

HIGH PERFORMANCE TOOLING SYSTEMS

- **ULTRA TEC®**
- **THICK TURRET**
- **THIN TURRET**
- **TRUMPF STYLE**
- **MURATA WIEDEMANN**
- **SALVAGNINI**
- **MT™**
- **XMT™**

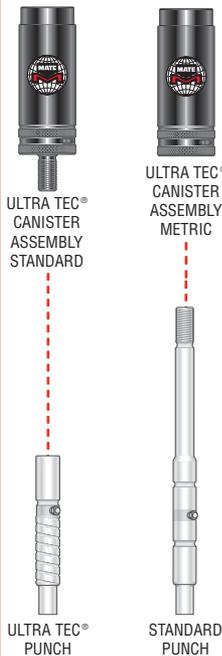


mate.com

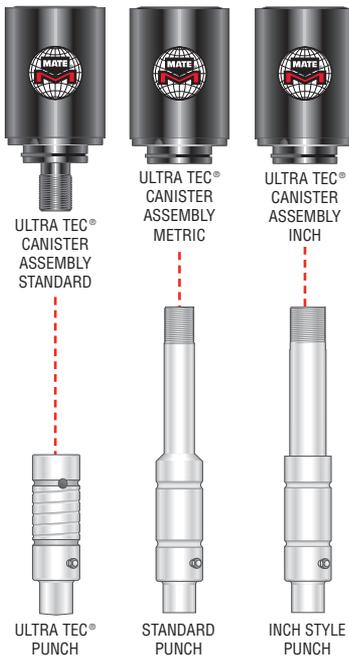
Mate Tooling Lasts Longer

ULTRA TEC® TOOLING SYSTEM

1/2" A STATION



1 1/4" B STATION



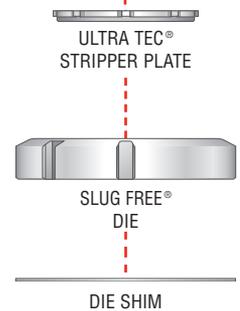
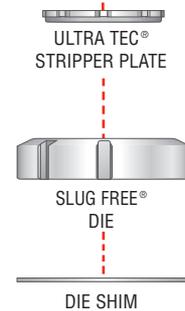
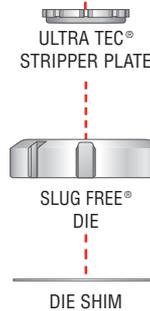
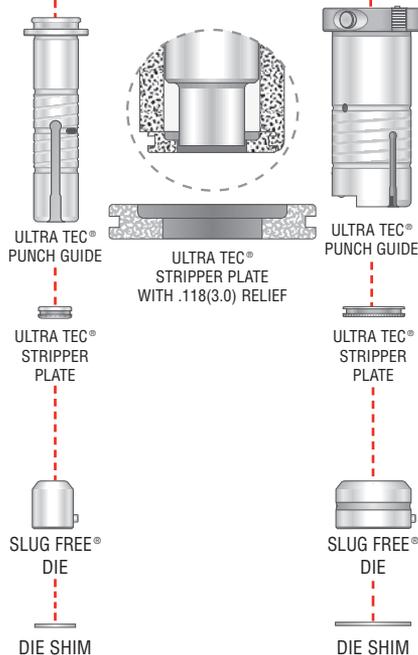
2" C STATION



3 1/2" D STATION



4 1/2" E STATION



- UP TO 0.118 (3.00) EXTRA PUNCH GRIND LIFE • INTERCHANGEABLE COMPONENTS
- MULTIPLE ANGLE SETTINGS • QUICK LENGTH ADJUSTMENT
- QUICK TOOL CHANGE • PREMIUM HIGH SPEED STEEL • SLUG FREE® DIE
- COMPATIBILITY WITH TOOL LUBRICATION SYSTEMS

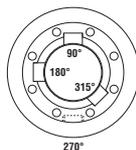


SIDE BY SIDE COMPARISON

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ULTRA TEC® SYSTEM SIDE BY SIDE COMPARISON

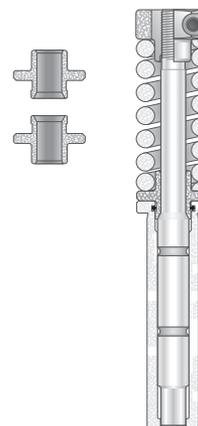
ULTRA TEC®



1/2" A STATION

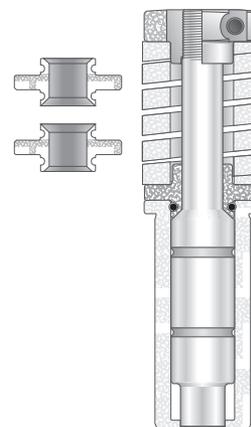
No tools required. Each 'click' is .006(0.15)	LENGTH ADJUSTMENT	Tools needed for adjustment
Self contained in canister	SPRING ASSEMBLY	Spring retainer with reversible design
Uses ULTRA® or original style	PUNCH	Original style
Snap in, self locking design. .118(3.0) additional grind life	STRIPPER	One piece 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

MATE ORIGINAL STYLE



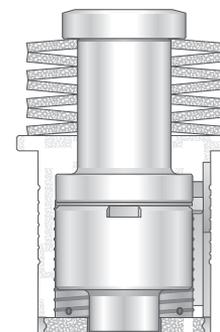
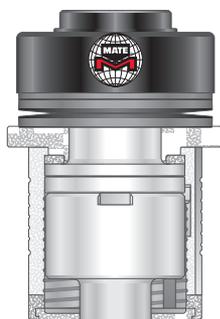
1 1/4" B STATION

No tools required. Each 'click' is .008(0.2)	LENGTH ADJUSTMENT	Tools needed for adjustment
Self contained in canister	SPRING ASSEMBLY	Spring retainer with reversible design
Uses ULTRA, original style, inch style or Series 90	PUNCH	Original style
Snap in, self locking design. .118(3.0) 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 .008(0.2)*	LENGTH ADJUSTMENT	Tools and shims needed for adjustment
Uses ULTRA, original style or Series 90**	PUNCH	Original style
Snap in, self locking design. .079(2.0) additional grind life	STRIPPER	Stripper held in place with external clips
0° and 90° External Slots	ANGLE ADJUSTMENT	0° and 90° 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 .016(0.4) per 'click'
 ** Requires punch adapter and/or drawbolt change

