Superior Solutions for Sheet Metal Fabricators

ULTRA® TOOLING

- ULTRA TEC® TOOLING
- ULTRA TEC® FULLY GUIDED TOOLING
- ULTRA TEC® HEAVY DUTY TOOLING
- ULTRA XT™ TOOLING
- ULTRAFORM®
- THICK TURRET STYLE TOOLING
- ULTRA LIGHT™ TOOLING
- ULTRA ABS® TOOLING

MATE®

PRECISION TOOLING

mate.com/thickturret

PART NUMBER 2007

Mate Tooling Lasts Longer

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MATE PRECISION TOOLING

Company Overview

Founded in 1962, Mate has grown into a world-class manufacturer of superior products and solutions for sheet metal fabricators. We manufacture tooling for every major CNC punch press, and offer a complete line of CO_2 laser products. Our mission: To be the world's leading supplier of precision tooling for CNC punch presses. Our purpose: Helping sheet metal fabricators produce quality parts faster and more efficiently.

Commitment to Quality

Mate's dedication to quality is not just demonstrated in the products and services we provide, it is a part of every aspect of our business. This commitment was formally recognized when Mate was honored with the Minnesota Quality Award, Achievement level, for 2005. We integrate the Baldrige National Quality Program's criteria into the way we operate and continually measure our progress in improving our products, processes, and service.

Customer Satisfaction Guaranteed

Customer service is a critical component of Mate's business. Mate's Sales engineers are experts in their field working on site with customers to solve fabricating issues. This commitment to customer satisfaction is extended around the world with Mate tooling experts available in every industrialized country. Customer education is available for every product Mate offers and is available 24/7 at mate.com. My.mate.com, a free web-based portal, allows registered users access to previously ordered drawings of special shapes and assemblies. Mate offers an extensive standard product line that can be delivered with same day or next day service and all our products come with a 100% satisfaction guarantee.

Products and Solutions That Work

Mate's product engineering team currently holds several national and international patents and continues to develop products that push the boundaries of manufacturing technology. Our state-of-the-art technology center is an integral part of this process. It allows us to develop and test new tooling concepts and designs, and focus on proving the viability of value-added products while reducing the time needed to bring these products to market. The technology center also allows us to replicate the end user's environment and needs in every way. We work closely with the world's leading sheet metal fabricators and punch press manufacturers conducting research and evaluating new products. These partnerships bring to Mate a combined effort to continually offer customers superior products with proven solutions.

Spanning the Globe

Mate has over 80 dealers providing products and services in every industrialized country, and Mate's European operations are headquartered in Oberursel, Germany. Our dealers are thoroughly trained to assist with all tooling needs from simple hole punching to complex special applications. Mate recognized the need for an international specialist in the punch press tooling field and has been serving the international market since 1967. Our commitment to serving manufacturers around the world was formally recognized when Mate was presented with the President's "E" Certificate for Exports by the Secretary of Commerce in 1996. Today, approximately 50% percent of Mate's revenue has come from outside the United States. We are committed to improving manufacturing technology around the world, by helping established and emerging manufacturers produce quality parts faster and more efficiently.

TABLE OF CONTENTS

THICK TURRET TOOLING SYSTEMS OVERVIEW

Mate offers the most comprehensive range of thick turret tooling systems designed to accommodate any punching application. Use this simple chart to determine which system is right for your typical thick turret applications.

LESS ← • •• ••• •••• → MORE	Ultra TEC®	Ultra XT™	Original Thick Turret
Overall Value – The combination of features, purchase price, and operating costs.	••••	•••	••
Cost Savings – The ongoing cost savings of operating the tooling system over time.	••••	•••	•
Ease of Use – Design features included in the tooling system that make it faster to install, simpler for the operator to set up, and more convenient to maintain.	••••	••	•
Interchangeability – The ability of a tooling system to be compatible with other popular systems from other major suppliers.	••••	•••	••
Quick Set-up – Integral features which enable tools to be changed quickly and accurately, thus maximizing machine up time.	••••	•••	••
Grind Life – The sum of the number of holes punched between regrinds AND the total grindable length of the punch tip before it needs to be replaced.	••••	•••	••
Slug Free® Die – Advanced die geometry that prevents the slug from being pulled back to the top of the sheet.	••••	••••	••••
Features – Elements of a tool system that affects its ease of use, performance and longevity.	••••	•••	••
Purchase Price – The initial purchase price of the system.	•••	••	•

Ultra TEC® Precision Tooling System

PERFORMANCE

Mate's Ultra TEC® precision tooling system is a thick turret punching system which increases tool performance and flexibility, offers extended tool life and allows interchangability with existing systems. Some features of the Ultra® system include:

- Premium high speed tool steel punches
- Quick tool change strippers – no tools required
- Relieved strippers for extended grind life
  - 0.118(3.00) for 1/2" A and 1-1/4" B station
  - 0.078(2.00) for 2" C, 3-1/2" D and 4-1/2" E stations
- Easy click length adjustment - no shims or tooling required
- Internal and external tool lubrication
- Hardened guides
- Slug Free® die design

Visit mate.com/ultra for more information.

Dimensions in inches (millimeters)

THICK TURRET TOOLING SYSTEMS OVERVIEW

Ultra XT™ Precision Tooling System

CONVENIENCE

Mate's Ultra XT™ precision tooling system is a thick turret punching system which increases tool performance and flexibility, offers extended tool life and allows interchangeability with existing systems. Features of the Mate Ultra XT™ system include:

- Premium high speed tool steel punches
- Quick tool change strippers
- Relieved strippers for extended grind life
  - 0.118(3.00) for 1/2" A and 1-1/4" B station
- OEM compatible strippers 2" C, 3-1/2" D, and 4-1/2" E stations.
- Easy click length adjustment - no shims or tooling required
- Internal and external lubrication
- Slug Free® die design

Visit mate.com/ultraxt for more information.

Original Style Thick Turret Tooling

ECONOMY

Original style thick turret tooling from Mate is OEM compatible, with several design enhancements, including:

- Premium high speed steel punches
- Hexagon shaped punch heads in 1/2" A and 1-1/4" B stations for easier adjustment
- Reversible spring retainers in 1/2" A and 1-1/4" B stations for additional tool life
- Hardened guides for reduced friction and longer service life.
- Mate Slug Free® dies as standard

Visit mate.com/originalthickturret for more information.

Mate Ultraform® Tooling System

FORMING

Mate's Ultraform tooling system features adjustable length holders for 1-1/4" B, 2" C, 3-1/2" D and 4-1/2" E stations. Each Ultraform holder can be used with a variety of special forming inserts.

Each Mate Ultraform holder includes a precise and convenient length adjustment mechanism to allow the fine adjustment of any forming tool to achieve high quality piece parts.

The benefits of the Ultraform tooling system include reduced tooling cost, increased flexibility and ease of length adjustment for accurate forms.

Visit mate.com/ultraform for more information.

Dimensions in inches (millimeters)

FEATURES AND BENEFITS
1/2" A AND 1-1/4" B STATION

Ultra® precision tooling system – designed to dramatically improve any punching operation • 0.237(6.04) more grind life than original style tooling • No tools needed for quick disassembly and assembly of guide, punch and stripper • Quick length adjustment significantly reduces change over and set-up times • Fully compatible with alternative systems • Superior internal and external spiral grooved lubrication system ensures uniform distribution of oil for smooth friction free operation of punch to guide and guide to turret bore • Hardened and ground guides stay round and true to size which greatly reduces turret bore wear • Slug Free® dies eliminate slug pulling.

Punches:
- Premium high speed tool steel for extended life between regrinds and maximum productivity.
- 1/4 degree back taper and near polished flanks to reduce friction, eliminate galling and extend punch life.
- External lubrication grooves to allow fluid flow.
- Available in multiple styles:
  - Ultra TEC with lubrication grooves.
  - Ultra Metric (original) style punches.
  - Inch style (1-1/4" B station only).

Strippers:
- Relieved to allow 0.118(3.00) extra grind life.
- Quick-change mechanism to allow rapid tool change.
- Rounded edges to minimize sheet marking.

Slug Free® Dies:
- Slug Free die geometry eliminates slug pulling.
- Highly wear resistant, chrome air hardened tool steel
- Uniform clearance radii in die corners improve edge quality.
- Superior roundness and flatness with exceptional die strength.
- Up to 0.125(3.20) grind life.

Canister Assemblies:
- Quick length adjustment with positive engagement with the guide.
- Uniform spring pressure for reliable stripping.
- Available in multiple styles:
  - Ultra TEC for use with Ultra TEC punches.
  - Ultra Metric (Original) style punches.
  - Inch style (1-1/4" B station only) for Inch style punches.

Universal Guides:
- Quick-change mechanism - no tools required.
- Tool remains assembled during tool length adjustment.
- Internal and external lubrication to reduce friction.
- Hardened and ground to reduce wear.
- Available in two styles:
  - Shaped – multiple precision internal keyways for shaped punches.
  - Round – internal keyway for round punches.

- **Long Lasting**
- **Freedom**
- **Flexibility**
- **Convenience**
- **Economy**
- **Quick adjustments**
- **Lowest cost per hole**

MATE®

Dimensions in inches (millimeters)

FEATURES AND BENEFITS
2" C, 3-1/2" D, AND 4-1/2" E STATION

Ultra® precision tooling system – designed to dramatically improve any punching operation • 0.212(5.38) more punch grind life than original style tooling • Quick change strippers • Quick length adjustment • Internal lubrication within punch guide • External lubrication between guide and turret bore ensures uniform distribution of oil within the turret bore • Hardened guides to reduce turret bore wear • Slug Free® dies eliminate slug pulling.

Punches:
- Premium high speed tool steel for extended life between regrinds and maximum productivity.
- 1/4 degree back taper and near polished flanks to reduce friction and eliminate galling.
- Superior angularity, concentricity, and dimensional accuracy.
- Robust full-body design.
- Fully compatible with original style thick turret tooling.

Strippers:
- Relieved to allow 0.078(2.00) extra grind life.
- Recessed to allow collection of lubrication fluid at punch tip.
- Quick-change mechanism to allow rapid tool change.
- Rounded edges to minimize sheet marking.
- Optional urethane stripper pads to eliminate sheet marking.

Slug Free® Dies:
- Highly wear resistant, chrome air hardened tool steel to balance hardness and toughness.
- Slug Free die geometry eliminates slug pulling.
- Uniform clearance radii in die corners to improve edge quality.
- Precision orientation keyway.
- Up to 0.125(3.20) grind life.
- Superior roundness and flatness with exceptional die strength.

Punch Guide Assembly:
- Quick-change stripper release mechanism allows stripper to be removed easily, without tools.
- Quick length adjustment mechanism on the side of the guide allows the punch length to be adjusted without disassembly.
- Hardened and ground to stay round and true to size to greatly reduce turret bore wear.
- Internal and external lubrication grooves to reduce friction.
- High performance disc springs to optimize stripping force throughout the service life of the machine.

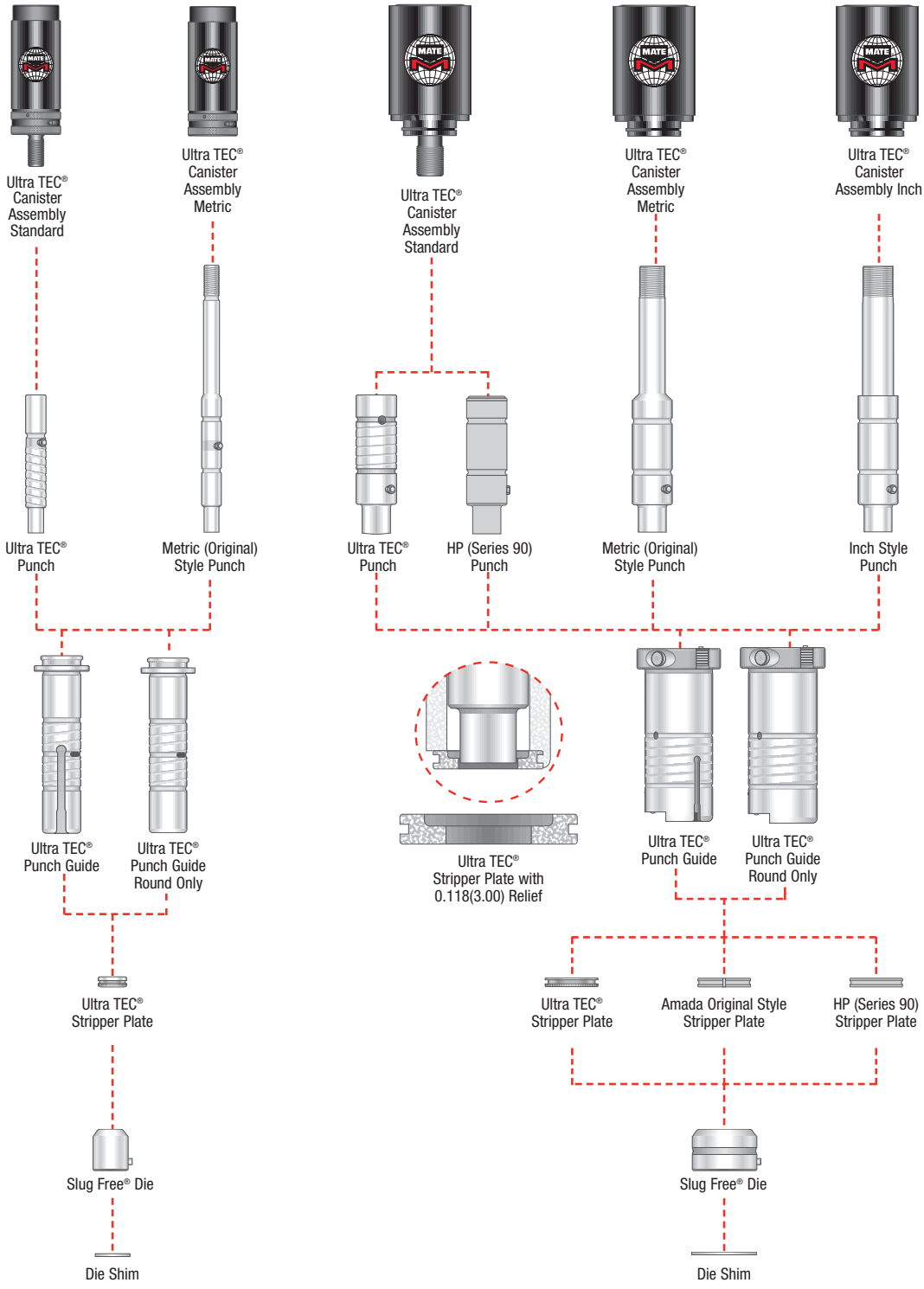
Visit mate.com/ultra for more information.

Dimensions in inches (millimeters)

SYSTEM OVERVIEW

1/2" A STATION

1-1/4" B STATION



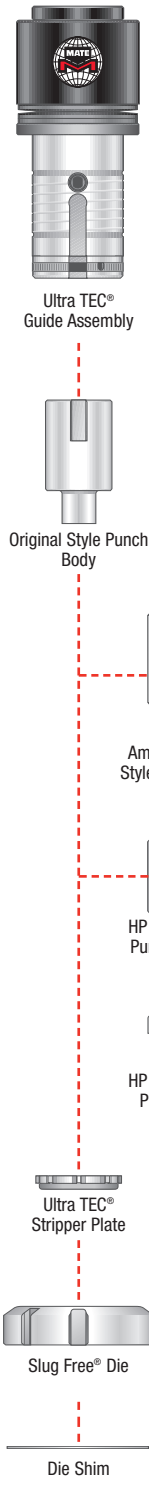
Features include:

• Extended grind life • Interchangeable components
• Multiple angle settings • Quick length adjustment
• Quick tool change • Premium high speed tool steel punches • Slug Free® die

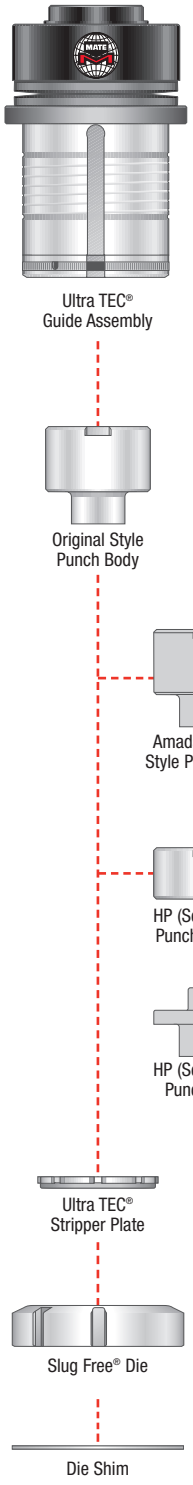
Dimensions in inches (millimeters)

SYSTEM OVERVIEW

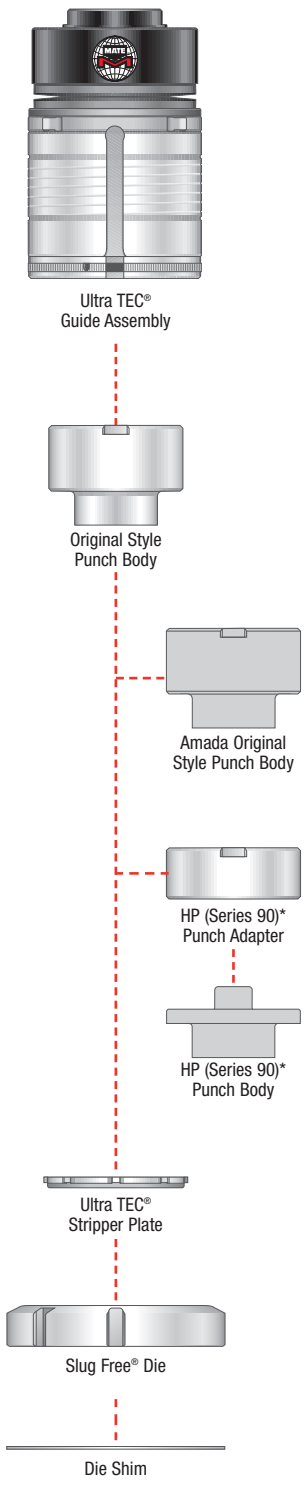
2" C STATION



3-1/2" D STATION



4-1/2" E STATION

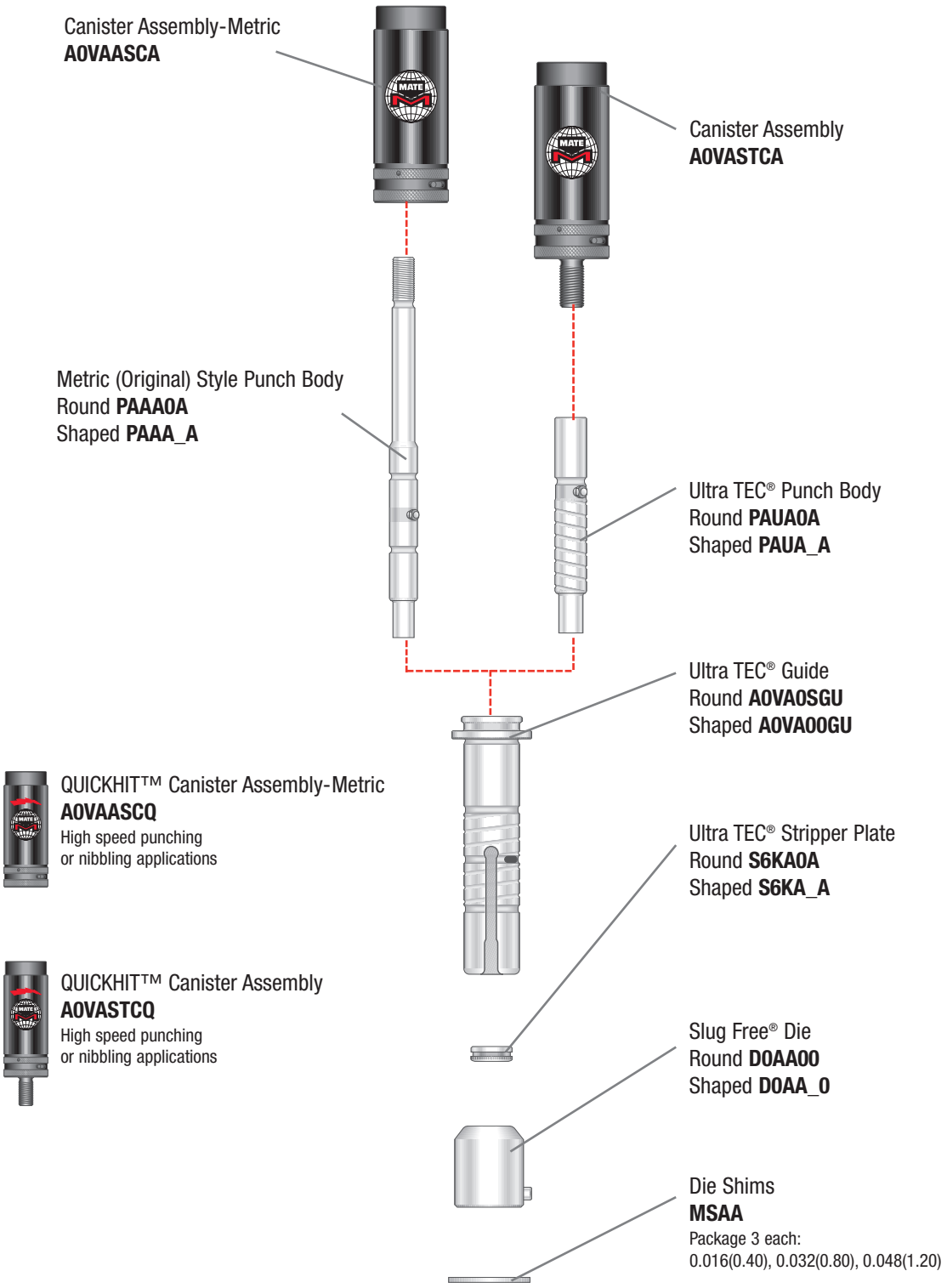


***Fully Compatible with Mate MXC™.** **See pages 42-43.**

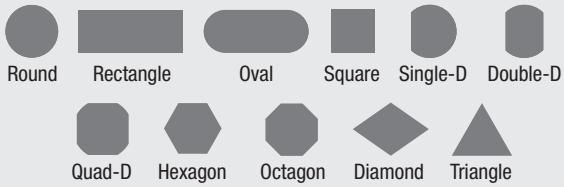
Features include:

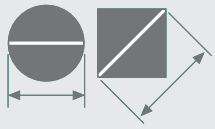
• Extended grind life • Interchangeable components
• Multiple angle settings • Quick length adjustment
• Quick tool change • Premium high speed tool steel punches • Slug Free® die

ULTRA TEC® 1/2" A STATION ASSEMBLY FOR ULTRA TEC® AND THICK TURRET STYLE PUNCHES



STANDARD SHAPES





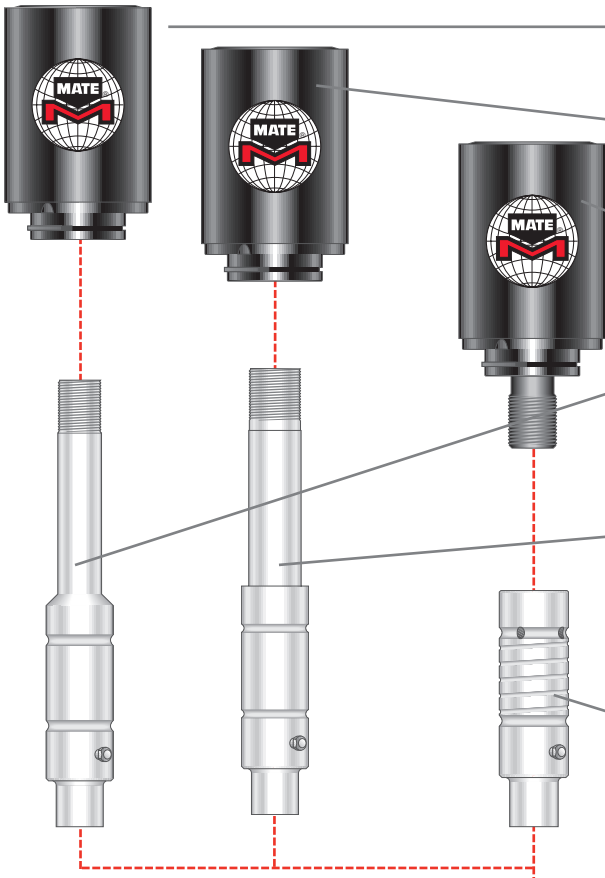
1/2" A Station
Maximum 0.500(12.70)
diameter/diagonal

See page 13 for Slug Free Light™ Dies

See page 94 for Add-Ons

Dimensions in inches (millimeters)

ULTRA TEC® 1-1/4" B STATION ASSEMBLY FOR ULTRA TEC® AND THICK TURRET STYLE PUNCHES



Canister Assembly-Metric
A0VBASCA

Canister Assembly-Inch
A0VBWSCA

Canister Assembly
A0VBSTCA

Metric (Original) Style Punch Body
Round **PAAB0A**
Shaped **PAAB_A**

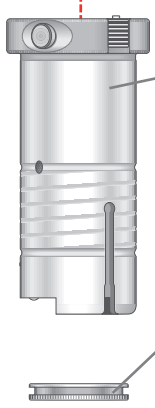
Inch Style Punch Body
Round **PAJB0A**
Shaped **PAJB_A**

Ultra TEC® Punch Body
Round **PAUB0A**
Shaped **PAUB_A**

QUICKHIT™ Canister Assembly
A0VBSTCQ
High speed punching
or nibbling applications

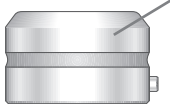
QUICKHIT™ Canister Assembly-Inch
A0VBWSCQ
High speed punching
or nibbling applications

QUICKHIT™ Canister Assembly-Metric
A0VBASCQ
High speed punching
or nibbling applications



Ultra TEC® Punch Guide
Round **A0VB0SGU**
Shaped **A0VB00GU**

Ultra TEC® Stripper Plate
Round **S6KB0A**
Shaped **S6KB_A**

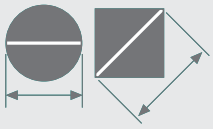


Slug Free® Die
Round **D0AB00**
Shaped **D0AB_0**

Die Shims
MSAB
Package 3 each:
0.016(0.40), 0.032(0.80), 0.048(1.20)

See page 13 for Slug Free Light™ Dies

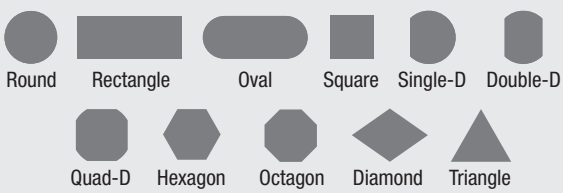
See page 94 for Add-Ons



1-1/4" B Station
Maximum 1.250(31.75)
diameter/diagonal

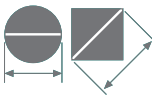
Dimensions in inches (millimeters)

STANDARD SHAPES



ULTRA TEC® GUIDE ASSEMBLIES FOR THICK TURRET STYLE PUNCHES

2" C STATION



Maximum
2.000(50.80)
diameter/diagonal

Ultra TEC® Guide Assembly
AGVC1Z

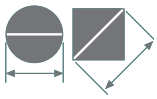
Original Style Punch Body
Round **PAAC0A**
Shaped **PAAC_A**

Ultra TEC® Stripper Plate
Round **S6KC0A**
Shaped **S6KC_A**

Slug Free® Die
Round **D0AC00**
Shaped **D0AC_0**

Die Shims
MSAC
Package 3 each:
0.016(0.40), 0.032(0.80), 0.048(1.20)

3-1/2" D STATION



Maximum
3.500(88.90)
diameter/diagonal

Ultra TEC® Guide Assembly
AGVD1Y

Original Style Punch Body
Round **PAAD0A**
Shaped **PAAD_A**

Ultra TEC® Stripper Plate
Round **S6KD0A**
Shaped **S6KD_A**

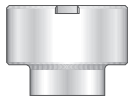
Slug Free® Die
Round **D0AD00**
Shaped **D0AD_0**

Die Shims
MSAD
Package 3 each:
0.016(0.40), 0.032(0.80), 0.048(1.20)

4-1/2" E STATION

Maximum
4.500(114.30)
diameter/diagonal

Ultra TEC® Guide Assembly
AGVE1Z



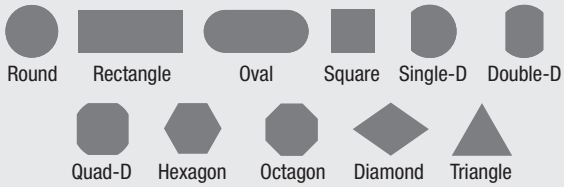
Original Style Punch Body
Round **PAAE0A**
Shaped **PAAE_A**

Ultra TEC® Stripper Plate
Round **S6KE0A**
Shaped **S6KE_A**

Slug Free® Die
Round **D0AE00**
Shaped **D0AE_0**

Die Shims
MSAE
Package 3 each:
0.016(0.40), 0.032(0.80), 0.048(1.20)

STANDARD SHAPES



See page 13 for Slug Free Light™ Dies

See page 94 for Add-Ons

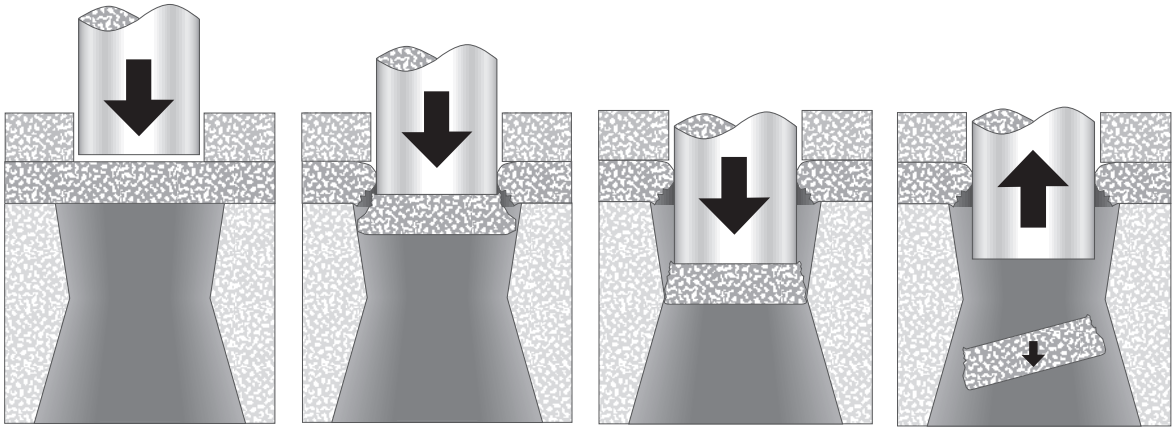
Dimensions in inches (millimeters)

MATE SLUG FREE® DIES

Mate Slug Free® Dies

Mate Slug Free® dies eliminate slug pulling. Slug pulling is a condition where the slug returns to the top of the sheet during the stripping portion of the punching cycle. The slug comes between the punch and the top of the sheet on the next cycle. This causes damage to the piece part and the tooling. Slug Free dies eliminate this problem.

The Slug Free die has been designed with an opening that has a constriction point below the surface so the slug cannot return once it passes this point. Once the slug is separated from the punch, it is free to fall away from the punching area. Slug pulling is eliminated.



Material held securely by stripper before punch makes contact.

Punch penetrates the material. Slug fractures away from sheet.

Pressure point constricts slug. Punch stroke bottoms out as slug squeezes past pressure point.

Punch retracts and slug is free to fall down and away through exit taper of the Slug Free® die.

Mate Slug Free Light™ Dies for Thin Sheet Metal

Mate Slug Free Light™ thick turret dies are designed to eliminate slug pulling when punching thin sheet metal material, where the recommended die clearance is less than 0.008(0.20).

The Mate Slug Free Light die works by introducing a series of small protrusions around the edge of the slug. Each protrusion is created by a small angled notch cut into the die opening (See photo 1). As the slug passes through the die, the position of the protrusion relative to the notch changes slightly. This change creates slight pressure between the slug and the die land, which traps the slug into the die and eliminates the possibility of the slug being pulled back through the die. By eliminating slug pulling with every punch cycle, the piece part quality is improved and tool life is increased.

Mate Slug Free Light dies are available for thick turret tooling and are particularly effective when the die clearance is less than 0.008(0.20).

