0010 25	.0005 13	.0030 76	.0140 356	.0120 305	.0110 279	.0100 254
	-1520-	.0010 25	.0005 13	.0010 25	.0005 13	.0030 76	.0140 356	.0120 305	.0140 356	.0100 254
	-1525-	.0010 25	.0005 13	.0010 25	.0005 13	.0030 76	.0140 356	.0140 356	.0140 356	.0100 254
.0010 - .0012 inches 25 - 30 $\mu\text{m}$	-2010-	.0005 13	.0005 13	.0005 13	.0005 13	.0040 102	.0140 356	.0140 356	.0140 356	.0100 254
	-2015-	.0010 25	.0010 25	.0010 25	.0005 13	.0040 102	.0140 356	.0140 356	.0140 356	.0120 305
	-2020-	.0010 25	.0010 25	.0010 25	.0005 13	.0040 102	.0140 356	.0140 356	.0140 356	.0120 305
	-2025-	.0010 25	.0010 25	.0010 25	.0005 13	.0040 102	.0140 356	.0140 356	.0140 356	.0120 305
	-2030-	.0010 25	.0010 25	.0010 25	.0005 13	.0040 102	.0140 356	.0140 356	.0140 356	.0140 356
	-2035-	.0010 25	.0010 25	.0010 25	.0010 25	.0040 102	.0140 356	.0140 356	.0140 356	.0140 356
.0012 - .0015 inches 30 - 38 $\mu\text{m}$	-2515-	.0010 25	.0010 25	.0010 25	.0008 20	.0040 102	.0140 356	.0140 356	.0140 356	.0120 305
	-2520-	.0010 25	.0010 25	.0010 25	.0008 20	.0040 102	.0140 356	.0140 356	.0140 356	.0120 305
	-2525-	.0010 25	.0010 25	.0010 25	.0008 20	.0040 102	.0170 432	.0140 356	.0140 356	.0120 305
	-2530-	.0010 25	.0010 25	.0010 25	.0008 20	.0040 102	.0170 432	.0140 356	.0140 356	.0140 356
	-2535-	.0010 25	.0010 25	.0010 25	.0008 20	.0040 102	.0170 432	.0150 381	.0150 381	.0140 356
	-2540-	.0010 25	.0010 25	.0010 25	.0008 20	.0040 102	.0170 432	.0200 508	.0150 381	.0140 356
.0015 - .0018 inches 38 - 46 $\mu\text{m}$	-3020-	.0010 25	.0010 25	.0010 25	.0010 25	.0050 127	.0170 432	.0200 508	.0180 457	.0180 457
	-3025-	.0010 25	.0010 25	.0010 25	.0010 25	.0050 127	.0170 432	.0200 508	.0180 457	.0180 457
	-3030-	.0010 25	.0010 25	.0010 25	.0010 25	.0050 127	.0200 508	.0200 508	.0180 457	.0180 457
	-3035-	.0010 25	.0010 25	.0010 25	.0010 25	.0050 127	.0200 508	.0200 508	.0180 457	.0180 457
	-3040-	.0010 25	.0010 25	.0010 25	.0010 25	.0050 127	.0200 508	.0200 508	.0180 457	.0180 457
.0018 - .0020 inches 46 - 51 $\mu\text{m}$	-3525-	.0015 38	.0010 25	.0015 38	.0010 25	.0050 127	.0220 559	.0220 559	.0180 457	.0180 457
	-3530-	.0015 38	.0010 25	.0015 38	.0010 25	.0050 127	.0220 559	.0220 559	.0180 457	.0180 457
	-3535-	.0015 38	.0010 25	.0015 38	.0010 25	.0050 127	.0220 559	.0220 559	.0180 457	.0180 457
	-3540-	.0015 38	.0010 25	.0015 38	.0010 25	.0060 152	.0220 559	.0220 559	.0180 457	.0180 457
	-3545-	.0015 38	.0010 25	.0015 38	.0010 25	.0060 152	.0220 559	.0220 559	.0180 457	.0180 457

\* Dimensions in this table refer to the most common shank styles. For other options please contact your local MPP representative

The  $\mu\text{m}$  dimensions in the table above are for reference only



Suggested Wire	HD BL	For AISi Wires		For Au Wires		Width W $\frac{\text{inches}}{\mu\text{m}}$	S (Throat size)		
		FR $\frac{\text{inches}}{\mu\text{m}}$	BR $\frac{\text{inches}}{\mu\text{m}}$	FR $\frac{\text{inches}}{\mu\text{m}}$	BR $\frac{\text{inches}}{\mu\text{m}}$		For 30° $\frac{\text{inches}}{\mu\text{m}}$	For 38° $\frac{\text{inches}}{\mu\text{m}}$	For 45° $\frac{\text{inches}}{\mu\text{m}}$
.0010 - .0012 inches 25 - 30 $\mu\text{m}$	-2010-	.0005 13	.0005 13	.0005 13	.0002 5	.0040 102	.0130 330	.0130 330	.0130 330
	-2015-	.0010 25	.0006 15	.0010 25	.0006 15	.0040 102	.0130 330	.0130 330	.0130 330
	-2020-	.0010 25	.0006 15	.0010 25	.0006 15	.0040 102	.0140 356	.0140 356	.0140 356
	-2025-	.0010 25	.0006 15	.0010 25	.0006 15	.0040 102	.0140 356	.0140 356	.0140 356
	-2030-	.0010 25	.0006 15	.0010 25	.0006 15	.0040 102	.0150 381	.0140 356	.0140 356
	-2035-	.0010 25	.0006 15	.0010 25	.0006 15	.0040 102	.0150 381	.0150 381	.0150 381
.0012 - .0015 inches 30 - 38 $\mu\text{m}$	-2515-	.0010 25	.0006 15	.0010 25	.0006 15	.0040 102	.0150 381	.0130 330	.0130 330
	-2520-	.0010 25	.0006 15	.0010 25	.0006 15	.0040 102	.0150 381	.0140 356	.0140 356
	-2525-	.0010 25	.0006 15	.0010 25	.0006 15	.0040 102	.0150 381	.0140 356	.0140 356
	-2530-	.0010 25	.0006 15	.0010 25	.0006 15	.0040 102	.0150 381	.0140 356	.0140 356
	-2535-	.0010 25	.0006 15	.0010 25	.0006 15	.0040 102	.0160 406	.0150 381	.0150 381
	-2540-	.0010 25	.0006 15	.0010 25	.0006 15	.0040 102	.0160 406	.0150 381	.0150 381
.0015 - .0018 inches 38 - 46 $\mu\text{m}$	-3020-	.0015 38	.0008 20	.0015 38	.0008 20	.0050 127	.0160 406	.0180 457	.0180 457
	-3025-	.0015 38	.0008 20	.0015 38	.0008 20	.0050 127	.0160 406	.0180 457	.0180 457
	-3030-	.0015 38	.0010 25	.0015 38	.0010 25	.0050 127	.0160 406	.0180 457	.0180 457
	-3035-	.0015 38	.0010 25	.0015 38	.0010 25	.0050 127	.0180 457	.0180 457	.0180 457
	-3040-	.0015 38	.0010 25	.0015 38	.0010 25	.0050 127	.0180 457	.0180 457	.0180 457
.0015 - .0018 mil 38 - 46 $\mu\text{m}$	-3530-	.0015 38	.0010 25	.0015 38	.0010 25	.0050 127	.0210 533	.0190 483	.0190 483
	-3540-	.0015 38	.0010 25	.0015 38	.0010 25	.0050 127	.0220 559	.0200 508	.0200 508
	-3545-	.0015 38	.0010 25	.0015 38	.0010 25	.0050 127	.0230 584	.0200 508	.0200 508