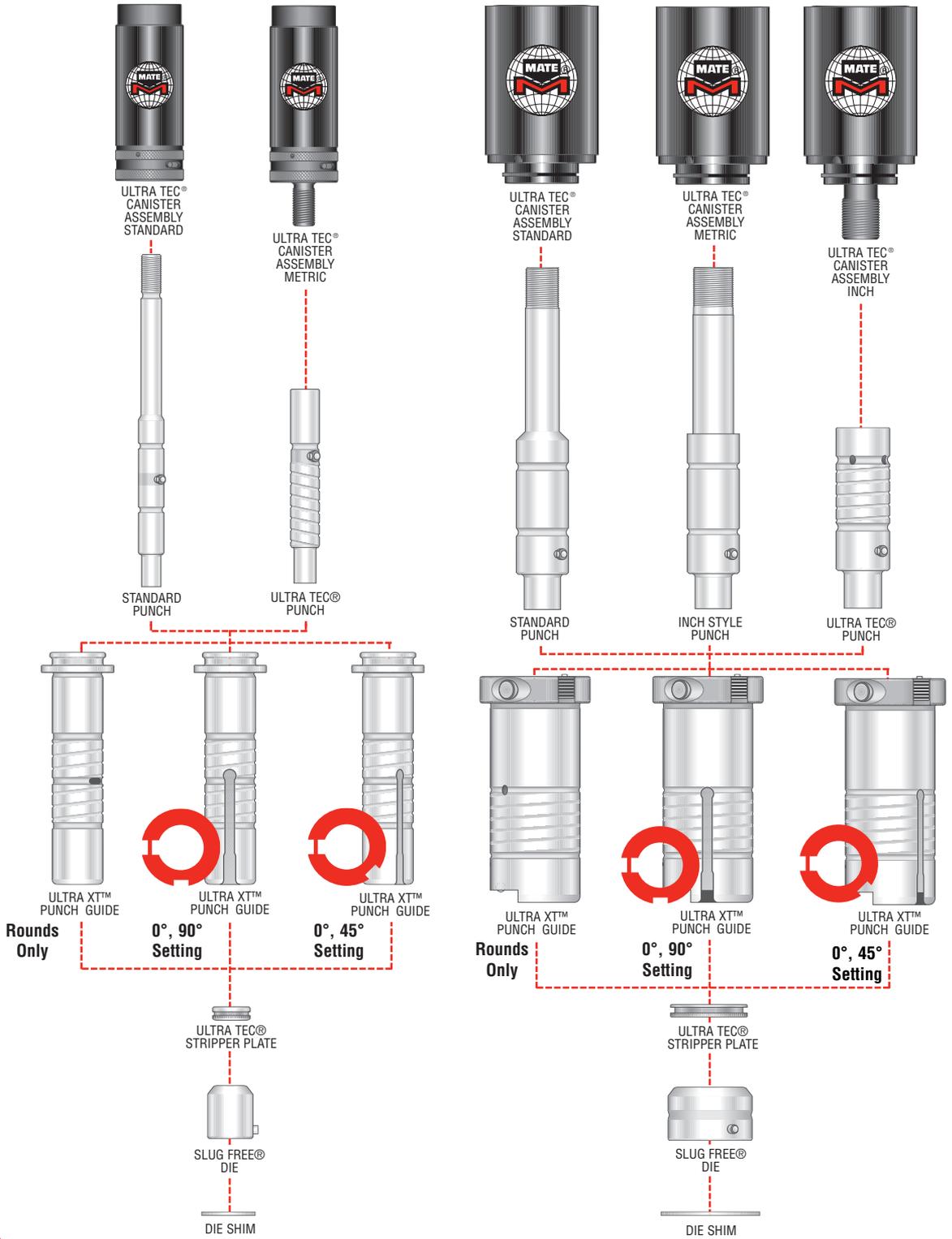
"Series 90" is a trademark of Wilson Tool International



ULTRA XT™ PRECISION TOOLING SYSTEM

1/2" A STATION

1-1/4" B STATION



- UP TO 0.118 (3.00) EXTRA PUNCH GRIND LIFE • INTERCHANGEABLE COMPONENTS •
- MULTIPLE ANGLE SETTINGS • QUICK LENGTH ADJUSTMENT
- QUICK TOOL CHANGE • PREMIUM HIGH SPEED STEEL • SLUG FREE® DIE
- COMPATIBILITY WITH TOOL LUBRICATION SYSTEMS



ULTRA XT™ PRECISION TOOLING SYSTEM

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ULTRA XT™ PRECISION TOOLING SYSTEM

2" C STATION



ULTRA XT™
PUNCH GUIDE
ASSEMBLY



ORIGINAL STYLE
PUNCH BODY

ORIGINAL STYLE
STRIPPER PLATE



SLUG FREE® DIE

DIE SHIM

package 3 each: .016(0.40),
.032(0.80), .048(1.20)

3-1/2" D STATION



ULTRA XT™
PUNCH GUIDE
ASSEMBLY



ORIGINAL STYLE
PUNCH BODY

ORIGINAL STYLE
STRIPPER PLATE



SLUG FREE® DIE

DIE SHIM

package 3 each: .016(0.40),
.032(0.80), .048(1.20)

4-1/2" E STATION



ULTRA XT™
PUNCH GUIDE
ASSEMBLY



ORIGINAL STYLE
PUNCH BODY

ORIGINAL STYLE
STRIPPER PLATE



SLUG FREE® DIE

DIE SHIM

package 3 each: .016(0.40),
.032(0.80), .048(1.20)

- **QUICK LENGTH ADJUSTMENT** With a push of the quick length adjustment button, rotation of the punch head will adjust the punch length
- **EXTERIOR ANGLE SETTING OPTIONS :**
 - 1/2" A station - one interior slot, two exterior slots for 0° and 90°
 - 1/2" A station - one interior slot, two exterior slots for 0° and 45°
 - 1 1/4" B station - one interior slot, two exterior slots for 0° and 90°
 - 1 1/4" B station - one interior slot, two exterior slots for 0° and 45°
 - 2" C station - two exterior slots for 0° and 90°
 - 3 1/2" D station - two exterior slots for 0° and 90°
 - 4 1/2" E station - two exterior slots for 0° and 90°
- **STRIPPER DISC DESIGN** Ultra XT 1/2" A station and 1 1/4" B station guides accept the Ultra Tec® style stripper discs for an additional 3.00mm grind life on all punches

- **ORIGINAL STYLE STRIPPERS** Ultra XT 2" C station, 3 1/2" D station and 4 1/2" E station are designed to accept the original style OEM strippers
- **ULTRA TEC® COMPATIBILITY** All Ultra XT punches, guides, canisters and dies are compatible with Ultra Tec products
- **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/EXTERIOR SPIRAL GREASE GROOVES** Even and consistent tool lubrication increases tool life
- **SLUG FREE® DIES** Clearing the slug every cycle eliminates slug pulling, extends tool life, improves piece part quality and reduces scrap



