



# Angle Drill Attachments & Accessories



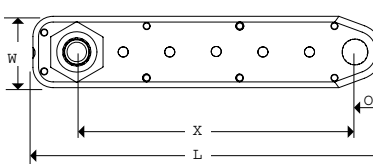
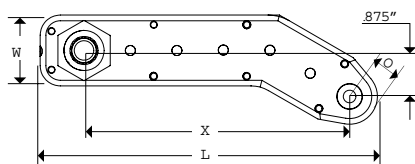
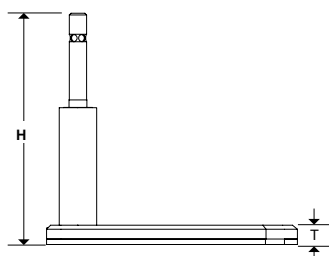
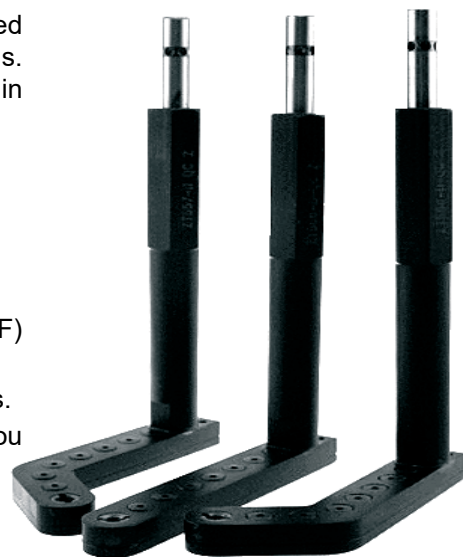


## ZT556/ZT557/ZT558 Angle Drill Attachment

The ZT556/ZT557/ZT558 series flat offset angle drill attachments have been designed to run at any speed up to 3,000 rpm in the tightest and most demanding applications. This angle drill is well suited for all metallic, graphite and composite materials used in the aircraft industry today.

Features include:

- Standard duty.
- Drive shaft and idler gear shafts are all supported by ball bearings.
- Drive shafts are available with 1/4" round (no suffix), 1/4" round with three flats (TF) and quick change (QC) drive shafts.
- Spindle gears are available with standard 10-32 (D) and 1/4-28 (C) internal threads.
- These angle drills feature a 1:1.5 drive shaft to spindle gear ratio. This means you will net more spindle gear speed from your existing drill motors.



| Model Number | Spindle Thread | Spindle Offset O | Drill Offset X | Overall Length L | Overall Height H | Body Thickness T | Body Width W | Angle    | Drill Capacity |
|--------------|----------------|------------------|----------------|------------------|------------------|------------------|--------------|----------|----------------|
| ZT556-D      | 10-32          | .250             | 3.125          | 3.812            | 5.75             | .312             | .562         | Straight | 1/4" Alum.     |
| ZT556-D-QC   | 10-32          | .250             | 3.125          | 3.812            | 5.75             | .312             | .562         | Straight | 1/4" Alum.     |
| ZT556-D-TF   | 10-32          | .250             | 3.125          | 3.812            | 5.75             | .312             | .562         | Straight | 1/4" Alum.     |
| ZT556-C      | 1/4-28         | .250             | 3.125          | 3.812            | 5.75             | .312             | .562         | Straight | 1/4" Alum.     |
| ZT556-C-QC   | 1/4-28         | .250             | 3.125          | 3.812            | 5.75             | .312             | .562         | Straight | 1/4" Alum.     |
| ZT556-C-TF   | 1/4-28         | .250             | 3.125          | 3.812            | 5.75             | .312             | .562         | Straight | 1/4" Alum.     |
| ZT557-D      | 10-32          | .250             | 2.750          | 3.312            | 5.75             | .312             | .562         | 30° L.H. | 1/4" Alum.     |
| ZT557-D-QC   | 10-32          | .250             | 2.750          | 3.312            | 5.75             | .312             | .562         | 30° L.H. | 1/4" Alum.     |
| ZT557-D-TF   | 10-32          | .250             | 2.750          | 3.312            | 5.75             | .312             | .562         | 30° L.H. | 1/4" Alum.     |
| ZT557-C      | 1/4-28         | .250             | 2.750          | 3.312            | 5.75             | .312             | .562         | 30° L.H. | 1/4" Alum.     |
| ZT557-C-QC   | 1/4-28         | .250             | 2.750          | 3.312            | 5.75             | .312             | .562         | 30° L.H. | 1/4" Alum.     |
| ZT557-C-TF   | 1/4-28         | .250             | 2.750          | 3.312            | 5.75             | .312             | .562         | 30° L.H. | 1/4" Alum.     |
| ZT558-D      | 10-32          | .250             | 2.750          | 3.312            | 5.75             | .312             | .562         | 30° R.H. | 1/4" Alum.     |
| ZT558-D-QC   | 10-32          | .250             | 2.750          | 3.312            | 5.75             | .312             | .562         | 30° R.H. | 1/4" Alum.     |
| ZT558-D-TF   | 10-32          | .250             | 2.750          | 3.312            | 5.75             | .312             | .562         | 30° R.H. | 1/4" Alum.     |
| ZT558-C      | 1/4-28         | .250             | 2.750          | 3.312            | 5.75             | .312             | .562         | 30° R.H. | 1/4" Alum.     |
| ZT558-C-QC   | 1/4-28         | .250             | 2.750          | 3.312            | 5.75             | .312             | .562         | 30° R.H. | 1/4" Alum.     |
| ZT558-C-TF   | 1/4-28         | .250             | 2.750          | 3.312            | 5.75             | .312             | .562         | 30° R.H. | 1/4" Alum.     |



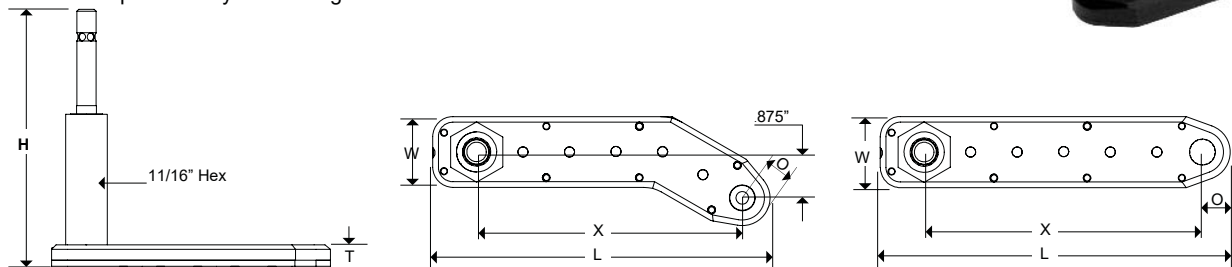
## ZT627/ZT628/ZT629

### High Speed Angle Drill Attachments

The ZT627/ZT628/ZT629 series flat offset angle drill attachments have been designed run at any speed up to 6,000 rpm in the tightest and most demanding applications. This full bearing angle drill is well suited for all metallic, graphite and composite materials used in the airframe industry today.

Features include:

- Standard duty-Full Bearing Design.
- Spindle gear is supported by both radial and thrust ball bearings designed to run at speeds up to 6,000 rpm.
- Improved spindle gear ball bearing system, significantly reduces spindle run out, run temperature and extends the product life.
- Drive shaft and idler gear shafts are all supported by ball bearings.
- Spindle gears are available with standard 10-32 (D) and 1/4-28 (C) internal threads.
- Drive shafts are available with 1/4" round (no suffix), 1/4" round with three flats (TF) and quick change (QC) drive shafts.
- These angle drills feature a 1:1.5 drive shaft to spindle gear ratio. This means you will net more speed from your existing drill motors.



| Model Number | Spindle Thread | Spindle Offset O | Drill Offset X | Overall Length L | Overall Height H | Body Thickness T | Body Width W | Angle    | Drill Capacity |
|--------------|----------------|------------------|----------------|------------------|------------------|------------------|--------------|----------|----------------|
| ZT627-D      | 10-32          | .345             | 3.381          | 4.227            | 4.00             | .335             | .880         | Straight | 1/4" Alum.     |
| ZT627-D-QC   | 10-32          | .345             | 3.381          | 4.227            | 4.00             | .335             | .880         | Straight | 1/4" Alum.     |
| ZT627-D-TF   | 10-32          | .345             | 3.381          | 4.227            | 4.00             | .335             | .880         | Straight | 1/4" Alum.     |
| ZT627-C      | 1/4-28         | .345             | 3.381          | 4.227            | 4.00             | .335             | .880         | Straight | 1/4" Alum.     |
| ZT627-C-QC   | 1/4-28         | .345             | 3.381          | 4.227            | 4.00             | .335             | .880         | Straight | 1/4" Alum.     |
| ZT627-C-TF   | 1/4-28         | .345             | 3.381          | 4.227            | 4.00             | .335             | .880         | Straight | 1/4" Alum.     |
| ZT628-D      | 10-32          | .345             | 3.239          | 4.083            | 4.00             | .335             | .880         | 30° L.H. | 1/4" Alum.     |
| ZT628-D-QC   | 10-32          | .345             | 3.239          | 4.083            | 4.00             | .335             | .880         | 30° L.H. | 1/4" Alum.     |
| ZT628-D-TF   | 10-32          | .345             | 3.239          | 4.083            | 4.00             | .335             | .880         | 30° L.H. | 1/4" Alum.     |
| ZT628-C      | 1/4-28         | .345             | 3.239          | 4.083            | 4.00             | .335             | .880         | 30° L.H. | 1/4" Alum.     |
| ZT628-C-QC   | 1/4-28         | .345             | 3.239          | 4.083            | 4.00             | .335             | .880         | 30° L.H. | 1/4" Alum.     |
| ZT628-C-TF   | 1/4-28         | .345             | 3.239          | 4.083            | 4.00             | .335             | .880         | 30° L.H. | 1/4" Alum.     |
| ZT629-D      | 10-32          | .345             | 3.239          | 4.083            | 4.00             | .335             | .880         | 30° R.H. | 1/4" Alum.     |
| ZT629-D-QC   | 10-32          | .345             | 3.239          | 4.083            | 4.00             | .335             | .880         | 30° R.H. | 1/4" Alum.     |
| ZT629-D-TF   | 10-32          | .345             | 3.239          | 4.083            | 4.00             | .335             | .880         | 30° R.H. | 1/4" Alum.     |
| ZT629-C      | 1/4-28         | .345             | 3.239          | 4.083            | 4.00             | .335             | .880         | 30° R.H. | 1/4" Alum.     |
| ZT629-C-QC   | 1/4-28         | .345             | 3.239          | 4.083            | 4.00             | .335             | .880         | 30° R.H. | 1/4" Alum.     |
| ZT629-C-TF   | 1/4-28         | .345             | 3.239          | 4.083            | 4.00             | .335             | .880         | 30° R.H. | 1/4" Alum.     |



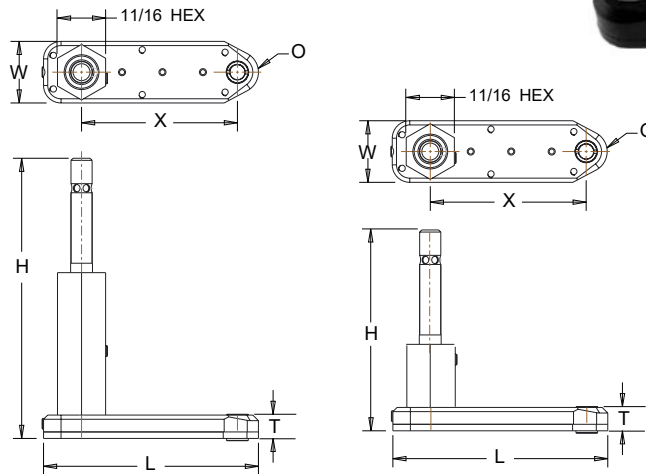
## ZT677/ZT777

### High Speed Angle Drill Attachments

The ZT677/ZT777 series flat offset angle drill attachments have been designed to run at any speed up to 6,000 rpm in the tightest and most demanding applications. This full bearing angle drill is well suited for all metallic, graphite and composite materials used in the airframe industry today.

**Features include:**

- Standard duty-Full Bearing Design.
- Spindle gear is supported by both radial and thrust ball bearings designed to run at speeds up to 6,000 rpm.
- Improved spindle gear ball bearing system, significantly reduces spindle run out, run temperature and extends the product life.
- Drive shaft and idler gear shafts are all supported by ball bearings.
- Spindle gears are available with standard 10-32 (D) and 1/4-28 (C) internal threads.
- Drive shafts are available with 1/4" round (no suffix), 1/4" round with three flats (TF) and quick change (QC) drive shafts.
- These angle drills feature a 1:1.5 drive shaft to spindle gear ratio. This means you will net more spindle gear speed from your existing drill motors.



| Model Number | Spindle Thread | Spindle Offset O | Drill Offset X | Overall Length L | Overall Height H | Body Thickness T | Body Width W | Angle    | Drill Capacity |
|--------------|----------------|------------------|----------------|------------------|------------------|------------------|--------------|----------|----------------|
| ZT677-D      | 10-32          | .300             | 2.230          | 3.07             | 4.00             | .335             | .880         | Straight | 1/4" Alum.     |
| ZT677-D-QC   | 10-32          | .300             | 2.230          | 3.07             | 4.00             | .335             | .880         | Straight | 1/4" Alum.     |
| ZT677-D-TF   | 10-32          | .300             | 2.230          | 3.07             | 4.00             | .335             | .880         | Straight | 1/4" Alum.     |
| ZT677-C      | 1/4-28         | .300             | 2.230          | 3.07             | 4.00             | .335             | .880         | Straight | 1/4" Alum.     |
| ZT677-C-QC   | 1/4-28         | .300             | 2.230          | 3.07             | 4.00             | .335             | .880         | Straight | 1/4" Alum.     |
| ZT677-C-TF   | 1/4-28         | .300             | 2.230          | 3.07             | 4.00             | .335             | .880         | Straight | 1/4" Alum.     |
| ZT777-D      | 10-32          | .300             | 2.230          | 3.07             | 2.34             | .335             | .880         | Straight | 1/4" Alum.     |
| ZT777-D-QC   | 10-32          | .300             | 2.230          | 3.07             | 2.34             | .335             | .880         | Straight | 1/4" Alum.     |
| ZT777-D-TF   | 10-32          | .300             | 2.230          | 3.07             | 2.34             | .335             | .880         | Straight | 1/4" Alum.     |
| ZT777-C      | 1/4-28         | .300             | 2.230          | 3.07             | 2.34             | .335             | .880         | Straight | 1/4" Alum.     |
| ZT777-C-QC   | 1/4-28         | .300             | 2.230          | 3.07             | 2.34             | .335             | .880         | Straight | 1/4" Alum.     |
| ZT777-C-TF   | 1/4-28         | .300             | 2.230          | 3.07             | 2.34             | .335             | .880         | Straight | 1/4" Alum.     |

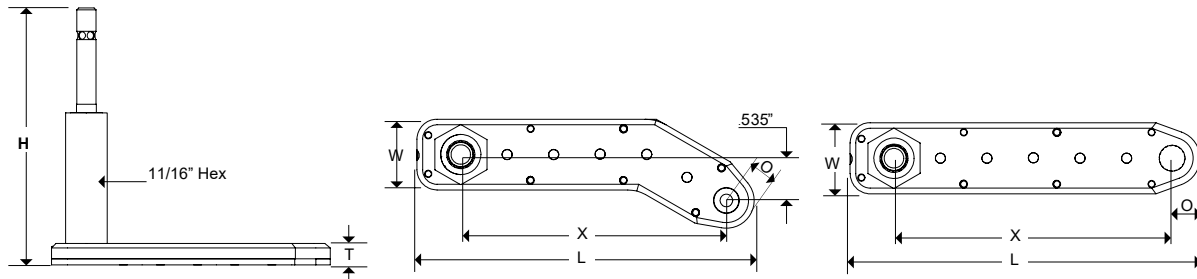


## **ZT727/ZT728/ZT729** **High Speed Angle Drill Attachments**

The ZT727/ZT728/ZT729 series flat offset angle drill attachments have been designed to run at any speed up to 6,000 rpm in the tightest and most demanding applications. This full bearing angle drill is well suited for all metallic, graphite and composite materials used in the airframe industry today.

### **Features include:**

- Standard duty-Full Bearing Design.
- Spindle gear is supported by both radial and thrust ball bearings designed to run at speeds up to 6,000 rpm.
- Improved spindle gear ball bearing system, significantly reduces spindle run out, run temperature and extends the product life.
- Drive shaft and idler gear shafts are all supported by ball bearings.
- Spindle gears are available with standard 10-32 (D) and 1/4-28 (C) internal threads.
- Drive shafts are available with 1/4" round (no suffix), 1/4" round with three flats (TF) and quick change (QC) drive shafts.
- These angle drills feature a 1:1.5 drive shaft to spindle gear ratio. This means you will net more spindle gear speed from your existing drill motors.

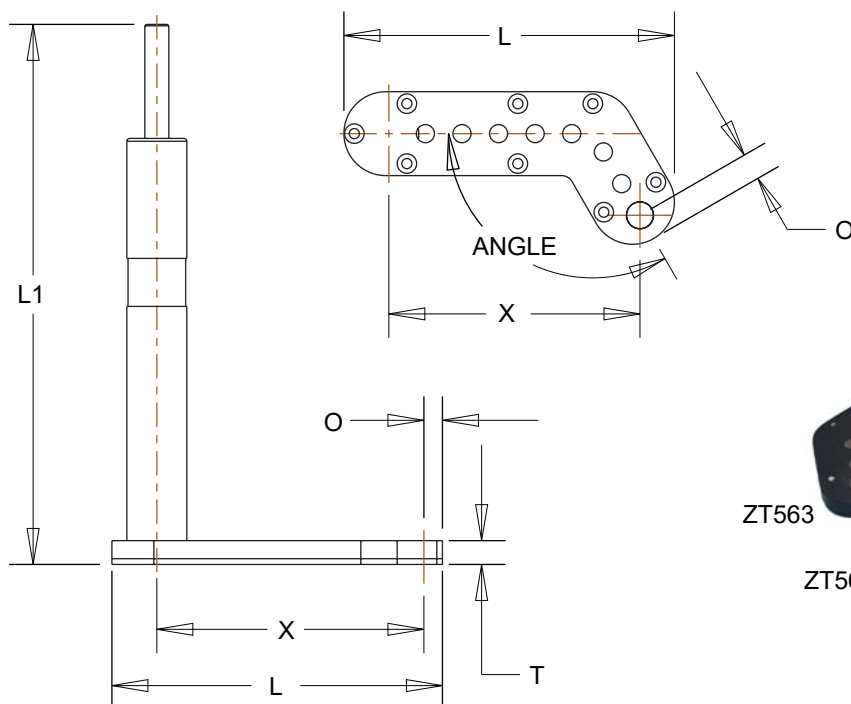


| Model Number | Spindle Thread | Spindle Offset | Drill Offset | Overall Length | Overall Height | Body Thickness | Body Width | Angle    | Drill Capacity |
|--------------|----------------|----------------|--------------|----------------|----------------|----------------|------------|----------|----------------|
|              |                | O              | X            | L              | H              | T              | W          |          |                |
| ZT727-D      | 10-32          | .300           | 3.383        | 4.227          | 2.34           | .335           | .880       | Straight | 1/4" Alum.     |
| ZT727-D-QC   | 10-32          | .300           | 3.383        | 4.227          | 2.34           | .335           | .880       | Straight | 1/4" Alum.     |
| ZT727-D-TF   | 10-32          | .300           | 3.383        | 4.227          | 2.34           | .335           | .880       | Straight | 1/4" Alum.     |
| ZT727-C      | 1/4-28         | .300           | 3.383        | 4.227          | 2.34           | .335           | .880       | Straight | 1/4" Alum.     |
| ZT727-C-QC   | 1/4-28         | .300           | 3.383        | 4.227          | 2.34           | .335           | .880       | Straight | 1/4" Alum.     |
| ZT727-C-TF   | 1/4-28         | .300           | 3.383        | 4.227          | 2.34           | .335           | .880       | Straight | 1/4" Alum.     |
| ZT728-D      | 10-32          | .300           | 3.230        | 4.170          | 2.34           | .335           | .880       | 30° L.H. | 1/4" Alum.     |
| ZT728-D-QC   | 10-32          | .300           | 3.230        | 4.170          | 2.34           | .335           | .880       | 30° L.H. | 1/4" Alum.     |
| ZT728-D-TF   | 10-32          | .300           | 3.230        | 4.170          | 2.34           | .335           | .880       | 30° L.H. | 1/4" Alum.     |
| ZT728-C      | 1/4-28         | .300           | 3.230        | 4.170          | 2.34           | .335           | .880       | 30° L.H. | 1/4" Alum.     |
| ZT728-C-QC   | 1/4-28         | .300           | 3.230        | 4.170          | 2.34           | .335           | .880       | 30° L.H. | 1/4" Alum.     |
| ZT728-C-TF   | 1/4-28         | .300           | 3.230        | 4.170          | 2.34           | .335           | .880       | 30° L.H. | 1/4" Alum.     |
| ZT729-D      | 10-32          | .300           | 3.230        | 4.170          | 2.34           | .335           | .880       | 30° R.H. | 1/4" Alum.     |
| ZT729-D-QC   | 10-32          | .300           | 3.230        | 4.170          | 2.34           | .335           | .880       | 30° R.H. | 1/4" Alum.     |
| ZT729-D-TF   | 10-32          | .300           | 3.230        | 4.170          | 2.34           | .335           | .880       | 30° R.H. | 1/4" Alum.     |
| ZT729-C      | 1/4-28         | .300           | 3.230        | 4.170          | 2.34           | .335           | .880       | 30° R.H. | 1/4" Alum.     |
| ZT729-C-QC   | 1/4-28         | .300           | 3.230        | 4.170          | 2.34           | .335           | .880       | 30° R.H. | 1/4" Alum.     |
| ZT729-C-TF   | 1/4-28         | .300           | 3.230        | 4.170          | 2.34           | .335           | .880       | 30° R.H. | 1/4" Alum.     |



## ZT561/ZT562/ZT563 Flat Offset Angle Drill

The ZT561/ZT562/ZT563 series flat offset angle drills. Extra thin drills which allow access into tight areas. All steel housings, heat treated gears, hardened and precision ground shafts tackle the toughest of tasks with ease.



| MODEL | SPINDLE<br>THREAD | SPINDLE<br>OFFSET<br>O | DRILL<br>OFFSET<br>X | OVERALL<br>LENGTH<br>L | LENGTH<br>L <sub>1</sub> | BODY<br>THICKNESS<br>T | BODY<br>WIDTH<br>W | ANGLE    | DRILL<br>CAP | PREVIOUS<br>MODEL |       |
|-------|-------------------|------------------------|----------------------|------------------------|--------------------------|------------------------|--------------------|----------|--------------|-------------------|-------|
| ZT562 | 10-32'            | 9/32"                  | 2-5/8"               | 3-7/16"                | 5-11/16"                 | 1/4"                   | 7/8"               | 30° R.H. | 1/8"         | ZT513             |       |
|       | 1/4"-28           |                        |                      |                        |                          |                        |                    |          |              |                   |       |
| ZT563 | 10-32'            |                        |                      |                        |                          |                        |                    |          |              | 30° L.H.          | ZT514 |
|       | 1/4"-28           |                        |                      |                        |                          |                        |                    |          |              |                   |       |
| ZT561 | 10-32'            |                        | 3-3/64"              | 3-13/16"               | 1-13/16"                 |                        |                    | STRAIGHT |              | ZT515             |       |
|       | 1/4"-28           |                        |                      |                        |                          |                        |                    |          |              |                   |       |
| ZT762 | 10-32'            |                        | 2-5/8"               | 3-7/16"                |                          |                        |                    | 30° R.H. |              | ZT713             |       |
|       | 1/4"-28           |                        |                      |                        |                          |                        |                    |          |              |                   |       |
| ZT763 | 10-32'            | 3-3/64"                | 3-13/16"             | 30° L.H.               |                          | ZT714                  |                    |          |              |                   |       |
|       | 1/4"-28           |                        |                      |                        |                          |                        |                    |          |              |                   |       |
| ZT761 | 10-32'            |                        |                      |                        |                          | STRAIGHT               | ZT715              |          |              |                   |       |
|       | 1/4"-28           |                        |                      |                        |                          |                        |                    |          |              |                   |       |

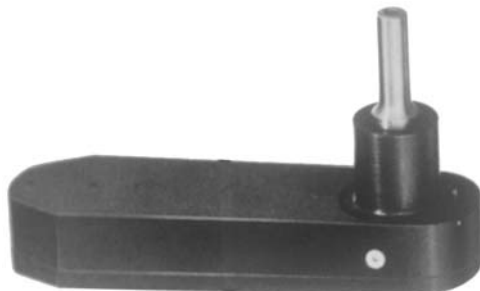
ZT561, ZT562 & ZT563 Angle drill illustrated, are also available as ZT761, ZT762 & ZT763 see reference L<sub>1</sub> dimension for difference.

For 1/4-28 Spindle thread add -C to the part numbers above

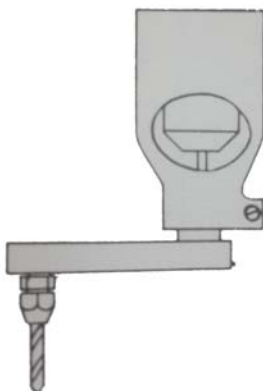


# **ZT528** **180° Flat Offset Angle Drill** **Heavy Duty**

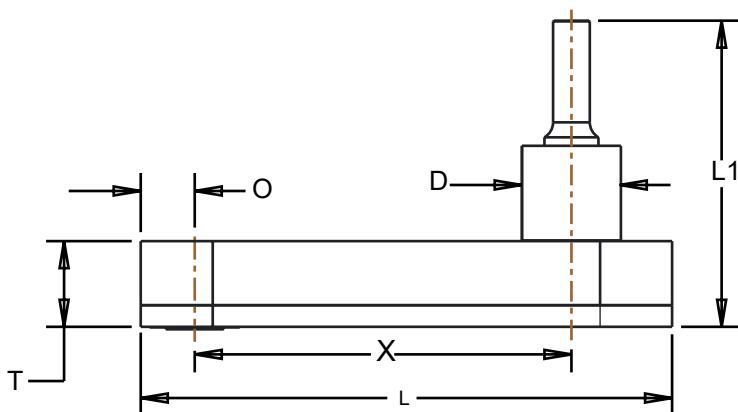
Drills offset for those places inaccessible for ordinary drills. Housings encase heat treated gears, with shafts hardened and precision ground to take the toughest task with ease.



**ZT528**



**MOUNTING ADAPTER  
FOR  
ZT528**



| MODEL   | SPINDLE<br>THREAD | SPINDLE<br>OFFSET<br>O | DRILL<br>OFFSET<br>X | OVERALL<br>LENGTH<br>L | LENGTH<br>SHORT END<br>L1 | BODY<br>THICKNESS<br>T | MOUNT<br>DIAMETER<br>D | MAX.REC.<br>CAP. |
|---------|-------------------|------------------------|----------------------|------------------------|---------------------------|------------------------|------------------------|------------------|
| ZT528-B | 5/16"-24          | 3/8"                   | 2-5/8"               | 3-11/16"               | 2-1/8"                    | 5/8"                   | 11/16"                 | 5/16"            |
| ZT528-C | 1/4"-28           |                        |                      |                        |                           |                        |                        |                  |

**MOUNTING ADAPTER FOR MODEL ZT528 SEE PAGE C2**



## ZT535/ZT622/ZT721/ZT733

### 180° Flat Offset Angle Drill

Offset drills for those "hard to get at" areas. Heat treated gears, Hardened and precision ground shafts, make this tool acceptable for the toughest jobs,



ZT622  
REVERSE SPINDLE TYPE

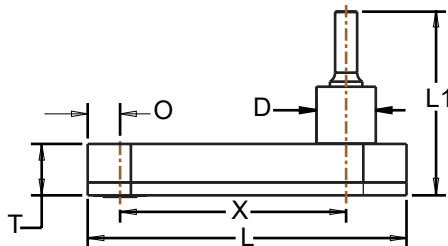
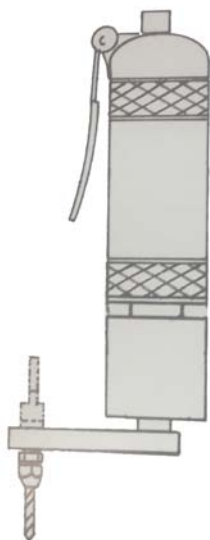


ZT535



ZT721

ZT733

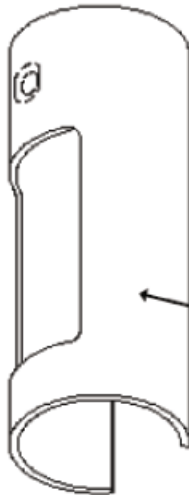
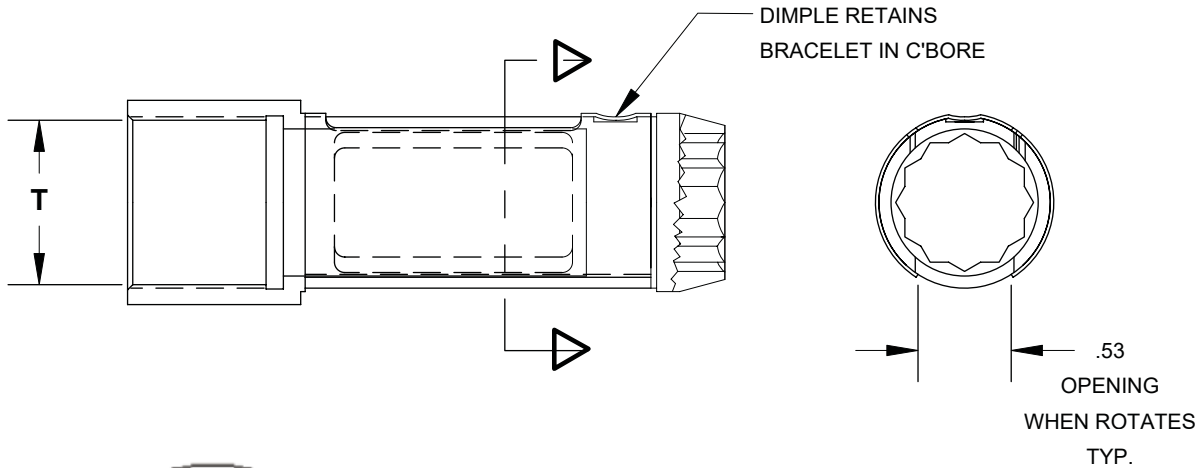


| MODEL   | SPINDLE<br>THREAD | SPINDLE<br>OFFSET<br>O | DRILL<br>OFFSET<br>X | OVERALL<br>LENGTH<br>L | LENGTH<br>SHORT END<br>L <sub>1</sub> | BODY<br>THICKNESS<br>T | MOUNT<br>DIAMETER<br>D | MAX.REC.<br>CAP. |
|---------|-------------------|------------------------|----------------------|------------------------|---------------------------------------|------------------------|------------------------|------------------|
| ZT535-C | 1/4-28"           | 5/16"                  | 3-13/16"             | 4-35/64"               | 1-61/64"                              | 17/32"                 | 11/16"                 | 1/4"             |
| ZT535-D | #10-32            |                        |                      |                        |                                       |                        |                        |                  |
| ZT535-G | #5-40             |                        |                      |                        |                                       |                        |                        |                  |
| ZT622-C | 1/4-28"           | 5/16"                  | 3-1/8"               | 3-7/8"                 | 1-61/64"                              | 17/32"                 | 11/16"                 | 1/4"             |
| ZT622-D | #10-32            |                        |                      |                        |                                       |                        |                        |                  |
| ZT622-G | #5-40             |                        |                      |                        |                                       |                        |                        |                  |
| ZT721-C | 1/4-28"           | 5/16"                  | 2-29/64"             | 3-13/64"               | 1-15/16"                              | 1/2"                   | 11/16"                 | 1/4"             |
| ZT721-D | #10-32            |                        |                      |                        |                                       |                        |                        |                  |
| ZT721-G | #5-40             |                        |                      |                        |                                       |                        |                        |                  |
| ZT733-C | 1/4-28"           | 5/16"                  | 2-15/32"             | 3-7/32"                | 1-13/16"                              | 3/8"                   | 11/16"                 | 3/16"            |
| ZT733-D | #10-32            |                        |                      |                        |                                       |                        |                        |                  |
| ZT733-G | #5-40             |                        |                      |                        |                                       |                        |                        |                  |

DRILL ADAPTERS FOR THESE ANGLE DRILLS SEE PAGE A17



## ZT627AD Motor Adapters High Speed Angle Drill Attachments



The ZT627AD Motor Adapters are designed to be used in conjunction with ZEPHYR's hex body flat offset angle drill attachments and the BOEING quick change chuck.

Features include:

- Threads directly onto your pneumatic drill.
- 11/16" 12 point hex.
- Safely Sleeve that protects the user from the rotating drive shaft and quick change chuck.

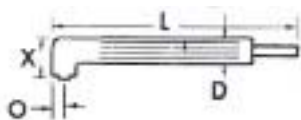
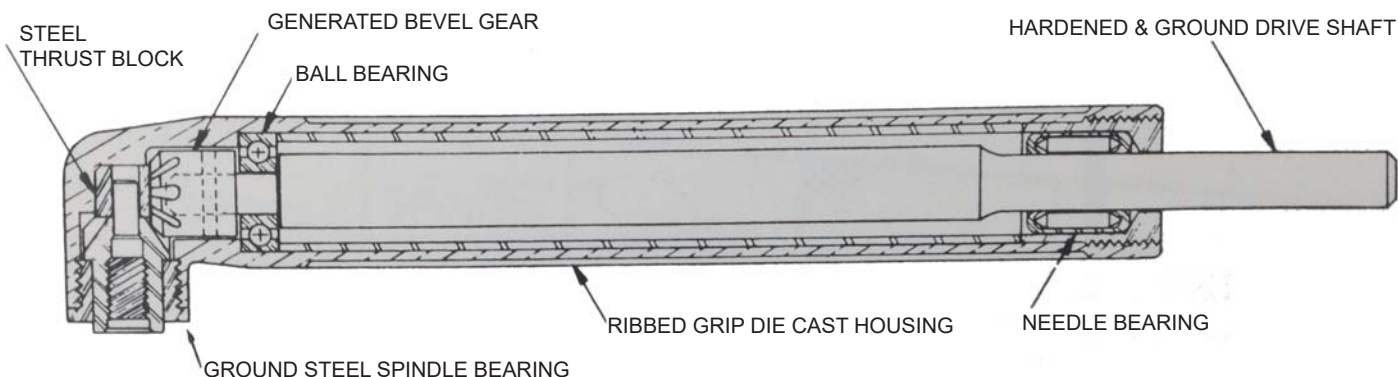
| Model Number | Motor Thread | Overall Length | Adapter Hex     | Body Diameter | Motor Model       |
|--------------|--------------|----------------|-----------------|---------------|-------------------|
| ZT627AD      | 1"-20 LH     | 3.450"         | 11/16" 12 Point | 1.030"        | Dotco             |
| ZT627AD-1.25 | 1-1/4-18- LH | 3.165"         | 11/16" 12 Point | 1.030"        | Ingersoll-Rand    |
| ZT627AD-M36  | M36X1.5 LH   | 3.340"         | 11/16" 12 Point | 1.030"        | Atlas Copco LBB36 |



# **ZT417** **Angle Drills** **90° Light Duty**



These small, compact drills are designed for extra "Tight" spots. They are similar in construction to the larger models except that, because of mechanical limitations, a ground steel spindle bearing is used instead of a radial thrust ball bearing.



| MODEL      | SPINDLE<br>THREAD | SPINDLE<br>OFFSET<br>O | LENGTH<br>SHORT END<br>X | LENGTH<br>OVERALL<br>L | BODY<br>DIAMETER<br>D | MAXIMUM<br>DRILL<br>CAPACITY |
|------------|-------------------|------------------------|--------------------------|------------------------|-----------------------|------------------------------|
| ZT417-C    | 1/4-28            | 17/64"                 | 27/32"                   | 5-5/8"                 | 5/8"                  | 1/8"                         |
| ZT417-C-QC | 1/4-28            | 17/64"                 | 27/32"                   | 5-15/16"               | 5/8"                  | 1/8"                         |
| ZT417-D    | 10-32             | 17/64"                 | 27/32"                   | 5-5/8"                 | 5/8"                  | 1/8"                         |
| ZT417-D-QC | 10-32             | 17/64"                 | 27/32"                   | 5-15/16"               | 5/8"                  | 1/8"                         |



# ZT613

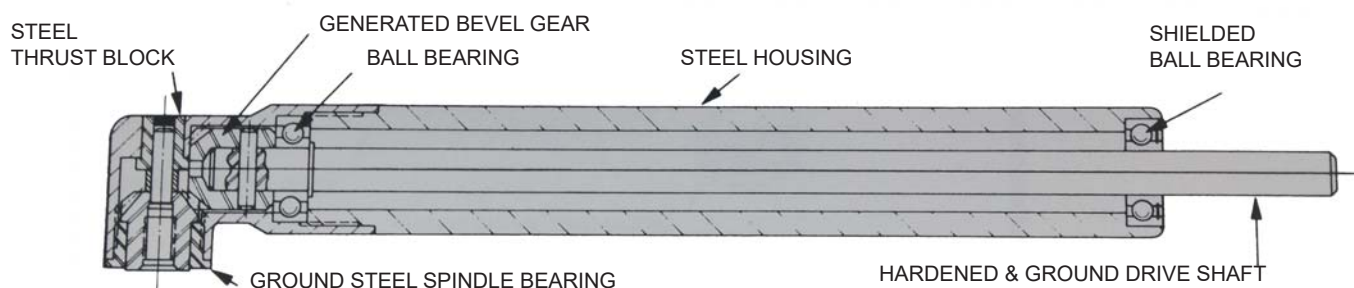
## Angle Drills

### 90° Light Duty

Constructed with an all steel housing to permit the use of larger, stronger gears and increased drill capacity, without sacrificing the overall size as offered in other Zephyr light duty drills.



ZT613



| MODEL   | SPINDLE<br>THREAD | SPINDLE<br>OFFSET<br>O | DRILL<br>OFFSET<br>X | OVERALL<br>LENGTH<br>L | BODY<br>DIAMETER<br>D | MAX.DILL.<br>CAP. |
|---------|-------------------|------------------------|----------------------|------------------------|-----------------------|-------------------|
| ZT613-C | 1/4-28"           | 5/16"                  | 29/32"               | 7-3/16"                | 1-61/64"              | 3/16"             |
| ZT613-D | #10-32            |                        |                      |                        |                       |                   |
| ZT613-F | 9/32"-40          |                        |                      |                        |                       |                   |

OTHER SPINDLE SIZES ON REQUEST

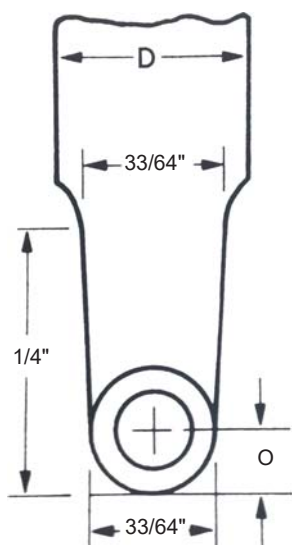
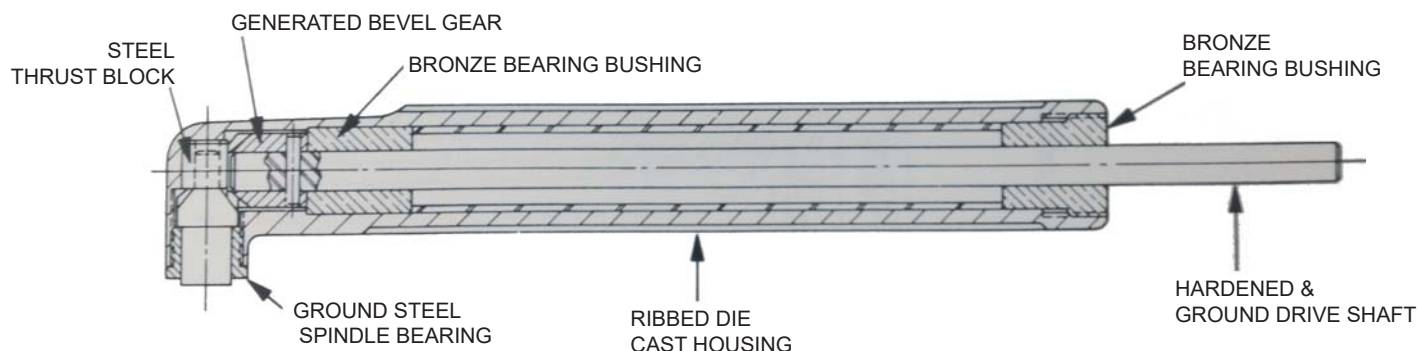


## ZT616 Angle Drills 90 Light Duty

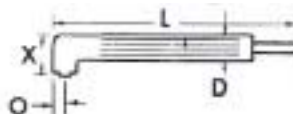
THE MIDGET DRILL THAT DOES A "BIG" JOB!



Designed primarily for use in limited spaces... this unit features a greatly reduced 90 degree end section plus all the advantages of other Zephyr light duty drills.



| MODEL  | SPINDLE<br>THREAD | SPINDEL<br>OFFSET<br>O | LENGTH<br>SHORT END<br>X | LENGTH<br>OVERALL<br>L | BODY<br>DIAMETER<br>D | MAXIMUM<br>DRILL<br>CAPACITY |
|--------|-------------------|------------------------|--------------------------|------------------------|-----------------------|------------------------------|
| ZT616D | 10-32             | 13/64"                 | 25/32"                   | 5-5/8"                 | 5/8"                  | 1/8"                         |



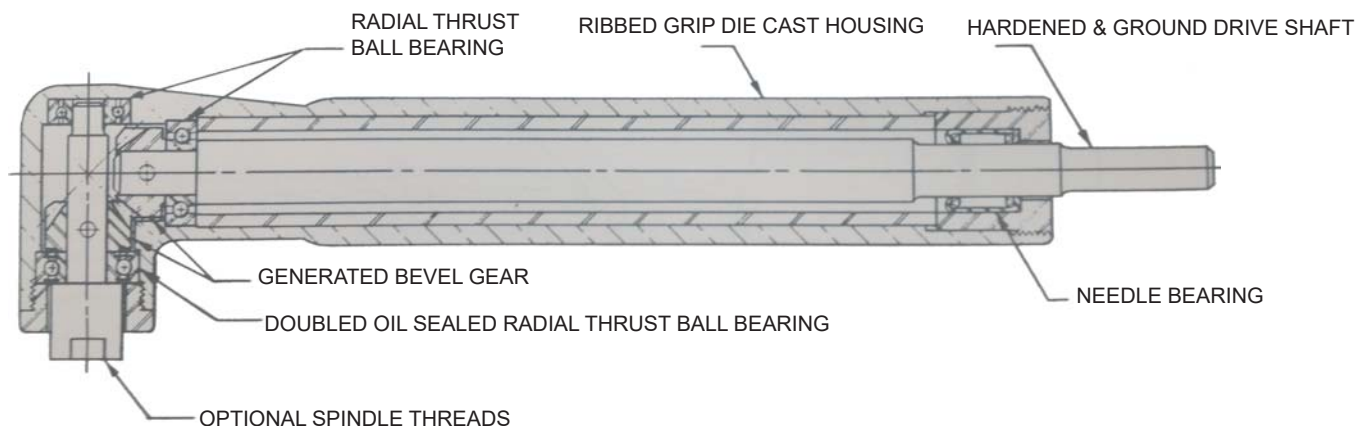


# **ZT219** **Angle Drills** **90° Standard Duty**

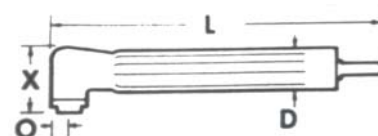


ZT219

These tools are considered as the "Standard Duty" size by most users. They incorporate the finest of mechanical design and construction that it is possible to pack into their physical dimensions.



| MODEL   | SPINDLE<br>THREAD | SPINDLE<br>OFFSET<br>O | DRILL<br>OFFSET<br>X | OVERALL<br>LENGTH<br>L | BODY<br>DIAMETER<br>D | MAX.DILL.<br>CAP. |
|---------|-------------------|------------------------|----------------------|------------------------|-----------------------|-------------------|
| ZT219-B | 5/16"-24          | 13/32"                 | 1-11/16"             | 7-3/8"                 | 7/8"                  | 3/8"              |
| ZT219-C | 1/4"-28           |                        |                      |                        |                       |                   |
| ZT219-D | 10-32             |                        |                      |                        |                       |                   |



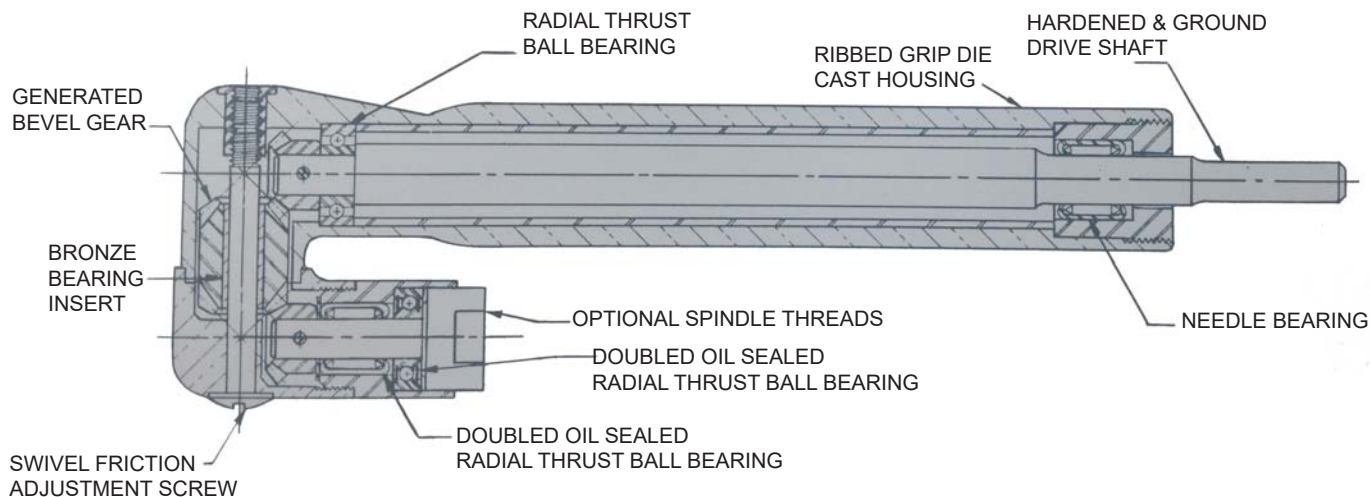


# **ZT246** **Angle Drills** **360° Standard Duty**

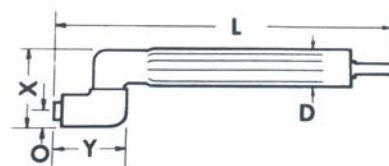


ZT246

A truly "all angle" 360° swivel heat type of tool designed for all standard duty drilling operations. Incorporates the same fine workmanship and design features as other Zephyr Tools.



| MODEL    | SPINDLE<br>THREAD | SPINDLE<br>OFFSET<br>O | LENGTH<br>SHORT<br>END<br>X | OVERALL<br>LENGTH<br>L | BODY<br>DIAMETER<br>D | OFFSET<br>LENGTH<br>Y | MAX.DILL.<br>CAP. |
|----------|-------------------|------------------------|-----------------------------|------------------------|-----------------------|-----------------------|-------------------|
| ZT246-B  | 5/16"-24          | 3/8"                   | 2.00"                       | 8-9/16"                | 7/8"                  | 2.00"                 | 3/8"              |
| ZT246-C  | 1/4"-28           |                        |                             |                        |                       |                       |                   |
| ZT246-D' | #10-32            |                        |                             |                        |                       |                       |                   |



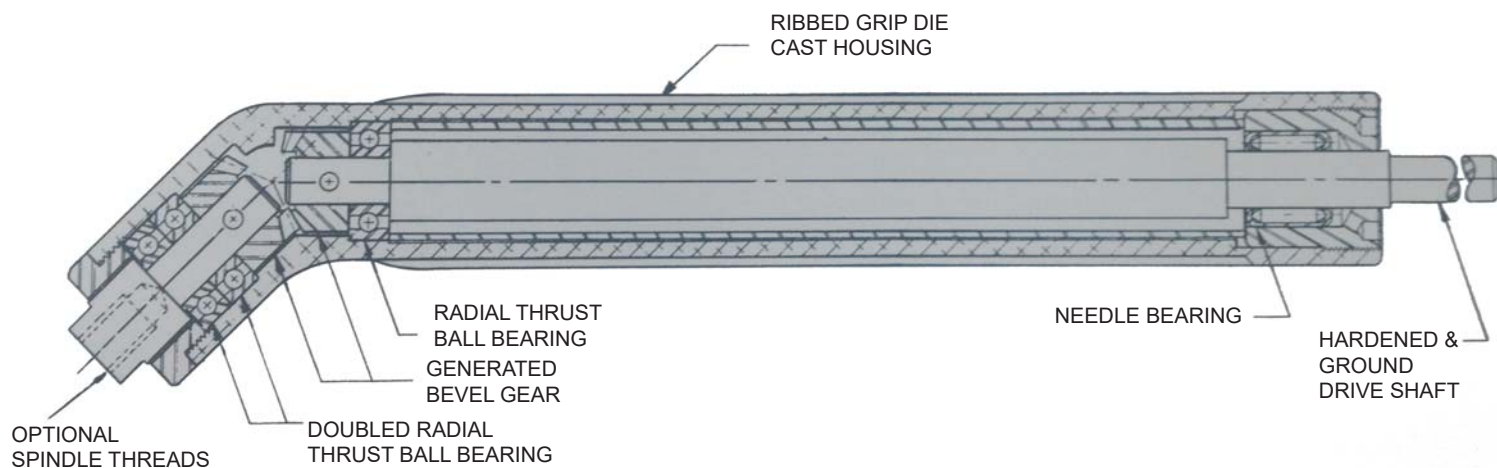


## ZT220 Angle Drills 45° Standard Duty

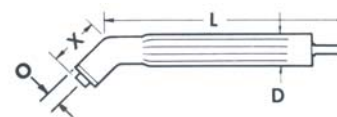


ZT220

This 45° angle head is the accepted "Standard Duty" size. Its conservative design and precision workmanship assure long and satisfactory service.