\* Dimensions in this table refer to the most common shank styles. For other options please contact your local MPP representative

The  $\mu\text{m}$  dimensions in the table above are for reference only

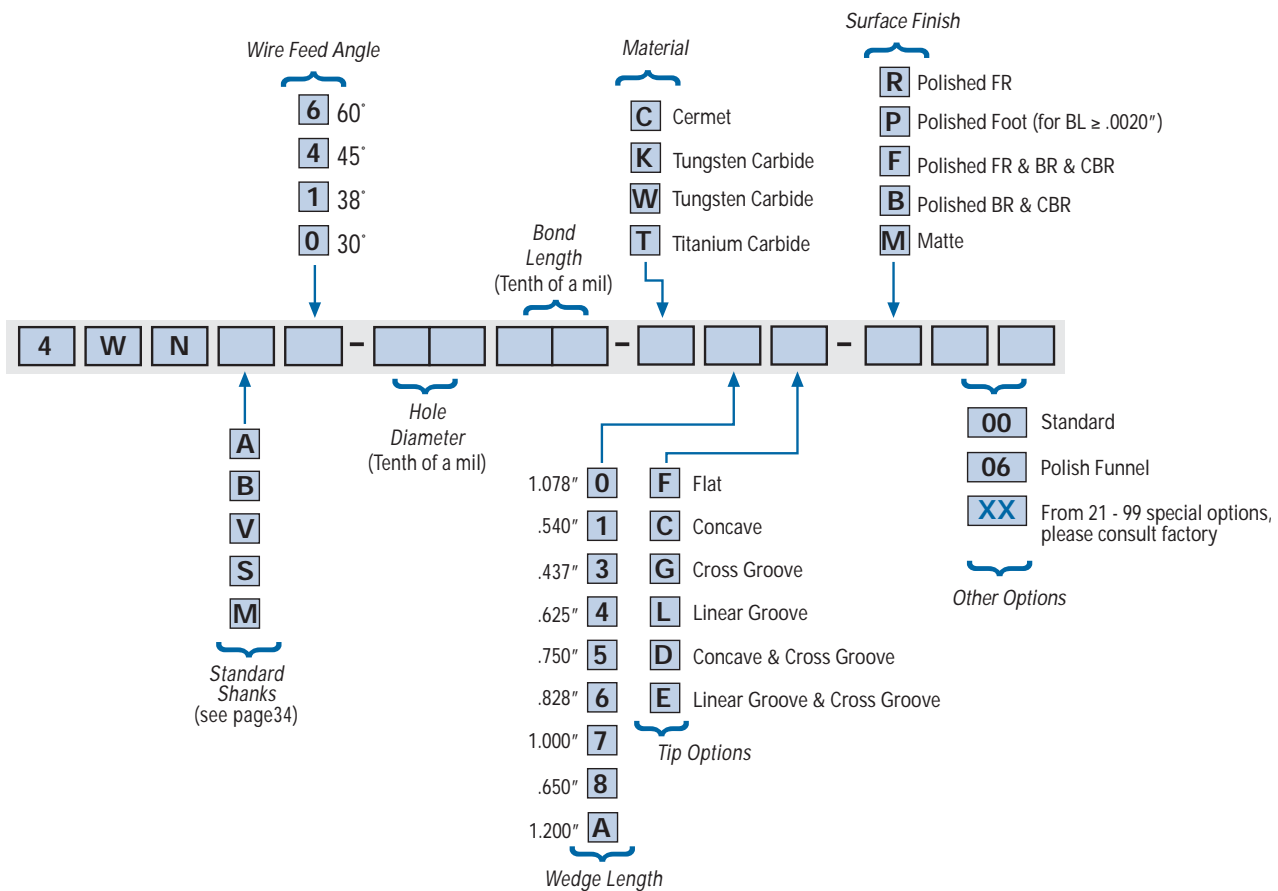
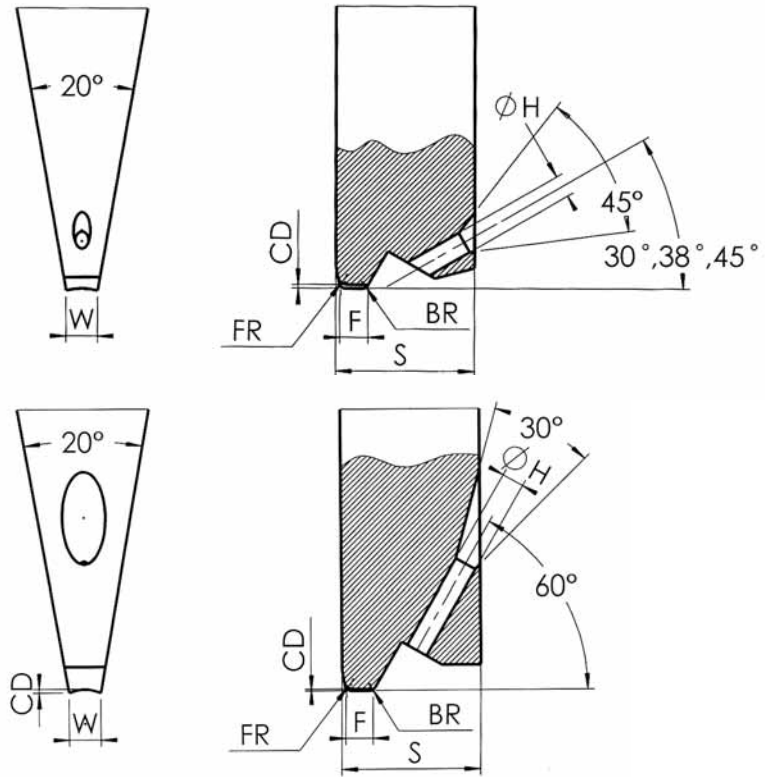


## NOTCHED TIP WEDGE FOR MANUAL BONDING

The 4WN wedges model are specially designed for Microwave and Hybrid applications. This unique configuration allows minimal stress on the wire.