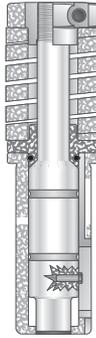
ORIGINAL THICK TURRET STYLE TOOLING

1/2" A STATION



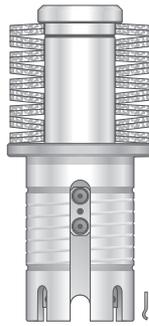
PUNCH ASSEMBLY

1 1/4" B STATION



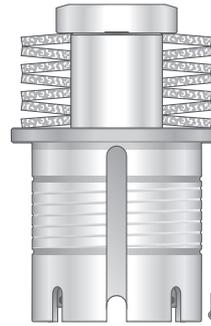
PUNCH ASSEMBLY

2" C STATION



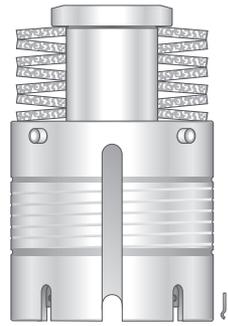
PUNCH GUIDE ASSEMBLY

3 1/2" D STATION



PUNCH GUIDE ASSEMBLY

4 1/2" E STATION



PUNCH GUIDE ASSEMBLY



PUNCH BODY



PUNCH BODY



PUNCH BODY



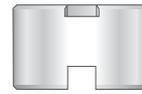
PUNCH BODY



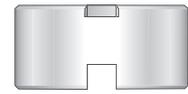
PUNCH BODY



PUNCH RETAINER



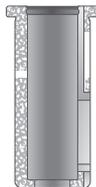
PUNCH RETAINER



PUNCH RETAINER



PUNCH GUIDE



PUNCH GUIDE



SLITTING INSERT



SLITTING INSERT



SLITTING INSERT



STRIPPER PLATE



STRIPPER PLATE



STRIPPER PLATE



SLUG FREE® DIE



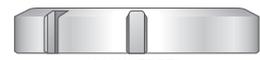
SLUG FREE® DIE



SLUG FREE® DIE



SLUG FREE® DIE



SLUG FREE® DIE



DIE SHIM



DIE SHIM



DIE SHIM



DIE SHIM



DIE SHIM

Features include :

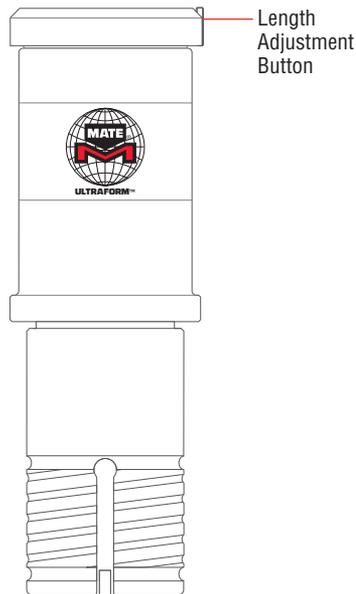
- OEM COMPATIBLE • HARDENED AND GROUND GUIDES •
- PREMIUM HIGH SPEED TOOL STEEL • SLUG FREE® DIE •



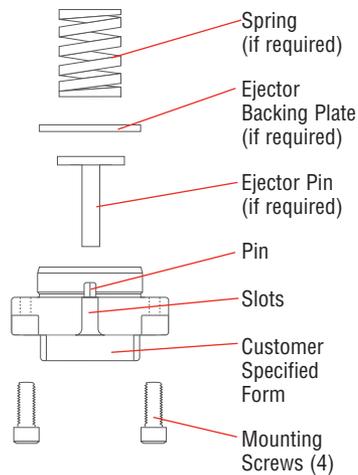
ULTRAFORM® FORMING HOLDER SYSTEM

COMPONENTS...

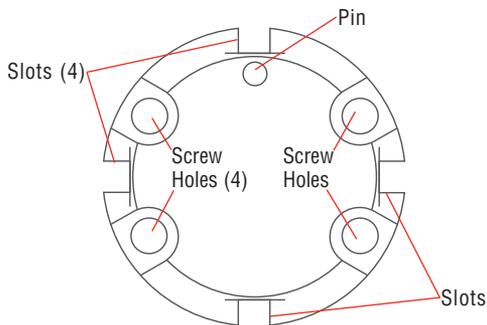
**ULTRAFORM®
HOLDER**



**ULTRAFORM®
INSERT**



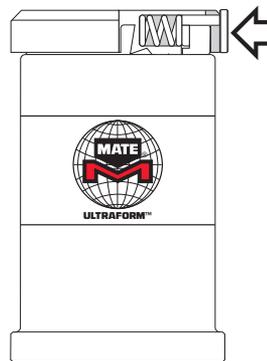
BOTTOM VIEW OF INSERT...



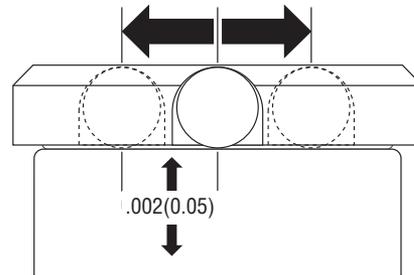
ANGLE SETTINGS...

ULTRAFORM holders have four external key slots. To change angle setting by 90°, lift ULTRAFORM holder out of turret and reinstall at another key slot. This allows all ULTRAFORM assemblies to be set at 0°, 90°, 180°, and 270°.

TO ADJUST ASSEMBLY LENGTH...



Depress length adjustment button and turn punch head clockwise to reduce length (counterclockwise to increase length) until the button 'clicks' into the next stop. Each stop adjusts assembly length by .002(0.05). There are 20 stops in each complete revolution of the punch head.



Note:

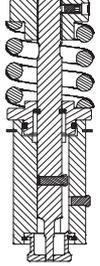
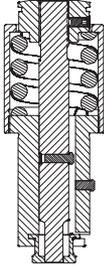
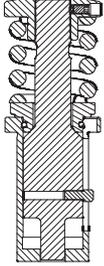
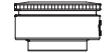
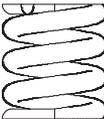
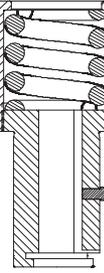
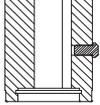
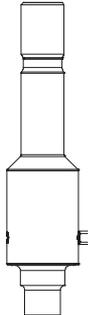
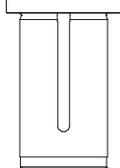
The Ultraform holder design has two configurations. They are identified by the number of external slots. The current design (April 1999 and newer), is with four external slots which enables the holder to be installed into the turret bore in any one of four positions. The previous design had one external slot where angle settings were made by positioning the insert in any one of four positions. There are no more and no fewer angle setting capabilities in either design. All inserts manufactured prior to the current design are usable in the current holder design. All current inserts are also usable in the previous design holders. The current design Ultraform holder is available as a response to customer requests.