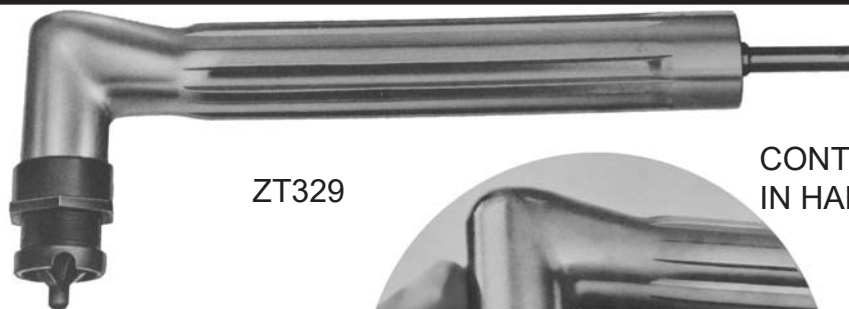
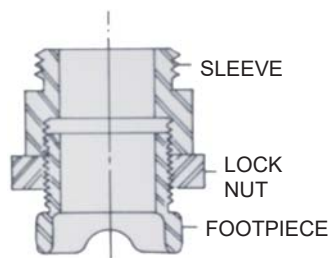
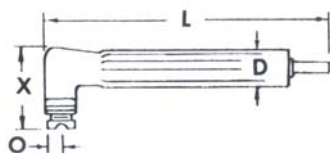


| MODEL   | SPINDLE<br>THREAD | SPINDLE<br>OFFSET<br>O | LENGTH<br>SHORT<br>END<br>X | OVERALL<br>LENGTH<br>L | BODY<br>DIAMETER<br>D | MAX.DILL.<br>CAP. |
|---------|-------------------|------------------------|-----------------------------|------------------------|-----------------------|-------------------|
| ZT220-B | 5/16"-24          | 13/32"                 | 1-3/8"                      | 7-7/8"                 | 7/8"                  | 3/8"              |
| ZT220-C | 1/4"-28           |                        |                             |                        |                       |                   |
| ZT220-D | #10-32            |                        |                             |                        |                       |                   |





# **ZT329** **Angle Drills** **90° Standard Duty**


**ZT329**
**CONTROLS CUTTING DEPTH  
IN HARD TO REACH PLACES**


| MODEL    | ATTACHMENT | FITS<br>ANGLE<br>DRILL | SPINDLE<br>THREAD | O      | MIN.<br>X | MAX.<br>X | L      | D    |
|----------|------------|------------------------|-------------------|--------|-----------|-----------|--------|------|
| ZT329-A* | ZT329042   | ZT219C                 | 1/4"-28           | 15/32" | 2-3/32"   | 2-1/4"    | 7-3/8" | 7/8" |
| ZT329-B* | ZT329041   |                        |                   |        |           |           |        |      |
| ZT329-C* | ZT329043   |                        |                   |        |           |           |        |      |
| ZT329-D* | ZT329044   |                        |                   |        |           |           |        |      |
| ZT418-D* | ZT418040   | ZT417                  | #10-32            | 5/16"  | 1-1/4"    | 1-7/16"   | 5-5/8" | 5/8" |

(\*)COMPLETE TOOL # (INCLUDES ANGLE HEAD)



| USE ON<br>MODEL # | CUTTER<br>DIAMETER | When ordering<br>these integral pilot<br>cutters, specify,<br>dash number and<br>pilot diameter<br>required:<br>Example:<br>ZT264-26-5/32 | CUTTER<br>THREAD | CUTTER NUMBER |          |          |          |          | No. OF<br>FLUTES | USED ON   |
|-------------------|--------------------|-------------------------------------------------------------------------------------------------------------------------------------------|------------------|---------------|----------|----------|----------|----------|------------------|-----------|
|                   |                    |                                                                                                                                           |                  | 78°           | 82°      | 100°     | 110°     | 115°     |                  |           |
| ZT329-A           | 7/16"              |                                                                                                                                           | 1/4"-28          | ZT264-24      | ZT264-25 | ZT264-26 | ZT264-27 | ZT264-45 | 3                | STAINLESS |
| ZT329-B           | 1/2"               |                                                                                                                                           |                  | ZT264-28      | ZT264-29 | ZT264-30 | ZT264-31 | ZT264-46 |                  |           |
| ZT329-C           | 7/16"              |                                                                                                                                           |                  | ZT170-24      | ZT170-25 | ZT170-26 | ZT170-27 | ZT170-45 |                  |           |
| ZT329-D           | 1/2"               |                                                                                                                                           |                  | ZT170-28      | ZT170-29 | ZT170-30 | ZT170-31 | ZT170-46 |                  |           |
| ZT418-D           | 9/32"              |                                                                                                                                           | #10-32           | ZT297-10      | ZT297-11 | ZT297-12 | ZT297-13 | ZT297-14 |                  |           |
|                   |                    | Pilot Hole                                                                                                                                |                  |               |          |          |          |          |                  |           |
| ZT418-D           | 9/32"              | 5/64" - (.078)**                                                                                                                          | #10-32           | ZT290-10      | ZT290-11 | ZT290-12 | ZT290-13 | ZT290-14 | 2                | ALUMINUM  |
|                   |                    |                                                                                                                                           |                  | ZT291-10      | ZT291-11 | ZT291-12 | ZT291-13 | ZT291-14 | 3                | STAINLESS |

USE PILOT #ZT292 (SPECIFY HEAD DIAMETER) USED ON ZT290, ZT291, CUTTERS

EXAMPLE: ZT290-12-5/32

ALSO AVAILABLE: RIVET SHAVING CARBIDE CUTTERS, FOR USE WITH ZT329

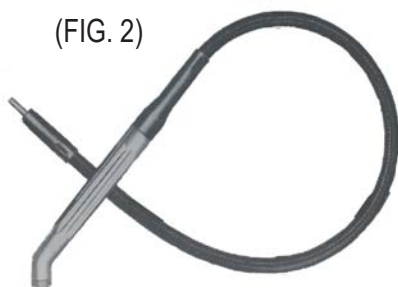
TO ORDER , SPECIFY ZT270 7/16" OR 1/2" DIAMETER



## Flexible Shaft Angle Drills

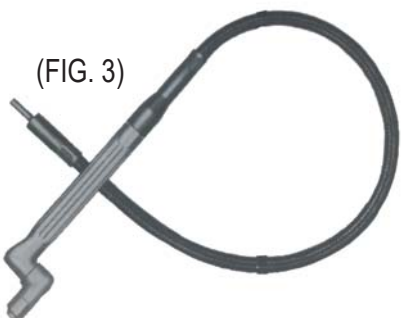
Zephyr Standard-Duty angle drills with flexible shaft drive are unsurpassed for efficient, economical operation. Flexible shaft is of latest design with sturdy piano wire stress relieved core encased with oil-resistant cover.

(FIG. 2)



Coupled with 45° Angle Drill

(FIG. 3)



Coupled with 360° Angle Drill

(FIG. 4)

Flexible Shaft  
with threaded spindle

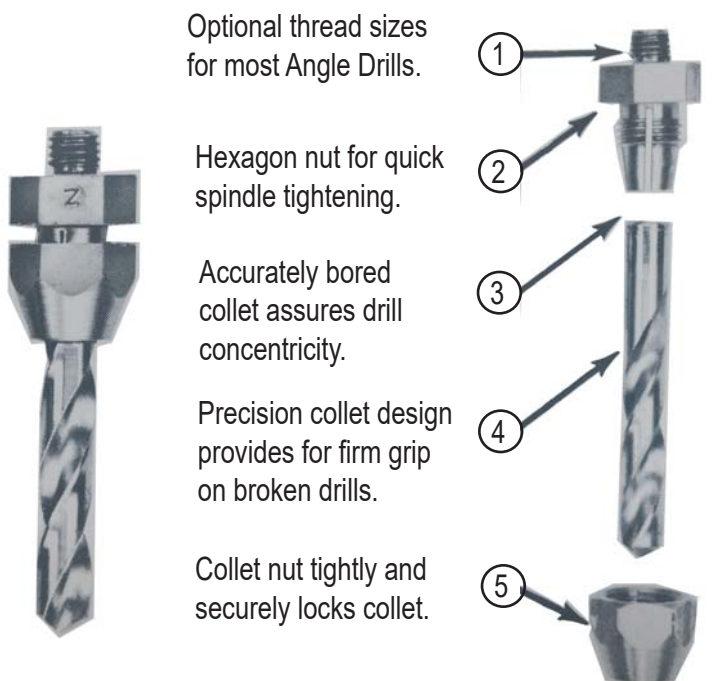
(FIG. 1)

| MODEL NUMBERS           |                   |                                  |                                  |                                   |                                       |
|-------------------------|-------------------|----------------------------------|----------------------------------|-----------------------------------|---------------------------------------|
| LENGTH OF<br>SHAFT ONLY | SPINDLE<br>THREAD | 90° DRILL AND<br>SHAFT<br>FIG. 1 | 45° DRILL AND<br>SHAFT<br>FIG. 2 | 360° DRILL AND<br>SHAFT<br>FIG. 3 | SHAFT ONLY<br>WITH THREADED<br>FIG. 4 |
| 18"                     | 5/16"-24          | ZT219B-FS18                      | ZT220B-FS18                      | ZT246B-FS18                       | ZT195B-FS18                           |
| 18"                     | 1/4"-28           | ZT219C-FS18                      | ZT220C-FS18                      | ZT246C-FS18                       | ZT195C-FS18                           |
| 18"                     | #10-32            | ZT219D-FS18                      | ZT220D-FS18                      | ZT246D-FS18                       | ZT195D-FS18                           |
| 30"                     | 5/16"-24          | ZT219B-FS30                      | ZT220B-FS30                      | ZT246B-FS30                       | ZT195B-FS30                           |
| 30"                     | 1/4"-28           | ZT219C-FS30                      | ZT220C-FS30                      | ZT246C-FS30                       | ZT195C-FS30                           |
| 30"                     | #10-32            | ZT219D-FS30                      | ZT220D-FS30                      | ZT246D-FS30                       | ZT195D-FS30                           |
| 18"                     | #10-32            | ZT417D-FS18                      | NOT MADE                         | NOT MADE                          | NOT MADE                              |
| 30"                     | #10-32            | ZT417D-FS30                      | NOT MADE                         | NOT MADE                          | NOT MADE                              |

EXTRA LONG FLEXIBLE SHAFTS CAN BE MADE TO SPECIAL ORDER



## Collet Chuck & Drill Adapters



Optional thread sizes  
for most Angle Drills.

Hexagon nut for quick  
spindle tightening.

Accurately bored  
collet assures drill  
concentricity.

Precision collet design  
provides for firm grip  
on broken drills.

Collet nut tightly and  
securely locks collet.

**This amazing tool solves several drill problems:**

Saves time and is easy to use does not gall drill shank

Increases life of drills two or three times

Nothing to wear out

Reduce costs

In some plants the savings on drill costs alone have  
paid for these adaptors the first day

| DRILL<br>CAPACITY | SPINDLE<br>THREAD | COLLET CHUCK<br>MODEL NUMBER |
|-------------------|-------------------|------------------------------|
| #50- 9/32"        | #10-32            | ZT41D (SPECIFY DRILL DIA.)   |
| #50- 3/8"         | 1/4"-28           | ZT41C (SPECIFY DRILL DIA.)   |
| #50- 1/2"         | 5/16"-24          | ZT41B (SPECIFY DRILL DIA.)   |

EXAMPLE FOR ORDERING: ZT41D-1/8  
LARGER SIZES MADE TO ORDER



# Microstop Countersink Cages, Countersink Cutters, and Accessories



## ZEPHYR TOOL GROUP

201 Hindry Avenue  
Inglewood, CA 90301

Tel. 310-410-4907 ■ Email: [sales@zephyrtoolgroup.com](mailto:sales@zephyrtoolgroup.com) ■ [zephyrtoolgroup.com](http://zephyrtoolgroup.com)



## ZT680 Microstop Countersink Cages

### HEAVY DUTY, HIGH SPEED

### SIMPLICITY - ACCURACY - DEPENDABILITY

**ZEPHYR's** new ZT680 Series Microstop Cage has been designed for continuous operation at any speed up to 10,000 rpm in the most demanding applications. This makes them well suited for all metallic, graphite and composite materials used in the airframe industry today. Quality standards have been held to insure the highest levels of accuracy and performance.

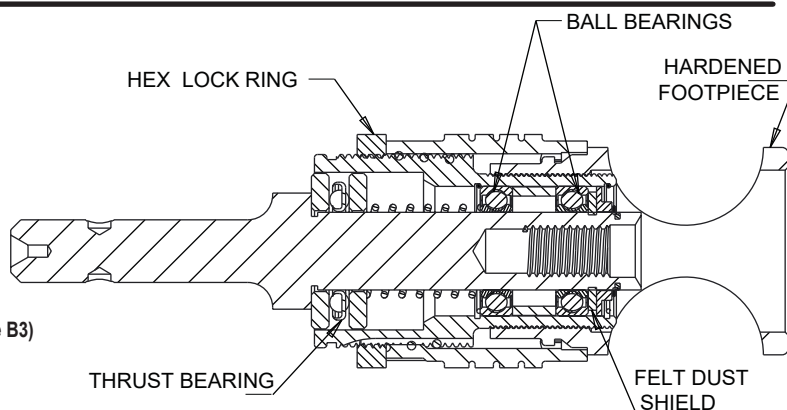
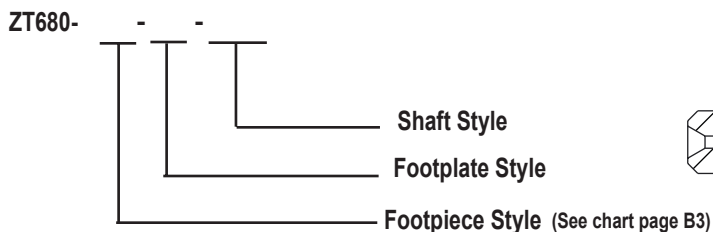
#### Features Include:

- Heavy duty - Compact size.
- Full ball bearing design supports all radial and thrust loads at speeds up to 10,000 rpm.
- .0005 inch incremental depth adjustment.
- Fail safe positive stop design insures accurate repeatability and eliminates any possibility of work piece damage.
- Built-in felt dust shield eliminates composite/graphite dust contamination of the radial ball bearings, significantly extending product life.
- 1/4" shaft travel
- Improved thrust system, significantly increases the run time between adjustments and product life.



- Left hand threaded hex lock ring eliminates any possibility of inadvertent resetting of primary adjustment.
- Available with standard 1/4-28 and on request 6mm, internally threaded shafts.
- 3/4" diameter cutter capacity with standard "S" footpieces and 1" cutter capacity with wide "W" footpieces.

#### ORDERING INFORMATION:





## Swivel Shaft Microstop Countersink Cages



ZT680 SERIES M8X1 THREAD

ZT680 SERIES M6X1 THREAD

ZT680 SERIES 1/4-28 THREAD

# ZT680-SW

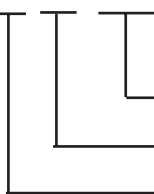
Zephyr's new Swivel Shaft- High Speed Microstops have been precision designed and machined for continuous operation at speeds of up to 6,000 RPM without over-heating. The unique Swivel Shaft enables you to countersink with up to a 5 degree off angle between the spindle and the cutter axis. The ZT680-SW series microstops utilize a ZT680 common body design making all footpieces and footplates totally interchangeable. Designed for use on all standard materials as well as the latest composite materials in the most demanding applications.

Features Include:

- 5 degree swivel shaft
- Full needle bearings and ball thrust bearings for continuous high speed use
- Compact size
- Internal serration design to eliminate chip clogging
- 0.013mm (.0005") incremental depth adjustment
- Cutter capacity:
  - 14mm (9/16") Diameter with "SP" Footpiece
  - 21mm (13/16") Diameter with "WP" Footpiece

### ORDERING INFORMATION:

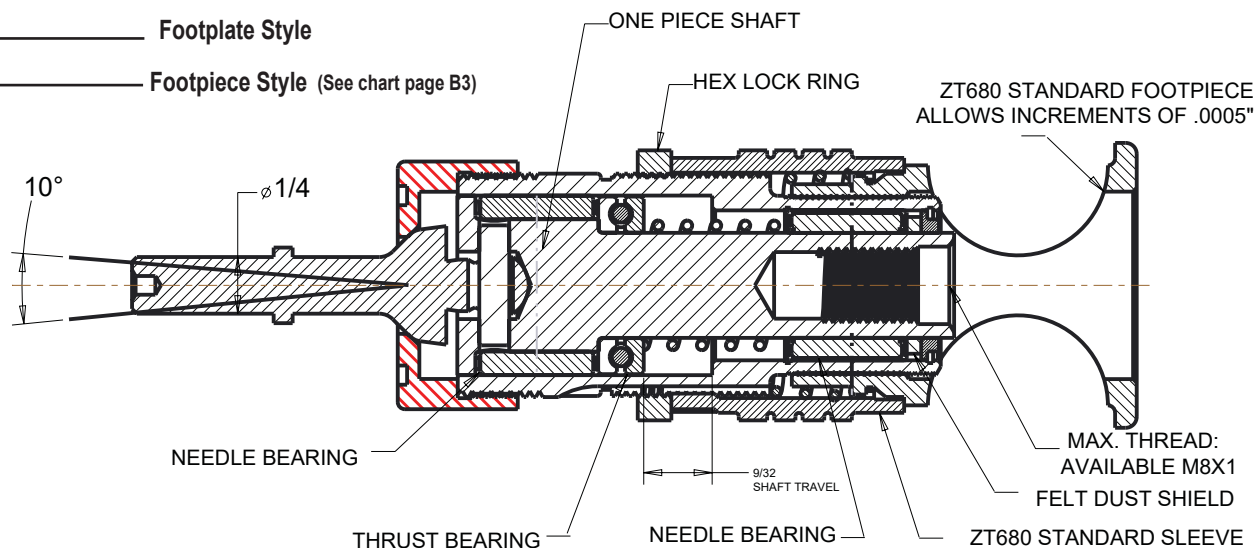
ZT680-SW-



Shaft Style

Footplate Style

Footpiece Style (See chart page B3)



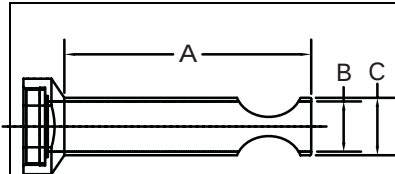


# **ZT680 Series Microstop Countersink Cage** **Product Data Sheet**

ZT680 Footpiece Style Chart (To the part numbers below add the shaft syle, QC=Quick Change, TF=1/4" Round w/Three Flats, no suffix =1/4" Round)

|                                |                                                  |                                                  |                                                  |                                  |                                                                                                                                                                             |
|--------------------------------|--------------------------------------------------|--------------------------------------------------|--------------------------------------------------|----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <br>STYLE 'S'<br>P/Nj ZT680010 | <br>STYLE 'SPI'<br>P/Nj ZT680011                 | <br>STYLE 'SPI'<br>P/Nj ZT680020                 | <br>STYLE 'ZPH'<br>P/Nj ZT680012                 | <br>STYLE 'ZPI'<br>P/Nj ZT680017 | <br>FOOTPLATE<br>STYLE 'N' (NYLON)<br>P/Nj ZT680052<br>USED WITH ZT68009<br>'SP' STYLE FTFC.<br>STYLE 'S' (STEEL)<br>P/Nj ZT680051<br>USED WITH ZT68009<br>'SP' STYLE FTFC. |
| <br>STYLE 'Y'<br>P/Nj ZT680032 | <br>STYLE 'SPI' W/CHIPGUARD<br>P/Nj ZT680050-272 | <br>STYLE 'SPI' W/CHIPGUARD<br>P/Nj ZT680050-328 | <br>STYLE 'SPI' W/CHIPGUARD<br>P/Nj ZT680050-372 | <br>STYLE 'X'<br>P/Nj ZT680031   |                                                                                                                                                                             |
| <br>STYLE 'Z'<br>P/Nj ZT680033 | <br>STYLE 'SPHR'<br>P/Nj ZT680055                | <br>STYLE 'RH'<br>P/Nj ZT680053                  | <br>STYLE 'R'<br>P/Nj ZT680018                   | <br>STYLE 'SPH'<br>P/Nj ZT680027 |                                                                                                                                                                             |
| <br>STYLE 'V'<br>P/Nj ZT680015 | <br>STYLE 'WPI'<br>P/Nj ZT680016                 | <br>STYLE 'WP'<br>P/Nj ZT680013                  | <br>STYLE 'SP'<br>P/Nj ZT68009                   | <br>STYLE 'RD'<br>P/Nj ZT680077  | <br>VACUUM FOOTPIECE<br>STYLE 'SV'<br>P/Nj ZT6800114                                                                                                                        |

## **ZT680 Extended Nose Footpiece Style Chart**



| Part No. | Style | Used with Shaft: | Thread      | A     | B    | C    |
|----------|-------|------------------|-------------|-------|------|------|
| ZT680061 | A     | ZT680065         | #10-32 Int. | 2.750 | .275 | .375 |
| ZT680062 | B     | ZT680066         | 1/4-28 Int. | 2.750 | .325 | .425 |
| ZT680063 | C     | ZT680069         | 1/4-28 Int. | 2.750 | .400 | .500 |
| ZT680063 | C     | ZT680067         | 1/4-28 Int. | 2.750 | .400 | .500 |
| ZT680064 | D     | ZT680064         | 1/4-28 Int. | 2.750 | .656 | .750 |



Note: The ZT680060 adapter and the appropriate extended shaft are included on all extended nose cage assemblies. Should you wish to convert a standard ZT680 cage to an extended nose model, you will need to order the required nose-piece, the adapter and the appropriate extended shaft separately.



# ZT680 Features and Benefits

## Compared to Standard Competitors

| ZT680                                                | Competition                                     | ZT680 Benefit                                                                                     |
|------------------------------------------------------|-------------------------------------------------|---------------------------------------------------------------------------------------------------|
| Depth adjustment: 0.0005" increments                 | Depth adjustment: 0.001" increments             | Increased accuracy of cut depth                                                                   |
| Heavy-duty design and construction                   | Medium-duty design and construction             | Stronger, longer lasting tool                                                                     |
| Maximum cutter diameter: 1.0"                        | Maximum cutter diameter: 0.75"                  | More cutter versatility                                                                           |
| Available shafts: Round, 3-Flat and Quick-Change     | Available shafts: Round                         | Greater adaptability                                                                              |
| Available internal cutter threads: 1/4-28 & 6mm      | Available internal cutter threads: 1/4-28       | Greater adaptability                                                                              |
| Matched ball-bearing design                          | Brass bushing                                   | Improved radial support, and less heat generation                                                 |
| Rotation speed up to 10,000 RPM                      | Rotation speed up to 3,000                      | Better match to standard 6,000 RPM tool motors, and is ideally suited for PCD cutting tools       |
| Integral bearing composite dust shield               | No barrier                                      | Excellent for composite applications                                                              |
| Footpiece heat treated and polished                  | Footpiece polished                              | Scratch-resistant foot surface                                                                    |
| Tested to 360K cycles with no depth of cut variation | Up to 20K cycles with no depth of cut variation | Excellent in high production environment where 100% perfect countersink cuts are required         |
| Hex lock ring                                        | Knurled lock ring                               | Improved mechanical tightening capability                                                         |
| Proprietary thrust-bearing                           | Standard thrust-bearing                         | Ensures accurate cut repeatability, reducing time consuming adjustments, and increasing tool life |
| Fail-safe positive stop design                       | Fail-safe positive stop design                  | Eliminates damage to workpiece                                                                    |



## ZT680-V VACUUM ATTACHMENT

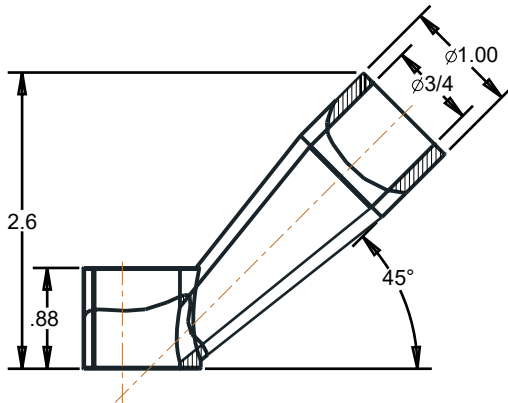
**NEW**



**Fits our  
ZT680  
Microstops  
also fits "ANY" cage  
of 1.00" Diameter**



ZEPHYR is pleased to offer its new ZT680-V Vacuum Attachment for use on its high speed, close tolerance, series Microstops. Specifically designed for ease of use when vacuum of composite dust or chips is required. The new ZT680-V offers durability, efficiency and lower cost when compared to other metal fabricated attachments.



Fits the following styles:

| Microstops Series | Footpiece Style | Shaft Style           |
|-------------------|-----------------|-----------------------|
| ZT680             | - S -           | - TF, QC,<br>( )PLAIN |
|                   | - SPH -         |                       |
|                   | - SPI -         |                       |
|                   | - SP-S -        |                       |
|                   | - SP-N -        |                       |
|                   | - Y -           |                       |
|                   | - Z -           |                       |
|                   | - ZPH -         |                       |
|                   | - ZPI -         |                       |





## ZT691/ZT692 Features and Benefits

### Compared to Standard ZT673/ZT334

| ZT691/ZT692                                                 | ZT673/673                                           | ZT691 / ZT692 Benefits                                                                                          |
|-------------------------------------------------------------|-----------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|
| Improved ball bearing design for greater support            | Ball bearing design for better radial support       | Improved run time at high spindle speeds                                                                        |
| Integral bearing composite dust shield                      | No barrier                                          | Excellent for composite applications                                                                            |
| Proprietary thrust-bearings                                 | Standard thrust-bearings                            | Ensures accurate countersink cut repeatability reducing time consuming re-adjustments, and increasing tool life |
| Superior repeatability minimizes variations in depth of cut | Good repeatability with no depth of cut variation   | Excellent in high production environments where 100% perfect countersinks cuts are required                     |
| Footpiece heat treated and polished                         | Footpiece polished                                  | Scratch-resistant foot surface                                                                                  |
| Fail-safe positive stop design                              | Fail-safe positive stop design                      | Eliminates damage to workpiece                                                                                  |
| Depth adjustment: 0.0005" increments Same                   | Depth adjustment: 0.0005" increments                | Accuracy required for today's assemblies                                                                        |
| 1" to 2" cutter capacity                                    | 1" to 1 1/2" cutter capacity                        | Great cutter versatility                                                                                        |
| Same capacity and travel in a short over all length         | No comparison                                       | Easier to handle and control                                                                                    |
| Available internal cutter threads: 3/8-24 & 7/16-20         | Available internal cutter threads: 3/8-24 & 7/16-20 | Same versatile holding method                                                                                   |
| Available Shafts: Round with 3-Flats                        | Available Shafts: Round with 3-Flats                | Same great holding method                                                                                       |



## ZT355, ZT357, ZT358 Series Long Travel Microstop Countersink Cages

**Zephyr** specially designed long travel microstops for use with Taper Lock drill reamers.

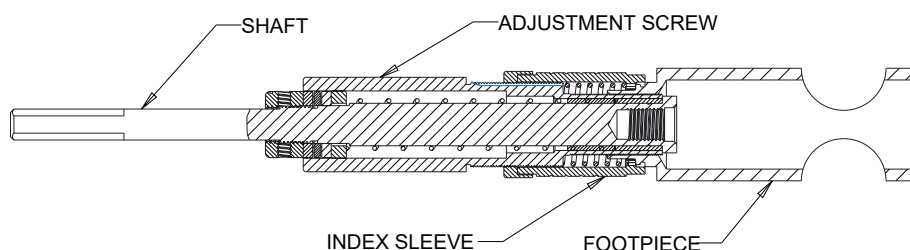
### Features

- Positive non-slip lock ring adjusts without tools.
- Specific types and sizes for every purpose.
- Micrometer dial type adjustment sleeve.
- Spring loaded retractable type shaft.
- Heavy duty enclosed ball thrust bearing.
- Microstop depth adjustment .001.

**ZT355** series for use with 1/8" & 5/32" diameter standard taper-lok drill-reamers.

**ZT357** series for use with 3/16" diameter standard taper-lok drill-reamers.

**ZT358** series for use with the larger diameter standard taper-lok drill-reamers.



| MICRO-STOP<br>C'SINK | SHAFT THREAD | OVERALL<br>LENGTH | INCHES OF<br>TRAVEL | ADJUSTMENT | CROSS REFERENCE |                  |
|----------------------|--------------|-------------------|---------------------|------------|-----------------|------------------|
|                      |              |                   |                     |            | BRILES          | NSN              |
| ZT355                | 1/4"-28      | 5-3/8"            | 3/4"                | 1/4        | TLA4900-12      | N/A              |
| ZT357                | 1/4"-28      | 7-7/16"           | 1-1/2"              | 1/4        | TLA4900-24      | 5133-00-838-2500 |
| ZT358                | 7/16"-20     | 12-1/4"           | 2-3/8"              | 1/2        | TLA4900-38      | 5133-00-838-2503 |



## ZT663 Series High Speed Microstop Countersink Cage

**Zephyr's** new High Speed Microstop has been precision machined and designed for continuous operation at speeds up to 10,000 rpm without overheating. For use in countersinking various metals and the latest graphite and composite materials, this new cage is available with a full range of footpieces and either standard 1/4", three-flat or quick-change shafts. Design requirements have been held to exacting standards for the most demanding requirements.

### Features include:

- Full ball bearings for continuous high speed use.
- Compact size.
- Internal spline design to eliminate chip clogging.
- .0005 inch incremental depth adjustment.
- Positive stop to connect shaft to eliminate work piece damage.
- Left hand threaded knurled lock ring to eliminate any possibility of inadvertent resetting of primary adjustment.
- Available with 1/4 - 28 and 6mm threaded shaft.
- 9/32" shaft travel.
- 5/8" diameter cutter capacity with standard foot pieces. 7/8" with "W" footpiece.
- Micrometer dial type adjustment sleeve.



ZT663

### Ordering Information:

ZT663 - \_\_\_\_\_ - \_\_\_\_\_ - \_\_\_\_\_  
FOOTPIECE      FOOTPLATE      SHAFT  
STYLE      (IF APPLICABLE)      STYLE



## Microstop Countersinks

ZT331-S



type for every use  
**SIMPLICITY**  
**ACCURACY**  
**DEPENDABILITY**

All **Zephyr** Microstop Countersinks have the same basic design and adjustment features. All are precision machined and designed for continuous high speed, heavy duty operation without overheating.

ZT330-S



ZT330-SP

ZT334-W

ZT331-SP

ZT338

ZT341

ZT339



## Microstop Countersinks

### ADJUSTMENT WITHOUT TOOLS.....



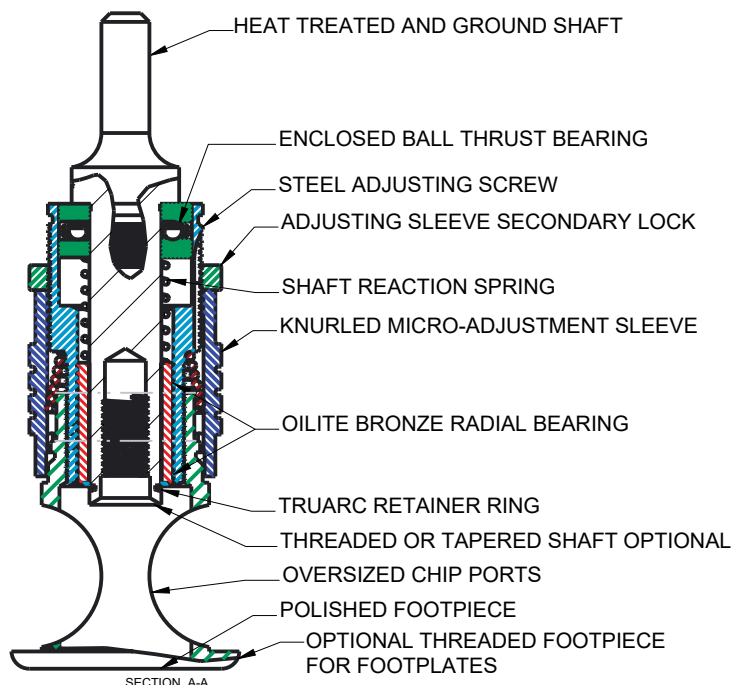
POSITIVE NON-SLIP LOCK

**Zephyr** Micrometer Countersinks are made in several models and styles - All incorporate the same basic adjustment features and positive lock design, plus a secondary lock protection - Footpieces for all conditions are readily interchangeable, thus making all models truly universal in their application - Enclosed ball thrust bearings plus bronze radial bearing permit sustained high speed heavy duty operation without overheating.

- 1** Knurled locking ring provides secondary locking, completely eliminating all possibility of inadvertent re-setting of primary adjustment.
- 2** Knurled adjusting sleeve with micrometer-type dial, calibrated in increments of .001" ... provides instant and positive setting to any cutter depth desired plus automatic locking.

#### DESIGN FEATURES

- Positive non-slip locking, adjusts without tools
- Specific types and sizes for every purpose
- Micrometer dial type adjustment sleeve
- Spring loaded retractable type shaft
- Polished steel footpieces or optional screw-on nylon or steel footplate
- Heavy duty enclosed ball thrust bearing
- Oversize radial bronze bearing





## Microstop Countersinks Standard Models

MODEL  
ZT330-S



SHAFT TRAVEL 9/32"  
ADJUSTMENT 5/16"

MODEL  
ZT331-S



SHAFT TRAVEL 1/2"  
ADJUSTMENT 1"

MODEL  
ZT334-W



SHAFT TRAVEL 1/2"  
ADJUSTMENT 1"



Style "S"



Style "W"



Style "Y"



Style "R"



Style "SP"



Style "WP"

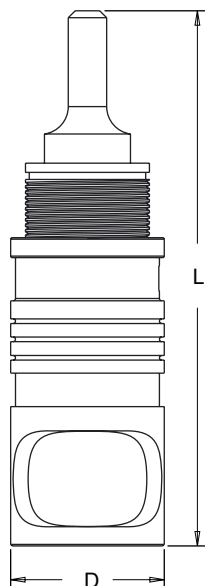


Style "X"



Style "Z"

The eight types of footpieces for each model will fill all needs. Footpieces styles "SP" and "WP" are available with either a hardened and polished steel footplate or a nylon screw on type protective footplate which helps to eliminate surface



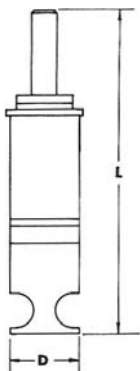
| MODEL NO. | D    | L       | MAX. CUT DIA. | SHAFT THREAD |
|-----------|------|---------|---------------|--------------|
| ZT330-S   | .87  | 3 9/16  | 5/8           | 1/4"-28      |
| ZT330-W   | 1.00 | 3 9/16  | 3/4           | 1/4"-28      |
| ZT330-X   | .87  | 3 9/16  | 5/8           | 1/4"-28      |
| ZT330-Y   | .87  | 3 9/16  | 5/8           | 1/4"-28      |
| ZT330-Z   | .87  | 3 9/16  | 5/8           | 1/4"-28      |
| ZT330-R   | .45  | 3 9/16  | 5/16          | 1/4"-28      |
| ZT330-SP  | 1.25 | 3 9/16  | 5/8           | 1/4"-28      |
| ZT330-WP  | 1.25 | 3 9/16  | 3/4           | 1/4"-28      |
| ZT331-S   | 1.11 | 5 15/16 | 7/8           | 3/8"-24      |
| ZT331-W   | 1.62 | 5 15/16 | 1 3/8         | 3/8"-24      |
| ZT331-X   | 1.11 | 5 15/16 | 7/8           | 3/8"-24      |
| ZT331-Y   | 1.11 | 5 15/16 | 7/8           | 3/8"-24      |
| ZT331-Z   | 1.11 | 5 15/16 | 7/8           | 3/8"-24      |
| ZT331-SP  | 1.13 | 5 15/16 | 7/8           | 3/8"-24      |
| ZT331-WP  | 1.87 | 5 15/16 | 1 3/8         | 3/8"-24      |
| ZT334-S   | 1.11 | 5 15/16 | 7/8           | 7/16"-20     |
| ZT334-W   | 1.75 | 5 15/16 | 1 1/2         | 7/16"-20     |
| ZT334-X   | 1.11 | 5 15/16 | 7/8           | 7/16"-20     |
| ZT334-Y   | 1.11 | 5 15/16 | 7/8           | 7/16"-20     |
| ZT334-Z   | 1.11 | 5 15/16 | 7/8           | 7/16"-20     |
| ZT334-SP  | 1.37 | 5 15/16 | 7/8           | 7/16"-20     |
| ZT334-WP  | 2.00 | 5 15/16 | 1 1/2         | 7/16"-20     |



## MICROSTOP COUNTERSINKS

### BASIC DESIGN

**Precision manufactured** for trouble-free operation.  
**Complete, interchangeable** parts - low maintenance.  
**Positive nonslip locking**, adjusts without tools.  
**Micrometer dial type** adjustment sleeve.  
**Spring loaded**, retractable type shaft.  
**Hardened and polished** steel foot pieces.  
**Heavy duty** enclosed ball thrust bearing.  
**Oversize radial** bronze bearing.



### MODEL ZT345-S



### New Midget Model

For close quarter operations

All Zephyr Micro Stop Countersinks have the same basic design and adjustment features. All are precision machined and designed for continuous high speed, heavy duty operation without overheating.

| MODEL    | D    | L       | CUTTER<br>THREAD | MAX<br>CUTTER<br>DIA. | CUTTER<br>PART NO.               |
|----------|------|---------|------------------|-----------------------|----------------------------------|
| ZT345-S  | .687 | 3-3/16" | 1/4"-28          | 7/16"                 | ZT150<br>ZT154<br>ZT164<br>ZT170 |
| ZT345-SP | .687 | 3-3/16" | 1/4"-28          | 3/8"                  | ZT172<br>ZT184<br>ETC.           |

Also available as Model 345-SP with threaded footpiece and a hardened and polished, screw on type footplate.

SHAFT TRAVEL 7/32"

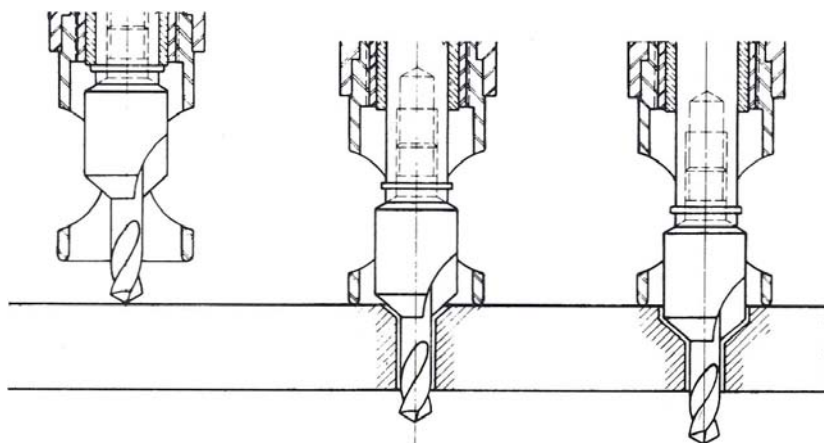
ADJUSTMENT 3/8"

### MODEL ZT338



### Special 9/16" Long Stroke Unit

For use with ZT184 and ZT185 Cutters  
 Permits full retraction of Drill-Countersink cutter  
 Also permits full extension for Drill-Countersink cutter



Other styles of footpieces such as illustrated on page B11 are also available for the ZT338 unit.



## MICROSTOP COUNTERSINKS

### Special Purpose Tools

#### BASIC DESIGN

ALL ZEPHYR MICRO STOP COUNTERSINKS have the same basic design and adjustment features. All are precision machined and designed for continuous high speed, heavy duty operation without overheating.

#### Extended Footpiece Type Model ZT284

| MODEL #: | CUTTER<br>THREAD | MAX.<br>CUTTER<br>DIA. | B    | C    |
|----------|------------------|------------------------|------|------|
| ZT284-A  | 10-32            | .250                   | .275 | .375 |
| ZT284-B  | 1/4-28           | .300                   | .325 | .425 |
| ZT284-C  | 1/4-28           | .375                   | .400 | .500 |
| ZT284-D  | 1/4-28           | .562                   | .656 | .750 |

| INTEGRAL PILOT CUTTERS |          |          |          |          |          |
|------------------------|----------|----------|----------|----------|----------|
| MODEL #                | 78°      | 82°      | 100°     | 110°     | 115°     |
| ZT284-A                | ZT285-15 | ZT285-16 | ZT285-17 | ZT285-18 | ZT285-19 |
| ZT284-B                | ZT286-15 | ZT286-16 | ZT286-17 | ZT286-18 | ZT286-19 |
| ZT284-C                | ZT154-20 | ZT154-21 | ZT154-22 | ZT154-23 | ZT154-24 |
| ZT284-D                | ZT154-25 | ZT154-26 | ZT154-58 | ZT154-28 | ZT154-29 |

When ordering Cutters please specify dash number and Pilot Diameter.  
Example: ZT285-17-1/8

**Precision manufactured**  
For trouble-free operation.

**Completely interchangeable**  
parts - low maintenance.

**Positive nonslip locking**  
adjusts without tools.

**Micrometer dial type**  
adjustment sleeve.

**Spring loaded**, retractable  
type shaft.

**Hardened and polished steel**  
foot pieces.

**Heavy duty enclosed ball**  
thrust bearing.

**Oversize radial bronze** bearing.





## MICRO STOP COUNTERSINKS

### SPECIAL PURPOSE TOOLS

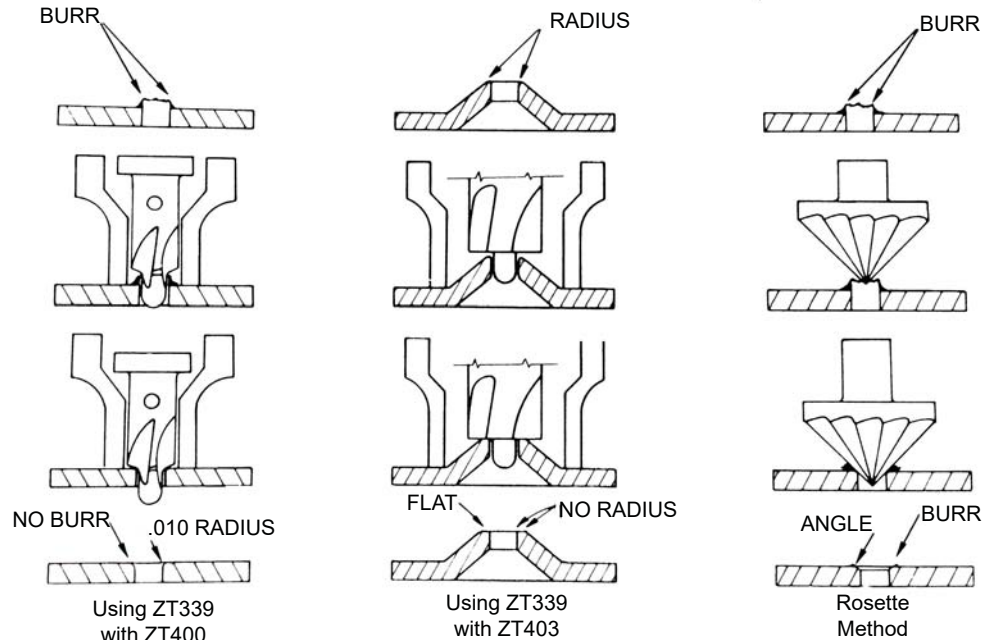
**MODEL**  
**ZT339**



SHAFT TRAVEL = 3/32"  
ADJUSTMENT = 5/16"

#### PRECISION DEBURRING OR SPOTFACING

For us with ZT400 and ZT403 Cutters.