Photo 1: Mate Slug Free Light™ notches are cut at an angle to create a series of protrusions on the slug. As the slug moves through the die, the protrusions become trapped against the die land to prevent the slug pulling back on to the sheet. (Image enhanced for additional clarity)

- **Eliminate slug pulling**
- **Reduce tool breakage**
- **Improve tool life**
- **Increase quality**

Dimensions in inches (millimeters)

FEATURES AND BENEFITS

1-1/4" B STATION

Ultra TEC® Canister Assembly Standard

Ultra TEC® Canister Assembly Metric

Ultra TEC® Punch

Metric (Original) Style Punch

Ultra TEC® Fully Guided Punch Guide

Ultra TEC® Fully Guided Stripper Plate

Slug Free® Die

2" C STATION

Fully Guided Guide Assembly

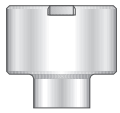
Original Style Punch Body

Ultra TEC® Fully Guided Stripper Plate

Slug Free® Die

3-1/2" D STATION

Fully Guided Guide Assembly



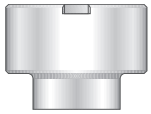
Original Style Punch Body

Ultra TEC® Fully Guided Stripper Plate

Slug Free® Die

4-1/2" E STATION

Fully Guided Guide Assembly



Original Style Punch Body

Ultra TEC® Fully Guided Stripper Plate

Slug Free® Die

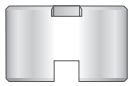
- **Fully guided assembly**
  Accurate and close tolerances between guide and stripper hold punches rigid, control against hole distortion and saw toothing.
- **Premium high speed tool steel punches at 60-62 Rockwell C**
  Specially formulated high speed steel and specially developed heat treatment processes result in unusually high tool performance, superior dimensional accuracy and maximum tool life.
- **Stripper opening 0.0015(0.04) TC to point**
  Guiding at punch point supports punches, increases hole accuracy, improves stripping and prevents scrap from rising into the assembly.
- **Quick length adjustment**
  The external quick length adjustment button on the side of the guide allows the punch length to be adjusted without disassembly.
- **Hardened and ground guide**
  Reduces abrasive action of punching, diffuses heat effectively, resists galling, extends tool life, increases turret life and improves up time.
- **Interior and exterior spiral grease grooves**
  Even and consistent tool lubrication increases tool life.
- **Tool Lubrication**
  Interior vertical fluid grooves and fluid through holes provide even and efficient transfer of lubrication fluid to internal surfaces and to external guide surface area, increases lubrication and tool life.
- **Slug Free® die design**
  Clearing the slug every cycle eliminates slug pulling, extends tool life, improves piece part quality and reduces scrap.

Dimensions in inches (millimeters)

FEATURES AND BENEFITS

3-1/2" D STATION

Ultra TEC® Fully Guided Clamp Clearing Guide Assmbly



Punch Retainer

Slitting Insert

"DD" Stripper Plate

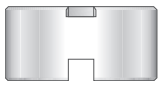
"D" Stripper Plate

"DD" Clamp Clearing Slug Free® Die

"D" Clamp Clearing Slug Free® Die

4-1/2" E STATION

Ultra TEC® Fully Guided Clamp Clearing Guide Assmbly



Punch Retainer

Slitting Insert

"DD" Stripper Plate

"D" Stripper Plate

"DD" Clamp Clearing Slug Free® Die

"D" Clamp Clearing Slug Free® Die

- **Fully guided assembly**
  Accurate and close tolerances between guide and stripper hold punches rigid, control against hole distortion and saw toothing.

- **Premium high speed tool steel punches at 60-62 Rockwell C**
  Specially formulated M4PM™ high speed steel and specially developed heat treatment processes result in unusually high tool performance, superior dimensional accuracy and maximum tool life.

- **Stripper opening 0.0015(0.04) TC to point**
  Guiding at punch point supports punches, increases hole accuracy, improves stripping and prevents scrap from rising into the assembly.

- **Clamp clearing relief**
  Use this tool close to work holder clamps. The stripper and the die are relieved so the clamp can pass between the upper and the lower unit. No need to reposition the clamps, saves time, improves piece part quality.

- **Quick length adjustment**
  The external quick length adjustment button on the side of the guide allows the punch length to be adjusted without disassembly. Guide will adjust punch point length by 0.008(0.20) per click.

- **Hardened and ground guide**
  Reduces abrasive action of punching, diffuses heat effectively, resists galling, extends tool life, increases turret life and improves up time.

- **Interior and exterior spiral grease grooves**
  Even and consistent tool lubrication increases tool life.

- **Tool Lubrication**
  Interior vertical fluid grooves and fluid through holes provide even and efficient transfer of lubrication fluid to internal surfaces and to external guide surface area, increases lubrication and tool life.

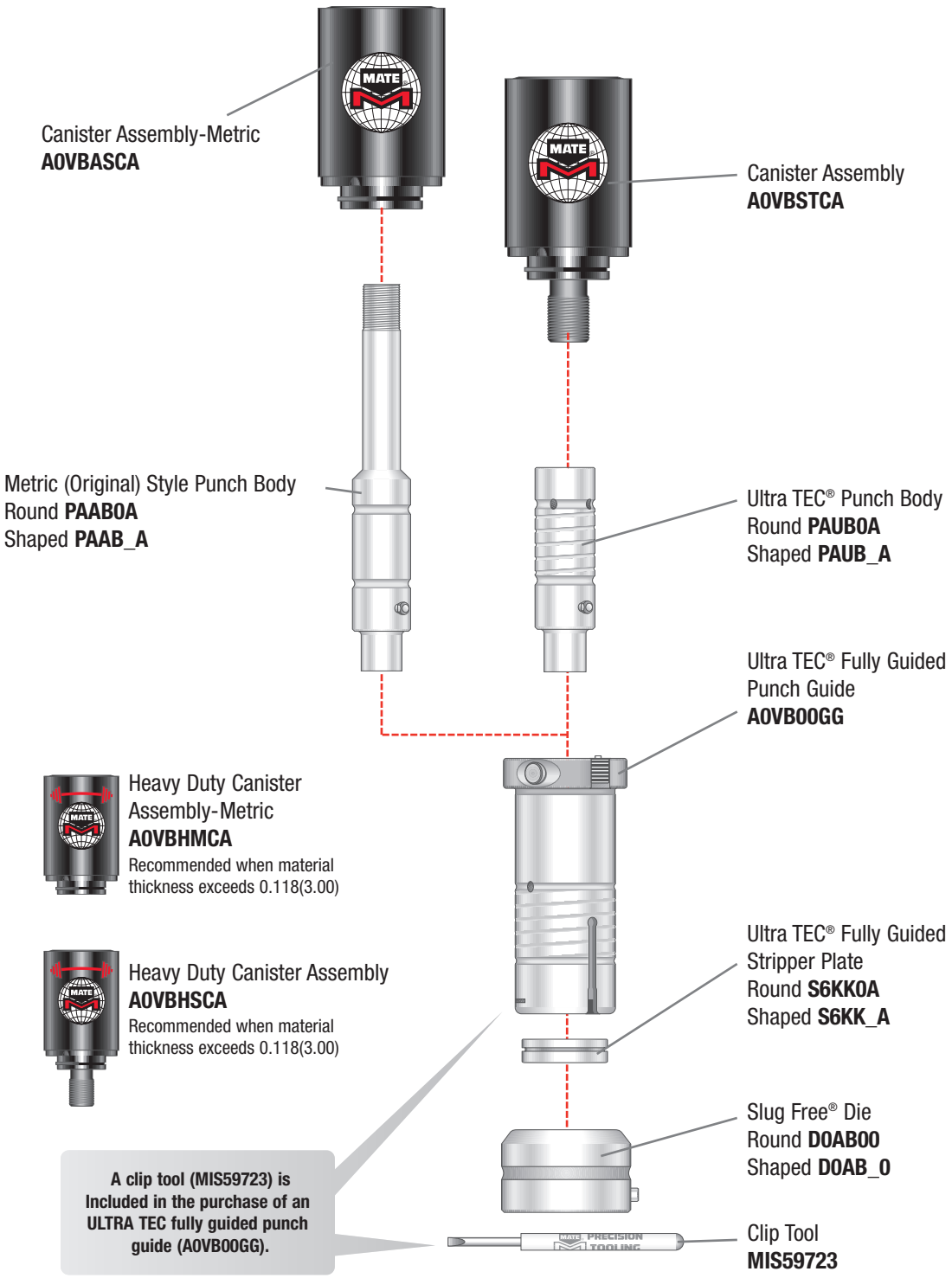
- **Additional 0.079(2.00) punch grind life**
  Use insert style punches from Mate in combination with this specially designed stripper to gain additional grind life.

- **Slug Free® die design**
  Clearing the slug every cycle eliminates slug pulling, extends tool life, improves piece part quality and reduces scrap.

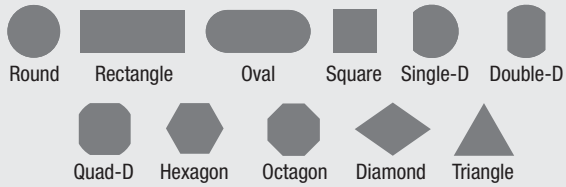
Dimensions in inches (millimeters)

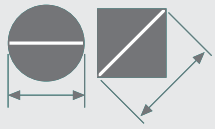
ULTRA TEC® FULLY GUIDED

1-1/4" B STATION



STANDARD SHAPES





1-1/4" B Station
Maximum 1.250(31.75)
diameter/diagonal

See page 13 for Slug Free Light™ Dies

See page 94 for Add-Ons

Dimensions in inches (millimeters)

ULTRA TEC® FULLY GUIDED

2" C STATION

Maximum
2.000(50.80)
diameter/diagonal

Ultra TEC® Fully Guided
Guide Assembly*
AGVS1Z

Original Style Punch Body
Round **PAAC0A**
Shaped **PAAC_A**

Fully Guided Stripper Plate
Round **S2KL0A**
Shaped **S2KL_A**

Slug Free® Die
Round **D0AC00**
Shaped **D0AC_0**

*Also Available
(2" C Station Only)
AGVS3Z
External keyways at
0°, 45° and 90°

3-1/2" D STATION

Maximum
3.500(88.90)
diameter/diagonal

Ultra TEC® Fully Guided
Guide Assembly**
AGVT1Y

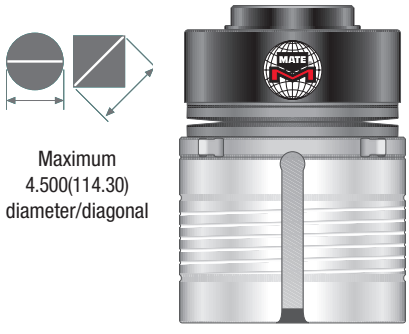
Original Style Punch Body
Round **PAAD0A**
Shaped **PAAD_A**

Fully Guided Stripper Plate
Round **S2KM0A**
Shaped **S2KM_A**

Slug Free® Die
Round **D0AD00**
Shaped **D0AD_0**

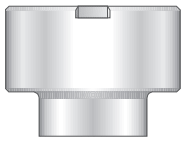
**Also Available
(3-1/2" D Station Only)
AGVT3Y
External keyways at
0°, 45° and 90°

4-1/2" E STATION



Maximum
4.500(114.30)
diameter/diagonal

Ultra TEC® Fully Guided
Guide Assembly
AGVU1Z



Original Style Punch Body
Round **PAAE0A**
Shaped **PAAE_A**

Fully Guided Stripper Plate
Round **S2KN0A**
Shaped **S2KN_A**

Slug Free® Die
Round **D0AE00**
Shaped **D0AE_0**

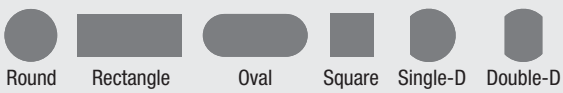
See page 13 for Slug Free Light™ Dies

See page 94 for Add-Ons

Lifter "T" Handle

A0LEH

STANDARD SHAPES

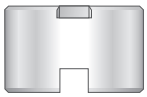


Dimensions in inches (millimeters)

ULTRA TEC® FULLY GUIDED CLAMP CLEARING SLITTING TOOL FOR 3-1/2" D AND 4-1/2" E STATION

3-1/2" D STATION

Ultra TEC® Fully Guided Clamp Clearing Guide Assembly



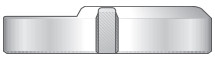
Punch Retainer

Slitting Insert

"DD" Stripper Plate

"D" Stripper Plate

"DD" Clamp Clearing Slug Free® Die

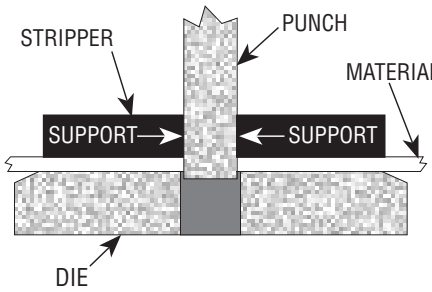


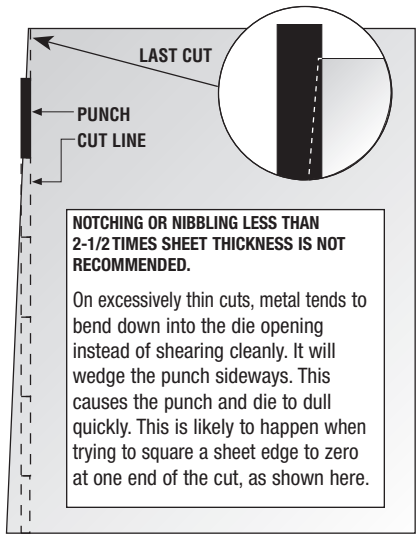
"D" Clamp Clearing Slug Free® Die

ULTRA® CLAMP CLEARING SLITTING TOOL

This tool is specially designed for slitting and parting applications. Separating piece parts, trimming sheet edges, and reducing sheet sizes often requires the use of a tool with long narrow dimensions. Rectangles with radius corners or ovals are recommended.

Slitting and parting applications require the tool to pierce material cleanly and accurately while overcoming various side load and twisting pressures. For example, parting a sheet will include an amount of overlap in each step where sheet resistance is absent. This causes the force of resistance to build on one side which can cause the hole to distort or saw tooth. The same is true when trimming the edge of a sheet.



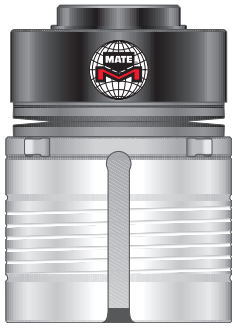


NOTCHING OR NIBBLING LESS THAN 2-1/2 TIMES SHEET THICKNESS IS NOT RECOMMENDED.

On excessively thin cuts, metal tends to bend down into the die opening instead of shearing cleanly. It will wedge the punch sideways. This causes the punch and die to dull quickly. This is likely to happen when trying to square a sheet edge to zero at one end of the cut, as shown here.

The Ultra clamp clearing slitting tool is designed to overcome these side load and twisting pressures. The advantage comes from punch point guiding. By squarely and tightly controlling the punch point where it contacts the sheet, the punch can accurately pierce a hole, even when punching partial hits.

4-1/2" E STATION



Ultra TEC® Fully Guided Clamp Clearing Guide Assembly

Punch Retainer

Slitting Insert

"DD" Stripper Plate

"D" Stripper Plate

"DD" Clamp Clearing Slug Free® Die

"D" Clamp Clearing Slug Free® Die

ULTRA TEC® FULLY GUIDED CLAMP CLEARING

3-1/2" D STATION

3.500(88.90) maximum punch diagonal/length

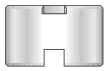
0.315(8.00) maximum punch width

3.560(90.40) maximum die diagonal/length

0.374(9.50) maximum die width

*Also Available
(3-1/2" D Station Only)
AGVT3Y
External keyways at 0°, 45° and 90°

Ultra TEC® Fully Guided Guide Assembly*
AGVT1Y



Punch Retainer
A0LD00PR

Slitting Insert
Shaped **P4AQ_A**

Clamp Clearing "DD" Stripper Plate
Shaped **S6KW_A**

Clamp Clearing "D" Stripper Plate
Shaped **S6KT_A**

Clamp Clearing "DD" Slug Free® Die
Shaped **D0AW_0**

Clamp Clearing "D" Slug Free® Die
Shaped **D0AT_0**

4-1/2" E STATION

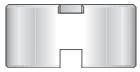
4.500(114.30) maximum punch diagonal/length

0.315(8.00) maximum punch width

4.560(115.80) maximum die diagonal/length

0.374(9.50) maximum die width

Ultra TEC® Fully Guided Guide Assembly*
AGVU1Z



Punch Retainer
A0LE00PR

Slitting Insert
Shaped **P4AR_A**

Clamp Clearing "DD" Stripper Plate
Shaped **S6KX_A**

Clamp Clearing "D" Stripper Plate
Shaped **S6KU_A**

Clamp Clearing "DD" Slug Free® Die
Shaped **D0AX_0**

Clamp Clearing "D" Slug Free® Die
Shaped **D0AU_0**

See page 13 for Slug Free Light™ Dies

See page 94 for Add-Ons

Lifter "T" Handle

A0LEH

STANDARD SHAPES

Rectangle Oval

Dimensions in inches (millimeters)

FEATURES AND BENEFITS
1/2" A AND 1-1/4" B STATION

Mate's Ultra XT™ Precision Tooling System is a thick turret punching system which increases tool performance and flexibility, offers extended tool life and allows interchangeability with existing systems. Some features of the Ultra XT™ system include: • Premium high speed tool steel punches • Quick tool change • Easy click length adjustment - no punch shims required • Grooved guides for better lubrication • Slug Free® die design • 0.118(3.00) additional punch grind life.

Punches:
- Premium high speed tool steel for extended life between regrinds and maximum productivity.
- 1/4 degree back taper and near polished flanks to reduce friction, eliminate galling and extend punch life.
- External lubrication grooves to allow fluid flow.
- Available in multiple styles:
  - Ultra TEC with lubrication grooves.
  - Ultra Metric compatible with original style punches.
  - Inch Style (1-1/4" B station only).

Strippers:
- Fully compatible with Ultra TEC® tooling system.
- Relieved to allow 0.118(3.00) extra grind life.
- Quick-change mechanism to allow rapid tool change.

Slug Free® Dies:
- Slug Free die geometry eliminates slug pulling. See page 13.
- Highly wear resistant, chrome air hardened tool steel
- Uniform clearance radii in die corners improve edge quality.
- Up to 0.125(3.20) grind life.

Canister Assemblies:
- Quick length adjustment with positive engagement with the guide.
- Uniform spring pressure for reliable stripping.
- Available in multiple styles:
  - Ultra TEC for use with Ultra TEC standard punches.
  - Ultra Metric for original style punches.
  - Inch Style (1-1/4" B station only) for Inch style punches.

Guides with External Orientation Slots:
- Quick-change mechanism with no tools require.
- Tool remains assembled during tool length adjustment.
- Internal and external lubrication to reduce friction.
- Hardened and ground to reduce wear.
- Available in three styles:
  - Round – internal keyway for round punches only.
  - Shaped – one precision internal keyway, 0° and 90° external keyways.
  - Shaped – one precision internal keyway, 0° and 45° external keyways

MATE®

Dimensions in inches (millimeters)

FEATURES AND BENEFITS
2" C, 3-1/2" D, AND 4-1/2" E STATION

Mate's Ultra XT™ Precision Tooling System is a thick turret punching system which increases tool performance and flexibility, offers extended tool life and allows interchangeability with existing systems. Some features of the Ultra XT™ system include: • Premium high speed tool steel punches • Quick tool change • Easy click length adjustment - no punch shims required • Grooved guides for better lubrication • Slug Free® die design • Compatible with machine tool lubrication systems • OEM compatible strippers in the 2" C, 3-1/2" D, 4-1/2" E stations.

Punches:
- Premium high speed tool steel for extended life between regrinds and maximum productivity.
- 1/4 degree back taper and near polished flanks to reduce friction and eliminate galling.
- Superior angularity, concentricity, and dimensional accuracy.
- Robust full-body design.
- Fully compatible with original style thick turret tooling.

Strippers:
- Fully OEM compatible.
- Close tolerance opening for superior piece part quality.
- Radiused face to ease installation and reduce sheet marking.

Slug Free® Dies:
- Highly wear resistant, chrome air hardened tool steel to balance hardness and toughness.
- Slug Free die geometry eliminates slug pulling. See page 13.
- Uniform clearance radii in die corners to improve edge quality.
- Precision orientation keyway.
- Up to 0.125(3.20) grind life.
- Superior roundness and flatness with exceptional die strength.

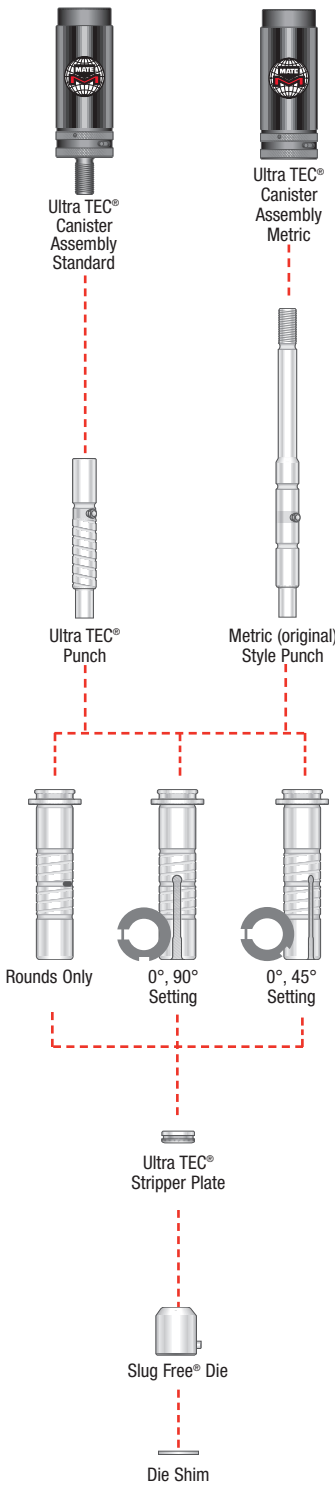
Punch Guide Assembly:
- Fully compatible with original style strippers.
- Quick length adjustment mechanism on the side of the guide allows the punch length to be adjusted without disassembly.
- Hardened and ground to stay round and true to size to greatly reduce turret bore wear.
- Internal and external lubrication grooves to reduce friction.
- High performance disc springs to optimize stripping force.

Visit mate.com/ultraxt for more information.

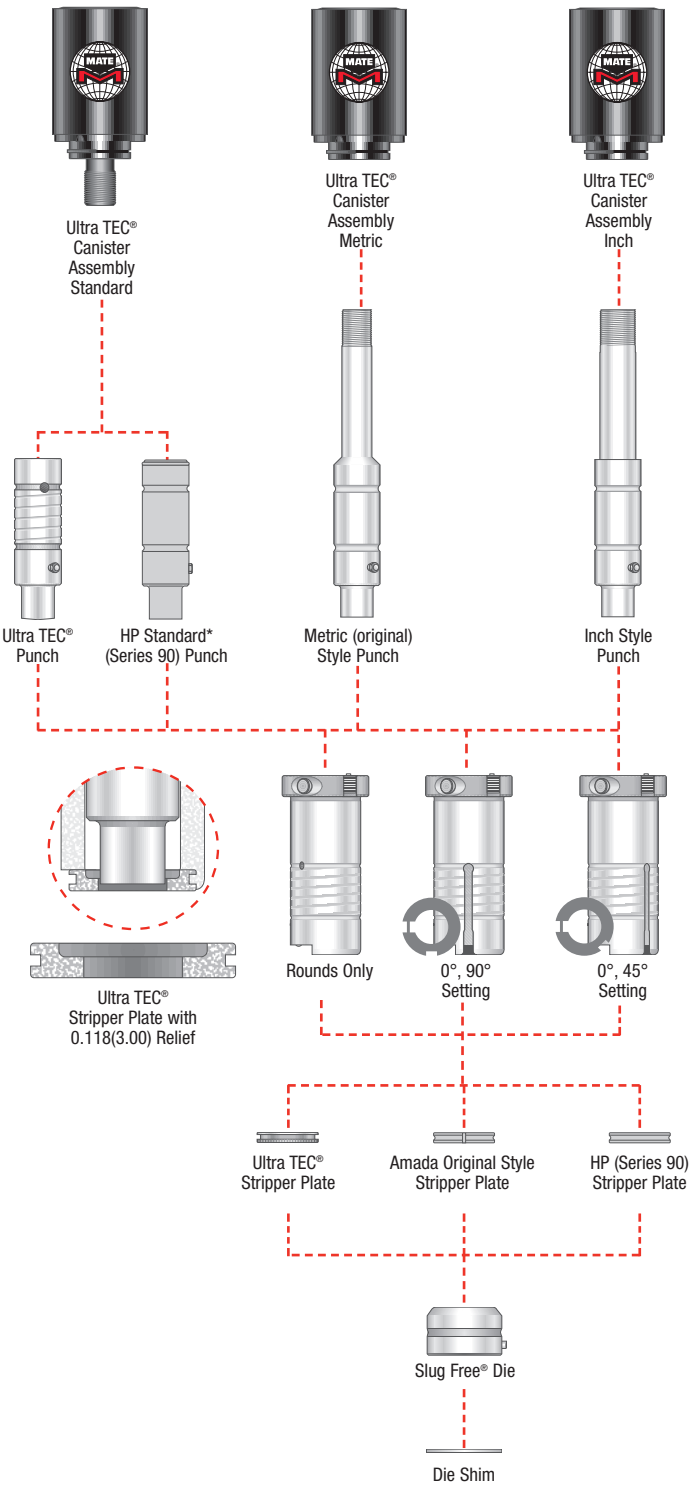
Dimensions in inches (millimeters)

SYSTEM OVERVIEW

1/2" A STATION



1-1/4" B STATION

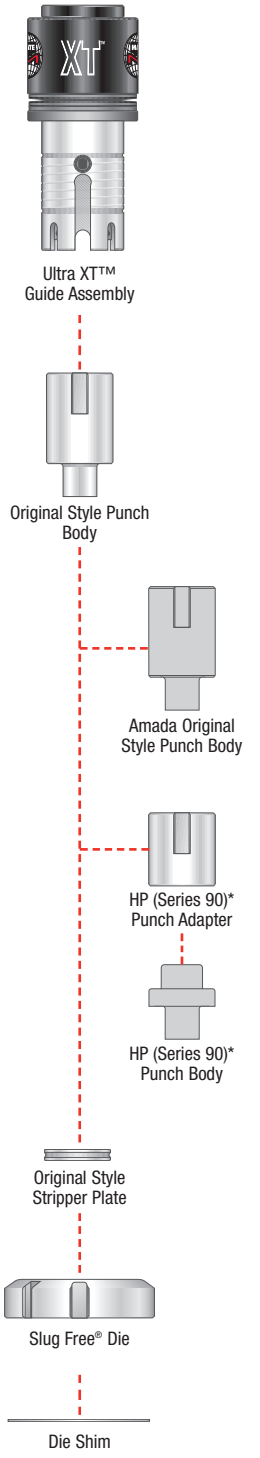


***HP WLS and HP ABS are not compaitble with Ultra XT guides. Use Ultra TEC guides.**
See pages 6-12

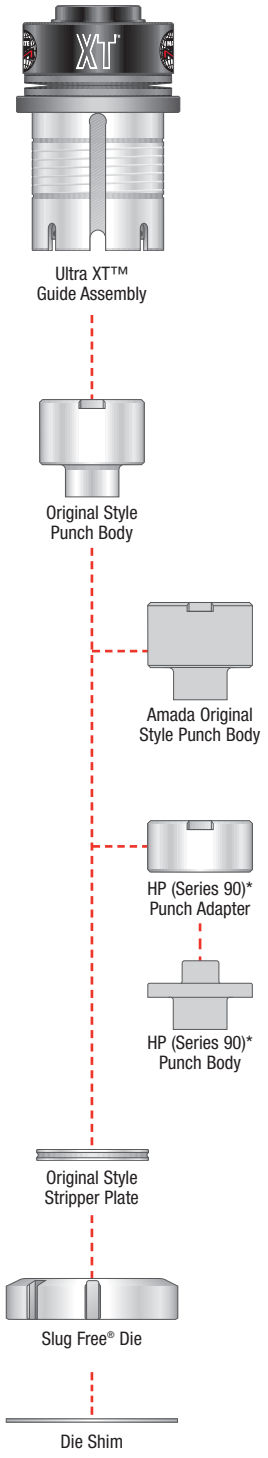
Dimensions in inches (millimeters)

SYSTEM OVERVIEW

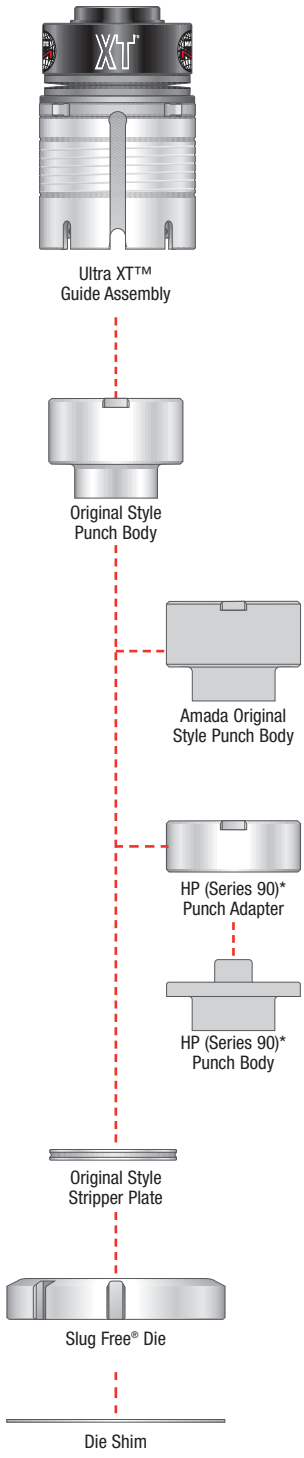
2" C STATION



3-1/2" D STATION



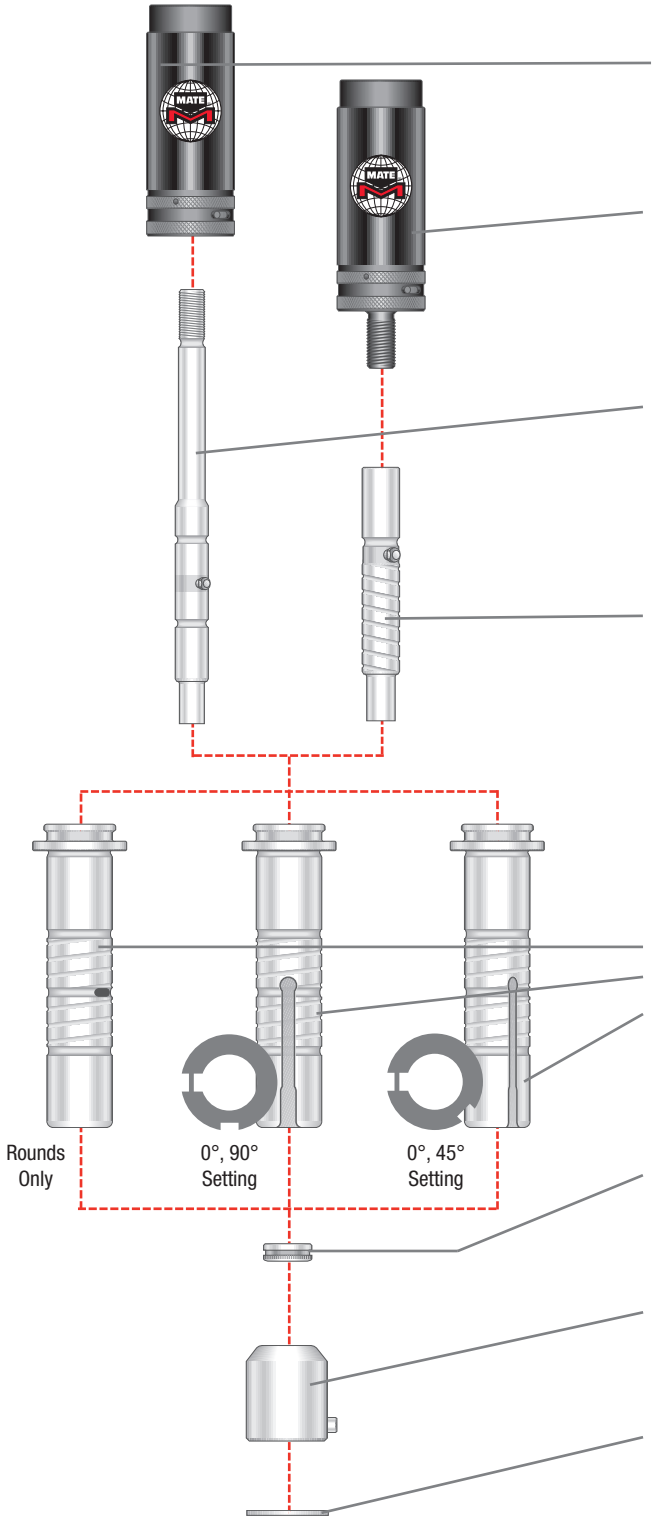
4-1/2" E STATION



***Fully Compatible with Mate MXC™. See pages 42-43.**

Visit mate.com/ultraxt for more information.