QUICK LENGTH ADJUSTMENT • INTERCHANGEABLE COMPONENTS



THIN TURRET TOOLING

Tooling for 1-1/4" Station

	1/2" Snap-Apart	5/8" Drop-In	1-1/4" Full Body
Upper Assembly	Punch Assembly 	Punch Assembly 	Punch Assembly 
Hardware	Punch Head 	Punch Head 	Punch Head 
	Spring 		Spring 
	Spring Retainer (with O-ring) 	Cansiter and Guide Assembly 	Spring Retainer (with O-ring) 
	Support Ring 		Punch Shim 
	Guide 		
	Stripper Retaining Ring 		
Punch	1/2" Snap-Apart Punch 	5/8" Drop-In Punch 	1-1/4" Full Body Punch 
Stripper	1/2" Snap-Apart Stripper 	5/8" Drop-In Stripper  5/8" Stripper (Short) 	1-1/4" Full Body Stripper 
Die		Slug Free® Die 	



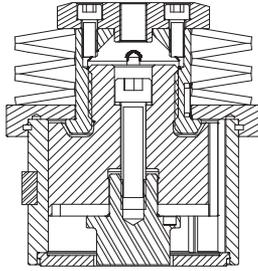
** can be used with existing 1/2" drop-in style holders
 *** snap ring must be removed for use in Strippit syle guide assembly

DURASTEEL™ PUNCHES • SLUG FREE® DIES
PRECISION STRIPPERS

THIN TURRET TOOLING

Tooling for Strippit Style 3-1/2" Station

The Mate Xcel™ High Performance Punch Guide for 3-1/2" station will be available in 2004.



The Xcel™ Punch Guide will offer multiple benefits to the fabricator including:

- Hardened guides for longer tool life and improved piece part quality.
- Quick length adjustment without disassembly for rapid tool change.
- Internal tool lubrication for longer tool life and reliable operation
- Quick release stripper mechanism for faster tool changes.

Tooling for Amada Style 3-1/2" Station

Punch – DuraSteel™ with superior hardness and toughness for maximum tool life. Hardened key for precise orientation of shaped tools. 1/4 degree back taper and near polished punch flanks to reduce friction. Maxima® coating available for extreme applications.

Stripper – toughened, shock resistance, steel with smooth rounded edges to eliminate sheet marking and improve piece part quality.

Slug Free® Die – 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 service life.

MTG™ 8 Station (0.500") Multi Tool

Punch



Stripper

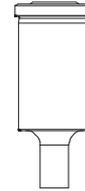


Slug Free® Die



MTG™ 3 Station (1.250") Multi Tool

Punch



Stripper



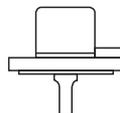
Slug Free® Die



3-1/2" Station Punch Stripper Style



3-1/2" Station Punch Inch Shank Style



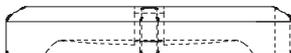
3-1/2" Station Stripper Strippit Style



3-1/2" Station Stripper Groove Edged Style



Slug Free® Die



Slug Free® Die



Accessories

Urethane Slug Ejector - 3.00mm URE40002 (12 minimum)

Urethane Slug Ejector - 6.00mm URE40010 (12 minimum)

Snap Ring Pliers - MIS61129

2.5mm Hex Wrench - MIS98896

Medium India Oil Stone - ST029807

THIN TURRET TOOLING

DURASTEEL™ PUNCHES • SLUG FREE® DIES
PRECISION STRIPPERS • QUICK LENGTH ADJUSTMENT GUIDE
MULTIPLE ANGLE SETTINGS • QUICK RELEASE STRIPPER





TRUMPF STYLE TOOLING SYSTEM

Size 0



Alignment Ring



Punch Chuck with Punch Insert



Urethane Stripper



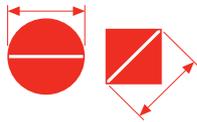
Metal Stripper



Size 1 Die



Die Shim



Maximum
0.413 (10.50)
diameter/diagonal

Size 1



Alignment Ring



Size 1 Punch



Urethane Stripper



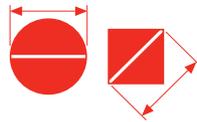
Metal Stripper



Size 1 Die



Die Shim

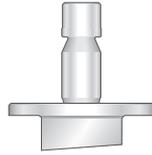


Maximum
1.181 (30.00)
diameter/diagonal

Size 2



Alignment Ring



Size 2 Punch



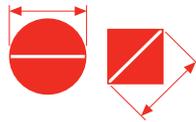
Metal Stripper



Size 2 Die



Die Shim



Maximum
3.000 (76.20)
diameter/diagonal

Size 3



Alignment Ring



Size 3 Punch



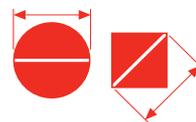
Metal Stripper



Size 3 Die



Die Shim



Maximum
4.134 (105.00)
diameter/diagonal

**Heavy Duty
Size 1 and Size 2**



Alignment Ring



Heavy Duty Punch
Size 1 and Size 2



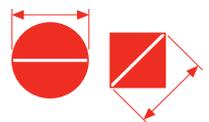
Metal Stripper



Heavy Duty Die
Size 2



Die Shim



Maximum
2.047 (52.00)
diameter/diagonal



**HIGH SPEED STEEL PUNCHES • HIGHLY WEAR RESISTANT DIES
TOUGHENED STRIPPERS • PRECISION ACCESSORIES
MAXIMA® COATING AVAILABLE • SLUG FREE® DIE AVAILABLE**

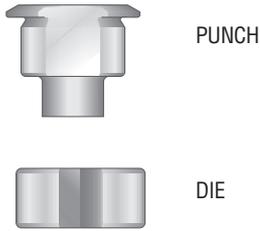
TRUMPF STYLE MULTITOOL TOOLING

10

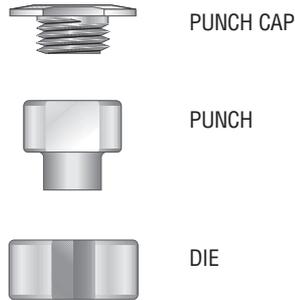


4 Station Multitool - Range .030 - .630(0.77 - 16.00) + .024(0.60) Die Clearance

1 PIECE PUNCH STYLE



2 PIECE PUNCH STYLE



Round (0)