A full range of feed angles is available to cover a wide spectrum of demands.

Standard features are available for this model, including CG (Cross Groove) for Gold wire application and a variety of standard finished tips (polish or matte).



Suggested Wire	HD BL	For AISi Wires		For Au Wires		Width W $\frac{\text{inches}}{\mu\text{m}}$	S (Throat size)			
		FR $\frac{\text{inches}}{\mu\text{m}}$	BR $\frac{\text{inches}}{\mu\text{m}}$	FR $\frac{\text{inches}}{\mu\text{m}}$	BR $\frac{\text{inches}}{\mu\text{m}}$		For 30° $\frac{\text{inches}}{\mu\text{m}}$	For 38° $\frac{\text{inches}}{\mu\text{m}}$	For 45° $\frac{\text{inches}}{\mu\text{m}}$	For 60° $\frac{\text{inches}}{\mu\text{m}}$
.00010 - .0012 inches 25 - 30 $\mu\text{m}$	-2010-	.0010 25	.0006 15	.0010 25	.0006 15	.0040 102	.0150 381	.0150 381	.0150 381	.0120 305
	-2015-	.0010 25	.0006 15	.0010 25	.0006 15	.0040 102	.0150 381	.0150 381	.0150 381	.0120 305
	-2020-	.0010 25	.0006 15	.0010 25	.0006 15	.0040 102	.0150 381	.0150 381	.0150 381	.0120 305
	-2025-	.0010 25	.0006 15	.0010 25	.0006 15	.0040 102	.0150 381	.0150 381	.0150 381	.0120 305
.0012 - .0015 inches 30 - 38 $\mu\text{m}$	-2515-	.0010 25	.0010 25	.0010 25	.0006 15	.0040 102	.0200 508	.0200 508	.0200 508	.0120 305
	-2520-	.0010 25	.0010 25	.0010 25	.0006 15	.0040 102	.0200 508	.0200 508	.0200 508	.0120 305
	-2525-	.0010 25	.0010 25	.0010 25	.0008 20	.0040 102	.0200 508	.0200 508	.0200 508	.0120 305
	-2530-	.0010 25	.0010 25	.0010 25	.0008 20	.0050 127	.0200 508	.0200 508	.0200 508	.0120 305
	-2535-	.0010 25	.0010 25	.0010 25	.0010 25	.0050 127	.0200 508	.0200 508	.0200 508	.0120 305
.0015 - .0018 inches 38 - 46 $\mu\text{m}$	-3025-	.0015 38	.0010 25	.0015 38	.0010 25	.0050 127	.0200 508	.0200 508	.0200 508	.0150 381
	-3030-	.0015 38	.0010 25	.0015 38	.0010 25	.0050 127	.0200 508	.0200 508	.0200 508	.0150 381
	-3035-	.0015 38	.0010 25	.0015 38	.0010 25	.0050 127	.0200 508	.0200 508	.0200 508	.0150 381
	-3040-	.0015 38	.0010 25	.0015 38	.0010 25	.0050 127	.0200 508	.0200 508	.0200 508	.0150 381
.0018 - .0020 inches 46 - 51 $\mu\text{m}$	-3530-	.0015 38	.0010 25	.0015 38	.0010 25	.0060 152	.0250 635	.0250 635	.0250 635	.0200 508
	-3535-	.0015 38	.0010 25	.0015 38	.0010 25	.0060 152	.0250 635	.0250 635	.0250 635	.0200 508
	-3540-	.0015 38	.0010 25	.0015 38	.0010 25	.0060 152	.0250 635	.0250 635	.0250 635	.0200 508
	-3545-	.0015 38	.0010 25	.0015 38	.0010 25	.0060 152	.0250 635	.0250 635	.0250 635	.0200 508
	-3550-	.0015 38	.0010 25	.0015 38	.0010 25	.0060 152	.0250 635	.0250 635	.0250 635	.0200 508

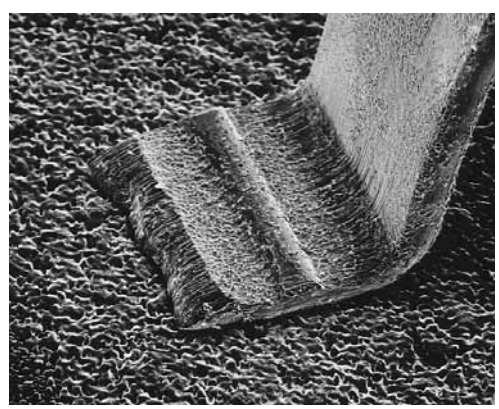
\* Dimensions in this table refer to the most common shank styles. For other options please contact your local MPP representative

The  $\mu\text{m}$  dimensions in the table above are for reference only

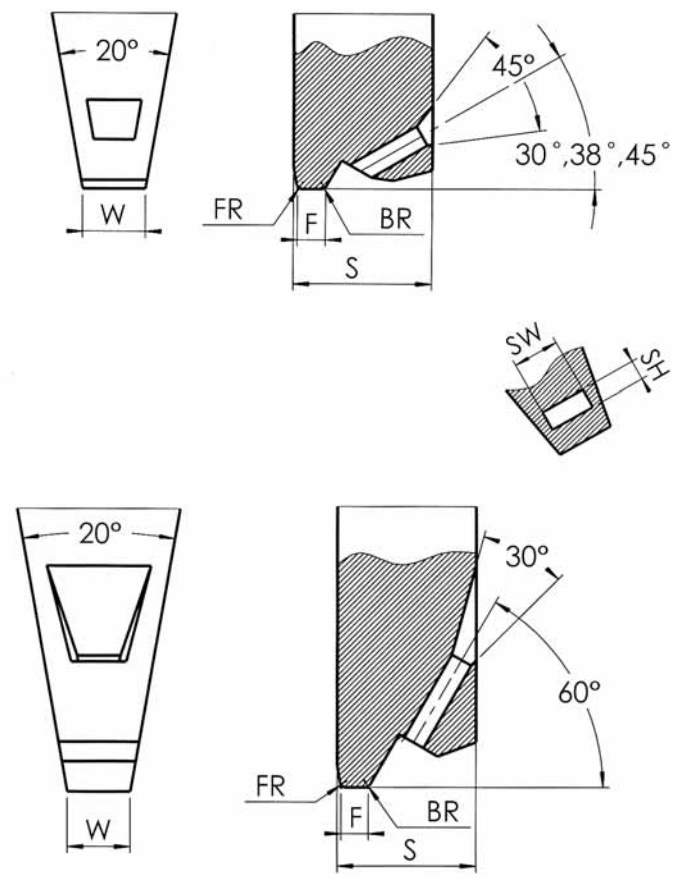
## WEDGE FOR RIBBON APPLICATIONS

The 4WR wedges model are designed to fit applications using ribbon wires. They feature a rectangular hole in which the ribbon can flow easily.