ULTRA XT™ 1/2" A STATION ASSEMBLY FOR ULTRA TEC® AND THICK TURRET STYLE PUNCHES



Canister Assembly-Metric
A0VAASCA

Canister Assembly
A0VASTCA

Metric (Original) Style Punch Body
Round **PAAA0A**
Shaped **PAAA_A**

Ultra TEC® Punch Body
Round **PAUA0A**
Shaped **PAUA_A**

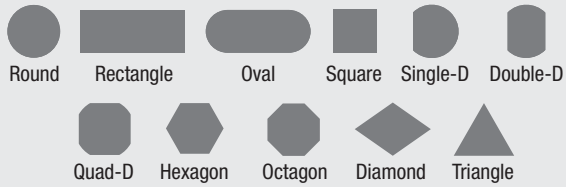
Ultra XT Guide
Round **A0VA0SGU**
Shaped **MATE00204**
Shaped **MATE00205**

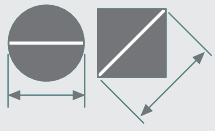
Ultra TEC® Stripper Plate
Round **S6KA0A**
Shaped **S6KA_A**

Slug Free® Die
Round **D0AA00**
Shaped **D0AA_0**

Die Shims
MSAA
Package 3 each:
0.016(0.40), 0.032(0.80), 0.048(1.20)

STANDARD SHAPES





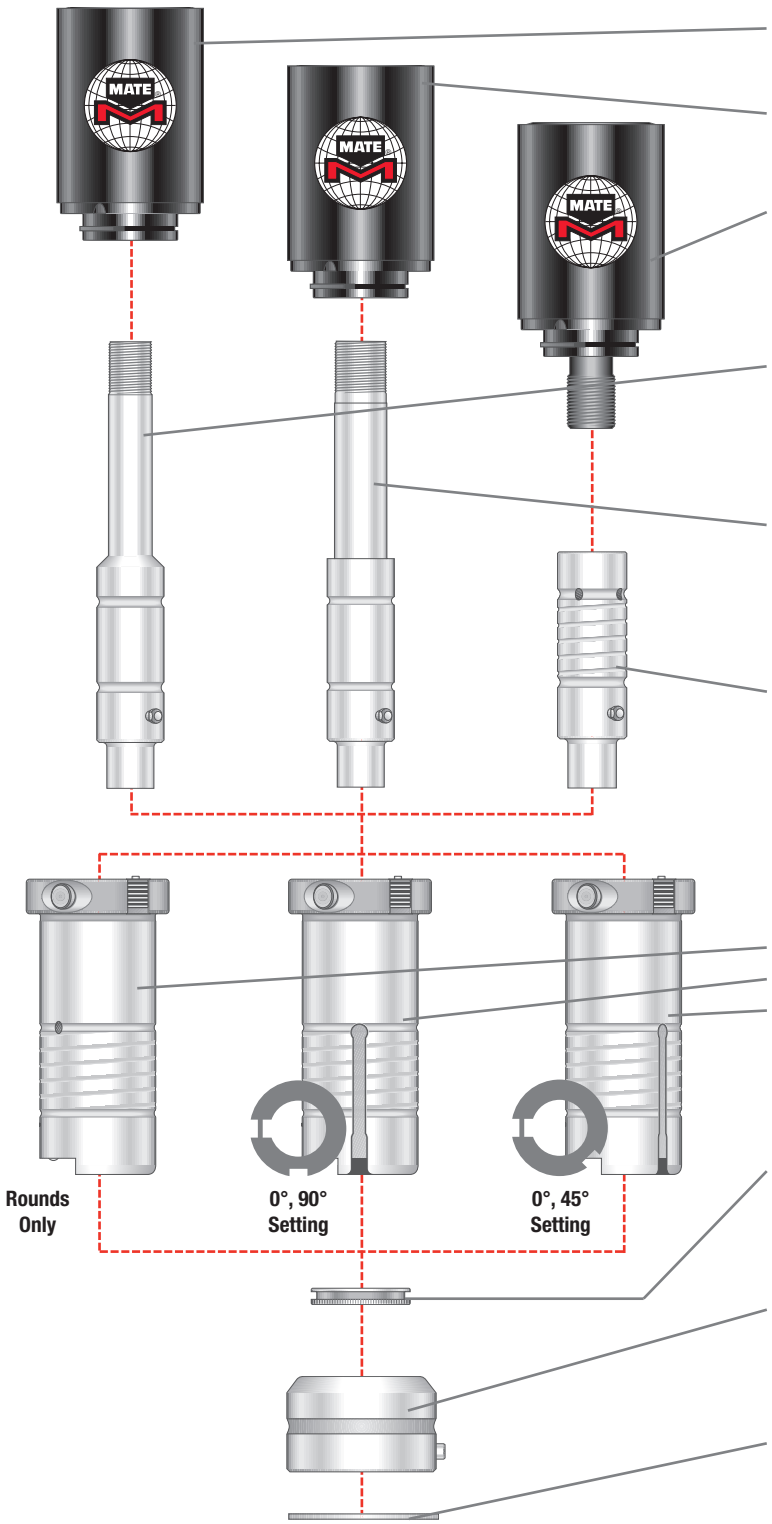
1/2" A Station
Maximum 0.500(12.70)
diameter/diagonal

See page 13 for Slug Free Light™ Dies

See page 94 for Add-Ons

Dimensions in inches (millimeters)

ULTRA XT™ 1-1/4" B STATION ASSEMBLY FOR ULTRA TEC® AND THICK TURRET STYLE PUNCHES



Canister Assembly-Metric
A0VBASCA

Canister Assembly-Inch
A0VBWSCA

Canister Assembly
A0VBSTCA

Metric (Original) Style Punch Body
Round **PAAB0A**
Shaped **PAAB_A**

Inch Style Punch Body
Round **PAJB0A**
Shaped **PAJB_A**

Ultra TEC® Punch Body
Round **PAUB0A**
Shaped **PAUB_A**

Ultra XT Guide
Round **A0VB0SGU**
Shaped **MATE00206**
Shaped **MATE00207**

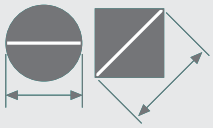
Ultra TEC® Stripper Plate
Round **S6KB0A**
Shaped **S6KB_A**

Slug Free® Die
Round **D0AB00**
Shaped **D0AB_0**

Die Shims
MSAB
Package 3 each:
0.016(0.40), 0.032(0.80), 0.048(1.20)

See page 13 for Slug Free Light™ Dies

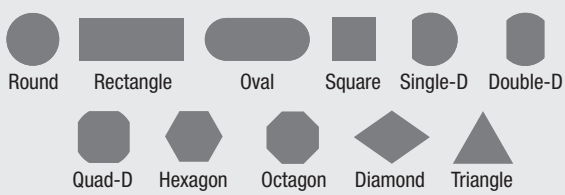
See page 94 for Add-Ons



1-1/4" B Station
Maximum 1.250(31.75) diameter/diagonal

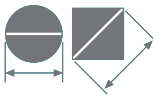
Dimensions in inches (millimeters)

STANDARD SHAPES



ULTRA XT™ GUIDE ASSEMBLIES FOR THICK TURRET STYLE TOOLING

2" C STATION



Maximum
2.000(50.80)
diameter/diagonal

Ultra XT Guide Assembly
MATE00209

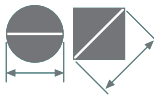
Original Style Punch Body
Round **PAAC0A**
Shaped **PAAC_A**

Original Style Stripper Plate
Round **S6AC0A**
Shaped **S6AC_A**

Slug Free® Die
Round **D0AC00**
Shaped **D0AC_0**

Die Shims
MSAC
Package 3 each:
0.016(0.40), 0.032(0.80), 0.048(1.20)

3-1/2" D STATION



Maximum
3.500(88.90)
diameter/diagonal

Ultra XT Guide Assembly
MATE00211

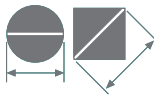
Original Style Punch Body
Round **PAAD0A**
Shaped **PAAD_A**

Original Style Stripper Plate
Round **S6AD0A**
Shaped **S6AD_A**

Slug Free® Die
Round **D0AD00**
Shaped **D0AD_0**

Die Shims
MSAD
Package 3 each:
0.016(0.40), 0.032(0.80), 0.048(1.20)

4-1/2" E STATION



Maximum
4.500(114.30)
diameter/diagonal

Ultra XT Guide Assembly
MATE00213

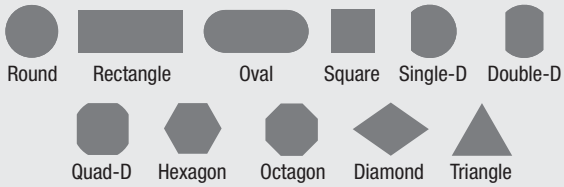
Original Style Punch Body
Round **PAAE0A**
Shaped **PAAE_A**

Original Style Stripper Plate
Round **S6AE0A**
Shaped **S6AE_A**

Slug Free® Die
Round **D0AE00**
Shaped **D0AE_0**

Die Shims
MSAE
Package 3 each:
0.016(0.40), 0.032(0.80), 0.048(1.20)

STANDARD SHAPES



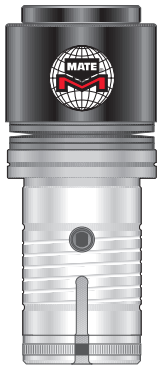
See page 13 for Slug Free Light™ Dies

See page 94 for Add-Ons

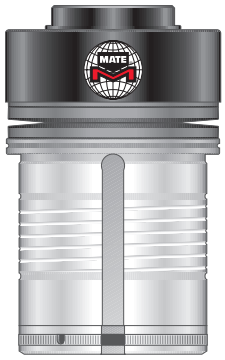
Dimensions in inches (millimeters)

ULTRA TEC® LVD STYLE PUNCH GUIDE ASSEMBLIES

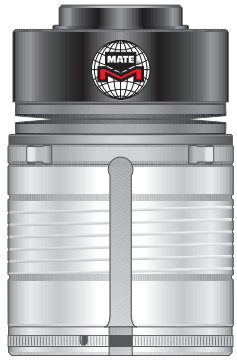
2" C STATION	3-1/2" D STATION	4-1/2" E STATION
0.250(6.35) wide keyway	0.512(13.00) wide keyway	0.512(13.00) wide keyway



Ultra® LVD Guide Assembly
LGVC1

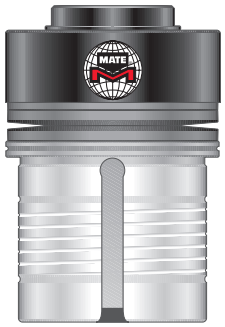


Ultra® LVD Guide Assembly
LGVD1



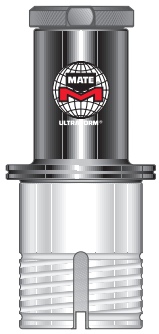
Ultra® LVD Guide Assembly
LGVE1

Ultra® LVD Fully Guided Guide Assembly*
LGVS1

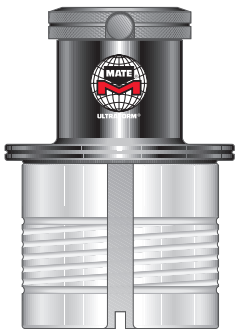


Ultra® LVD Fully Guided Guide Assembly*
LGVT1

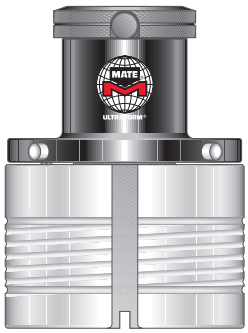
Ultra® LVD Fully Guided Guide Assembly*
LGVU1



Ultraform® LVD Style Forming Unit Guide Assembly
LFKC2



Ultraform® LVD Style Forming Unit Guide Assembly
LFKD2



Ultraform® LVD Style Forming Unit Guide Assembly
LFKE2

Lifter "T" Handle

A0LEH

Dimensions in inches (millimeters)

*Also Available
(2" C Station Only)
LGVS3
External keyways at 0°, 45° and 90°

*Also Available
(3-1/2" D Station Only)
LGVT3
External keyways at 0°, 45° and 90°

FEATURES AND BENEFITS
1/2" A AND 1-1/4" B STATION

Mate's Original Style Thick Turret Tooling is fully OEM compatible tooling with several design enhancements. Premium High Speed Tool Steel is a standard feature in all Mate Thick Turret punches.

Punches:
- Premium high speed tool steel - optimum edge wear resistance.
- 1/4 degree back taper and near polished flanks to reduce friction and eliminate galling.
- Exceptional dimensional accuracy and tool life.
- Minute corner radii to reduce chipping.
- Superior angularity and concentricity.

Strippers:
- Fully OEM compatible.
- Close tolerance opening - superior piece part quality.
- Precision alignment slots - superior piece part quality.
- Hardened and ground - to reduce friction.
- Radiused face - to reduce sheet marking.

Slug Free® Dies:
- Highly wear resistant, chrome air hardened tool steel.
- Slug Free® die geometry eliminate slug pulling.
- Uniform clearance radii in die corners for improved piece part quality.
- Precision orientation with hardened pin.
- Up to 0.125(3.20) grind life.
- Improved die strength.
- Superior roundness and flatness.

Punch Head:
- Hexagonal design and 12.9 grade socket head cap screw for easier installation and adjustment.

Spring:
- High performance spring shot peened prior to painting for extended service life.

Spring Retainer:
- Reversible design returns the punch point to “new” position by turning over retainer after 0.078(2.00) has been removed during regrinding.

MATE®

Dimensions in inches (millimeters)

FEATURES AND BENEFITS
2" C, 3-1/2" D, AND 4-1/2" E STATION

Mate's Original Style Thick Turret Tooling is fully OEM compatible tooling with several design enhancements. Premium High Speed Tool Steel is a standard feature in all Mate Thick Turret punches.

Punches:
- Premium high speed tool steel - optimum edge wear resistance.
- 1/4 degree back taper and near polished flanks to reduce friction and eliminate galling.
- Exceptional dimensional accuracy and tool life.
- Minute corner radii to reduce chipping.
- Superior angularity and concentricity.

Slug Free® Dies:
- Highly wear resistant, chrome air hardened tool steel.
- Slug Free® die geometry eliminates slug pulling.
- Uniform clearance radii in die corners for improved piece part quality.
- Precision orientation with external keyway.
- Up to 0.125(3.20) grind life.
- Improved die strength.
- Superior roundness and flatness.

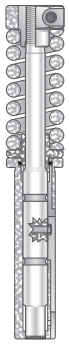
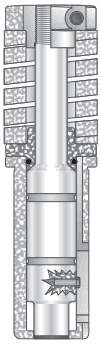
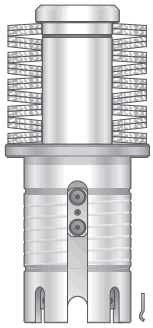
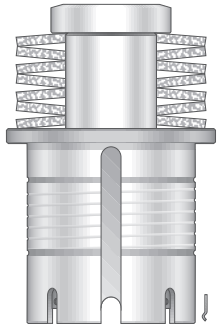
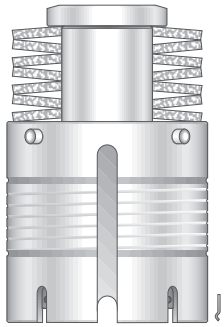
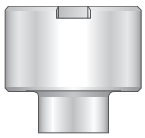
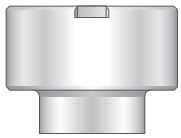
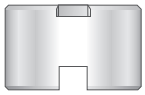
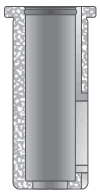
Stripper:
- Fully OEM compatible.
- Close tolerance opening for superior piece part quality.
- Radiused face to ease installation and reduce sheet marking.

Punch Guide Assembly:
- Fully OEM compatible.
- Hardened and ground to reduce turret bore wear.
- Internal and external lubrication grooves to reduce friction.
- High performance disc springs to optimize stripping force throughout the service life of the machine.

Visit mate.com/originalthickturret for more information.

Dimensions in inches (millimeters)

SYSTEM OVERVIEW

1/2" A STATION	1-1/4" B STATION	2" C STATION	3-1/2" D STATION	4-1/2" E STATION
 Punch Assembly	 Punch Assembly	 Punch Guide Assembly	 Punch Guide Assembly	 Punch Guide Assembly
		Punch Shim	Punch Shim	Punch Shim
 Punch Body	 Punch Body	 Punch Body	 Punch Body	 Punch Body
		 Punch Retainer	 Punch Retainer	 Punch Retainer
 Punch Guide	 Punch Guide	 Slitting Insert	 Slitting Insert	 Slitting Insert
		 Stripper Plate	 Stripper Plate	 Stripper Plate
 Slug Free® Die	 Slug Free® Die	 Slug Free® Die	 Slug Free® Die	 Slug Free® Die
		Die Shim	Die Shim	Die Shim
Die Shim	Die Shim			

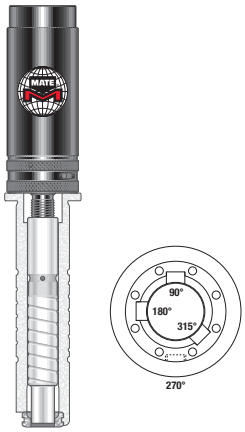
Features include:

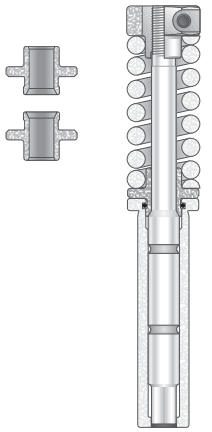
• OEM compatible • Hardened and ground guides
• Premium high speed tool steel punches • Slug Free® die

SIDE BY SIDE COMPARISON

1/2" A STATION

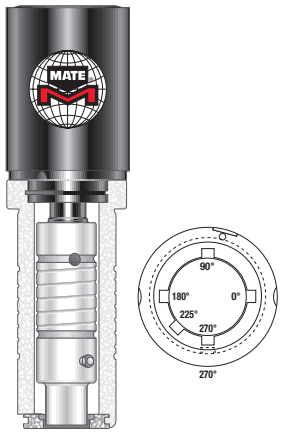
ULTRA TEC®		MATE ORIGINAL STYLE
No tools required. Each 'click' is 0.006(0.15)	LENGTH ADJUSTMENT	Tools needed for adjustment
Self contained in canister	SPRING ASSEMBLY	Spring retainer with reversible design
Uses Ultra® or Original style	PUNCH	Original style
Snap in, self locking design. 0.118(3.00) additional grind life	STRIPPER	One piece punch guide
3 internal slots: 90°, 180° and 315°. 1 external slot at 270°	ANGLE ADJUSTMENT	External slots: 1 for rounds 2 for shapes
Quick release locking mechanism	ASSEMBLY	O-ring snap fit

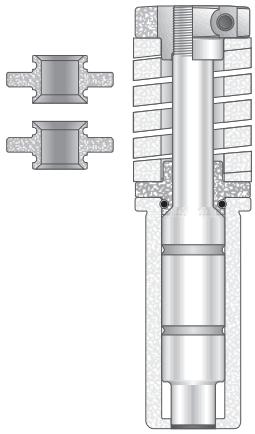




1-1/4" B STATION

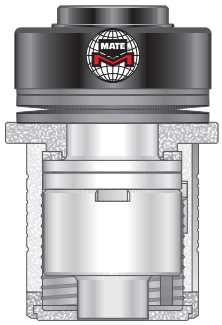
No tools required. Each 'click' is 0.008(0.20)	LENGTH ADJUSTMENT	Tools needed for adjustment
Self contained in canister	SPRING ASSEMBLY	Spring retainer with reversible design
Uses Ultra Metric (Original) style, inch style or HP (Series 90)	PUNCH	Original style
Snap in, self locking design. 0.118(3.00) additional grind life	STRIPPER	One piece punch guide
5 internal slots: 0°, 90°, 180°, 225° and 270° 1 external slot at 270°	ANGLE ADJUSTMENT	External slots: 1 for rounds, 2 for shapes and 4 for special shapes
Quick release locking mechanism	ASSEMBLY	O-ring snap fit

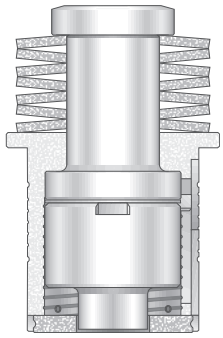




2" C, 3-1/2" D, 4-1/2" E STATION

No tools or shims required. Each 'click' is 0.008(0.20)*	LENGTH ADJUSTMENT	Tools and shims needed for adjustment
Uses Ultra, original style or HP (Series 90)**	PUNCH	Original style
Snap in, self locking design. 0.079(2.00) additional grind life	STRIPPER	Stripper held in place with external clips
0° and 90° Two External Slots	ANGLE ADJUSTMENT	0° and 90° Two External Slots
Ease out design helps punch removal	ASSEMBLY	Tools required to make adjustments

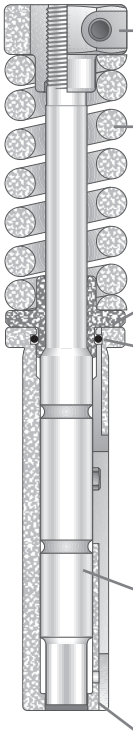




* Holders made prior to June 1999 have length adjustment settings of 0.016(0.40) per 'click'
** Requires punch adapter and/or drawbolt change

Dimensions in inches (millimeters)

1/2" A STATION ASSEMBLY



Punch Head
A0LA00PH

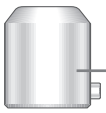
Stripping Spring
SPR33662

Spring Retainer
A0LA00SR

O-Ring
Round **MIS60548***
(12 minimum)
Shaped **MIS60468***
(12 minimum)

Punch Body
Round **PAAA0A**
Shaped **PAAA_A**

Punch Guide (Includes O-Ring)
Round **S6AA0A**
Shaped **S6AA_A**



Slug Free® Die
Round **D0AA00**
Shaped **D0AA_0**

Die Shims
MSAA
Package 3 each:
0.016(0.40), 0.032(0.80), 0.048(1.20)

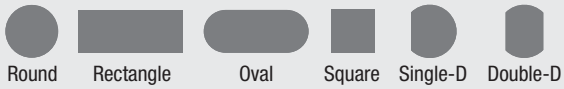
Hardware
XPAAAA

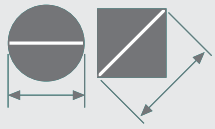
Punch Assembly
Round
Shaped

Complete Assembly
Round
Shaped

* Items sold separately
beyond minimum quantity

STANDARD SHAPES



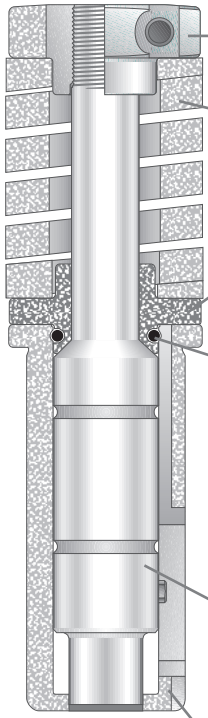


1/2" A Station
Maximum 0.500(12.70)
diameter/diagonal

See page 94 for Add-Ons

Dimensions in inches (millimeters)

1-1/4" B STATION ASSEMBLY



Punch Head
A0LB00PH

Stripping Spring
SPR33689

Spring Retainer
A0LB00SR
(Includes O-Ring)

O-Ring
MIS60556*
(12 minimum)

Punch Body
Round **PAAB0A**
Shaped **PAAB_A**

Punch Guide
Round **S6AB0A**
Shaped **S6AB_A**

Slug Free® Die
Round **D0AB00**
Shaped **D0AB_0**

Die Shims
MSAB
Package 3 each:
0.016(0.40), 0.032(0.80), 0.048(1.20)

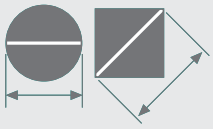
Hardware
XPABAA

Punch Assembly
Round
Shaped

Complete Assembly
Round
Shaped

* Items sold separately
beyond minimum quantity

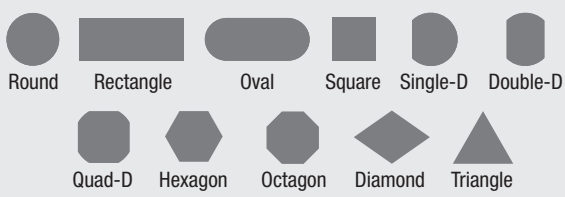
See page 94 for Add-Ons



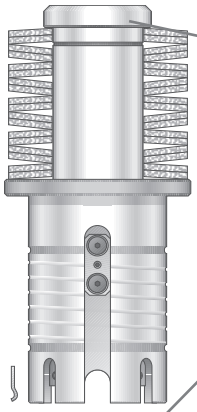
1-1/4" B Station
Maximum 1.250(31.75)
diameter/diagonal

Dimensions in inches (millimeters)

STANDARD SHAPES

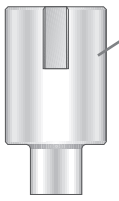


2" C STATION ASSEMBLY



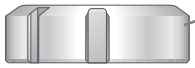
Punch Guide Assembly
AGLC1

Punch Shims
VSAC
Package 3 each:
0.016(0.40), 0.032(0.80), 0.048(1.20)



Punch Body
Round **PAAC0A**
Shaped **PAAC_A**

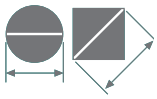
Stripper Plate
Round **S6AC0A**
Shaped **S6AC_A**



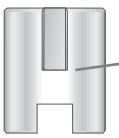
Slug Free® Die
Round **D0AC00**
Shaped **D0AC_0**

Die Shims
MSAC
Package 3 each:
0.016(0.40), 0.032(0.80), 0.048(1.20)

Set Assembly
Round
Shaped



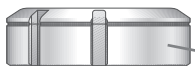
Maximum
2.000(50.80)
diameter/diagonal



Punch Retainer
A0LC00PR

Slitting Insert
Shaped **P4AP_A**

Die Inserts
Shaped **D0KP_0**



Slitting Die Body
A0LC00SD

Slitting Tool Components

D/L = Diagonal/Length
R C = Radius Corners

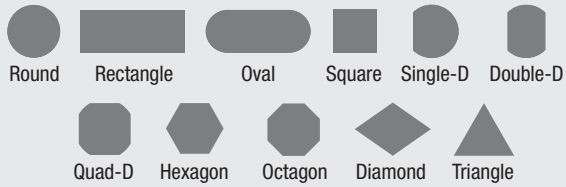
Slitting Insert with Slug Free Die
2.000(50.80) max. D/L
0.709(18.00) max. width

Slug Free Die
2.059(52.30) max. D/L
0.768(19.50) max. width

Slitting Insert with Die Inserts
2.000(50.80) max. D/L
0.268(6.80) max. width

Die Inserts, Rectangles and Ovals
2.028(51.50) max. D/L
0.295(7.50) max. width

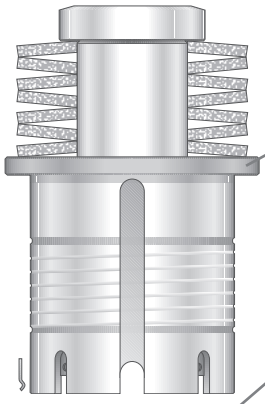
STANDARD SHAPES



See page 94 for Add-Ons

Dimensions in inches (millimeters)

3-1/2" D STATION ASSEMBLY



Punch Guide Assembly
AGLD1

Punch Shims
VSAD
Package 3 each:
0.016(0.40), 0.032(0.80), 0.048(1.20)

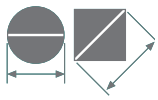
Punch Body
Round **PAAD0A**
Shaped **PAAD_A**

Stripper Plate
Round **S6AD0A**
Shaped **S6AD_A**

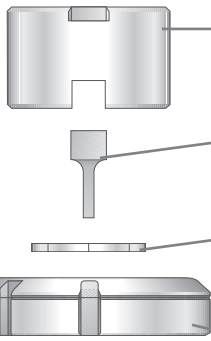
Set Assembly
Round
Shaped

Slug Free® Die
Round **D0AD00**
Shaped **D0AD_0**

Die Shims
MSAD
Package 3 each:
0.016(0.40), 0.032(0.80), 0.048(1.20)



Maximum
3.500(88.90)
diameter/diagonal



Punch Retainer
A0LD00PR

Slitting Insert
Shaped **P4AQ_A**

Die Inserts
Shaped **D0KQ_0**

Slitting Die Body
A0LD00SD

Slitting Tool Components

D/L = Diagonal/Length
R C = Radius Corners

Slitting Insert with Slug Free Die
3.500(88.90) max. D/L
0.709(18.00) max. width

Slug Free Die
3.559(90.40) max. D/L
0.768(19.50) max. width

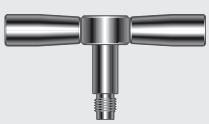
Slitting Insert with Die Inserts
3.500(88.90) max. D/L
0.315(8.00) max. width

Die Inserts R C ≤ 0.125(3.18)
3.384(85.95) max. length
0.335(8.50) max. width
OR
3.539(89.90) max. length
0.175(4.45) max. width

Die Inserts R C > 0.125(3.18) and Ovals
3.520(89.40) max. length
0.335(8.50) max. width

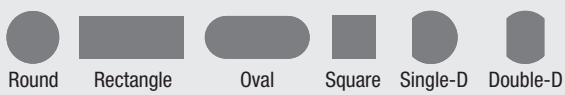
See page 94 for Add-Ons

Lifter "T" Handle



A0LEH

STANDARD SHAPES

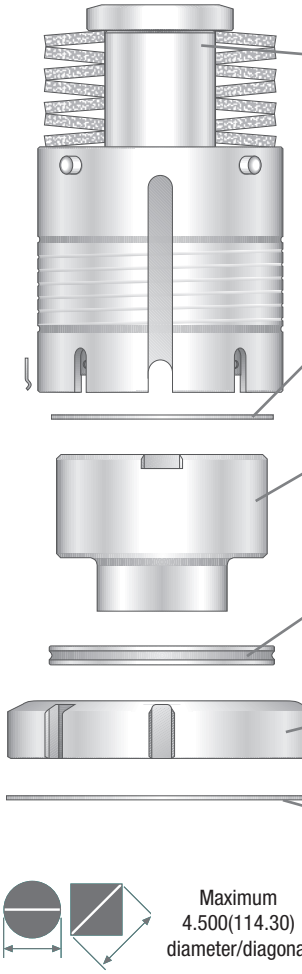


Round Rectangle Oval Square Single-D Double-D

Quad-D Hexagon Octagon Diamond Triangle

Dimensions in inches (millimeters)

4-1/2" STATION ASSEMBLY



Punch Guide Assembly
AGLE1

Punch Shims
VSAE
Package 3 each:
0.016(0.40), 0.032(0.80), 0.048(1.20)

Punch Body
Round **PAAE0A**
Shaped **PAAE_A**

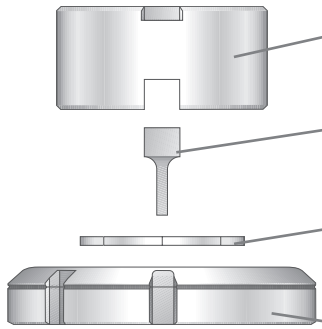
Stripper Plate
Round **S6AE0A**
Shaped **S6AE_A**

Slug Free® Die
Round **D0AE00**
Shaped **D0AE_0**

Set Assembly
Round
Shaped

Die Shims
MSAE
Package 3 each:
0.016(0.40), 0.032(0.80), 0.048(1.20)

Maximum
4.500(114.30)
diameter/diagonal



Punch Retainer
A0LE00PR

Slitting Insert
Shaped **P4AR_A**

Die Inserts
Shaped **D0KR_0**

Slitting Die Body
A0LE00SD

Slitting Tool Components

D/L = Diagonal/Length
R C = Radius Corners

Slitting Insert with Slug Free Die
4.500(114.30) max. D/L
0.709(18.00) max. width

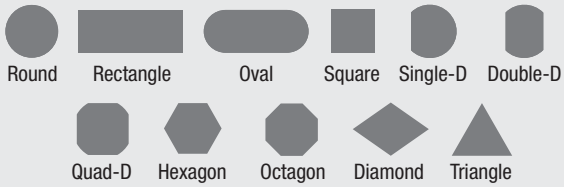
Slug Free Die
4.559(115.80) max. D/L
0.768(19.50) max. width

Slitting Insert with Die Inserts
4.500(114.30) max. D/L
0.315(8.00) max. width

Die Inserts R C ≤ .125(3.18)
4.411(112.05) max. length
0.335(8.50) Max. width
OR
4.539(115.30) max. length
0.236(6.00) max. width

Die Inserts R C > .125(3.18) and Ovals
4.539(115.30) max. length
0.335(8.50) max. width

STANDARD SHAPES



See page 94 for Add-Ons

Dimensions in inches (millimeters)

6" F STATION ASSEMBLY

Punch Guide Assembly:

This punch guide assembly is designed to fit all thick turret machines with a 6" F station. The guide assembly incorporates many performance features including;

- Hardened guide body
- High performance disc springs
- High tensile draw bolt
- Precision internal punch key
- Internal and external lubrication grooves
- Spring steel stripper clips
- Fully OEM compatible

Punches, Strippers, and Dies

Mate offers a comprehensive range of punches, strippers and dies to suit the thick turret 6" F Station.