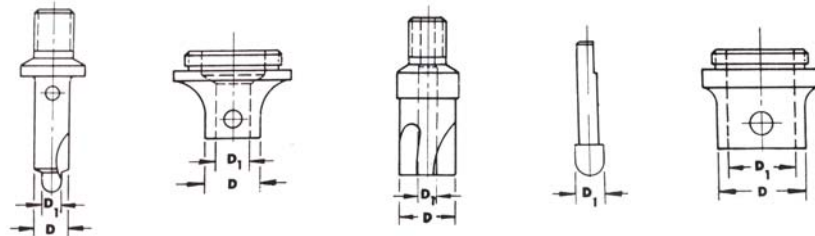


Solves the problems of sheet cracking when dimpling titanium's and other exotic materials. Accurately controls the depth of cut and radius with positive non-slip lock



**ZT400**

THREADS  
1/4-28 RH

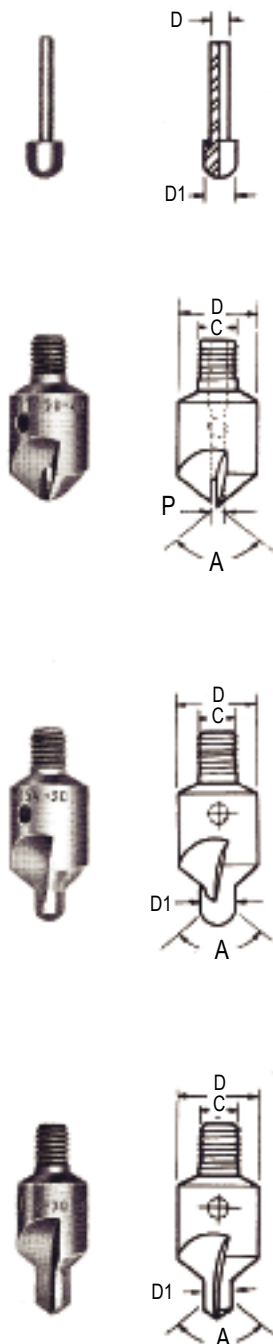


| CUTTER   |      |      | FOOTPIECE   |      |      | CUTTER   |      |      | PILOT       |      | FOOTPIECE   |      |      |
|----------|------|------|-------------|------|------|----------|------|------|-------------|------|-------------|------|------|
| TOOL NO. | D1   | D    | PART NUMBER | D1   | D    | TOOL NO. | D1   | D    | PART NUMBER | D1   | PART NUMBER | D1   | D    |
| ZT400-00 | .054 | .167 | ZT339010    | .173 | .296 | ZT403-3  | .078 | .160 | ZT309-3/32  | .092 | ZT339031    | .219 | .335 |
| ZT400-0  | .069 | .167 | ZT339010    | .173 | .296 | ZT403-4  | .078 | .210 | ZT309-1/8   | .123 | ZT339032    | .266 | .390 |
| ZT400-1  | .097 | .167 | ZTJ39010    | .173 | .296 | ZT403-5  | .125 | .315 | ZT309-5/32  | .154 | ZT339033    | .375 | .500 |
| ZT400-3  | .127 | .198 | ZT339011    | .204 | .327 | ZT403-5  | .125 | .315 | ZT309 #8    | .164 | ZT339033    | .375 | .500 |
| ZT400-5  | .158 | .230 | ZT339012    | .236 | .359 | ZT403-6  | .125 | .360 | ZT309-3/16  | .187 | ZT339034    | .422 | .550 |
| ZT400-7  | .172 | .240 | ZT339013    | .246 | .369 | ZT403-6  | .125 | .360 | ZT309-1/4   | .248 | ZT339035    | .547 | .672 |
| ZT400-9  | .190 | .260 | ZT339014    | .266 | .389 | ZT403-6  | .125 | .360 | ZT309-5/16  | .310 | ZT339035    | .547 | .672 |
| ZT400-11 | .227 | .295 | ZT339015    | .301 | .424 |          |      |      |             |      |             |      |      |
| ZT400-13 | .249 | .319 | ZT339016    | .325 | .448 |          |      |      |             |      |             |      |      |
| ZT400-15 | .280 | .348 | ZTJ39017    | .354 | .477 |          |      |      |             |      |             |      |      |
| ZT400-17 | .311 | .382 | ZTJ39018    | .388 | .512 |          |      |      |             |      |             |      |      |
| ZT400-21 | .135 | .205 | ZT339021    | .211 | .336 |          |      |      |             |      |             |      |      |
| ZT400-23 | .151 | .221 | ZT339023    | .227 | .352 |          |      |      |             |      |             |      |      |
| ZT400-25 | .204 | .274 | ZT339025    | .280 | .405 |          |      |      |             |      |             |      |      |



## MICRO STOP COUNTERSINKS CUTTERS AND PILOTS

For ALUMINUM AND DURAL... These two-flute cutters are precision ground with perfect cutting edges for chatterless countersinking. Easily sharpened

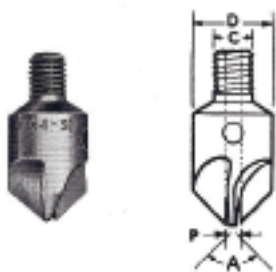


| Pilot Number                    | Shank Diameter     | Head Diameter<br>D1<br>+0.000 -0.001                                                                                  | Cutter in which Used        |               |          |          |           |           |  |
|---------------------------------|--------------------|-----------------------------------------------------------------------------------------------------------------------|-----------------------------|---------------|----------|----------|-----------|-----------|--|
| ZT300                           | 5/64"              | When ordering specify head diameter desired                                                                           | ZT150 with 5/64" Pilot Hole |               |          |          |           |           |  |
| ZT301                           | 1/8"               | example ZT300-1/8                                                                                                     | ZT150 with 1/8" Pilot Hole  |               |          |          |           |           |  |
| ZT302                           | 3/16"              |                                                                                                                       | ZT150 with 5/64" Pilot Hole |               |          |          |           |           |  |
| Used on<br>Countersink<br>Model | Cutter<br>Diameter | Pilot Hole Diameter                                                                                                   | Cutter<br>Thread            | Cutter Number |          |          |           |           |  |
|                                 | D                  | P                                                                                                                     | C                           | 100°<br>A     | 78°<br>A | 82°<br>A | 110°<br>A | 115°<br>A |  |
| ZT330                           | 1/4"               | 5/64"                                                                                                                 | 1/4"-28                     | ZT150-17      | ZT150-15 | ZT150-16 | ZT150-18  | ZT150-19  |  |
|                                 | 3/8"               | 5/64"                                                                                                                 | 1/4"-28                     | ZT150-22      | ZT150-20 | ZT150-21 | ZT150-23  | ZT150-44  |  |
|                                 | 5/16"              | 5/64"                                                                                                                 | 1/4"-28                     | ZT150-12      | ZT150-10 | ZT150-11 | ZT150-13  | ZT150-14  |  |
|                                 | 7/16"              | 5/64"                                                                                                                 | 1/4"-28                     | ZT150-26      | ZT150-24 | ZT150-25 | ZT150-27  | ZT150-45  |  |
|                                 | 1/2"               | 5/64"                                                                                                                 | 1/4"-28                     | ZT150-30      | ZT150-28 | ZT150-29 | ZT150-31  | ZT150-46  |  |
|                                 | 1/2"               | 1/8"                                                                                                                  | 1/4"-28                     | ZT150-42      | ZT150-40 | ZT150-41 | ZT150-43  | ZT150-49  |  |
|                                 | 9/16"              | 1/8"                                                                                                                  | 1/4"-28                     | ZT150-58      | ZT150-56 | ZT150-57 | ZT150-59  | ZT150-60  |  |
|                                 | 5/8"               | 1/8"                                                                                                                  | 1/4"-28                     | ZT150-52      | ZT150-50 | ZT150-51 | ZT150-53  | ZT150-54  |  |
| ZT331                           | 3/4"               | 3/16"                                                                                                                 | 3/8"-24                     | ZT152-21      | ZT152-19 | ZT152-20 | ZT152-22  | ZT152-23  |  |
|                                 | 7/8"               | 3/16"                                                                                                                 | 3/8"-24                     | ZT152-26      | ZT152-24 | ZT152-25 | ZT152-27  | ZT152-33  |  |
|                                 | 1"                 | 3/16"                                                                                                                 | 3/8"-24                     | ZT152-36      | ZT152-34 | ZT152-35 | ZT152-37  | ZT152-38  |  |
|                                 | 1-1/8"             | 3/16"                                                                                                                 | 3/8"-24                     | ZT152-41      | ZT152-39 | ZT152-40 | ZT152-42  | ZT152-43  |  |
|                                 | 1-1/4"             | 3/16"                                                                                                                 | 3/8"-24                     | ZT152-46      | ZT152-44 | ZT152-45 | ZT152-47  | ZT152-48  |  |
|                                 | 1-3/8"             | 3/16"                                                                                                                 | 3/8"-24                     | ZT152-51      | ZT152-49 | ZT152-50 | ZT152-52  | ZT152-53  |  |
| ZT331                           | 7/8"               | 3/16"                                                                                                                 | 7/16"-20                    | ZT151-26      | ZT151-24 | ZT151-25 | ZT151-27  | ZT151-33  |  |
|                                 | 1"                 | 3/16"                                                                                                                 | 7/16"-20                    | ZT151-36      | ZT151-34 | ZT151-35 | ZT151-37  | ZT151-38  |  |
|                                 | 1-1/8"             | 3/16"                                                                                                                 | 7/16"-20                    | ZT151-41      | ZT151-39 | ZT151-40 | ZT151-42  | ZT151-43  |  |
|                                 | 1-1/4"             | 3/16"                                                                                                                 | 7/16"-20                    | ZT151-46      | ZT151-44 | ZT151-45 | ZT151-47  | ZT151-48  |  |
|                                 | 1-3/8"             | 3/16"                                                                                                                 | 7/16"-20                    | ZT151-51      | ZT151-49 | ZT151-50 | ZT151-52  | ZT151-53  |  |
|                                 | 1-1/2"             | 3/16"                                                                                                                 | 7/16"-20                    | ZT151-56      | ZT151-54 | ZT151-55 | ZT151-57  | ZT151-58  |  |
| ZT330                           | 1/4"               | When ordering these integral pilot cutters, specify dash number and pilot diameter D1 required. Example: ZT154-20-1/8 | 1/4"-28                     | ZT154-17      | ZT154-15 | ZT154-16 | ZT154-18  | ZT154-19  |  |
|                                 | 3/8"               |                                                                                                                       | 1/4"-28                     | ZT154-22      | ZT154-20 | ZT154-21 | ZT154-23  | ZT154-44  |  |
|                                 | 5/16"              |                                                                                                                       | 1/4"-28                     | ZT154-12      | ZT154-10 | ZT154-11 | ZT154-13  | ZT154-14  |  |
|                                 | 7/16"              |                                                                                                                       | 1/4"-28                     | ZT154-26      | ZT154-24 | ZT154-25 | ZT154-27  | ZT154-45  |  |
|                                 | 1/2"               |                                                                                                                       | 1/4"-28                     | ZT154-30      | ZT154-28 | ZT154-29 | ZT154-31  | ZT154-46  |  |
|                                 | 9/16"              |                                                                                                                       | 1/4"-28                     | ZT154-58      | ZT154-56 | ZT154-57 | ZT154-59  | ZT154-60  |  |
| ZT331                           | 3/4"               |                                                                                                                       | 3/8"-24                     | ZT156-21      | ZT156-19 | ZT156-20 | ZT156-22  | ZT156-23  |  |
|                                 | 7/8"               |                                                                                                                       | 3/8"-24                     | ZT156-26      | ZT156-24 | ZT156-25 | ZT156-27  | ZT156-33  |  |
|                                 | 1"                 |                                                                                                                       | 3/8"-24                     | ZT156-36      | ZT156-34 | ZT156-35 | ZT156-37  | ZT156-38  |  |
|                                 | 1-1/8"             |                                                                                                                       | 3/8"-24                     | ZT156-41      | ZT156-39 | ZT156-40 | ZT156-42  | ZT156-43  |  |
|                                 | 1-1/4"             |                                                                                                                       | 3/8"-24                     | ZT156-46      | ZT156-44 | ZT156-45 | ZT156-47  | ZT156-48  |  |
|                                 | 1-3/8"             |                                                                                                                       | 3/8"-24                     | ZT156-51      | ZT156-49 | ZT156-50 | ZT156-52  | ZT156-53  |  |
| ZT334                           | 7/8"               |                                                                                                                       | 7/16"-20                    | ZT153-26      | ZT153-24 | ZT153-25 | ZT153-27  | ZT153-33  |  |
|                                 | 1"                 |                                                                                                                       | 7/16"-20                    | ZT153-36      | ZT153-34 | ZT153-35 | ZT153-37  | ZT153-38  |  |
|                                 | 1-1/8"             |                                                                                                                       | 7/16"-20                    | ZT153-41      | ZT153-39 | ZT153-40 | ZT153-42  | ZT153-43  |  |
|                                 | 1-1/4"             |                                                                                                                       | 7/16"-20                    | ZT153-46      | ZT153-44 | ZT153-45 | ZT153-47  | ZT153-48  |  |
|                                 | 1-3/8"             |                                                                                                                       | 7/16"-20                    | ZT153-51      | ZT153-49 | ZT153-50 | ZT153-52  | ZT153-53  |  |
|                                 | 1-1/2"             |                                                                                                                       | 7/16"-20                    | ZT153-56      | ZT153-54 | ZT153-55 | ZT153-57  | ZT153-58  |  |
| ZT330                           | 3/8"               | When ordering these integral pilot cutters, specify dash number and pilot diameter D1 required. Example: ZT155-20-1/8 | 1/4"-28                     | ZT155-22      | ZT155-20 | ZT155-21 | ZT155-23  | ZT155-44  |  |
|                                 | 7/16"              |                                                                                                                       | 1/4"-28                     | ZT155-26      | ZT155-24 | ZT155-25 | ZT155-27  | ZT155-45  |  |
|                                 | 1/2"               |                                                                                                                       | 1/4"-28                     | ZT155-30      | ZT155-28 | ZT155-29 | ZT155-31  | ZT155-46  |  |
|                                 | 5/8"               |                                                                                                                       | 1/4"-28                     | ZT155-49      | ZT155-47 | ZT155-48 | ZT155-50  | ZT155-51  |  |
| ZT331                           | 7/8"               |                                                                                                                       | 3/8"-24                     | ZT176-26      | ZT176-24 | ZT176-25 | ZT176-27  | ZT176-33  |  |
|                                 | 1"                 |                                                                                                                       | 3/8"-24                     | ZT176-36      | ZT176-34 | ZT176-35 | ZT176-37  | ZT176-38  |  |
|                                 | 1-1/8"             |                                                                                                                       | 3/8"-24                     | ZT176-41      | ZT176-39 | ZT176-40 | ZT176-42  | ZT176-43  |  |

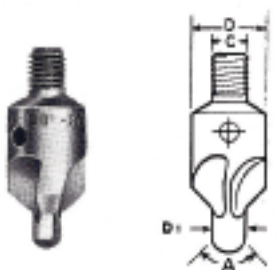


## MICRO STOP COUNTERSINKS CUTTERS AND PILOTS

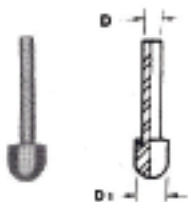
For STAINLESS STEEL AND TITANIUM...These three-flute cutters are made from special steel and are specially heat treated for efficient cutting of Stainless steel and titanium.



**Removable Pilot Type  
for Stainless Steel  
and Titanium**



**Integral Pilot Type  
for Stainless Steel  
and Titanium**



**Hardened  
Countersink Cutter Pilots**

| Used on<br>Countersink<br>Model | Cutter<br>Diameter | Pilot Hole Diameter                                                                                                                     | Cutter<br>Thread | Cutter Number |          |          |           |           |
|---------------------------------|--------------------|-----------------------------------------------------------------------------------------------------------------------------------------|------------------|---------------|----------|----------|-----------|-----------|
|                                 | D                  | P                                                                                                                                       | C                | 100°<br>A     | 78°<br>A | 82°<br>A | 110°<br>A | 115°<br>A |
| ZT330                           | 1/4"               | 5/64"                                                                                                                                   | 1/4"-28          | ZT164-17      | ZT164-15 | ZT164-16 | ZT164-18  | ZT164-19  |
|                                 | 3/8"               | 5/64"                                                                                                                                   | 1/4"-28          | ZT164-22      | ZT164-20 | ZT164-21 | ZT164-23  | ZT164-44  |
|                                 | 5/16"              | 5/64"                                                                                                                                   | 1/4"-28          | ZT164-12      | ZT164-10 | ZT164-11 | ZT164-13  | ZT164-14  |
|                                 | 7/16"              | 5/64"                                                                                                                                   | 1/4"-28          | ZT164-26      | ZT164-24 | ZT164-25 | ZT164-27  | ZT164-45  |
|                                 | 1/2"               | 5/64"                                                                                                                                   | 1/4"-28          | ZT164-30      | ZT164-28 | ZT164-29 | ZT164-31  | ZT164-46  |
|                                 | 1/2"               | 1/8"                                                                                                                                    | 1/4"-28          | ZT164-42      | ZT164-40 | ZT164-41 | ZT164-43  | ZT164-49  |
|                                 | 9/16"              | 1/8"                                                                                                                                    | 1/4"-28          | ZT164-58      | ZT164-56 | ZT164-57 | ZT164-59  | ZT164-60  |
|                                 | 5/8"               | 1/8"                                                                                                                                    | 1/4"-28          | ZT164-52      | ZT164-50 | ZT164-51 | ZT164-53  | ZT164-54  |
| ZT331                           | 3/4"               | 3/16"                                                                                                                                   | 3/8"-24          | ZT165-21      | ZT165-19 | ZT165-20 | ZT165-22  | ZT165-23  |
|                                 | 7/8"               | 3/16"                                                                                                                                   | 3/8"-24          | ZT165-26      | ZT165-24 | ZT165-25 | ZT165-27  | ZT165-33  |
|                                 | 1"                 | 3/16"                                                                                                                                   | 3/8"-24          | ZT165-36      | ZT165-34 | ZT165-35 | ZT165-37  | ZT165-38  |
|                                 | 1-1/8"             | 3/16"                                                                                                                                   | 3/8"-24          | ZT165-41      | ZT165-39 | ZT165-40 | ZT165-42  | ZT165-43  |
|                                 | 1-1/4"             | 3/16"                                                                                                                                   | 3/8"-24          | ZT165-46      | ZT165-44 | ZT165-45 | ZT165-47  | ZT165-48  |
|                                 | 1-3/8"             | 3/16"                                                                                                                                   | 3/8"-24          | ZT165-51      | ZT165-49 | ZT165-50 | ZT165-52  | ZT165-53  |
| ZT331                           | 7/8"               | 3/16"                                                                                                                                   | 7/16"-20         | ZT163-26      | ZT163-24 | ZT163-25 | ZT163-27  | ZT163-33  |
|                                 | 1"                 | 3/16"                                                                                                                                   | 7/16"-20         | ZT163-36      | ZT163-34 | ZT163-35 | ZT163-37  | ZT163-38  |
|                                 | 1-1/8"             | 3/16"                                                                                                                                   | 7/16"-20         | ZT163-41      | ZT163-39 | ZT163-40 | ZT163-42  | ZT163-43  |
|                                 | 1-1/4"             | 3/16"                                                                                                                                   | 7/16"-20         | ZT163-46      | ZT163-44 | ZT163-45 | ZT163-47  | ZT163-48  |
|                                 | 1-3/8"             | 3/16"                                                                                                                                   | 7/16"-20         | ZT163-51      | ZT163-49 | ZT163-50 | ZT163-52  | ZT163-53  |
|                                 | 1-1/2"             | 3/16"                                                                                                                                   | 7/16"-20         | ZT163-56      | ZT163-54 | ZT163-55 | ZT163-57  | ZT163-58  |
| ZT330                           | 1/4"               | When ordering these<br>integral pilot cutters,<br>specify dash number and<br>pilot diameter D1<br>required.<br>Example:<br>ZT154-20-1/8 | 1/4"-28          | ZT170-17      | ZT170-15 | ZT170-16 | ZT170-18  | ZT170-19  |
|                                 | 3/8"               |                                                                                                                                         | 1/4"-28          | ZT170-22      | ZT170-20 | ZT170-21 | ZT170-23  | ZT170-44  |
|                                 | 5/16"              |                                                                                                                                         | 1/4"-28          | ZT170-12      | ZT170-10 | ZT170-11 | ZT170-13  | ZT170-14  |
|                                 | 7/16"              |                                                                                                                                         | 1/4"-28          | ZT170-26      | ZT170-24 | ZT170-25 | ZT170-27  | ZT170-45  |
|                                 | 1/2"               |                                                                                                                                         | 1/4"-28          | ZT170-30      | ZT170-28 | ZT170-29 | ZT170-31  | ZT170-46  |
|                                 | 9/16"              |                                                                                                                                         | 1/4"-28          | ZT170-58      | ZT170-56 | ZT170-57 | ZT170-59  | ZT170-60  |
| ZT331                           | 5/8"               |                                                                                                                                         | 1/4"-28          | ZT170-49      | ZT170-47 | ZT170-48 | ZT170-50  | ZT170-51  |
|                                 | 3/4"               |                                                                                                                                         | 3/8"-24          | ZT171-21      | ZT171-19 | ZT171-20 | ZT171-22  | ZT171-23  |
|                                 | 7/8"               |                                                                                                                                         | 3/8"-24          | ZT171-26      | ZT171-24 | ZT171-25 | ZT171-27  | ZT171-33  |
|                                 | 1"                 |                                                                                                                                         | 3/8"-24          | ZT171-36      | ZT171-34 | ZT171-35 | ZT171-37  | ZT171-38  |
|                                 | 1-1/8"             |                                                                                                                                         | 3/8"-24          | ZT171-41      | ZT171-39 | ZT171-40 | ZT171-42  | ZT171-43  |
|                                 | 1-1/4"             |                                                                                                                                         | 3/8"-24          | ZT171-46      | ZT171-44 | ZT171-45 | ZT171-47  | ZT171-48  |
| ZT334                           | 1-3/8"             |                                                                                                                                         | 3/8"-24          | ZT171-51      | ZT171-49 | ZT171-50 | ZT171-52  | ZT171-53  |
|                                 | 7/8"               |                                                                                                                                         | 7/16"-20         | ZT174-26      | ZT174-24 | ZT174-25 | ZT174-27  | ZT174-33  |
|                                 | 1"                 |                                                                                                                                         | 7/16"-20         | ZT174-36      | ZT174-34 | ZT174-35 | ZT174-37  | ZT174-38  |
|                                 | 1-1/8"             |                                                                                                                                         | 7/16"-20         | ZT174-41      | ZT174-39 | ZT174-40 | ZT174-42  | ZT174-43  |
|                                 | 1-1/4"             |                                                                                                                                         | 7/16"-20         | ZT174-46      | ZT174-44 | ZT174-45 | ZT174-47  | ZT174-48  |
|                                 | 1-3/8"             |                                                                                                                                         | 7/16"-20         | ZT174-51      | ZT174-49 | ZT174-50 | ZT174-52  | ZT174-53  |
| ZT330                           | 1-1/2"             |                                                                                                                                         | 7/16"-20         | ZT174-56      | ZT174-54 | ZT174-55 | ZT174-57  | ZT174-58  |

| Pilot Number | Shank<br>Diameter | Head Diameter<br>D1<br>+.000 -.001                                  | Cutter in which Used        |
|--------------|-------------------|---------------------------------------------------------------------|-----------------------------|
| ZT300        | 5/64"             | When ordering specify<br>head diameter desired<br>example ZT300-1/8 | ZT164 with 5/64" Pilot Hole |
| ZT301        | 1/8"              |                                                                     | ZT164 with 1/8" Pilot Hole  |
| ZT302        | 3/16"             |                                                                     | ZT165 with 5/64" Pilot Hole |



# MICRO STOP COUNTERSINKS CUTTERS AND PILOTS

## CUTTERS

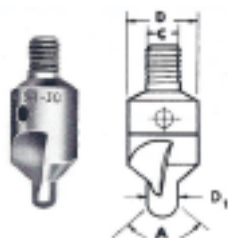


**Carbide Tipped  
Removable Pilot  
Countersink Cutters**

These cutters with solid carbide heads are designed for use in microstop countersink units. They have been specifically designed for use in countersinking of stainless steel, inconel and titanium alloys.

| Used on<br>Countersink<br>Model | Cutter<br>Diameter | Pilot Hole Diameter | Cutter<br>Thread | Cutter Number |          |          |           |           |
|---------------------------------|--------------------|---------------------|------------------|---------------|----------|----------|-----------|-----------|
|                                 | D                  | P                   | C                | 100°<br>A     | 78°<br>A | 82°<br>A | 110°<br>A | 115°<br>A |
| ZT330                           | 3/8"               | 5/64"               | 1/4"-28          | ZT350-22      | ZT350-20 | ZT350-21 | ZT350-23  | ZT350-44  |
|                                 | 7/16"              | 5/64"               | 1/4"-28          | ZT350-26      | ZT350-24 | ZT350-25 | ZT350-27  | ZT350-45  |
|                                 | 1/2"               | 5/64"               | 1/4"-28          | ZT350-30      | ZT350-28 | ZT350-29 | ZT350-31  | ZT350-46  |
|                                 | 1/2"               | 1/8"                | 1/4"-28          | ZT350-42      | ZT350-40 | ZT350-41 | ZT350-43  | ZT350-49  |
|                                 | 5/8"               | 1/8"                | 1/4"-28          | ZT350-52      | ZT350-50 | ZT350-51 | ZT350-53  | ZT350-54  |
| ZT331                           | 7/8"               | 3/16"               | 3/8"-24          | ZT352-26      | ZT352-24 | ZT352-25 | ZT352-27  | ZT352-33  |
|                                 | 1"                 | 3/16"               | 3/8"-24          | ZT352-36      | ZT352-34 | ZT352-35 | ZT352-37  | ZT352-38  |
|                                 | 1-1/8"             | 3/16"               | 3/8"-24          | ZT352-41      | ZT352-39 | ZT352-40 | ZT352-42  | ZT352-43  |
|                                 | 1-1/4"             | 3/16"               | 3/8"-24          | ZT352-46      | ZT352-44 | ZT352-45 | ZT352-47  | ZT352-48  |
|                                 | 1-3/8"             | 3/16"               | 3/8"-24          | ZT352-51      | ZT352-49 | ZT352-50 | ZT352-52  | ZT352-53  |

Note: MAXIMUM NON CUTTING (DEAD CENTER) DIAMETER 1/32" LARGER THAN PILOT HOLE.  
USE CUTTERS WITH PILOT HOLE A MINIMUM OF 1/32" SMALLER THAN DESIRED PILOT DIAMETER.



**Carbide Tipped  
Integral Pilot  
Countersink Cutters**

| Used on<br>Countersink<br>Model | Cutter<br>Diameter | Pilot Hole Diameter                                                                                                                     | Cutter<br>Thread | Cutter Number |          |          |           |           |
|---------------------------------|--------------------|-----------------------------------------------------------------------------------------------------------------------------------------|------------------|---------------|----------|----------|-----------|-----------|
|                                 | D                  | P                                                                                                                                       | C                | 100°<br>A     | 78°<br>A | 82°<br>A | 110°<br>A | 115°<br>A |
| ZT330                           | 3/8"               | When ordering these<br>integral pilot cutters,<br>specify dash number and<br>pilot diameter D1<br>required.<br>Example:<br>ZT154-20-1/8 | 1/4"-28          | ZT354-22      | ZT354-20 | ZT354-21 | ZT354-23  | ZT354-44  |
|                                 | 7/16"              |                                                                                                                                         | 1/4"-28          | ZT354-26      | ZT354-24 | ZT354-25 | ZT354-27  | ZT354-45  |
|                                 | 1/2"               |                                                                                                                                         | 1/4"-28          | ZT354-30      | ZT354-28 | ZT354-29 | ZT354-31  | ZT354-46  |
|                                 | 5/8"               |                                                                                                                                         | 1/4"-28          | ZT354-49      | ZT354-47 | ZT354-48 | ZT354-50  | ZT354-51  |
| ZT331                           | 7/8"               |                                                                                                                                         | 3/8"-24          | ZT356-26      | ZT356-24 | ZT356-25 | ZT356-27  | ZT356-33  |
|                                 | 1"                 |                                                                                                                                         | 3/8"-24          | ZT356-36      | ZT356-34 | ZT356-35 | ZT356-37  | ZT356-38  |
|                                 | 1-1/8"             |                                                                                                                                         | 3/8"-24          | ZT356-41      | ZT356-39 | ZT356-40 | ZT356-42  | ZT356-43  |
|                                 | 1-1/4"             |                                                                                                                                         | 3/8"-24          | ZT356-46      | ZT356-44 | ZT356-45 | ZT356-47  | ZT356-48  |
|                                 | 1-3/8"             |                                                                                                                                         | 3/8"-24          | ZT356-51      | ZT356-49 | ZT356-50 | ZT356-52  | ZT356-53  |



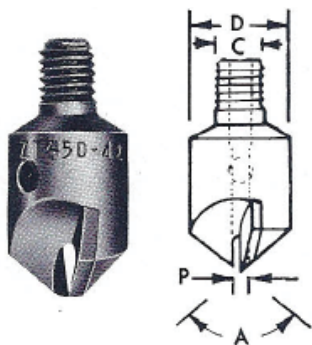
**Hardened  
Countersink Cutter Pilots**

| Pilot Number | Shank<br>Diameter | Head Diameter<br>D1<br>+ .000 - .001                                | Cutter in which Used        |
|--------------|-------------------|---------------------------------------------------------------------|-----------------------------|
| ZT300        | 5/64"             | When ordering specify<br>head diameter desired<br>example ZT300-1/8 | ZT350 with 5/64" Pilot Hole |
| ZT301        | 1/8"              |                                                                     | ZT350 with 1/8" Pilot Hole  |
| ZT302        | 3/16"             |                                                                     | ZT352 with 5/64" Pilot Hole |

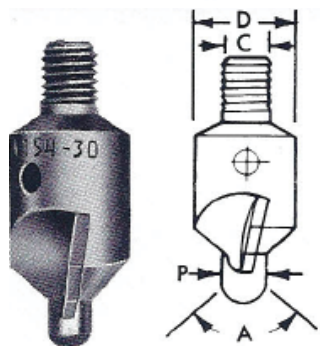


# MICRO STOP COUNTERSINKS CUTTERS AND PILOTS

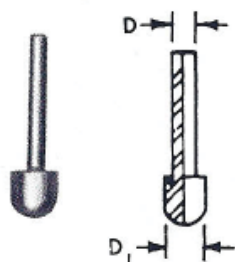
## CUTTERS



**Carbide Insert  
Removable Pilot  
Countersink Cutters**



**Carbide Insert  
Integral Pilot  
Countersink Cutters**



**Hardened  
Countersink Cutter Pilot**

These carbide cutters are designed for use in microstop countersink units. They have been specifically designed for use in countersinking of stainless steel, inconel and titanium alloys.

| Used on<br>Countersink<br>Model | Cutter<br>Diameter | Pilot Hole Diameter | Cutter<br>Thread | Cutter Number |          |          |           |           |
|---------------------------------|--------------------|---------------------|------------------|---------------|----------|----------|-----------|-----------|
|                                 | D                  | P                   | C                | 100°<br>A     | 78°<br>A | 82°<br>A | 110°<br>A | 115°<br>A |
| ZT330                           | 7/16"              | 5/64"               | 1/4"-28          | ZT450-26      | ZT450-24 | ZT450-25 | ZT450-27  | ZT450-45  |
|                                 | 1/2"               | 5/64"               | 1/4"-28          | ZT450-30      | ZT450-28 | ZT450-29 | ZT450-31  | ZT450-46  |
|                                 | 1/2"               | 1/8"                | 1/4"-28          | ZT450-42      | ZT450-40 | ZT450-41 | ZT450-43  | ZT450-49  |
|                                 | 5/8"               | 1/8"                | 1/4"-28          | ZT450-52      | ZT450-50 | ZT450-51 | ZT450-53  | ZT450-54  |
| ZT331                           | 3/4"               | 3/16"               | 3/8"-24          | ZT452-21      | ZT452-19 | ZT452-20 | ZT452-22  | ZT452-23  |
|                                 | 7/8"               | 3/16"               | 3/8"-24          | ZT452-26      | ZT452-24 | ZT452-25 | ZT452-27  | ZT452-33  |
|                                 | 1"                 | 3/16"               | 3/8"-24          | ZT452-36      | ZT452-34 | ZT452-35 | ZT452-37  | ZT452-38  |
|                                 | 1-1/8"             | 3/16"               | 3/8"-24          | ZT452-41      | ZT452-39 | ZT452-40 | ZT452-42  | ZT452-43  |
|                                 | 1-1/4"             | 3/16"               | 3/8"-24          | ZT452-46      | ZT452-44 | ZT452-45 | ZT452-47  | ZT452-48  |
|                                 | 1-3/8"             | 3/16"               | 3/8"-24          | ZT452-51      | ZT452-49 | ZT452-50 | ZT452-52  | ZT452-53  |

Note: MAXIMUM NON CUTTING (DEAD CENTER) DIAMETER 1/32" LARGER THAN PILOT HOLE.  
USE CUTTERS WITH PILOT HOLE A MINIMUM OF 1/32" SMALLER THAN DESIRED PILOT DIAMETER.

ZT450 & 452 SERIES  
78°, 110° & 115° MADE TO ORDER ONLY

| Used on<br>Countersink<br>Model | Cutter<br>Diameter | Pilot Hole Diameter                                                                                                         | Cutter<br>Thread | Cutter Number |          |          |           |           |
|---------------------------------|--------------------|-----------------------------------------------------------------------------------------------------------------------------|------------------|---------------|----------|----------|-----------|-----------|
|                                 | D                  | P                                                                                                                           | C                | 100°<br>A     | 78°<br>A | 82°<br>A | 110°<br>A | 115°<br>A |
| ZT330                           | 7/16"              | When ordering these integral pilot cutters, specify dash number and pilot diameter D1 required.<br>Example:<br>ZT154-20-1/8 | 1/4"-28          | ZT454-26      | ZT454-24 | ZT454-25 | ZT454-27  | ZT454-45  |
|                                 | 1/2"               |                                                                                                                             | 1/4"-28          | ZT454-30      | ZT454-28 | ZT454-29 | ZT454-31  | ZT454-46  |
|                                 | 5/8"               |                                                                                                                             | 1/4"-28          | ZT454-49      | ZT454-47 | ZT454-48 | ZT454-50  | ZT454-51  |
| ZT331                           | 3/4"               | When ordering these integral pilot cutters, specify dash number and pilot diameter D1 required.<br>Example:<br>ZT154-20-1/8 | 3/8"-24          | ZT456-21      | ZT456-19 | ZT456-20 | ZT456-22  | ZT456-23  |
|                                 | 7/8"               |                                                                                                                             | 3/8"-24          | ZT456-26      | ZT456-24 | ZT456-25 | ZT456-27  | ZT456-33  |
|                                 | 1"                 |                                                                                                                             | 3/8"-24          | ZT456-36      | ZT456-34 | ZT456-35 | ZT456-37  | ZT456-38  |
|                                 | 1-1/8"             |                                                                                                                             | 3/8"-24          | ZT456-41      | ZT456-39 | ZT456-40 | ZT456-42  | ZT456-43  |
|                                 | 1-1/4"             |                                                                                                                             | 3/8"-24          | ZT456-46      | ZT456-44 | ZT456-45 | ZT456-47  | ZT456-48  |
|                                 | 1-3/8"             |                                                                                                                             | 3/8"-24          | ZT456-51      | ZT456-49 | ZT456-50 | ZT456-52  | ZT456-53  |

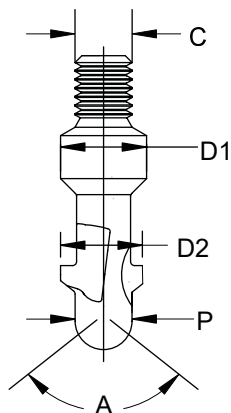
| Pilot Number | Shank<br>Diameter | Head Diameter<br>D1<br>+.000 -.001                               | Cutter in which Used        |
|--------------|-------------------|------------------------------------------------------------------|-----------------------------|
| ZT300        | 5/64"             | When ordering specify head diameter desired<br>example ZT300-1/8 | ZT450 with 5/64" Pilot Hole |
| ZT301        | 1/8"              |                                                                  | ZT450 with 1/8" Pilot Hole  |
| ZT302        | 3/16"             |                                                                  | ZT452 with 5/64" Pilot Hole |



## MICRO STOP COUNTERSINKS CUTTERS AND PILOTS

### CUTTERS

#### ZT385 SHOWN



#### ZT386 SHOWN



For ALUMINUM AND DURAL...These two flute cutters are precision ground with perfect cutting edges for chatterless countersinking. The undercut body diameter provides for faster chip ejection. These cutters are designed to produce close tolerance countersinking and to eliminate sheet damage. Factory regrind service is available on all Zephyr cutters.

| Used on Countersink Model | Cutter Diameter | Pilot Hole Diameter                                                                                                   | Cutter Thread | Cutter Number |          |          |          |          | Type of Grind |
|---------------------------|-----------------|-----------------------------------------------------------------------------------------------------------------------|---------------|---------------|----------|----------|----------|----------|---------------|
|                           | D               | P                                                                                                                     | C             | 100° A        | 78° A    | 82° A    | 110° A   | 115° A   |               |
| ZT330                     | 3/8"            | When ordering these integral pilot cutters, specify dash number and pilot diameter D1 required. Example: ZT385-20-1/8 | 1/4"-28       | ZT385-22      | ZT385-20 | ZT385-21 | ZT385-23 | ZT385-44 | Primary       |
|                           | 7/16"           |                                                                                                                       | 1/4"-28       | ZT385-26      | ZT385-24 | ZT385-25 | ZT385-27 | ZT385-45 |               |
|                           | 1/2"            |                                                                                                                       | 1/4"-28       | ZT385-30      | ZT385-28 | ZT385-29 | ZT385-31 | ZT385-46 |               |

| Used on Countersink Model | Cutter Diameter | Cutter Diameter | Pilot | Cutter Thread | Cutter Number |          |          |          |          | Type of Grind |
|---------------------------|-----------------|-----------------|-------|---------------|---------------|----------|----------|----------|----------|---------------|
|                           | D1              | D2              | P     | C             | 100° A        | 78° A    | 82° A    | 110° A   | 115° A   |               |
| ZT330-M                   | 3/8"            | .256            | .0980 | 1/4"-28       | ZT389-22      | ZT389-20 | ZT389-21 | ZT389-23 | ZT389-44 | Primary       |
|                           | 3/8"            | .256            | .1270 | 1/4"-28       | ZT385-27      | ZT389-25 | ZT389-26 | ZT389-28 | ZT389-29 |               |
|                           | 3/8"            | .317            | .1575 | 1/4"-28       | ZT385-32      | ZT389-30 | ZT389-31 | ZT389-33 | ZT389-34 |               |
|                           | 3/8"            | .375            | .1860 | 1/4"-28       | ZT385-37      | ZT389-35 | ZT389-36 | ZT389-38 | ZT389-39 |               |
|                           | 3/8"            | .385            | .1895 | 1/4"-28       | ZT385-42      | ZT389-40 | ZT389-41 | ZT389-43 | ZT389-44 |               |
|                           | 3/8"            | .382            | .1562 | 1/4"-28       | ZT385-47      | ZT389-45 | ZT389-46 | ZT389-48 | ZT389-49 |               |

For Stainless Steel and Titanium. These three-flute cutters are made from special steel and are specially heat treated for efficient cutting of stainless steel and Titanium.

| Used on Countersink Model | Cutter Diameter | Pilot Hole Diameter                                                                                                   | Cutter Thread | Cutter Number |          |          |          |          | Type of Grind |
|---------------------------|-----------------|-----------------------------------------------------------------------------------------------------------------------|---------------|---------------|----------|----------|----------|----------|---------------|
|                           | D               | P                                                                                                                     | C             | 100° A        | 78° A    | 82° A    | 110° A   | 115° A   |               |
| ZT330                     | 3/8"            | When ordering these integral pilot cutters, specify dash number and pilot diameter D1 required. Example: ZT386-20-1/8 | 1/4"-28       | ZT386-22      | ZT386-20 | ZT386-21 | ZT386-23 | ZT386-44 | Primary       |
|                           | 7/16"           |                                                                                                                       | 1/4"-28       | ZT386-26      | ZT386-24 | ZT386-25 | ZT386-27 | ZT386-45 |               |
|                           | 1/2"            |                                                                                                                       | 1/4"-28       | ZT386-30      | ZT386-28 | ZT386-29 | ZT386-31 | ZT386-46 |               |



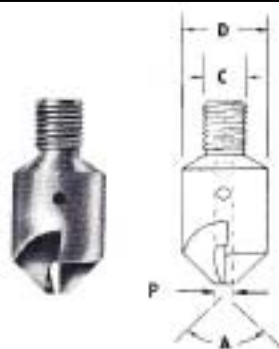
## COUNTERSINKS CUTTERS

### MISCELLANEOUS TYPES



#### Huk and Hi-Shear Collar removal

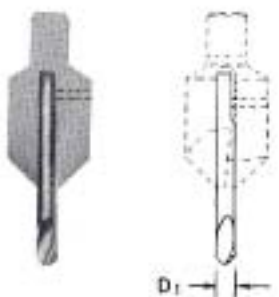
| PART NO. | D     | B    | SHANK   | FASTENER & SIZE |                |          |
|----------|-------|------|---------|-----------------|----------------|----------|
| ZT86-1   | .365  | .124 | 1/4"-28 | HS47            | 1/8"           | HI-SHEAR |
| ZT86-2   | .365  | .157 | 1/4"-28 | HS47            | 5/32"          | HI-SHEAR |
| ZT86-3   | .438  | .188 | 1/4"-28 | HS47            | 3/16"          | HI-SHEAR |
| ZT86-4   | .500  | .247 | 1/4"-28 | HS47            | 1/4"           | HI-SHEAR |
| ZT86-5   | .562  | .310 | 1/4"-28 | HS47            | 5/16"          | HI-SHEAR |
| ZT86-6   | .625  | .373 | 1/4"-28 | HS47            | 3/8"           | HI-SHEAR |
| ZT86-7   | .750  | .434 | 3/8"-24 | HS47            | 7/16"          | HI-SHEAR |
| ZT86-8   | .875  | .497 | 3/8"-24 | HS47            | 1/2"           | HI-SHEAR |
| ZT86-9   | .937  | .558 | 3/8"-24 | HS47            | 9/16"          | HI-SHEAR |
| ZT86-10  | 1.000 | .620 | 3/8"-24 | HS47            | 5/8"           | HI-SHEAR |
| ZT87-1   | .323  | .188 | 1/4"-28 | 3/16"           | HUCK LOCK BOLT |          |
| ZT87-2   | .413  | .250 | 1/4"-28 | 1/4"            | HUCK LOCK BOLT |          |
| ZT87-3   | .372  | .265 | 1/4"-28 | 1/4"            | BLIND RIVET    |          |
| ZT87-4   | .528  | .313 | 1/4"-28 | 5/16"           | HUCK LOCK BOLT |          |
| ZT87-5   | .465  | .339 | 1/4"-28 | 5/16"           | BLIND RIVET    |          |
| ZT87-6   | .622  | .375 | 1/4"-28 | 3/8"            | HUCK LOCK BOLT |          |
| ZT87-7   | .550  | .397 | 1/4"-28 | 3/8"            | BLIND RIVET    |          |



**Pilot Drill  
Countersink Cutters**

#### Pilot Drill Countersink Cutters

| Used on<br>Countersink<br>Model | Cutter<br>Diameter | Pilot Hole<br>Diameter                             | Cutter<br>Thread | Cutter Number |          |          |           |           |
|---------------------------------|--------------------|----------------------------------------------------|------------------|---------------|----------|----------|-----------|-----------|
|                                 | D                  | P                                                  | C                | 100°<br>A     | 78°<br>A | 82°<br>A | 110°<br>A | 115°<br>A |
| ZT330                           | 3/8"               | Customer<br>Specified<br>Example:<br>ZT184-30-3/16 | 1/4"-28          | ZT184-22      | ZT184-20 | ZT184-21 | ZT184-23  | ZT184-44  |
|                                 | 7/16"              |                                                    | 1/4"-28          | ZT184-26      | ZT184-24 | ZT184-25 | ZT184-27  | ZT184-45  |
|                                 | 1/2"               |                                                    | 1/4"-28          | ZT184-30      | ZT184-28 | ZT184-29 | ZT184-31  | ZT184-46  |
|                                 | 5/8"               |                                                    | 1/4"-28          | ZT184-49      | ZT184-47 | ZT184-48 | ZT184-50  | ZT184-51  |



**Pilot Drill**

#### ZT185 Drills for use with ZT184 Cutters Above

| Cutter Diameter | Minimum | Maximum     |
|-----------------|---------|-------------|
| D               | D1      | D1          |
| 3/8"            | 3/32"   | #20- (.161) |
| 7/16"           | 3/32"   | #10- (.193) |
| 1/2"            | 3/32"   | F (.257)    |
| 5/8"            | 3/32"   | F (.257)    |

When ordering specify ZT185 -(drill size) Example ZT185-3/16



## COUNTERSINKS CUTTERS

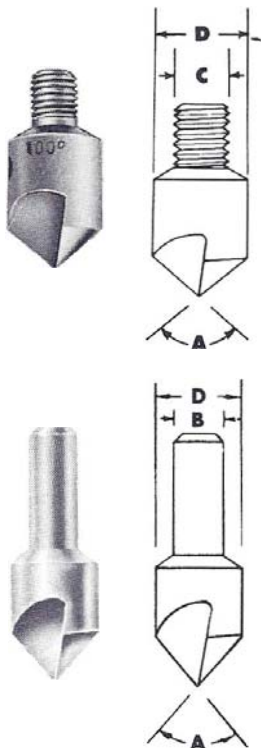
### Single Flute Countersink Cutters

#### Threaded Shank

| Used on<br>Countersink<br>Model | Cutter<br>Diameter | Cutter<br>Thread | Cutter Number |          |           |           |
|---------------------------------|--------------------|------------------|---------------|----------|-----------|-----------|
|                                 | D                  | C                | 78°<br>A      | 82°<br>A | 110°<br>A | 115°<br>A |
| ZT330                           | 3/8"               | 1/4"-28          | ZT394-23      | ZT394-36 | ZT394-49  | ZT394-62  |
|                                 | 7/16"              | 1/4"-28          | ZT394-24      | ZT394-37 | ZT394-50  | ZT394-63  |
|                                 | 1/2"               | 1/4"-28          | ZT394-25      | ZT394-38 | ZT394-51  | ZT394-64  |

#### Straight Shank

| Cutter<br>Diameter<br>D | Straight Shank Diameter | Cutter Number |          |           |           |
|-------------------------|-------------------------|---------------|----------|-----------|-----------|
|                         | B                       | 78°<br>A      | 82°<br>A | 110°<br>A | 115°<br>A |
| 1/4"                    | 3/16"                   | ZT395-21      | ZT395-34 | ZT395-47  | ZT395-60  |
| 3/8"                    | 1/4"                    | ZT395-23      | ZT395-36 | ZT395-49  | ZT395-62  |
| 1/2"                    | 1/4"                    | ZT395-25      | ZT395-38 | ZT395-51  | ZT395-64  |
| 3/4"                    | 3/8"                    | ZT395-27      | ZT395-40 | ZT395-53  | ZT395-66  |
| 1"                      | 1/2"                    | ZT395-29      | ZT395-42 | ZT395-55  | ZT395-68  |



### Hole Radius Cutters

Sharp edges may lead to cracking, eliminate this problem with a Precision Radius.

| CUTTER<br>NUMBER | CUTTER<br>DIAMETER<br>D | PILOT<br>DIAMETER<br>P | RADIUS<br>R | ANGLE<br>A | CUTTER<br>THREAD |
|------------------|-------------------------|------------------------|-------------|------------|------------------|
| ZT362-.186       | .375                    | .1865                  | .025        | 160°       | 1/4"-28          |
| ZT362-.186       | .375                    | .1865                  | .030        |            |                  |
| ZT362-.187       | .375                    | .1870                  | .025        |            |                  |
| ZT362-.246       | .319                    | .2465                  | .025        |            |                  |
| ZT362-.246       | .319                    | .2465                  | .030        |            |                  |
| ZT362-.250       | .319                    | .2500                  | .030        |            |                  |
| ZT362-.248       | .319                    | .2485                  | .025        |            |                  |
| ZT362-.307       | .382                    | .3075                  | .030        |            |                  |
| ZT362-.307       | .382                    | .3075                  | .035        |            |                  |
| ZT362-.312       | .382                    | .3125                  | .030        |            |                  |
| ZT362-.370       | .484                    | .3700                  | .035        |            |                  |
| ZT362-.372       | .484                    | .3725                  | .030        |            |                  |
| ZT362-.435       | .547                    | .4355                  | .030        |            |                  |
| ZT362-.495       | .609                    | .4950                  | .035        |            |                  |
| ZT362-.497       | .609                    | .4975                  | .030        |            |                  |

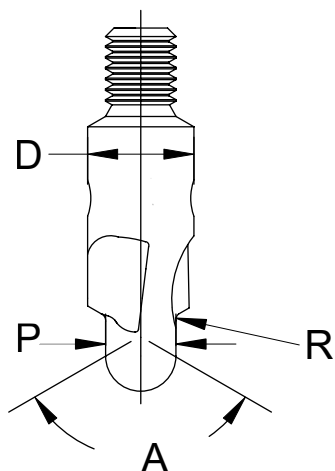
When ordering specify Radius required. Example: ZT362-186 w .025R  
other sizes of cutter, Pilot and Radius dimensions available on application.



## COUNTERSINKS CUTTERS

### Countersink Radius Cutters

For use on Stainless Steels or Titanium. Countersink with a Precision Radius at the intersection necessary when installing high tensile strength fasteners.



| Used on<br>Countersink<br>Model | Cutter<br>Diameter | Cutter<br>Thread | Angle | Pilot Hole<br>Diameter | RADIUS<br><br>R | Cutter<br>Number |
|---------------------------------|--------------------|------------------|-------|------------------------|-----------------|------------------|
|                                 | D                  |                  | A     | P                      |                 |                  |
| ZT330                           | 1/4"               | 1/4"-28          | 100°  | SPECIFY                | SPECIFY         | ZT437-17         |
|                                 | 3/8"               | 1/4"-28          |       |                        |                 | ZT437-22         |
|                                 | 5/16"              | 1/4"-28          |       |                        |                 | ZT437-12         |
|                                 | 7/16"              | 1/4"-28          |       |                        |                 | ZT437-26         |
|                                 | 1/2"               | 1/4"-28          |       |                        |                 | ZT437-30         |
|                                 | 9/16"              | 1/4"-28          |       |                        |                 | ZT437-58         |
|                                 | 5/8"               | 1/4"-28          |       |                        |                 | ZT437-49         |
| ZT331                           | 3/4"               | 3/8"-24          | 100°  | SPECIFY                | SPECIFY         | ZT438-21         |
|                                 | 7/8"               | 3/8"-24          |       |                        |                 | ZT438-26         |
|                                 | 1"                 | 3/8"-24          |       |                        |                 | ZT438-36         |
|                                 | 1-1/8"             | 3/8"-24          |       |                        |                 | ZT438-41         |
|                                 | 1-1/4"             | 3/8"-24          |       |                        |                 | ZT438-46         |
|                                 | 1-3/8"             | 3/8"-24          |       |                        |                 | ZT438-51         |
| ZT334                           | 7/8"               | 7/16"-20         | 100°  | SPECIFY                | SPECIFY         | ZT439-26         |
|                                 | 1"                 | 7/16"-20         |       |                        |                 | ZT439-36         |
|                                 | 1-1/8"             | 7/16"-20         |       |                        |                 | ZT439-41         |
|                                 | 1-1/4"             | 7/16"-20         |       |                        |                 | ZT439-46         |
|                                 | 1-3/8"             | 7/16"-20         |       |                        |                 | ZT439-51         |
|                                 | 1-1/2"             | 7/16"-20         |       |                        |                 | ZT439-56         |

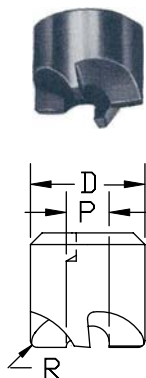
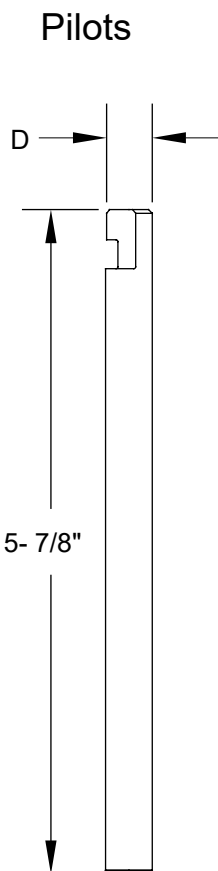
Example Ordering: ZT437-17-5/32-.030R



## BACK SPOTFACERS & COUNTERSINKS

### Back Spotfacers

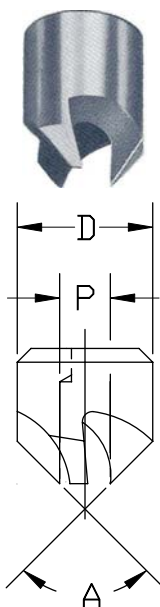
For use on Stainless Steels or Titanium.



| PART NUMBER | D     | P     | R     | NO.OF FLUTES | PART NUMBER | D      | P     | R     | NO.OF FLUTES |
|-------------|-------|-------|-------|--------------|-------------|--------|-------|-------|--------------|
| ZT73-20     | 1/4"  | 3/32" | 1/32" | 3            | ZT73-42     | 11/16" | 1/4"  | 1/32" | 4            |
| ZT73-21     | 1/4"  | 1/8"  | 1/32" | 3            | ZT73-43     | 11/16" | 5/16" | 1/32" | 4            |
| ZT73-22     | 5/16" | 1/8"  | 1/32" | 3            | ZT73-44     | 3/4"   | 1/4"  | 1/32" | 4            |
| ZT73-23     | 5/16" | 5/32" | 1/32" | 3            | ZT73-34     | 3/4"   | 5/16" | 1/32" | 4            |
| ZT73-24     | 3/8"  | 5/32" | 1/32" | 4            | ZT73-35     | 3/4"   | 3/8"  | 1/32" | 4            |
| ZT73-25     | 3/8"  | 3/16" | 1/32" | 4            | ZT73-45     | 13/16" | 5/16" | 1/32" | 4            |
| ZT73-26     | 7/16" | 5/32" | 1/32" | 4            | ZT73-46     | 13/16" | 3/8"  | 1/32" | 4            |
| ZT73-27     | 7/16" | 3/16" | 1/32" | 4            | ZT73-47     | 7/8"   | 5/16" | 1/32" | 4            |
| ZT73-40     | 1/2"  | 3/16" | 1/32" | 4            | ZT73-36     | 7/8"   | 3/8"  | 1/32" | 4            |
| ZT73-28     | 1/2"  | 1/4"  | 1/32" | 4            | ZT73-37     | 7/8"   | 1/2"  | 1/32" | 4            |
| ZT73-29     | 1/2"  | 5/16" | 1/32" | 4            | ZT73-48     | 1"     | 5/16" | 1/32" | 4            |
| ZT73-41     | 9/16" | 3/16" | 1/32" | 4            | ZT73-38     | 1"     | 3/8"  | 1/32" | 4            |
| ZT73-30     | 9/16" | 1/4"  | 1/32" | 4            | ZT73-49     | 1-1/8" | 3/8"  | 1/32" | 4            |
| ZT73-31     | 9/16" | 5/16" | 1/32" | 4            | ZT73-50     | 1-1/8" | 1/2"  | 1/32" | 4            |
| ZT73-32     | 5/8"  | 1/4"  | 1/32" | 4            | ZT73-51     | 1-1/4" | 3/8"  | 1/32" | 4            |
| ZT73-33     | 5/8"  | 5/16" | 1/32" | 4            | ZT73-52     | 1-1/4" | 1/2"  | 1/32" | 4            |

Note: Other radius sizes available by special order.