The 4WR model fits ribbon thicknesses in the range of .0005" (0.013mm) through .0020" (0.051mm).



1st Bond Ribbon Wedge



**Surface Finish**

- H** Heavy Matte
- R** Polished FR
- P** Polished Foot (for BL ≥ .0020")
- F** Polished FR & BR & CBR
- B** Polished BR & CBR
- M** Matte

**Material**

- C** Cermet
- K** Tungsten Carbide
- W** Tungsten Carbide
- T** Titanium Carbide

**Wire Feed Angle**

- 6** 60°
- 4** 45°
- 1** 38°
- 0** 30°

**Bond Length (Tenth of a mil)**

- 0** 1.078"
- 1** .540"
- 2** .860"
- 3** .437"
- 4** .625"
- 5** .750"
- 6** .828"
- 7** 1.000"
- 8** .650"
- A** 1.200"

**Tip Options**

- F** Flat
- G** Cross Groove
- L** Linear Groove
- E** Linear Groove & Cross Groove
- H** Flat + CBR

**Other Options**

- 00** Standard
- XX** From 21 - 99 special options, please consult factory

**Ribbon Code** (See Ribbon Code Table on page 29)

**Standard Shanks** (see page 34)

- V**
- S**
- L**

**Deep Access Shanks** (see page 35)

- C**
- D**
- F**
- G**
- H**
- J**
- K**

**Wedge Length**

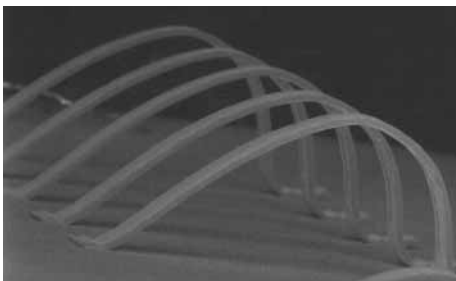
**4WR** [Shank] [Wire Feed Angle] [Bond Length] [Material] [Tip] [Surface Finish] [Other Options]

## 4WR WEDGE MODEL

Code +BL	FR <small>inches μm</small>	BR <small>inches μm</small>	Slot Size		S (throat Size)		Width W <small>inches μm</small>
			SH <small>inches μm</small>	SW <small>inches μm</small>	For 30°/45° <small>inches μm</small>	For 60° <small>inches μm</small>	
A120	.0010	.0003	.0020	.0030	.0150	.0120	.0050
	25	8	51	76	381	305	127
A125	.0010	.0003	.0020	.0030	.0150	.0120	.0050
	25	8	51	76	381	305	127
A220	.0010	.0003	.0025	.0030	.0150	.0120	.0050
	25	8	64	76	381	305	127
A225	.0010	.0003	.0025	.0030	.0150	.0120	.0050
	25	8	64	76	381	305	127
B120	.0010	.0003	.0020	.0050	.0150	.0120	.0065
	25	8	51	127	381	305	165
B125	.0010	.0003	.0020	.0050	.0150	.0120	.0065
	25	8	51	127	381	305	165
B225	.0010	.0003	.0025	.0050	.0150	.0120	.0065
	25	8	64	127	381	305	165
C225	.0010	.0003	.0025	.0060	.0180	.0140	.0075
	25	8	64	152	457	356	191
C230	.0010	.0003	.0025	.0060	.0180	.0140	.0075
	25	8	64	152	457	356	191
C240	.0010	.0003	.0025	.0060	.0180	.0140	.0075
	25	8	64	152	457	356	191
D230	.0010	.0003	.0030	.0070	.0180	.0180	.0085
	25	8	76	178	457	457	216
D330	.0010	.0003	.0035	.0070	.0180	.0180	.0085
	25	8	89	178	457	457	216
D440	.0010	.0003	.0040	.0070	.0180	.0180	.0085
	25	8	102	178	457	457	216
G240	.0010	.0003	.0030	.0110	.0180	.0180	.0125
	25	8	76	279	457	457	318
J450	.0010	.0003	.0040	.0135	.0180	.0180	.0150
	25	8	102	343	457	457	381

\* Dimensions in this table refer to the most common shank styles.  
For other options please contact your local MPP representative

The μm dimensions in the table above are for reference only



*Ribbon Wire Bonding*

**Notes for Ribbon Shank Styles Selection:**

- \* Deep access shank styles G, H, T, P support Ribbon size width ≤ .0050"
- \* Deep access shank styles F, Q support Ribbon size width ≤ .0120"
- \* For Ribbon sizes > .0120", shank styles C, D are available only