- High Speed Steel Punches
- Toughened Strippers
- Shock Steel Dies

Special Assembly Applications

- Available on request. Contact your Mate applications specialist.

Punch Guide Assembly
AGLF1

Punch
Round **PAAF0A**
Shaped **PAAF_A**

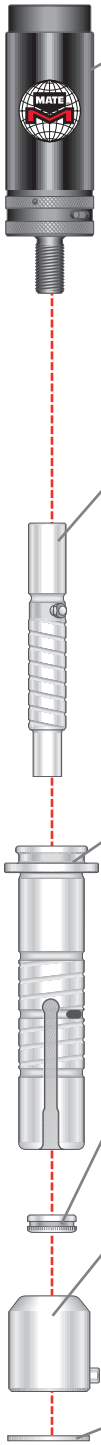
Stripper
Round **S6AF0A**
Shaped **S6AF_A**

Die
Round **D0KF00**
Shaped **D0KF_0**

Dimensions in inches (millimeters)

ULTRA TEC® HEAVY DUTY

1/2" A STATION



Canister Assembly
A0VASTCA

Ultra TEC® Heavy Duty
Punch Body
Round **PHUA0A**
Shaped **PHUA_A**

Maximum Heavy Duty Punch Size
0.500(12.70)
diameter/diagonal

Ultra TEC® Guide
Round **A0VA0SGU**
Shaped **A0VA00GU**

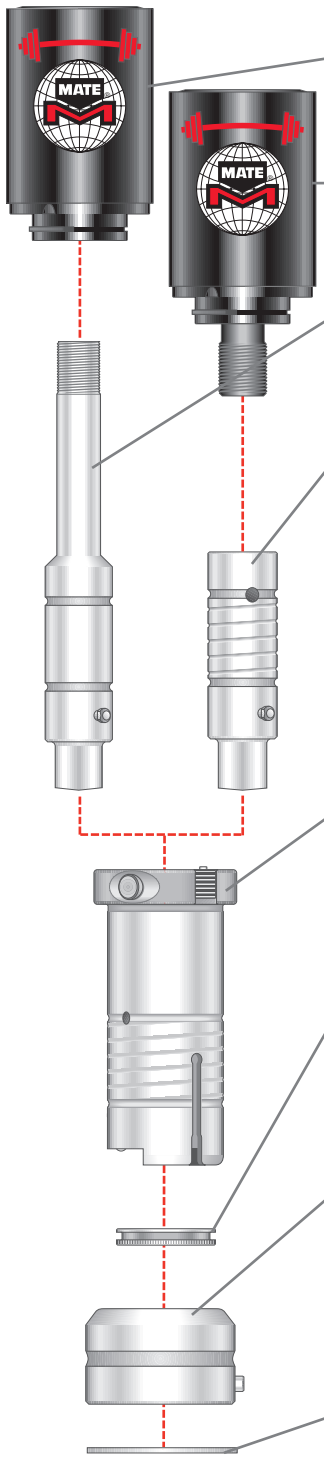
Ultra TEC® Heavy Duty
Stripper Plate
Round **SHKA0A**
Shaped **SHKA_A**

Heavy Duty Slug Free® Die
Round **DHAA00**
Shaped **DHAA_0**

Maximum Heavy Duty Die Size
0.559(14.20)
diameter/diagonal
(includes clearance)

Die Shims
MSAA
Package 3 each:
0.016(0.40), 0.032(0.80), 0.048(1.20)

1-1/4" B STATION



Heavy Duty Canister
Assembly-Metric
A0VBHMCA

Heavy Duty Canister Assembly
A0VBHSCA

Heavy Duty Punch Body
Round **PHAB0A**
Shaped **PHAB_A**

Ultra TEC® Heavy Duty
Punch Body
Round **PHUB0A**
Shaped **PHUB_A**

Maximum Heavy Duty Punch Size
1.250(31.75)
diameter/diagonal

Ultra TEC® Guide
Round **A0VB0SGU**
Shaped **A0VB00GU**

Ultra TEC® Heavy Duty
Stripper Plate
Round **SHKB0A**
Shaped **SHKB_A**

Heavy Duty Slug Free® Die
Round **DHAB00**
Shaped **DHAB_0**

Maximum Heavy Duty Die Size
1.309(33.25)
diameter/diagonal
(includes clearance)

Die Shims
MSAB
Package 3 each:
0.016(0.40), 0.032(0.80), 0.048(1.20)

Minimum width/diameter in heavy duty is 0.250(6.35)

Features include:

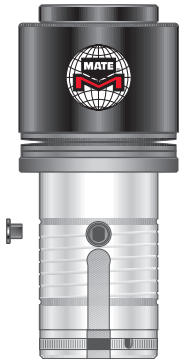
• 1 Degree back taper on punches (per side) • Quick tool change
• Heavy duty Slug Free® die design • Premium high speed tool steel punches
• Heavy duty springs (1-1/4" B Station)
• Roof top shear • Quick length adjustment

See page 94 for Add-Ons

Dimensions in inches (millimeters)

ULTRA TEC® HEAVY DUTY

2" C STATION



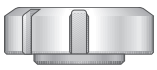
Ultra TEC® Guide Assembly
AGVC1Z

Maximum Heavy Duty Punch Size 1.752(44.50) diameter/diagonal

Heavy Duty Punch Body
Round **PHAC0A**
Shaped **PHAC_A**

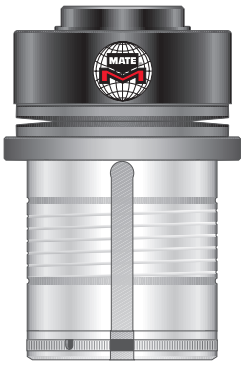
Ultra TEC® Heavy Duty
Stripper Plate
Round **SHKC0A**
Shaped **SHKC_A**

Maximum Heavy Duty Die Size 1.791(45.50) diameter/diagonal (includes clearance)



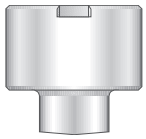
Heavy Duty Slug Free® Die
Round **DHAC00**
Shaped **DHAC_0**

3-1/2" D STATION



Ultra TEC® Guide Assembly
AGVD1Y

Maximum Heavy Duty Punch Size 3.169(80.50) diameter/diagonal



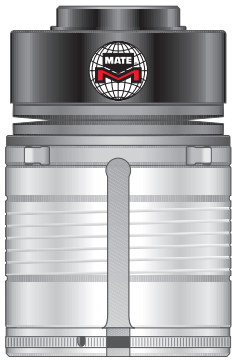
Heavy Duty Punch Body
Round **PHAD0A**
Shaped **PHAD_A**

Ultra TEC® Heavy Duty
Stripper Plate
Round **SHKD0A**
Shaped **SHKD_A**

Maximum Heavy Duty Die Size 3.209(81.50) diameter/diagonal (includes clearance)

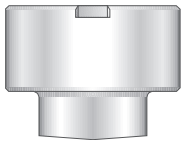
Heavy Duty Slug Free® Die
Round **DHAD00**
Shaped **DHAD_0**

4-1/2" E STATION



Ultra TEC® Guide Assembly
AGVE1Z

Maximum Heavy Duty Punch Size 4.173(106.00) diameter/diagonal



Heavy Duty Punch Body
Round **PHAE0A**
Shaped **PHAE_A**

Ultra TEC® Heavy Duty
Stripper Plate
Round **SHKE0A**
Shaped **SHKE_A**

Maximum Heavy Duty Die Size 4.213(107.00) diameter/diagonal (includes clearance)

Heavy Duty Slug Free® Die
Round **DHAE00**
Shaped **DHAE_0**

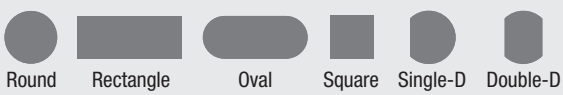
Minimum width/diameter in heavy duty is 0.250(6.35)

See page 94 for Add-Ons

Lifter "T" Handle

A0LEH

STANDARD SHAPES



Dimensions in inches (millimeters)

SECTION 5

ULTRA LIGHT™ TOOLING SYSTEM CANISTERS AND SPRING PACKS

1/2" A STATION

Ultra Light Spring Canister Ultra® Style
MATE00276

Ultra Light Spring Canister Metric Style
MATE00278

Ultra Light 1/2" A station canisters apply 70% of the stripping force of the standard Ultra TEC® 1/2" A station canisters.

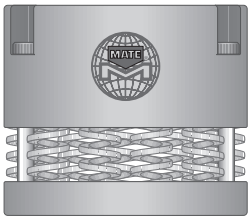
1-1/4" B STATION

Ultra Light Spring Canister Ultra® Style
MATE00277

Ultra Light Spring Canister Metric Style
MATE00279

Ultra Light 1-1/4" B station canisters apply 60% of the stripping force of the standard Ultra TEC® 1-1/4" B station canisters.

2" C STATION

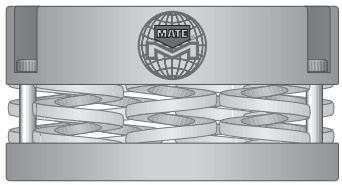


Ultra Light Spring Assembly
MATE00038

(Package of 9)
Heavy Pressure Gold Springs*
MATE00280

MATE00038 is assembled with 9 medium pressure blue springs.

3-1/2" D AND 4-1/2" E STATION



Ultra Light Spring Assembly
MATE00033

(Package of 9)
Medium Heavy Pressure Red Springs*
MATE00281

MATE00033 is assembled with 9 medium pressure blue springs.

***See page 41 for details on spring selection.**

Eliminate Sheet Marking

THICK TURRET PUNCH GUIDE ASSEMBLIES WITH ULTRA LIGHT™ SPRING PACKS

Mate Ultra Light™ spring packs provide precise control of the stripping pressure when using any thick turret guide assembly manufactured by Mate. Benefits include:

- Reduced spring pressure to eliminate unwanted sheet marking. Designed for thin or decorative materials.
- Ideal for high polish, textured, pre-painted or reflective metals where finish appearance is critical.
- Quieter punching in all applications. Noise levels reduced by as much as 10 decibels.
- Maximum control over total spring pressure. Combine two sets of springs for nine pressure variations. See table.

Mate punch guide assemblies complete with Mate Ultra Light™ spring packs are now available for popular thick turret tooling styles including:

- Mate Ultra TEC®
- Mate Ultra TEC® fully guided
- Mate Ultra XT™
- Original style thick turret

Note: Your existing Mate thick turret guides can be retrofitted with Mate Ultra Light™ spring packs.

TOOL STYLE	STATION	PART NUMBER
Mate Ultra TEC®	2" C	**MATE00487**
	3-1/2" D	**MATE00488**
	4-1/2" E	**MATE00489**
Mate Ultra TEC® fully guided	2" C	**MATE00490**
	3-1/2" D	**MATE00491**
	4-1/2" E	**MATE00492**
Mate Ultra XT™	2" C	**MATE00496**
	3-1/2" D	**MATE00497**
	4-1/2" E	**MATE00498**
Original style thick turret	2" C	**MATE00493**
	3-1/2" D	**MATE00494**
	4-1/2" E	**MATE00495**
Additional springs for heavier application. (pack of 9)	2" C	**MATE00280**
	3-1/2" D	**MATE00281**
	4-1/2" E	**MATE00281**

Mate Ultra Light™ spring packs are supplied with 9 blue springs. The spring pressure can be altered by removing and/or replacing the springs. Additional red and gold springs are available. (See page 42)

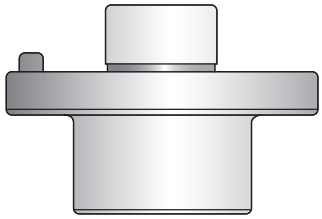
Use the table below to select the spring combination to achieve the desired stripping pressure. The spring pressure is stated as the percentage achieved in the Ultra Light guide as compared to an Ultra TEC disc spring stack.

2" C Station		3-1/2" D Station 4-1/2" E Station	
3 blue	4%	3 blue	5%
6 blue	7%	6 blue	10%
9 blue	10%	3 red	11%
3 gold	12%	9 blue	15%
3 blue + 3 gold	15%	3 blue + 3 red	16%
6 blue + 3 gold	19%	6 blue + 3 red	21%
6 gold	25%	6 red	22%
3 blue + 6 gold	27%	3 blue + 6 red	27%
9 gold	36%	9 red	33%

Eliminate Sheet Marking

FEATURES AND BENEFITS

- DuraSteel™ with superior hardness and toughness for extended interval between regrinds.
- Hardened pin for precise orientation of punches for improved piece part quality.



- 1/4 degree back taper and near polished punch flanks to reduce friction, eliminate galling, and maximize punch life.
- Maxima® coating available for extreme applications.

- Smooth rounded edges to eliminate sheet marking and improve piece part quality.

- Compatible with existing HP (Series 90) tooling inventory for maximum flexibility.

- Slug Free® die geometry eliminates slug pulling to improve piece part quality and increase tool life.

- Highly wear-resistant tool steel provides optimum balance between hardness and toughness, for extended life.

MATE DURASTEEL™ HIGH PERFORMANCE TOOL STEEL

Mate DuraSteel™ is an air hardening tool steel designed specifically for use in high performance tooling systems.

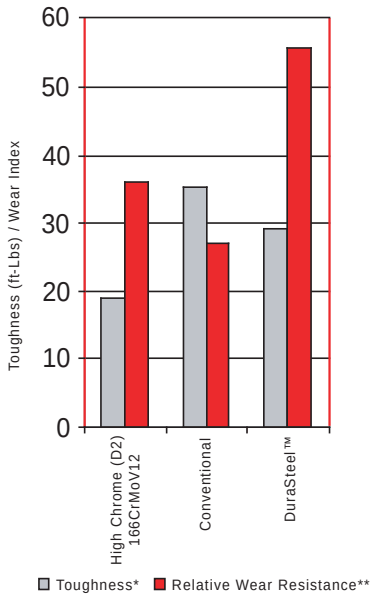
A combination of the chemical composition of Mate DuraSteel and the closely controlled manufacturing process results in an upgrade to conventional High Chrome D2 tool steel. It offers better wear resistance, greater toughness, better compressive strength, and higher attainable hardness.

Mate DuraSteel is a high quality tool steel which has many advantages when compared to alternative tool steels commonly available. These advantages include:

Superior Wear Resistance – Mate DuraSteel offers superior resistance to adhesive- and abrasive-wear to maximize the interval between regrinds.
- Increased Vanadium carbides – harder wearing than chromium carbides for greater resistance to abrasive-wear.
- Increased Tungsten carbides – harder wearing and offer better red hardness; increased resistance to high temperatures which may anneal or damage the material.
- Higher hardness – increased alloy content results in higher effective hardness for better wear resistance.

Increased Toughness – the chemical composition and heat treatment processes used with Mate DuraSteel make it tougher than conventional tool steels in impact strength tests.
- The inclusion of tungsten and vanadium allows the carbon content to be reduced, which increases the toughness.

Better Value – Customer trials have shown that tools manufactured in Mate DuraSteel last 100% longer between regrinds than tools manufactured using conventional tool steels. By increasing the interval between regrinds, the tooling lasts longer and punches many more holes before needing to be replaced.



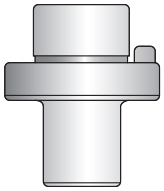
DuraSteel™ Chemical Composition	
Carbon	1.10%
Chromium	7.50%
Vanadium	2.40%
Tungsten	1.15%
Molybdenum	1.60%

MATE®

Visit mate.com/MXC for more information.

MXC™ TOOLING SYSTEM

2" C STATION



MXC™ Punch
Round **PXCC0A**
Shaped **PXCC_A**

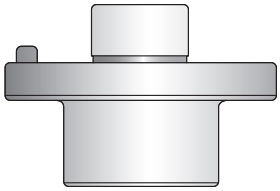
Ultra TEC® Adapter
A0VCWSPA

MXC™ Stripper
Round **SXCC0A**
Shaped **SXCC_A**

Slug Free® Die
Round **D0AC00**
Shaped **D0AC_0**

Die Shims
MSAC
Package 3 each:
0.016(0.40), 0.032(0.80), 0.048(1.20)

3-1/2" D STATION



MXC™ Punch
Round **PXCD0A**
Shaped **PXCD_A**

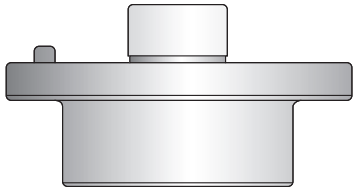
Ultra TEC® Adapter
A0VDWSPA

MXC™ Stripper
Round **SXCD0A**
Shaped **SXCD_A**

Slug Free® Die
Round **D0AD00**
Shaped **D0AD_0**

Die Shims
MSAD
Package 3 each:
0.016(0.40), 0.032(0.80), 0.048(1.20)

4-1/2" E STATION



MXC™ Punch
Round **PXCE0A**
Shaped **PXCE_A**

Ultra TEC® Adapter
A0VEWSPA

MXC™ Stripper
Round **SXCE0A**
Shaped **SXCE_A**

Slug Free® Die
Round **D0AE00**
Shaped **D0AE_0**

Die Shims
MSAE
Package 3 each:
0.016(0.40), 0.032(0.80), 0.048(1.20)

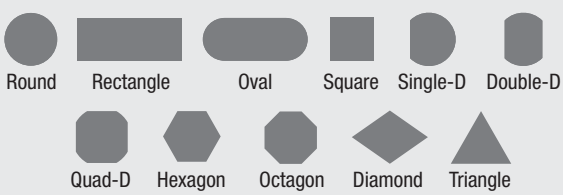
Fully Compatible with Wilson HP (Series 90)

SECTION 5

See page 13 for Slug Free Light™ Dies

See page 94 for Add-Ons

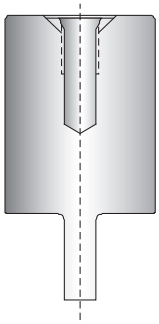
STANDARD SHAPES



THICK TURRET INCH STYLE PUNCHES WITH 1/2-13 THREADS FOR 2" C, 3-1/2" D, AND 4-1/2" E STATION

Inch Style tooling is designed with features to enhance punching performance, including:

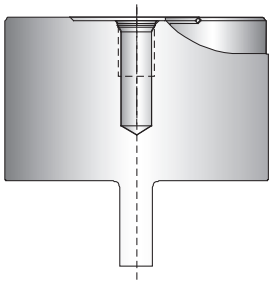
- Premium High Speed Steel which is specially formulated to deliver superior abrasion resistance to extend the interval between regrinds.
- Near polished punch flanks with a 1/4 degree back taper to minimize friction, eliminate galling during stripping and improve piece part quality.
- Minute corner radii to eliminate chipping and extend punch life.
- Superior angularity and concentricity for improved hole quality.
- Thread size clearly marked for ease of use.
- Maxima™ coating available.



2" C STATION

Maximum Diagonal
2.000(50.80)

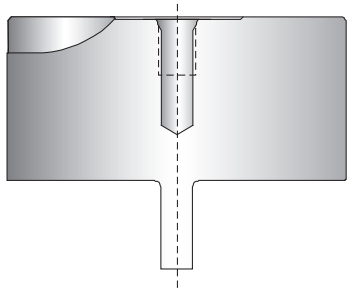
Round **PAJC0A**
Shaped **PAJC_A**



3-1/2" D STATION

Maximum Diagonal
3.500(88.90)

Round **PAJD0A**
Shaped **PAJD_A**



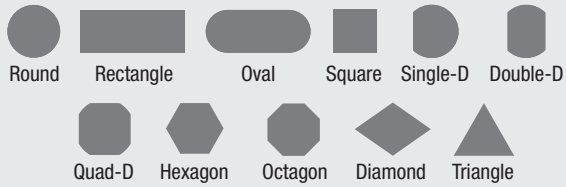
4-1/2" E STATION

Maximum Diagonal
4.500(114.30)

Round **PAJE0A**
Shaped **PAJE_A**

Fully Compatible with Wilson Inch Style

STANDARD SHAPES



ULTRA TEC® GUIDE ASSEMBLIES WITH M14 BOLTS

The Mate Ultra TEC® precision tooling system for thick turret punch presses increases tool performance and flexiblity, offers extended tool life, and allows interchangeability with existing tooling inventory.

Mate Ultra TEC punch guide assemblies with M14 bolts provide many important benefits, including:

- Quick length adjustment – no shims or tooling required.
- Internal and external grooves for superior lubrication.
- Hardened and ground surfaces for maximum turret bore life.
- High performance stripping springs for extended service life.
- Full compatibility with existing M14 threaded punches.
- Conversion kit for compatibility with M12 threaded punches.

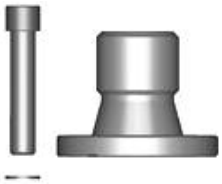
Mate Ultra TEC guides with M14 bolts are available in two versions:

Ultra TEC®

- Quick-change stripper release mechanism allows stripper to be removed quickly and easily, without tools.
- Quick length adjustment mechanism on the side of the guide allows the punch length to be adjusted without disassembly.

Ultra TEC® Fully Guided

- Fully guided stripper to guide the punch tip for improved piece part quality and extended punch life. Ideal for slitting and nibbling applications.
- Quick length adjustment mechanism on the side of the guide allows the punch length to be adjusted without disassembly.



Also available is an M14 punch driver conversion kit to convert existing Mate Ultra TEC guides with M12 bolts to suit punches with an M14 thread.

Tool Style / Station	2" C Station	3-1/2" D Station	4-1/2" E Station
Mate Ultra TEC® Guide with M14 bolt	**MATE00654**	**MATE00655**	**MATE00656**
Mate Ultra TEC® Fully Guided Guide with M14 bolt	**MATE00657**	**MATE00658**	**MATE00659**
Mate Ultra TEC® M14 Punch Driver Conversion Kit	**MATE00651**	**MATE00652**	**MATE00653**

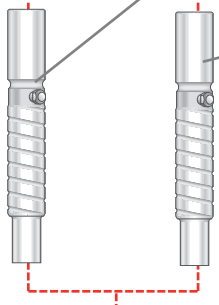
ULTRA ABS® 1/2" A STATION

Ultra ABS Quickhit™
Canister Assembly
A0YASTCQ

Ultra ABS Canister Assembly
A0YASTCA

Ultra ABS Punch Body
Round **PAYA0A**
Shaped **PAYA_A**

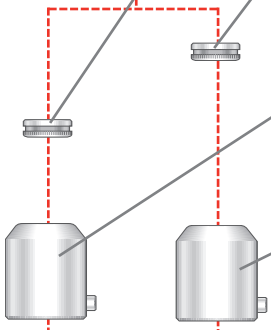
Ultra ABS Heavy Duty Punch Body
Round **PHYA0A**
Shaped **PHYA_A**



Ultra ABS Punch Guide
Round **A0YA0SGU**
Shaped **A0YA00GU**

Ultra ABS Stripper Plate
Round **S6YA0A**
Shaped **S6YA_A**

Ultra ABS Heavy Duty Stripper Plate
Round **SHYA0A**
Shaped **SHYA_A**



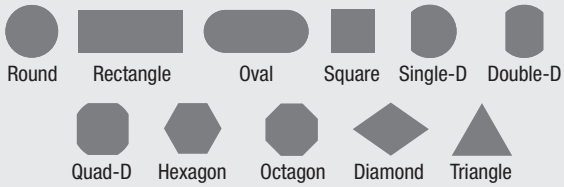
Slug Free® Die
Round **D0AA00**
Shaped **D0AA_0**

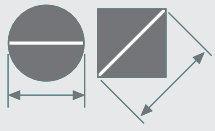
Slug Free® Heavy Duty Die
Round **DHAA00**
Shaped **DHAA_0**

Die Shims
MSAA
Package 3 each:
0.016(0.40), 0.032(0.80), 0.048(1.20)

Minimum width/diameter in heavy duty is 0.250(6.35)

STANDARD SHAPES





1/2" A Station
Maximum 0.500(12.70)
diameter/diagonal

See pages 86-87 for ABS Operation

See page 94 for Add-Ons

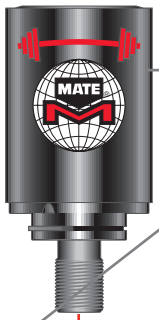
Dimensions in inches (millimeters)

ULTRA ABS® 1-1/4" B STATION

Ultra ABS Quickhit™
Canister Assembly
A0YBSTCQ

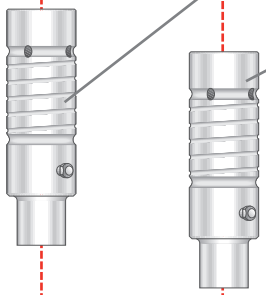
Heavy Duty
Canister Assembly
A0YBHSCA
Recommended when material thickness exceeds 0.118(3.00)

Ultra ABS Canister Assembly
A0YBSTCA



Ultra ABS Heavy Duty
Canister Assembly
A0YBHSCA

Ultra ABS Punch Body
Round **PAYB0A**
Shaped **PAYB_A**



Ultra ABS Heavy Duty Punch Body
Round **PHYB0A**
Shaped **PHYB_A**

Ultra ABS Punch Guide
Round **A0YB0SGU**
Shaped **A0YB00GU**

A clip tool (MIS59723) is included in the purchase of an Ultra ABS fully guided punch guide (A0YB00GG).

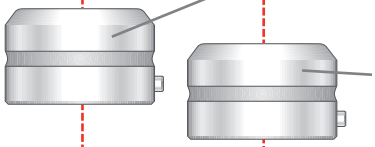
Ultra ABS Fully Guided
Punch Guide
A0YB00GG

Ultra ABS Stripper Plate
Round **S6YB0A**
Shaped **S6YB_A**

Ultra ABS Heavy Duty
Stripper Plate
Round **SHYB0A**
Shaped **SHYB_A**

Ultra ABS Fully Guided
Stripper Plate
Round **S6YK0A**
Shaped **S6YK_A**

Slug Free® Die
Round **D0AB00**
Shaped **D0AB_0**



Slug Free® Heavy Duty Die
Round **DHAB00**
Shaped **DHAB_0**

Clip Tool
MIS59723

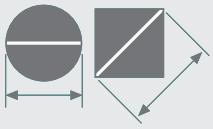
Die Shims
MSAB
Package 3 each:
0.016(0.40), 0.032(0.80), 0.048(1.20)

Minimum width/diameter in heavy duty is 0.250(6.35)

SECTION 6

See pages 86-87 for ABS Operation

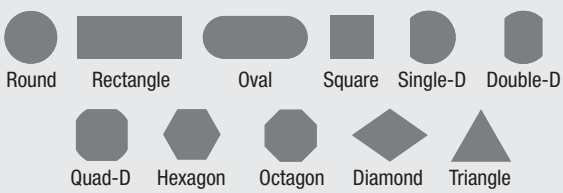
See page 94 for Add-Ons



1-1/4" B Station
Maximum 1.250(31.75) diameter/diagonal

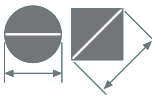
Dimensions in inches (millimeters)

STANDARD SHAPES



ULTRA ABS® GUIDE ASSEMBLIES FOR THICK TURRET STYLE PUNCHES

2" C STATION



Maximum
2.000(50.80)
diameter/diagonal

Ultra ABS Guide Assembly
AGYC1Z

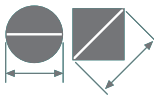
Original Style Punch Body
Round **PAAC0A**
Shaped **PAAC_A**

Ultra ABS Stripper Plate
Round **S6YC0A**
Shaped **S6YC_A**

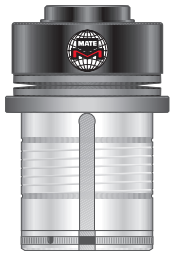
Slug Free® Die
Round **D0AC00**
Shaped **D0AC_0**

Die Shims
MSAC
Package 3 each:
0.016(0.40), 0.032(0.80), 0.048(1.20)

3-1/2" D STATION



Maximum
3.500(88.90)
diameter/diagonal



Ultra ABS Guide Assembly
AGYD1Y

Original Style Punch Body
Round **PAAD0A**
Shaped **PAAD_A**

Ultra ABS Stripper Plate
Round **S6YD0A**
Shaped **S6YD_A**

Slug Free® Die
Round **D0AD00**
Shaped **D0AD_0**

Die Shims
MSAD
Package 3 each:
0.016(0.40), 0.032(0.80), 0.048(1.20)

4-1/2" E STATION

Maximum
4.500(114.30)
diameter/diagonal

Ultra ABS Guide Assembly
AGYE1Z

Original Style Punch Body
Round **PAAE0A**
Shaped **PAAE_A**

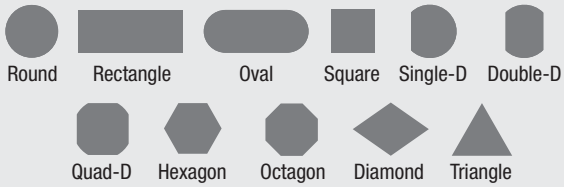
Ultra ABS Stripper Plate
Round **S6YE0A**
Shaped **S6YE_A**

Slug Free® Die
Round **D0AE00**
Shaped **D0AE_0**

Die Shims
MSAE
Package 3 each:
0.016(0.40), 0.032(0.80), 0.048(1.20)

SECTION 6

STANDARD SHAPES



See pages 86-87 for ABS Operation

See page 94 for Add-Ons

Dimensions in inches (millimeters)

ULTRA ABS® FULLY GUIDED CLAMP CLEARING

3-1/2" D STATION

3.500(88.90) maximum punch diagonal/length

0.315(8.00) maximum punch width

3.560(90.40) maximum die diagonal/length

0.374(9.50) maximum die width

Ultra ABS Fully Guided Guide Assembly*
AGYT1Y

*Ultra ABS Fully Guided Guide Assembly
(3-1/2" D Station Only)
AGYT3Y
External keyways at 0°, 45° and 90°

Punch Retainer
A0LD00PR

Slitting Insert M4PM™
Shaped **P4AQ_A**

Clamp Clearing
"DD" Stripper Plate
Shaped **S6YW_A**

Clamp Clearing
"D" Stripper Plate
Shaped **S6YT_A**

Clamp Clearning
"DD" Slug Free® Die
Shaped **D0AW_0**

Clamp Clearning
"D" Slug Free® Die
Shaped **D0AT_0**

4-1/2" E STATION

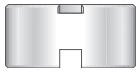
4.500(114.30) maximum punch diagonal/length

0.315(8.00) maximum punch width

4.560(115.80) maximum die diagonal/length

0.374(9.50) maximum die width

Ultra ABS Fully Guided Guide Assembly
AGYU1Z



Punch Retainer
A0LE00PR

Slitting Insert M4PM™
Shaped **P4AR_A**

Clamp Clearing
"DD" Stripper Plate
Shaped **S6YX_A**

Clamp Clearing
"D" Stripper Plate
Shaped **S6YU_A**

Clamp Clearning
"DD" Slug Free® Die
Shaped **D0AX_0**

Clamp Clearning
"D" Slug Free® Die
Shaped **D0AU_0**

See pages 86-87 for ABS Operation

See page 94 for Add-Ons

Lifter "T" Handle

A0LEH

STANDARD SHAPES

Rectangle Oval

Dimensions in inches (millimeters)

ULTRA ABS® FULLY GUIDED

2" C STATION

Ultra ABS Fully Guided
Guide Assembly
AGYS1Z

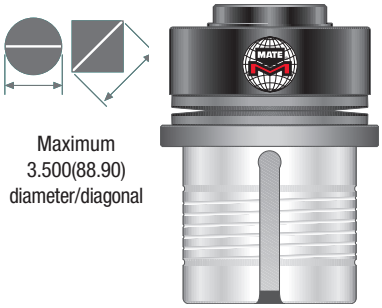
Original Style Punch Body
Round **PAAC0A**
Shaped **PAAC_A**

Fully Guided Stripper Plate
Round **S2YL0A**
Shaped **S2YL_A**

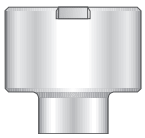
Slug Free® Die
Round **D0AC00**
Shaped **D0AC_0**