### Back Countersinks



| PART NUMBER | D     |
|-------------|-------|
| ZT82A-1     | 3/32" |
| ZT82A-2     | 1/8"  |
| ZT82A-3     | 5/32" |
| ZT82A-4     | 3/16" |
| ZT82A-5     | 1/4"  |
| ZT82A-6     | 5/16" |
| ZT82A-7     | 3/8"  |
| ZT82A-8     | 1/2"  |

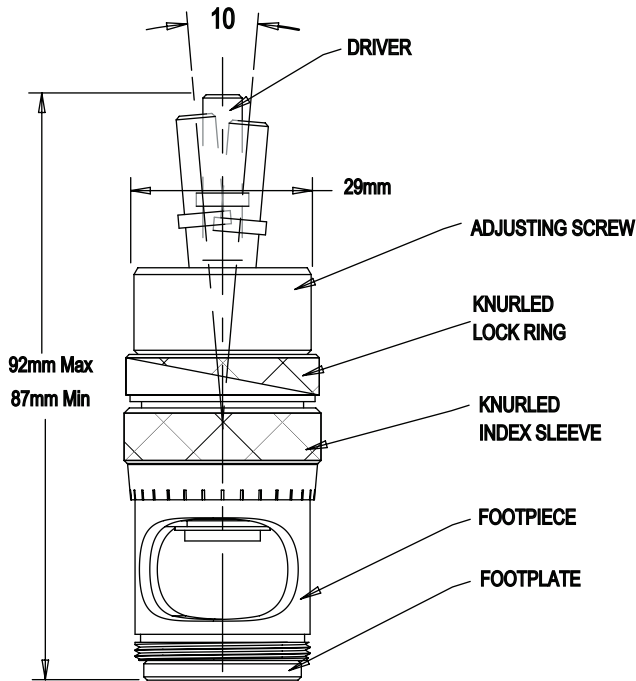
| D      | P     | 100° A   | 78° A    | 82° A    | 110° A   | 115° A   | NO.OF FLUTES |
|--------|-------|----------|----------|----------|----------|----------|--------------|
| 1/4"   | 3/32" | ZT75-60  | ZT75- 20 | ZT75- 40 | ZT75-80  | ZT75-100 | 3            |
| 1/4"   | 1/8"  | ZT75-61  | ZT75- 21 | ZT75- 41 | ZT75- 81 | ZT75-101 | 3            |
| 5/16"  | 1/8"  | ZT75- 62 | ZT75- 22 | ZT75- 42 | ZT75- 82 | ZT75-102 | 3            |
| 5/16"  | 5/32" | ZT75- 63 | ZT75- 23 | ZT75- 43 | ZT75- 83 | ZT75-103 | 3            |
| 3/8"   | 5/32" | ZT75- 64 | ZT75- 24 | ZT75- 44 | ZT75- 84 | ZT75-104 | 4            |
| 3/8"   | 3/16" | ZT75- 65 | ZT75- 25 | ZT75- 45 | ZT75- 85 | ZT75-105 | 4            |
| 7/16"  | 5/32" | ZT75- 66 | ZT75- 26 | ZT75- 46 | ZT75- 86 | ZT75-106 | 4            |
| 7/16"  | 3/16" | ZT75- 67 | ZT75- 27 | ZT75- 47 | ZT75- 87 | ZT75-107 | 4            |
| 1/2"   | 3/16" | ZT75-146 | ZT75-120 | ZT75-133 | ZT75-159 | ZT75-172 | 4            |
| 1/2"   | 1/4"  | ZT75- 68 | ZT75- 28 | ZT75- 48 | ZT75- 88 | ZT75-108 | 4            |
| 1/2"   | 5/16" | ZT75- 69 | ZT75- 29 | ZT75- 49 | ZT75- 89 | ZT75-109 | 4            |
| 9/16"  | 3/16" | ZT75-147 | ZT75-121 | ZT75-134 | ZT75-160 | ZT75-173 | 4            |
| 9/16"  | 1/4"  | ZT75- 70 | ZT75- 30 | ZT75- 50 | ZT75- 90 | ZT75-110 | 4            |
| 9/16"  | 5/16" | ZT75- 71 | ZT75- 31 | ZT75- 51 | ZT75- 91 | ZT75-111 | 4            |
| 5/8"   | 1/4"  | ZT75- 72 | ZT75- 32 | ZT75- 52 | ZT75- 92 | ZT75-112 | 4            |
| 5/8"   | 1/4"  | ZT75- 73 | ZT75- 33 | ZT75- 53 | ZT75- 93 | ZT75-113 | 4            |
| 11/16" | 1/4"  | ZT75-148 | ZT75-122 | ZT75-135 | ZT75-161 | ZT75-174 | 4            |
| 11/16" | 5/16" | ZT75-149 | ZT75-123 | ZT75-136 | ZT75-162 | ZT75-175 | 4            |
| 3/4"   | 1/4"  | ZT75-150 | ZT75-124 | ZT75-137 | ZT75-163 | ZT75-176 | 4            |
| 3/4"   | 5/16" | ZT75- 74 | ZT75- 34 | ZT75- 54 | ZT75- 94 | ZT75-114 | 4            |
| 3/4"   | 3/8"  | ZT75- 75 | ZT75- 35 | ZT75- 55 | ZT75- 95 | ZT75-115 | 4            |
| 13/16" | 5/16" | ZT75-151 | ZT75-125 | ZT75-138 | ZT75-164 | ZT75-177 | 4            |
| 13/16" | 3/8"  | ZT75-152 | ZT75-126 | ZT75-139 | ZT75-165 | ZT75-178 | 4            |
| 7/8"   | 5/16" | ZT75-153 | ZT75-127 | ZT75-140 | ZT75-166 | ZT75-179 | 4            |
| 7/8"   | 3/8"  | ZT75- 76 | ZT75- 36 | ZT75- 56 | ZT75- 96 | ZT75-116 | 4            |
| 7/8"   | 1/2"  | ZT75- 77 | ZT75- 37 | ZT75- 57 | ZT75- 97 | ZT75-117 | 4            |
| 1"     | 5/16" | ZT75-154 | ZT75-128 | ZT75-141 | ZT75-167 | ZT75-180 | 4            |
| 1"     | 3/8"  | ZT75- 78 | ZT75- 38 | ZT75- 58 | ZT75- 98 | ZT75-118 | 4            |
| 1"     | 1/2"  | ZT75- 79 | ZT75- 39 | ZT75- 59 | ZT75- 99 | ZT75-119 | 4            |
| 1-1/8" | 3/8"  | ZT75-155 | ZT75-129 | ZT75-142 | ZT75-168 | ZT75-181 | 4            |
| 1-1/8" | 1/2"  | ZT75-156 | ZT75-130 | ZT75-143 | ZT75-169 | ZT75-182 | 4            |
| 1-1/4" | 3/8"  | ZT75-157 | ZT75-131 | ZT75-144 | ZT75-170 | ZT75-183 | 4            |
| 1-1/4" | 1/2"  | ZT75-158 | ZT75-132 | ZT75-145 | ZT75-171 | ZT75-184 | 4            |



# ZT666/ZT667/ZT668

## Microstop Countersink Cage, Metric, Swivel Shaft, High Speed

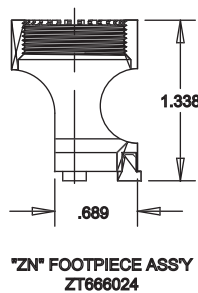
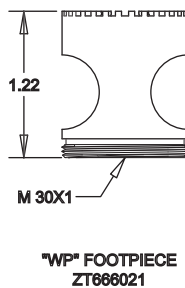
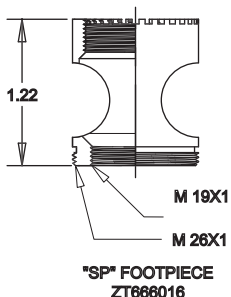
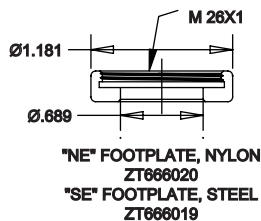
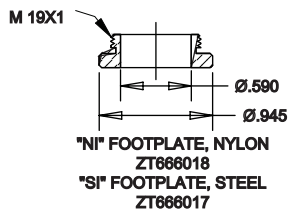
ZT666 SERIES M6X1 THREAD  
 ZT667 SERIES M8X1 THREAD  
 ZT668 SERIES 1/4-28 THREAD



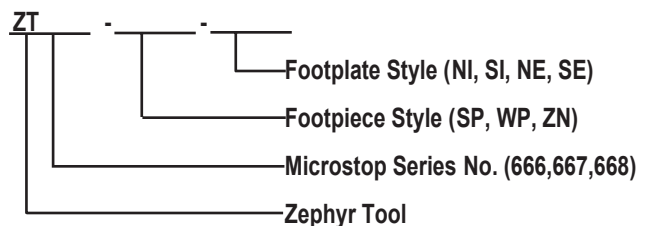
Zephyr's new Swivel Shaft- High Speed Microstops have been precision designed and machined to continuous operation at speeds up to 6,000 RPM without overheating. The unique Swivel Shaft enables you to countersink with up to a 5 degree off angle between the spindle and the cutter axis. The ZT666, ZT667 and ZT668 series microstops utilize a common body design making all footpieces, footplates and spare parts totally interchangeable. Designed for use on all standard materials as well as the latest composite materials in the most demanding applications.

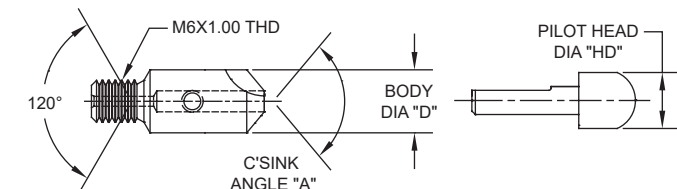
### Features Include:

- 5 degree swivel shaft
- Full needle bearings and ball thrust bearings for continuous high speed use
- Compact size
- Threaded Knurl Lock Ring to eliminate any possibility of inadvertent resetting of the primary adjustment
- Internal serration design to eliminate chip clogging
- 0.025mm (.001") incremental depth adjustment
- Cutter capacity:
  - 14mm (9/16") Diameter with "SP" Footpiece
  - 21mm (13/16") Diameter with "WP" Footpiece
- Available with M6X1, M8X1 and 1/4-28 Internal Threads



### ORDERING INFORMATION:




**METRIC COUNTERSINK CUTTER**  
**COBALT HIGH SPEED STEEL**  
**REMOVABLE PILOT**
**ZT564 Series**  
**2 Flute**


| Angle Code | "A"  |
|------------|------|
| A          | 60°  |
| B          | 78°  |
| C          | 82°  |
| D          | 90°  |
| E          | 100° |
| F          | 110° |
| G          | 115° |
| H          | 120° |
| I          | 130° |

| Body Dia. Code | "D"  |
|----------------|------|
| 10             | 10MM |
| 12             | 12MM |
| 14             | 14MM |
| 17             | 17MM |

| Pilot Head dia. Code | "DH"   |
|----------------------|--------|
| 2.00                 | 2.00MM |
| 2.38                 | 2.38MM |
| 2.50                 | 2.50MM |
| 2.80                 | 2.80MM |
| 3.00                 | 3.00MM |
| 3.50                 | 3.50MM |
| 4.00                 | 4.00MM |
| 4.17                 | 4.17MM |
| 4.76                 | 4.76MM |
| 4.80                 | 4.80MM |
| 5.00                 | 5.00MM |
| 5.60                 | 5.60MM |
| 6.00                 | 6.00MM |
| 6.35                 | 6.35MM |
| 7.92                 | 7.92MM |
| 8.00                 | 8.00MM |

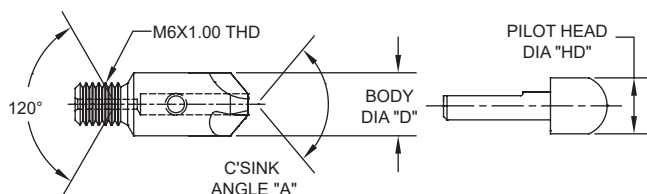
Standard 2 Flute Cutter and Removable pilot with M6 X 1.00 metric male threaded shank for use with all ZT330, ZT663 and ZT666 (-M6) series, and for use with Recoules (-M6) series Microstop Cages.

WHEN ORDERING SPECIFY:  
 Part Number, Angle, Body Diameter and Pilot Head Dia.  
 Example:

ZT564 E 14 - 4.17

"HD", Pilot Head DIA. 4.17mm  
 "D", Body Dia. 14.00mm  
 "A", Angle, 100°  
 Part No.

Note:  
 Other pilot sizes are available upon request.

**ZT566 Series**  
**3 Flute**


| Angle Code | "A"  |
|------------|------|
| A          | 60°  |
| B          | 78°  |
| C          | 82°  |
| D          | 90°  |
| E          | 100° |
| F          | 110° |
| G          | 115° |
| H          | 120° |
| I          | 130° |

| Body Dia. Code | "D"  |
|----------------|------|
| 10             | 10MM |
| 12             | 12MM |
| 14             | 14MM |
| 17             | 17MM |

| Pilot Head dia. Code | "DH"   |
|----------------------|--------|
| 2.00                 | 2.00MM |
| 2.38                 | 2.38MM |
| 2.50                 | 2.50MM |
| 2.80                 | 2.80MM |
| 3.00                 | 3.00MM |
| 3.50                 | 3.50MM |
| 4.00                 | 4.00MM |
| 4.17                 | 4.17MM |
| 4.76                 | 4.76MM |
| 4.80                 | 4.80MM |
| 5.00                 | 5.00MM |
| 5.60                 | 5.60MM |
| 6.00                 | 6.00MM |
| 6.35                 | 6.35MM |
| 7.92                 | 7.92MM |
| 8.00                 | 8.00MM |

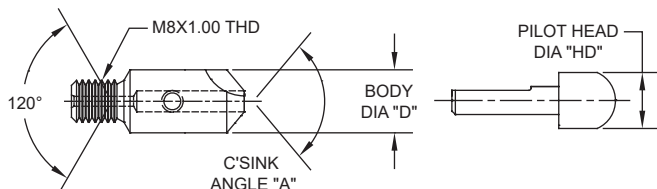
Standard 3 Flute Cutter and Removable pilot with M6 X 1.00 metric male threaded shank for use with all ZT330, ZT663 and ZT666 (-M6) series and for use with Recoules (-M6) series Microstop Cages

WHEN ORDERING SPECIFY:  
 Part Number, Angle, Body Diameter and Pilot Head Dia.  
 Example:

ZT566 E 10 - 2.50

"HD", Pilot Head DIA. 2.50mm  
 "D", Body Dia. 10.00mm  
 "A", Angle, 100°  
 Part No.

Note:  
 Other pilot sizes are available upon request.


**METRIC COUNTERSINK CUTTER**  
**COBALT HIGH SPEED STEEL**  
**REMOVABLE PILOT**
**ZT565 Series**  
**2 Flute**


Standard 2 Flute Cutter and Removable pilot with M8 X 1.00 metric male threaded shank for use with all ZT667 (-M8) series, and for use with Recoules (-M8) series Microstop Cages.

| Angle Code | "A"  |
|------------|------|
| A          | 60°  |
| B          | 78°  |
| C          | 82°  |
| D          | 90°  |
| E          | 100° |
| F          | 110° |
| G          | 115° |
| H          | 120° |
| I          | 130° |

| Body Dia. Code | "D"  |
|----------------|------|
| 12             | 12MM |
| 14             | 14MM |
| 17             | 17MM |
| 21             | 21MM |

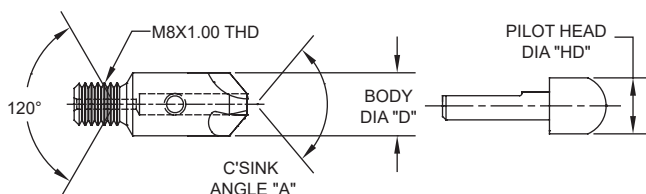
| Pilot Head dia. Code | "DH"    |
|----------------------|---------|
| 4.00                 | 4.00MM  |
| 4.17                 | 4.17MM  |
| 4.76                 | 4.76MM  |
| 4.80                 | 4.80MM  |
| 5.00                 | 5.00MM  |
| 5.60                 | 5.60MM  |
| 6.00                 | 6.00MM  |
| 6.35                 | 6.35MM  |
| 7.92                 | 7.92MM  |
| 8.00                 | 8.00MM  |
| 9.52                 | 9.52MM  |
| 10.00                | 10.00MM |

WHEN ORDERING SPECIFY:  
 Part Number, Angle, Body Diameter  
 and Pilot Head Dia.  
 Example:

ZT565 E 17 - 8.00

"HD", Pilot Head DIA. 8.00mm  
 "D", Body Dia. 17.00mm  
 "A", Angle, 100°  
 Part No.

Note:  
 Other pilot sizes are available upon request.

**ZT567 Series**  
**3 Flute**


Standard 3 Flute Cutter and Removable pilot with M8 X 1.00 metric male threaded shank for use with all ZT667 (-M8) series and for use with Recoules (-M8) series Microstop Cages

| Angle Code | "A"  |
|------------|------|
| A          | 60°  |
| B          | 78°  |
| C          | 82°  |
| D          | 90°  |
| E          | 100° |
| F          | 110° |
| G          | 115° |
| H          | 120° |
| I          | 130° |

| Body Dia. Code | "D"  |
|----------------|------|
| 12             | 12MM |
| 14             | 14MM |
| 17             | 17MM |
| 21             | 21MM |

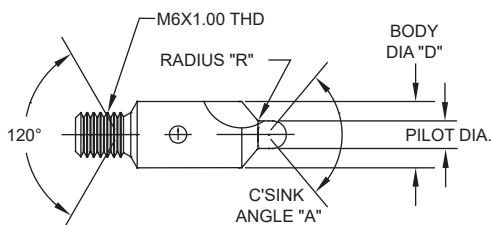
| Pilot Head dia. Code | "DH"    |
|----------------------|---------|
| 4.00                 | 4.00MM  |
| 4.17                 | 4.17MM  |
| 4.76                 | 4.76MM  |
| 4.80                 | 4.80MM  |
| 5.00                 | 5.00MM  |
| 5.60                 | 5.60MM  |
| 6.00                 | 6.00MM  |
| 6.35                 | 6.35MM  |
| 7.92                 | 7.92MM  |
| 8.00                 | 8.00MM  |
| 9.52                 | 9.52MM  |
| 10.00                | 10.00MM |

WHEN ORDERING SPECIFY:  
 Part Number, Angle, Body Diameter  
 and Pilot Head Dia.  
 Example:

ZT567 E 14 - 6.00

"HD", Pilot Head DIA. 6.00mm  
 "D", Body Dia. 14.00mm  
 "A", Angle, 100°  
 Part No.

Note:  
 Other pilot sizes are available upon request.


**METRIC COUNTERSINK CUTTER**  
**COBALT HIGH SPEED STEEL**  
**INTEGRAL PILOT**
**ZT569 Series**  
**2 Flute**


| Angle Code | "A"  |
|------------|------|
| A          | 60°  |
| B          | 78°  |
| C          | 82°  |
| D          | 90°  |
| E          | 100° |
| F          | 110° |
| G          | 115° |
| H          | 120° |
| I          | 130° |

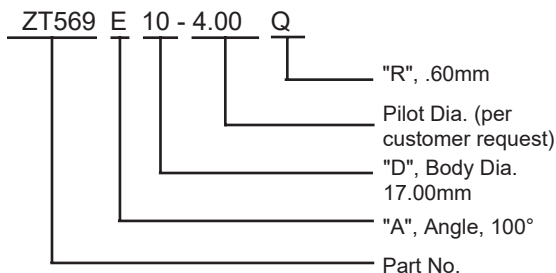
| Body Dia. Code | "D"  |
|----------------|------|
| 6              | 6MM  |
| 8              | 8MM  |
| 10             | 10MM |
| 12             | 12MM |
| 14             | 14MM |
| 17             | 17MM |

| Radius Code | "R"    |
|-------------|--------|
| -           | .40MM  |
| P           | .50MM  |
| Q           | .60MM  |
| R           | .80MM  |
| S           | .90MM  |
| T           | 1.00MM |
| U           | 1.10MM |
| V           | 1.20MM |
| W           | 1.30MM |
| X           | 1.40MM |

Standard 2 Flute integral pilot cutter with  
 M6 X 1.00 metric male threaded shank  
 for use with all ZT330, ZT663 (-M6)  
 series Microstop Cages.

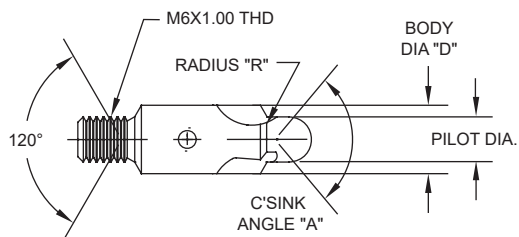
WHEN ORDERING SPECIFY:  
 Part Number, Angle, Body Diameter  
 and Pilot Head Dia.

Example:



Note:

Other pilot sizes are available upon request.

**ZT572 Series**  
**3 Flute**


| Angle Code | "A"  |
|------------|------|
| A          | 60°  |
| B          | 78°  |
| C          | 82°  |
| D          | 90°  |
| E          | 100° |
| F          | 110° |
| G          | 115° |
| H          | 120° |
| I          | 130° |

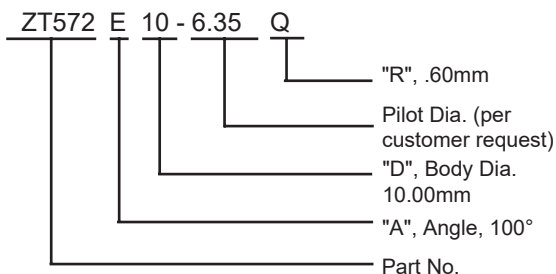
| Body Dia. Code | "D"  |
|----------------|------|
| 6              | 6MM  |
| 8              | 8MM  |
| 10             | 10MM |
| 12             | 12MM |
| 14             | 14MM |
| 17             | 17MM |

| Radius Code | "R"    |
|-------------|--------|
| -           | .40MM  |
| P           | .50MM  |
| Q           | .60MM  |
| R           | .80MM  |
| S           | .90MM  |
| T           | 1.00MM |
| U           | 1.10MM |
| V           | 1.20MM |
| W           | 1.30MM |
| X           | 1.40MM |

Standard 3 Flute Integral pilot cutter  
 and Removable pilot with M6 X 1.00  
 metric male threaded shank for use  
 with all ZT330, ZT663 (-M6)  
 series Microstop Cages

WHEN ORDERING SPECIFY:  
 Part Number, Angle, Body Diameter  
 and Pilot Head Dia.

Example:



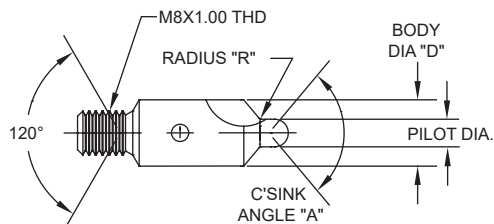
Note:

Other pilot sizes are available upon request.



## METRIC COUNTERSINK CUTTER COBALT HIGH SPEED STEEL INTEGRAL PILOT

## ZT570 Series 2 Flute



Standard 2 Flute integral pilot cutter with  
M8 X 1.00 metric male threaded shank  
for use with all ZT331(-M8) series  
Microstop Cages.

WHEN ORDERING SPECIFY:  
Part Number, Angle, Body Diameter  
and Pilot Head Dia.

Example:

| Angle Code | "A"  | Body Dia. Code | "D"  | Radius Code | "R"    |
|------------|------|----------------|------|-------------|--------|
| A          | 60°  | 10             | 10MM | -           | .40MM  |
| B          | 78°  | 12             | 12MM | P           | .50MM  |
| C          | 82°  | 14             | 14MM | Q           | .60MM  |
| D          | 90°  | 17             | 17MM | R           | .80MM  |
| E          | 100° | 21             | 21MM | S           | .90MM  |
| F          | 110° |                |      | T           | 1.00MM |
| G          | 115° |                |      | U           | 1.10MM |
| H          | 120° |                |      | V           | 1.20MM |
| I          | 130° |                |      | W           | 1.30MM |
|            |      |                |      | X           | 1.40MM |

ZT570 E 14 - 6.35 Q

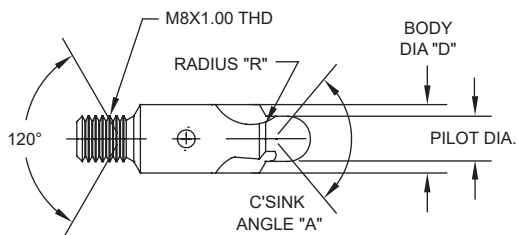
"R", .60mm  
Pilot Dia. (per customer request)  
"D", Body Dia. 14.00mm  
"A", Angle, 100°  
Part No.

Note:

Other pilot sizes are available upon request.

## ZT573 Series 3 Flute

Standard 3 Flute Integral pilot cutter  
with M8 X 1.00 metric male threaded  
shank for use with all ZT331(-M8)  
series Microstop Cages



WHEN ORDERING SPECIFY:  
Part Number, Angle, Body Diameter  
and Pilot Head Dia.

Example:

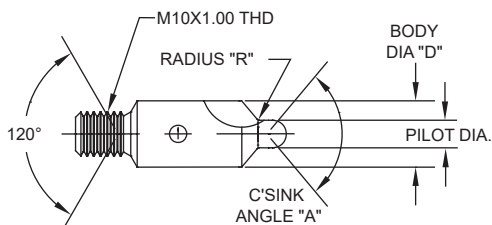
| Angle Code | "A"  | Body Dia. Code | "D"  | Radius Code | "R"    |
|------------|------|----------------|------|-------------|--------|
| A          | 60°  | 10             | 10MM | -           | .40MM  |
| B          | 78°  | 12             | 12MM | P           | .50MM  |
| C          | 82°  | 14             | 14MM | Q           | .60MM  |
| D          | 90°  | 17             | 17MM | R           | .80MM  |
| E          | 100° | 21             | 21MM | S           | .90MM  |
| F          | 110° |                |      | T           | 1.00MM |
| G          | 115° |                |      | U           | 1.10MM |
| H          | 120° |                |      | V           | 1.20MM |
| I          | 130° |                |      | W           | 1.30MM |
|            |      |                |      | X           | 1.40MM |

ZT573 E 14 - 6.35 Q

"R", .60mm  
Pilot Dia. (per customer request)  
"D", Body Dia. 14.00mm  
"A", Angle, 100°  
Part No.

Note:

Other pilot sizes are available upon request.


**METRIC COUNTERSINK CUTTER**  
**COBALT HIGH SPEED STEEL**  
**INTEGRAL PILOT**
**ZT571 Series**  
**2 Flute**


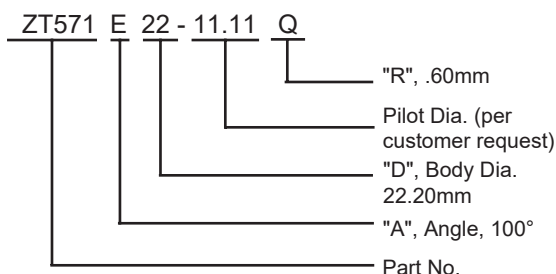
Standard 2 Flute integral pilot cutter with  
 M10 X 1.00 metric male threaded shank  
 for use with all ZT331(-M10) series  
 Microstop Cages.

WHEN ORDERING SPECIFY:  
 Part Number, Angle, Body Diameter  
 and Pilot Head Dia.  
 Example:

| Angle<br>Code | "A"  |
|---------------|------|
| A             | 60°  |
| B             | 78°  |
| C             | 82°  |
| D             | 90°  |
| E             | 100° |
| F             | 110° |
| G             | 115° |
| H             | 120° |
| I             | 130° |

| Body Dia.<br>Code | "D"     |
|-------------------|---------|
| 17                | 17MM    |
| 21                | 21MM    |
| 22                | 22.20MM |
| 25                | 25.40MM |
| 28                | 28.57MM |

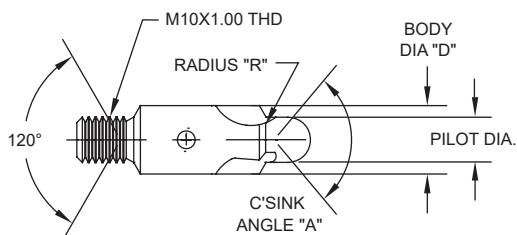
| Radius<br>Code | "R"    |
|----------------|--------|
| -              | .40MM  |
| P              | .50MM  |
| Q              | .60MM  |
| R              | .80MM  |
| S              | .90MM  |
| T              | 1.00MM |
| U              | 1.10MM |
| V              | 1.20MM |
| W              | 1.30MM |
| X              | 1.40MM |



Note:  
 Other pilot sizes are available upon request.

**ZT574 Series**  
**3 Flute**

Standard 3 Flute Integral pilot cutter  
 with M10 X 1.00 metric male threaded  
 shank for use with all ZT331(-M10)  
 series Microstop Cages

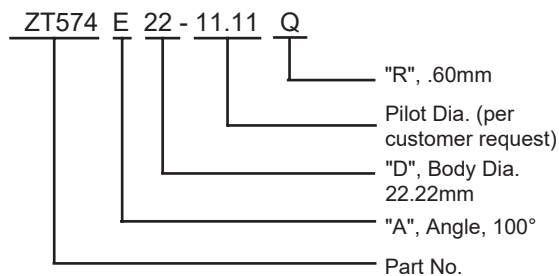


| Angle<br>Code | "A"  |
|---------------|------|
| A             | 60°  |
| B             | 78°  |
| C             | 82°  |
| D             | 90°  |
| E             | 100° |
| F             | 110° |
| G             | 115° |
| H             | 120° |
| I             | 130° |

| Body Dia.<br>Code | "D"     |
|-------------------|---------|
| 17                | 17MM    |
| 21                | 21MM    |
| 22                | 22.20MM |
| 25                | 25.40MM |
| 28                | 28.57MM |

| Radius<br>Code | "R"    |
|----------------|--------|
| -              | .40MM  |
| P              | .50MM  |
| Q              | .60MM  |
| R              | .80MM  |
| S              | .90MM  |
| T              | 1.00MM |
| U              | 1.10MM |
| V              | 1.20MM |
| W              | 1.30MM |
| X              | 1.40MM |

WHEN ORDERING SPECIFY:  
 Part Number, Angle, Body Diameter  
 and Pilot Head Dia.  
 Example:

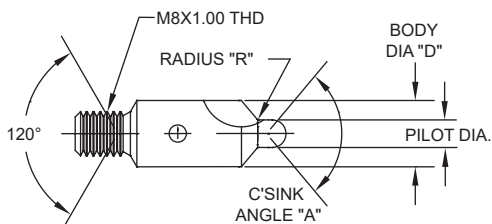


Note:  
 Other pilot sizes are available upon request.



## METRIC COUNTERSINK CUTTER COBALT HIGH SPEED STEEL INTEGRAL PILOT

## ZT575 Series 2 Flute

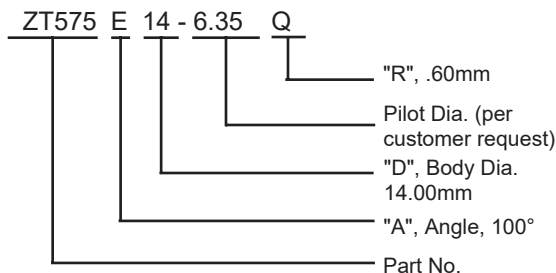


Standard 2 Flute integral pilot cutter with  
M8 X 1.00 metric male threaded shank  
for use with Recoules (-M8) series  
Microstop Cages.

WHEN ORDERING SPECIFY:  
Part Number, Angle, Body Diameter  
and Pilot Head Dia.

Example:

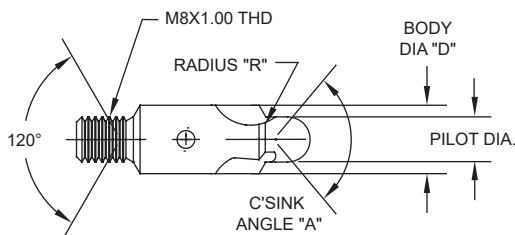
| Angle Code | "A"  | Body Dia. Code | "D"  | Radius Code | "R"    |
|------------|------|----------------|------|-------------|--------|
| A          | 60°  | 10             | 10MM | -           | .40MM  |
| B          | 78°  | 12             | 12MM | P           | .50MM  |
| C          | 82°  | 14             | 14MM | Q           | .60MM  |
| D          | 90°  | 17             | 17MM | R           | .80MM  |
| E          | 100° | 21             | 21MM | S           | .90MM  |
| F          | 110° |                |      | T           | 1.00MM |
| G          | 115° |                |      | U           | 1.10MM |
| H          | 120° |                |      | V           | 1.20MM |
| I          | 130° |                |      | W           | 1.30MM |
|            |      |                |      | X           | 1.40MM |



Note:  
Other pilot sizes are available upon request.

## ZT576 Series 3 Flute

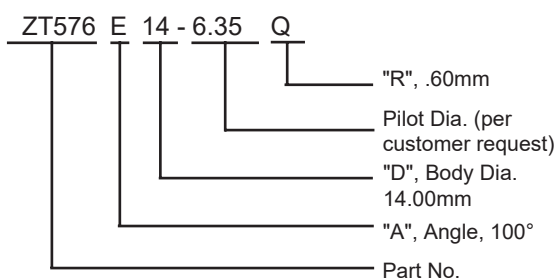
Standard 3 Flute Integral pilot cutter  
with M8 X 1.00 metric male threaded  
shank for use with Recoules (-M8)  
series Microstop Cages



| Angle Code | "A"  | Body Dia. Code | "D"  | Radius Code | "R"    |
|------------|------|----------------|------|-------------|--------|
| A          | 60°  | 10             | 10MM | -           | .40MM  |
| B          | 78°  | 12             | 12MM | P           | .50MM  |
| C          | 82°  | 14             | 14MM | Q           | .60MM  |
| D          | 90°  | 17             | 17MM | R           | .80MM  |
| E          | 100° | 21             | 21MM | S           | .90MM  |
| F          | 110° |                |      | T           | 1.00MM |
| G          | 115° |                |      | U           | 1.10MM |
| H          | 120° |                |      | V           | 1.20MM |
| I          | 130° |                |      | W           | 1.30MM |
|            |      |                |      | X           | 1.40MM |

WHEN ORDERING SPECIFY:  
Part Number, Angle, Body Diameter  
and Pilot Head Dia.

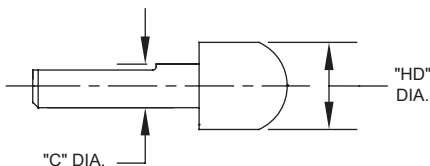
Example:



Note:  
Other pilot sizes are available upon request.



## ZT590 Series Standard Metric Pilots



| "HD" DIA. | "C" DIA. | PART NUMBER     | "HD" DIA. | "C" DIA. | PART NUMBER     |
|-----------|----------|-----------------|-----------|----------|-----------------|
| 2.00      | 2.00     | ZT590-2.00-2.00 | 4.17      | 3.50     | ZT590-3.50-4.17 |
| 2.38      | 2.00     | ZT590-2.00-2.38 | 4.80      | 3.50     | ZT590-3.50-4.80 |
| 2.40      | 2.00     | ZT590-2.00-2.40 | 5.00      | 3.50     | ZT590-3.50-5.00 |
| 2.50      | 2.00     | ZT590-2.00-2.50 | 4.00      | 4.00     | ZT590-4.00-4.00 |
| 2.80      | 2.00     | ZT590-2.00-2.80 | 4.50      | 4.00     | ZT590-4.00-4.50 |
| 3.00      | 2.00     | ZT590-2.00-3.00 | 4.76      | 4.00     | ZT590-4.00-4.76 |
| 3.17      | 2.00     | ZT590-2.00-3.17 | 4.80      | 4.00     | ZT590-4.00-4.80 |
| 3.50      | 2.00     | ZT590-2.00-3.50 | 5.00      | 4.00     | ZT590-4.00-5.00 |
| 4.00      | 2.00     | ZT590-2.00-4.00 | 5.50      | 4.00     | ZT590-4.00-5.50 |
| 2.50      | 2.50     | ZT590-2.50-2.50 | 5.60      | 4.00     | ZT590-4.00-5.60 |
| 2.80      | 2.50     | ZT590-2.50-2.50 | 5.80      | 4.00     | ZT590-4.00-5.80 |
| 3.00      | 2.50     | ZT590-2.50-3.00 | 6.00      | 4.00     | ZT590-4.00-6.00 |
| 3.17      | 2.50     | ZT590-2.50-3.17 | 6.35      | 4.00     | ZT590-4.00-6.35 |
| 3.50      | 2.50     | ZT590-2.50-3.50 | 8.00      | 4.00     | ZT590-4.00-8.00 |
| 3.80      | 2.50     | ZT590-2.50-3.80 | 5.60      | 5.00     | ZT590-5.00-5.60 |
| 4.00      | 2.50     | ZT590-2.50-4.00 | 6.00      | 5.00     | ZT590-5.00-6.00 |
| 4.17      | 2.50     | ZT590-2.50-4.17 | 6.35      | 5.00     | ZT590-5.00-5.35 |
| 4.80      | 2.50     | ZT590-2.50-4.80 | 7.00      | 5.00     | ZT590-5.00-7.00 |
| 5.00      | 2.50     | ZT590-2.50-5.00 | 7.80      | 5.00     | ZT590-5.00-7.80 |
| 3.00      | 3.00     | ZT590-3.00-3.00 | 7.92      | 5.00     | ZT590-5.00-7.92 |
| 3.17      | 3.00     | ZT590-3.00-3.17 | 8.00      | 5.00     | ZT590-5.00-8.00 |
| 3.20      | 3.00     | ZTS90-3.00-3.20 | 9.52      | 5.00     | ZT590-5.00-9.52 |
| 3.50      | 3.00     | ZT590-3.00-3.50 | 10.00     | 5.00     | ZT590-5.0-10.00 |
| 3.80      | 3.00     | ZT590-3.00-3.50 | 12.00     | 5.00     | ZT590-5.0-12.00 |
| 4.00      | 3.00     | ZT590-3.00-4.00 | 11.11     | 6.00     | ZT590-6.0-11.11 |
| 5.00      | 3.00     | ZT590-3.00-S.00 | 12.70     | 6.00     | ZT590-6.0-12.70 |
| 6.00      | 3.00     | ZT590-3.00-6.00 | 14.29     | 6.00     | ZT590-6.0-14.29 |
| 3.80      | 3.50     | ZT590-3.50-3.50 | 15.87     | 6.00     | ZTS90-6.0-15.87 |
| 4.00      | 3.50     | ZT590-3.50-4.00 |           |          |                 |



## **ZEPHYR VS. RECOULES METRIC SWIVEL MICROSTOP CAGE**

### **CROSS-REFERENCE**

| <b>RECOULES</b> | <b>ZEPHYR</b> | <b>METRIC<br/>INTERNAL<br/>THREAD</b> |
|-----------------|---------------|---------------------------------------|
| <b>RB257</b>    |               |                                       |
| 10015010        | NOT AVAILABLE | M6 X 1.00                             |
| 10015015        | ZT666-SP-SI   | M6 X 1.00                             |
| 10015020        | ZT666-SP-NI   | M6 X 1.00                             |
| 10015200        | ZT666-ZN      | M6 X 1.00                             |
| <b>RB307</b>    |               |                                       |
| 10020010        | NOT AVAILABLE | M8 X 1.00                             |
| 10020015        | ZT667-SP-SI   | M8 X 1.00                             |
| 10020020        | ZT667-SP-NI   | M8 X 1.00                             |
| 10020105        | NOT AVAILABLE | M8 X 1.00                             |
| 10020110        | ZT667-WP-SI   | M8 X 1.00                             |
| 10020115        | ZT667-WP-NI   | M8 X 1.00                             |
| 10020200        | ZT667-ZN      | M8 X 1.00                             |

**ZEPHYR VS. RECOULES**  
**METRIC CUTTER****CROSS-REFERENCE**

| RECOULES<br>PART NO. | ZEPHYR<br>PART NO. | No.OF<br>FLUTES | METRIC<br>THREAD | CUTTER<br>ANGLE |
|----------------------|--------------------|-----------------|------------------|-----------------|
| 31205 000            | ZT572D10-2.38      | 3               | M6X1.00          | 90°             |
| 31205 005            | ZT572D10-3.17      | 3               | M6X1.00          | 90°             |
| 31205 010            | ZT572D10-3.50      | 3               | M6X1.00          | 90°             |
| 31205 015            | ZT572D10-3.60      | 3               | M6X1.00          | 90°             |
| 31205 020            | ZT572D10-3.96      | 3               | M6X1.00          | 90°             |
| 31205 025            | ZT572D10-4.00      | 3               | M6X1.00          | 90°             |
| 31205 030            | ZT572D10-4.15      | 3               | M6X1.00          | 90°             |
| 31205 035            | ZT572D10-4.76      | 3               | M6X1.00          | 90°             |
| 31205 040            | ZT572D10-4.83      | 3               | M6X1.00          | 90°             |
| 31205 045            | ZT572D10-5.60      | 3               | M6X1.00          | 90°             |
| 31206 000            | ZT572E10-2.38      | 3               | M6X1.00          | 100°            |
| 31206 005            | ZT572E10-3.17      | 3               | M6X1.00          | 100°            |
| 31206 010            | ZT572E10-3.50      | 3               | M6X1.00          | 100°            |
| 31206 015            | ZT572E10-3.60      | 3               | M6X1.00          | 100°            |
| 31206 020            | ZT572E10-3.96      | 3               | M6X1.00          | 100°            |
| 31206 025            | ZT572E10-4.00      | 3               | M6X1.00          | 100°            |
| 31206 030            | ZT572E10-4.15      | 3               | M6X1.00          | 100°            |
| 31206 035            | ZT572E10-4.76      | 3               | M6X1.00          | 100°            |
| 31206 040            | ZT572E10-4.83      | 3               | M6X1.00          | 100°            |
| 31206 045            | ZT572E10-5.60      | 3               | M6X1.00          | 100°            |
| 31207 000            | ZT572H10-2.38      | 3               | M6X1.00          | 120°            |
| 31207 005            | ZT572H10-3.17      | 3               | M6X1.00          | 120°            |
| 31207 010            | ZT572H10-3.50      | 3               | M6X1.00          | 120°            |
| 31207 015            | ZT572H10-3.60      | 3               | M6X1.00          | 120°            |
| 31207 020            | ZT572H10-3.96      | 3               | M6X1.00          | 120°            |
| 31207 025            | ZT572H10-4.00      | 3               | M6X1.00          | 120°            |
| 31207 030            | ZT572H10-4.15      | 3               | M6X1.00          | 120°            |
| 31207 035            | ZT572H10-4.76      | 3               | M6X1.00          | 120°            |
| 31207 040            | ZT572H10-4.83      | 3               | M6X1.00          | 120°            |
| 31207 045            | ZT572H10-5.60      | 3               | M6X1.00          | 120°            |



## **ZEPHYR VS. RECOULES METRIC REMOVABLE PILOT CUTTER**

### CROSS-REFERENCE

| RECOULES<br>PART NO. | ZEPHYR<br>PART NO. | No.OF<br>FLUTES | METRIC<br>THREAD | CUTTER<br>ANGLE |
|----------------------|--------------------|-----------------|------------------|-----------------|
| 30200 005            | ZT564D10-2.00      | 2               | M6X1.00          | 90°             |
| 30200 010            | ZT564D10-2.38      | 2               | M6X1.00          | 90°             |
| 30200 015            | ZT564D10-2.50      | 2               | M6X1.00          | 90°             |
| 30200 110            | ZT564D10-2.80      | 2               | M6X1.00          | 90°             |
| 30200 115            | ZT564D10-3.00      | 2               | M6X1.00          | 90°             |
| 30200 120            | ZT564D10-3.17      | 2               | M6X1.00          | 90°             |
| 30200 215            | ZT564D10-3.50      | 2               | M6X1.00          | 90°             |
| 30200 310            | ZT564D10-4.00      | 2               | M6X1.00          | 90°             |
| 30200 315            | ZT564D10-4.17      | 2               | M6X1.00          | 90°             |
| 30220 005            | ZT564E10-2.00      | 2               | M6X1.00          | 100°            |
| 30220 010            | ZT564E10-2.38      | 2               | M6X1.00          | 100°            |
| 30220 015            | ZT564E10-2.50      | 2               | M6X1.00          | 100°            |
| 30220 110            | ZT564E10-2.80      | 2               | M6X1.00          | 100°            |
| 30220 115            | ZT564E10-3.00      | 2               | M6X1.00          | 100°            |
| 30220 120            | ZT564E10-3.17      | 2               | M6X1.00          | 100°            |
| 30220 215            | ZT564E10-3.50      | 2               | M6X1.00          | 100°            |
| 30220 310            | ZT564E10-4.00      | 2               | M6X1.00          | 100°            |
| 30220 315            | ZT564E10-4.17      | 2               | M6X1.00          | 100°            |
| 30240 005            | ZT564H10-2.00      | 2               | M6X1.00          | 120°            |
| 30240 010            | ZT564H10-2.38      | 2               | M6X1.00          | 120°            |
| 30240 015            | ZT564H10-2.50      | 2               | M6X1.00          | 120°            |
| 30240 110            | ZT564H10-2.80      | 2               | M6X1.00          | 120°            |
| 30240 115            | ZT564H10-3.00      | 2               | M6X1.00          | 120°            |
| 30240 120            | ZT564H10-3.17      | 2               | M6X1.00          | 120°            |
| 30240 215            | ZT564H10-3.50      | 2               | M6X1.00          | 120°            |
| 30240 310            | ZT564H10-4.00      | 2               | M6X1.00          | 120°            |
| 30240 315            | ZT564H10-4.17      | 2               | M6X1.00          | 120°            |



## **ZEPHYR VS. RECOULES METRIC CUTTER**

### CROSS-REFERENCE

| RECOULES<br>PART NO. | ZEPHYR<br>PART NO. | No.OF<br>FLUTES | METRIC<br>THREAD | CUTTER<br>ANGLE |
|----------------------|--------------------|-----------------|------------------|-----------------|
| 31205 400            | ZT574D22-11.11     | 3               | M10X1.00         | 90°             |
| 31205 410            | ZT574D25-11.11     | 3               | M10X1.00         | 90°             |
| 31205 430            | ZT574D28-12.70     | 3               | M10X1.00         | 90°             |
| 31205 440            | ZT574D31-12.70     | 3               | M10X1.00         | 90°             |
| 31205 450            | ZT574D30-14.00     | 3               | M10X1.00         | 90°             |
| 31205 460            | ZT574D34-14.92     | 3               | M10X1.00         | 90°             |
| 31205 470            | ZT574D38-15.87     | 3               | M10X1.00         | 90°             |
| 31206 400            | ZT574E22-11.11     | 3               | M10X1.00         | 100°            |
| 31206 410            | ZT574E25-11.11     | 3               | M10X1.00         | 100°            |
| 31206 430            | ZT574E28-12.70     | 3               | M10X1.00         | 100°            |
| 31206 440            | ZT574E31-12.70     | 3               | M10X1.00         | 100°            |
| 31206 450            | ZT574E30-14.00     | 3               | M10X1.00         | 100°            |
| 31206 460            | ZT574E34-14.92     | 3               | M10X1.00         | 100°            |
| 31206 470            | ZT574E38-15.87     | 3               | M10X1.00         | 100°            |
| 31207 400            | ZT574H22-11.11     | 3               | M10X1.00         | 120°            |
| 31207 410            | ZT574H25-11.11     | 3               | M10X1.00         | 120°            |
| 31207 430            | ZT574H28-12.70     | 3               | M10X1.00         | 120°            |
| 31207 440            | ZT574H31-12.70     | 3               | M10X1.00         | 120°            |
| 31207 450            | ZT574H30-14.00     | 3               | M10X1.00         | 120°            |
| 31207 460            | ZT574H34-14.92     | 3               | M10X1.00         | 120°            |
| 31207 470            | ZT574H38-15.87     | 3               | M10X1.00         | 120°            |



## **ZEPHYR VS. RECOULES METRIC CUTTER**

### CROSS-REFERENCE

| RECOULES<br>PART NO. | ZEPHYR<br>PART NO. | No.OF<br>FLUTES | METRIC<br>THREAD | CUTTER<br>ANGLE |
|----------------------|--------------------|-----------------|------------------|-----------------|
| 31205 100            | ZT576D14-4.76      | 3               | M8X1.00          | 90°             |
| 31205 105            | ZT576D14-5.00      | 3               | M8X1.00          | 90°             |
| 31205 110            | ZT576D14-5.60      | 3               | M8X1.00          | 90°             |
| 31205 120            | ZT576D14-6.00      | 3               | M8X1.00          | 90°             |
| 31205 125            | ZT576D14-6.35      | 3               | M8X1.00          | 90°             |
| 31205 200            | ZT576D17-8.00      | 3               | M8X1.00          | 90°             |
| 31205 300            | ZT576D21-9.50      | 3               | M8X1.00          | 90°             |
| 31205 305            | ZTS76D21-10.00     | 3               | M8X1.00          | 90°             |
| 31206 100            | ZT576E14-4.76      | 3               | M8X1.00          | 100°            |
| 31206 105            | ZT576E14-5.00      | 3               | M8X1.00          | 100°            |
| 31206 110            | ZT576E14-5.60      | 3               | M8X1.00          | 100°            |
| 31206 120            | ZT576E 14-6.00     | 3               | M8X1.00          | 100°            |
| 31206 125            | ZT576E14-6.35      | 3               | M8X1.00          | 100°            |
| 31206 200            | ZTS76E17-8.00      | 3               | M8X1.00          | 100°            |
| 31206 300            | ZTS76E21 -9.50     | 3               | M8X1.00          | 100°            |
| 31206 305            | ZT576E21- 10.00    | 3               | M8X1.00          | 100°            |
| 31207 100            | ZT576H14-4.76      | 3               | M8X1.00          | 120°            |
| 31207 105            | ZT576H14-5.00      | 3               | M8X1.00          | 120°            |
| 31207 110            | ZT576H14-5.60      | 3               | M8X1.00          | 120°            |
| 31207 120            | ZT576H14-6.00      | 3               | M8X1.00          | 120°            |
| 31207 125            | ZT576H14-6.35      | 3               | M8X1.00          | 120°            |
| 31207 200            | ZT576H17-8.00      | 3               | M8X1.00          | 120°            |
| 31207 300            | ZT576H21-9.50      | 3               | M8X1.00          | 120°            |
| 31207 305            | ZT576H21-10.00     | 3               | M8X1.00          | 120°            |



## **ZEPHYR VS. RECOULES**

### **METRIC REMOVABLE PILOT CUTTER**

#### CROSS-REFERENCE

| RECOULES<br>PART NO. | ZEPHYR<br>PART NO. | RECOULES<br>PART NO. | ZEPHYR<br>PART NO. |
|----------------------|--------------------|----------------------|--------------------|
| 31100 000            | ZT590-2.00-2.00    | 31100 215            | ZT590-3.00-3.80    |
| 31100 005            | ZT590-2.00-2.38    | 31100 220            | ZT590-3.00-4.00    |
| 31100 006            | ZT590-2.00-2.40    | 31100 225            | ZT590-3.00-5.00    |
| 31100 010            | ZT590-2.00-2.50    | 31100 230            | ZT590-3.00-6.00    |
| 31100 015            | ZT590-2.00-2.80    | 31100 305            | ZT590-3.50-3.80    |
| 31100 020            | ZT590-2.00-3.00    | 31100 300            | ZT590-3.50-4.00    |
| 31100 025            | ZT590-2.00-3.17    | 31100 310            | ZT590-3.50-4.17    |
| 31100 030            | ZT590-2.00-3.50    | 31100 315            | ZT590-3.50-4.80    |
| 31100 035            | ZT590-2.00-4.00    | 31100 320            | ZT590-3.50-5.00    |
| 31100 100            | ZT590-2.50-2.50    | 31100 400            | ZT590-4.00-4.00    |
| 31100 10S            | ZT590-2.50-2.80    | 31100 405            | ZT590-4.00-4.50    |
| 31100 110            | ZT590-2.50-3.00    | 31100 410            | ZT590-4.00-4.76    |
| 31100 115            | ZT590-2.50-3.17    | 31100 415            | ZT590-4.00-4.50    |
| 31100 120            | ZT590-2.50-3.50    | 31100 420            | ZT590-4.00-5.00    |
| 31100 125            | ZT590-2.50-3.80    | 31100 425            | ZT590-4.00-5.50    |
| 31100 130            | ZT590-2.50-4.00    | 31100 430            | ZT590-4.00-5.60    |
| 31100 131            | ZT590-2.50-4.17    | 31100 435            | ZT590-4.00-5.80    |
| 31100 133            | ZT590-2.50-4.80    | 31100 440            | ZT590-4.00-5.00    |
| 31100 135            | ZT590-2.50-5.00    | 31100 445            | ZT590-4.00-6.35    |
| 31100 200            | ZT590-3.00-3.00    | 31100 455            | ZT590-4.00-5.00    |
| 31100 205            | ZT590-3.00-3.17    | 31100 505            | ZT590-5.00-5.60    |
| 31100 206            | ZT590-3.00-3.20    | 31100 510            | ZT590-5.00-6.00    |
| 31100 210            | ZT590-3.00-3.50    | 31100 515            | ZT590-5.00-6.35    |
| 31100 520            | ZT590-5.00-7.00    | 31100 525            | ZT590-5.00-7.80    |
| 31100 530            | ZT590-5.00-7.92    | 31100 535            | ZT590-5.00-8.00    |
| 31100 540            | ZT590-5.00-9.52    | 31100 545            | ZT590-5.00-10.00   |
| 31100 550            | ZT590-5.00-12.00   | 31100 600            | ZT590-5.00-11.11   |
| 31100 605            | ZT590-6.00-12.70   | 31100 610            | ZT590-5.00-14.29   |
| 31100 615            | ZT590-6.00-15.87   |                      |                    |

**ZEPHYR®**  
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TOOLS ENGINEERED TO PERFORM



# Miscellaneous Tools



## ZEPHYR TOOL GROUP

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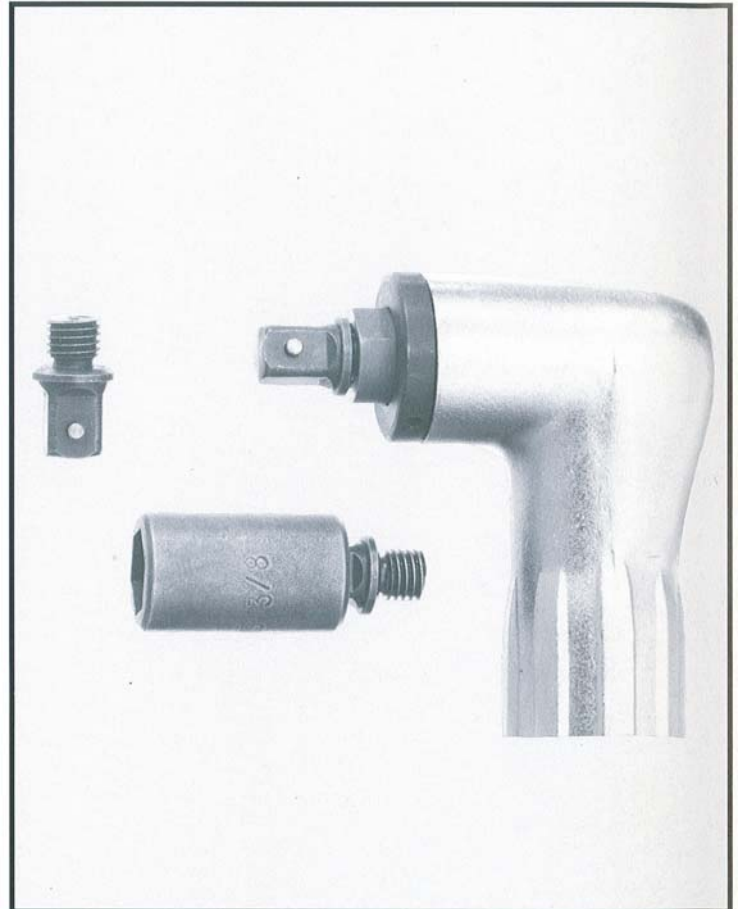


## **Z10SHT-1/2**

### **Convert 1/4-28 Threaded Drive Angle Drill to a 1/4" Square Drive Nut Runner**

**Zephyr's new Z10SHT-1/2 Adapter** allows you to use any 1 1/4-28 threaded drive angle drill as a nut runner for close quarters applications. The Z10SHT-1/2 can be used with any of Zephyr's 1/4" square drive sockets for driving 1/4", 5/16", 3/8" or 7/16" hex head screws or nuts as well as Zephyr's 1/4" square drive insert bit holders for driving screws in hard to reach places.