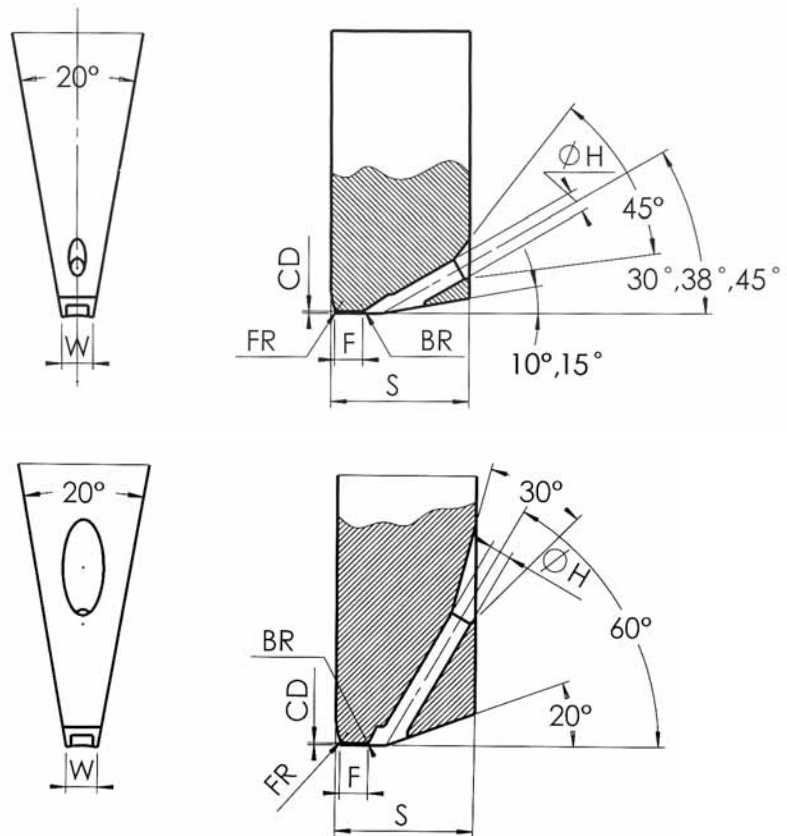
### Ribbon Code Table

Ribbon width inches	Ribbon thickness (inches)				
	.0005	.0010	.0015	.0020	.0030
.0010	Z1	Z2	Z3	Z4	Z5
.0020	A1	A2	A3	A4	A5
.0030	B1	B2	B3	B4	B5
.0040	C1	C2	C3	C4	C5
.0050	D1	D2	D3	D4	D5
.0060	E1	E2	E3	E4	E5
.0070	F1	F2	F3	F4	F5
.0080	G1	G2	G3	G4	G5
.0090	H1	H2	H3	H4	H5
.0100	J1	J2	J3	J4	J5
.0110	K1	K2	K3	K4	K5
.0120	L1	L2	L3	L4	L5
.0130	M1	M2	M3	M4	M5
.0140	N1	N2	N3	N4	N5
.0150	P1	P2	P3	P4	P5
.0160	Q1	Q2	Q3	Q4	Q5
.0170	R1	R2	R3	R4	R5
.0180	S1	S2	S3	S4	S5
.0190	T1	T2	T3	T4	T5
.0200	U1	U2	U3	U4	U5

## WEDGE FOR DEEP ACCESS APPLICATIONS

The 4WD wedges model are intended for packages with high or closely positioned walls. In these wedge designs, the wire is fed vertically. Therefore, the bonding machine used in this application should include a special Deep Access Kit. Deep Access wedges are suitable for table tear method due to their high feed angle (see stage 6 page 9).

A wide selection of options is available for this model, such as CG (Cross Groove) for Gold wires, and a variety of tip finishes.



Wire Feed Angle		Material		Surface Finish	
6	60°	C	Cermet	R	Polished FR
4	45°	K	Tungsten Carbide	P	Polished FR & BR & CBR
1	38°	W	Tungsten Carbide	F	Polished BR & CBR
0	30°	T	Titanium Carbide	B	Polished BR
				M	Matte

Bond Length (Tenth of a mil)		Hole Diameter (Tenth of a mil)		Tip Options	
1.078"	0	00	Standard	F	Flat
.540"	1	01	Oval Hole	C	Concave
.860"	2	02	Polish EHR, Hole & Funnel	G	Cross Groove
.437"	3	04	Polish Hole	L	Linear Groove
.625"	4	05	Polish EHR	H	CBR & Concave
.750"	5	06	Polish Funnel	D	Concave & Cross Groove
.828"	6	07	Polish EHR & Funnel	E	Linear Groove & Cross Groove
1.000"	7	08	Polish Hole & Funnel		
.650"	8	10	Polish Back Side Funnel + Funnel		
1.200"	A	11	Polish Back Side Funnel + Funnel + Hole + EHR		

Deep Access Shanks (see page 35)		Other Options	
C		XX	From 21 - 99 special options, please consult factory
D			
E			
F			
G			
H			
J			
K			

Suggested Wire	HD BL	For Gold Wires		For AISi Wires		Width W $\frac{\text{inches}}{\mu\text{m}}$	S for Shank style E		S for rest of Shanks	
		FR $\frac{\text{inches}}{\mu\text{m}}$	BR $\frac{\text{inches}}{\mu\text{m}}$	FR $\frac{\text{inches}}{\mu\text{m}}$	BR $\frac{\text{inches}}{\mu\text{m}}$		For 45° $\frac{\text{inches}}{\mu\text{m}}$	For 60° $\frac{\text{inches}}{\mu\text{m}}$	For 45° $\frac{\text{inches}}{\mu\text{m}}$	For 60° $\frac{\text{inches}}{\mu\text{m}}$
.0007 - .0008 inches 18 - 20 $\mu\text{m}$	-1507-	.0008 20	.0002 5	.0008 20	.0005 13	.0030 76	.0100 254	.0090 229	.0110 279	.0090 229
	-1510-	.0008 20	.0002 5	.0008 20	.0005 13	.0030 76	.0100 254	.0090 229	.0110 279	.0090 229
	-1515-	.0008 20	.0002 5	.0008 20	.0001 25	.0030 76	.0100 254	.0090 229	.0110 279	.0090 229
	-1520-	.0008 20	.0002 5	.0008 20	.0008 20	.0030 76	.0100 254	.0090 229	.0140 356	.0090 229
	-1525-	.0008 20	.0002 5	.0008 20	.0008 20	.0030 76	.0100 254	.0090 229	.0140 356	.0090 229
.0010 - .0012 inches 25 - 30 $\mu\text{m}$	-2015-	.0010 125	.0004 10	.0005 13	.0005 13	.0035 89	.0100 254	.0090 229	.0140 356	.0120 305
	-2020-	.0010 25	.0006 15	.0010 25	.0010 25	.0035 89	.0100 254	.0090 229	.0140 356	.0120 305
	-2025-	.0010 25	.0006 15	.0010 25	.0010 25	.0035 89	.0100 254	.0090 229	.0140 356	.0120 305
	-2030-	.0010 25	.0006 15	.0010 25	.0010 25	.0035 89	N/A N/A	N/A N/A	.0140 356	.0120 305
.0013 - .0015 inches 30 - 38 $\mu\text{m}$	-2520-	.0010 25	.0006 15	.0010 25	.0010 25	.0040 102	N/A N/A	N/A N/A	.0140 356	.0120 305
	-2525-	.0010 25	.0006 15	.0010 25	.0010 25	.0040 102	N/A N/A	N/A N/A	.0140 356	.0120 305
	-2530-	.0010 25	.0006 15	.0010 25	.0010 25	.0040 102	N/A N/A	N/A N/A	.0140 356	.0140 356
.0015 - .0018 inches 38 - 46 $\mu\text{m}$	-3030-	.0010 25	.0006 15	.0010 25	.0010 25	.0050 127	N/A N/A	N/A N/A	.0160 406	.0160 406
	-3035-	.0010 25	.0010 25	.0010 25	.0010 25	.0050 127	N/A N/A	N/A N/A	.0160 406	.0160 406
	-3040-	.0010 25	.0010 25	.0010 25	.0010 25	.0050 127	N/A N/A	N/A N/A	.0160 406	.0160 406