Also Available
(2" C Station Only)
AGYS3Z
External keyways at
0°, 45° and 90°

3-1/2" D STATION



Ultra ABS Fully Guided
Guide Assembly
AGYT1Y



Original Style Punch Body
Round **PAAD0A**
Shaped **PAAD_A**

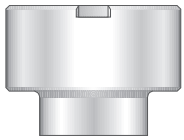
Fully Guided Stripper Plate
Round **S2YM0A**
Shaped **S2YM_A**

Slug Free® Die
Round **D0AD00**
Shaped **D0AD_0**

Also Available
(3-1/2" D Station Only)
AGYT3Y
External keyways at
0°, 45° and 90°

4-1/2" E STATION

Ultra ABS Fully Guided
Guide Assembly
AGYU1Z

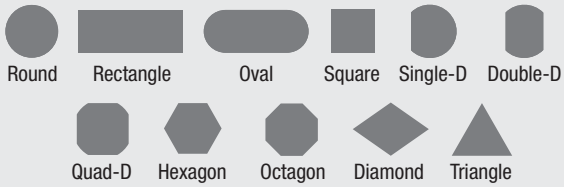


Original Style Punch Body
Round **PAAE0A**
Shaped **PAAE_A**

Fully Guided Stripper Plate
Round **S2YN0A**
Shaped **S2YN_A**

Slug Free® Die
Round **D0AE00**
Shaped **D0AE_0**

STANDARD SHAPES



See pages 86-87 for ABS Operation

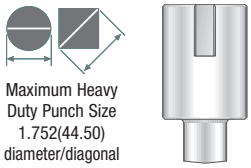
See page 94 for Add-Ons

Dimensions in inches (millimeters)

ULTRA ABS® HEAVY DUTY

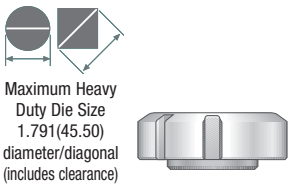
2" C STATION

Ultra ABS Guide Assembly
AGYC1Z



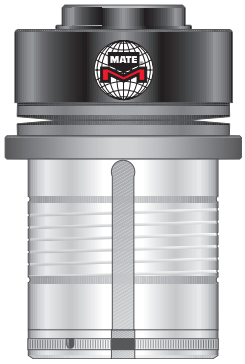
Heavy Duty Punch Body
Round **PHAC0A**
Shaped **PHAC_A**

Ultra ABS Heavy Duty Stripper Plate
Round **SHYC0A**
Shaped **SHYC_A**

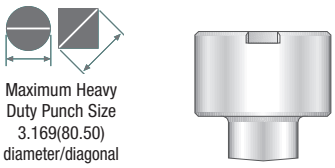


Heavy Duty Slug Free® Die
Round **DHAC00**
Shaped **DHAC_0**

3-1/2" D STATION

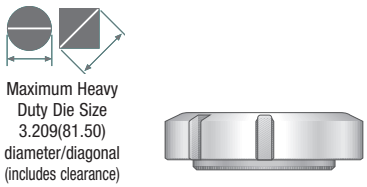


Ultra ABS Guide Assembly
AGYD1Y



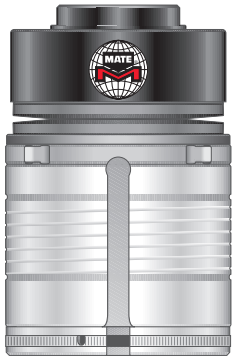
Heavy Duty Punch Body
Round **PHAD0A**
Shaped **PHAD_A**

Ultra ABS Heavy Duty Stripper Plate
Round **SHYD0A**
Shaped **SHYD_A**

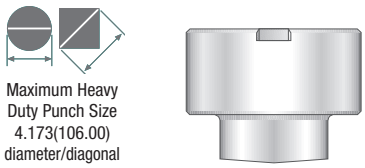


Heavy Duty Slug Free® Die
Round **DHAD00**
Shaped **DHAD_0**

4-1/2" E STATION

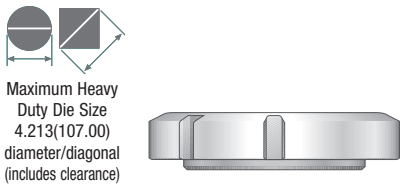


Ultra ABS Guide Assembly
AGYE1Z



Heavy Duty Punch Body
Round **PHAE0A**
Shaped **PHAE_A**

Ultra ABS Heavy Duty Stripper Plate
Round **SHYE0A**
Shaped **SHYE_A**



Heavy Duty Slug Free® Die
Round **DHAE00**
Shaped **DHAE_0**

Minimum width/diameter in heavy duty is 0.250(6.35)

See pages 86-87 for ABS Operation

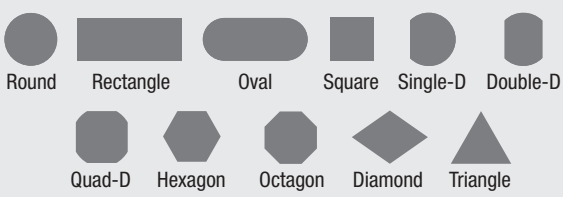
See page 94 for Add-Ons

Lifter "T" Handle

A0LEH

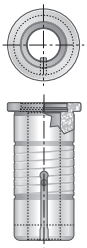
Dimensions in inches (millimeters)

STANDARD SHAPES

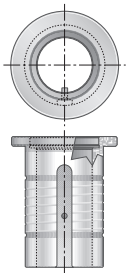


SECTION 6

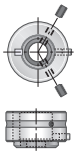
THICK TURRET AND ULTRA® ACCESSORIES



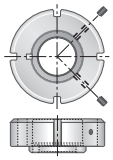
1-1/4" to 1/2"
B to A Station
Punch Guide Adapter
APLG00AD



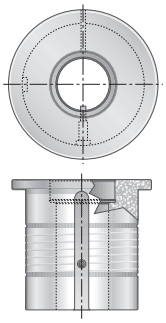
2" to 1-1/4"
C to B Station
Punch Guide Adapter
APLH00AD



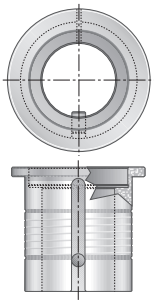
1-1/4" to 1/2"
B to A Station
Die Adapter
ADLG00AD



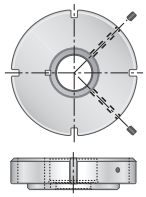
2" to 1-1/4"
C to B Station
Die Adapter
ADLH00AD



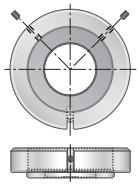
3-1/2" to 1-1/4"
D to B Station
Punch Guide Adapter
APLK00AD



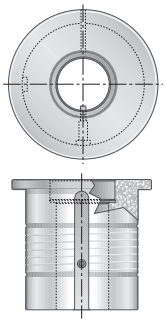
3-1/2" to 2"
D to C Station
Punch Guide Adapter
APLJ00AD



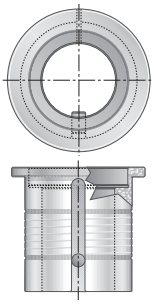
3-1/2" to 1-1/4"
D to B Station
Die Adapter*
ADLK00AD



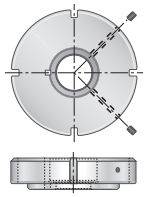
3-1/2" to 2"
D to C Station
Die Adapter*
ADLJ00AD



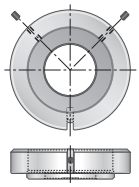
4-1/2" to 1-1/4"
E to B Station
Punch Guide Adapter
APLM00AD



4-1/2" to 2"
E to C Station
Punch Guide Adapter
APLL00AD



4-1/2" to 1-1/4"
E to B Station
Die Adapter
ADLM00AD



4-1/2" to 2"
E to C Station
Die Adapter
ADLL00AD

*Use this table to select the appropriate die adapter for use in the Finn-Power upforming station.

	Non-Indexable Upform Station				Indexable Upform Station			
	Piercing		Forming		Piercing		Forming	
3-1/2" D to 1-1/4" B	**MATE00727**		**MATE00725**		**MATE00727**		**MATE00725**	
3-1/2" D to 2" C	**MATE00721**		**ADLJFUAD**		**MATE00721**		**MATE00723**	

When using a die adapter in an upforming station, the press upper ram stroke may need to be reduced by 0.079(2.00).

Dimensions in inches (millimeters)

THICK TURRET AND ULTRA® ACCESSORIES

ULTRA® SYSTEM ANTI-ROTATION CLAMPS FOR ROUND PUNCHES

1/2" A Station
Original Style Round Punch
Anti-Rotation Clamp

A0VAASAC

1-1/4" B Station
Original Style Round Punch
Anti-Rotation Clamp

A0VBASAC

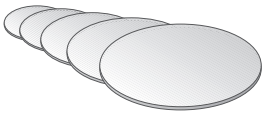
1-1/4" B Station HP (Series 90)
Style Round Punch
Anti-Rotation Clip

A0VBWSAC

1-1/4" B Station Punch
Length Adjustment Clamp
HP (Series 90) Driver Assembly

A0VBWGAC

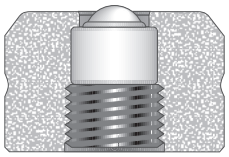
SOFT FACE STRIPPER PADS - ADHESIVE BACKED URETHANE



Soft faced stripper pads for thick turret and Ultra style tooling - 0.009(0.25) thick adhesive backed urethane to prevent material scratching and reduce noise levels.

A Station Soft Face Stripper Pad - Package 6	**A0LA00SF**
B Station Soft Face Stripper Pad - Package 6	**A0LB00SF**
C Station Soft Face Stripper Pad - Package 6	**A0LC00SF**
D Station Soft Face Stripper Pad - Package 4	**A0LD00SF**
E Station Soft Face Stripper Pad - Package 4	**A0LE00SF**

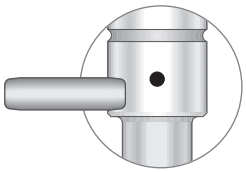
MORE ACCESSORIES FOR ULTRA® AND ULTRAFORM®



Roller Die for Ultraform
System Special Assemblies
(1-1/4" B Station Only)

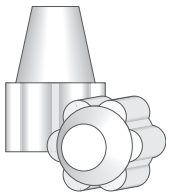
A0LB00FG

0.157(4.00) Diameter Pin (12 Minimum)



Pin for Original Style Round Punch
when used with Ultra Guide
1/2" A and 1-1/4" B Station (12 minimum)

MIS60256*



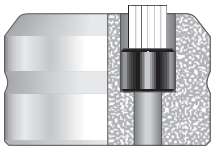
Urethane Slug Ejectors
3 and 6 mm Diameters
(12 minimum)

3 mm Urethane Slug Ejectors

URE40002*

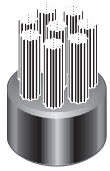
6 mm Urethane Slug Ejectors

URE40010*



Brush Die for Ultraform
System Special Assemblies
(B thru E Stations)

B Station	**ADLB0001**
C Station	**ADLC0001**
D Station	**ADLD0001**
E Station	**ADLE0001**



Replacement Brush
Assembly for
Brush Dies (3 minimum)

MIS61188*

Clip Tool for Ultra 1-1/4" B Station
Fully Guided Punch Guide
Stripper Clip

MIS59723

Medium India Oil Stone

ST029807

* Items sold separately beyond minimum quantity

Lifter "T" Handle

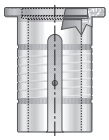
A0LEH

Dimensions in inches (millimeters)

SECTION 7

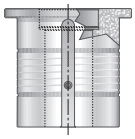
THICK TURRET AND ULTRA TEC® ADAPTERS

LVD STYLE TO ACCEPT LVD, THICK TURRET AND ULTRA TEC® GUIDE ASSEMBLIES



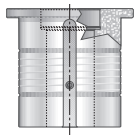
2" to 1-1/4"
LVD C Station to
Thick Turret B Station
Punch Guide
Adapter Assembly

LPLH00AD



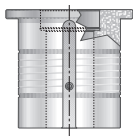
3-1/2" to 1-1/4"
LVD D Station to
Thick Turret B Station
Punch Guide
Adapter Assembly

LPLK00AD



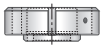
3-1/2" to 2"
LVD D Station to
LVD C Station
Punch Guide
Adapter Assembly

LPPJ00AD



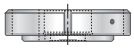
3-1/2" to 2"
LVD D Station to
Thick Turret C Station
Punch Guide
Adapter Assembly

LPLJ00AD



2" to 1-1/4"
C to B Station
Die Adapter

ADLH00AD

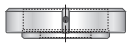


3-1/2" to 1-1/4"
D to B Station
Die Adapter

ADLK00AD

3-1/2" to 2"
D to C Station
Die Adapter

ADLJ00AD



3-1/2" to 2"
D to C Station
Die Adapter

ADLJ00AD

HP (SERIES 90) PUNCH ADAPTERS

C Station HP (Series 90)
Punch Adapter

A0VCWSPA

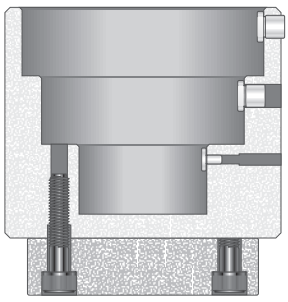
D Station HP (Series 90)
Punch Adapter

A0VDWSPA

E Station HP (Series 90)
Punch Adapter

A0VEWSPA

THICK TURRET - ULTRA® 2" C, 3-1/2" D AND 4-1/2" E STATION TORQUE STAND ASSEMBLY AND ACCESSORIES



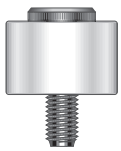
MIS59483
10mm Hex Key
also available
separately

Ultra / Thick Turret Torque Stand
Assembly with 3/8" Drive 10mm Hex Key
2" C, 3-1/2" D and 4-1/2" E Stations

MATE00083

Torque Wrench
for use with Torque Stand
Fixed setting at 75 lbs. ft. (102 N•m)

MIS99030



Ultra Spacer for
Amada Tightening
Fixture 2" C Station

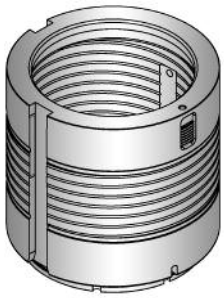
APLEP

SECTION 7

ULTRA TEC® FIELD SERVICE KITS

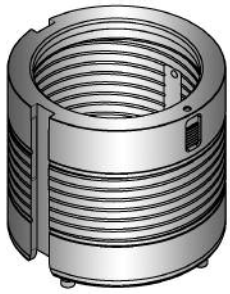
Ultra TEC® Replacement Locking Ring Kit

2" C	**MATE00628**
3-1/2" D	**MATE00629**
4-1/4" E	**MATE00630**



Ultra TEC® Replacement Guide Body Kit

2" C	**MATE00631**
3-1/2" D	**MATE00632**
4-1/4" E	**MATE00633**



Ultra TEC® Fully Guided Replacement Guide Body Kit

2" C	**MATE00634**
3-1/2" D	**MATE00636**
4-1/4" E	**MATE00638**

Ultra TEC® Fully Guided Replacement Guide Body Kit (3-slot)

2" C	**MATE00635**
3-1/2" D	**MATE00637**

Ultra TEC® Replacement Spring Kit

2" C	**MIS61647P** (18 springs)
3-1/2" D	**MATE00270** (7 springs)
4-1/4" E	**MATE00270** (7 springs)

Ultra TEC® Replacement Spring Cover

2" C	**MIS99709**
3-1/2" D	**A0VDSTCV**
4-1/4" E	**A0VDSTCV**

THICK TURRET TOOLING CABINETS

- Heavy duty construction
- Overall Dimensions: 38" (965 mm) High x 30" (762 mm) Wide x 29" (737 mm) Deep
- Five drawers with heavy duty slide mechanism
- Drawer capacity 400 lbs.(182 kg.) each
- Includes 8 groove trays and 40 groove tray dividers for maximum storage flexibility
- Rubber mat top for easy tool maintenance
- Includes lock and key
- Made in the USA

MATE00582

Drawer Number	Drawer Front Height	Drawer Useable Height
1	3.000(76.20)	2.125(53.98)
2	3.875(98.43)	3.000(76.20)
3	7.000(177.80)	6.125(155.58)
4	7.750(196.85)	7.000(177.80)
5	9.250(234.95)	8.500(219.50)

See part # MATE00137 and MATE00149 for cabinets with inserts for thick turret tooling

Tooling Cabinet for Ultra® and Thick Turret Tooling
- Includes Ultra® Thick Turret Torque Stand—for easier tool installation
- Includes 3/8" drive pre-set torque wrench—for precise punch installation
- Heavy duty drawer inserts—securely hold each tool
- Drawer for miscellaneous tools, hardware, and catalogs

Thick Turret – 1/2" A Station to 3-1/2" D Station
- 1/2" A Station: 30 Complete Assemblies; 33 Ultra Punches; 33 Ultra Strippers; 16 Ultra Canisters; 102 Dies; 12 Original Style Punches; and 16 Guides.
- 1-1/4" B Station: 16 Complete Assemblies; 16 Ultra Punches; 16 Ultra Strippers; 8 Ultra Canisters; 77 Dies; 12 Original Style Punches; and 8 Guides.
- 2" C Station: 5 Complete Assemblies; 9 Punches; 9 Strippers; and 18 Dies.
- 3-1/2" D Station: 3 Complete Assemblies; 6 Punches; 6 Strippers; and 12 Dies.

MATE00137

Thick Turret – 1/2" A Station to 4-1/2" E Station
- 1/2" A Station: 30 Complete Assemblies; 33 Ultra Punches; 33 Ultra Strippers; 16 Ultra Canisters; 102 Dies; 12 Original Style Punches; and 16 Guides.
- 1-1/4" B Station: 16 Complete Assemblies; 16 Ultra Punches; 16 Ultra Strippers; 8 Ultra Canisters; 77 Dies; 12 Original Style Punches; and 8 Guides.
- 2" C Station: 5 Complete Assemblies; 7 Punches; 7 Strippers; and 14 Dies.
- 3-1/2" D Station: 3 Complete Assemblies; 5 Punches; 5 Strippers; and 10 Dies.
- 4-1/2" E Station: 1 Complete Assembly; 2 Punches; 2 Strippers; and 4 Dies.

MATE00149

Dimensions in inches (millimeters)

MATE PILOT™ TURRET CALIBRATION SYSTEM

The Mate Pilot™ Turret Calibration System is the most accurate system for ensuring precision concentric and angular alignment of thick turret punch press stations available. The Mate Pilot Turret Calibration System operates in two modes.

- **Verification Mode** – Confirm the precise concentric and angular alignment of your turret to maintain high quality piece part production and maximum tool
- **Alignment Mode** – Restore the concentric and angular alignment of each station with the same or better precision as the initial machine installation.

The Mate Pilot™ Turret Calibration System is simply the best system available.

Accurate:
Each calibration instrument is machined from a single piece of high quality tool steel. The upper and lower halves are separated near the end of the production process, just prior to installation of the hardware. This eliminates the possibility of cumulative tolerances adversely affecting the accuracy of the finished instrument.

Simple to Use:
Install the two halves of the calibration instrument into the turret station to be aligned. Rotate turret to position the station to be aligned under the machine ram. Use the integral adjustment handle to draw the two halves of the calibration instrument together.

The interlocking design of the interface between the two halves causes the loosened die holder assembly, to be drawn into concentric and angular alignment relative to the upper bore as the two halves of the calibration instrument engage.

The tri-color light indicates alignment.

- Engaged, but not aligned
- Angularity and concentricity within 0.0012(0.030)
- Angularity and concentricity within 0.0003(0.008)*

Comprehensive:
The Mate Pilot Calibration System is available in all five thick turret station sizes and is also available to suit the Finn-Power Multi-Tool stations. The Mate Pilot Calibration System is available as a set to suit thick turret presses.

Station	Part Number	Package A	Package F
1/2" A	MATE00670	•	
1-1/4" B	MATE00666	•	•
2" C	MATE00667	•	•
3-1/2" D	MATE00668	•	•
4-1/2" E	MATE00669	•	
Multi-Tool	MATE00671		•
Accessory Kit	MATE00662	•	•
		MATE00665	MATE00672

SECTION 7

Visit mate.com/pilot for more information.

*Angularity and concentricity within 0.0003(0.008) - Green Indicator Light - is recommended when punching materials with a thicknesses of 0.048(1.20) or less.

Dimensions in inches (millimeters)

FEATURES AND BENEFITS

Concept: One adjustable length holder can be used with a variety of special forming inserts. The benefits include reduced tooling cost, increased flexibility, and the length of the assembly can be accurately pre-set.

Quick Length Adjustment:
The push-button length adjustment mechanism allows the overall length of the assembly to be set in 0.002(0.05) increments, without disassembly or removal from the machine.

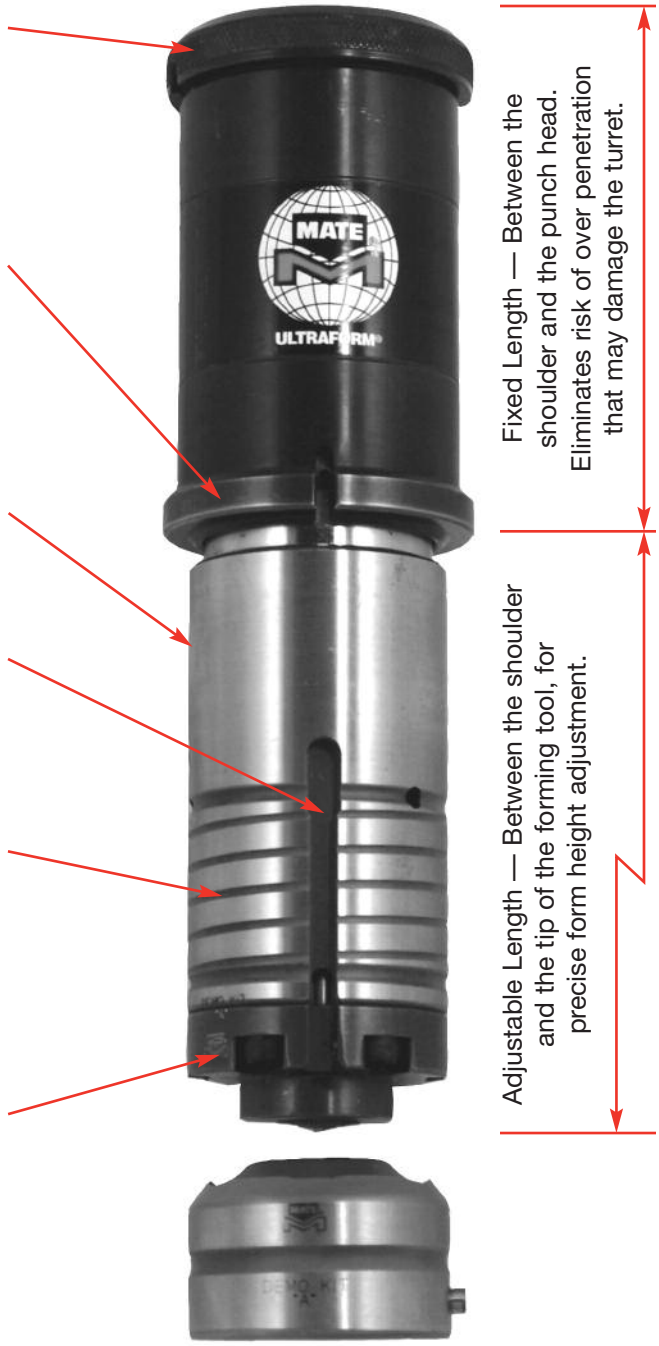
Adjustment Below the Shoulder:
The length adjustment is made below the shoulder of the assembly, thus maintaining the gap between the ram and the tool at top of stroke to prevent the ram from hitting the tool.

Hardened Guides:
The hardened guides, combined with the lubrication grooves, reduce friction and extend turret bore life.

Multiple Angle Settings:
All Ultraform holders can be set at 0, 90, 180 and 270 degrees as a standard, for maximum flexibility.

Tool Lubrication:
Ultraform holders provide internal channels and external grease grooves to allow lubrication of forming tools. Ultraform is compatible with all popular punch press machine tool lubrication systems.

One Holder – Multiple Applications:
The Ultraform holder system is designed to allow an unlimited number of forming tools to be used with the same holder, which reduces tooling inventory costs.



Available for:
- 1-1/4" B Station
- 2" C Station
- 3-1/2" D Station
- 4-1/2" E Station

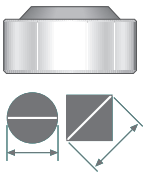
Dimensions in inches (millimeters)

SYSTEM OVERVIEW

Ultraform 1-1/4" B Station
Forming Unit
Guide Assembly

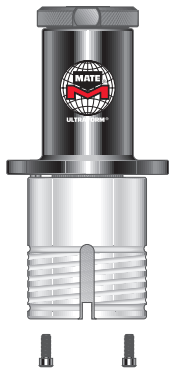
AFKB2

Upper Insert
Assembly
Priced upon application
Consult your MATE representative



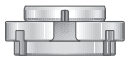
Lower Insert
Assembly
Priced upon application
Consult your MATE representative

1-1/4" B Station
Maximum .866(22.00)
diameter/diagonal

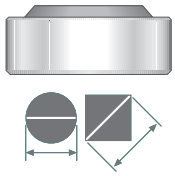


Ultraform 2" C Station
Forming Unit
Guide Assembly

AFKC2

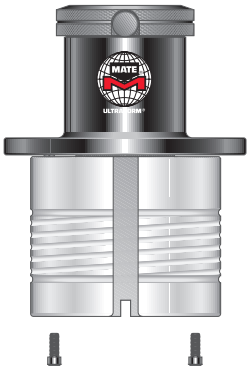


Upper Insert
Assembly
Priced upon application
Consult your MATE representative



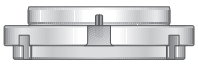
Lower Insert
Assembly
Priced upon application
Consult your MATE representative

2" C Station
Maximum 1.654(42.00)
diameter/diagonal

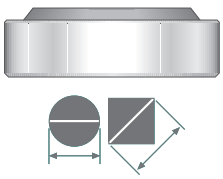


Ultraform 3-1/2" D Station
Forming Unit
Guide Assembly

AFKD2

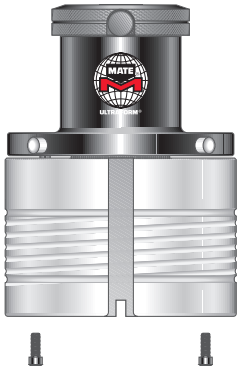


Upper Insert
Assembly
Priced upon application
Consult your MATE representative



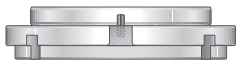
Lower Insert
Assembly
Priced upon application
Consult your MATE representative

3-1/2" D Station
Maximum 2.559(65.00)
diameter/diagonal

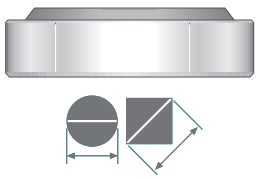


Ultraform 4-1/2" E Station
Forming Unit
Guide Assembly

AFKE2



Upper Insert
Assembly
Priced upon application
Consult your MATE representative



Lower Insert
Assembly
Priced upon application
Consult your MATE representative

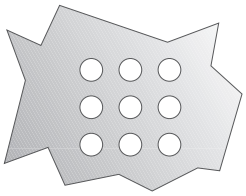
4-1/2" E Station
Maximum 3.374(85.70)
diameter/diagonal

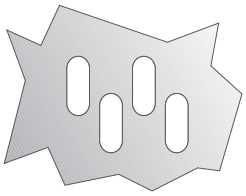
SECTION 8

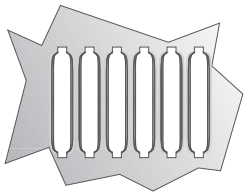
Visit mate.com/ultraform for more information.

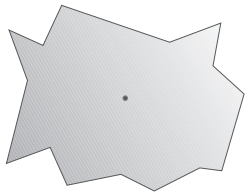
Dimensions in inches (millimeters)

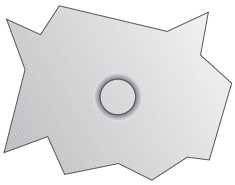
SPECIAL ASSEMBLIES

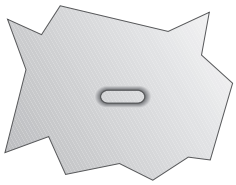

Cluster—Round

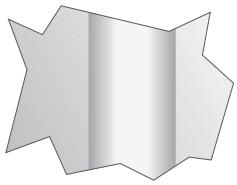

Cluster—Shape

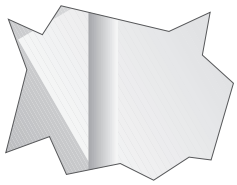

Card Guide

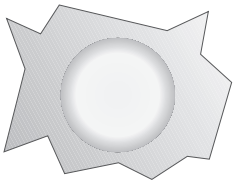

Centerpoint

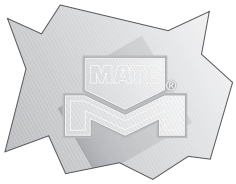

Countersink—Round

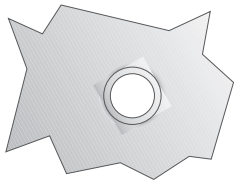

Countersink—Shape

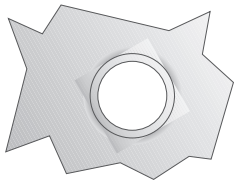

Emboss—Beading

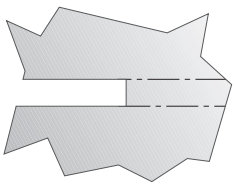

Emboss—Edgeform

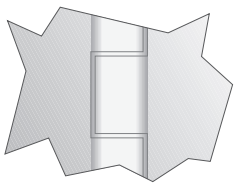

Emboss—Formed

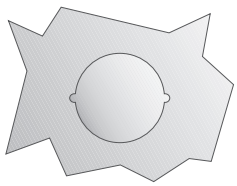

Emboss—Cold Forged

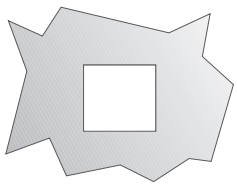

Extrusion—Tapping


Extrusion—Flanged Hole

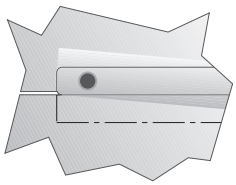

Guided Shearing

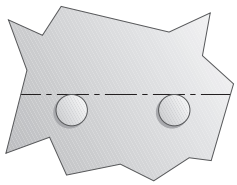

Hinge Tool

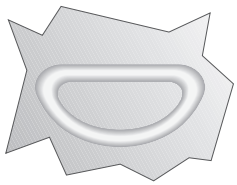

Knockout

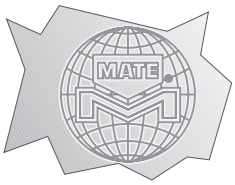

Lance And Form


Louver


Scissortool®

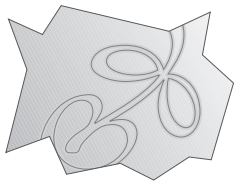

Shearbutton

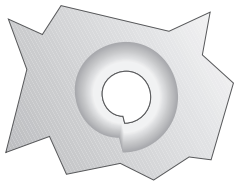

Rollerball®



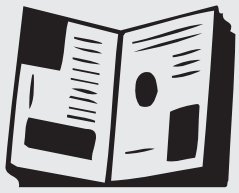
Sheetmarker®

Stamping—Alpha Numeric


Stamping—V-line


Threadform

SECTION 8



See **MATE** Forming Tool Order Guide for forming tool ordering specifications...

Ask for part number
LIT00002

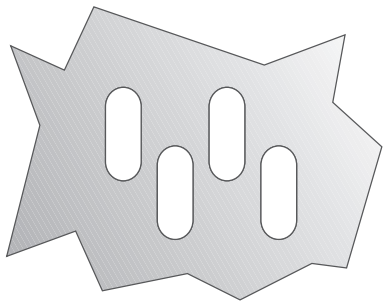
SPECIAL ASSEMBLIES

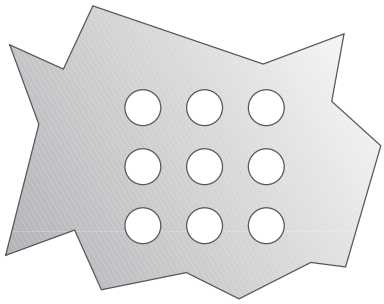
Cluster

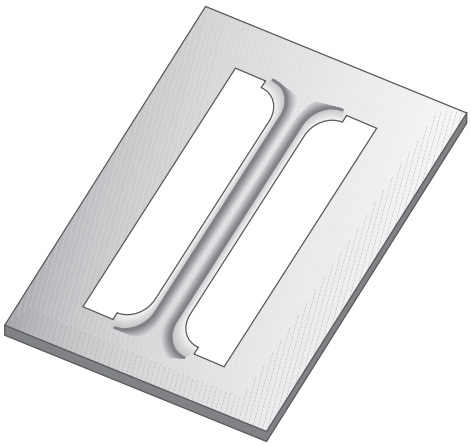
Use:
To produce multiple holes with minimal hits.