**The new Z10SHT-1/2 Adapter** was designed for use in the most demanding applications where close quarter limitations result in difficulty in installing and removing fasteners.



Part No. ZT10SHT-1/2

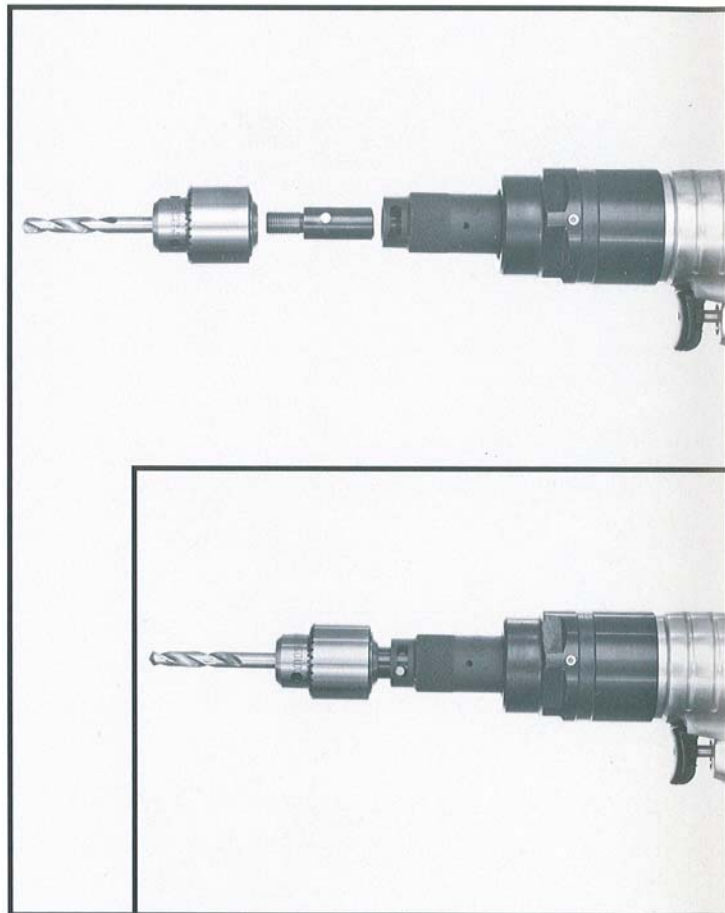


## ZT111P / ZT111L Quick Change Chuck and Adaptor

A precision made TIMESAVING tool combination. The ZT111P and ZT111 L used with Jacobs threaded chucks produce uniform high quality holes, a necessity when working with high strength stainless steel or titanium.

**SAVES TIME**, .At least a 40% savings in time required to change drills. Imagine the time saved by being able to change cutters in seconds.

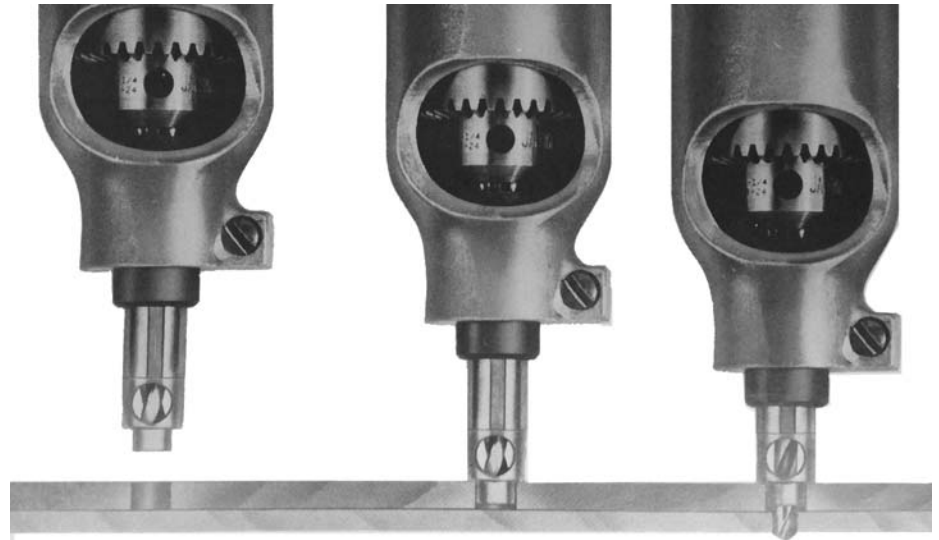
Load the Jacobs chucks with varying sizes of cutters and thread in a ZT111L (3/8 -24) to each. Then insert into the ZT111P (3/8-24) already threaded onto the drill. To change simply unlock adaptor/chuck/cutter combination and insert another. No keys to use. Zephyr brings you the bottom line: less cost, more productivity and top quality resulting in money earned.



Part No. ZT111P and ZT111L



## Collapsible Drill Guides

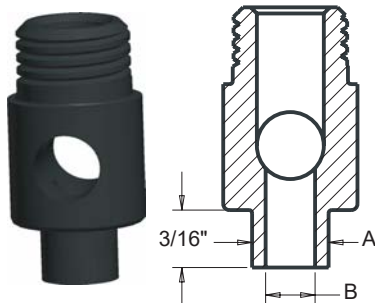


1. The drill guide is shown in extended position ready to be inserted into templet hole. Note how point of the drill is kept protected by drill guide.

2. Here the drill guide tip is shown seated in the templet. Rotating drill cannot mar or scratch either templet

3. As pressure is applied, the drill guide retracts as the hole is drilled. Drill centers automatically. Chips are discharge easily through large ports in tip.

Zephyr's collapsible drill guides and tips permit use of standard length twist drills. Drill breakage is avoided through accurately aligned and rigidly mounted spring loaded guide and tip. Enables unskilled help to produce more accurately and in greater volume. Eliminates spoiled templets. "off holes" and results in fewer broken drills.



### Drill Guides (less tips)

| PART NUMBER | T (TRAVEL) | DIMENSION |        |
|-------------|------------|-----------|--------|
| ZT38B       | 9/16"      |           | CLOSED |
| ZT38B-1     | 1"         |           |        |
| ZT38B-2     | 1-1/2"     |           |        |

### Replaceable Tips (for drill guides)

| PART NUMBER    | A*   | B**   | A*      | B** | PART NUMBER                                         |
|----------------|------|-------|---------|-----|-----------------------------------------------------|
| ZT28T-249-20   | .249 | #20   | .374    | #10 | ZT28T-374-10                                        |
| ZT28T-249-21   | .249 | #21   | .374    | #11 | ZT28T-374-11                                        |
| ZT28T-249-30   | .249 | #30   | .374    | #20 | ZT28T-374-20                                        |
| ZT28T-249-40   | .249 | #40   | .374    | #21 | ZT28T-374-21                                        |
| ZT28T-311-3/16 | .311 | 3/16" | .374    | #30 | ZT28T-374-30                                        |
| ZT28T-311-11   | .311 | #11   | .374    | #40 | ZT28T-374-40                                        |
| ZT28T-311-20   | .311 | #20   | Cupped  |     | ZT28T-Cupped                                        |
| ZT28T-311-21   | .311 | #21   |         |     | (Specify round or<br>brazier head and<br>hole size) |
| ZT28T-311-30   | .311 | #30   |         |     |                                                     |
| ZT28T-374-3/16 | .374 | 3/16" | Tapered |     | ZT28T-Tapered                                       |
| ZT28T-374-1/4  | .374 | 1/4"  |         |     | (Specify angle and<br>hole size)                    |
| ZT28T-374-8    | .374 | #8    |         |     |                                                     |

#### NOTES:

- (\*)Maximum standard O.D. of A is .499" other diameters and types made to special order.
- (\*\*)Maximum diameter of B is "#F" in all cases. Minimum Diameter of B is #50. If smaller diameter is desired we will furnish blanks which can be drilled by customer as required.
- Minimum thickness of wall between A and B is .050".
- Combinations of A and B other than shown above can be furnished on special order only. Tapered and Cupped tips made to order only.

## ZEPHYR TOOL GROUP

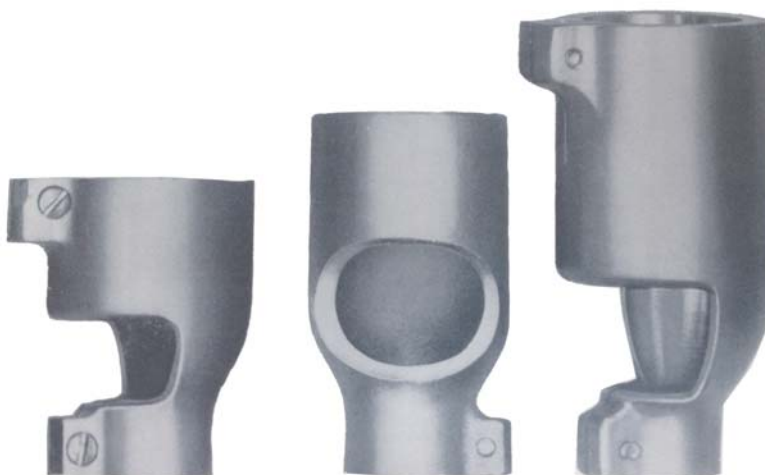
201 Hindry Avenue

Inglewood, CA 90301

Tel. 310-410-4907 ■ Email: sales@zephyrtoolgroup.com ■ [zephyrtoolgroup.com](http://zephyrtoolgroup.com)



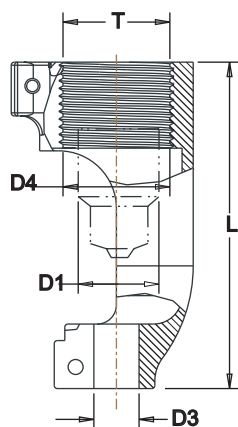
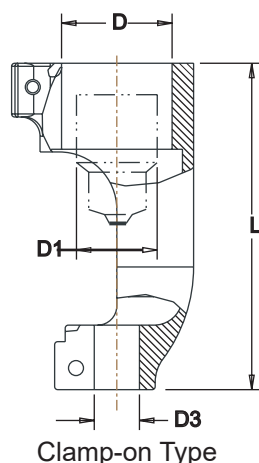
## Drill Guide Mounting Adapters



ZT5

ZT5B

ZT5D



| TYPE          | PART NO. | D        | D1      | D3     | D4     | T            | MAXIMUM CHUCK MODEL | L      |
|---------------|----------|----------|---------|--------|--------|--------------|---------------------|--------|
| Clamp-On Type | ZT5-1    | 1-1/2"   | 1-3/16" | 11/16" | -.-    | -.-          | 1B                  | 2-3/4" |
|               | ZT5-2    | 1-5/8"   | 1-3/16" | 11/16" | -.-    | -.-          | 1B                  | 2-3/4" |
|               | ZT5D-1   | 1-1/2"   | 1-7/16" | 11/16" | -.-    | -.-          | 30B                 | 4-1/4" |
|               | ZT5D-2   | 1-9/16"  | 1-7/16" | 11/16" | -.-    | -.-          | 30B                 | 4-1/4" |
|               | ZT5D-3   | 1-5/8"   | 1-7/16" | 11/16" | -.-    | -.-          | 30B                 | 4-1/4" |
|               | ZT5D-4   | 1-11/16" | 1-7/16" | 11/16" | -.-    | -.-          | 30B                 | 4-1/4" |
| Threaded Type | ZT5B-1   | -.-      | 1-3/16" | 11/16" | 1-1/4" | 1-3/8-20 LH  | 1B                  | 2-3/4" |
|               | ZT5B-2   | -.-      | 1-3/16" | 11/16" | 1-3/8" | 1-1/2-20 LH  | 1B                  | 2-3/4" |
|               | ZT5B-4   | -.-      | 1-3/16" | 11/16" | 1-1/4" | 1-7/16-20 RH | 30B                 | 4-1/4" |

Adapters with other D, D4, or T specifications made to order.  
The above adapters will also accommodate our Flat Offset Angle Drill.



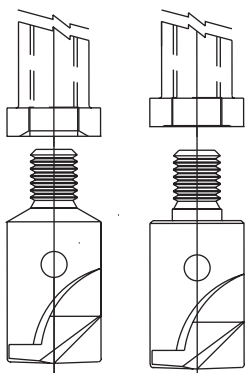
# Rivet Shavers & Accessories



## ZEPHYR TOOL GROUP

201 Hindry Avenue  
Inglewood, CA 90301

Tel. 310-410-4907 ■ Email: [sales@zephyrtoolgroup.com](mailto:sales@zephyrtoolgroup.com) ■ [zephyrtoolgroup.com](http://zephyrtoolgroup.com)

**ZT405AAC RIVET SHAVER****Heavy Duty****1.0 HP****18,000 RPM**

ZT88 Series    ZT108 Series

**FEATURES**

All aluminum head exterior body greatly reduces the overall weight of the rivet shaver.

Back Angle "BA" shaft features a 120 degree seat angle which when used with the ZT88 series cutters greatly improves the flushness of cut.



| MODEL        | CUTTER CAPACITY | SPINDLE RPM | CUTTER SERIES | WEIGHT  | LENGTH |
|--------------|-----------------|-------------|---------------|---------|--------|
| ZT405AAC     | 1.250"          | 18,000      | ZT108         | 2.5 lbs | 8.75"  |
| ZT405AEAC    | 1.250"          | 18,000      | ZT108         | 2.5 lbs | 9.00"  |
| ZT405AAC-BA  | 1.250"          | 18,000      | ZT88          | 2.5 lbs | 8.75"  |
| ZT405AEAC-BA | 1.250"          | 18,000      | ZT88          | 2.5 lbs | 9.00"  |

ZT405016    Stabilizer Assembly

ZT405040    Ext. Stabilizer Assembly

**Standard Footpieces**

|           |                  |
|-----------|------------------|
| ZT405021  | Footpiece 5/16"  |
| ZT405022  | Footpiece 3/8"   |
| ZT405023  | Footpiece 7/16"  |
| ZT405024  | Footpiece 1/2"   |
| ZT405025  | Footpiece 9/16"  |
| ZT405026  | Footpiece 5/8"   |
| ZT405027  | Footpiece 3/4"   |
| ZT405028  | Footpiece 7/8"   |
| ZT405029  | Footpiece 1"     |
| ZT405030  | Footpiece 1-1/8" |
| ZT4050110 | Footpiece 1-1/4" |

**Extended Footpieces**

|           |                           |
|-----------|---------------------------|
| ZT405051  | Extended Footpiece 5/16"  |
| ZT405052  | Extended Footpiece 3/8"   |
| ZT405053  | Extended Footpiece 7/16"  |
| ZT405054  | Extended Footpiece 1/2"   |
| ZT405055  | Extended Footpiece 9/16"  |
| ZT405056  | Extended Footpiece 5/8"   |
| ZT405057  | Extended Footpiece 3/4"   |
| ZT405058  | Extended Footpiece 7/8"   |
| ZT405059  | Extended Footpiece 1"     |
| ZT405060  | Extended Footpiece 1-1/8" |
| ZT4050167 | Extended Footpiece 1-1/4" |

**Standard Rivet Shaver Cutters**

|          |                            |
|----------|----------------------------|
| ZT108-1  | Rivet Shaver Cutter 5/16"  |
| ZT108-2  | Rivet Shaver Cutter 3/8"   |
| ZT108-3  | Rivet Shaver Cutter 7/16"  |
| ZT108-4  | Rivet Shaver Cutter 1/2"   |
| ZT108-5  | Rivet Shaver Cutter 9/16"  |
| ZT108-6  | Rivet Shaver Cutter 5/8"   |
| ZT108-7  | Rivet Shaver Cutter 3/4"   |
| ZT108-8  | Rivet Shaver Cutter 7/8"   |
| ZT108-9  | Rivet Shaver Cutter 1"     |
| ZT108-10 | Rivet Shaver Cutter 1 1/8" |
| ZT108-11 | Rivet Shaver Cutter 1 1/4" |

**Back Angle Rivet Shaver Cutters**

|         |                            |
|---------|----------------------------|
| ZT88-1  | Rivet Shaver Cutter 5/16"  |
| ZT88-2  | Rivet Shaver Cutter 3/8"   |
| ZT88-3  | Rivet Shaver Cutter 7/16"  |
| ZT88-4  | Rivet Shaver Cutter 1/2"   |
| ZT88-5  | Rivet Shaver Cutter 9/16"  |
| ZT88-6  | Rivet Shaver Cutter 5/8"   |
| ZT88-7  | Rivet Shaver Cutter 3/4"   |
| ZT88-8  | Rivet Shaver Cutter 7/8"   |
| ZT88-9  | Rivet Shaver Cutter 1"     |
| ZT88-10 | Rivet Shaver Cutter 1 1/8" |
| ZT88-11 | Rivet Shaver Cutter 1 1/4" |

Standard Model

Atlas Copco Motor

Back Angle Model

**ZT405AAC-BA****ORDERING INFORMATION**

1. Shaver, footpiece, stabilizer and cutter should be ordered separately.
2. Match the diameters of the footpiece and the cutter for best results.
3. Extended footpieces and stabilizer should only be used with extended length shavers (ZT405AE).
4. ZT108 series rivet shaver cutters should be used with standard shavers.
5. ZT88 series rivet shaver cutters should be used with back angle shavers.



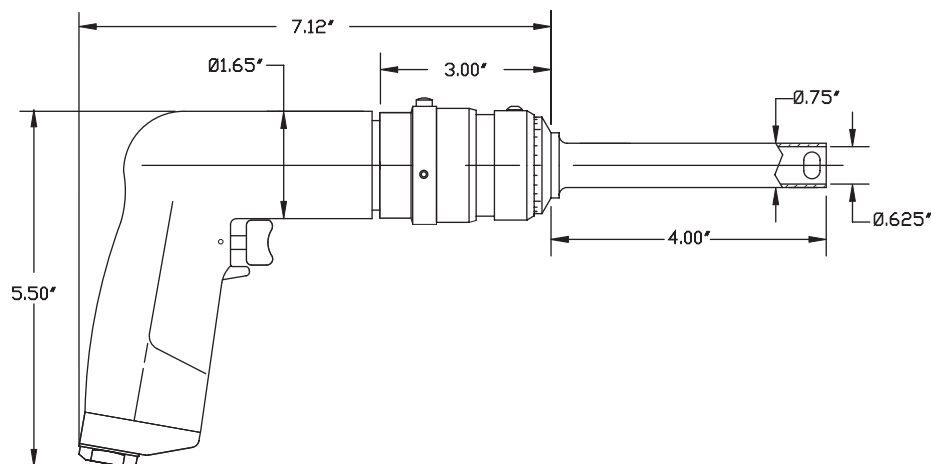
## ZT405AEIR-4 4" Extended Footpiece Heavy Duty Rivet Shaver



Zephyr's ZT405 Heavy Duty Rivet Shavers are designed to shave aluminum or similar strength alloy rivets flush to a precise plane without scratching.

### FEATURES

- New aluminum head reduces the overall weight.
- Footpiece lengths for special restricted access applications, 3", 5", 6" and 7", available on request.
- Footpiece cutter capacity 1/2" to 5/8".
- Depth adjustment in .0005" increments.
- Uses 1/4"-28 threaded cutters.
- 20,000 RPM free speed.
- Weight 3.5 lbs. (1.59Kg).
- Air Supply 90 psi (inlet 1/4").
- CE Certified.
- Manufactured in USA.





## MICRO SHAVERS STANDARD AND HEAVY DUTY

**MODEL  
ZT507C  
SUPER SHAVER**



**MODEL  
ZT706AIR  
STANDARD DUTY**



**MODEL  
ZT405AIR  
HEAVY DUTY**





## MICRO SHAVERS STANDARD AND HEAVY DUTY

### POSITIVE MICRO-STOP DEPTH CONTROL



### Fingertips Adjustment in .0005" increments

Adjustment for depth of cut in increments of .0005". To adjust grasp locking with thumb and index finger and retract. Turn nosepiece to right to increase depth of cut, left to decrease. Retraction of footpiece constant over entire range of adjustment.

Can't  
Skid



Can't  
Heel



Can't  
Undercut



### Shaves clean No Scratching



Illustrated at the left is an actual photograph of rivets before and after shaving by the Zephyr Micro-Shaver. Rivet has been shaved flush to precise plane of sheet without surface scratching. Shaving process is consistent regardless of rivet height.



## ZT706AIR RIVET SHAVER

### Standard Duty

**Fingertips Adjustment in .0005" increments**

#### FEATURES

- New aluminum head reduces the overall weight.
- Footpiece lengths for special restricted access
- Footpiece cutter capacity 1/4" to 5/8".
- Depth adjustment in .0005" increments.
- Uses 1/4"-28 threaded cutters.
- 15,000 RPM free speed.
- Weight 3.0 lbs. (1.59Kg).
- Air Supply 90 psi (inlet 1/4").
- CE Certified.
- Manufactured in USA.

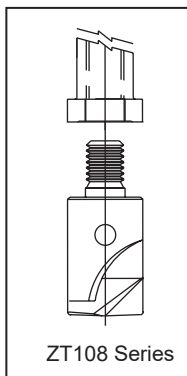
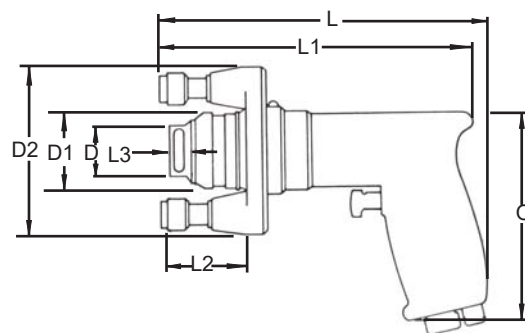
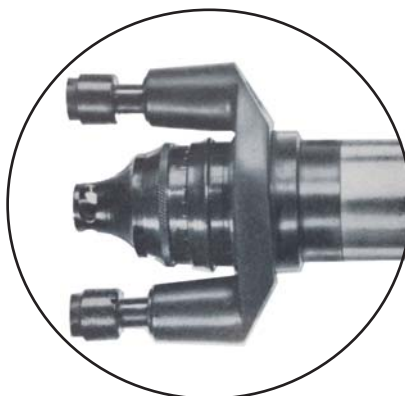


Standard Model  
Ingersoll Rand

**ZT706A IR**

#### ORDERING INFORMATION

1. Shaver, footpiece, stabilizer and cutter should be ordered separately.
2. Match the diameters of the footpiece and the cutter for best results.
3. Extended footpieces and stabilizer should only be used with extended length shavers (ZT706AEIR).
4. ZT108 series rivet shaver cutters should be used with standard shavers.



| MODEL     | CUTTER CAPACITY | WT. LESS CUTTER | CUTTER RPM | D(max) | D1     | D2 | L        | L1       | L2     | L3   | O      |
|-----------|-----------------|-----------------|------------|--------|--------|----|----------|----------|--------|------|--------|
| ZT706AIR  | 5/8"            | 3#              | 15,000     | 1-1/8" | 1-1/2" | 4" | 7-1/2"   | 6-3/8"   | 1-7/8" | 3/8" | 4-7/8" |
| ZT706AEIR | 5/8"            | 3#              | 15,000     | 1-1/8" | 1-1/2" | 4" | 7-13/16" | 6-13/16" | 2-1/4" | 7/8" | 4-7/8" |



## ZT405AIR RIVET SHAVER

### Heavy Duty

**Fingertips Adjustment in .0005" increments**

#### FEATURES

- New aluminum head reduces the overall weight.
- Footpiece lengths for special restricted access
- Footpiece cutter capacity 1/2" to 5/8".
- Depth adjustment in .0005" increments.
- Uses 1/4"-28 threaded cutters.
- 20,000 RPM free speed.
- Weight 3.5 lbs. (1.59Kg).
- Air Supply 90 psi (inlet 1/4").
- CE Certified.
- Manufactured in USA.



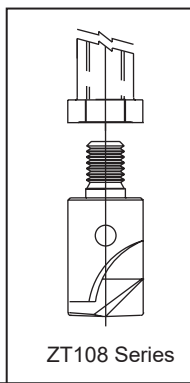
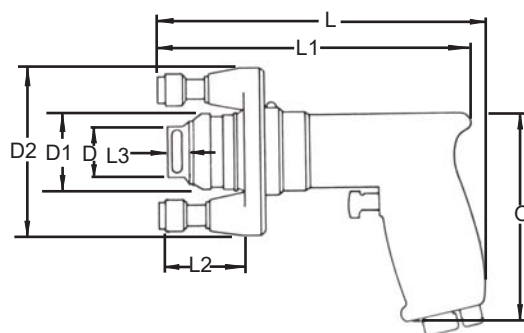
Standard Model

Ingersoll Rand

**ZT405AIR**

#### ORDERING INFORMATION

1. Shaver, footpiece, stabilizer and cutter should be ordered separately.
2. Match the diameters of the footpiece and the cutter for best results.
3. Extended footpieces and stabilizer should only be used with extended length shavers (ZT405AEIR).
4. ZT108 series rivet shaver cutters should be used with standard shavers.



| MODEL     | CUTTER CAPACITY | WT. LESS CUTTER | CUTTER RPM | D(max) | D1     | D2 | L      | L1     | L2     | L3   | O      |
|-----------|-----------------|-----------------|------------|--------|--------|----|--------|--------|--------|------|--------|
| ZT405AIR  | 1-1/4"          | 3-1/2#          | 20,000     | 1-3/8" | 1-3/4" | 4" | 7-3/4" | 6-7/8" | 1-3/4" | 3/8" | 5-1/8" |
| ZT405AEIR | 1-1/4"          | 3-1/2#          | 20,000     | 1-3/8" | 1-3/4" | 4" | 8-1/8" | 7-1/4" | 2-1/4" | 7/8" | 5-1/8" |



## MICRO SHAVERS STANDARD AND HEAVY DUTY

### CARBIDE TIPPED CUTTERS

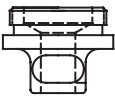
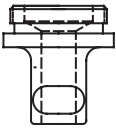
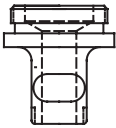
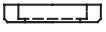
### THESE CUTTERS ARE DESIGNED FOR USE IN ZEPHYR MICRO SHAVERS

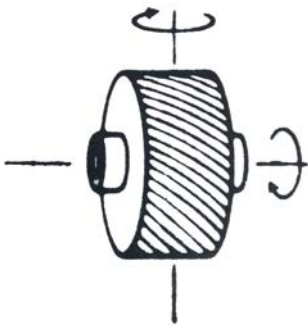


### CUTTERS FOOPIECES AND FOOTPLATES



These sizes are available with the correct combinations of cutters, Footpieces and Footplates as noted.

|             |             | <br>ZT108 Series |  |  |  |  |
|-------------|-------------|-----------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|             | CUTTER DIA. | CUTTER STANDARD                                                                                     | FOOTPIECE STANDARD PNEUMATIC                                                        | FOOTPIECE EXTENDED PNEUMATIC                                                          | FOOTPIECE THREADED EXTENDED PNEUMATIC                                                 | FOOTPLATE NYLON TYPE                                                                  |
| MODEL ZT706 | 1/4"        | ZT108-0                                                                                             | ZT306020                                                                            | ZT306040                                                                              | NOT MADE                                                                              | NOT MADE                                                                              |
|             | 5/16"       | ZT108-1                                                                                             | ZT306021                                                                            | ZT306041                                                                              | NOT MADE                                                                              | NOT MADE                                                                              |
|             | 3/8"        | ZT108-2                                                                                             | ZT306022                                                                            | ZT306042                                                                              | NOT MADE                                                                              | NOT MADE                                                                              |
|             | 7/16"       | ZT108-3                                                                                             | ZT306023                                                                            | ZT306043                                                                              | ZT306050                                                                              | ZT205053                                                                              |
|             | 1/2"        | ZT108-4                                                                                             | ZT306024                                                                            | ZT306044                                                                              | ZT306051                                                                              | ZT205054                                                                              |
|             | 9/16"       | ZT108-5                                                                                             | ZT306025                                                                            | ZT306045                                                                              | ZT306052                                                                              | ZT205055                                                                              |
|             | 5/8"        | ZT108-6                                                                                             | ZT306026                                                                            | ZT306046                                                                              | ZT306053                                                                              | ZT205056                                                                              |
| MODEL ZT405 | 3/8"        | ZT108-2                                                                                             | ZT405022                                                                            | ZT405052                                                                              | NOT MADE                                                                              | NOT MADE                                                                              |
|             | 7/16"       | ZT108-3                                                                                             | ZT405023                                                                            | ZT405053                                                                              | ZT405032                                                                              | ZT205053                                                                              |
|             | 1/2"        | ZT108-4                                                                                             | ZT405024                                                                            | ZT405054                                                                              | ZT405033                                                                              | ZT205054                                                                              |
|             | 9/16"       | ZT108-5                                                                                             | ZT405025                                                                            | ZT405055                                                                              | ZT405034                                                                              | ZT205055                                                                              |
|             | 5/8"        | ZT108-6                                                                                             | ZT405026                                                                            | ZT405056                                                                              | ZT405035                                                                              | ZT205056                                                                              |
|             | 3/4"        | ZT108-7                                                                                             | ZT405027                                                                            | ZT405057                                                                              | ZT405036                                                                              | ZT205057                                                                              |
|             | 7/8"        | ZT108-8                                                                                             | ZT405028                                                                            | ZT405058                                                                              | ZT405037                                                                              | ZT205058                                                                              |
|             | 1"          | ZT108-9                                                                                             | ZT405029                                                                            | ZT405059                                                                              | ZT405038                                                                              | ZT205059                                                                              |
|             | 1-1/8"      | ZT108-10                                                                                            | ZT405030                                                                            | ZT405060                                                                              | ZT405039                                                                              | ZT205060                                                                              |
|             | 1-1/4"      | ZT108-11                                                                                            | ZT4050110                                                                           |                                                                                       |                                                                                       |                                                                                       |

**ZT507C  
SUPER SHAVER****DUAL  
ROTATION  
TYPE  
CUTTERS**

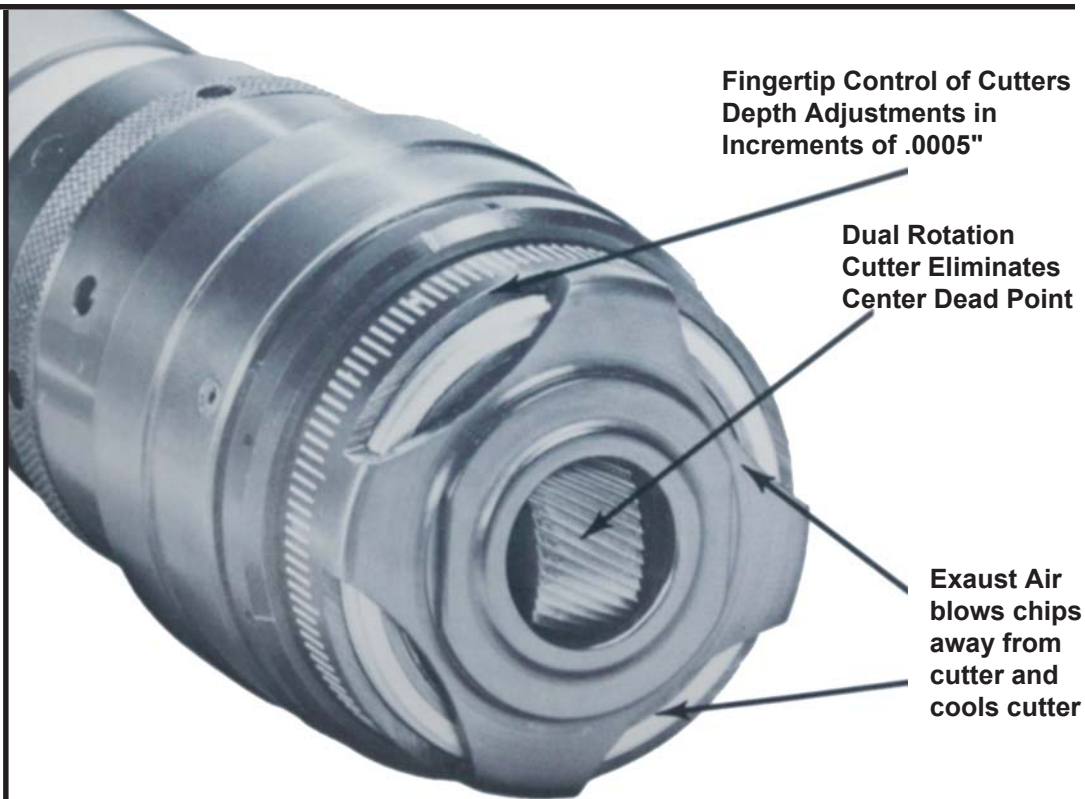
**FOR USE ON TITANIUM , STAINLESS STEEL,  
MONEL AND SIMILAR HIGH STRENGTH FASTENERS**



- Dual rotation cutting action.
- Micrometer dial type adjustment with .0005 inch increments.
- Positive cutting depth control
- Solid Carbide Cutters.
- Cutter rotation - 12,000 R.P.M.

**ZT507C  
SUPER SHAVER**

**FLUSH FINISHES  
EXTRA HARD AND  
TOUGH MATERIALS**



**STABILIZER  
ASSEMBLY**



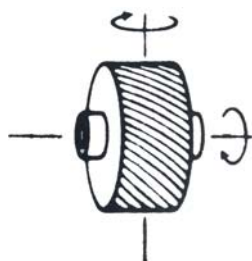
Removable Stabilizer Assembly  
is easily installed on shaver to  
prevent "walking" across the  
sheet the shaver. It is specially  
recommended for use with  
ZT507C Dual Rotation model.

**NOTE:** Stabilizer Assembly, available as accessory if required,  
specify at time of order



## ZT507C SUPER SHAVER

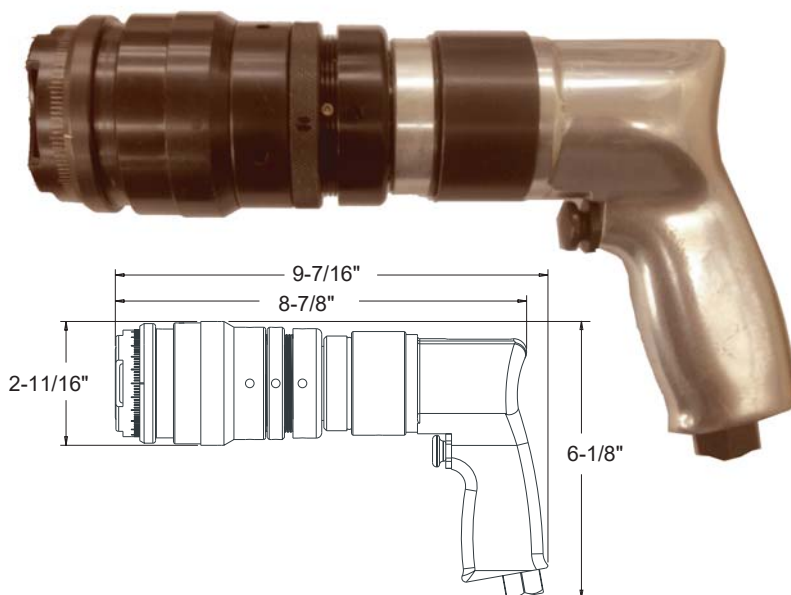
Model ZT507C rotates  
cutter at approximately  
12,000 rpm  
Weight: 5 ½ lbs.



**DUAL  
ROTATION  
TYPE  
CUTTERS**

Zephyr's Super  
Shavers will flush-finish  
the toughest and  
hardest fasteners in  
seconds. Precision  
finishing conforms with  
rigid standards  
established for  
construction of  
supersonic aircraft.

**FOR USE ON TITANIUM , STAINLESS STEEL,  
MONEL AND SIMILAR HIGH STRENGTH FASTENERS.**



## CARBIDE CUTTERS



**FOOTPIECES**

| CUTTER<br>WIDTH | STEEL<br>FOOTPIECE | NYLON<br>FOOTPIECE | CLOSE QUARTER<br>NOSEPIECE |
|-----------------|--------------------|--------------------|----------------------------|
| 3/8" & 7/16"    | ZT507084           | -.-                | ZT507094                   |
| 1/2"            | ZT507029           | ZT507041           | ZT507092                   |
| 3/4"            | ZT507035           | ZT507055           | -.-                        |

### CUTTERS FOR ZT507C SUPER SHAVER

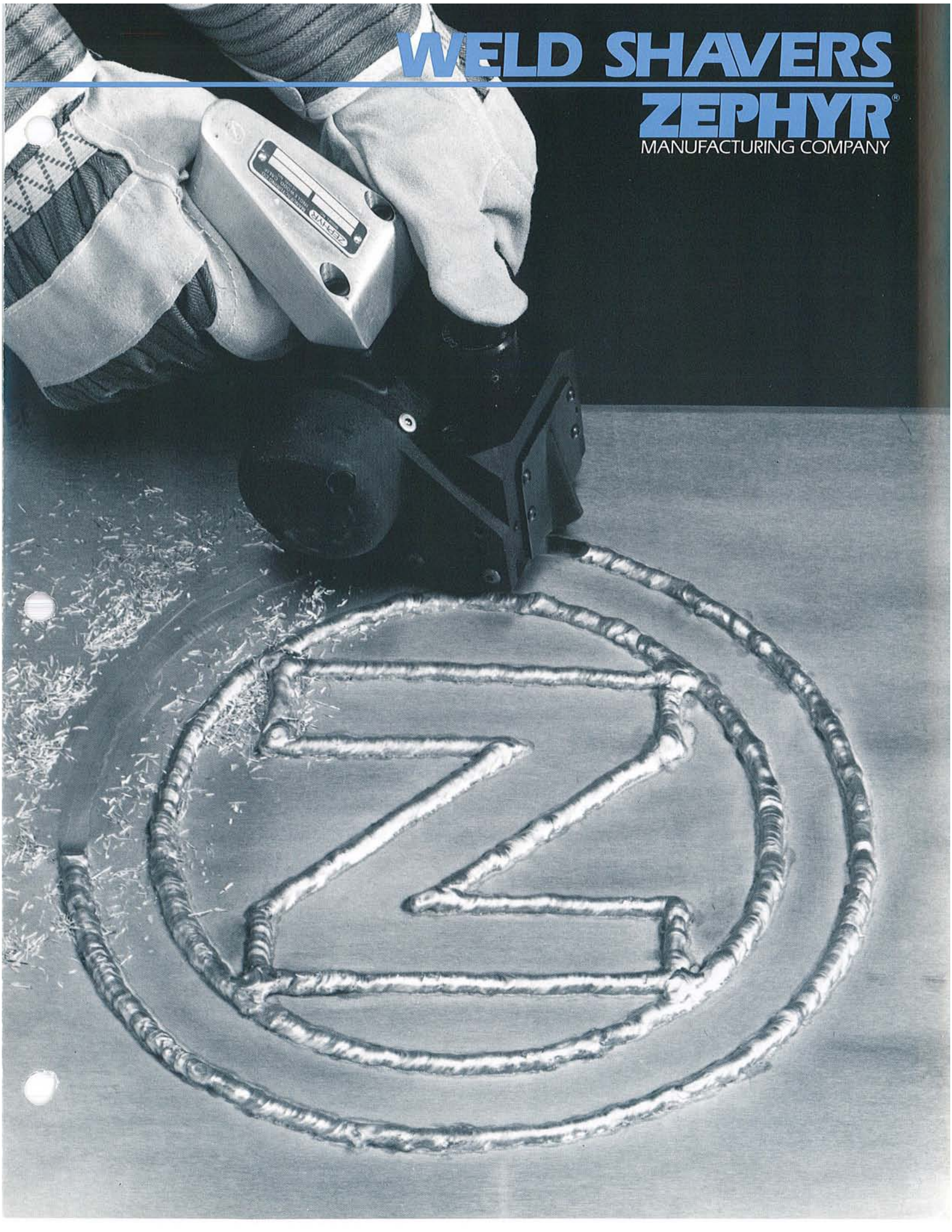
Zephyr's Carbide  
Cutters are  
precision ground  
for high speed  
usage and long  
life. They are  
fluted to meet the  
special  
requirements for  
various metals  
and finishes.

| CUTTER<br>NUMBER | MATERIAL | DIAMETER | WIDTH | No. OF<br>TEETH | CHIP<br>BREAKER | APPLICATION                             |
|------------------|----------|----------|-------|-----------------|-----------------|-----------------------------------------|
| ZT507-20B        | CARBIDE  | 1-1/8"   | 1/2"  | 49              | NO              | MONEL STEEL, TITANIUM                   |
| ZT507-21B        | CARBIDE  | 1-1/8"   | 3/4"  | 49              | NO              | MONEL STEEL, TITANIUM                   |
| ZT507-22B        | CARBIDE  | 1-1/8"   | 1/2"  | 25              | NO              | MONEL STEEL, TITANIUM, JO BOLT          |
| ZT507-23B        | CARBIDE  | 1-1/8"   | 3/8"  | 49              | NO              | MONEL STEEL, TITANIUM                   |
| ZT507-24B        | CARBIDE  | 1-1/8"   | 1/2"  | 37              | YES             | NACA, STRAYLAR RIVET, ALUMINUM, JO BOLT |
| ZT507-25B        | CARBIDE  | 1-1/8"   | 3/4"  | 37              | YES             | NACA, STRAYLAR RIVET, ALUMINUM, JO BOLT |
| ZT507-26B        | CARBIDE  | 1-1/8"   | 3/8"  | 37              | YES             | NACA, STRAYLAR RIVET, ALUMINUM, JO BOLT |
| ZT507-27B        | CARBIDE  | 1-1/8"   | 1/2"  | 25              | NO              | A-286 STAINLESS STEEL RIVET             |
| ZT507-28B        | CARBIDE  | 1-1/8"   | 3/4"  | 25              | NO              | A-286 STAINLESS STEEL RIVET             |
| ZT507-29B        | CARBIDE  | 1-1/8"   | 7/16" | 49              | NO              | MONEL, STEEL, TITANIUM                  |

# WELD SHAVERS

## ZEPHYR<sup>®</sup>

MANUFACTURING COMPANY



**R****emove welds in one  
step instead of three.**

The old method was a grind. And with chipping and sanding, it was also a costly, time consuming, three-stage process. But now, with Zephyr Z-Mill™ Pneumatic Weld Shavers, you can remove a weld bead in just one pass.

A Zephyr Weld Shaver will remove a weld bead up to ten times faster than a hand held grinder. Because we've combined three steps into one, you save more than time. You save money.

**Aluminum, titanium, exotic  
metals, and more.**

Born in the aerospace industry, we understand specialized materials. That's why we've designed our Weld Shavers to be precision milling tools. You can set them for the depth of shaving you need—something that would be unthinkable with a hand held grinder.

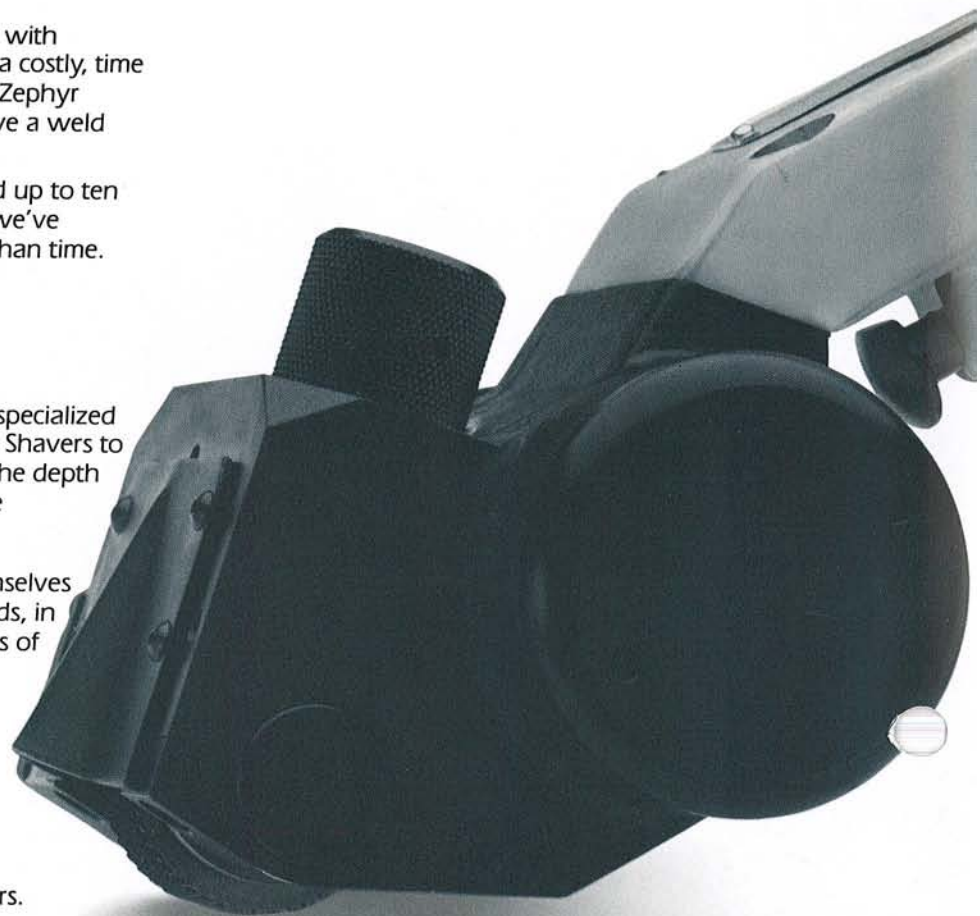
Zephyr Weld Shavers have already proven themselves in application after application: in naval shipyards, in trailer manufacturing plants, even in the facilities of specialized tank manufacturers.

**Satisfied customers in  
your industry.**

Builders of electrical and computer cabinetry, refrigeration equipment, and truck and trailer bodies are just a few of the types of companies enjoying the advantages of Zephyr Weld Shavers.

We have complete case studies of Weld Shaver applications by firms like yours. Ask your Zephyr representative for an example in your area of interest.

Then see for yourself how Zephyr Z-Mill™ Weld Shavers will improve your weld finish as well as your bottom line.



# ZT708 & ZT709

## STANDARD DUTY WELD SHAVERS

Remove stainless steel or titanium weld beads with the ZT708. Remove aluminum, copper, magnesium, or other non-ferrous metal weld beads with the ZT709.

Both are portable air-powered tools designed to shave weld beads to a pre-determined height—above, below, or flush to the surface. Each can solve special requirements such as burr removal, beveling, and working at angles or in close quarters. Grooving is accomplished with the ZT709 aluminum shaver only. No matter what your application, these Weld Shavers will perform with precision, giving you a smooth finished surface in less time than ever before.

Here's how they work: two adjustable ball bearing rollers straddle the weld bead, centering the cutter over the weld. The ball bearings keep the cutter at a constant height on any surface, whether flat, convex, or concave.

You have absolute control over the cutter height and can make adjustments in increments of 0.001 inch. You also can select a variety of cutter widths. The different cutter widths require a different roller bracket shaft assembly, each one of which can be rapidly removed when changing or re-sharpening the cutters. This ensures rapid turn-around time on the job. Both Weld Shavers are designed to have the exhaust air blow chips from the work area and cool the cutter.

The ZT708 will shave a maximum weld bead of .030" high by  $\frac{7}{8}$ " wide in one pass. Cutters are slab type, and available in widths of  $\frac{3}{8}$ " to 1" with a chip breaker, or  $\frac{3}{8}$ " to  $\frac{1}{2}$ " without chip breaker.

The ZT709 will shave a maximum bead of 0.125" high by  $\frac{7}{8}$ " wide. Cutters are slab type, and are available in widths of  $\frac{3}{8}$ " to  $\frac{3}{4}$ " in high speed steel;  $\frac{3}{8}$ " to 1" in carbide; and grooving cutters of  $\frac{1}{2}$ " in 60°, 75°, and 88° angles. Grooving aluminum is now a faster process. The grooving cutter can be used to remove a poor weldment that does not have deep roots, which saves the work piece for a re-weld.