\* Dimensions in this table refer to the most common shank styles. For other options please contact your local MPP representative

The  $\mu\text{m}$  dimensions in the table above are for reference only

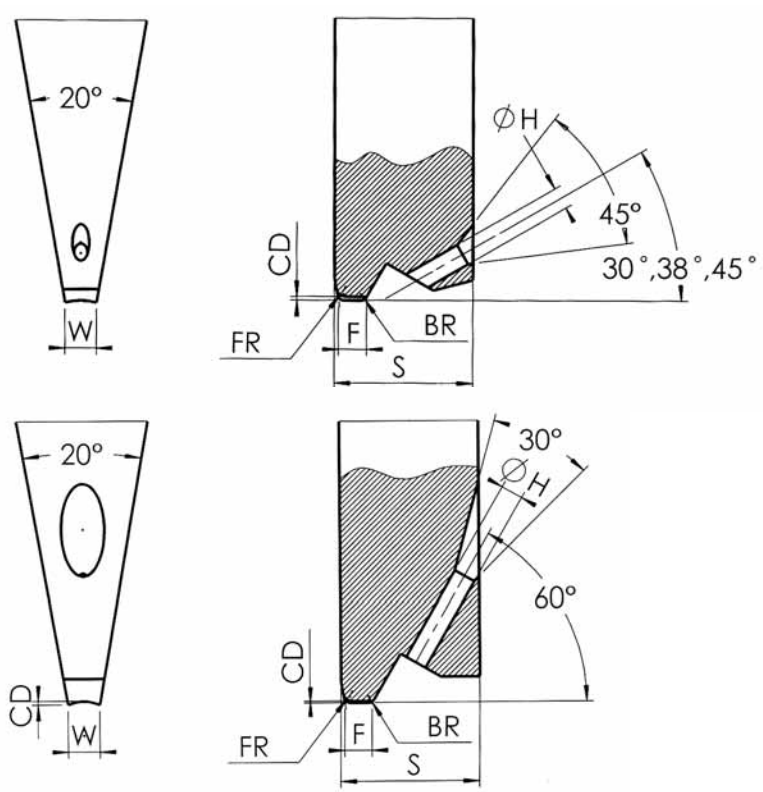
## NOTCHED TIP FOR DEEP ACCESS APPLICATIONS

The 4WV wedges model are designed to fit most Deep Access applications.

They feature a special combination of vertical feed hole and inclined feed hole that is fermented by a notch. The notch reduces the drag force on the wire, as well as providing tension relief for Al wires. Due to the high feed angles and the vertical wire feed, this wedge is used with table tear methods (see stage 6, page 9).

For Gold wires, the standard (CG Cross Groove) option is recommended to facilitate a strong and durable bond.

A variety of standard finished tips are also available for this model.



**Wire Feed Angle**

- 6 60°
- 4 45°

**Bond Length (Tenth of a mil)**

- 0 1.078"
- 1 .540"
- 2 .860"
- 3 .437"
- 4 .625"
- 5 .750"
- 6 .828"
- 7 1.000"
- 8 .650"
- A 1.200"

**Material**

- C Cermet
- K Tungsten Carbide
- W Tungsten Carbide
- T Titanium Carbide

**Surface Finish**

- R Polished FR
- P Polished Foot (for BL ≥ .0020")
- F Polished FR & BR
- B Polished BR
- M Matte

**Hole Diameter (Tenth of a mil)**

- C
- D
- E
- F
- G
- H
- J
- K

**Tip Options**

- F Flat
- C Concave
- G Cross Groove
- L Linear Groove
- D Concave & Cross Groove
- E Linear Groove & Cross Groove

**Other Options**

- 00 Standard
- 06 Polish Funnel
- XX From 21 - 99 special options, please consult factory

**Deep Access Shanks (see page 35)**

Suggested Wire <small>inches μm</small>	HD BL	For Gold Wires		For AISi Wires		Width <small>inches μm</small>	S for Shank style E		S for rest of Shanks	
		FR <small>inches μm</small>	BR <small>inches μm</small>	FR <small>inches μm</small>	BR <small>inches μm</small>		For 45° <small>inches μm</small>	For 60° <small>inches μm</small>	For 45° <small>inches μm</small>	For 60° <small>inches μm</small>
.0007 - .0008 inches 18 - 20 μm	-1507-	.0008 20	.0002 5	.0008 20	.0005 13	.0030 76	.0100 254	.0090 229	.0130 330	.0110 279
	-1510-	.0008 20	.0002 5	.0008 20	.0005 13	.0030 76	.0100 254	.0090 229	.0135 343	.0110 279
	-1515-	.0008 20	.0002 5	.0008 20	.0010 25	.0030 76	.0100 254	.0090 229	.0140 356	.0110 279
.0010 - .0012 inches 25 - 30 μm	-2010-	.0008 20	.0002 5	.0008 20	.0005 13	.0035 89	.0100 254	.0090 229	.0120 305	.0120 305
	-2015-	.0010 25	.0004 10	.0010 25	.0010 25	.0035 89	.0100 254	.0090 229	.0140 356	.0120 305
	-2020-	.0010 25	.0006 15	.0010 25	.0010 25	.0035 89	.0100 254	.0090 229	.0140 356	.0120 305
	-2025-	.0010 25	.0006 15	.0010 25	.0010 25	.0035 89	.0100 254	.0090 229	.0140 356	.0120 305
.0012 - .0015 inches 30 - 38 μm	-2520-	.0010 25	.0006 15	.0010 25	.0010 25	.0040 102	N/A N/A	N/A N/A	.0140 356	.0120 305
	-2525-	.0010 25	.0006 15	.0010 25	.0010 25	.0040 102	N/A N/A	N/A N/A	.0140 356	.0140 356
	-2530-	.0010 25	.0006 15	.0010 25	.0010 25	.0040 102	N/A N/A	N/A N/A	.0140 356	.0160 406