Typical Application:
- Material thickness from 0.020(0.50) to 0.157(4.00).
- Other constraints dependent upon station size, punch size and shape and press tonnage.

Comments:
- For greater hole uniformity and flatter sheets, spread the punches to avoid punching adjacent holes in the same hit.
- Do not re-punch through previously punched holes to complete a pattern. A single hit tool may be necessary.







Card Guide

Use:
As a retainer for printed circuit boards.

Typical Application:
- Material thickness from 0.040(1.00) to 0.078(2.00).
- Maximum recommended top-of-sheet to top-of-form height is 0.125 (3.20).

Comments:
- Length of the card guide is dependent upon station size and machine tonnage.
- Also available as a continuous form to increase productivity and flexibility.

SECTION 8

Visit mate.com/specialassemblies for more information

Dimensions in inches (millimeters)

SPECIAL ASSEMBLIES

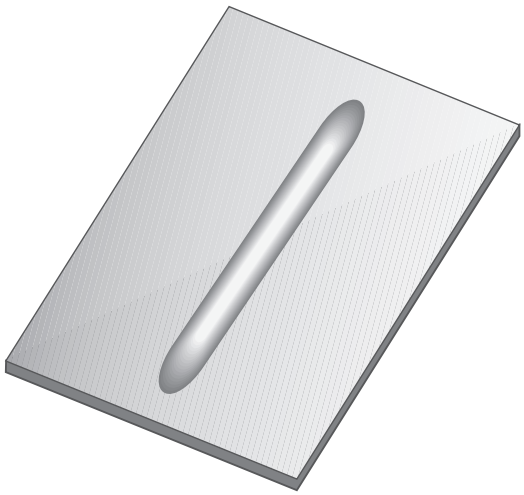
Countersink—Dedicated

Use:
Allows screw and rivet head to sit flush or below the surface of the material.

Typical Application:
- Material thickness from 0.048(1.22) to 0.250(6.35), dependent upon press tonnage capacity.

Comments:
- The *shoulder* (dedicated) style is generally ordered for one material thickness and screw size.
- The shoulder style coins the surrounding area, producing a clean flat countersink with minimal burring.

Emboss—Continuous



Use:
As a stiffener to add rigidity to sheet metal panels.

Typical Application:
- Material thickness from 0.027(0.70) to 0.250(6.35), dependent upon press tonnage capacity.

Comments:
- The increment between hits is determined by the cosmetic requirements for the finished part. Smaller increments result in improved appearance.
- The form height should be as low as possible to minimize sheet distortion.

Dimensions in inches (millimeters)

2007 • REV 12/07

Emboss—Cold Forged

Use:
To produce a logo or design on a part.

Typical Application:
- Material thickness from 0.018(0.46) to 0.118(3.00).
- Best results in material thickness from 0.040(1.00) to 0.078(2.00).
- Maximum size dependent on the tooling style, station size and press tonnage capacity.

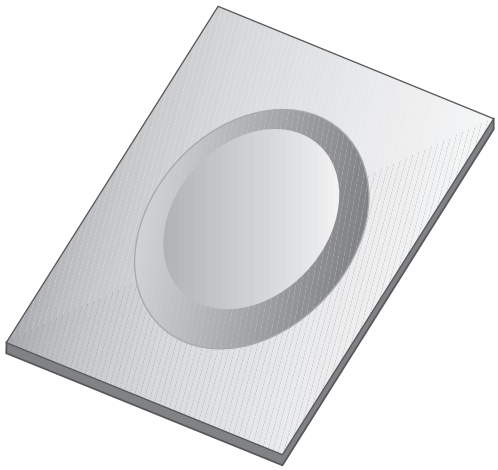
Comments:
- An exact drawing, CAD file, or artwork of logo is required to produce this type of assembly.

Emboss—Formed

Use:
Provides a recess or a protrusion.

Typical Application:
- Material thickness from 0.027(0.70) to 0.250(6.35), dependent upon press tonnage capacity.

Comments:
- Best results are attained when the side wall angle is 45° or less.
- Optimum form height is 3 x the material thickness or less.



Visit mate.com/specialassemblies for more information

Dimensions in inches (millimeters)

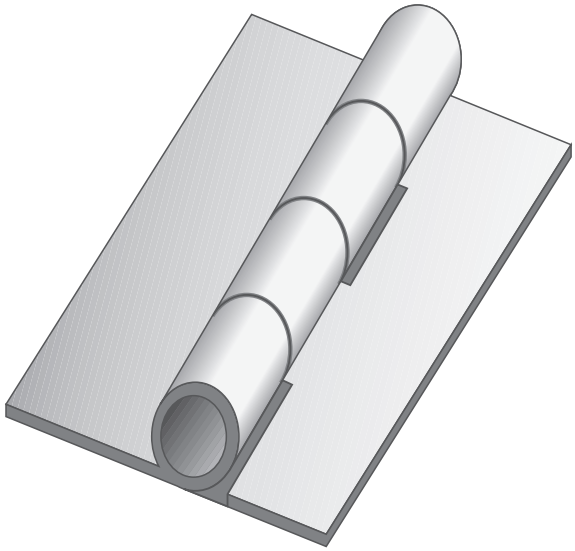
SPECIAL ASSEMBLIES

Extrusion—Tapping

Use:
Threading for screws and increased bearing area for tubes, etc.

Typical Application:
- Material thickness from 0.031(0.80) to 0.106(2.70).
- Overall Height – 2x to 2.5x material thickness.

Comments:
- Additional inverted dies are required to accommodate different material thickness.



Hinge

Use:
To create hinge knuckles as integral elements on sheet metal components.

Typical Application:
- The range of this application is dependent on a combination of the material thickness, pin diameter and feed gap of the press.

Comments:
- An integral hinge knuckle on a component will eliminate the costly process of purchasing and assembling separate hinges.

MATE®

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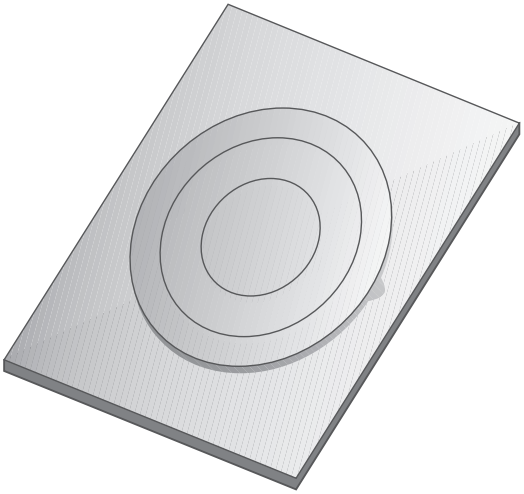
for 24x7 Access to Special Assembly Drawings

Dimensions in inches (millimeters)

2007 • REV 12/07

Knockout



Use:
Allows optional pathway for electrical cable.

Typical Application:
- Material thickness from 0.024(0.60) to 0.118(3.00).
- Maximum size dependent upon material type, thickness and press tonnage capacity.

Comments:
- The tool can normally be used with other material thickness within a range of + or - 0.016(0.41) from design thickness.
- Maintain 0.236(6.00) difference between diameters used for knockout.

Lance And Form

Use:
For air flow, decoration, as card guides, location markers, shear tabs, wire harnesses or clip attachments.

Typical Application:
- Material thickness from 0.020(0.50) to 0.118 (3.00).
- Maximum recommended top-of-sheet to top-of-form height is 0.250(6.40).
- Other limitations include material type, station size, and press tonnage capacity.

Comments:
- The inclusion of a 5° draft angle is recommended to assure reliable operation of open ground forms.

See **MATE** Forming Order Tool Guide for forming tool ordering specifications...

Ask for part number
LIT00002

Dimensions in inches (millimeters)

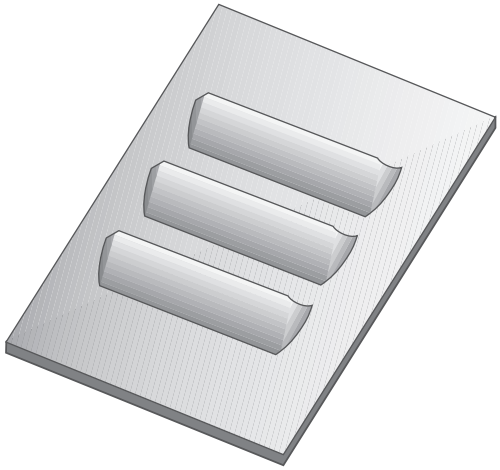
SPECIAL ASSEMBLIES

Louver

Use:
To provide air flow or ventilation.

Typical Application:
- Material thickness from 0.028(0.70) to 0.106(2.70)
- Maximum recommended top-to-top height is 0.255(6.50).

Comments:
- One tool cuts the sheet and produces the form in the same operation.
- The tool is designed for a specific material thickness.



Insert Sizes Available

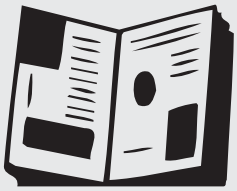
Fractional	Decimal	Metric
3/32	0.094	2.40
1/8	0.125	3.12
3/16	0.188	4.50
1/4	0.250	6.34

Stamp—Alpha Numeric

Use:
To provide indelible marking of alpha-numeric characters on the top or bottom of the sheet.

Typical Application:
- Material thickness 0.032(0.80) up to machine capacity.
- Characters available in 4 popular sizes. See table.

Comments:
- Individual characters can be easily changed.



See **MATE** Forming Order Tool Guide for forming tool ordering specifications...

Ask for part number
LIT00002

Dimensions in inches (millimeters)

Threadform

Use:
To provide a form to accept a sheet metal screw.

Typical Application:
- Material thickness 0.020(0.50) to 0.048(1.20).
- Size is dependent upon screw size selected.
- Thicker material requires a countersink operation or thinning prior to threadforming.

V-Line Inscription

Use:
To produce logos, messages, or symbols.

Typical Application:
- Material thickness from 0.032(0.80) up to machine capacity.
- Maximum size is dependent on station size, size of symbols and characters, and press tonnage capacity.

Comments:
- V-Line Stamping – renders the image with a sharp line stamped into the surface.
- An exact drawing, CAD file, or artwork of logo is required in order to produce this type of assembly.

Visit mate.com/mymate
for 24x7 Access to Special Assembly Drawings

Dimensions in inches (millimeters)

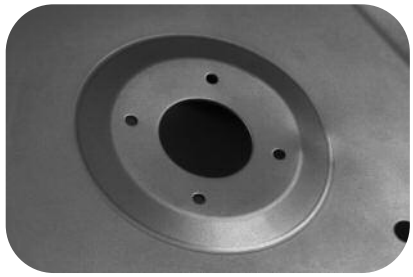
SPECIAL ASSEMBLIES

Mate Rollerball®

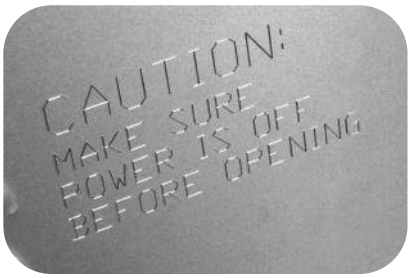
Use:
The Rollerball® is an exciting new concept designed by Mate Precision Tooling to take advantage of the extended programming capabilities of hydraulic and other punch presses capable of operating in the x and y axis with the ram down. The Rollerball® gives you the benefit of making forms not possible with single hit forming tools.

Typical Application:
- Maximum workable material thickness is 0.105(2.70) mild steel.

Comments:
- The press must be capable of holding the ram down while the sheet is moved in the x and/or y.



Mate Sheetmarker®



Use:
For markings or etchings on the surface of sheet metal. The tool uses a diamond pointed insert in a spring loaded holder to create the marking.

Typical Application:
- The Sheetmarker® Tool can be used on all material types and thicknesses.

Comments:
- A wide variety of results can be produced, ranging from very light etching to fairly deep grooves in the sheet.
- Variations are achieved with a combination of three spring pressures and two insert point angles.

Comments:
- The press must be capable of holding the ram down while the sheet is moved in the x and/or y.

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for 24x7 Access to Special Assembly Drawings

Dimensions in inches (millimeters)

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Mate SnapLock™

Use:
For joining materials, thus eliminating secondary operations such as spot welding, riveting, or fastening with threaded hardware.

Typical Application:
- Material thickness from 0.020(0.50) up to 0.118(3.00).
- Other limitations include material type, station size, and press tonnage capacity.

Comments:
- Suitable for joining materials of dissimilar type and/or thickness.
- Positive locking and locating feature for fast and accurate assembly.

Mate HexLock™

Use:
To provide a reliable and secure method of retaining common threaded fasteners in sheet metal.

Typical Application:
- Material thickness from 0.020(0.50) up to 0.118(3.00).
- Other limitations include material type, station size, and press tonnage capacity.

Comments:
- Suitable for hexagon nuts and hexagon headed bolts that conform to DIN933 or DIN934.

See **MATE** Forming Order Tool Guide for forming tool ordering specifications...

Ask for part number
LIT00002

Dimensions in inches (millimeters)

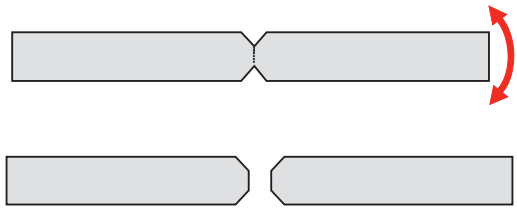
SPECIAL ASSEMBLIES

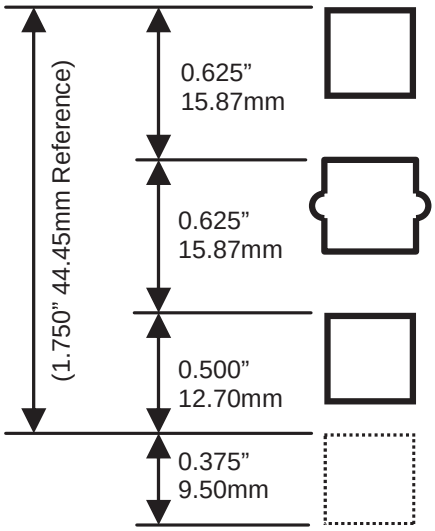
Mate EasySnap™

Use:
Scrapless retention system to allow fabricator to snap punched parts out of sheet metal.

Typical Application:
- Material thickness from 0.020(0.50) up to 0.078(2.00) for mild steel and aluminium, and 0.020(0.50) up to 0.059(1.50) for stainless steel.
- Maximum length of form is 36.00(914.40).

Comments:
- Reduces the need for slitting and micro joints for part retention.
- Material type and thickness must be specified at time of order.





Mate 19" Racking Cluster

Use:
For high speed punching of the mounting hole pattern commonly found in electronic and telecommunications cabinets. The hole spacing conforms to DIN41494, IEC 297 and BS 5954.

Typical Application:
- Material thickness from 0.020(0.50) up to 0.157(4.00).

Comments:
- Special shape "U" pitch marker on the central punch point allows the end user to count pitches, not holes!
- Solid (non-insert) style cluster tools and insert style cluster assembly options available.

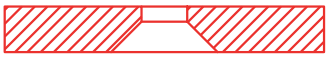
Dimensions in inches (millimeters)

ORIGINAL STYLE 1-1/4" B STATION FORMING TOOLS

Combine the economy of original style thick turret tooling, with the convenience of integrated tool body construction, and the simplicity of the hexagon shaped punch head. Ideal for hydraulic punch presses with programmable ram control.

Dedicated Countersink Down

Complete Assembly with blank die.	**XAABD0B399**
Replacement Countersink Tip	**XAABD0B316**



Dedicated Countersink Up

Complete Assembly with non-spring loaded lower.	**XAABD0B199**

Round Emboss with Dome Top

Complete Assembly with spring loaded lower.	**XAABD0E099**

Round Emboss with Flat Top

Complete Assembly with spring loaded lower.	**XAABD0E199**

Round Embossed Countersink Up

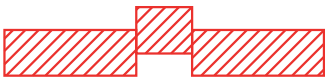
Complete Assembly with spring loaded lower.	**XAABD0E999**

Round Extrude Up

Complete Assembly with spring loaded lower.	**XAABD0D199**
Replacement Lower Insert	**XAABD0D104**

Single Round Knockout Up

Complete Assembly with spring loaded lower	**XAABD0K199**



Shear Button Up

Complete Assembly with spring loaded lower	**XAABD0S199**
Replacement Lower Insert	**XAABD0S104**

All 1-1/4" B station original style forming tools are designed to your specific material type, thickness, and machine model requirements. Interchangeability between machines is not recommended due to the variations in the shut height between different machines. For fully adjustable and interchangeable forming tools, we recommend the Mate Ultraform® forming tool system. **Visit mate.com/ultraform for more information.**

SECTION 8

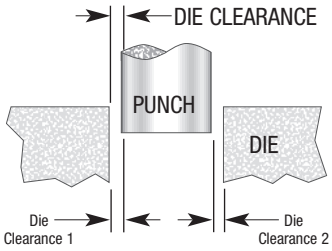
Visit mate.com/originalthickturretforming for more information.

DIE CLEARANCE

Blanking Tools are used to punch out a small part down the slug chute.		Piercing	Blanking
Material Type (Typical Shear Strength)	Material Thickness (T)	Total Die Clearance (% of T)	Total Die Clearance (% of T)
Aluminum 25,000 psi (0.172 kN/mm²)	Less than 0.098(2.50)	15%	15%
	0.098(2.50) to 0.197(5.00)	20%	15%
	Greater than 0.197(5.00)	25%	20%
Mild Steel 50,000 psi (0.344 kN/mm²)	Less than 0.118(3.00)	20%	15%
	0.118(3.00) to 0.237(6.00)	25%	20%
	Greater than 0.237(6.00)	30%	20%
Stainless Steel 75,000 psi (0.517 kN/mm²)	Less than 0.059(1.50)	20%	15%
	0.059(1.50) to 0.110(2.80)	25%	20%
	0.110(2.80)to 0.157(4.00)	30%	20%
	Greater than 0.157(4.00)	35%	25%

WHAT IS DIE CLEARANCE?

Die clearance is equal to the space between punch and die when the punch enters the die opening.

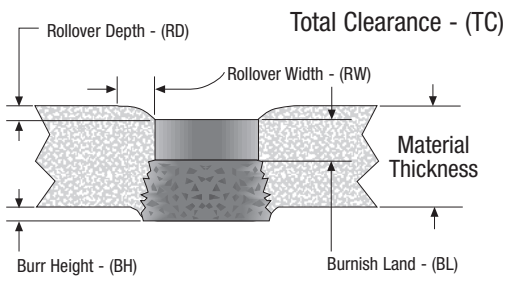


Total Die Clearance = Die Clearance on both sides of punch

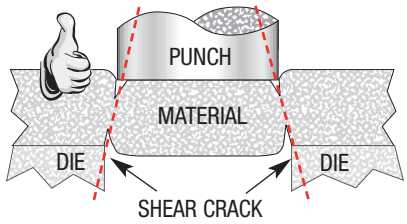
Total Die Clearance = Die Clearance 1 + Die Clearance 2

Regardless of sheet thickness, the recommended penetration of the punch into a Slug Free® die is 0.118(3.00).

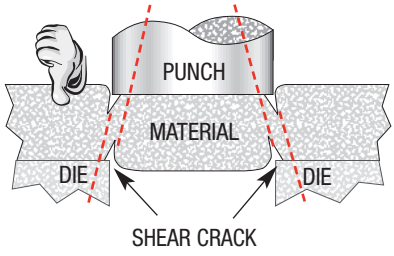
ANATOMY OF A PUNCHED HOLE



WHY USE PROPER DIE CLEARANCE?



PROPER CLEARANCE —
shear cracks join, balancing punching force, piece part quality, and tool life.



CLEARANCE TOO SMALL —
secondary shear cracks are created, raising punching force, and shortening tool life.

SECTION 9

MATE®

*MATE always refers to **TOTAL DIE CLEARANCE** — **NOT** clearance per side.*

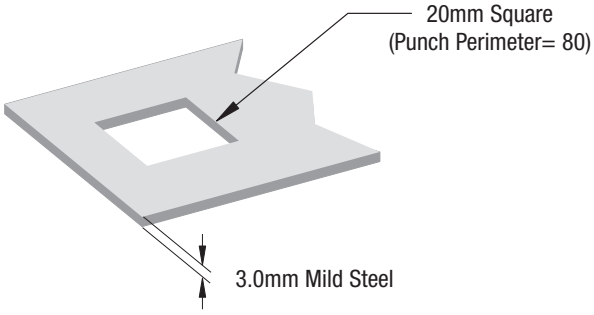
Dimensions in inches (millimeters)

CALCULATING PUNCHING FORCE

Tonnage Formula:

Tonnage = Punch Perimeter x Material Thickness x Material Tonnage Value x Material Multipler

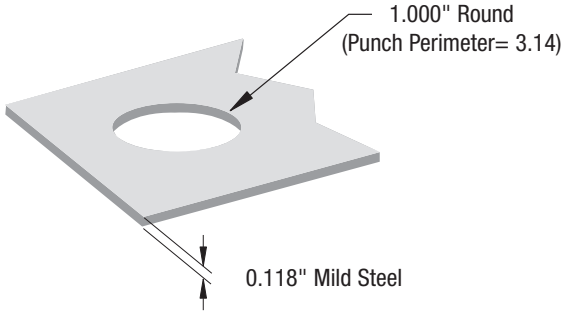
EXAMPLE OF TONNAGE CALCULATION



Metric Example:

Metric Tonnage for a 20mm square in 3.0mm Mild Steel

Tonnage = 80 x 3.0 x 0.0352 x 1.0 = 8.45 Metric Tons

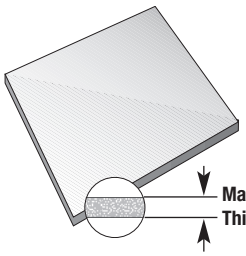


Inch Example:

Imperial Tonnage for a 1.000" round in 0.118" Mild Steel

Tonnage = 3.14 x 0.118 x 25 x 1.0 = 9.27 Imperial Tons

MATERIAL THICKNESS

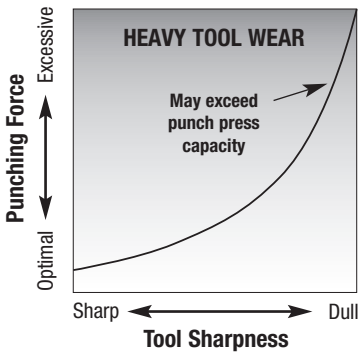


Material thickness is the width of the workpiece or sheet that the punch must penetrate in making a hole. Generally the thicker the material the more difficult it is to punch.

MATERIAL TONNAGE VALUE

Metric (Metric Tons/mm²)	Inch (Imperial Tons/in²)
0.0352	25

PUNCHING FORCE CHANGES AS TOOLS DULL



MATERIAL MULTIPLIER

MATERIAL TYPE	MATERIAL MULTIPLIER
Aluminum (soft sheet)	0.3
Aluminum (1/2 hard)	0.4
Aluminum (full hard)	0.5
Copper (rolled)	0.6
Brass (soft sheet)	0.6
Brass (1/2 hard)	0.7
Mild Steel	1.0
Stainless Steel	1.6

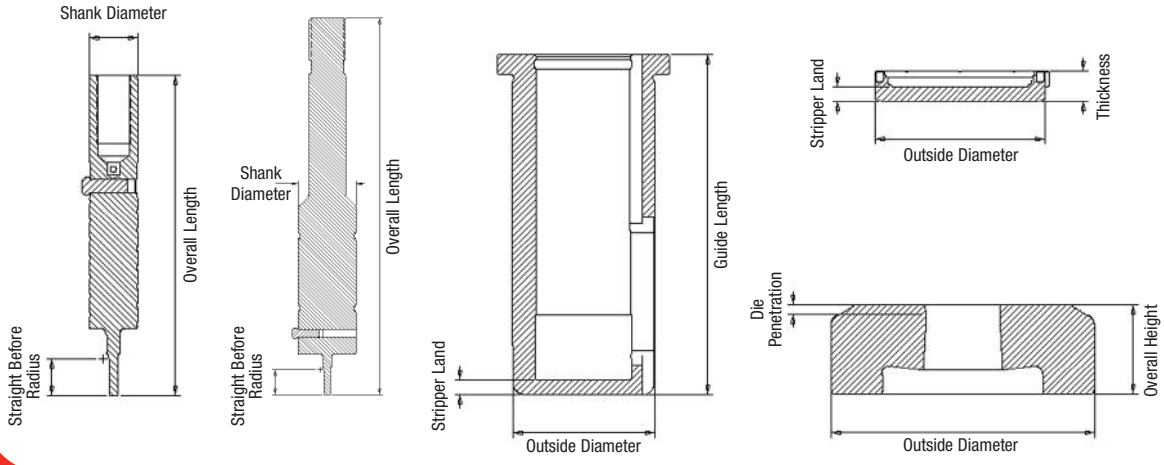
MATERIAL SHEAR STRENGTH —
Material shear strength is a measure of maximum internal stress before a given material begins to shear. This property is determined by metallurgical science and expressed as a numerical factor. Popular materials like aluminum, brass, mild steel and stainless steel have approximate shear strengths of:

MATERIAL :	SHEAR STRENGTH - psi/in²(kN/mm²):
Aluminum	25000(0.1724)
Brass	35000(0.2413)
Mild Steel	50000(0.3447)
Stainless	80000(0.5516)

Dimensions in inches (millimeters)

THICK TURRET TOOLING CRITICAL DIMENSIONS

Station	1/2" A	1-1/4" B	2" C	3-1/2" D	4-1/2" E
Maximum Punch Diagonal	0.500(12.70)	1.250(31.75)	2.000(50.80)	3.500(88.90)	4.500(114.30)
Ultra TEC Punch					
Part Number	PAUA	PAUB	PAAC	PAAD	PAAE
Overall Length	4.245(107.82)	3.957(100.51)	3.786(96.16)	3.313(84.15)	3.353(85.17)
Shank Diameter	0.630(15.99)	1.250(31.75)	2.007(50.98)	3.520(89.41)	4.520(114.81)
Straight Before Radius*	0.742(18.85)	0.742(18.85)	1.004(25.50)	1.004(25.50)	1.043(26.49)
Ultra TEC Stripper					
Part Number	S6KA	S6KB	S6KC	S6KD	S6KE
Outside Diameter	0.751(19.07)	1.500(38.10)	2.249(57.12)	3.825(97.16)	4.759(120.88)
Thickness	0.272(6.91)	0.272(6.91)	0.394(10.01)	0.394(10.01)	0.394(10.01)
Stripper Land	0.157(3.99)	0.157(3.99)	0.315(8.00)	0.315(8.00)	0.315(8.00)
Metric (Original) Style Punch					
Part Number	PAAA	PAAB	PAAC	PAAD	PAAE
Overall Length	8.169(207.49)	8.169(207.49)	3.786(96.16)	3.313(84.15)	3.353(85.17)
Shank Diameter	0.630(16.00)	1.250(31.75)	2.007(50.98)	3.520(89.41)	4.520(114.81)
Straight Before Radius*	0.664(16.87)	0.742(18.85)	1.004(25.50)	1.004(25.50)	1.043(26.49)
Original Style Stripper					
Part Number	S6AA	S6AB	S6AC	S6AD	S6AE
Guide/Stripper Outside Diameter	1.020(25.91)	1.883(47.83)	2.007(50.98)	3.520(89.41)	4.520(114.81)
Guide Length/Stripper Thickness	4.448(112.98)	4.528(115.01)	0.394(10.01)	0.394(10.01)	0.394(10.01)
Stripper Land	0.197(5.00)	0.197(5.00)	0.394(10.01)	0.394(10.01)	0.394(10.01)
Slug Free® Die					
Part Number	D0AA	D0AB	D0AC	D0AD	D0AE
Outside Diameter	1.000(25.40)	1.875(47.63)	3.500(88.90)	4.938(125.43)	6.249(158.72)
Overall Height	1.187(30.15)	1.187(30.15)	1.187(30.15)	1.187(30.15)	1.187(30.15)
Die Penetration	0.118(3.00)	0.118(3.00)	0.118(3.00)	0.118(3.00)	0.118(3.00)



*** The Straight Before Radius (SBR) dimension may be reduced for small diameters and narrow widths. Consult your application specialists.**

PUNCH AND DIE MAINTENANCE

PUNCH MAINTENANCE

You can greatly extend overall punch life by sharpening whenever the edge dulls to a 0.005(0.13) radius. At this point, just a small amount of sharpening will "touch up" the cutting edge. Frequent touch up works better than waiting for the punch to become very dull. The tool lasts longer and cuts cleaner with less punching force.

Maximum amount of sharpening depends on thickness of material being punched, size of punch (length and width), and punch press station.

1. To sharpen, clamp the punch squarely in a Vee Block on the magnetic chuck of a surface grinder. Only 0.001 to 0.002 (0.03 to 0.05) should be removed in one "pass". Repeat until tool is sharp, normally 0.005-0.010(0.13-0.25) total.
2. Use a standard vitrified bond, aluminum oxide wheel: hardness range "D" to "J"; grain size 46 to 60. A "ROSE" wheel made especially for grinding high speed steel is a good choice but not mandatory.
3. Dress the wheel using a rigid single or multi-point diamond: downfeed 0.0002-0.0008 (0.005-0.020); crossfeed quickly 20-30 in/min (508-762 mm/min).
4. Apply coolant with as much force and as close to the tool and wheel as is practical. Use a good general purpose grinding coolant used to the manufacturer's specifications.
5. Feeds and feed rates: A, Downfeed (wheelhead), 0.001 - 0.003 (0.03-0.08); B, Crossfeed (infeed), 0.005-0.010 (0.13-0.25); for nitrided punches, 0.002-0.007(0.05-0.18); C, Traverse (sideways), 100-150 in/min (2,540-3,810 mm/min).
6. After the sharpening, lightly stone the sharp cutting edges to remove any grinding burrs and to leave a 0.001-0.002 (0.03-0.05) radius. This reduces risk of chipping.
7. Demagnetize the punch and spray on a light oil to prevent corrosion.

DIE MAINTENANCE

As with punches, keep dies clean and watch for wear. Use the same sharpening procedures — hold die on surface grinder's magnetic chuck; use same wheel and feed rates. Check die thickness after each sharpening and add shims as necessary.

CONSIDERATIONS IN GRINDING

A grinding wheel's abrasive particles, in effect, are break-away "teeth". These teeth can be made from a variety of very hard, abrasion resistant materials, such as diamond, borozon and, most commonly, aluminum oxide.

The abrasive particles are embedded in a softer matrix material and meant to fracture loose from the matrix as cutting pressure becomes greater. Cutting pressure can increase from raising the feed rate or from dulling of abrasive particles. Pressure causes surface particles to fracture or break free from the wheel matrix and expose new sharp edges, resulting in the wheel's sharpness.

For our purposes, in selecting a vitrified bond aluminum oxide wheel, we need only be concerned with two variables: hardness and coarseness of the wheel. Hardness refers to the bond strength of the matrix. Coarseness refers to the size and concentration of the abrasive particles (grit).

Generally speaking, harder materials require softer wheels — softer materials require harder wheels. Grinding a harder and/or more abrasive resistant material, such as hardened tool steel, dulls abrasive particles quickly. The wheel then needs increased feed forces. A softer wheel allows spent particles to break loose from the matrix more easily. The newly exposed sharp edges will cut rather than rub and tear at the workpiece. Less pressure is required and the wheel runs cooler.

Coarse wheels with large, widely spaced abrasive particles perform less cutting per revolution and allow greater "chip" clearance. The wheel stays cleaner. Friction is reduced.

Balancing hardness and coarseness results in a wheel that stays sharp and clean to optimize cutting action. It meets the grinding objective of removing material from the workpiece while expending a minimal amount of wheel energy. Wheel energy losses largely translate to workpiece heating. Workpiece heating, in turn, will result in softened and/or highly stressed tools which will not perform well. Hardened tool steels are particularly vulnerable.

It is generally desirable to use a softer "G" or "H" hardness wheel with a grit concentration/size of about forty-six.