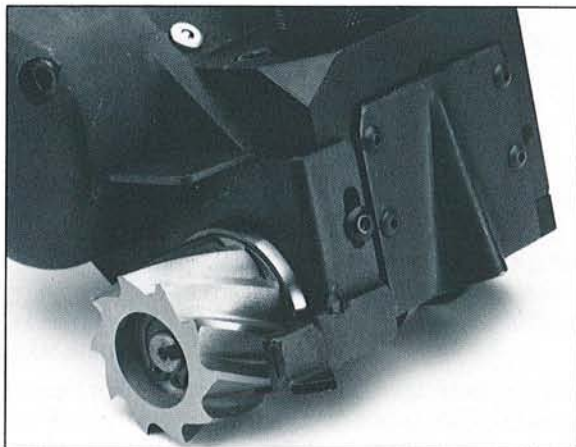
Please see our Specification Sheet for complete details.

## OUTRIGGER & BEVEL ATTACHMENTS

Right hand and left hand outrigger attachments enable you to remove corner fillets or radius welds which are adjacent to 90° plates, walls, or structures. You can shave a 90° weld to  $\frac{9}{64}$ " with a standard slab cutter  $\frac{3}{4}$ " wide. Perform flush cutting with a side recessed 1" cutter. A radius fillet weld finish can be achieved with a side recessed edge radius cutter.

The standard attachment is manually adjusted for depth control without requiring any basic modification of the Weld Shaver. Optional mechanically controlled outriggers are also available to micro-adjust depth and distance from a side plate or wall surface.

The bevel attachment is designed for two jobs: to bevel or chamfer plates prior to welding, and to bevel or chamfer edges of aluminum and stainless steel. A right hand and left hand bevel attachment is available with a standard 60° slide.



# ZT550 & ZT553

## LIGHT DUTY WELD SHAVERS



Both of these Weld Shavers are designed for light duty close-quarters work. The ZT550 shaves aluminum weld beads and grooves aluminum plates. The ZT553 shaves stainless steel weld beads and is therefore slightly larger and heavier.

Adjustable ball bearing rollers straddle the weld bead with the cutter rotating in between. You can shave a weld bead parallel to a flat, concave, or convex work surface. In precise applications, the positive micro-stop adjustment controls cutting depth in 0.0005 inch increments.

Slab cutters for shaving weld beads are available in  $\frac{3}{8}$ " to  $\frac{1}{2}$ " wide in high speed steel and  $\frac{1}{4}$ " to  $\frac{1}{2}$ " wide in carbide. Grooving cutters are available in high speed steel,  $\frac{3}{8}$ " wide, in 40° and 60° angles.

Each cutter width requires a different roller bracket shaft assembly which is easily removed to change or re-sharpen the cutters. The exhaust air serves a dual purpose: blowing chips away from the work area and cooling the cutter.

Please refer to our Specification Sheet for more detailed information.

## ZT501

### HEAVY DUTY WELD SHAVER



Here is a portable milling machine designed for heavy duty use with aluminum, magnesium, and copper. This tool may be used in three ways: to shave weld beads, as a slab mill, and to groove non-ferrous metals.

As in all our Weld Shavers, the ball bearing roller bracket straddles the weld bead with the cutter rotating in between. This design ensures that the weld bead is shaved tangent to the work surface, whether flat, concave, or convex. Positive micro-stop adjustment of the cutter is calibrated in 0.001 inch increments, permitting a shave of a pre-determined height or flush with the work surface.

Slab cutter widths are  $\frac{3}{4}$ " to 2", while the grooving cutters are  $1\frac{1}{2}$ " wide for 60° or  $1\frac{5}{8}$ " wide for 70° to a depth of  $1\frac{1}{16}$ ".

The motor is governor controlled to assure a constant speed. Air exhaust blows away chips and controls the temperature of the cutter. The roller bracket assembly is easily removed, enabling you to rapidly replace the cutter.

Please consult our Specification Sheet for complete details.

## SAFETY

Zephyr products are designed to be safe under proper working conditions. Be sure that you know the proper way to use a tool before working with it. We recommend the wearing of eye protection when using any hand tool or machine shop tool.

Keep your tools clean, lubricated, inspect them from time to time, and replace worn or damaged tools. The nominal cost will be more than offset by the reduction in mistakes and the savings on rework.

# ZEPHYR<sup>®</sup>

TOOL

**ZEPHYR<sup>®</sup> Manufacturing Co., Inc.**

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Inglewood, CA 90301-1519  
TEL 310-410-4907 • FAX 310-410-2913  
zephyr@zephyrtool.com  
<http://www.zephyrtool.com>

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Printed in USA 9-01 1M





# **ZT501** **Porta Mil** **Heavy Duty Weld Shaver**



The Porta-Mill is a heavy duty hand held milling machine designed to be used on aluminum, magnesium and copper. The Porta-Mill may be used in 3 ways: to shave weld beads, as a slab mill and to groove non-ferrous metals.

As with all our Weld Shavers, the ball bearing roller bracket straddles the weld bead with the cutter rotating in between. This insures that the weld bead is shaved tangent to the work surface, whether flat, concave or convex. Positive depth control allows the cutter height to be set in increments of .001 inch, making it ease to shave flush to the work surface or to a pre-determined depth.

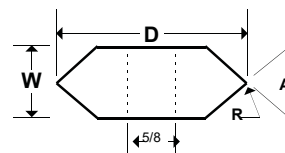
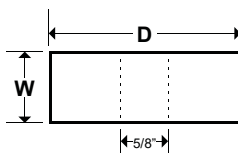
The motor is governor controlled to assure a constant speed. The air exhaust blows away the shavings and helps control the temperature of the cutter. The roller bracket is easily removed, enabling the end user to replace the cutter quickly.

**How to Order:** The basic Porta-Mill assembly consists of the **ZT501 Porta-Mill Shaver**, and two accessories, a **Cutter** and a **Roller Shaft Assembly**. All three are required and must be ordered separately. To select the accessory part numbers refer to the table below. Simply determine the cutter style and the cutter width. The two accessory part numbers will be at either end of that row, in **Bold**.

| Cutter Number   | Cutter Material | D Diameter | W Width | Number Of Teeth | A Angle | Cutter Style | R Radius | Roller Shaft Assembly |
|-----------------|-----------------|------------|---------|-----------------|---------|--------------|----------|-----------------------|
| <b>ZT501-19</b> | Carbide         | 2"         | 3/4"    | 10              |         | Slab         |          | <b>ZT5010124</b>      |
| <b>ZT501-20</b> | Carbide         | 2"         | 1"      | 10              |         | Slab         |          | <b>ZT5010121</b>      |
| <b>ZT501-21</b> | Carbide         | 2"         | 1 1/2"  | 10              |         | Slab         |          | <b>ZT5010122</b>      |
| <b>ZT501-22</b> | Carbide         | 2"         | 2"      | 10              |         | Slab         |          | <b>ZT5010123</b>      |
| <b>ZT501-30</b> | Carbide Tipped  | 3 3/8"     | 1 1/2"  | 8               | 60°     | Groove       | .156"    | <b>ZT5010126</b>      |
| <b>ZT501-31</b> | Carbide Tipped  | 3 3/8"     | 1 5/8"  | 8               | 70°     | Groove       | .156"    | <b>ZT5010128</b>      |

## **ZT501 Weld Shaver Specification**

|                                   |          |
|-----------------------------------|----------|
| Horse Power                       | 3.6 hp   |
| Free speed                        | 4700 rpm |
| Weight                            | 29 lbs   |
| Air consumption at free run (min) | 44 cfm   |
| PSI (min)                         | 90 psi   |
| Sound level at free speed         |          |
| Air inlet thread                  | NPT      |
| Hose size (min)                   |          |

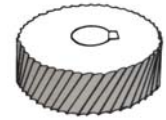




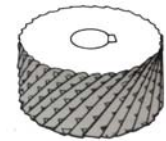
## CUTTERS FOR ZT708

For use on Titanium, Stainless Steel, Monel and similar high strength materials.

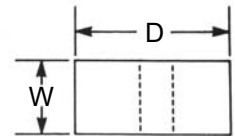
| Cutter Part No. | Cutter Material | D        | W     | Cutter |      | Roller Shaft Assembly | Cutter Adjustment |      | Number of Teeth |
|-----------------|-----------------|----------|-------|--------|------|-----------------------|-------------------|------|-----------------|
|                 |                 | Diameter | Width | Style  | Type |                       | In                | Out  |                 |
| ZT508-20B       | Carbide         | 1 1/2    | 1/2   | Slab   | I    | ZT709041              | .230              | .206 | 49              |
| ZT508-21B       | Carbide         | 1 1/2    | 3/4   | Slab   | I    | ZT709042              | .230              | .206 | 49              |
| ZT508-22B       | Carbide         | 1 1/2    | 3/8   | Slab   | I    | ZT709040              | .230              | .206 | 49              |
| ZT508-26B       | Carbide         | 1 1/2    | 1/2   | Slab   | II   | ZT709041              | .230              | .206 | 49              |
| ZT508-27B       | Carbide         | 1 1/2    | 3/4   | Slab   | II   | ZT709042              | .230              | .206 | 49              |
| ZT508-28B       | Carbide         | 1 1/2    | 3/8   | Slab   | II   | ZT709040              | .230              | .206 | 49              |
| ZT508-29B       | Carbide         | 1 1/2    | 5/8   | Slab   | II   | ZT709098              | .230              | .206 | 49              |
| ZT508-35B       | Carbide         | 1 1/2    | 3/8   | Slab   | II   | ZT709040              | .230              | .206 | 36              |
| ZT508-36B       | Carbide         | 1 1/2    | 1/2   | Slab   | II   | ZT709041              | .230              | .206 | 36              |
| ZT508-37B       | Carbide         | 1 1/2    | 3/8   | Slab   | II   | ZT709042              | .230              | .206 | 36              |
| ZT508-38B       | Carbide         | 1 1/2    | 15/16 | Slab   | II   | ZT708031              | .230              | .206 | 36              |
| ZT708-20B       | Carbide         | 1 1/2    | 1     | Slab   | II   | ZT709043              | .230              | .206 | 49              |



Type I slab cutter w/o chipbreaker



Type II slab cutter w/ chipbreaker

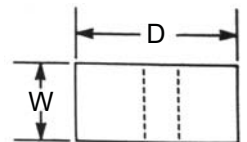


Slab Type

## CUTTERS FOR ZT709

For use on Aluminum, Magnesium, Copper and Softer alloys.

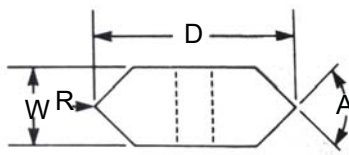
| Cutter Part No. | Cutter Material | D        | W     | A     | Cutter Style | R      | Roller Shaft Assembly | Cutter Adjustment |      | Number of Teeth |
|-----------------|-----------------|----------|-------|-------|--------------|--------|-----------------------|-------------------|------|-----------------|
|                 |                 | Diameter | Width | Angle |              | Radius |                       | In                | Out  |                 |
| ZT509-20        | H.S.S.          | 1 1/2    | 1/2   | -     | Slab         | -      | ZT709041              | .230              | .206 | 15              |
| ZT509-21        | H.S.S.          | 1 1/2    | 3/4   | -     | Slab         | -      | ZT709042              | .230              | .206 | 15              |
| ZT509-22B       | Carbide         | 1 1/2    | 1/2   | -     | Slab         | -      | ZT709041              | .230              | .206 | 15              |
| ZT509-23B       | Carbide         | 1 1/2    | 3/4   | -     | Slab         | -      | ZT709042              | .230              | .206 | 15              |
| ZT509-24        | H.S.S.          | 1 1/2    | 3/8   | -     | Slab         | -      | ZT709040              | .230              | .206 | 15              |
| ZT509-25B       | Carbide         | 1 1/2    | 3/8   | -     | Slab         | -      | ZT709040              | .230              | .206 | 15              |
| ZT509-32B       | Carbide         | 1 1/2    | 5/8   | -     | Slab         | -      | ZT709098              | .230              | .206 | 15              |
| ZT509-37B       | Carbide         | 1 1/2    | 1/2   | -     | Slab         | -      | ZT709041              | .230              | .206 | 10              |
| ZT509-38B       | Carbide         | 1 1/2    | 1.00  | -     | Slab         | -      | ZT709043              | .230              | .206 | 15              |
| ZT509-39B       | Carbide         | 1 1/2    | 3/4   | -     | Slab         | -      | ZT709042              | .230              | .206 | 10              |
| ZT509-33        | H.S.S.          | 1 15/16  | 1/2   | 75°   | Groove       | .046   | ZT709041              | .046              | .420 | 10              |
| ZT509-36B       | Carbide Tip     | 1.906    | 1/2   | 60°   | Groove       | .062   | ZT709041              | .015              | .409 | 6               |
| ZT509-45B       | Carbide Tip     | 1.687    | 1/2   | 88°   | Groove       | .062   | ZT709043              | .137              | .299 | 6               |



Slab Type



Grooving Type





## OUTRIGGER ATTACHMENT FOR ZT708/ZT709

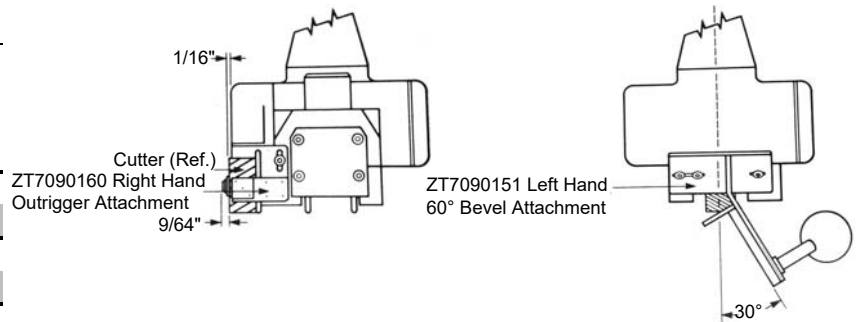
Specify ZT7090160 for right hand cutting, Specify ZT7090170 for left hand cutting

| Weld Shaver Number | Outrigger Attachment | Standard Cutter Number | Recessed Flush Cutter Flush | Recessed Radius Flush Cutter | Cutter Radius | Roller Bracket Needed* |
|--------------------|----------------------|------------------------|-----------------------------|------------------------------|---------------|------------------------|
| ZT708              | ZT7090160 Right Hand | ZT508-21B              |                             |                              |               | ZT709046               |
|                    |                      | ZT508-27B              | ZT708-21B                   | ZT708-23B                    | .250          | ZT709046               |
|                    |                      | ZT508-37B              |                             |                              |               | ZT709046               |
| ZT708              | ZT7090170 Left Hand  | ZT508-21B              |                             |                              |               | ZT709046               |
|                    |                      | ZT508-27B              | ZT708-22B                   | ZT708-24B                    | .250          | ZT709046               |
|                    |                      | ZT508-37B              |                             |                              |               | ZT709046               |
| ZT709              | ZT7090160 Right Hand | ZT509-21               |                             |                              |               | ZT709046               |
|                    |                      | ZT509-23B              | ZT709-20B                   | ZT709-21B                    | .250          | ZT709046               |
|                    |                      | ZT509-39B              |                             |                              |               | ZT709046               |
| ZT709              | ZT7090170 Left Hand  | ZT509-21               |                             |                              |               | ZT709046               |
|                    |                      | ZT509-23B              | ZT709-22B                   | ZT709-23B                    | .250          | ZT709046               |
|                    |                      | ZT509-39B              |                             |                              |               | ZT709046               |

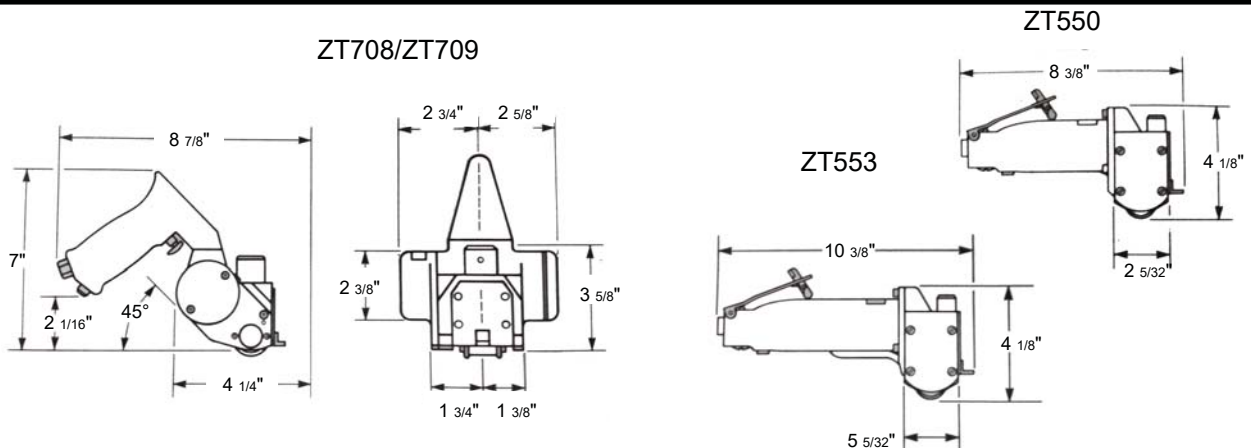
\*Recommended for stability if your ZT708 or ZT709 does not have 3/4" wide roller bracket.

## BEVEL ATTACHMENTS FOR ZT708/ZT709

| Weld Shaver Number | Bevel Attachment Number 60° | Cutter Number | Style      |
|--------------------|-----------------------------|---------------|------------|
| ZT708              | ZT7090150                   | ZT708-20B     | Right Hand |
|                    | ZT7090151                   | ZT708-20B     | Left Hand  |
| ZT709              | ZT7090150                   | ZT509-38B     | Right Hand |
|                    | ZT7090151                   | ZT509-38B     | Left Hand  |



## DIMENSIONS AND SPECIFICATIONS OF WELD SHAVERS

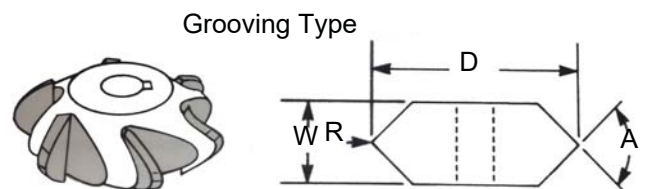
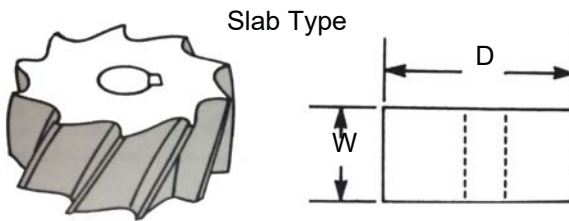




## CUTTERS FOR ZT550

For use on Aluminum, Magnesium, Copper and Softer alloys.

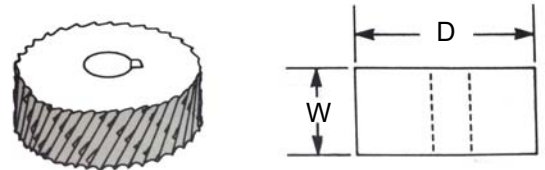
| Cutter Part No. | Cutter Material | D        | W     | A     | Cutter Style | R Radius | Roller Shaft Assembly | Cutter Adjustment |      | Number of Teeth |
|-----------------|-----------------|----------|-------|-------|--------------|----------|-----------------------|-------------------|------|-----------------|
|                 |                 | Diameter | Width | Angle |              |          |                       | In                | Out  |                 |
| ZT550-21        | H.S.S.          | 1 1/8    | 3/8   | -     | Slab         | -        | ZT550069              | .125              | .187 | 10              |
| ZT550-23        | H.S.S.          | 1 1/8    | 1/2   | -     | Slab         | -        | ZT550070              | .125              | .187 | 10              |
| ZT550-30        | Carbide         | 1 1/8    | 1/4   | -     | Slab         | -        | ZT550069              | .125              | .187 | 10              |
| ZT550-31        | Carbide         | 1 1/8    | 3/8   | -     | Slab         | -        | ZT550069              | .125              | .187 | 10              |
| ZT550-32        | Carbide         | 1 1/8    | 1/2   | -     | Slab         | -        | ZT550070              | .125              | .187 | 10              |
| ZT550-29        | H.S.S.          | 1 5/16   | 3/8   | 60°   | Groove       | .062     | ZT550069              | .000              | .234 | 6               |
| ZT550-40        | H.S.S.          | 1 31/64  | 3/8   | 40°   | Groove       | .062     | ZT550069              | .086              | .320 | 8               |
| ZT550-451       | H.S.S.          | 1 5/16   | 3/8   | 40°   | Groove       | .062     | ZT550069              | .000              | .234 | 6               |



## CUTTERS FOR ZT553

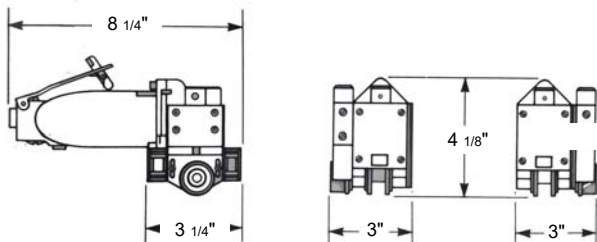
For use on Titanium, Stainless Steel, Monel and similar high strength materials.

| Cutter Part No. | Cutter Material | D        | W     | Cutter Style | Roller Shaft Assembly | Cutter Adjustment |      | Number of Teeth |
|-----------------|-----------------|----------|-------|--------------|-----------------------|-------------------|------|-----------------|
|                 |                 | Diameter | Width |              |                       | In                | Out  |                 |
| ZT553-26        | Carbide         | 1 1/8    | 1/2   | Slab         | ZT550070              | .125              | .187 | 34              |
| ZT553-28        | Carbide         | 1 1/8    | 3/8   | Slab         | ZT550069              | .125              | .187 | 34              |



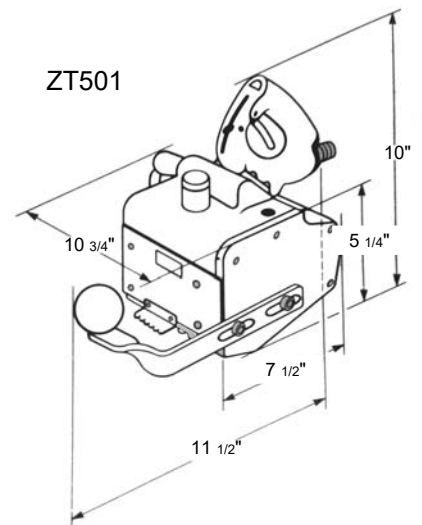
Slab Type

### ZT551/ZT552 ZT554/ZT555



|                    | ZT708  | ZT709  | ZT550      | ZT553  | ZT501   |
|--------------------|--------|--------|------------|--------|---------|
| Cutter Rotation    | 2,700  | 13,500 | 15,000     | 3,500  | 4,600   |
| Weight             | 6 lbs. | 6 lbs. | 3 3/4 lbs. | 5 lbs. | 25 lbs. |
| Required CFM (Min) | 35     | 35     | 29         | 29     | 44      |
| Required PSI (Min) | 90     | 90     | 90         | 90     | 90      |

### ZT501

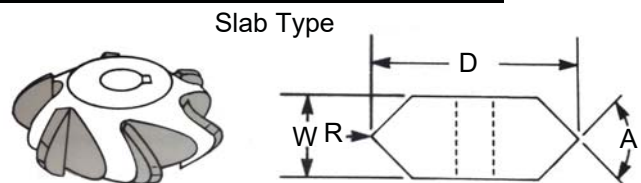
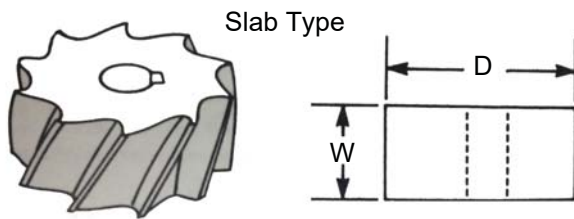




## CUTTERS FOR ZT550

For use on Aluminum, Magnesium, Copper and Softer alloys.

| Cutter Part No. | Cutter Material | D        | W     | A     | Cutter Style | R      | Cutter Adjustment |      | Number of Teeth |
|-----------------|-----------------|----------|-------|-------|--------------|--------|-------------------|------|-----------------|
|                 |                 | Diameter | Width | Angle |              | Radius | In                | Out  |                 |
| ZT551-30        | Carbide         | 1 1/4    | 1/2   | 70°   | Groove       | .156   | .078              | .218 | 6               |
| ZT551-31        | H.S.S.          | 1 1/4    | 1/2   | 70°   | Groove       | .156   | .078              | .218 | 6               |
| ZT551-32        | Carbide         | 1 1/8    | 1/2   | -     | Slab         | -      | .125              | .187 | 10              |
| ZT552-32        | Carbide         | 1 1/8    | 1/2   | -     | Slab         | -      | .125              | .187 | 10              |
| ZT552-30        | Carbide         | 1 1/4    | 1/2   | 70°   | Groove       | .156   | .078              | .187 | 6               |

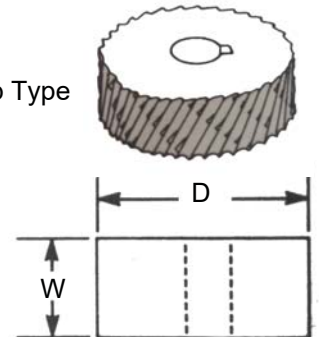


## CUTTERS FOR ZT554/ZT555

For use on Titanium, Stainless Steel, Monel and similar high strength materials.

| Cutter Part No. | Radius Cutter | Cutter Material | Cutter Radius | D        | W     | Cutter Style | Cutter Adjustment |      | Number of Teeth |
|-----------------|---------------|-----------------|---------------|----------|-------|--------------|-------------------|------|-----------------|
|                 |               |                 |               | Diameter | Width |              | In                | Out  |                 |
| ZT554-31B       |               | Carbide         |               | 1 1/8    | 1/2   | Slab         | .125              | .187 | 34              |
| ZT554-30        |               | Carbide         | .250          | 1 3/8    | 1/2   | Slab         | .250              | .062 | 24              |
| ZT555-31B       |               | Carbide         |               | 1 3/8    | 1/2   | Slab         | .125              | .187 | 34              |
| ZT555-30        |               | Carbide         | .250          | 1 3/8    | 1/2   | Slab         | .250              | .062 | -               |

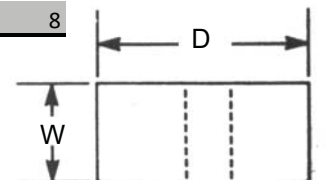
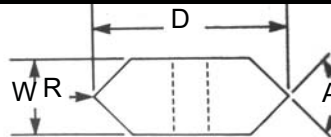
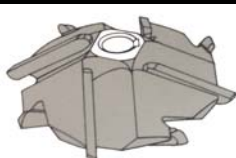
Slab Type



## CUTTERS FOR ZT501

For use on Aluminum, Magnesium, Copper and Softer alloys.

| Cutter Part No. | Cutter Material | D        | W     | A     | Cutter Style | R      | Roller Shaft Assembly | Cutter Adjustment |       | Number of Teeth |
|-----------------|-----------------|----------|-------|-------|--------------|--------|-----------------------|-------------------|-------|-----------------|
|                 |                 | Diameter | Width | Angle |              | Radius |                       | In                | Out   |                 |
| ZT501-19        | Carbide         | 2        | 3/4   | -     | Slab         | -      | ZT5010124             | -.240             | .240  | 10              |
| ZT501-20        | Carbide         | 2        | 1     | -     | Slab         | -      | ZT5010121             | -.240             | .240  | 10              |
| ZT501-21        | Carbide         | 2        | 1 1/2 | -     | Slab         | -      | ZT5010122             | -.240             | .240  | 10              |
| ZT501-22        | Carbide         | 2        | 2     | -     | Slab         | -      | ZT5010123             | -.240             | .240  | 10              |
| ZT501-30        | Carbide         | 3 3/8    | 1 1/2 | 60°   | Groove       | .156   | ZT5010126             | .000              | 1.060 | 8               |
| ZT201-31        | Carbide         | 3 3/8    | 1 5/8 | 70°   | Groove       | .156   | ZT5010128             | .000              | 1.060 | 8               |





# Dimpling & Riveting Equipment



## ZEPHYR TOOL GROUP

201 Hindry Avenue  
Inglewood, CA 90301

Tel. 310-410-4907 ■ Email: [sales@zephyrtoolgroup.com](mailto:sales@zephyrtoolgroup.com) ■ [zephyrtoolgroup.com](http://zephyrtoolgroup.com)



# ZP-450EA-36R

## COMPRESSION RIVETER



Compression Riveter with 36" Reach  
(PLC) Programmable Logic Controller-controlled  
High-Speed Machine  
Yoke Deflection Trips Micro-Switch  
for precise control of compression force

**Adjustable Stroke** - Shorten stroke to shorten cycle time and speed up operation.

**Adjustable pressure** - Adjustable pressure regulator limits maximum force applied to rivets.

**Adjustable Speed** - Speed adjustable from fast snap action to slow creep.

**Flexible foot throttle connection**-Throttle can be shifted to the most convention operating position.

**Automatic backhead** - Riveting plunger returns automatically the instant rivet heads is formed. No time lag waiting for operator's foot to act.

**Adjustable dolly**- compensates for varying material thickness and rivet lengths. .001 Increment Adjustment.

**External Programming Port**- RS-232 port.

### Optional:

#### 1. Safety Feature:

**Two Step Action**- The safety feature to operate safely from danger of accidentally stepping on the foot pedal and causing the machine to function at the wrong time.

#### 2. Step Down transformer connects 110v to 220v, 60hz.

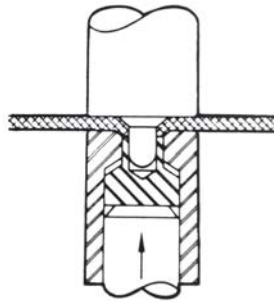
### Specifications

|                                           |                          |
|-------------------------------------------|--------------------------|
| 1. Yoke Reach                             | : 36"                    |
| 2. Height of Yoke Gap                     | : 8"                     |
| 3. Rivet Size (Aluminum)                  | : 1/8"-5/16"             |
| 4. Adjustable Compressive Force at 90 PSI | : 24000 lbs.             |
| 5. Ram Stroke                             | : 1-3/8"                 |
| 6. Foot Pedal with Safety Guard           |                          |
| 7. Safety Device with Two Step Action     |                          |
| 8. External Programming Port              |                          |
| 9. Input Voltage                          | : 110V Single Phase 60HZ |



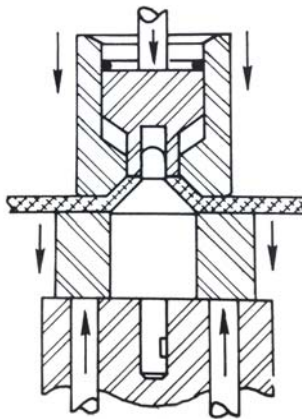
## DIMPLING PROCESSES

### RAM COIN



PARALLEL FACES OF DIMPLE CONES assure perfect nesting in all gauges. Special dimpling tools are not required for different gauges or diameters. Geometry held to close tolerances assures consistently accurate crack free dimples

### TRIPLE ACTION



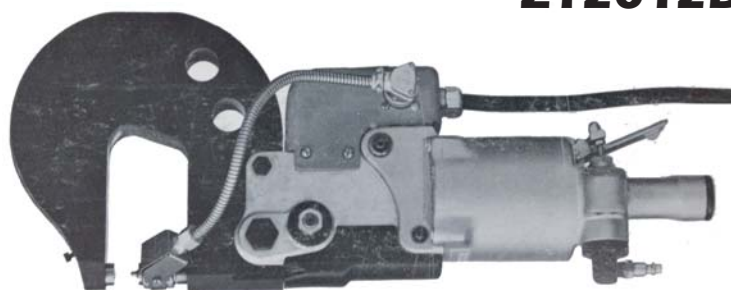
Refinements of the basic RAM COIN DIMPLE PRINCIPLE resulted in the development of TRIPLE ACTION DIMPLING. Use of the fundamental RAM COIN DIMPLE PRINCIPLES plus those developed by the triple action method permits dimpling to closer tolerances and on materials that otherwise cannot be satisfactorily dimpled. In addition, sheet growth or warpage is reduced as much as 75%.

**PORTABLE RAM COIN DIMPLERS**  
**BLIND PULL GUN PORTABLE DIMPLER**  
**STATIONARY DIMPLER**  
**DIMPLE TOOLS**

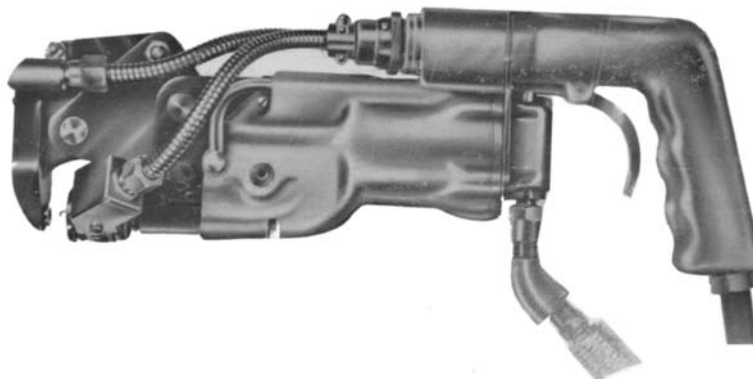


## PORTABLE RAM COIN DIMPLERS

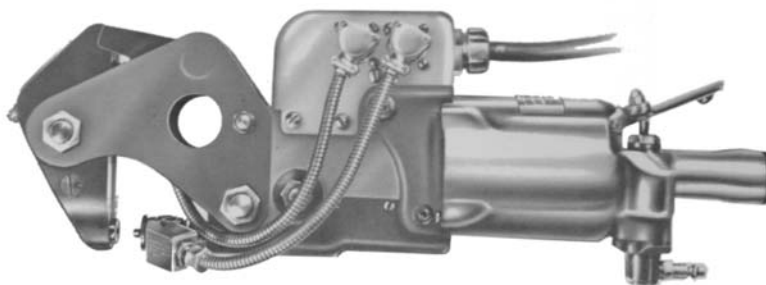
Models ZT2012-8, -C and -D Portable Ram Coin Dimplers can be operated as either hot or cold portable dimplers when used in conjunction with Zephyr Thermo-Dimple Control Panels. Of fixed jaw yoke type, they feature conservative streamlined design, built around established principles.

**ZT2012D**

Model ZT2427 incorporates the newly designed Zephyr adjustable, lower jaw, featuring built-in yoke deflection compensator. This new concept of yoke design, coupled to industry accepted, conservatively rated pneumatic power source, has resulted in a lightweight, versatile unit capable of meeting a large percentage of the portable dimpling requirements, especially in thinner gauges and smaller diameter fastener sizes.

**ZT2427**

See chart page F4 for comprehensive information relative to various styles and types of yokes not illustrated.

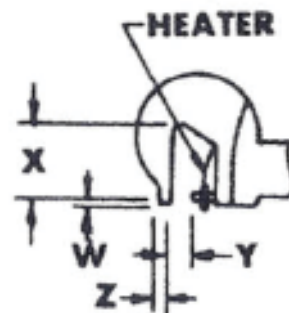
**ZT2429**



## PORTABLE RAM COIN DIMPLER

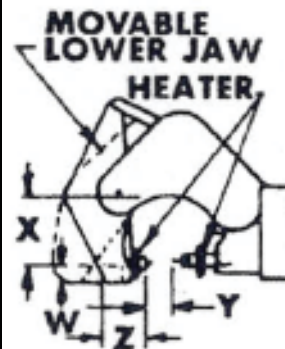
### FIXED JAW

|                                                      |               |                                      |                                      |                                      |                                      |
|------------------------------------------------------|---------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|
| DIMPLER NUMBER                                       |               | ZT2012A                              | ZT2012B                              | ZT2012C                              | ZT2012D                              |
| POWER SOURCE                                         |               | C.P. 355                             | C.P. 355                             | C.P. 355                             | C.P. 355                             |
| WEIGHT WITH CABLE (lbs. approximate)                 |               | 27.0                                 | 27.0                                 | 32.0                                 | 34.0                                 |
| MAXIMUM FORCE ON DIES (rated at 90 psi)              |               | 12,000                               | 12,000                               | 12,000                               | 12,000                               |
| SIZE (length, width, height)                         |               | 21.5x4.5x7.0                         | 22x4.5x7.0                           | 22x4.5x7.0                           | 22x4.5x7.0                           |
| OVER-All YOKE (length, width, depth)                 |               | 7.2x1.5x5.0                          | 7.2x1.5x5.0                          | 8.5x1.5x9.0                          | 8.7x1.5x9.0                          |
| "W" DIMENSION (edge to center of dimpling tool)      |               | .50                                  | .50                                  | .50                                  | .50                                  |
| "X" DIMENSION (inches) (throat reach)                |               | .95                                  | 1.50                                 | 3.00                                 | 4.68                                 |
| "Y" DIMENSION- (See Note 1.throat gap, Max. open)    |               | .62                                  | .62                                  | .62                                  | .62                                  |
| "Z" DIMENSION                                        |               | 1                                    | 1                                    | 1                                    | 1                                    |
| CAPACITY (maximum gauge and fastener) Aluminum Alloy |               | .072- #10 Screw<br>.072- 1/4 Rivet   | .072- #10 Screw<br>.072- 1/4 Rivet   | .072- #10 Screw<br>.072- 1/4 Rivet   | .072- #10 Screw<br>.072- 1/4 Rivet   |
| HEATER RECOMMENDED<br>(See Note 2)                   | Upper (Punch) | ZT1880D10A                           | ZT1880D10A                           | ZT1880D10A                           | ZT1880D10A                           |
|                                                      | Lower (Die)   | NONE                                 | NONE                                 | NONE                                 | NONE                                 |
| DIE ASSEMBLY (type)                                  |               | SHORT<br>STANDARD<br>(ZT2953, etc.)  | SHORT<br>STANDARD<br>(ZT2953, etc.)  | SHORT<br>STANDARD<br>(ZT2953, etc.)  | SHORT<br>STANDARD<br>(ZT2953, etc.)  |
| PUNCH ASSEMBLY (type)                                |               | STANDARD<br>TYPE I<br>(ZT1855, etc.) | STANDARD<br>TYPE I<br>(ZT1855, etc.) | STANDARD<br>TYPE I<br>(ZT1855, etc.) | STANDARD<br>TYPE I<br>(ZT1855, etc.) |



### MOVABLE JAW

|                                                      |               |                                      |                                      |                                      |                                      |                                      |
|------------------------------------------------------|---------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|
| DIMPLER NUMBER                                       |               | ZT2427                               | ZT2427B                              | ZT2429                               | ZT2429B                              | ZT2429C                              |
| POWER SOURCE                                         |               | C.P. 214                             | C.P. 214                             | C.P. 355                             | C.P. 355                             | C.P. 355                             |
| WEIGHT WITH CABLE (lbs. approximate)                 |               | 11.0                                 | 12.3                                 | 30.0                                 | 29.7                                 | 30.0                                 |
| MAXIMUM FORCE ON DIES (rated at 90 psi)              |               | 3,000                                | 3,000                                | 16,000                               | 16,000                               | 16,000                               |
| SIZE (length, width, height)                         |               | 14.75x3.0x4.2                        | 15.0x3.0x4.75                        | 22x4.5x7.0                           | 20.75x4.5x7.0                        | 21.5x4.5x7.0                         |
| OVER-All YOKE (length, width, depth)                 |               | 3.9x1.2x4.0                          | 4.37x1.2x4.75                        | 7.5x3.1x6.4                          | 6.75x3.1x6.4                         | 7.5x3.1x6.4                          |
| "W" DIMENSION (edge to center of dimpling tool)      |               | .37                                  | .37                                  | .50                                  | .28                                  | .44                                  |
| "X" DIMENSION (inches) (throat reach)                |               | .87                                  | 1.50                                 | 2.12                                 | 2.12                                 | 2.12                                 |
| "Y" DIMENSION- (See Note 1.throat gap, Max. open)    |               | .25                                  | .25                                  | .50                                  | .50                                  | .50                                  |
| "Z" DIMENSION                                        |               | .37                                  | .37                                  | 1.00                                 | .56                                  | 1.00                                 |
| CAPACITY (maximum gauge and fastener) Aluminum Alloy |               | .040-5/32 Rivet                      | .040-5/32 Rivet                      | .081-1/4 Screw                       | .064-3/16 Screw                      | .064-#10 Screw                       |
| HEATER RECOMMENDED<br>(See Note 2)                   | Upper (Punch) | ZT1880E5A                            |                                      | ZT1880D10A                           |                                      |                                      |
|                                                      | Lower (Die)   | ZT2427070                            | ZT2427082                            | ZT242903                             | ZT2429073                            | ZT2429075                            |
| DIE ASSEMBLY (type)                                  |               | MIDGET MOD.<br>RADIUS<br>(ZT2441)    | MIDGET MOD.<br>RADIUS<br>(ZT2441)    | SHORT<br>STANDARD<br>(ZT2953, etc.)  | MIDGET MOD.<br>RADIUS<br>(ZT2441)    | MIDGET<br>TYPE III<br>(ZT1771, etc.) |
| PUNCH ASSEMBLY (type)                                |               | STANDARD<br>TYPE I<br>(ZT1855, etc.) | STANDARD<br>TYPE I<br>(ZT1855, etc.) | STANDARD<br>TYPE I<br>(ZT1855, etc.) | STANDARD<br>TYPE I<br>(ZT1855, etc.) | STANDARD<br>TYPE I<br>(ZT1855, etc.) |



#### Notes:

1. Dimension "Y" is maximum clearance between punch pilot and die face. Given dimensions are for dimple tooling corresponding to specific fastener. See under "Capacity", lower line

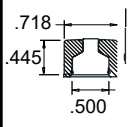
2. ZT2427070  
ZT2427082  
ZT242903  
ZT2429073  
ZT2429075

HEATER CAPACITY 175W 115V  
HEATER CAPACITY 300W 115V  
HEATER CAPACITY 400W 115V  
HEATER CAPACITY 400W 115V  
HEATER CAPACITY 400W 115V



## Coin Dimple Die Assemblies for Hot or Cold coin Dimpling

Specifically designed for use with ZT2012 and ZT2429 portable hot dimplers

|                                                                   |               | TYPE X<br>SHORT<br>MIDGET                                                         |                                                                                                 |                                                                                            |
|-------------------------------------------------------------------|---------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|
|                                                                   |               |  | <br>DIE BODY | <br>RAM |
| FASTENER                                                          | SIZE          | DIE ASSEMBLY                                                                      | PARTS IN DIE ASSEMBLY                                                                           |                                                                                            |
|                                                                   |               |                                                                                   | DIE BODY                                                                                        | RAM                                                                                        |
| AN426 Rivet (100°)                                                | 3/32"         | ZT2953-3/32                                                                       | ZT295301-3/32                                                                                   | ZT185302-3/32                                                                              |
|                                                                   | 1/8"          | ZT2953-1/8                                                                        | ZT295301-1/8                                                                                    | ZT185302-1/8                                                                               |
|                                                                   | 5/32"         | ZT2953-5/32                                                                       | ZT295301-5/32                                                                                   | ZT185302-5/32                                                                              |
|                                                                   | 3/16"         | ZT2953-3/16                                                                       | ZT295301-3/16                                                                                   | ZT185302-3/16                                                                              |
|                                                                   | 1/4"          | ZT2953-1/4                                                                        | ZT295301-1/4                                                                                    | ZT185302-1/4                                                                               |
| AN509 (100°) Screw<br>Standard Pilot<br>Non Drill Out             | #6            | ZT2963-6                                                                          | ZT296301-6                                                                                      | ZT186302-6                                                                                 |
|                                                                   | #8            | ZT2963-8                                                                          | ZT296301-8                                                                                      | ZT186302-8                                                                                 |
|                                                                   | #10           | ZT2963-10                                                                         | ZT296301-10                                                                                     | ZT186302-10                                                                                |
|                                                                   | 1/4"          | ZT2963-1/4                                                                        | ZT296301-1/4                                                                                    | ZT186302-1/4                                                                               |
|                                                                   | 5/16"         | ZT2963-5/16                                                                       | ZT296301-5/16                                                                                   | ZT186302-5/16                                                                              |
| HS 47 (100°)<br>Hi-Shear Rivet<br>Standard Pilot Non Drill Out    | 3/16"         | ZT2973-3/16                                                                       | ZT297301-3/16                                                                                   | ZT297302-3/16                                                                              |
|                                                                   | 1/4"          | ZT2973-1/4                                                                        | ZT297301-1/4                                                                                    | ZT297302-1/4                                                                               |
|                                                                   | 5/16" (1)     | ZT2973-5/16                                                                       | ZT297301-5/16                                                                                   | ZT297302-5/16                                                                              |
| AN509 (100°) Screw<br>Standard Pilot<br>Drill Out                 | #8            | ZT2968-8                                                                          | ZT296801-8                                                                                      | ZT186802-8                                                                                 |
|                                                                   | #10           | ZT2968-10                                                                         | ZT296801-10                                                                                     | ZT186802-10                                                                                |
|                                                                   | 1/4"          | ZT2968-1/4                                                                        | ZT296801-1/4                                                                                    | ZT186802-1/4                                                                               |
|                                                                   | 5/16"         | ZT2968-5/16                                                                       | ZT296801-5/16                                                                                   | ZT186802-5/16                                                                              |
| HS 47 (100°)<br>Hi-Shear Rivet<br>Standard Pilot Drill Out        | 1/8"          | ZT2978-1/8                                                                        | ZT297801-1/8                                                                                    | ZT175202-1/8                                                                               |
|                                                                   | 5/32"         | ZT2978-5/32                                                                       | ZT297801-5/32                                                                                   | ZT175202-5/32                                                                              |
|                                                                   | 3/16"         | ZT2978-3/16                                                                       | ZT297801-3/16                                                                                   | ZT175202-3/16                                                                              |
|                                                                   | 1/4"          | ZT2978-1/4                                                                        | ZT297801-1/4                                                                                    | ZT175202-1/4                                                                               |
| Cherry Rivet (100°)<br>Undersize Pilot<br>Drill-Out Type          | 5/16"         | ZT2978-5/16                                                                       | ZT297801-5/16                                                                                   | ZT175202-5/16                                                                              |
|                                                                   | 1/8"          | ZT2912-1/8                                                                        | ZT297801-1/8                                                                                    | ZT175202-1/8                                                                               |
|                                                                   | 5/32"         | ZT1912-5/32                                                                       | ZT297801-5/32                                                                                   | ZT175202-5/32                                                                              |
|                                                                   | 3/16"         | ZT2912-3/16                                                                       | ZT297801-3/16                                                                                   | ZT175202-3/16                                                                              |
| B. F. Goodrich Rivnut (100°)<br>Undersize Pilot<br>Drill-Out Type | 1/4"          | ZT2912-1/4                                                                        | ZT297801-1/4                                                                                    | ZT175202-1/4                                                                               |
|                                                                   | #4            | ZT2947-4                                                                          | ZT294701-4                                                                                      | ZT174902-4                                                                                 |
|                                                                   | #6            | ZT2947-6                                                                          | ZT294701-6                                                                                      | ZT174902-6                                                                                 |
|                                                                   | #8            | ZT2947-8                                                                          | ZT294701-8                                                                                      | ZT174902-8                                                                                 |
| Airloc Fastener<br>w/o Grommet                                    | #10           | ZT2947-10                                                                         | ZT294701-10                                                                                     | ZT174902-10                                                                                |
|                                                                   | 1/4"          | ZT2947-1/4                                                                        | ZT294701-1/4                                                                                    | ZT174902-1/4                                                                               |
|                                                                   | #2 (100°)     | ZT2992-3/4                                                                        | ZT299201-3/4                                                                                    | ZT179202-3/4                                                                               |
|                                                                   | #5 (120°) (1) | ZT2992-1                                                                          | ZT299201-1                                                                                      | ZT299202-1                                                                                 |

1. 1.06 Diameter Flange added to die body



## BLIND PULL GUN PORTABLE DIMPLER

### MODEL ZT2021

## Eliminates:

Skin Marking Buck-Bar,  
elliptical holes, excessive pilot  
breakage



A unit for those areas where the yoke type dimplers cannot reach.  
Ideal for repair, overhaul, or maintenance work. Forming satisfactory,  
well defined crack free dimples in gauge fastener material

Ideal for repair,  
Maintenance  
and overhaul  
operations.

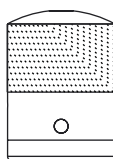


To set the dimple in the heavier gauges, use one medium blow  
with ball peen hammer, or use rivet gun with gooseneck  
extension.