5 Station Multitool - Range .030 - .630(0.77 - 16.00) + .024(0.60) Die Clearance

1 PIECE PUNCH STYLE

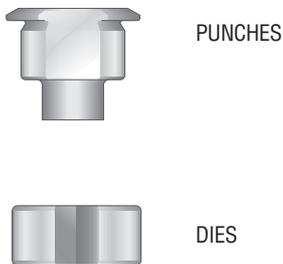


Rectangle (1)

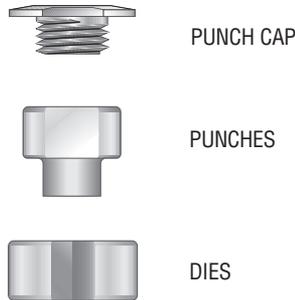


3 & 6 Station Multitool - Range .030 - .413(0.77 - 10.50) + .024(0.60) Die Clearance

1 PIECE PUNCH STYLE



2 PIECE PUNCH STYLE

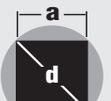


Oval (2)



10 Station Multitool - Range .030 - .413(0.77 - 10.5) + .024(0.60) Die Clearance

1 PIECE PUNCH STYLE



Square (3)

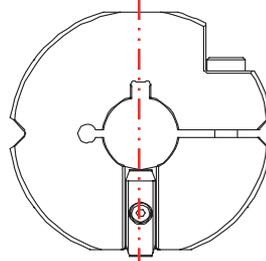
All multitool shape tools are made for Station 1 unless otherwise specified, see worksheet example on Mate Trumf Tooling order form.

HIGH SPEED STEEL PUNCHES • HIGHLY WEAR RESISTANT DIES
MAXIMA® COATING AVAILABLE



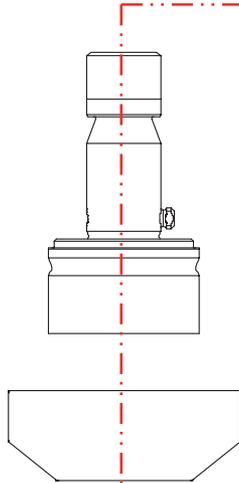
MATE QUICKLOCK™ TOOLING SYSTEM

Mate QuickLock™ is a new tooling system for Trumpf style presses that combines the economy of conventional Trumpf style tooling with the convenience of alignment via a keyed alignment ring. The keyed alignment ring engages the alignment key in the punch for quick tool alignment without an alignment fixture, resulting in quicker tool set-ups and maximum machine productivity.



Mate QuickLock™ Universal Alignment Ring

The integral keyway allows for fast and accurate alignment of the Mate QuickLock™ punch for faster machine set-up without a dedicated alignment fixture. Also compatible with conventional size 2 punches.

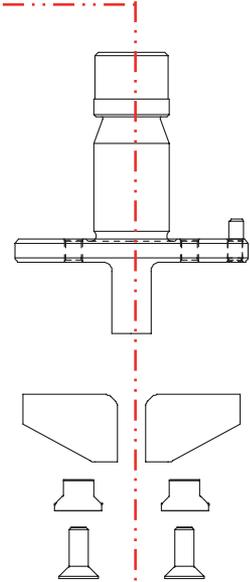


Mate QuickLock™ Punch with Alignment Pin.

The hardened and ground key (located in the shank or shoulder, depending on punch point size) engages the keyway in the alignment ring for fast and accurate alignment without a dedicated alignment fixture.

Push-On Urethane Stripper

- Positive, on-the-die stripping to eliminate sheet rattle and reduce punching noise.
- Locks securely onto punch and alignment ring for reliable operation.
- Available for all punches with a diagonal dimension up to 2.000(50.80)



Screw-On Urethane Stripper

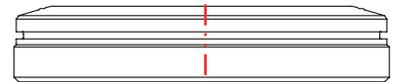
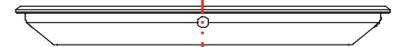
- Positive, on-the-die stripping to eliminate sheet rattle and reduce punching noise.
- Available in two sizes: for shaped punches with width up to 0.394(10.00) and length up to 2.263(60.00), or length up to 3.000(76.20).
- Supplied in pairs, and fixed to the punch shoulder with a flat head screw.



Mate QuickLock™ Tooling System is fully compatible with existing strippers and dies

High strength steel strippers for reliable operation

Highly wear-resistant steel dies for exception tool life.



HIGH SPEED STEEL PUNCHES • HIGHLY WEAR RESISTANT DIES
PUNCH WITH ALIGNMENT KEY • ALIGNMENT RING WITH KEYWAY
MAXIMA® COATING AVAILABLE • SLUG FREE® DIE AVAILABLE

MATE NEXT™ TOOLING SYSTEM

12

MATE NEXT™ TOOLING SYSTEM

The new NEXT™ Insert Tooling System for Trumpf style presses, is designed to dramatically increase tool life and reduce punching costs.

The NEXT™ Insert Tooling System includes • Interchangeable, abrasion-resistant, punch inserts
• Two sizes of insert punch holders with precision orientation features • Precision ground shims which return the punch insert to the original length after 0.118(3.00) has been removed during regrinding.

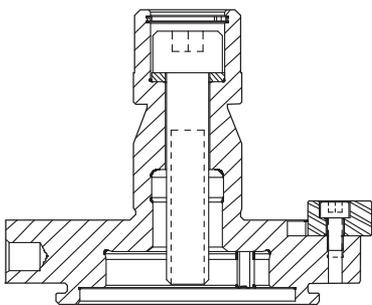
Size 40

0.80-40.00mm
0.031-1.575

NEXT™ Insert Tooling System holders, with integral precision alignment features and captive draw bolt accept interchangeable punch inserts for faster and more accurate machine set-ups.

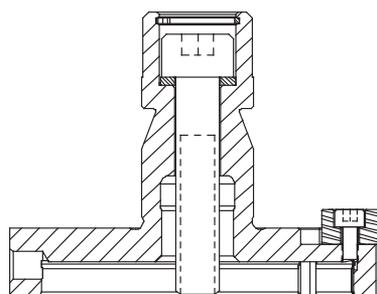
Size 76

40.01-76.20mm
1.576-3.000



Available in two sizes.
Size 40 0.031-1.575(0.80-40.00)
Size 76 1.576-3.000(40.01-76.20)

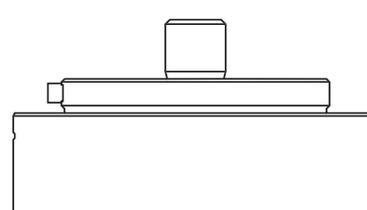
Precision ground punch shim returns the NEXT punch assembly to the original length after 0.118(3.00) has been removed during routine regrinding.