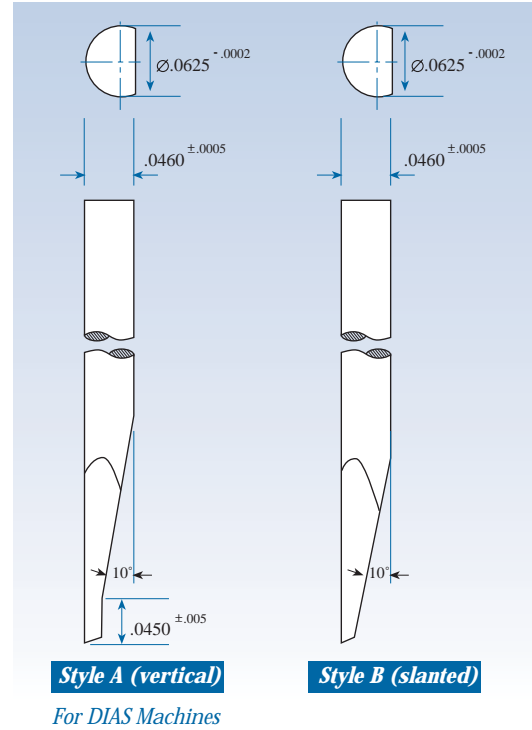
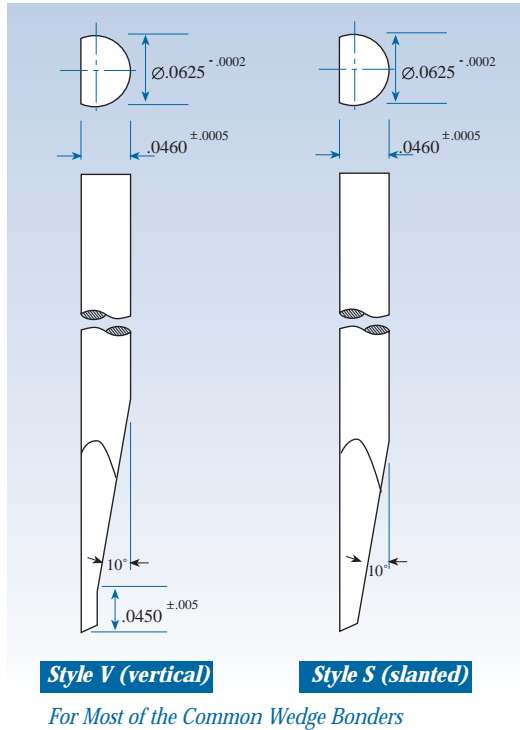
\* Dimensions in this table refer to the most common shank styles. For other options please contact your local MPP representative

The μm dimensions in the table above are for reference only

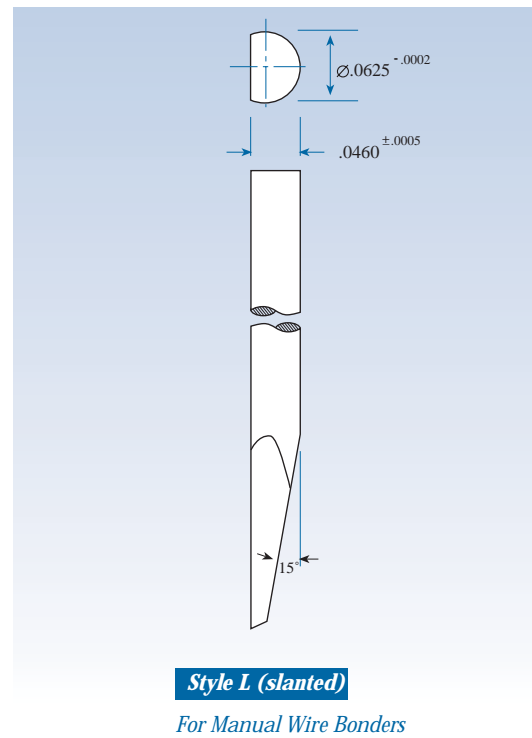
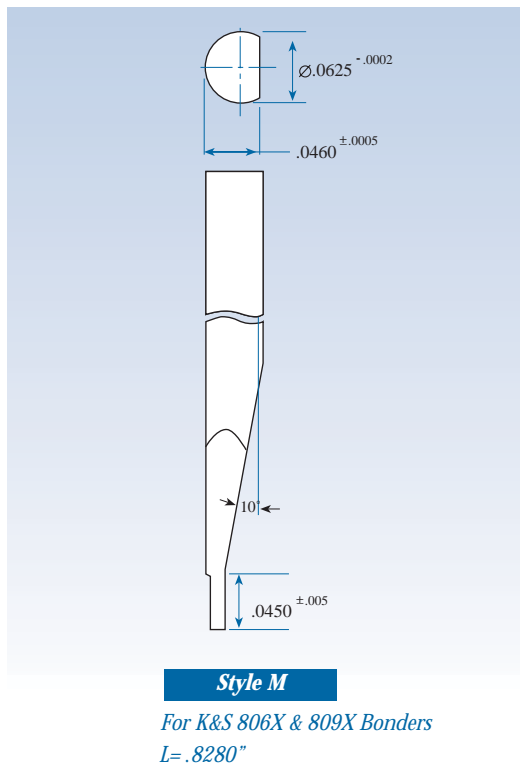