A-2 and S-7 STEEL

Grinding Wheel Hardness: **G-J**
Grit: **46-60**

M-2 and M4PM™ STEEL

Grinding Wheel Hardness: **D-G**
Grit: **46-60**

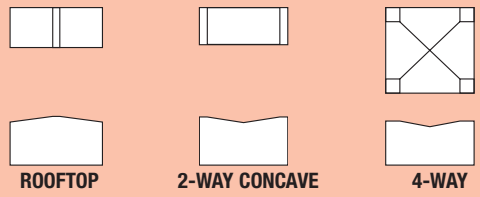
Dimensions in inches (millimeters)

PUNCH AND DIE MAINTENANCE

PUNCH SHEAR RECOMMENDATIONS

STATION	DESCRIPTION	STANDARD	ALTERNATIVE
1/2" A	Rounds and Shapes	None	None
1-1/4" B	Rounds and Shapes	None	None
2" C	Rounds	None	2-Way Concave
	Rectangles Width ≤ 0.188(4.78)	None	Rooftop
	Rectangles Width ≤ 0.188(4.78)	None	2-Way Concave
	Squares	None	4-Way
3-1/2" D	Rounds	None	2-Way Concave
	Rectangles Width ≤ 0.188(4.78)	None	Rooftop
	Rectangles Width ≤ 0.188(4.78)	None	2-Way Concave
	Squares	None	4-Way
4-1/2" E	Rounds	Rooftop	2-Way Concave
	Rectangles Width ≤ 0.188(4.78)	Rooftop	Rooftop
	Rectangles Width ≤ 0.188(4.78)	Rooftop	2-Way Concave
	Squares	Rooftop	4-Way

ALTERNATIVE SHEARS

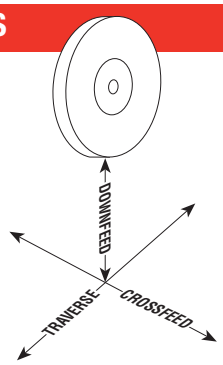


FEED RATES PER PASS

Downfeed:
0.001-0.003(0.03-0.08)

Crossfeed:
0.010(0.25)

Traverse:
100-150 in/min.
(2.50-3.80 m/min.)



WHEELHEAD

FIXING SHARPENING PROBLEMS

PROBLEM:	CAUSE:	CURE:
Discoloration** and/or surface cracks	Insufficient coolant	Increase or redirect flow.
	Improper wheel	Use coarser grain, softer grade grinding wheel.
	Improper dress	Drop wheelhead 0.0002-0.0004 (0.005-0.010) and redress. Move crossfeed approx. 50 in/min. (1.25 m/min.)
Harsh cutting sound and/or poor surface finish	Excessive stock removal	Less downfeed; lower crossfeed rate
	Improper wheel	Use coarser grain, softer grade grinding wheel.
	Improper dress or glazed wheel	Redress wheel, break glaze on wheel surface

**Dark discoloration indicates damage not necessarily limited to the tool surface. Removal of burned surface will not rectify damage. Recommend replacement of the tool.

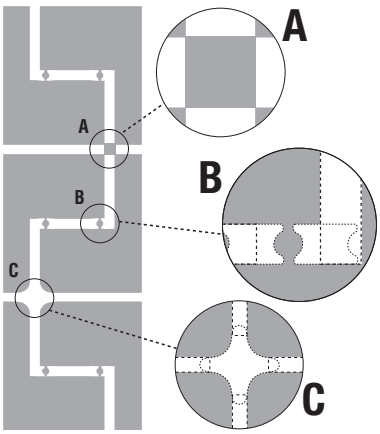
Dimensions in inches (millimeters)

Three methods for separating parts using long, narrow rectangles

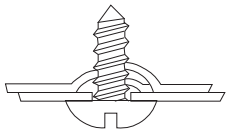
SHAKE-AND-BREAK — By programming a small gap between hits at exterior corners (A), the corners remain connected to the sheet until removed from the press and shaken loose. This technique works where corners of four parts meet.

By programming a larger gap adjacent to interior corners (B), a special tab tool can transform the gap into a 0.008(0.2) shake-and-break connection. Just one tangent or radial tool makes a tab at any corner without rotating when the corner is made by the shearing tool perpendicular to the tab tool.

If exterior corners don't need to remain connected (C), the 4-way corner rounding tool cuts and rounds all four corners in one hit. Tips are specially tapered to blend the corner radius into the sides – also available with shake-and-break tab tips.



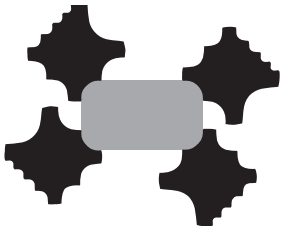
Costs for bolts and lockwashers can be eliminated



if thread forms can be programmed into a part. This domed shape with a screw thread acts like a locknut as a screw tightens it down. Mate's special thread form tools make both the screw hole and the raised dome in one hit.

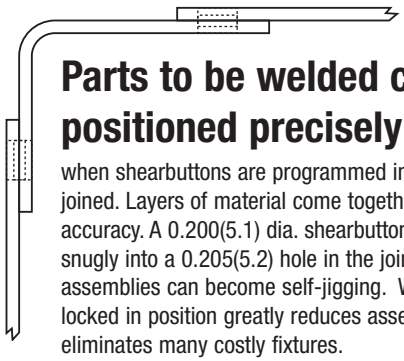
9 radii in one auto index tool

No job shop should be without one. Nine popular radii or customize.



Tearing or splitting of overstressed metal forms

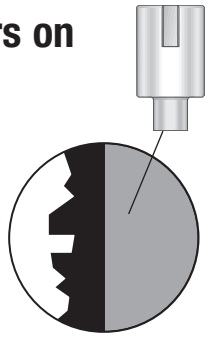
can be reduced by placing the form on the sheet with the grain running perpendicular to the form. Corners of high louvers, high extrusions, complex lance-and-forms, and card guides are typically vulnerable to this effect. Liberal application of a forming lubricant is also recommended to let the metal slide more freely over the forming surface of the tool, especially in stainless steel.



Parts to be welded can be positioned precisely

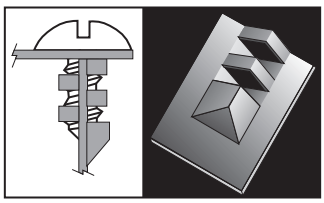
when shearbuttons are programmed into surfaces to be joined. Layers of material come together with CNC accuracy. A 0.200(5.1) dia. shearbutton in one part fits snugly into a 0.205(5.2) hole in the joining part. Complex assemblies can become self-jigging. Welding with parts locked in position greatly reduces assembly time and eliminates many costly fixtures.

When galling occurs on punch tips



(Galling is an adhesion to the punch tip of metal being punched, caused by pressure and heat)
The best technique for removing galling is to rub it off with a fine stone (India Oil Stone STO29807). The rubbing should be done parallel to the direction of the punching motion. This will polish the surface which contacts the material, decreasing the chance of any future galling. Do not sandblast, belt sand or use other harsh abrasive methods. These create a coarse surface finish to which material adheres more easily to the tool.

For access panels that fasten with screws



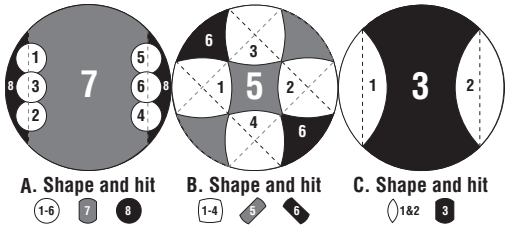
Screw-pockets in the edge of one panel, coupled with screw holes in a joining panel, make a quick job out of preparing a removable panel on the punch press. No nuts needed. The screw pocket is formed in one hit by a lance and form tool assembly available in sizes to accommodate economical standard screws.

SECTION 9

Dimensions in inches (millimeters)

PRODUCTIVITY IMPROVEMENTS TIPS AND TECHNIQUES

How to punch large holes without exceeding press punching force



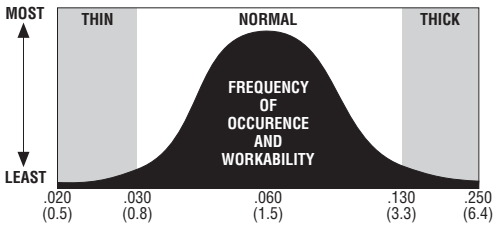
Tooling is available for round holes up to 4.500(114.3) diameter. Such holes can exceed press capacities, especially in high shear strength materials. Creating large holes with more than one hit may solve the problem. Using smaller tools to break long perimeters can cut punching force by a half or more, without resorting to nibbling a rough hole with a radius punch. Many tools may be available among the tools you already have. Others can be ordered to fill out your plan. The diagrams above use rounds, "DDs", a quad radius and a biconvex radius. In all three, slugs fall away through die, leaving no scrap on the punch press table.

If punches overheat...

A. Use a lubricant. This will decrease friction. If lubricant is unacceptable or if slug pulling occurs:
B. Use more than one punch of the same size in the sequence. By rotating the punches, there will be a longer time for each punch to cool down before it is used again.
C. Simply give the tool a rest. Plan the program so that the tool that is overheating alternates with different punches. Or stop the press for awhile.

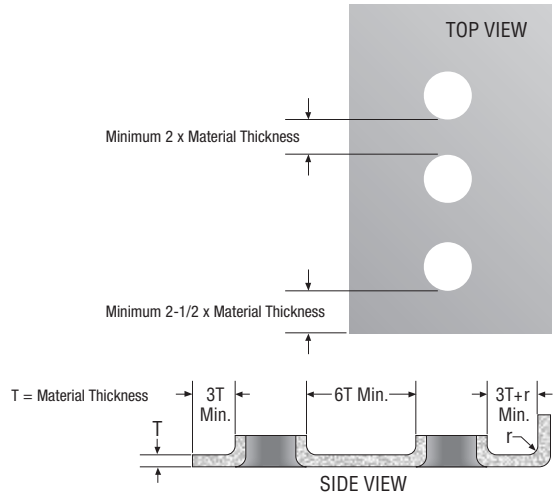
What constitutes "normal" sheet metal?

Thickness: 0.030-0.130(0.80-3.30)
Shear strength: 25,000-75,000 psi (0.172-0.157 kN/mm^2)
Normal sheet metal will provide the most trouble-free operation and longest tool life.
Material that is not in the normal range but still within the capacity of the punch press may require special tools, high lubrication, multiple hits and/or other procedures to produce a satisfactory job. Call Mate customer service for suggestions.

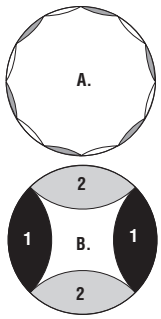


Recommended minimum distances between holes, forms and edges of sheets

If holes and forms are placed any closer to each other or to edges of sheets than shown below, they will distort each other and the material because material flows when it is punched or formed.



A handy shape for punching large, round holes



This biconvex or lenticular shaped tooling can be made with the exact radius for the hole you need. If the hole is larger than press capacity, we recommend using the tool with tool rotation (A). Program the tool for bridge hitting around the perimeter of the circle. If the hole falls within press capacity, a radial tool and a tangent tool can punch holes in four hits at less than half the punching force required for a full size round and without tool rotation (B).

What to do about tool alignment

If alignment of your punch press deteriorates to the point where tools dull too rapidly or workpiece quality is unacceptable, here are things you can check and fix:
A. Examine tool loading equipment for wear and damage. Adjust where possible. Replace where necessary. Clean and lubricate linkages.
B. Examine tool receptacles. Clean so that tools seat accurately and rigidly. Restore damaged or worn components. Check keys and keyways for proper clearance.
C. Keep your machine manual handy – refer to it regularly.

Dimensions in inches (millimeters)

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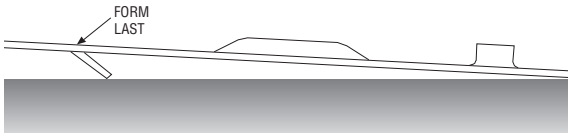
When punches dull too fast

Clearance may be too tight. It should be 20-25% of material thickness TOTAL clearance (not per side). In partial hitting (notching, nibbling, shearing), lateral forces may deflect the punch tip and tighten clearance on one side. Sometimes the punch tip may move far enough to shave the side of the die. This results in rapid deterioration of both punch and die.



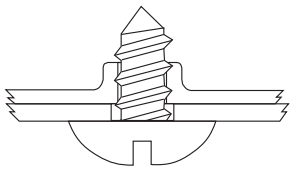
Form-down last

When using forming tools, form-down operations are generally avoided because they take up so much vertical room and any additional operations tend to flatten them out or bend the sheet. They can also drop into dies, get caught and pull out of work holders. However, if a form-down operation is the only solution for a particular piece part, make it the last operation on the sheet.

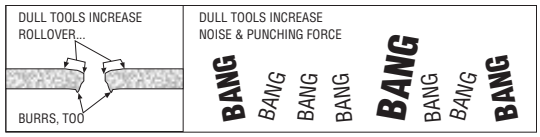
A method for separating parts especially for thin materials

This shake-and-break configuration is for use with materials less than 0.048(1.2) thick where more strength is needed in keeping the sheet together. It should be programmed to leave the side with the wide tabs on the discarded side of the material away from the piece-part.

Screws not holding? Use tapping extrusions



If screws threading into a single thickness of material are pulling loose, one way to get extra holding power is with tapping extrusions. They can be made on the same punch press that is punching your regular screw holes. This is done by punching a smaller hole that is then enlarged by a forming tool. The forming operation raises a flange around the edge of the hole permitting more screw threads to engage the material. Screws in extruded holes develop nearly twice as much holding strength as in holes that are not extruded. You can make threads with taps or use thread cutting screws.



When to sharpen tools

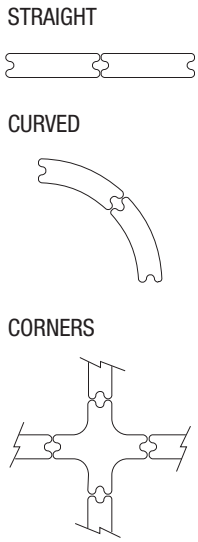
If a piece-part is starting to show too much roll over, if the punch press is making more noise than you think it should, or if it's working harder than it used to – perhaps a tool is dull. It is recommended that tools be resharpened when the edges are worn to 0.005(0.13) radius. You get improved consistency in quality of work. Machines last longer and so do tools if resharpened in small amounts more frequently rather than waiting until they are “really” dull.

Inscribe parts on a punch press to reduce costly separate operations

Inscribing numbers, words, or any combination thereof can be programmed into your punch press with Mate stamping tools. These tools can eliminate a secondary operation or a time consuming manual process. Produce one or two lines with one hit. The characters line up straight and depth of impression is uniform. Wide choice of type sizes.

Shake-and-break

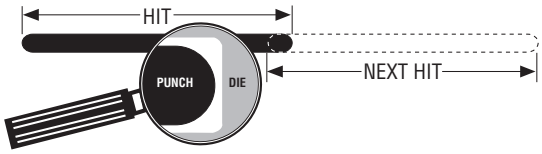
Shake-and-break is a popular name for this easy method of separating multiple parts from a sheet of material. The method is based on small, interconnecting tabs between the parts created by programming spacing of the shearing or slitting punch. These tabs keep the sheet and parts intact while being punched, yet easy to separate off the machine. Any parts that don't fall loose by shaking the sheet are quickly twisted out by hand. The tabs should be 0.008(0.2) wide. A number of punch shapes are available, depending upon the shape of the part. Although straight X and Y axis parting can be performed in any station, curved shapes are only practical in the auto index stations.



Dimensions in inches (millimeters)

PRODUCTIVITY IMPROVEMENTS TIPS AND TECHNIQUES

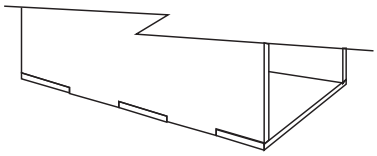
A smooth slitting tip…



To get rid of the small "teeth" left on edges by rectangular tools, it is a common practice to order oval punches with rectangular dies having radiused corners for slitting and parting. The radii blend into the next cut more smoothly even on older machines with play in the toolholder bores and workholders. Workpieces are less likely to cause cuts and scratches when being handled, need less finishing work later.

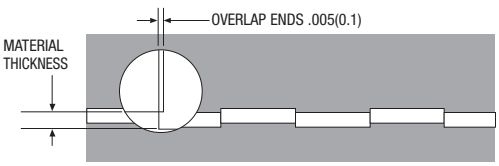
The secret to fine quality custom stamped inscriptions

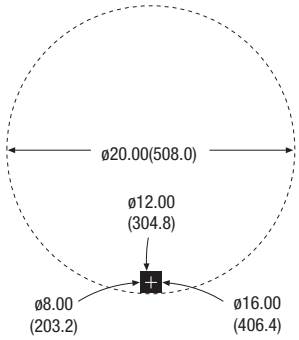
If you want your company logo or other symbol to look the best it possibly can, there is no substitute for good artwork. That means a well executed drawing rendered with crisp, clean lines. Providing a high quality CAD file will assure your custom stamping tool is exactly to your specifications.



Making accurate butt joints in metal is easy if you cut both tab and slot in the same hit

This practice cuts a modified dovetail joint out of the metal that leaves both pieces flush with each other on the sides and on the ends. The trick is to position the pieces to be joined next to each other on the sheet so that the mating edges can be parted with a single row of hits. Then program the hits to overlap 0.005(0.10) end to end and position alternate hits to be offset one material thickness side to side.





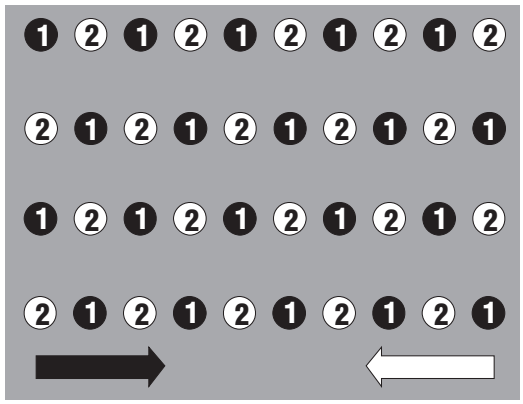
Here's how to punch huge, smooth holes in your auto index station

Using a punch and die with an arc for a much larger circle, your auto index station can nibble a smooth edged, round hole limited only by your sheet size. The example shown above is Mate's quad radius tool for the four circle sizes shown. You can nibble larger holes with this tool, but scalloping will appear the more the hole size deviates from the punch size. You can order any custom radius you wish.

Combating material warpage

If you're punching a large number of holes in a sheet and the sheet does not stay flat, it could be caused by the cumulative effect of punching. Each time a hole is punched, material surrounding the hole is stretched downward, placing the top of the sheet in tension. The downward movement causes a corresponding compression at the bottom of the sheet. For a few holes, the effect is insignificant, but as the number of holes increases the tension and compression can multiply to the point where the sheet deforms.

One way to counteract this effect is to punch every other hole first and then come back and punch the remaining holes. This places the same amount of force on the sheet, but it disrupts tension/compression accumulation that occurs when punching operations follow one another in close succession and in the same direction. It also allows the first set of holes to absorb some of the distorting effect of the second set.



Dimensions in inches (millimeters)

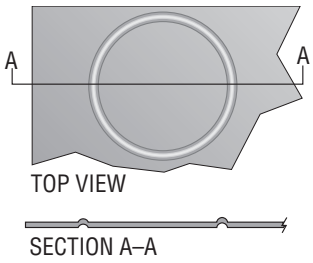
For flatter emboss top

A combination of material properties and emboss proportions may cause the flat top of an emboss to arch into a domed shape after it is formed. If a domed emboss shape is unacceptable, pre-punching a hole in the top of the dome will remove much of the stress that is causing the material to arch. The form will remain much flatter across the top.

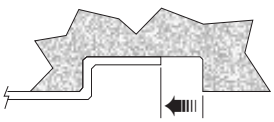
'DOMED' EFFECT IN EMBOSS

PRE-PIERCE FLATTENS TOP

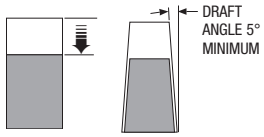
Here's how you can form raised beads in any configuration



With Mate's beaded emboss tool, you can raise an embossed bead in virtually any configuration that fits on the sheet. This tool forms in 0.030(0.8) increments up to a height of 0.250(6.4) in materials 0.075(1.9) and thinner. It can be used for forming straight lines or curved lines.



SIDE VIEW: FRONT EDGE OF TAB MOVES BACK IN DIE AS IT IS FORMED.

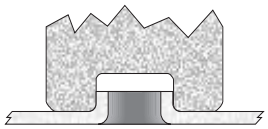


TOP VIEW: WITH AND WITHOUT DRAFT ANGLE, SHOWING EFFECT AS FRONT EDGE OF TAB MOVES BACK IN DIE.

Tabs designed with "Draft Angle" won't bind in forming dies

Tabs and louvers will bind in dies if they are the same width as the die opening. Designing a slight angle (draft angle) into the tab narrows the tip. Then the tip can move back into a wider space in the die as the tab is formed, leaving clearance on both sides so that the tab strips freely. Draft angle is normally 5°.

If your stainless steel extrusions are distorted

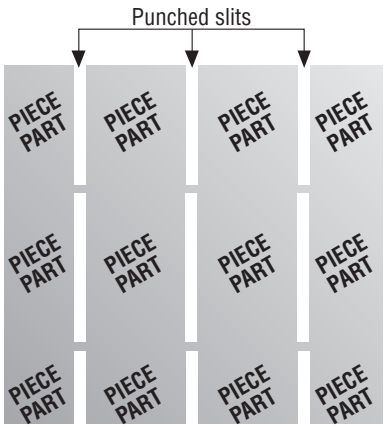


Apply a good forming lubricant to the material before making the extrusion. Not only will the material release from the die better, it slides over the die surface smoothly when being formed. This gives the material a better opportunity to distribute the forces of bending and stretching, preventing distortion in the formed wall and tearing at the root of the extrusion.

Precision, high speed separation of piece-parts combines punch press and shear operation with automatic gauging system

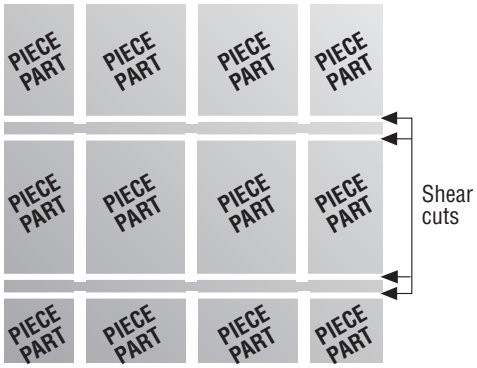
'Y" axis cut on the punch press

Programming your CNC punch press to slit between piece-parts using a guided shearing assembly, prepares the Y axis for separation of the piece-parts. Enough material is left between parts to hold the sheet intact.



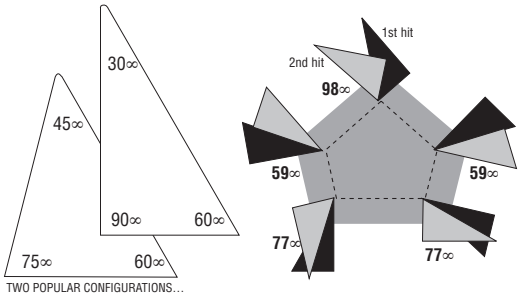
'X" axis cut on the shear

Specially gauged shear-cuts along the X axis intersect punched slits so that one pass through the shear separates piece parts completely.



Dimensions in inches (millimeters)

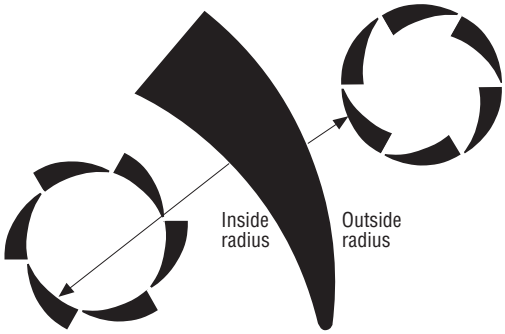
PRODUCTIVITY IMPROVEMENTS TIPS AND TECHNIQUES



Notch a variety of angles with one set of 3-way corner notching tools

Here's another candidate for an auto index station. A three-way corner notching tool can cut any angle larger than the smallest point by programming single or multiple hits. 15° is the smallest angle available.

I/O radius tool cuts both inside and outside radii



With this tool, you do not have to stop your machine to remove the slug for an oversize opening, or the blank if saving the slug. Small, precise tabs keep slugs and blanks intact while being punched, yet permit them to break away from each other easily off the machine. The precise tab is created by leaving a 0.016(0.4) gap between hits.

The tool's large radii result in slugs or blanks with smoother edges produced with far fewer hits than using an ordinary radius punch for nibbling holes. One tool punches slugs or blanks of any size practical for its configuration with smoothest edges occurring when radius punched and tool radius coincide.

This tool is for use in presses with tool rotation. Inside radius must be larger than outside radius. Programming requirements are enclosed with parts when shipped.

Consistent form height requires stroke control

Consistent, precise forming requires analysis of punch press stroke dynamics. When the upper unit meets material, several tons of force come into play. In applying this force, the frame of the punch press tends to move slightly in the opposite direction; to "yaw" in a manner that increases shut height. As the punch pierces the material, punching force reduces sharply and the frame springs back toward its original position. This causes the upper unit to lunge deeper into the lower unit.

The lunging motion typically occurs before the forming operation has taken place. If the motion is not controlled, forming is performed by spring back of the press frame and there is very little control over accuracy of depth.

To counteract this process, Mate's Dyna-Form Stroke Control™ positions the forming operation to become complete with upper unit "bottomed" in the lower unit. Spring back does not affect the depth. One piece part is exactly the same as the next. An additional advantage of bottoming is to coin the forms, giving them a crisp, well-defined appearance.

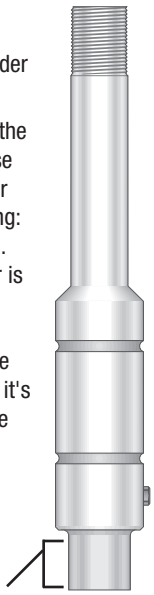
Dyna-Form Stroke Control is designed into all Mate special assemblies which include forming of material.

Extra back taper on punches reduces galling

If galling (build up on punch flank) is a problem, order punches with 2° total back taper.

Examine a Mate punch closely and you'll find that the punch tip is largest at the cutting edge. It's because we normally build in 1/4° total back taper (1/8° per side). This minute change in size facilitates stripping: material is much less likely to adhere to the punch. Grind life is not affected. The reduction in diameter is so small that the punch remains within normal tolerances for both hole size and die clearance throughout its life. Most likely you don't even notice the back taper when examining your punches. But it's there, working to make your punching more trouble free.

If galling is especially troublesome, order a combination of 2° total back taper (1° per side) on the punch and 20% to 30% clearance for the die.



Dimensions in inches (millimeters)

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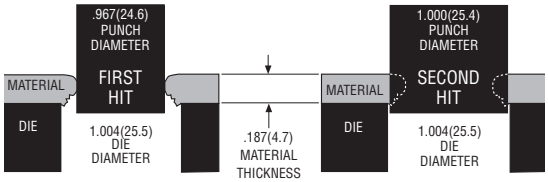


Shaving makes straight-walled holes without drilling

When you need a smooth, straight-walled hole for a shaft bearing or other use, shaving can save the time and trouble of performing a second operation on another machine. To do this, you need to punch the hole twice. First, use a punch with a punch-to-die Total Clearance equal to 20% material thickness. Second, use a larger punch exactly the same size as the finished hole. The die(s) used for both punches should be 0.004(0.10) larger than the second punch.

The second hit will shave the sides of the hole, removing most of the rollover and fracture effects caused in the first step, and enlarge the burnished area. This operation works best on mild steel and other materials ductile enough to shave.

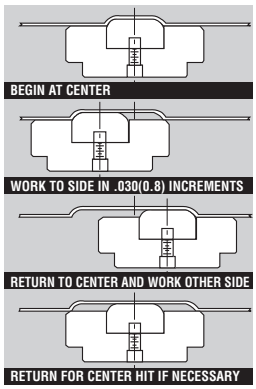
An easy way to order tools for shaving is to use the finished hole size as a reference. Order PUNCH #2 to the finished hole size, the DIE(S) to the same size as punch #2 + 0.004(0.10) Total Clearance, and for PUNCH #1 subtract 20% material thickness from the die size including clearance.

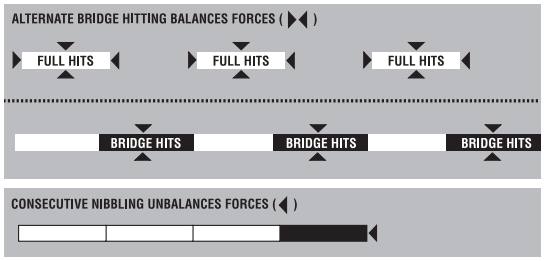
"Clearance corners" in dies control corner burrs

Why put a radius in the corners of rectangular and square dies with clearance greater than 0.020(0.5)? Because it keeps clearance uniform around the corner of the punch.
If the die is sharp cornered too, then distance between punch and die corners would be greater than side clearance, resulting in larger burrs. To get clearance corners always order "punch size plus clearance"
[Ex. 1.000 + 0.037(25.4+0.9)].

Start continuous louvers in the center

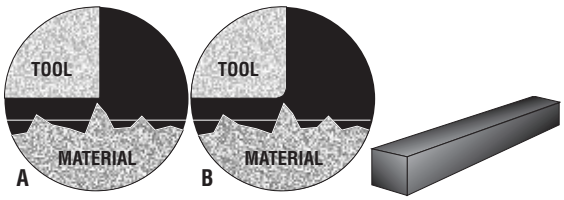
Continuous louver tools are now designed to produce smooth-edged, level-topped louvers when recommended procedures are followed. Start in the center and form to one side and then the other in 0.030(0.8) increments. If needed, complete the process by rehitting the center for ultimate flatness.





Bridge hitting reduces tool wear

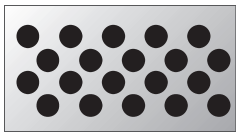
By alternating hits when performing shearing/slitting operations, forces upon the tool remain balanced from side to side and end to end. As a result, the punch operates square to the material and die. Over time you will notice a difference in the reduced frequency of sharpening and generally longer tool service. This practice is called "bridge" hitting because the full hits leave a "bridge" of material between them that is removed by the bridge hits.



Sharpened tool edges stay sharp longer if edges are dressed

The microscopic irregularities in workpieces and tools attack each other with each impact. Protrusions and sharp corners get flattened and knocked off. With very sharp tool edges (A), flakes in various microscopic sizes are knocked off as the tool wears. Each flake leaves a rough surface vulnerable to additional flaking. For this reason, we recommend lightly dressing the edge of freshly sharpened punches (B) with an oil stone (India Oil Stone STO29807). This removes the corner, which is most vulnerable to breaking off. Although the radius is tiny, it strengthens the tool edge by distributing stresses which cause flaking. With a radius of just 0.001-0.002(0.03-0.05), the tool can still be considered very sharp, and it stays that way longer. This small radius is applied with only one light pass of the stone per edge. You can't see the radius, but it's there!

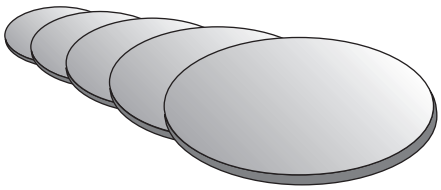
More holes per hit save time, cut costs



Mate cluster punches can increase the number of holes per hit by several times. Many different punch designs and cluster areas are available to provide a wide variety of punching choices.

Dimensions in inches (millimeters)

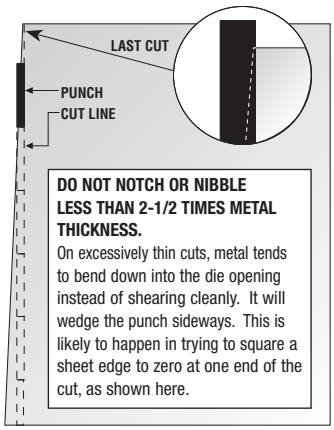
PRODUCTIVITY IMPROVEMENTS TIPS AND TECHNIQUES



Need to punch painted surfaces without marring?

Use Mate's urethane stripper pads. These self-stick pads can be applied to ULTRA® system stripper faces. Simply peel off the backing to expose an adhesive surface ready to stick. The pad covers the entire bottom with the hole being punched right along with work material when the punch is cycled. Pads come in sizes to fit stations 1/2" A through 4-1/2" E.

Narrow punches need guiding

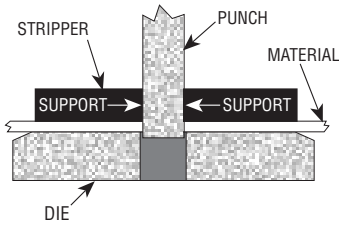


DO NOT NOTCH OR NIBBLE LESS THAN 2-1/2 TIMES METAL THICKNESS.
On excessively thin cuts, metal tends to bend down into the die opening instead of shearing cleanly. It will wedge the punch sideways. This is likely to happen in trying to square a sheet edge to zero at one end of the cut, as shown here.