M4 HSS
0.031-1.181
(0.80-30.00)

M4PM from 0.031(0.80) to 1.181(30.00)
M2 HSS from 1.182(30.01) to 3.000(76.20)
High speed steel (HSS) NEXT punch inserts provide superior abrasion resistance to extend the interval between regrinds.

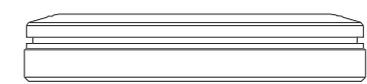
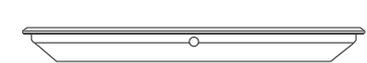
Push-On urethane stripper for Size 40 punch insert holders, provides positive stripping, without sheet marking.



The NEXT™ Insert Tooling System is fully compatible with existing strippers and dies.

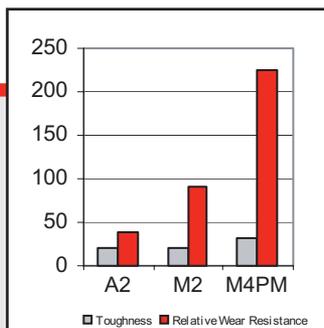
High strength steel strippers for reliable operation.

High wear resistant steel dies for exceptional tool life.



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

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

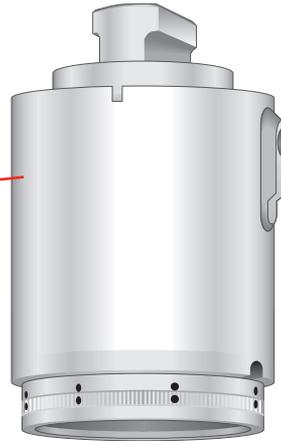


MATE MARATHON® TOOLING SYSTEM

Marathon tooling is designed and engineered to meet the demands of new high speed, high accuracy punch presses. At today's high production speeds, Marathon offers longer tool life, less down time and superior piece part quality.

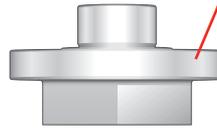
Punch Holder:

- Fully hardened and ground
- Full length guiding at three points
- Spring loaded stripping
- Eight angle settings at 45° intervals
- Built-in lubrication and cooling vents
- Built-in adjustment - no shims needed



Punch:

- Premium High Speed Steel for high speed punching
- Both punch and shank are guided for stability
- Optional nitride surface treatment for special applications
- MAXIMA™ coating optional for special applications



Stripper:

- Hardened steel for long life
- Multiple angle settings for versatile use
- Guides and keys the punch at the cutting edge
- Precision fit to the punch for precise alignment
- Quick tool change - no wrenches needed



Slug Free® Die:

- Eliminates slug pulling
- Premium grade hardened tool steel for combined strength and edge wear
- Stress Free Relief™ to ensure trouble free performance



Die Holder:

- Quick, easy, accurate installation in every station
- Manufactured from high grade alloy steel



Die Shims:

- Precise uniform design
- Premium grade steel holds accurate dimensions

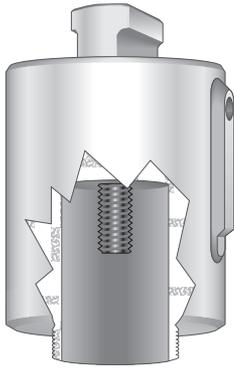


114/112 TOOLING SYSTEM

114 is an OEM standard tooling system for Murata Wiedemann punch presses worldwide.

14

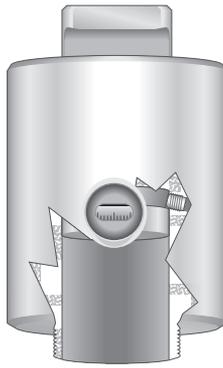
STANDARD



Standard Punch Holder:

- General use punch holder precision designed and manufactured

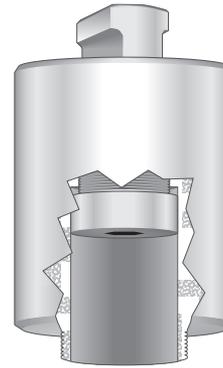
ADJUSTABLE ANGLE



Adjustable Angle Punch Holder:

- Allows for special angle settings

ADJUSTABLE LENGTH



Adjustable Length Punch Holder:

- Punch length can be adjusted for forming tools

Punch Shims:

- Premium grade steel holds accurate dimensions

Urethane Stripper:

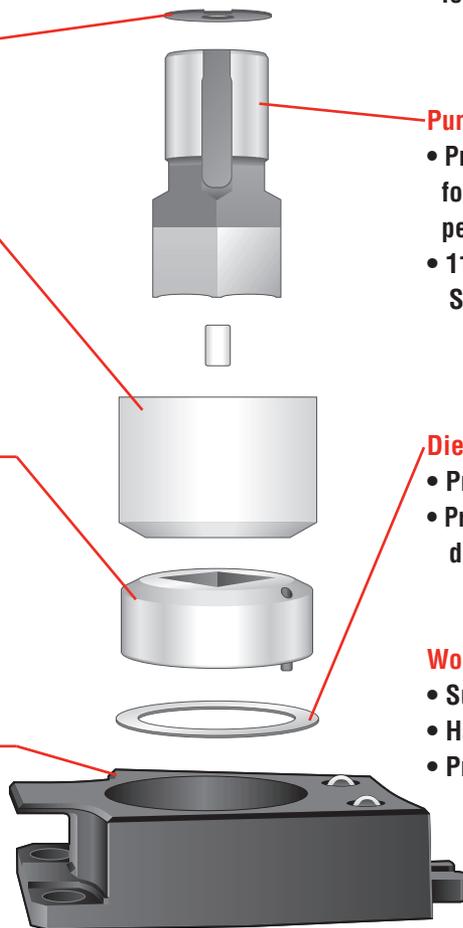
- Available in both 'push-on' and 'custom molded'
- Available in two durometers to custom fit your application

Slug Free® Die:

- Premium grade hardened tool steel for combined strength and edge wear
- Stress Free Relief™ to ensure trouble free performance
- Clearance radius in die corners

Die Holder:

- Quick, easy, accurate installation in every station
- Manufactured from high grade alloy steel



Punch:

- Premium grade tool steel hardened for long life and superior performance
- 114 style also available in High Speed Steel

Die Shims:

- Precise uniform design
- Premium grade steel holds accurate dimensions

Work Holders:

- Superior gripping ability
- Hardened and stabilized
- Precision manufactured

114/112 TOOLING SYSTEM
FOR MURATA WIEDEMANN

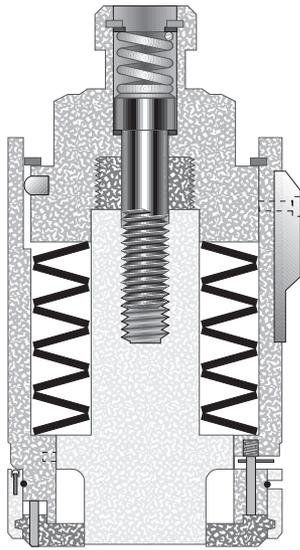


SIDE BY SIDE COMPARISON

MARATHON®

A Comparison of Punching Systems...