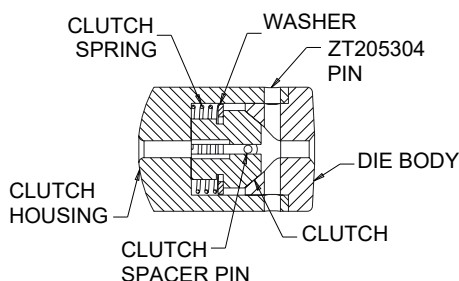


## BLIND PULL GUN DIMPLER

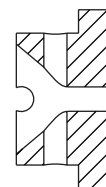
### Standard Die Assembly Parts



### TYPE 1



### TYPE 2

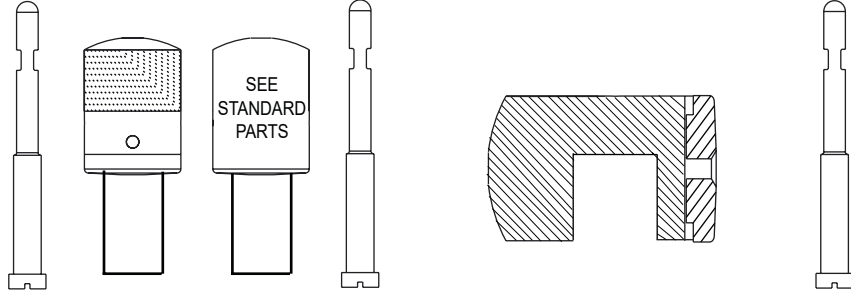


|        | Fastener                                      | Size        | Punch        | Die Assembly | Clutch Spring | Clutch Housing | Clutch Spacer Pin (2 Req.) | Die Body      | Clutch    | Washer    |
|--------|-----------------------------------------------|-------------|--------------|--------------|---------------|----------------|----------------------------|---------------|-----------|-----------|
| TYPE 1 | AN426 Rivet (100° ) (NON-DRILL-OUT)           | 3/32"       | ZT2055-3/32  | ZT2053-3/32  | ZT205302      | ZT205301-3/32  | ZT205309                   | ZT205305-3/32 | ZT205306  | ZT205303  |
|        |                                               | 1/8"        | ZT2055-1/8   | ZT2053-1/8   | ZT205302      | ZT205301-1/8   | ZT205307                   | ZT205305-1/8  | ZT2053012 | ZT205303  |
|        |                                               | 5/32"       | ZT2055-5/32  | ZT2053-5/32  | ZT205302      | ZT205301-5/32  | ZT205304                   | ZT205305-5/32 | ZT2053013 | ZT205303  |
|        |                                               | 3/16"       | ZT2055-3/16  | ZT2053-3/16  | ZT205302      | ZT205301-3/16  | ZT205304                   | ZT205305-3/16 | ZT2053014 | ZT205303  |
|        |                                               | 1/4"        | ZT2055-1/4   | ZT2053-1/4   | ZT2053010     | ZT205301-1/4   | ZT205308                   | ZT205305-1/4  | ZT2053015 | ZT2053011 |
|        | AN & NAS Screw (100° ) (NON-DRILL-OUT)        | #6          | ZT2065-6     | ZT2063-6     | ZT205302      | ZT206301-6     | ZT205307                   | ZT206305-6    | ZT206306  | ZT205303  |
|        |                                               | #8          | ZT2065-8     | ZT2063-8     | ZT205302      | ZT206301-8     | ZT205304                   | ZT206305-8    | ZT2053013 | ZT205303  |
|        |                                               | #10         | ZT2065-10    | ZT2063-10    | ZT205302      | ZT206301-10    | ZT205304                   | ZT206305-10   | ZT2053014 | ZT205303  |
|        |                                               | 1/4"-28     | ZT2065-1/4   | ZT2063-1/4   | ZT2053010     | ZT206301-1/4   | ZT205308                   | ZT206305-1/4  | ZT2053015 | ZT2053011 |
|        |                                               | 5/16"-24    | ZT2065-5/16  | ZT2063-5/16  | ZT206302      | ZT206301-5/16  | ZT206303                   | ZT206305-5/16 | ZT206307  | ZT206304  |
|        | HS47 High Shear Rivet (100° ) (NON-DRILL-OUT) | 3/16"       | ZT2075-3/16  | ZT2073-3/16  | ZT205302      | ZT207301-3/16  | ZT205304                   | ZT207305-3/16 | ZT2053014 | ZT205303  |
|        |                                               | 1/4"        | ZT2075-1/4   | ZT2073-1/4   | ZT2053010     | ZT207301-1/4   | ZT205308                   | ZT207305-1/4  | ZT2053015 | ZT2053011 |
|        |                                               | 5/16"       | ZT2075-5/16  | ZT2073-5/16  | ZT206302      | ZT207301-5/16  | ZT206303                   | ZT207305-5/16 | ZT206307  | ZT206304  |
|        |                                               | #8          | ZT2067-8     | ZT2068-8     | ZT205302      | ZT206801-8     | ZT205309                   | ZT206805-8    | ZT205306  | ZT205303  |
|        |                                               | #10         | ZT2067-10    | ZT2068-10    | ZT205302      | ZT206801-10    | ZT205304                   | ZT206805-10   | ZT205306  | ZT205303  |
|        | AN & NAS Screw (100° ) (DRILL-OUT)            | 1/4"-28     | ZT2067-1/4   | ZT2068-1/4   | ZT2053010     | ZT206801-1/4   | ZT205304                   | ZT206805-1/4  | ZT205307  | ZT205303  |
|        |                                               | 5/16"-24    | ZT2067-5/16  | ZT2068-5/16  | ZT206302      | ZT206801-5/16  | ZT205308                   | ZT206805-5/16 | ZT2063015 | ZT2053011 |
|        | HS47 High Shear Rivet (100° ) (DRILL-OUT)     | 1/8"        | ZT2077-1/8   | ZT2078-1/8   | ZT205302      | ZT207801-1/8   | ZT205309                   | ZT207805-1/8  | ZT205306  | ZT205303  |
|        |                                               | 5/32"       | ZT2077-5/32  | ZT2078-5/32  | ZT205302      | ZT207801-5/32  | ZT205307                   | ZT207805-5/32 | ZT2053012 | ZT205303  |
|        |                                               | 3/16"       | ZT2077-3/16  | ZT2078-3/16  | ZT205302      | ZT207801-3/16  | ZT205304                   | ZT207805-3/16 | ZT2053013 | ZT205303  |
|        |                                               | 1/4"        | ZT2077-1/4   | ZT2078-1/4   | ZT2053010     | ZT207801-1/4   | ZT205308                   | ZT207805-1/4  | ZT207806  | ZT2053011 |
|        |                                               | 5/16"       | ZT2077-5/16  | ZT2078-5/16  | ZT206302      | ZT207801-5/16  | ZT207803                   | ZT207805-5/16 | ZT207807  | ZT206304  |
|        | AIRLOC                                        | 3/4"-100°   | ZT2091-3/4   | ZT2093-3/4   | ZT205302      | ZT207301-3/4   | ZT205304                   | ZT209305-3/4  | ZT209306  | ZT205303  |
|        |                                               | 1"-120°     | ZT2091-1     | ZT2093-1     | ZT2053010     | ZT207301-1     | ZT209309                   | ZT2093-1      | ZT209307  | ZT206304  |
|        |                                               | 1-3/8"-120° | ZT2091-1-3/8 | ZT2093-1-3/8 | ZT206302      | ZT207301-1-3/8 | ZT209309                   | ZT2093-1-3/8  | ZT209307  | ZT206304  |

|        |                                               |         |             |             |           |               |          |               |           |           |
|--------|-----------------------------------------------|---------|-------------|-------------|-----------|---------------|----------|---------------|-----------|-----------|
| TYPE 2 | AN426 Rivet (100° ) (NON-DRILL-OUT)           | 3/32"   | ZT2055-3/32 | ZT2041-3/32 | ZT205302  | ZT205301-3/32 | ZT205309 | ZT204105-3/32 | ZT205306  | ZT205303  |
|        |                                               | 1/8"    | ZT2055-1/8  | ZT2041-1/8  | ZT205302  | ZT205301-1/8  | ZT205307 | ZT204105-1/8  | ZT2053012 | ZT205303  |
|        |                                               | 5/32"   | ZT2055-5/32 | ZT2041-5/32 | ZT205302  | ZT205301-5/32 | ZT205304 | ZT204105-5/32 | ZT2053013 | ZT205303  |
|        |                                               | 3/16"   | ZT2055-3/16 | ZT2041-3/16 | ZT205302  | ZT205301-3/16 | ZT205304 | ZT204105-3/16 | ZT2053014 | ZT205303  |
|        | AN & NAS Screw (100° ) (NON-DRILL-OUT)        | #6      | ZT2065-6    | ZT2042-6    | ZT205302  | ZT206301-6    | ZT205307 | ZT204205-6    | ZT206306  | ZT205303  |
|        |                                               | #8      | ZT2065-8    | ZT2042-8    | ZT205302  | ZT206301-8    | ZT205304 | ZT204205-8    | ZT2053013 | ZT205303  |
|        |                                               | #10     | ZT2065-10   | ZT2042-10   | ZT205302  | ZT206301-10   | ZT205304 | ZT204205-10   | ZT2053014 | ZT205303  |
|        |                                               | 1/4"-28 | ZT2065-1/4  | ZT2042-1/4  | ZT2053010 | ZT206301-1/4  | ZT205308 | ZT204205-1/4  | ZT2053015 | ZT2053011 |
|        | HS47 High Shear Rivet (100° ) (NON-DRILL-OUT) | 5/32"   | ZT2075-5/32 | ZT2043-5/32 | ZT205302  | ZT204301-5/32 | ZT205304 | ZT204305-5/32 | ZT2053013 | ZT205303  |
|        |                                               | 3/16"   | ZT2075-3/16 | ZT2043-3/16 | ZT205302  | ZT204301-3/16 | ZT205304 | ZT204305-3/16 | ZT2053014 | ZT205303  |
|        |                                               | 1/4"    | ZT2075-1/4  | ZT2043-1/4  | ZT2053010 | ZT204301-1/4  | ZT205308 | ZT204305-1/4  | ZT2053015 | ZT2053011 |



## BLIND PULL GUN DIMPLER



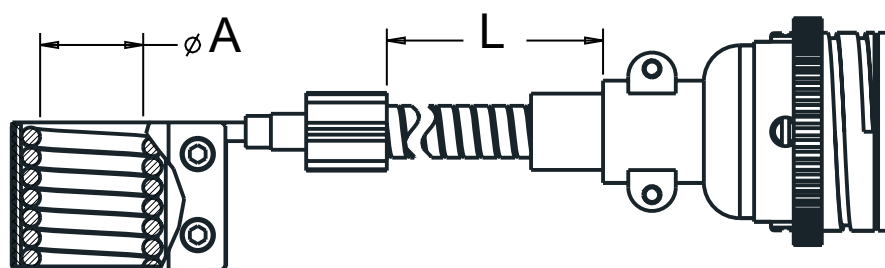
|        | Fastener                                      | Pull Bar     | Cut Away Die Assembly | Cut Away Die Body | Pull Bar    | Clutch Housing | Die Body      | Offset Die Assembly | Pull Bar    |
|--------|-----------------------------------------------|--------------|-----------------------|-------------------|-------------|----------------|---------------|---------------------|-------------|
| TYPE 1 | AN426 Rivet (100° ) (NON-DRILL-OUT)           | ZT2052-3/32  | ZT2056-3/32           | ZT205605-3/32     | ZT2054-3/32 |                |               |                     |             |
|        |                                               | ZT2052-1/8   | ZT2056-1/8            | ZT205605-1/8      | ZT2054-1/8  | ZT202301-1/8   | ZT202305-1/8  | ZT2023-1/8          | ZT2022-1/8  |
|        |                                               | ZT2052-5/32  | ZT2056-5/32           | ZT205605-5/32     | ZT2054-5/32 | ZT202301-5/32  | ZT202305-5/32 | ZT2023-5/32         | ZT2022-5/32 |
|        |                                               | ZT2052-3/16  | ZT2056-3/16           | ZT205605-3/16     | ZT2054-3/16 |                |               |                     |             |
|        |                                               | ZT2052-1/4   |                       |                   |             |                |               |                     |             |
|        | AN & NAS Screw (100° ) (NON-DRILL-OUT)        | ZT2062-6     | ZT2066-6              | ZT206605-6        | ZT2064-6    | ZT203301-6     | ZT203305-6    | ZT2033-6            | ZT2032-6    |
|        |                                               | ZT2062-8     | ZT2066-8              | ZT206605-8        | ZT2064-8    | ZT203301-8     | ZT203305-8    | ZT2033-8            | ZT2032-8    |
|        |                                               | ZT2062-10    | ZT2066-10             | ZT206605-10       | ZT2064-10   | ZT203301-10    | ZT203305-10   | ZT2033-10           | ZT2032-10   |
|        |                                               | ZT2062-1/4   |                       |                   |             |                |               |                     |             |
|        |                                               | ZT2062-5/16  |                       |                   |             |                |               |                     |             |
|        | HS47 High Shear Rivet (100° ) (NON-DRILL-OUT) | ZT2072-3/16  | ZT2049-3/16           | ZT204905-3/16     | ZT2074-3/16 |                |               |                     |             |
|        |                                               | ZT2072-1/4   | ZT2049-1/4            | ZT204905-1/4      | ZT2074-1/4  |                |               |                     |             |
|        |                                               | ZT2072-5/16  |                       |                   |             |                |               |                     |             |
|        |                                               | ZT2082-8     |                       |                   |             |                |               |                     |             |
|        | AN & NAS Screw (100° ) (DRILL-OUT)            | ZT2082-10    |                       |                   |             |                |               |                     |             |
|        |                                               | ZT2082-1/4   |                       |                   |             |                |               |                     |             |
|        |                                               | ZT2082-5/16  |                       |                   |             |                |               |                     |             |
|        |                                               | ZT2079-1/8   |                       |                   |             |                |               |                     |             |
|        | HS47 High Shear Rivet (100° ) (DRILL-OUT)     | ZT2079-5/32  |                       |                   |             |                |               |                     |             |
|        |                                               | ZT2079-3/16  |                       |                   |             |                |               |                     |             |
|        |                                               | ZT2079-1/4   |                       |                   |             |                |               |                     |             |
|        |                                               | ZT2079-5/16  |                       |                   |             |                |               |                     |             |
|        | AIRLOC                                        | ZT2092-3/4   |                       |                   |             |                |               |                     |             |
|        |                                               | ZT2092-1     |                       |                   |             |                |               |                     |             |
|        |                                               | ZT2092-1-3/8 |                       |                   |             |                |               |                     |             |

|        |                                               |             |  |  |  |  |  |  |  |
|--------|-----------------------------------------------|-------------|--|--|--|--|--|--|--|
| TYPE 2 | AN426 Rivet (100° ) (NON-DRILL-OUT)           | ZT2052-3/32 |  |  |  |  |  |  |  |
|        |                                               | ZT2052-1/8  |  |  |  |  |  |  |  |
|        |                                               | ZT2052-5/32 |  |  |  |  |  |  |  |
|        |                                               | ZT2052-3/16 |  |  |  |  |  |  |  |
|        |                                               | ZT2062-6    |  |  |  |  |  |  |  |
|        | AN & NAS Screw (100° ) (NON-DRILL-OUT)        | ZT2062-8    |  |  |  |  |  |  |  |
|        |                                               | ZT2062-10   |  |  |  |  |  |  |  |
|        |                                               | ZT2062-1/4  |  |  |  |  |  |  |  |
|        |                                               | ZT2072-5/32 |  |  |  |  |  |  |  |
|        | HS47 High Shear Rivet (100° ) (NON-DRILL-OUT) | ZT2072-3/16 |  |  |  |  |  |  |  |
|        |                                               | ZT2072-1/4  |  |  |  |  |  |  |  |



## DIE HEATERS

Zephyr Band Heaters are designed for continuous operation at 900°F or less. Input Voltage 110V A.C. Heaters are supplied complete with thermocouple, flexible cable & quick disconnect plugs. See chart below for specific details.



## DIE HEATER DATA

| TYPE                 | PART NO.   | A (in) | L (in) | WATTS | CONNECTOR    | USED WITH DIMPLER MODEL         |
|----------------------|------------|--------|--------|-------|--------------|---------------------------------|
| OFFSET<br><b>II</b>  | ZT1880B15A | .718   | 15     | 225   | ZT1883-5B    | ZP-450EA (Hot & Triple Action)  |
|                      | ZT1880B20A | .718   | 20     | 225   | ZT1883-5B    | ZP-450EA (Hot & Triple Action)  |
|                      | ZT1880B30A | .718   | 30     | 225   | ZT1883-5B    | ZP-450EA (Hot & Triple Action)  |
| STRAIGHT<br><b>I</b> | ZT1881B15A | .718   | 15     | 225   | ZT1883-5B    | ZP-450EA (Hot & Triple Action)  |
|                      | ZT1881B20A | .718   | 20     | 225   | ZT1883-5B    | ZP-450EA (Hot & Triple Action)  |
|                      | ZT1881B30A | .718   | 30     | 225   | ZT1883-5B    | ZP-450EA (Hot & Triple Action)  |
| OFFSET<br><b>II</b>  | ZT1880D5A  | .718   | 5      | 225   | ZT2429-29    | ZT2012, ZT2429 Portable Dimpler |
|                      | ZT1880D9A  | .718   | 9      | 225   | ZT2429-29    | ZT2012, ZT2429 Portable Dimpler |
|                      | ZT1880D10A | .718   | 10     | 225   | ZT2429-29    | ZT2012, ZT2429 Portable Dimpler |
|                      | ZT1880D15A | .718   | 15     | 225   | ZT2429-29    | ZT2012, ZT2429 Portable Dimpler |
| STRAIGHT<br><b>I</b> | ZT1881D10A | .718   | 10     | 225   | ZT2429-29    | ZT2012, ZT2429 Portable Dimpler |
| OFFSET<br><b>II</b>  | ZT1880E5A  | .718   | 5      | 225   | ZT2427-51    | ZT2427 Portable Dimpler         |
|                      | ZT1880E6A  | .718   | 9      | 225   | ZT2427-51    | ZT2427 Portable Dimpler         |
|                      | ZT1880E7A  | .718   | 9      | 225   | ZT2427-51    | ZT2427 Portable Dimpler         |
|                      | ZT1880E15A | .718   | 15     | 225   | ZT2427-51    | ZT2427 Portable Dimpler         |
| STRAIGHT<br><b>I</b> | ZT1882B15A | 1.312  | 15     | 350   | ZT1883-5B    | ZP-450EA (Hot & Triple Action)  |
|                      | ZT1882B20A | 1.312  | 20     | 350   | ZT1883-5B    | ZP-450EA (Hot & Triple Action)  |
|                      | ZT1882B30A | 1.312  | 30     | 350   | ZT1883-5B    | ZP-450EA (Hot & Triple Action)  |
|                      | ZT1882J6A  | 1.312  | 6      | 350   | No Connector | ZT2021                          |



## PORTABLE CONTROLS THERMO DIMPLE CONTROL PANEL

### PORTABLE MODEL ZT2409G



Designed to accurately and selectively control both high and low limit heating of either one or two die heaters; to control pre-pressures and dwell times on dimpling dies; to control high and low dimpling pressures; to permit selective use of either a compression dimpler or blind pull gun dimpler, and to control all phases of a complete hot or cold dimpling cycle.

Cycling is fully automatic and any element of the cycle can be pre-set or varied to suit conditions at hand.

Incorporated in the panel is the important "fail-safe" electric-pneumatic interlock which prevents operation of the panel if heaters are not operating in accordance with pre-selected conditions.

Selective switching can be used to take heaters out of circuit thus permitting "cold dimpling" under automatically controlled pressure conditions

### PORTABLE MODEL ZT2411

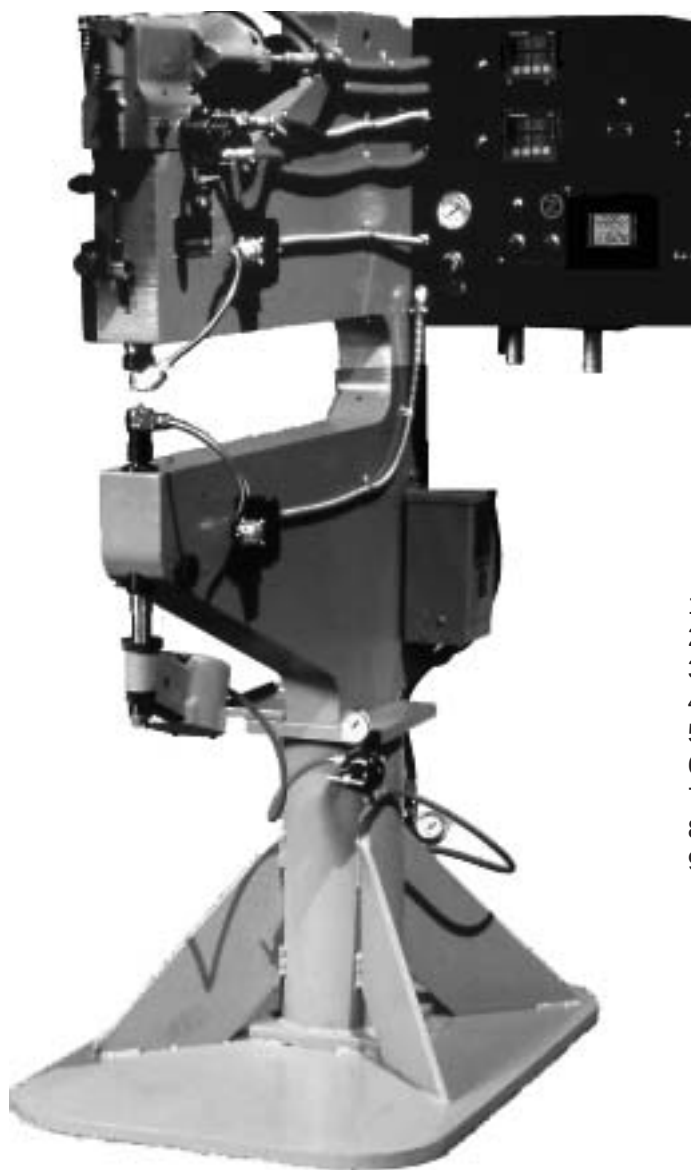
## Roll-a-way Cart

Specially designed "roll-away" cart permits storage of ZT2409G Panel together with other accessory items as desired. Provides storage space for portable dimplers, buck bars, rivet gun, extra heaters, dies, punches, etc.





# **ZP-450EA-36H & 36HTT HOT RAM COIN DIMPLING MACHINE AND TRIPLE ACTION**



Hot Ram Coin Dimpler  
with 36" Reach,  
Air Coin Post,  
Fully Automatic Electrical  
and Pneumatic Controls

## **Specifications**

|                                   |                                                                               |
|-----------------------------------|-------------------------------------------------------------------------------|
| 1. Capacity                       | : 8"                                                                          |
| 2. Reach                          | : 36"                                                                         |
| 3. Maximum Pressure at 90 PSI     | : 24000 lbs.                                                                  |
| 4. Maximum Set Holder Travel      | : 1-3/4"                                                                      |
| 5. Stroke Force at start          | : 1-3/4 ~ 3/16"                                                               |
| 6. Foot Pedal with Safety Guard   |                                                                               |
| 7. Digital Temperature Controller | : 68°F to 1250°F                                                              |
| 8. Digital Dwell Timer            | : .01 ~ 30.00 sec.                                                            |
| 9. Input Voltage                  | : 110V Single Phase<br>60HZ,<br>(220V, 60HZ<br>with step-down<br>Transformer) |



## DIMPLE TOOLS

A wide variety of Zephyr ram coin dimple dies and punches are available. These tools are turned from heat-treated, shock-resistant, finest tool steel, precision ground to extremely close tolerances.

### RAM COIN

#### PUNCHES

TYPE I    TYPE II    TYPE III



TYPE IV    TYPE VI



#### DIES

TYPE I    TYPE II    TYPE III



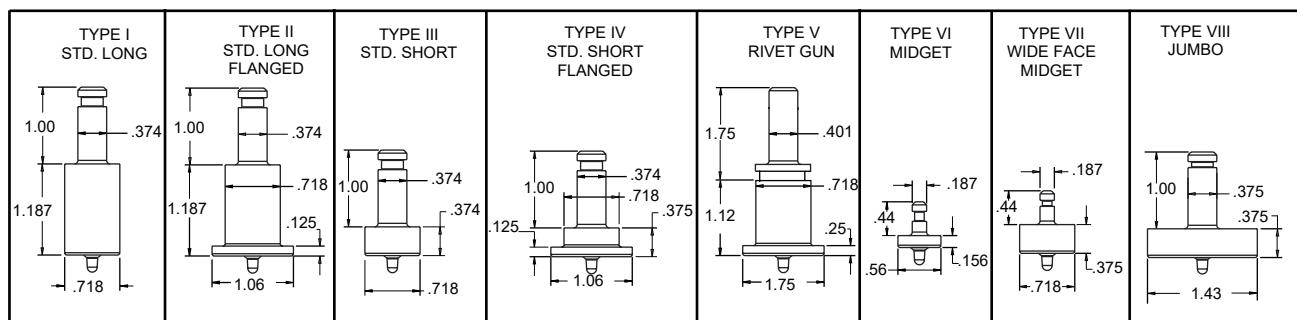
TYPE XII    TYPE XIII



### TRIPLE ACTION



## Coin Dimple Punch Assemblies for Hot or Cold coin Dimpling



| FASTENER                                       | SIZE             | TYPE I      | TYPE II     | TYPE III    | TYPE IV     | TYPE V      | TYPE VI     | TYPE VII    | TYPE VIII    |
|------------------------------------------------|------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------|
| AN426 Rivet(100°)                              | 3/32"            | ZT1855-3/32 |             | ZT1852-3/32 |             | ZT1835-3/32 | ZT1895-3/32 | ZT1741-3/32 |              |
|                                                | 1/8"             | ZT1855-1/8  |             | ZT1852-1/8  |             | ZT1835-1/8  | ZT1895-1/8  | ZT1741-1/8  |              |
|                                                | 5/32"            | ZT1855-5/32 |             | ZT1852-5/32 |             | ZT1835-5/32 | ZT1895-5/32 | ZT1741-5/32 |              |
|                                                | 3/16"            | ZT1855-3/16 |             | ZT1852-3/16 |             | ZT1835-3/16 | ZT1895-3/16 | ZT1741-3/16 |              |
| See note # 1                                   | 1/4"             |             | ZT1855-1/4  |             | ZT1852-1/4  | ZT1835-1/4  |             |             |              |
| AN & NAS<br>Screw (100°)                       | #6               | ZT1865-6    |             | ZT1862-6    |             | ZT1836-6    | ZT1896-6    | ZT1742-6    |              |
|                                                | #8               | ZT1865-8    |             | ZT1862-8    |             | ZT1836-8    | ZT1896-8    | ZT1742-8    |              |
|                                                | #10              | ZT1865-10   |             | ZT1862-10   |             | ZT1836-10   | ZT1896-10   | ZT1742-10   |              |
|                                                | #1/4             |             | ZT1865-1/4  |             | ZT1862-1/4  | ZT1836-1/4  |             |             |              |
| See note #1                                    | #5/16 (5)        |             | ZT1865-5/16 |             | ZT1862-5/16 |             |             |             |              |
| HS 47<br>Hi-Shear Rivet (100°)                 | 3/16"            | ZT1875-3/16 |             | ZT1872-3/16 |             | ZT1837-3/16 | ZT1847-3/16 | ZT1743-3/16 |              |
|                                                | 1/4"             | ZT1875-1/4  |             | ZT1872-1/4  |             | ZT1837-1/4  | ZT1847-1/4  | ZT1743-1/4  |              |
| See note # 1                                   | 5/16"            |             | ZT1875-5/16 |             | ZT1872-5/16 | ZT1837-5/16 |             |             |              |
| AN & NAS<br>Screw (100°)                       | #8               | ZT1867-8    |             | ZT1869-8    |             | ZT1838-8    | ZT1897-8    | ZT1744-8    |              |
|                                                | #10              | ZT1867-10   |             | ZT1869-10   |             | ZT1838-10   | ZT1897-10   | ZT1744-10   |              |
| High Stress Drill-Out Type                     | #1/4             |             | ZT1867-1/4  |             | ZT1869-1/4  | ZT1838-1/4  |             |             |              |
| See note # 2                                   | #5/16            |             | ZT1867-5/16 |             | ZT1869-5/16 | ZT1838-5/16 |             |             |              |
| HS47<br>Hi-Shear Rivet (100°)                  | 1/8"             | ZT1877-1/8  |             | ZT1879-1/8  |             | ZT1839-1/8  | ZT1845-1/8  | ZT1745-1/8  |              |
|                                                | 5/32"            | ZT1877-5/32 |             | ZT1879-3/16 |             | ZT1839-3/16 | ZT1845-3/16 | ZT1745-3/16 |              |
|                                                | 3/16"            | ZT1877-3/16 |             | ZT1879-1/4  |             | ZT1839-1/4  | ZT1845-1/4  | ZT1745-1/4  |              |
|                                                | 1/4"             | ZT1877-1/4  |             |             |             |             |             |             |              |
| See note # 2                                   | 5/16"            |             | ZT1877-5/16 |             | ZT1879-5/16 | ZT1839-5/16 |             |             |              |
| Blind Rivet (100°) (Huck,<br>Cherry, DuPont)   | 1/8"             | ZT1751-1/8  |             | ZT1753-1/8  |             |             |             | ZT1746-1/8  |              |
|                                                | 5/32"            | ZT1751-5/32 |             | ZT1753-5/32 |             |             |             | ZT1746-5/32 |              |
| High Stress Drill-Out Type                     | 3/16"            |             | ZT1751-3/16 |             | ZT1753-3/16 |             |             | ZT1746-3/16 |              |
| See note # 2                                   |                  |             |             |             |             |             |             |             |              |
| B. F. Goodrich Rivnut (100°)<br>Drill-Out Type | #4               | ZT1748-4    |             |             |             |             |             |             |              |
|                                                | #6               |             | ZT1748-6    |             |             |             |             |             |              |
|                                                | #8               |             | ZT1748-8    |             |             |             |             |             |              |
|                                                | #10              |             | ZT1748-10   |             |             |             |             |             |              |
| See note # 2                                   | 1/4" (4)         |             | ZT1748-1/4  |             |             |             |             |             |              |
| DZUS Fastener<br>Type "FA"                     | FA-5 Stud        |             |             |             |             |             |             |             | ZT1784       |
|                                                | FA-5 Spring      |             |             |             |             |             |             |             | ZT1786       |
|                                                | FA-6 1/2 Stud    |             |             |             |             |             |             |             | ZT1788       |
| See Note #1                                    | FA-6 1/2 Spring  |             |             |             |             |             |             |             | ZT1790       |
| Airloc Fastener<br>w/o Grommet                 | 3/4 (100°)       |             | ZT1791-3/4  |             |             |             |             |             |              |
|                                                | 1" (120°) (4)    |             | ZT1791-1    |             |             |             |             |             |              |
| See notes #1 & #3                              | 1 3/8" (128°)    |             |             |             |             | ZT1777-1    |             |             | ZT1793-1-3/8 |
| Airloc Fastener w/Grommet                      | 1" (120°) (4)    |             | ZT1793-1    |             |             |             |             |             |              |
| See note # 1                                   | 1 3/8" (128°)    |             |             |             |             |             |             |             | ZT1793-1-3/8 |
| Camloc Fastener                                | CLC-4S7          |             | ZT1723      |             |             |             |             |             | ZT795        |
| See note #1                                    | 4S10-1           |             | ZT1718      |             |             |             |             |             |              |
| DZUS Fastener<br>Type F                        | F4 Spring (4)    |             | ZT1710      |             |             |             |             |             |              |
|                                                | F4 w/Grommet (4) |             | ZT1715      |             |             |             |             |             |              |

1. For Pilot Drill and Dimple type installation.

2. For Pilot Drill, Dimple and Redrill type installation.

3. Punches to Cowl Fastener Specification "AND 10076" made to customer installation requirements.

4. Flange diameter is increased from 1.06 to 1.22.

5. Flange diameter is increased from 1.06 to 1.31 Flange thickness increased to .25.

6. Coin Dimple Punches ordered by fastener size, an D punch type, and not shown here, are made to special order.

7. For superior flushness on installation, the HS47 precision Hi Shear Rivet is recommended.



## Coin Dimple Die Assemblies for Hot or Cold coin Dimpling Spring loaded or air coin anvil type

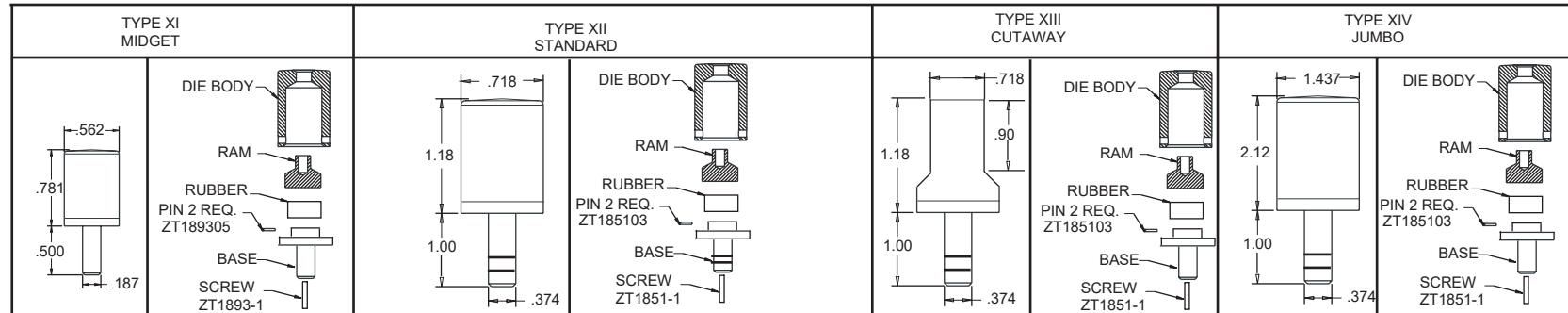
| TYPE I<br>STANDARD<br>LONG |                       |                      | TYPE II<br>STANDARD<br>CUTAWAY |                       |               | TYPE III<br>SHORT<br>MIDGET |                       |               | TYPE IV<br>MIDGET |                       |               | TYPE V<br>JUMBO                      |                                              |                                              |
|----------------------------|-----------------------|----------------------|--------------------------------|-----------------------|---------------|-----------------------------|-----------------------|---------------|-------------------|-----------------------|---------------|--------------------------------------|----------------------------------------------|----------------------------------------------|
|                            |                       |                      |                                |                       |               |                             |                       |               |                   |                       |               |                                      |                                              |                                              |
| DIE ASSEMBLY               | PARTS IN DIE ASSEMBLY |                      | DIE ASSEMBLY                   | PARTS IN DIE ASSEMBLY |               | DIE ASSEMBLY                | PARTS IN DIE ASSEMBLY |               | DIE ASSEMBLY      | PARTS IN DIE ASSEMBLY |               | DIE ASSEMBLY                         | PARTS IN DIE ASSEMBLY                        |                                              |
|                            | DIE BODY              | RAM                  |                                | DIE BODY              | RAM           |                             | DIE BODY              | RAM           |                   | DIE BODY              | RAM           |                                      | DIE BODY                                     | RAM                                          |
| ZT1853-3/32                | ZT185301-3/32         | ZT185302-3/32        | ZT1856-3/32                    | ZT185601-3/32         | ZT185402-3/32 | ZT1771-3/32                 | ZT177101-3/32         | ZT189302-3/32 | ZT1891-3/32       | ZT189301-3/32         | ZT189302-3/32 |                                      |                                              |                                              |
| ZT1853-1/8                 | ZT185301-1/8          | ZT185302-1/8         | ZT1856-1/8                     | ZT185601-1/8          | ZT185402-1/8  | ZT1771-1/8                  | ZT177101-1/8          | ZT189302-1/8  | ZT1891-1/8        | ZT189301-1/8          | ZT189302-1/8  |                                      |                                              |                                              |
| ZT1853-5/32                | ZT185301-5/32         | ZT185302-5/32        | ZT1856-5/32                    | ZT185601-5/32         | ZT185402-5/32 | ZT1771-5/32                 | ZT177101-5/32         | ZT189302-5/32 | ZT1891-5/32       | ZT189301-5/32         | ZT189302-5/32 |                                      |                                              |                                              |
| ZT1853-3/16                | ZT185301-3/16         | ZT185302-3/16        | ZT1856-3/16                    | ZT185601-3/16         | ZT185402-3/16 | ZT1771-3/16                 | ZT177101-3/16         | ZT189302-3/16 | ZT1891-3/16       | ZT189301-3/16         | ZT189302-3/16 |                                      |                                              |                                              |
| ZT1853-1/4                 | ZT185301-1/4          | ZT185302-1/4         |                                |                       |               |                             |                       |               |                   |                       |               |                                      |                                              |                                              |
| ZT1863-6                   | ZT186301-6            | ZT186302-6           | ZT1866-6                       | ZT186601-6            | ZT186402-6    | ZT1772-6                    | ZT177201-6            | ZT189402-6    | ZT1892-6          | ZT189401-6            | ZT189402-6    |                                      |                                              |                                              |
| ZT1863-8                   | ZT186301-8            | ZT186302-8           | ZT1866-8                       | ZT186601-8            | ZT186402-8    | ZT1772-8                    | ZT177201-8            | ZT189402-8    | ZT1892-8          | ZT189401-8            | ZT189402-8    |                                      |                                              |                                              |
| ZT1863-10                  | ZT186301-10           | ZT186302-10          | ZT1866-10                      | ZT186601-10           | ZT186402-10   | ZT1772-10                   | ZT177201-10           | ZT189402-10   | ZT1892-10         | ZT189401-10           | ZT189402-10   |                                      |                                              |                                              |
| ZT1863-1/4                 | ZT186301-1/4          | ZT186302-1/4         |                                |                       |               |                             |                       |               |                   |                       |               |                                      |                                              |                                              |
| ZT1863-5/16                | ZT186301-5/16         | ZT179402-1           |                                |                       |               |                             |                       |               |                   |                       |               |                                      |                                              |                                              |
| ZT1873-3/16                | ZT187301-3/16         | ZT187302-3/16        | ZT1849-3/16                    | ZT184901-3/16         | ZT187402-3/16 | ZT1773-3/16                 | ZT177301-3/16         | ZT188802-3/16 | ZT1833-3/16       | ZT188801-3/16         | ZT188802-3/16 |                                      |                                              |                                              |
| ZT1873-1/4                 | ZT187301-1/4          | ZT187302-1/4         | ZT1849-1/4                     | ZT184901-1/4          | ZT187402-1/4  | ZT1773-1/4                  | ZT177301-1/4          | ZT188802-1/4  | ZT1833-1/4        | ZT188801-1/4          | ZT188802-1/4  |                                      |                                              |                                              |
| ZT1873-5/16                | ZT187301-5/16         | ZT187302-5/16        |                                |                       |               |                             |                       |               |                   |                       |               |                                      |                                              |                                              |
| ZT1868-8                   | ZT186801-8            | ZT186802-8           | ZT1846-8                       | ZT186601-8            | ZT184402-8    | ZT1774-8                    | ZT177201-8            | ZT189802-8    | ZT1898-8          | ZT189401-8            | ZT189802-8    |                                      |                                              |                                              |
| ZT1868-10                  | ZT186801-10           | ZT186802-10          | ZT1846-10                      | ZT186601-10           | ZT184402-10   | ZT1774-10                   | ZT177201-10           | ZT189802-10   | ZT1898-10         | ZT189401-10           | ZT189802-10   |                                      |                                              |                                              |
| ZT1868-1/4                 | ZT186801-1/4          | ZT186802-1/4         |                                |                       |               |                             |                       |               |                   |                       |               |                                      |                                              |                                              |
| ZT1868-5/16                | ZT186801-5/16         | ZT186802-5/16        |                                |                       |               |                             |                       |               |                   |                       |               |                                      |                                              |                                              |
| ZT1878-1/8                 | ZT187801-1/8          | ZT175202-1/8         | ZT1876-1/8                     | ZT187601-1/8          | ZT175402-1/8  | ZT1775-1/8                  | ZT177501-1/8          | ZT175502-1/8  | ZT1887-1/8        | ZT188701-1/8          | ZT175502-1/8  |                                      |                                              |                                              |
| ZT1878-5/32                | ZT187801-5/32         | ZT185302-5/32        | ZT1876-5/32                    | ZT187601-5/32         | ZT187602-5/32 | ZT1775-5/32                 | ZT177501-5/32         | ZT188702-5/32 | ZT1887-5/32       | ZT188701-5/32         | ZT188702-5/32 |                                      |                                              |                                              |
| ZT1878-3/16                | ZT187801-3/16         | ZT187802-3/16        | ZT1876-3/16                    | ZT187601-3/16         | ZT183402-3/16 | ZT1775-3/16                 | ZT177501-3/16         | ZT188702-3/16 | ZT1887-3/16       | ZT188701-3/16         | ZT188702-3/16 |                                      |                                              |                                              |
| ZT1878-1/4                 | ZT187801-1/4          | ZT187802-1/4         | ZT1876-1/4                     | ZT187601-1/4          | ZT183402-1/4  | ZT1775-1/4                  | ZT177501-1/4          | ZT188702-1/4  | ZT1887-1/4        | ZT188701-1/4          | ZT188702-1/4  |                                      |                                              |                                              |
| ZT1878-5/16                | ZT187801-5/16         | ZT187802-5/16        |                                |                       |               |                             |                       |               |                   |                       |               |                                      |                                              |                                              |
| ZT1752-1/8                 | ZT175201-1/8          | ZT175202-1/8         | ZT1754-1/8                     | ZT175401-1/8          | ZT175402-1/8  | ZT1755-1/8                  | ZT175501-1/8          | ZT175502-1/8  |                   |                       |               |                                      |                                              |                                              |
| ZT1752-5/32                | ZT175201-5/32         | ZT175202-5/32        | ZT1754-5/32                    | ZT175401-5/32         | ZT175402-5/32 | ZT1755-5/32                 | ZT175501-5/32         | ZT175502-5/32 |                   |                       |               |                                      |                                              |                                              |
| ZT1752-3/16                | ZT175201-3/16         | ZT175202-3/16        | ZT1754-3/16                    | ZT175401-3/16         | ZT175402-3/16 | ZT1755-3/16                 | ZT175501-3/16         | ZT175502-3/16 |                   |                       |               |                                      |                                              |                                              |
| ZT1747-4                   | ZT186301-6            | ZT174902-4           |                                |                       |               |                             |                       |               |                   |                       |               |                                      |                                              |                                              |
| ZT1747-6                   | ZT174901-6            | ZT174902-6           |                                |                       |               |                             |                       |               |                   |                       |               |                                      |                                              |                                              |
| ZT1747-8                   | ZT174901-8            | ZT174902-8           |                                |                       |               |                             |                       |               |                   |                       |               |                                      |                                              |                                              |
| ZT1747-10                  | ZT174901-10           | ZT174902-10          |                                |                       |               |                             |                       |               |                   |                       |               |                                      |                                              |                                              |
| ZT1747-1/4                 | ZT174901-1/4          | ZT174902-1/4         |                                |                       |               |                             |                       |               |                   |                       |               |                                      |                                              |                                              |
|                            |                       |                      |                                |                       |               |                             |                       |               |                   |                       |               | ZT1782<br>ZT1797<br>ZT1798<br>ZT1799 | ZT178301<br>ZT178501<br>ZT178701<br>ZT178901 | ZT178302<br>ZT178302<br>ZT178702<br>ZT178902 |
| ZT1792-3/4                 | ZT179201-3/4          | ZT179202-3/4         |                                |                       |               |                             |                       |               |                   |                       |               |                                      |                                              |                                              |
| ZT1792-1                   | ZT179201-1            | ZT179202-1           |                                |                       |               |                             |                       |               |                   |                       |               | ZT1792-1-3/8                         | ZT179201-1-3/8                               | ZT179202-1-3/8                               |
| ZT1794-1                   | ZT179401-1            | ZT179402-1           |                                |                       |               |                             |                       |               |                   |                       |               |                                      |                                              |                                              |
|                            |                       |                      |                                |                       |               |                             |                       |               |                   |                       |               | ZT1794-1-3/8                         | ZT179401-1-3/8                               | ZT179402-1-3/8                               |
| ZT1724<br>ZT1717           | ZT172401<br>ZT171701  | ZT172402<br>ZT171702 |                                |                       |               |                             |                       |               |                   |                       |               | ZT1796                               | ZT179601                                     | ZT179602                                     |
| ZT1709                     | ZT170901              | ZT171602             |                                |                       |               |                             |                       |               |                   |                       |               |                                      |                                              |                                              |
|                            | ZT171601              | ZT171602             |                                |                       |               |                             |                       |               |                   |                       |               |                                      |                                              |                                              |

1. For Pilot Drill and Dimple type installation.
2. For Pilot Drill, Dimple and Redrill type installation.
3. Die Assemblies to Cowl Fastener Specification "AND 10076" made to customer installation requirements.
4. To adapt Type V Die Assembly to CP-450 EA use ZT1781 Adapter Assembly.

5. 1.06 diameter flange added to die body.
6. Coin Die Assemblies ordered by Fastener Size and Die Assembly type and not shown here made to special order.
7. For superior flushness on installation, the HS47 precision Hi-Shear Rivet is recommended



## Coin Dimple Die Assemblies for Hot or Cold coin Dimpling Rubber Loaded Ram type



| FASTENER                     | SIZE           | DIE ASSEMBLY | PARTS IN DIE ASSEMBLY |               | DIE ASSEMBLY | PARTS IN DIE ASSEMBLY |               |          |          | DIE ASSEMBLY | PARTS IN DIE ASSEMBLY |               | DIE ASSEMBLY | PARTS IN DIE ASSEMBLY |                |
|------------------------------|----------------|--------------|-----------------------|---------------|--------------|-----------------------|---------------|----------|----------|--------------|-----------------------|---------------|--------------|-----------------------|----------------|
|                              |                |              | DIE BODY              | RAM           |              | DIE BODY              | RAM           | RUBBER   | BASE     |              | DIE BODY              | RAM           |              | DIE BODY              | RAM            |
| AN426 Rivet(100°)            | 3/32"          | ZT1893-3/32  | ZT189301-3/32         | ZT189302-3/32 | ZT1851-3/32  | ZT185301-3/32         | ZT185302-3/32 | ZT1851-6 | ZT185104 | ZT1854-3/32  | ZT185401-3/32         | ZT185402-3/32 |              |                       |                |
|                              | 1/8"           | ZT1893-1/8   | ZT189301-1/8          | ZT189302-1/8  | ZT1851-1/8   | ZT185301-1/8          | ZT185302-1/8  | ZT1851-6 | ZT185104 | ZT1854-1/8   | ZT185401-1/8          | ZT185402-1/8  |              |                       |                |
|                              | 5/32"          | ZT1893-5/32  | ZT189301-5/32         | ZT189302-5/32 | ZT1851-5/32  | ZT185301-5/32         | ZT185302-5/32 | ZT1851-6 | ZT185104 | ZT1854-5/32  | ZT185401-5/32         | ZT185402-5/32 |              |                       |                |
| See note #2                  | 3/16"          | ZT1893-3/16  | ZT189301-3/16         | ZT189302-3/16 | ZT1851-3/16  | ZT185301-3/16         | ZT185302-3/16 | ZT1851-6 | ZT185104 | ZT1854-3/16  | ZT185401-3/16         | ZT185402-3/16 |              |                       |                |
| AN & NAS Screw (100°)        | #6             | ZT1894-6     | ZT189401-6            | ZT189402-6    | ZT1861-6     | ZT186301-6            | ZT186302-6    | ZT1851-6 | ZT185104 | ZT1864-6     | ZT186401-6            | ZT186402-6    |              |                       |                |
|                              | #8             | ZT1894-8     | ZT189401-8            | ZT189402-8    | ZT1861-8     | ZT186301-8            | ZT186302-8    | ZT1851-6 | ZT185104 | ZT1864-8     | ZT186401-8            | ZT186402-8    |              |                       |                |
| See note #2                  | #10            |              |                       |               | ZT1861-10    | ZT186301-10           | ZT186302-10   | ZT1851-5 | ZT185106 |              |                       |               |              |                       |                |
| HS 47 Hi-Shear Rivet (100°)  | 3/16"          | ZT1888-3/16  | ZT188801-3/16         | ZT188802-3/16 | ZT1871-3/16  | ZT187301-3/16         | ZT187302-3/16 | ZT1851-6 | ZT185104 | ZT1874-3/16  | ZT187401-3/16         | ZT187402-3/16 |              |                       |                |
|                              | 1/4"           | ZT1888-1/4   | ZT188801-1/4          | ZT188802-1/4  | ZT1871-1/4   | ZT187301-1/4          | ZT187302-1/4  | ZT1851-5 | ZT185106 | ZT1874-1/4   | ZT187401-1/4          | ZT187402-1/4  |              |                       |                |
| See note #2 and #7           |                |              |                       |               |              |                       |               |          |          |              |                       |               |              |                       |                |
| AN & NAS Screw (100°)        | #8             | ZT1899-8     | ZT189401-8            | ZT189402-8    | ZT1889-8     | ZT186301-8            | ZT186802-8    | ZT1851-6 | ZT185104 | ZT1844-8     | ZT186401-8            | ZT184402-8    |              |                       |                |
|                              | #10            |              |                       |               | ZT1889-10    | ZT186301-10           | ZT186802-10   | ZT1851-5 | ZT185106 |              |                       |               |              |                       |                |
| High Stress Drill-Out Type   |                |              |                       |               |              |                       |               |          |          |              |                       |               |              |                       |                |
| See note #3                  |                |              |                       |               |              |                       |               |          |          |              |                       |               |              |                       |                |
| HS47 Hi-Shear Rivet (100°)   | 3/16"          | ZT1890-3/16  | ZT188701-3/16         | ZT188702-3/16 | ZT1848-3/16  | ZT187801-3/16         | ZT187802-3/16 | ZT1851-6 | ZT185104 | ZT1834-3/16  | ZT183401-3/16         | ZT183402-3/16 |              |                       |                |
|                              | 1/4"           | ZT1890-1/4   | ZT188701-1/4          | ZT188702-1/4  | ZT1848-1/4   | ZT187801-1/4          | ZT187802-1/4  | ZT1851-5 | ZT185106 | ZT1834-1/4   | ZT183401-1/4          | ZT183402-1/4  |              |                       |                |
| See note #3 and #7           |                |              |                       |               |              |                       |               |          |          |              |                       |               |              |                       |                |
| B. F. Goodrich Rivnut (100°) | #4             |              |                       |               | ZT1749-4     | ZT174901-4            | ZT174902-4    | ZT1851-6 | ZT185104 |              |                       |               |              |                       |                |
|                              | #6             |              |                       |               | ZT1749-6     | ZT174901-6            | ZT174902-6    | ZT1851-6 | ZT185104 |              |                       |               |              |                       |                |
|                              | #8             |              |                       |               | ZT1749-8     | ZT174901-8            | ZT174902-8    | ZT1851-6 | ZT185104 |              |                       |               |              |                       |                |
|                              | #10            |              |                       |               | ZT1749-10    | ZT174901-10           | ZT174902-10   | ZT1851-5 | ZT185106 |              |                       |               |              |                       |                |
| See note #3                  | 1/4"           |              |                       |               | ZT1749-1/4   | ZT174901-1/4          | ZT174902-1/4  | ZT1851-5 | ZT185106 |              |                       |               |              |                       |                |
| DZUS Fastener Type "FA"      | FA-5 Stud      |              |                       |               |              |                       |               |          |          |              |                       |               | ZT1783       | ZT178301              | ZT178302       |
|                              | FA-5 Spring    |              |                       |               |              |                       |               |          |          |              |                       |               | ZT1785       |                       | ZT178302       |
|                              | FA-61/2 Stud   |              |                       |               |              |                       |               |          |          |              |                       |               | ZT1787       | ZT178701              | ZT178702       |
|                              | FA-61/2 Spring |              |                       |               |              |                       |               |          |          |              |                       |               | ZT1789       | ZT178901              | ZT178902       |
| See Note #2                  |                |              |                       |               |              |                       |               |          |          |              |                       |               |              |                       |                |
| Airloc Fastener w/o Grommet  | 3/4 (100°)     |              |                       |               | ZT1761-3/4   | ZT179201-3/4          | ZT179202-3/4  |          |          |              |                       |               |              |                       |                |
|                              | 1" (120°) (5)  |              |                       |               | ZT1761-1     | ZT179201-1            | ZT179202-1    |          |          |              |                       |               |              |                       |                |
| See notes #2 & #4            | 1 3/8" (128°)  |              |                       |               |              |                       |               |          |          |              |                       |               | ZT1763-1-3/8 | ZT179201-1-3/8        | ZT179202-1-3/8 |
| Airloc Fastener w/Grommet    | 1" (120°) (5)  |              |                       |               | ZT1762-1     | ZT179401-1            | ZT179402-1    |          |          |              |                       |               |              |                       |                |
| See note #2                  | 1 3/8" (128°)  |              |                       |               |              |                       |               |          |          |              |                       |               | ZT1764-1-3/8 | ZT179401-1-3/8        | ZT179402-1-3/8 |
| Camloc Fastener              |                |              |                       |               |              |                       |               |          |          |              |                       |               | ZT1765       | ZT179601              | ZT179602       |
| See note #2                  |                |              |                       |               |              |                       |               |          |          |              |                       |               |              |                       |                |