## SHANK STYLES

For General Purpose Wedge, Fine Pitch, Automatic and Manual Machines

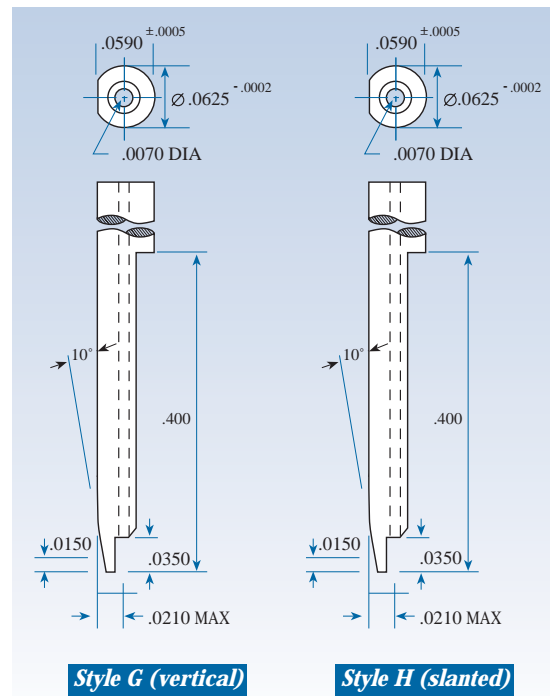
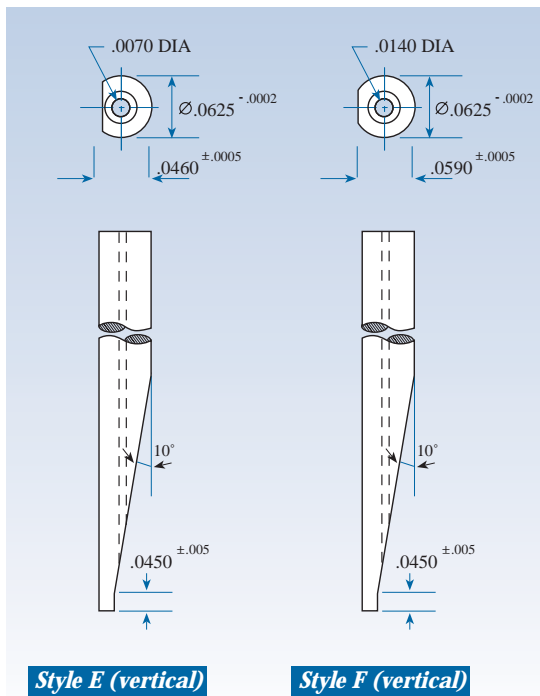
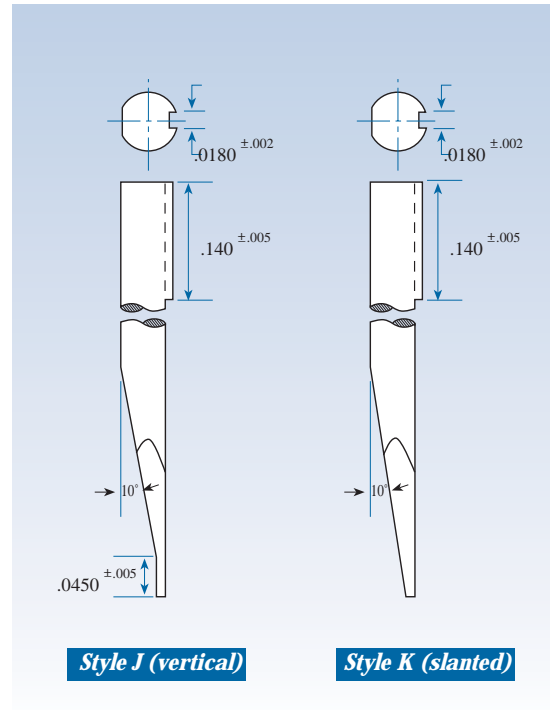
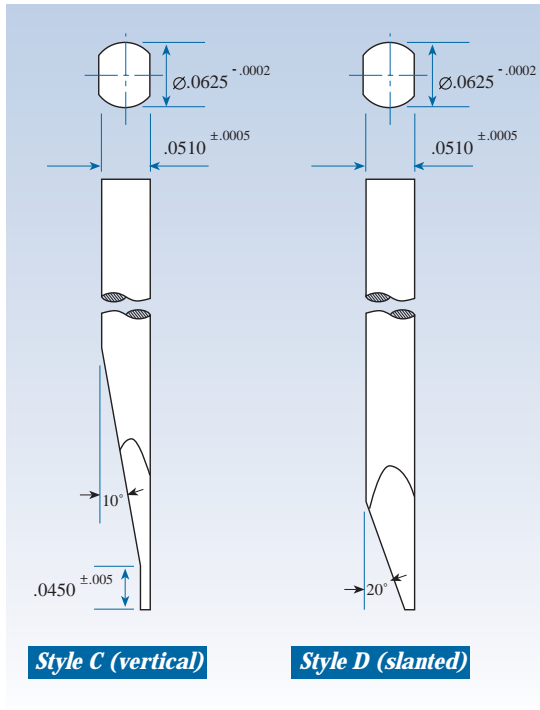


For Notched Tip wedges (on appropriate machines):



## For Deep Access Applications

(on appropriate machines)



## WEDGE PART NUMBER STRUCTURE

Wedge Type:

- V** Notched tip for Deep Access applications
- D** Deep Access applications
- R** Ribbon applications
- 4** **N** Notched tip for manual bonding and microwave applications
- 3** **C** COB applications
- 2** **A** Automatic machines, general applications
- 1** **F** Fine Pitch

Wire Feed Angle

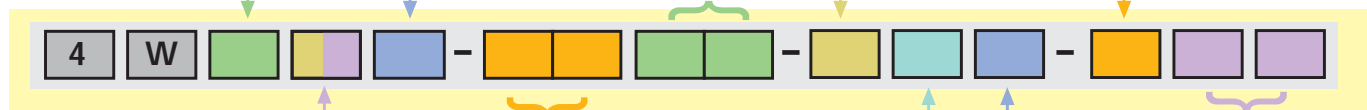
- 6** 60°
- 4** 45°
- 1** 38°
- 0** 30°

Material

- C** Cermet
- K** Tungsten Carbide
- W** Tungsten Carbide
- T** Titanium Carbide

Surface Finish

- 12** **H** Heavy Matte
- R** Polished FR
- 11** **P** Polished Foot
- F** Polished FR & BR & CBR
- B** Polished BR & CBR
- M** Matte



- 5** **A**
  - 5** **B**
  - V**
  - S**
  - L**
  - 6** **M**
- Standard Shanks (see page 34)

Deep Access Shanks (see page 35)

- C**
- D**
- E**
- F**
- G**
- H**
- J**
- K**

Hole Diameter (Tenth of a mil)

- 1.078" **0**
- .540" **1**
- 8** .860" **2**
- .437" **3**
- .625" **4**
- .750" **5**
- .828" **6**
- 1.000" **7**
- .650" **8**
- 1.200" **A**

Wedge Length

- F** Flat
  - C** Concave
  - 9** **G** Cross Groove
  - L** Linear Groove
  - H** CBR & Concave
  - 9** **D** Concave & Cross Groove
  - 10** **E** Linear Groove & Cross Groove
- Tip Options

- 00** Standard
- 01** Oval Hole
- 02** Polish EHR, Hole & Funnel
- 04** Polish Hole
- 05** Polish EHR
- 06** Polish Funnel
- 07** Polish EHR & Funnel
- 08** Polish Hole & Funnel
- 10** Polish Back Side Funnel + Funnel
- 11** Polish Back Side Funnel + Funnel + Hole + EHR

Other Options  
**XX** From 21 - 99 special options, please consult factory

### NOTES:

- 1** For Fine Pitch wedge type wire feeding hole shape is OVAL only.
- 2** For Automatic wedge type only the standard shanks are available.
- 3** For COB wedge type feed angles can be 30°, 38° or 45° only.
- 4** For Notched wedge type other options **00**, **06** are available only.
- 5** Shanks styles **A**, **B** are unavailable for Ribbon wedge type.
- 6** Shank style **M** is for K&S 8060 & 8090 wedge bonder, L=.8280".
- 7** Shanks styles **P**, **Q** and **T** are for K&S Triton wedge bonder.
- 8** Shank style **T** length, is recommended as .860".
- 9** Cross Groove (CG) tip option is available for wedges with BL ≥ .0015".
- 10** Linear & Cross Groove (LG+CG) tip options are available for wedges with BL ≥ .0020".
- 11** Polished foot surface finish is available for wedges with BL ≥ .0020".
- 12** Heavy matte surface finish is available for Ribbon wedge types only.