STANDARD 112 AND 114 STYLES



Punching force and motion are contained inside a sleeve with lubricated punch guides, punch press bore suffers no wear and stays accurate.



Captive

Built-in fine thread adjustable shim

Premium high speed steel for high speed punching compatibility

Three way positive guided action – top, middle and punch point

Built-in steel stripper for positive stripping action, flatter sheets

Built-in angles for 0°, 45° left, 45° right and 90°

Spring loaded stripper pops in or out without tools - punch rises from or retracts into the punch holder as drawbolt is turned

Slug Free® Die with Stress Free Relief™ improves slug control and die strength

DRAWBOLT

Not captive

LENGTH ADJUSTMENT

Metal shims must be added or separate adjustable length punch holder must be used

PUNCH

Premium air hardened tool steel

PUNCH GUIDING ACTION

Unguided

STRIPPER

non-marring, resilient urethane stripper must be added

ANGLE ADJUSTMENT

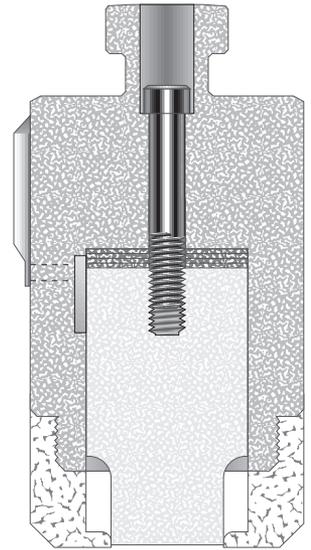
Single custom angle available, or separate adjustable angle punch holder must be used for settings other than 0° and 90°

ASSEMBLY

Drawbolt assembles punch and shims to punch holder. Force fit urethane stripper to punch holder holding spud

DIE

Stress Free Relief™ for high die strength



Punching force and motion are in direct contact with the punch press bore, causing bore walls to wear and lose accuracy.

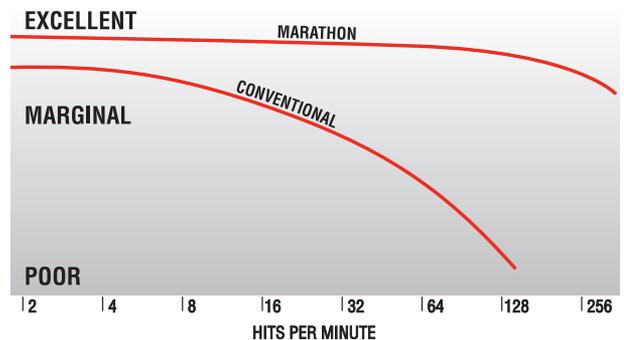


MARATHON TOOLING SYSTEM FEATURES :

- Length adjustment built into the punch holder
- Angle adjustment keyed to both punch and die holder
- Positive stripping to hold material flat
- Eliminates slug pulling in the die
- Increases accuracy at the punch tip
- Produce a million hits in standard cold rolled steel and not change out any components
- Attain the lowest cost-per-hit of any tooling system now available
- Available for 114 and 112 tooling systems

FLATNESS OF MATERIAL

MARATHON TOOLING SYSTEM VS. CONVENTIONAL TOOLS



VULCAN TOOLING SYSTEM

STATION X (ROUNDS)

RANGE up thru .500(12.7)

AB

up thru .984(25.0)

B

up thru .984(25.0)

C

.984(25.0) - 1.496(38.0)

D

1.496(38.0) - 2.008(51.0)

PUNCHES



STRIPPERS



SLUG FREE® DIES



STATION E

RANGE 2.008(51.0) - 2.500(63.5)

F

2.500(63.5) - 2.992(76.0)

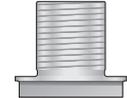
F VARISTATION

2.500(63.5) - 2.992(76.0)

G

2.992(76.0) - 3.500(88.9)

PUNCHES



STRIPPERS



SLUG FREE® DIES



STATION H

RANGE 3.500(88.9) - 4.125(104.8)

J

4.125(104.8) - 4.764(121.0)

K

4.764(121.0) - 5.500(139.7)

L

5.500(139.7) - 5.984(152.0)

PUNCHES



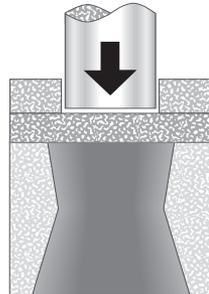
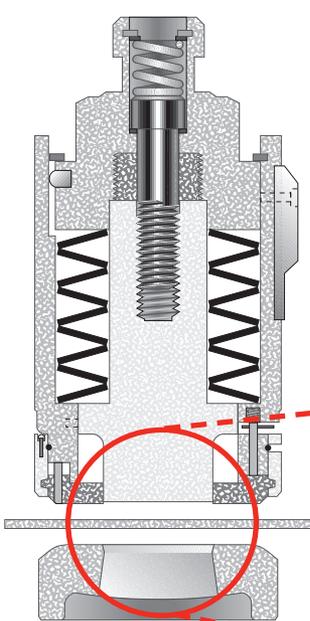
STRIPPERS



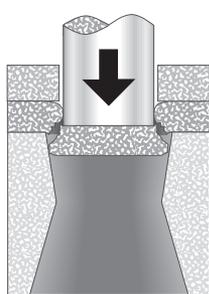
SLUG FREE® DIES



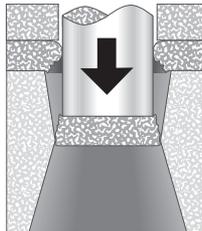
SLUG FREE® DIE OPERATION



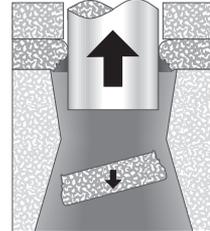
Material held securely by stripper before punch makes contact



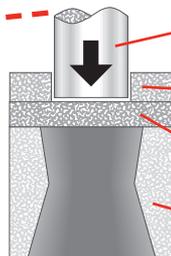
Punch penetrates the material. Slug fractures away from sheet.