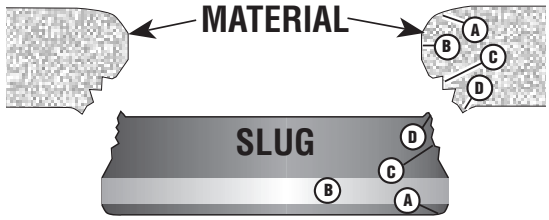
Punches narrower than material thickness are vulnerable to lateral forces which bend the tip. This results in tight punch-to-die clearance on the side toward which the punch is bending and the punch dulls quickly. If severely misused, the punch bends far enough to shave the die, damaging both tools. We recommend never nibbling off a strip narrower than 2-1/2 times material thickness.

Even in normal operation, narrow punches benefit from support at the punch tip. Mate's fully guided assembly provides such support with close stripper-to-punch clearance. The stripper clamps material to the die during the entire working part of the stroke so that it can support the punch as near to the tip as physically possible.

At Mate, we recommend fully guided assemblies with full confidence for all applications using narrow punch widths. Quality of production consistently improves and tools last three or more times longer than without guiding.



What do your slugs tell you?

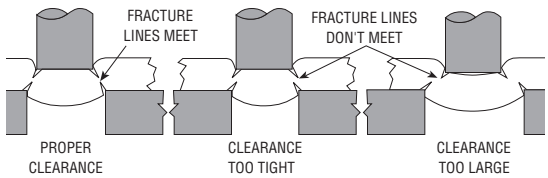


The slug is essentially a mirror image of the hole, with the same parts in reverse order. By examining your slugs you can tell if punch-to-die clearance is correct. If clearance is too large, the slug will show a rough, undulating fracture plane and a small burnish zone.

The larger the clearance, the greater the angle between the fracture plane and the burnish zone. If clearance is too small, the slug will show a fracture plane with little angle, and a large burnish zone.

Excess clearance makes a hole with large rollover and fracture so that the profile is somewhat pointed with a thin edge. Inadequate clearance makes a hole with small rollover and steep fracture so that the profile is more or less perpendicular to the surface of the material.

An ideal slug is created when the fracture planes coming from the top and bottom of the material have the same angle and form in alignment with each other. This keeps punching force to a minimum and forms a clean hole with little burr. At this point, any extension in tool life gained by increasing clearance, comes at the sacrifice of hole quality.



2007 • REV 12/07

MULTI TOOL TOOLING SYSTEMS

Mate is a world leading manufacturer, and OEM supplier, of multi tool systems for popular punch presses. The result of these valuable design partnerships is a comprehensive range of world class multi tool products. These products are designed and engineered as an integral part of the high performance machines in which they operate.

What is a multi tool? – It is a tool which expands the capacity of any one station of a CNC press (turret or otherwise) by allowing more than one punch and die set to be placed in a particular machine station. It is different from a cluster tool in that only one punch actuates during a ram cycle.

Multi tool systems available from Mate include:

Mate Ultra® Multi Tool Tooling System:
The new Mate Ultra multi tool assemblies for suitably equipped thick turret punch presses make full use of the advantages of Mate Ultra TEC® punches, strippers and Slug Free® dies. They provide complete compatibility with existing tooling inventory for added convenience. Mate Ultra multi tools fit into 3-1/2" D-Index stations and are available in two versions for maximum flexibility.

The Mate Ultra Multi Tool 8 station assembly
- Punch point range: 0.030(0.80) to 0.500(12.70)
- Ultra TEC 1/2" A station punches, strippers, and Slug Free dies

The Mate Ultra Multi Tool 3 station assembly
- Punch point range: 0.500(12.70) to 1.250(31.70)
- Ultra TEC 1-1/4" B station punches, strippers, and Slug Free dies

Visit mate.com/ultramultitools for more information.

MT™ Tooling System:
The Mate MT tooling system delivers exceptional punching performance for users of Finn-Power and Euromac punch presses. The Mate MT tooling system is available in three size ranges.
- MT 24mm – punch point range from 0.030(0.80) to 0.945(24.00)
- MT 16mm - punch point range from 0.030(0.80) to 0.630(16.00)
- MT 8mm - punch point range from 0.030(0.80) to 0.315(8.00)

Visit mate.com/MT for more information.

XMT™ Tooling System:
The Mate XMT tooling system is the world's first and only tooling designed specifically for Euromac punch presses. Mate's status as Original Equipment Manufacturer for Euromac makes XMT tooling the only way to take full advantage of the capabilities of the Euromac multi tool punch holders.
- XMT 24mm – punch point range from 0.030(0.80) to 0.945(24.00)
- XMT 12.7mm - punch point range from 0.030(0.80) to 0.500(12.70)

Visit mate.com/XMT for more information.

Visit mate.com/multitoolsystems for more information.

Dimensions in inches (millimeters)

ULTRA® TOOL LUBRICATION SYSTEM
1/2" A AND 1-1/4" B STATION

Machines equipped with tool lubrication systems introduce a lubrication fluid (oil, or an oil/air mixture) into the top of the tooling system. This diagram shows the method of transporting this fluid throughout the Ultra® tooling system in the 1/2" A (not show) and 1-1/4" B station (as shown) system.

The lubrication fluid – is introduced at the top of the tool by the machine mechanism.

It travels through the center of the assembly.

It flows through four fluid transportation holes in the punch. Two holes have been shown here. The four holes are at 90 degrees from each other.

The lubrication fluid reaches the interior wall of the Ultra guide.

The lubrication fluid also reaches the exterior of the guide.

There are internal keyways (Three for 1/2 A, Five for 1-1/4 B-Station) in the Ultra guide for punch angle settings. One keyway will be obstructed with the key of the punch. The lubrication fluid moves through the remaining four unobstructed keyways to the stripper pooling area.

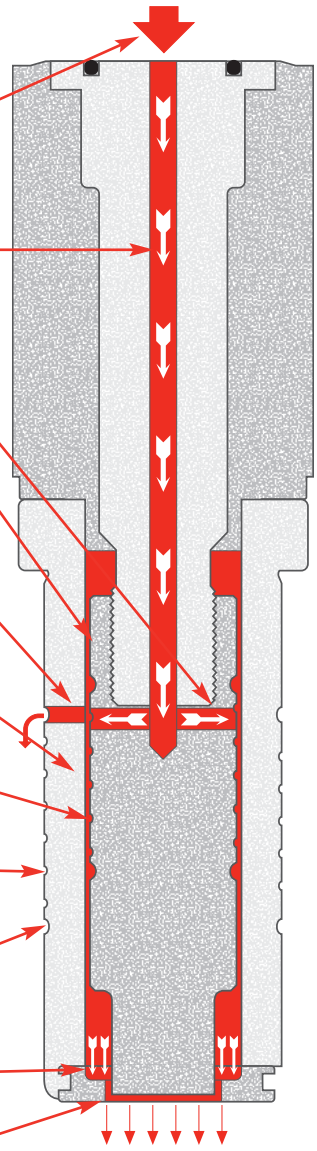
The punch spiral grooves evenly distribute the lubrication fluid around the entire interior of the guide.

The exterior spiral grooves evenly distribute the lubrication fluid around the entire guide between the guide and the turret bore.

The exterior spiral grooves do not extend beyond the turret bore. This keeps the lubrication on the contact surfaces and prevents the fluid from draining onto the work surface.

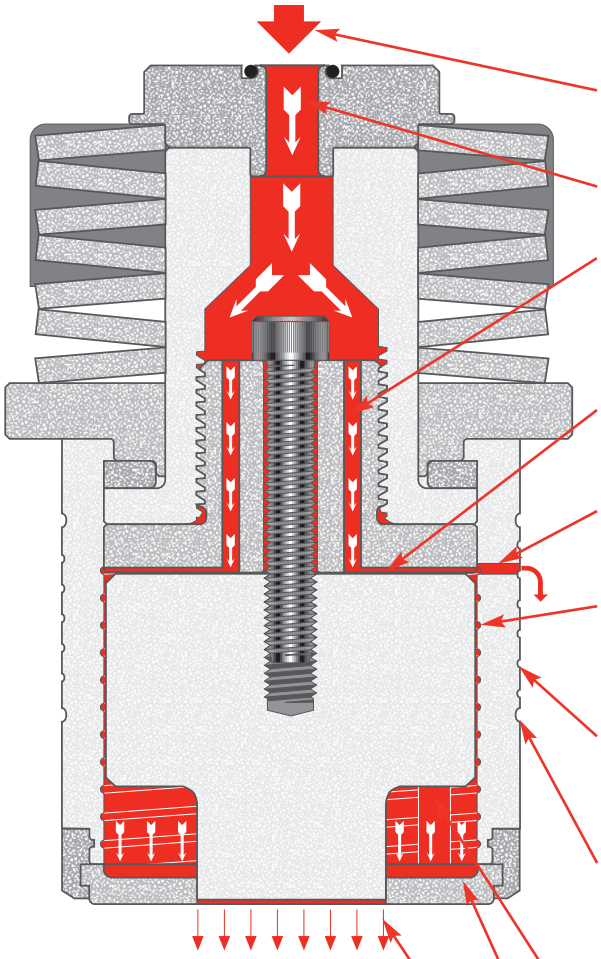
Stripper pooling area.

For Ultra ABS® Only:
Fluid is expelled through the small reliefs in the stripper next to the punch.



Ultra ABS is licensed under U.S. Patent No. 4,977,804 and corresponding foreign patents and patent applications, and authorized for use only on punch press machines manufactured by, for, or under license from Amada Company, Ltd.

ULTRA® TOOL LUBRICATION SYSTEM
2" C, 3-1/2" D, AND 4-1/2" E STATION



Machines equipped with tool lubrication systems introduce a lubrication fluid (oil, or an oil/air mixture) into the top of a tooling system. This diagram shows the method of transporting this mixture throughout the Ultra® tooling system in the 2" C, 3-1/2" D (as shown), and the 4-1/2" E station system.

The lubrication fluid is introduced at the top of the tool by the machine mechanism.

It travels through the center of the assembly.

It flows through three fluid transportation holes. Two holes have been shown here. The three holes are at 120 degrees from each other.

The lubrication fluid reaches the interior wall of the guide as it flows through three channels.

The lubrication fluid also reaches the exterior of the guide.

The interior spiral grooves evenly distribute the lubrication fluid around the entire punch between the punch and the guide.

The exterior spiral grooves evenly distribute the lubrication fluid around the entire guide between the guide and the turret bore.

The exterior spiral grooves do not extend beyond the turret bore. This keeps the lubrication on the contact surfaces and prevents the fluid from draining onto the work surface.

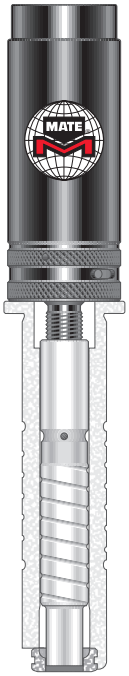
There are three vertical interior guide grooves that transport the fluid to the stripper pooling area.

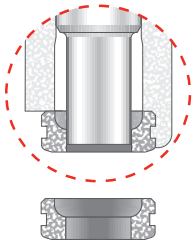
Stripper pooling area.

For Ultra ABS® Only:
Fluid is expelled through the small reliefs in the stripper next to the punch.

ULTRA TEC® AND ULTRA ABS® GRIND LIFE COMPARISON 1/2" A STATION

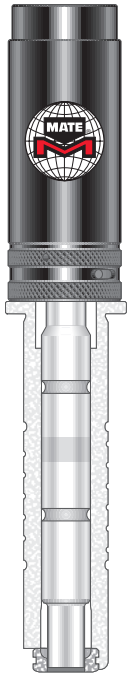
1/2" A Station Ultra with Ultra Punch



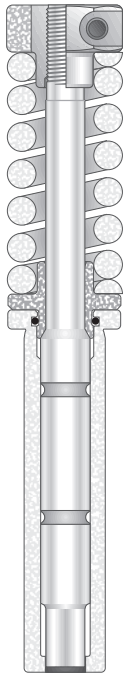


Ultra Stripper with 0.118(3.0) Relief

1/2" A Station Ultra with Original Style Punch

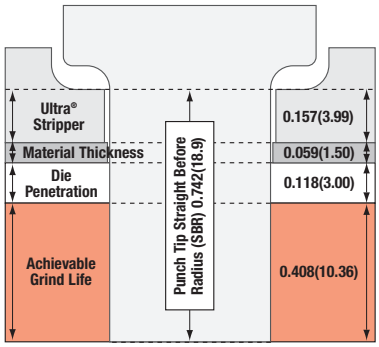


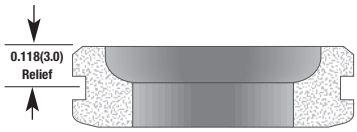
1/2" A Station Original Style



VALUE COMPARISON - 0.408(10.36) grind life when used with 0.059(1.50) material

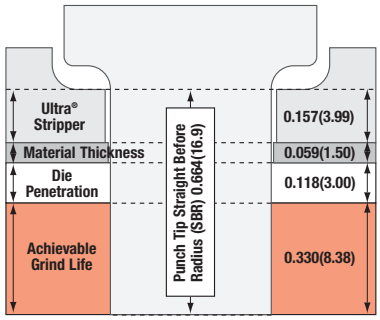
Mate Ultra® System w/Ultra Punch

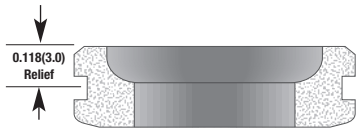




Ultra System Stripper

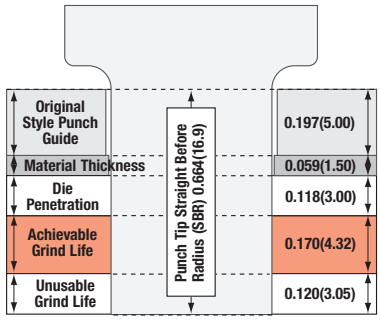
Mate Ultra® System w/Original Style Punch





Ultra System Stripper

Original Style



*Limited by punch head position

Original Style Punch Guide

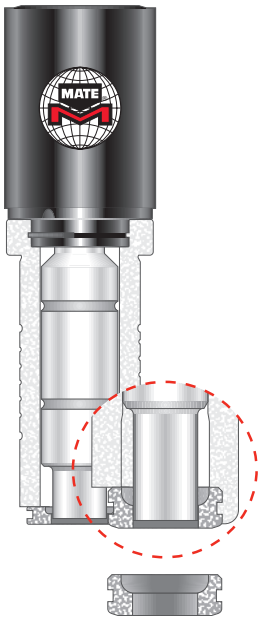
SECTION 9

See page 74 for Thick Turret Tooling Critical Dimensions

Dimensions in inches (millimeters)

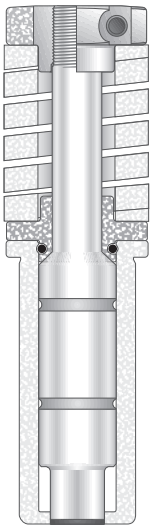
ULTRA TEC® AND ULTRA ABS® GRIND LIFE COMPARISON 1-1/4" B STATION

1-1/4" B Station
Ultra



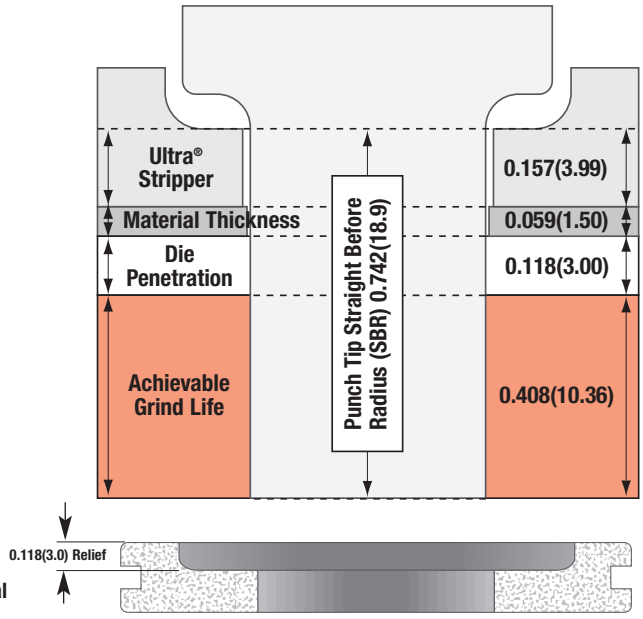
Ultra Stripper with
0.118(3.0) Relief

1-1/4" B Station
Original Style



1-1/4" B Station Original
System
Punch Guide

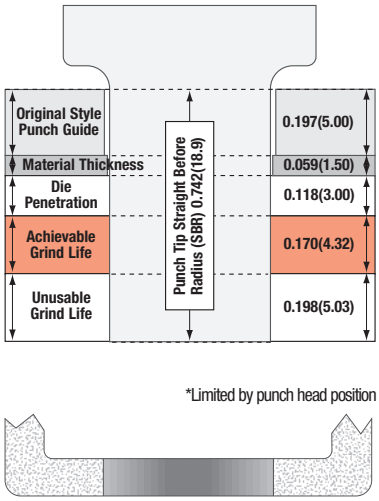
Mate Ultra® System



Ultra System Stripper

VALUE COMPARISON - 0.408(10.36) grind life when used with 0.059(1.50) material

Original Style



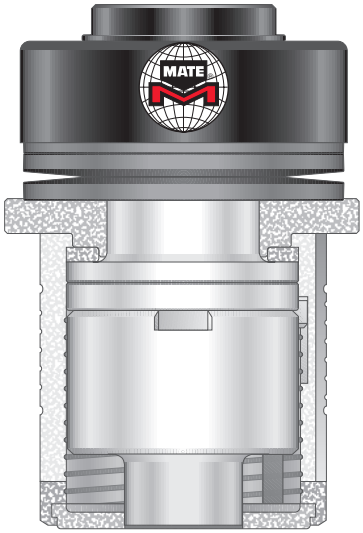
Original Style
Punch Guide

See page 74 for
Thick Turret Tooling
Critical Dimensions

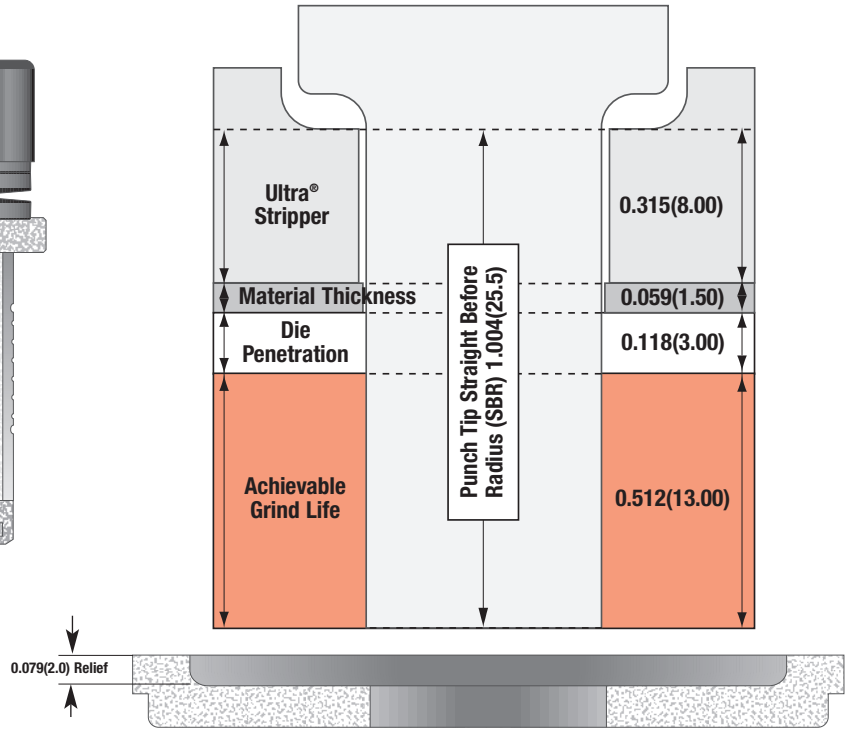
Dimensions in inches (millimeters)

ULTRA TEC® AND ULTRA ABS® GRIND LIFE COMPARISON 2" C, 3-1/2" D, AND 4-1/2" E STATION

4-1/2" D Station Ultra



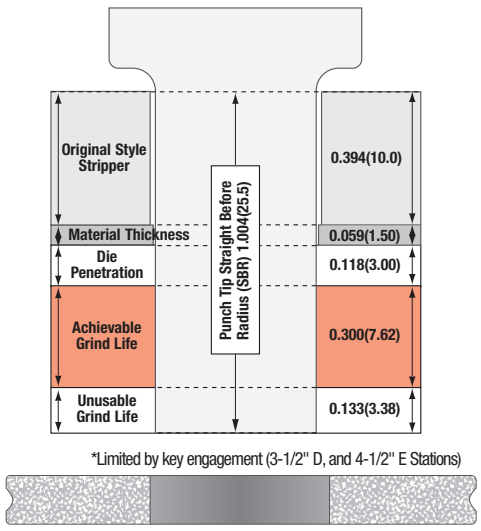
Mate Ultra® System



Ultra System Stripper

VALUE COMPARISON - 0.512(13.00) grind life when used with 0.059(1.50) material

Original Style



*Limited by key engagement (3-1/2" D, and 4-1/2" E Stations)

Original Style Stripper

See page 74 for Thick Turret Tooling Critical Dimensions

Dimensions in inches (millimeters)

THICK TURRET COMPATIBILITY CHART

Use this table to determine the compatibility of Mate punches, strippers, and dies with popular tooling systems.
● Indicates punch, stripper, or die is compatible with the corresponding tool system

	Tool Style	Mate Part Number	Ultra TEC®	Ultra XT™	Ultra ABS®	Mate Original	HP™	HP™ WLS®	HP™ ABS	Wilson Inch Style	Amada Standard	Amada ABS	Amada Z-Standard	Amada Z-ABS	Amada NEX Standard	Amada NEX ABS	Amada Alpha
1/2" A Station																	
Punch	Ultra TEC® Punch	PAUA	●	●													●
	Metric (Original) Punch	PAAA	●	●		●					●				●		●
	Ultra ABS® Punch	PAYA			●												●
Stripper	Ultra TEC®	S6KA	●	●													●
	Original Style	S6AA	●								●				●		●
	Ultra ABS®	S6YA			●												●
Die	Slug Free® Die	D0AA	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
1-1/4" B Station																	
Punch	Ultra TEC® Punch	PAUB	●	●			●1										●
	Metric (Original) Punch	PAAB	●	●		●					●				●		●
	Ultra ABS® Punch	PAYB			●												●
	Inch Style	PAJB	●	●						●							●
Stripper	Ultra TEC®	S6KB	●	●													●
	Original Style	S6AB				●					●				●		●
	Ultra ABS®	S6YB			●												●
Die	Slug Free® Die	D0AB	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
2" C, 3-1/2" D, and 4-1/2" E Stations																	
Punch	Original Style (M12 bolt)	PAA	●	●	●	●					●		●2				●2
	Inch Style (1/2-13 bolt)	PAJ								●							
	MXC™	PXC					●	●									
Stripper	Ultra TEC®	S6K	●														
	Original Style	S6A		●		●					●		●3				●3
	Ultra ABS®	S6Y			●												
	MXC™	SXC					●	●									
Die	Slug Free® Die	D0A	●	●	●	●	●	●	●	●	●	●	●	●			●

Notes:
1. Round Ultra TEC punches are not compatible with HP guides.
2. Requires the optional M12 bolt to be installed into the guide.
3. Requires use of optional Original style strippers.

MAXIMA® COATING AND NITRIDE TREATMENT

Maxima® Coating

Maxima is a premium tool steel coating that has been specially formulated for turret punch press tooling applications. Maxima is a multilayer Zirconium Titanium Nitride (ZrTiN) coating that is hard, wear resistant, and lubricious. It acts as a barrier between the punch and the sheet metal being punched and, because of its exceptional lubricity, greatly improves stripping.

Why is Maxima better? Maxima is applied to the precision ground surface of Mate's premium tool steel punches. Since Maxima is an extremely hard, wear resistant, slippery material which reduces the friction that occurs during the stripping portion of the punching cycle, it is particularly good for abrasive tooling applications. Less friction means less heat build up, less galling and longer tool life.

Results! In real life tests around the world, Maxima has increased tool life by a factor of 2 times, and even 10 times, and the tools are still in production.

Nitride Treatment

Nitriding is an optional heat treatment feature for high speed steel (HSS) punches. It is a surface treatment, which becomes an integral component of the structure of the material itself.

Nitrided punches are recommended for punching abrasive materials such as fiberglass or materials that cause galling such as stainless steel, galvanized steel, and aluminum. It is also recommended for high speed nibbling applications. It is not recommended for punches smaller than 0.158(4.01) in diameter or width, for material thicker than 0.250(6.35), or where significant punch deflection may occur.

Shape	Minimum tool widths suitable for Maxima coating	Minimum tool widths suitable for Nitride treatment
Round	Minimum diameter is 0.098(2.50)	Minimum diameter = 0.158(4.01)
Rectangle	If length is >0.250(6.35) the minimum width is 0.060(1.50) If length is <0.250(6.35) the minimum width is 0.098(2.50)	Minimum width = 0.158(4.01)
Oval	If length is >0.250(6.35) the minimum width is 0.060(1.50) If length is <0.250(6.35) the minimum width is 0.098(2.50)	Minimum width = 0.158(4.01)
Square	Minimum width is 0.098(2.50)	Minimum width = 0.158(4.01)
Others	Consult a Mate application specialist	Consult a Mate application specialist

M4PM™ TOOL STEEL

M4PM™ is a high speed, particle metallurgy tool steel designed for use in high performance tooling systems.

A combination of the chemical composition of M4, the particle metallurgy manufacturing process, and the triple temper heat treatment process, produces M4PM: the world's finest tool steel for use in punching tools.

M4PM is a very homogeneous, high quality tool steel which has many advantages when compared to alternative tool steels commonly available. These advantages include:

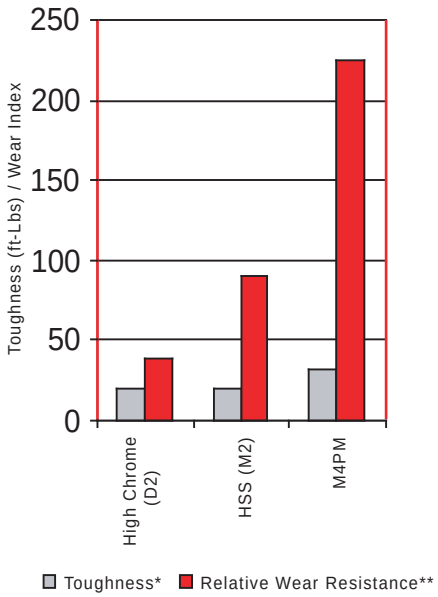
Superior Wear Resistance – 100% better wearing, M4PM offers superior resistance to adhesive- and abrasive-wear to maximize the interval between regrinds.

- More uniform distribution of smaller carbides—results in improved ductility (adhesive-wear) while still providing abrasive-wear resistant carbides over the entire surface of the material.
- 100% more Vanadium carbides—harder wearing for greater resistance to abrasive-wear.
- Increased Tungsten carbides—harder wearing and offer better red hardness; increased resistance to high temperatures which may anneal or damage the material.
- Higher hardenability—increased alloy content results in higher effective hardness for better wear resistance.

Increased Toughness – the molecular structure of M4PM is 50% tougher than conventional tool steels in impact strength tests.

- Triple temper heat treatment process—ensures full conversion of the material matrix. Results in fully tempered martensite and reduced internal stress, together with better dimensional stability.
- More uniform distribution of smaller carbides—offsets the effects of increased alloy content. Results in a more "interlocked" material matrix for significantly reduced tool breakage and edge chipping. See micrograph.

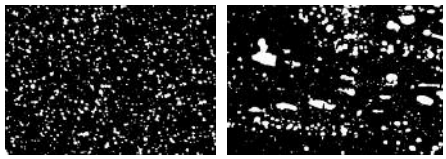
Better Value – customer trials have shown that tools manufactured in M4PM last 100% longer between regrinds than tools manufactured using conventional High Speed Steel. By increasing the interval between regrinds, the tooling lasts longer and punches many more holes before needing to be replaced.



International Material Standards			
	D2	M2	M4PM
JIS	SKD 11	SKH 51	SKH 54
WNr	1.2379	1.3343	none
DIN	X155 CrVMo 12-1	HS 6-5-2	none

M4PM Chemical Composition	
Carbon	1.42%
Chromium	4.00%
Vanadium	4.00%
Tungsten	5.50%
Molybdenum	5.25%

Micrograph shows that the particle metallurgy process produces a very homogeneous, high quality tool steel with superior wear resistance, toughness and dimensional stability.



M4PM™ **Conventional Tool Steel**

*Toughness: Charpy C-Notch impact strength test.
**Relative Wear Resistance: 10x Cross cylinder adhesive wear test.
Based upon steel manufacturers data.

ADD-ONS

General
Radius Corners
Non-Standard Straight Before Radius (SBR) Dimension
Special Angle Settings
Optional Shear (Limited Options)

Small Diameter Round Tools
Diameter 0.031(0.79) to 0.061(1.55)
Diameter 0.062(1.56) to 0.092(2.34)

Narrow Width Shaped Tools
Widths under 0.079(2.00)

Station Jumper
1-1/4" B Station - if diagonal dimension is <0.500(12.70)
2" C Station - if diagonal dimension is <1.250(31.70)
3-1/2" D Station - if diagonal dimension is <2.000(50.80)
4-1/2" E Station - if diagonal dimension is <3.500(88.90)
6" F Station - if diagonal dimension is <4.500(114.30)

Maxima® Coating - See Page 92
1/2" A Station
1-1/4" B Station
2" C Station
3-1/2" D Station
4-1/2" E Station
6" F Station
Slitting Punch Insert

Nitride Treatment - See Page 92
1/2" A Station
1-1/4" B Station
2" C Station
3-1/2" D Station
4-1/2" E Station
6" F Station
Slitting Punch Insert

Slug Free Light™ Die Geometry - See Page 13
1/2" A Station
1-1/4" B Station
2" C Station
3-1/2" D Station
4-1/2" E Station

1/2" A Station
1-1/4" B Station
2" C Station
3-1/2" D Station
4-1/2" E Station

Contact your Mate representative for pricing information.

THICK TURRET TOOLING SYSTEM QUICK REFERENCE PRICE GUIDE

Station	Tool Style

Mate Ultra TEC®

1/2" A	Canister and guide with Ultra punch, stripper, and Slug Free® die
1-1/4" B	Canister and guide with Ultra punch, stripper, and Slug Free® die
2" C	Original punch, Ultra stripper, Slug Free® die
3-1/2" D	Original punch, Ultra stripper, Slug Free® die
4-1/2" E	Original punch, Ultra stripper, Slug Free® die

See pages 10-12 for complete ordering information

Ultra TEC® Fully Guided

1-1/4" B	Canister and guide with Ultra punch, guided stripper, and Slug Free® die
2" C	Original punch, guided stripper, Slug Free® die
3-1/2" D	Original punch, guided stripper, Slug Free® die
4-1/2" E	Original punch, guided stripper, Slug Free® die

See pages 16-17 for complete ordering information

Ultra TEC® Fully Guided Clamp Clearing

3-1/2" D	Punch insert, clamp clearing stripper and clamp clearing Slug Free® die
4-1/2" E	Punch insert, clamp clearing stripper and clamp clearing Slug Free® die

See page 19 for complete ordering information

Ultra XT™

1/2" A	Canister and guide with Ultra punch, Ultra stripper, and Slug Free® die
1-1/4" B	Canister and guide with Ultra punch, Ultra stripper, and Slug Free® die
2" C	Original punch, original stripper, and Slug Free® die
3-1/2" D	Original punch, original stripper, and Slug Free® die
4-1/2" E	Original punch, original stripper, and Slug Free® die

See pages 24-26 for complete ordering information

Original Style Thick Turret

1/2" A	Complete assembly with Slug Free® die
1-1/4" B	Complete assembly with Slug Free® die
2" C	Original punch, original stripper, and Slug Free® die
3-1/2" D	Original punch, original stripper, and Slug Free® die
4-1/2" E	Original punch, original stripper, and Slug Free® die
6" F	Original punch, original stripper, and Slug Free® die

See pages 33-37 for complete ordering information

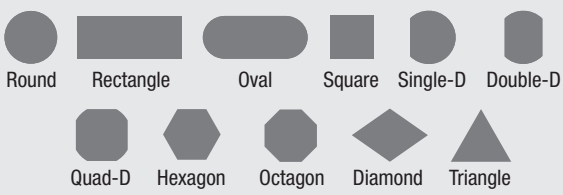
MXC™ Tooling System

2" C	Punch, stripper, and Slug Free® die
3-1/2" D	Punch, stripper, and Slug Free® die
4-1/2" E	Punch, stripper, and Slug Free® die

See page 45 for complete ordering information

Contact your Mate representative for pricing information.

STANDARD SHAPES



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