1. Die Assemblies shown to be used with Punches shown on page F12.
2. For Pilot Drill, Dimple type installation.
3. For Pilot Drill, Dimple and Redrill type installation.
4. Die Assemblies to Cowl Fastener Specification "AND 10076" made to customer installation requirements.
5. 1.06 diameter flange added to die body.
6. Coin Die Assemblies ordered by Fastener Size and Die Assembly type and not shown here made to special order.
7. For superior flushness on installation, the HS47 precision Hi-Shear Rivet is recommended

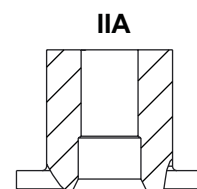
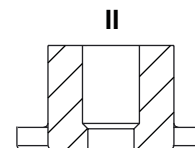
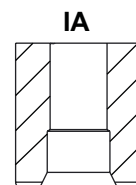
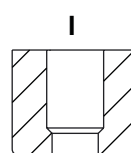
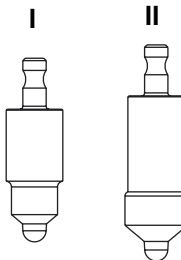
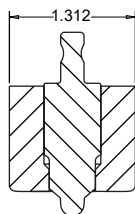


## Triple Action Punch & Pressure Pad Assembly

For use where minimum sheet warpage and marking are required

### PRESSURE PAD

### PUNCH TYPE

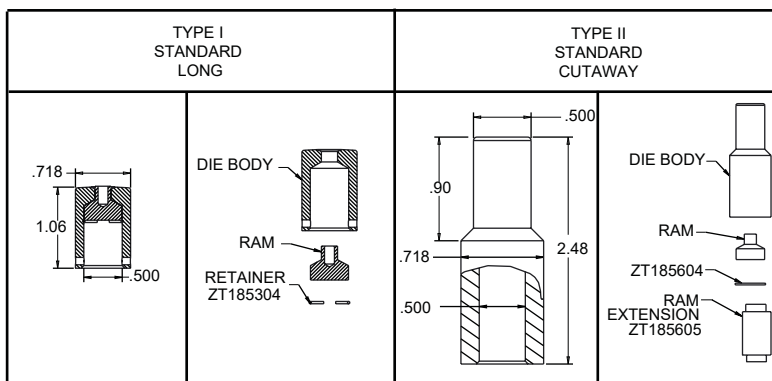


| FASTENER                                        | SIZE       | PUNCH ASSEMBLY | PARTS IN PUNCH ASSEMBLY |      |               |      |
|-------------------------------------------------|------------|----------------|-------------------------|------|---------------|------|
|                                                 |            |                | PUNCH                   | TYPE | PRESSURE PAD  | TYPE |
| AN426 (100°) Rivet                              | 3/32"      | ZT3855-3/32    | ZT385501-3/32           | I    | ZT385502-3/32 | I    |
| Std. Pilot                                      | 1/8"       | ZT3855-1/8     | ZT385501-1/8            | I    | ZT385502-1/8  | I    |
| Non Drill-Out                                   | 5/32"      | ZT3855-5/32    | ZT385501-5/32           | I    | ZT385502-5/32 | I    |
|                                                 | 3/16"      | ZT3855-3/16    | ZT385501-3/16           | I    | ZT385502-3/16 | I    |
|                                                 | 1/4"       | ZT3855-1/4     | ZT385501-1/4            | I    | ZT385502-1/4  | I    |
|                                                 | 5/16"      | ZT3855-5/16    | ZT385501-5/16           | I    | ZT385502-5/16 | IIA  |
| AN509 (100°) Screw                              | #6         | ZT3865-6       | ZT386501-6              | I    | ZT386502-6    | I    |
| Std. Pilot Non Drill-Out                        | #8         | ZT3865-8       | ZT386501-8              | I    | ZT386502-8    | I    |
|                                                 | #10        | ZT3865-10      | ZT386501-10             | I    | ZT386502-10   | I    |
|                                                 | 1/4"       | ZT3865-1/4     | ZT386501-1/4            | I    | ZT386502-1/4  | I    |
| AN509 (100°) Screw                              | #6         | ZT3867-6       | ZT386701-6              | I    | ZT386702-6    | I    |
| Undersize Pilot                                 | #8         | ZT3867-8       | ZT386701-8              | I    | ZT386702-8    | I    |
| Drill-Out                                       | #10        | ZT3867-10      | ZT386701-10             | I    | ZT386702-10   | I    |
|                                                 | 1/4"       | ZT3867-1/4     | ZT386701-1/4            | I    | ZT386702-1/4  | I    |
|                                                 | 5/16"      | ZT3867-5/16    | ZT386701-5/16           | II   | ZT386702-5/16 | II   |
|                                                 | 3/8"       | ZT3867-3/8     | ZT386701-3/8            | II   | ZT386702-3/8  | IIA  |
| HS47 (100°) Hi-Shear Rivet                      | 1/8"       | ZT3877-1/8     | ZT387701-1/8            | I    | ZT387702-1/8  | I    |
| Undersize Pilot                                 | 5/32"      | ZT3877-5/32    | ZT387701-5/32           | I    | ZT387702-5/32 | I    |
| Drill-Out                                       | 3/16"      | ZT3877-3/16    | ZT387701-3/16           | I    | ZT387702-3/16 | I    |
|                                                 | 1/4"       | ZT3877-1/4     | ZT387701-1/4            | I    | ZT387702-1/4  | I    |
|                                                 | 5/16"      | ZT3877-5/16    | ZT387701-5/16           | I    | ZT387702-5/16 | I    |
|                                                 | 3/8"       | ZT3877-3/8     | ZT387701-3/8            | I    | ZT387702-3/8  | II   |
| Blind Rivet (100°)                              | 1/8"       | ZT3811-1/8     | ZT381101-1/8            | I    | ZT381102-1/8  | I    |
| Huck, Cherry, DuPont, Undersize Pilot Drill-Out | 5/32"      | ZT3811-5/32    | ZT381101-5/32           | I    | ZT381102-5/32 | I    |
|                                                 | 3/16"      | ZT3811-3/16    | ZT381101-3/16           | I    | ZT381102-3/16 | I    |
| Camloc Drill-Out                                | 4S14       | ZT3823         | ZT382301                | I    | ZT382302      | IA   |
| DZUS Non Drill-Out                              | FAS Stud   | ZT3884         | ZT388401                | II   | ZT388402      | IIA  |
|                                                 | FAS Spring | ZT3886         | ZT388601                | II   | ZT388602      | IIA  |
| Airloc w/o Grommet Drill-Out                    | #5         | ZT3891-1       | ZT389101-1              | II   | ZT389102-1    | IIA  |
| Airloc with Grommet Drill-Out                   | #5         | ZT3893-1       | ZT389301-1              | II   | ZT389302-1    | IIA  |



## Triple Action Dies Assemblies

For use where minimum sheet warpage and marking are required

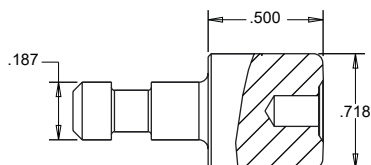
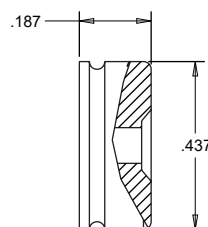


| FASTENER            | SIZE       | DIE ASSEMBLY | PARTS IN DIE ASSEMBLY |               | DIE ASSEMBLY | PARTS IN DIE ASSEMBLY |               |
|---------------------|------------|--------------|-----------------------|---------------|--------------|-----------------------|---------------|
|                     |            |              | DIE BODY              | RAM           |              | DIE BODY              | RAM           |
| AN426 (100°)        | 3/32"      | ZT3853-3/32  | ZT385301-3/32         | ZT385302-3/32 | ZT3856-3/32  | ZT385601-3/32         | ZT185402-3/32 |
| Rivet               | 1/8"       | ZT3853-1/8   | ZT385301-1/8          | ZT385302-1/8  | ZT3856-1/8   | ZT385601-1/8          | ZT185402-1/8  |
| Std. Pilot          | 5/32"      | ZT3853-5/32  | ZT385301-5/32         | ZT385302-5/32 | ZT3856-5/32  | ZT385601-5/32         | ZT185402-5/32 |
| Non Drill-Out       | 3/16"      | ZT3853-3/16  | ZT385301-3/16         | ZT385302-3/16 | ZT3856-3/16  | ZT385601-3/16         | ZT185402-3/16 |
|                     | 1/4" (1)   | ZT3853-1/4   | ZT385301-1/4          | ZT385302-1/4  |              |                       |               |
|                     | 5/16" (1)  | ZT3853-5/16  | ZT385301-5/16         | ZT385302-5/16 |              |                       |               |
| AN509 (100°) Screw  | #8         | ZT3863-8     | ZT386301-8            | ZT386302-8    | ZT3866-8     | ZT386601-8            | ZT386402-8    |
| Non Drill-Out       | #10        | ZT3863-10    | ZT386301-10           | ZT386302-10   | ZT3866-10    | ZT386601-10           | ZT386402-10   |
|                     | 1/4"       | ZT3863-1/4   | ZT386301-1/4          | ZT386302-1/4  |              |                       |               |
| AN509 (100°)        | #6         | ZT3868-6     | ZT386801-6            | ZT386802-6    | ZT3846-6     | ZT384601-6            | ZT384602-6    |
| Screw               | #8         | ZT3868-8     | ZT386801-8            | ZT386802-8    | ZT3846-8     | ZT384601-8            | ZT384602-8    |
| Undersize Pilot     | #10        | ZT3868-10    | ZT386801-10           | ZT386802-10   | ZT3846-10    | ZT384601-10           | ZT384602-10   |
| Drill-Out           | 1/4"       | ZT3868-1/4   | ZT386801-1/4          | ZT386802-1/4  |              |                       |               |
|                     | 5/16" (1)  | ZT3868-5/16  | ZT386801-5/16         | ZT386802-5/16 |              |                       |               |
|                     | 3/8" (2)   | ZT3868-3/8   | ZT386801-3/8          | ZT386802-3/8  |              |                       |               |
| HS47 (100°)         | 1/8"       | ZT3878-1/8   | ZT387801-1/8          | ZT387802-1/8  |              |                       |               |
| Hi-Shear Rivet      | 5/32"      | ZT3878-5/32  | ZT387801-5/32         | ZT387802-5/32 |              |                       |               |
| Undersize Pilot     | 3/16"      | ZT3878-3/16  | ZT387801-3/16         | ZT387802-3/16 |              |                       |               |
| Drill-Out           | 1/4"       | ZT3878-1/4   | ZT387801-1/4          | ZT387802-1/4  |              |                       |               |
|                     | 5/16"      | ZT3878-5/16  | ZT387801-5/16         | ZT387802-5/16 |              |                       |               |
|                     | 3/8"       | ZT3878-3/8   | ZT387801-3/8          | ZT387802-3/8  |              |                       |               |
| Blind Rivet (100°)  | 1/8"       | ZT3812-1/8   | ZT381201-1/8          | ZT175202-1/8  | ZT3813-1/8   | ZT381301-1/8          | ZT381302-1/8  |
| Huck, Cherry,       | 5/32"      | ZT3812-5/32  | ZT381201-5/32         | ZT381202-5/32 | ZT3813-5/32  | ZT381301-5/32         | ZT381302-5/32 |
| DuPont, Undersize   | 3/16"      | ZT3812-3/16  | ZT381201-3/16         | ZT381202-3/16 | ZT3813-3/16  | ZT381301-3/16         | ZT381302-3/16 |
| Pilot Drill-Out     |            |              |                       |               |              |                       |               |
| Camloc Drill-Out    | 4S14       | ZT3824       | ZT382401              | ZT215302-5/16 |              |                       |               |
| DZUS Non Drill-Out  | FAS Stud   | ZT3882       | ZT388201              | ZT388202      |              |                       |               |
|                     | FAS Spring | ZT3897       | ZT389701              | ZT389702      |              |                       |               |
| Airloc w/o Grommet  | #5         | ZT3892-1     | ZT389201-1            | ZT179202-1    |              |                       |               |
| Drill-Out           |            |              |                       |               |              |                       |               |
| Airloc with Grommet | #5         | ZT3894-1     | ZT389401-1            | ZT179402-1    |              |                       |               |
| Drill-Out           |            |              |                       |               |              |                       |               |

1. 1.062 Flanged added to die body
2. 2.44 Flanged added to die body



## Modified Radius Dimple Tools

**TYPE I**

**TYPE II**


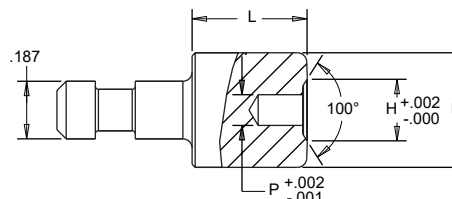
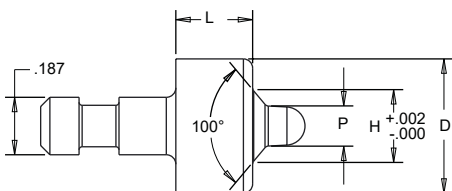
| FASTENER                                                                    | SIZE  | TYPE I<br>DIE | TYPE II<br>DIE | PUNCH*      | PUNCH       |
|-----------------------------------------------------------------------------|-------|---------------|----------------|-------------|-------------|
| AN426 (100°) Rivet<br>Non Drill-Out                                         | 3/32" | ZT1841-3/32   | ZT2441-3/32    | ZT1741-3/32 | ZT1855-3/32 |
|                                                                             | 1/8"  | ZT1841-1/8    | ZT2441-1/8     | ZT1741-1/8  | ZT1855-1/8  |
|                                                                             | 5/32" | ZT1841-5/32   | ZT2441-5/32    | ZT1741-5/32 | ZT1855-5/32 |
|                                                                             | 3/16" | ZT1841-3/16   | ZT2441-3/16    | ZT1741-3/16 | ZT1855-3/16 |
|                                                                             | 1/4"  | ZT1841-1/4    |                | ZT1741-1/4  | ZT1855-1/4  |
| AN & NAS (100°) Screw<br>Non Drill-Out                                      | #6    | ZT1842-6      | ZT2442-6       | ZT1742-6    | ZT1865-6    |
|                                                                             | #8    | ZT1842-8      | ZT2442-8       | ZT1742-8    | ZT1865-8    |
|                                                                             | #10   | ZT1842-10     | ZT2442-10      | ZT1742-10   | ZT1865-10   |
|                                                                             | 1/4"  | ZT1842-1/4    |                | ZT1742-1/4  | ZT1865- 1/4 |
| 2R2, 2R7, HS47, NAS 177<br>Hi-Shear (100°) Rivet<br>Non Drill               | 1/8"  | ZT1843-1/8    | ZT2443-1/8     | ZT1743-1/8  | ZT1875-1/8  |
|                                                                             | 5/32" | ZT1843-5/32   | ZT2443-5/32    | ZT1743-5/32 | ZT1875-5/32 |
|                                                                             | 3/16" | ZT1843-3/16   | ZT2443-3/16    | ZT1743-3/16 | ZT1875-3/16 |
| Blind Rivet (100°)<br>Huck, Cherry,<br>DuPont, Undersize Pilot<br>Drill-Out | 1/8"  | ZT1713-1/8    | ZT2444-1/8     | ZT1714-1/8  | ZT2445-1/8  |
|                                                                             | 5/32" | ZT1713-5/32   | ZT2444-5/32    | ZT1714-5/32 | ZT2445-5/32 |
|                                                                             | 3/16" | ZT1713-3/16   | ZT2444-3/16    | ZT1714-3/16 | ZT2445-3/16 |
|                                                                             | 1/8"  | ZT1730-1/8    |                | ZT1714-1/8  | ZT2445-1/8  |
|                                                                             | 5/32" | ZT1770-5/32   |                | ZT1714-5/32 | ZT2445-1/8  |
|                                                                             | 3/16" | ZT1770-3/16   |                | ZT1714-3/16 | ZT2445-3/16 |

TYPE I - For use in ZP-450EA-36H Stationary Dimpler - Using ZT2416050.

TYPE II- For use in ZT2427-ZT2429 Portable Dimplers.

Punch\* When used in the above equipment - incorporate adapter ZT2416051

## Radius Dimple Tools



| Part No. | Rivet Size | P    | H    | D     | L                            |
|----------|------------|------|------|-------|------------------------------|
| ZT26-9   | 3/32"      | .095 | .184 | 3/8"  | When ordering specify length |
| ZT26-10  | 1/8"       | .126 | .237 | 7/16" |                              |
| ZT26-11  | 5/32"      | .157 | .307 | 1/2"  |                              |
| ZT26-12  | 3/16"      | .188 | .367 | 5/8"  |                              |

| Part No. | Rivet Size | P    | H    | D     | L                            |
|----------|------------|------|------|-------|------------------------------|
| ZT27-9   | 3/32"      | .098 | .206 | 3/8"  | When ordering specify length |
| ZT27-10  | 1/8"       | .129 | .257 | 7/16" |                              |
| ZT27-11  | 5/32"      | .160 | .321 | 1/2"  |                              |
| ZT27-12  | 3/16"      | .191 | .384 | 5/8"  |                              |

AVAILABLE LENGTHS: 5/16", 3/8", 7/16" 1/2", 5/8" 11/16", 3/4" : Sample ZT26-11-3/8 - Male Punch 5/32" Rivet Size.

Lengths other than listed above are made to special order.



# Positive Feed Drills



## ZEPHYR TOOL GROUP

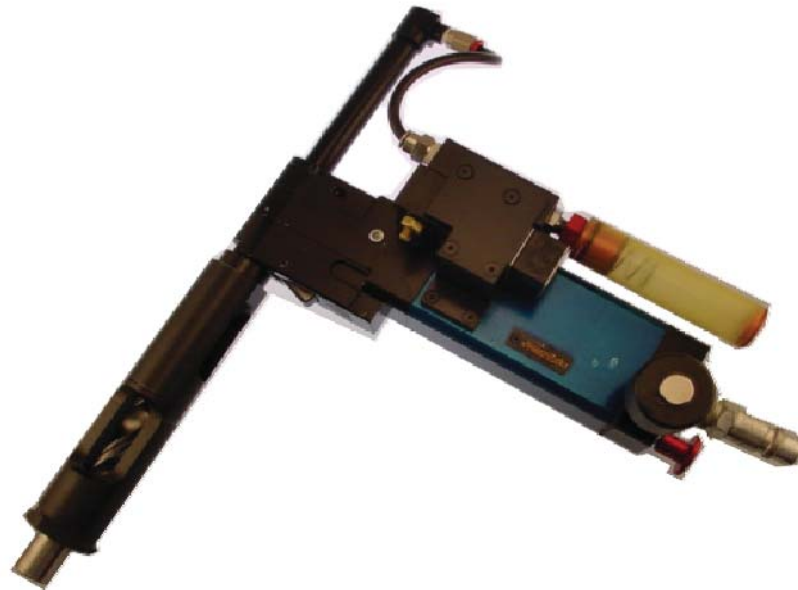
201 Hindry Avenue  
Inglewood, CA 90301

Tel. 310-410-4907 ■ Email: [sales@zephyrtoolgroup.com](mailto:sales@zephyrtoolgroup.com) ■ [zephyrtoolgroup.com](http://zephyrtoolgroup.com)



# Positive Feed Drills

US Patent: 8,522,941



## Features

- Automatic retract and shut off at the completion of the drilling cycle.
- Automatic start and shut off of the lubricant system during the drilling cycle.
- Built-in nosepiece with 30° indexing mechanism.
- Interrupted cut.
- Multiple air inlets on motor housing.

## Benefits

- Shortens drilling process per hole. Increase output and decrease production time.
- Saves lubricant usage and clean up time and cost.
- Easy indexing of tool for the best drilling position and saving time with set-up.
- Chip removal for better hole quality.
- Allows the operator to maximize accessibility and easily adaptable to all coolant systems.

**ZT4000**

## ZEPHYR TOOL GROUP

201 Hindry Avenue  
Inglewood, CA 90301

Tel. 310-410-4907 ■ Email: [sales@zephyrtoolgroup.com](mailto:sales@zephyrtoolgroup.com) ■ [zephyrtoolgroup.com](http://zephyrtoolgroup.com)



# ZT4000

## Positive Feed Drill

### Specifications

Capacity:  
Aluminum- Ø1.25" (31.75 mm)  
Steel-Ø.75" (19.05mm)  
Titanium-Ø.75" (19.05mm)

Stroke:  
Minimum- .375" (9.525mm)  
Maximum- unlimited

RPM's:  
230, 350, 550, 750, 1000, 2100, 3200 and 4500 RPM

Feed Rates:  
.001, .002, .003, .004, .005, .006, .007 and .008 IPR.

Air Motor Power: 1.75 HP

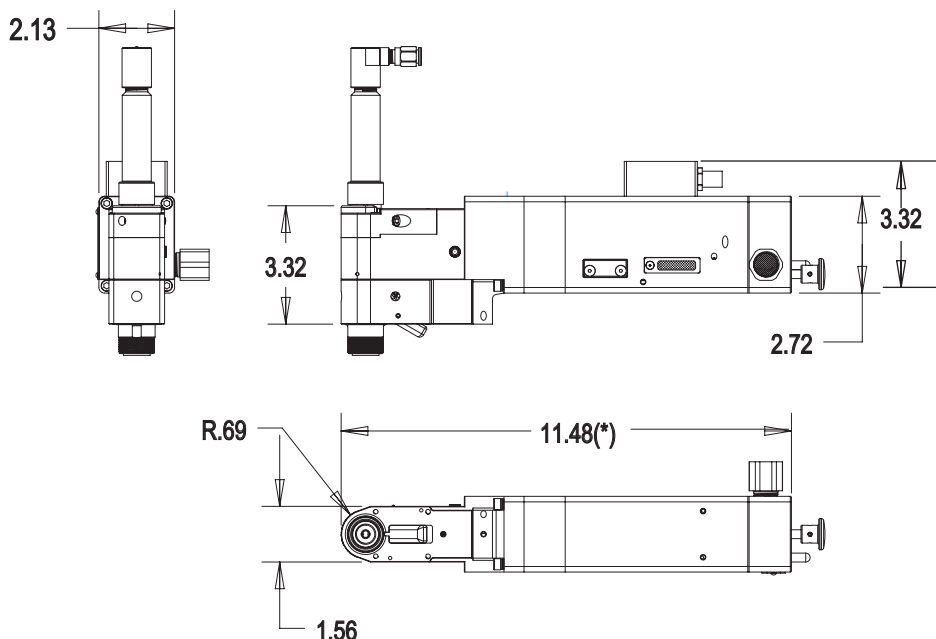
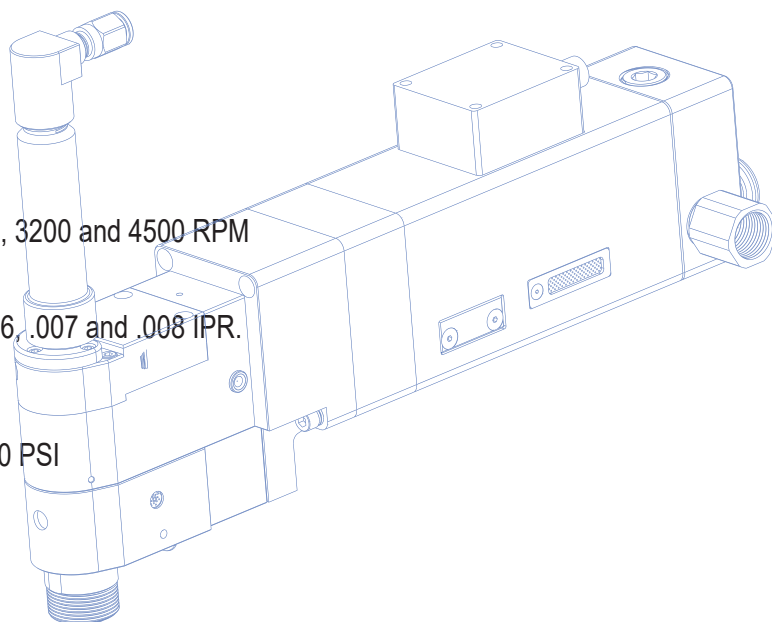
Operative Air Pressure: 90 - 120 PSI

Air Consumption: 53 S.C.F.M

Noise: 90 dB scale A

Vibration below 2.5 cm/sec<sup>2</sup>

Weight with single Gear Reduction: 7.8 lb.



(\*) The overall dimension will increase by 1.16" when using a double gear reduction



# ZT4000I

## Inline Positive Feed Drill

### Specifications

**Capacity:**

Aluminum- Ø1.25" (31.75 mm)

Steel-Ø.75" (19.05mm)

Titanium-Ø.75" (19.05mm)

**Stroke:**

Minimum- .375" (9.525mm)

Maximum- unlimited

**RPM's:**

230, 350, 550, 750, 1000, 2100, 3200 and 4500 RPM

**Feed Rates:**

.001, .002, .003, .004, .005, .006, .007 and .008 IPR.

Air Motor Power: 1.75 HP

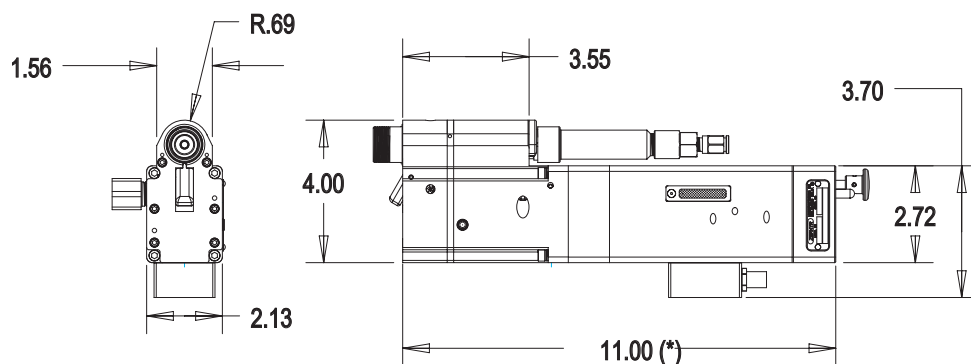
Operative Air Pressure: 90 - 120 PSI

Air Consumption: 53 S.C.F.M

Noise: 85 dB scale A

Vibration below 2.5 cm/sec<sup>2</sup>

Weight with single Gear Reduction: 7.8 lb.



(\*) The overall dimension will increase by 1.16" when using a double gear reduction



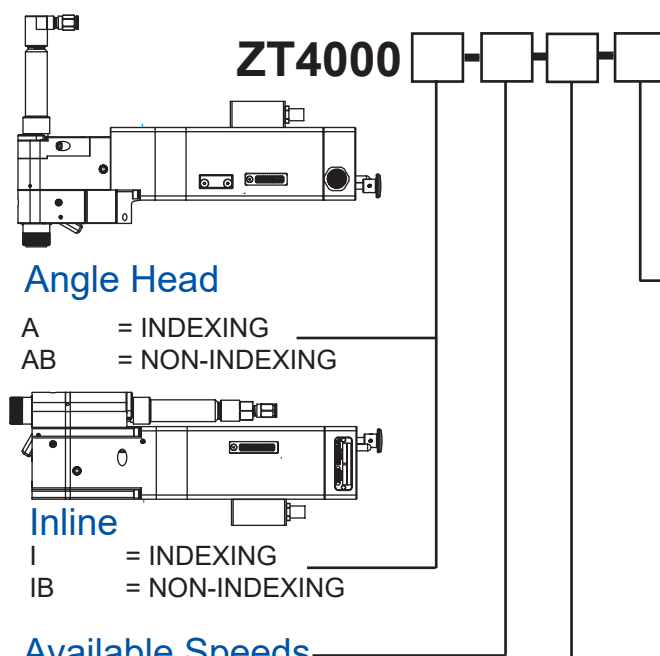
# ZT4000

## HOW TO ORDER AND CONFIGURE YOUR TOOL

### Advanced Positive Feed Drill System

#### Indicate

#### TYPE OF TOOL, RPM, FEED RATE & STROKE



#### Available Speeds

| RPM |        |
|-----|--------|
| 2   | = 230  |
| 3   | = 350  |
| 5   | = 550  |
| 7   | = 750  |
| 10  | = 1000 |
| 21  | = 2100 |
| 32  | = 3200 |
| 45  | = 4500 |

#### Available Strokes

| STROKE |         |
|--------|---------|
| 1      | = 1.00" |
| 2      | = 2.00" |
| 3      | = 3.00" |
| 4      | = 4.00" |
| 5      | = 5.00" |
| 6      | = 6.00" |
| 7      | = 7.00" |
| 8      | = 8.00" |

#### Available Feed Rates

| FEED RATE<br>IN/REV. |        |
|----------------------|--------|
| 1                    | = .001 |
| 2                    | = .002 |
| 3                    | = .003 |
| 4                    | = .004 |
| 5                    | = .005 |
| 6                    | = .006 |
| 7                    | = .007 |
| 8                    | = .008 |

Example: ZT4000A-21-6-3

This is a ZT4000 motor with Indexing Angle head design  
2100 RPM, .006 Feed Rate, and a 3 inch stroke

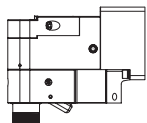
- (\*) Nosepiece adapters, Nosepieces, and Taper Lock Bushings available on request; see accessories page concentric collets, Interrupted Cut.



# ZT4000

## Advanced Positive Feed Drill System

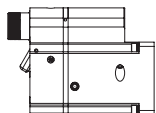
### Assembly Angle Head Module



### Available Feed Rates

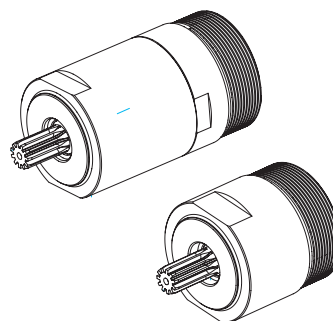
| FEED RATE IN/REV. | ASSEMBLY INDEXING ANGLE HEAD MODULE | ASSEMBLY NON-INDEXING ANGLE HEAD MODULE | ASSEMBLY INDEXING INLINE HEAD MODULE | ASSEMBLY NON-INDEXING INLINE HEAD MODULE |
|-------------------|-------------------------------------|-----------------------------------------|--------------------------------------|------------------------------------------|
| .001              | ZT4000301                           | ZT4000291                               | ZT4000601                            | ZT4000651                                |
| .002              | ZT4000302                           | ZT4000292                               | ZT4000602                            | ZT4000652                                |
| .003              | ZT4000303                           | ZT4000293                               | ZT4000603                            | ZT4000653                                |
| .004              | ZT4000304                           | ZT4000294                               | ZT4000604                            | ZT4000654                                |
| .005              | ZT4000305                           | ZT4000295                               | ZT4000605                            | ZT4000655                                |
| .006              | ZT4000306                           | ZT4000296                               | ZT4000606                            | ZT4000656                                |
| .007              | ZT4000307                           | ZT4000297                               | ZT4000607                            | ZT4000657                                |
| .008              | ZT4000308                           | ZT4000298                               | ZT4000608                            | ZT4000658                                |

### Assembly Inline Head Module



### Available Speeds

| RPM  | ASSEMBLY GEAR REDUCER |
|------|-----------------------|
| 230  | ZT4000202             |
| 350  | ZT4000203             |
| 550  | ZT4000204             |
| 750  | ZT4000207             |
| 1000 | ZT4000210             |
| 2100 | ZT4000220             |
| 3200 | ZT4000230             |
| 4500 | ZT4000242             |



### Available Strokes

| STROKE | SPINDLE   | ASSEMBLY SPINDLE GUARD ANGLE HEAD | ASSEMBLY SPINDLE GUARD INLINE |
|--------|-----------|-----------------------------------|-------------------------------|
| 1"     | ZT4000491 | ZT4000441                         | ZT4000641                     |
| 2"     | ZT4000492 | ZT4000442                         | ZT4000642                     |
| 3"     | ZT4000493 | ZT4000443                         | ZT4000643                     |
| 4"     | ZT4000494 | ZT4000444                         | ZT4000644                     |
| 5"     | ZT4000495 | ZT4000445                         | ZT4000645                     |
| 6"     | ZT4000496 | ZT4000446                         | ZT4000646                     |
| 7"     | ZT4000497 | ZT4000447                         | ZT4000647                     |
| 8"     | ZT4000498 | ZT4000448                         | ZT4000648                     |



Spindle: Internal Thread 9/16"-18



Assembly Spindle Guard Inline



Assembly Spindle Guard Angle Head

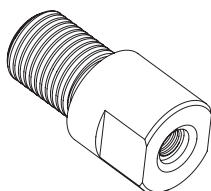


# ZT4000

## Advanced Positive Feed Drill System

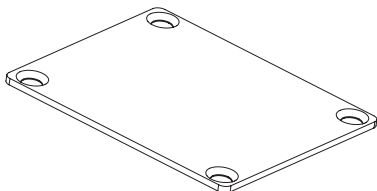
### ZT4000 Accesories

#### Spindle Adapter



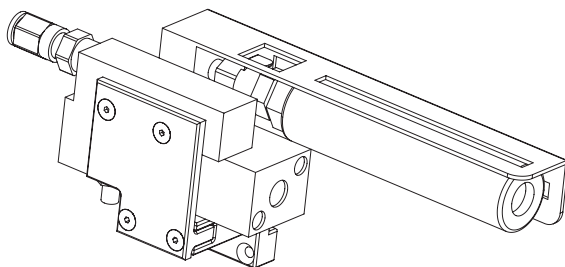
| PART No.  | DESCRIPTION                                 |
|-----------|---------------------------------------------|
| ZT4000417 | SPINDLE ADAPTER THREAD 9/16"-18 TO 1/4"-28  |
| ZT4000418 | SPINDLE ADAPTER THREAD 9/16"-18 TO 5/16"-24 |
| ZT4000419 | SPINDLE ADAPTER THREAD 9/16"-18 TO 3/8"-24  |

#### ZT4000180 Small Hole silencer



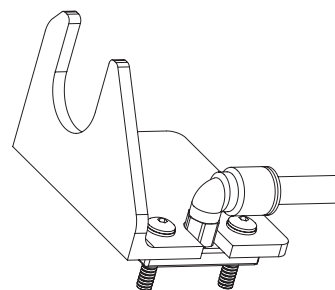
If the tool is going to be used to drill small holes you may not need all of the horse power the ZT4000 produces. You can reduce the noise level from 90dB down to less than 80dB by replacing the air motor muffler retainer.

#### ZT4000500 Unist Lubricator



(\*) Refill Kit ZT4000-61

#### ZT4000516 Bracket Kit West Coast Lubricator



#### ZT4000-TK Concentric Collet

#### ZT4000-TK Interrupted Cut



# ZT4000



# ZT802X

## POSITIVE FEED DRILL

A 90 DEGREE, MANUALLY OPERATED ANGLE DRILL WITH AUTO RETRACT AND MINIMUM SPINDLE OFFSET PERMITS USE IN RESTRICTED AREAS

### Specifications

Zephyr's new ZT802X Positive Feed Drill offers a high power to weight ratio in a compact modular design with ease of operation and maintenance in mind. In addition to its unique features, the ZT802X offers a wider range of RPM's and feed rates than any other tool in its class.

#### Capacity:

Aluminum- .Ø750" (19.0 mm)  
Steel-Ø.500" (12.7 mm)  
Titanium-Ø.500" (12.7mm)  
          -(Ø.625" Intermittent use)  
Carbon (Composite) Ø.625" (15.9 mm)

#### Stroke:

Minimum- .375" (9.525mm)  
Maximum- unlimited

#### RPM:

400, 500, 700, 1000, 1400, 2800 RPM

#### Feed Rate:

.0007, .001, .002, .003, .004, .006, and .008 IPR

#### Weight:

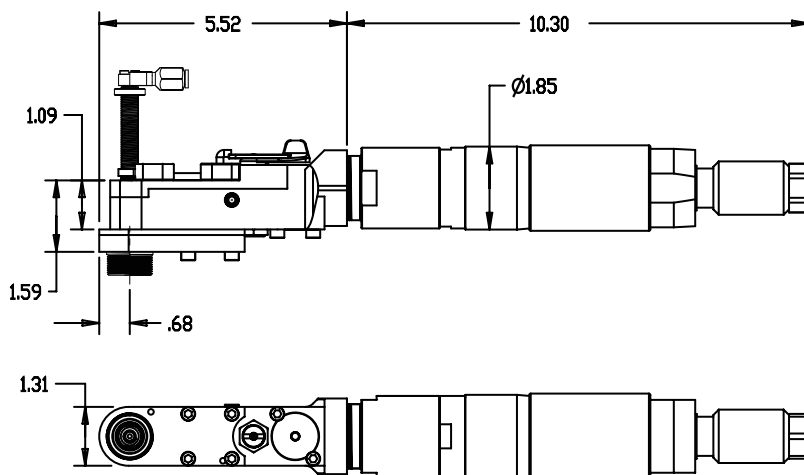
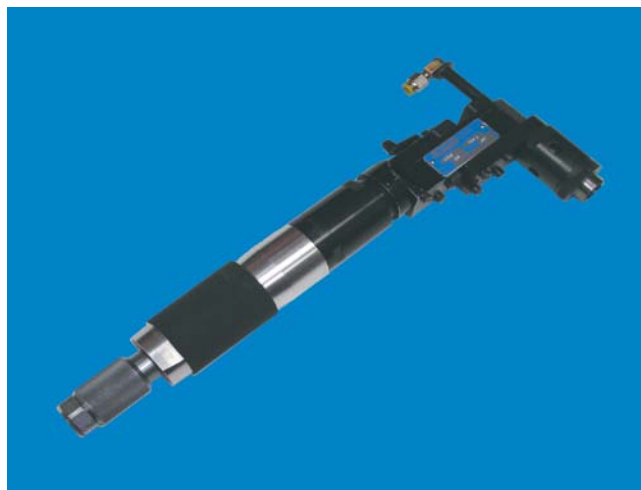
4-1/4 lbs - 1.93 Kg

#### Features:

1. 1.5 HP motor.
2. Right Angle design for close quarter application.
3. Designed for oil hole application.
4. Spindle utilizes 1/4-28 or 5/16-24 (R.H. Threads) internal threads for standard threaded shank drill.
5. Auto retract at the end of drilling cycle.
6. The tool can start in either feed or the retract mode.
7. The spindle can be retracted at any given point during the feed cycle.
8. Rapid spindle retraction permits faster drilling cycle.

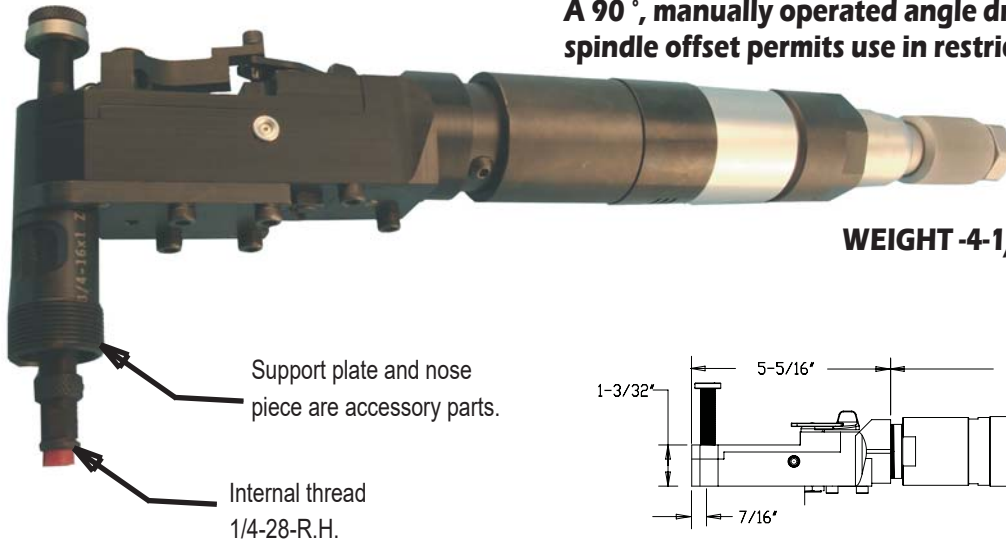
#### Modular Design

1. Gear reducer sub-assembly:
  - Modular designed gear reducers use fewer components while offering a wide range of RPM's.
2. Drill head module:
  - Smallest Drill head for close quarters drilling.
3. Nose piece Index Mechanism:
  - Easy access simple to operate index lever.
  - Allows orientation of the tool around drill axis in 30° increments.
4. No adapter needed for standard 1-20 internal thread nosepiece.
5. For peak performance air line pressures should be 90-100 P.S.I. with hose of 3/8" diameter and tool fitting of 9/32".





# **ZT802** **POSITIVE FEED DRILL**

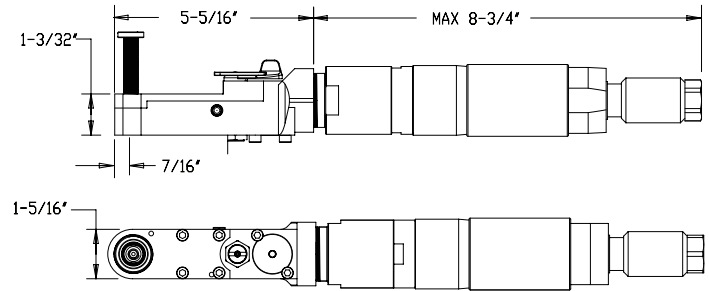


**WEIGHT -4-1/4 Lbs.**

Drill Capacity  
 1/2" Dia. in Aluminum  
 3/8" Dia. in Steel  
 3/8" Dia. in Titanium

Support plate and nose  
 piece are accessory parts.

Internal thread  
 1/4-28-R.H.



## **SPECIFICATIONS**

- Standard .5 H.P. fixed speed or optional variable speed motors. State specific speed or speeds required.
- Drill supplied with standard length solid spindle or optional oil hole spindle through spindle coolant attachment available. State spindle length and style.
- Standard feed rates are listed optional feed rates from .0007 to .016 are available. State specific rate required.
- Support plate nosepiece, and nose lock bushing are accessory parts and are not included as standard parts. If required, state length, diameter and nose lock bushing size and series type.
- Drill and motor cases, transmission and motors are machined from solid bar stock and are fully heat treated.
- Spindle is supported by heavy duty bearings.
- Shear key overload system prevents damage to critical components.
- Rapid spindle retraction permits faster drilling cycle.
- No change in spindle rotation during the retraction cycle produce superior holes.
- Mounting dimensions are shown for use on special fixtures.
- For peak performance air line pressures should be 90-100 P.S.I. with hose of 3/8" inside diameter and tool fitting of 9/32".

| AVAILABLE SPEEDS                    | AVAILABLE FEED (AT ANY SPEED) INCH PER REV. | STROKE | SPINDLE LENGTH |
|-------------------------------------|---------------------------------------------|--------|----------------|
| 150, 200, 300, 400, 665, 1000, 1330 | .0007                                       | 1/2"   | 1-1/2"         |
|                                     |                                             | 1"     | 2"             |
|                                     |                                             | 2"     | 3"             |
|                                     | .001                                        | 1/2"   | 1-1/2"         |
|                                     |                                             | 1"     | 2"             |
|                                     |                                             | 2"     | 3"             |
|                                     | .002                                        | 1/2"   | 1-1/2"         |
|                                     |                                             | 1"     | 2"             |
|                                     |                                             | 2"     | 3"             |
|                                     | .003                                        | 1/2"   | 1-1/2"         |
|                                     |                                             | 1"     | 2"             |
|                                     |                                             | 2"     | 3"             |
|                                     | .004                                        | 1/2"   | 1-1/2"         |
|                                     |                                             | 1"     | 2"             |
|                                     |                                             | 2"     | 3"             |
|                                     | .006                                        | 1/2"   | 1-1/2"         |
|                                     |                                             | 1"     | 2"             |
|                                     |                                             | 2"     | 3"             |
|                                     | .008                                        | 1/2"   | 1-1/2"         |
|                                     |                                             | 1"     | 2"             |
|                                     |                                             | 2"     | 3"             |

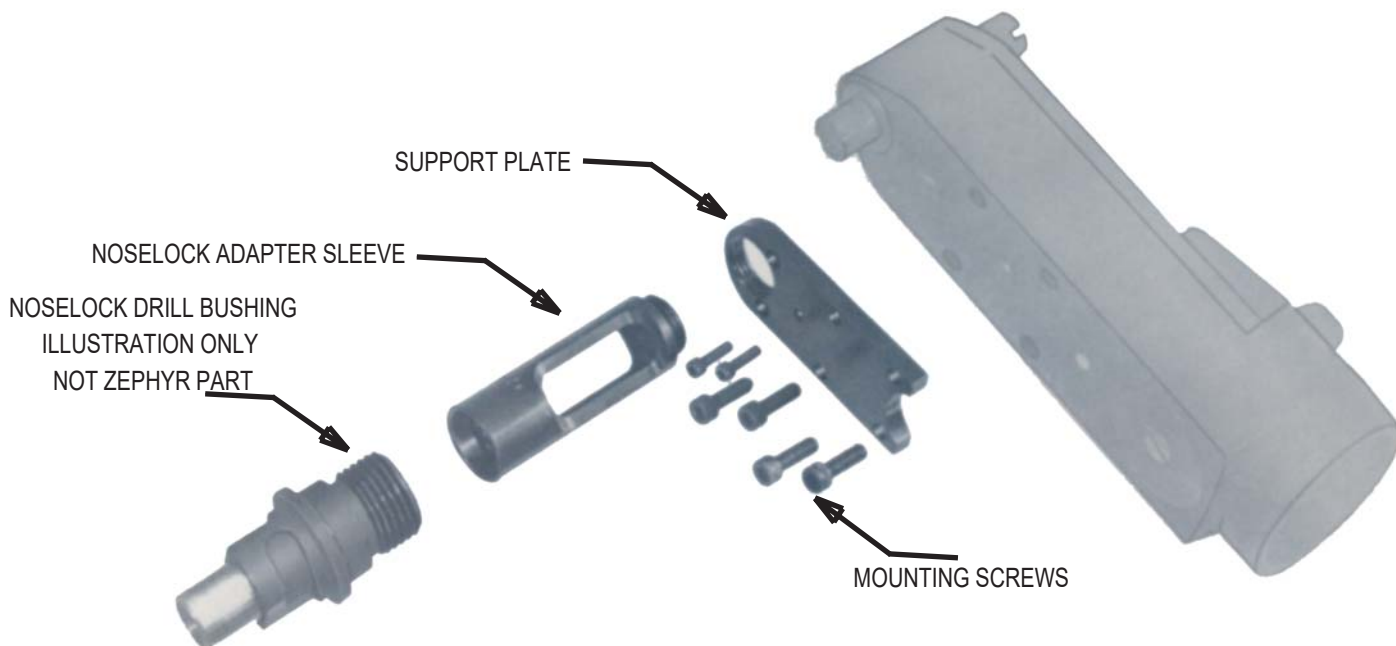
Other motor speeds available on request.



## POSITIVE FEED DRILL ACCESSORIES

Other motor speeds available on request.

### NOSELOCK BUSHING ADAPTORS



| USED ON DRILL<br>MODEL | SPINDLE<br>STROKE<br>LENGTH | BUSHINGS<br>THREADS<br>L. HAND | ASSEMBLY<br>NUMBER | SUPPORT<br>PLATE | NOSELOCK<br>ADAPTOR | MOUNTING<br>SCREWS |
|------------------------|-----------------------------|--------------------------------|--------------------|------------------|---------------------|--------------------|
| ZT802                  | 1"                          | 3/4"-16                        | ZT802099           | ZT8020106        | ZT8010107           | ZT449-15           |
|                        | 2"                          |                                | ZT8020100          |                  | ZT8010108           | &                  |
|                        | 3"                          |                                | ZT8020101          |                  | ZT8010109           | ZT507-2            |

Other Noselock Bushing adaptors are available on request, these allow for fine length adjustments and positioning of the tool in relation to the structure.



## POSITIVE FEED DRILLS

Zephyr Automatic and Semi-Automatic Air Powered Positive Feed Drills represent a significant advancement in drilling precision holes for both aerospace and industrial applications. Zephyr positive feed drills incorporate a simple, rugged and highly versatile power and transmission system that results in unmatched performance and reliability whether the application is aluminum, heat treated steel, titanium or advanced composite structure. Straight, tapered, countersunk or counterbored holes, up to three inches in diameter and fifteen inches long, with finish diameter tolerances of .0003 can be drilled at high production rates with Zephyr drill systems.

Zephyr positive feed drills ensure high quality and productivity because of their built-in design features. Zephyr drills produce high quality holes by drilling at a fixed rate of feed with respect to drill rotation. The positive feed system avoids work hardening caused by drill rotation without cutting and premature drill failure due to excess pressure applied by the operator or drill breakthrough. The drilling cycle is fully automatic, the operator needs only to start the drill by a simple button or valve.

Zephyr positive feed drills have been designed to achieve performance levels and unmatched service life with motor sizes and transmission systems significantly smaller than current systems. These features reduce operator fatigue, increase productivity, allow access in severely restricted areas and reduce the use of compressed air.

Zephyr drills have been designed for long service life at high production rates. They require minimum maintenance and will deliver reliable performance under severe operating conditions.

Zephyr positive feed drill systems are available in a wide range of sizes and styles, inline, piggy -back and right angle drills. Feed rates of .0005 to .016 and motor speeds in excess of 3,000 RPM's are available. In addition Zephyr offers a wide range of standard and special accessories such as magnetic bases, lubricators, special nose pieces, offsets, portable gun drills and fully automated systems.

Zephyr has a major ongoing commitment to the development of new drilling concepts, designed to increase both productivity and quality standards.

We would welcome the opportunity to service your special requirements on an individual basis.



## POSITIVE FEED DRILLS

DESIGNED AND MANUFACTURED WITH RIGID PRECISION REQUIREMENTS, A MINIMUM OF DETAIL PARTS, PLUS THE USE OF QUALITY MATERIALS, PRESENTS A STRONG AND RUGGED UNIT WITH A MINIMUM OF MAINTENANCE NEEDS.

CHECK THESE FEATURES:

1. POSITIVE FEED
2. RAPID SPINDLE RETURN
3. FULL AUTOMATIC CYCLE, OR
4. SEMI AUTOMATIC CYCLE, (RESET FOR DRILLING)
5. MINIMUM SPINDLE OFFSET
6. OVERLOAD PROTECTION
7. STROKE LENGTH CONTROL
8. OPTIONAL SPINDLE LENGTH
9. OPTIONAL MOTOR SPEEDS
10. OPTIONAL FEED RATES
11. ACCURATE DEPTH CONTROL FOR COUNTERSINKING

COMPARE THE ABOVE WITH THE TOOLS YOU ARE NOW USING, THEN WRITE AND REQUEST A DEMONSTRATION IN YOUR PLANT.