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.



PUNCH

STRIPPER

MATERIAL

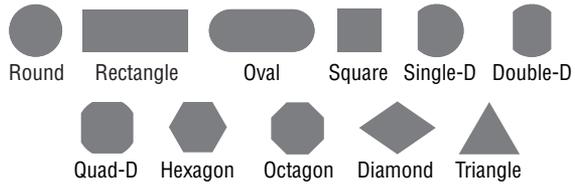
SLUG FREE® DIE

SALVAGNINI TYPE III TOOLING SYSTEM

SALVAGNINI POSITIONS 1-20, 41-76 7 TON

	30	31	32	33	34	35
90 x 90	76	68	60	56	52	48
24	75	67	59	55	51	47
70 x 90	74	66	58	54	50	46
23	73	65	57	53	49	45
70 x 90	72	64	20	16	12	8
22	71	63	19	15	11	7
90 x 90	70	62	18	14	10	6
21	69	61	17	13	9	5

*STANDARD SHAPES



6 mm Size

>.030-.236(0.76-5.99)
ROUND ONLY



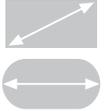
10.5mm Size

.237-.413(6.00-10.49)
ROUND ONLY



33mm Size

UP TO 1.299(33.00)
DIAMETER OR DIAGONAL



Lock Screw



Insert Punch



Punch Chuck



Stripper



Die

Die Shim

Package 6 each:
.004(0.10), .008(0.20),
.012(0.30)



Lock Screw



Insert Punch



Punch Chuck



Stripper



Die

Die Shim

Package 6 each:
.004(0.10), .008(0.20),
.012(0.30)



Punch



Stripper



Die

Die Shim

Package 6 each:
.004(0.10), .008(0.20),
.012(0.30)

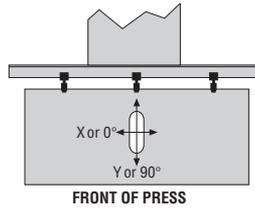


HIGH SPEED STEEL PUNCHES • HIGHLY WEAR RESISTANT DIES
TOUGHENED STRIPPERS • PRECISION ACCESSORIES
MAXIMA® COATING AVAILABLE • SLUG FREE® DIE AVAILABLE

SALVAGNINI TYPE III TOOLING SYSTEM

SALVAGNINI POSITIONS 30-35 12 TON

	30	31	32	33	34	35
90 x 90	76	68	60	56	52	48
24	75	67	59	55	51	47
70 x 90	74	66	58	54	50	46
23	73	65	57	53	49	45
70 x 90	72	64	20	16	12	8
22	71	63	19	15	11	7
90 x 90	70	62	18	14	10	6
21	69	61	17	13	9	5



PUNCHING ORIENTATION...

For shapes other than round or square, punching orientation must be specified when ordering punches, strippers or dies.

60mm Size

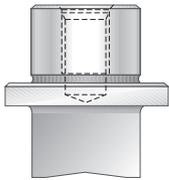
UP TO 2.362(60.00)
DIAMETER OR DIAGONAL



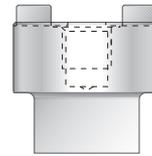
60mm Size

for use in Salvagnini Blank
Holder style holders

UP TO 2.362(60.00)
DIAMETER OR DIAGONAL



Punch



Punch



Stripper



Stripper

Die comes with brushes
already installed. Order
replacements separately.



Die

Die comes with brushes
already installed. Order
replacements separately.



Die



Die Shim



Die Shim

HIGH SPEED STEEL PUNCHES • HIGHLY WEAR RESISTANT DIES
TOUGHENED STRIPPERS • OEM COMPATIBLE
MAXIMA® COATING AVAILABLE • SLUG FREE® DIE AVAILABLE



SALVAGNINI TYPE III TOOLING SYSTEM

SALVAGNINI POSITIONS 21-24 26 TON

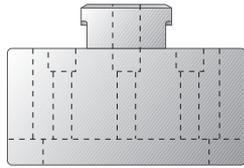
	30	31	32	33	34	35
70 x 90 24	76	68	60	56	52	48
	75	67	59	55	51	47
70 x 90 23	74	66	58	54	50	46
	73	65	57	53	49	45
70 x 90 22	72	64	20	16	12	8
	71	63	19	15	11	7
70 x 90 21	70	62	18	14	10	6
	69	61	17	13	9	5

Type 70

	30	31	32	33	34	35
90 x 90 24	76	68	60	56	52	48
	75	67	59	55	51	47
70 x 90 23	74	66	58	54	50	46
	73	65	57	53	49	45
70 x 90 22	72	64	20	16	12	8
	71	63	19	15	11	7
90 x 90 21	70	62	18	14	10	6
	69	61	17	13	9	5

Type 90

Type 70 (3.1)
70x90 mm Size
2.755x3.543(70.0x90.0)



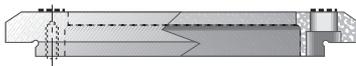
Punch Support



Punch



Stripper

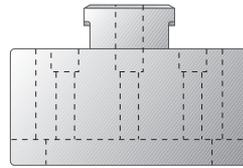


Die



Brush

Type 90 (3.0)
70x90 mm Size
2.755x3.543(70.0 x 90.0)



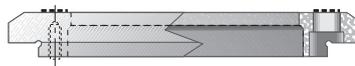
Punch Support



Punch



Stripper

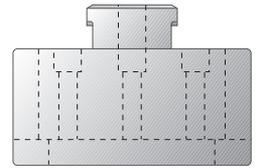


Die



Brush

Type 90 (3.0)
90x90 mm Size
3.543x3.543(90.0 x 90.0)



Punch Support



Punch



Stripper



Die



Brush



HIGH SPEED STEEL PUNCHES • HIGHLY WEAR RESISTANT DIES
TOUGHENED STRIPPERS • PRECISION ACCESSORIES
MAXIMA® COATING AVAILABLE • SLUG FREE® DIE AVAILABLE

SALVAGNINI TYPE III TOOLING SYSTEM

20

SALVAGNINI POSITIONS 1-20, 41-76 7 TON
1.023(26.0) MAXIMUM

	30	31	32	33	34	35
90 x 90	76	68	60	56	52	48
24	75	67	59	55	51	47
70 x 90	74	66	58	54	50	46
23	73	65	57	53	49	45
70 x 90	72	64	20	16	12	8
22	71	63	19	15	11	7
90 x 90	70	62	18	14	10	6
21	69	61	17	13	9	5



Insert Punch



Fully Guided Stripper

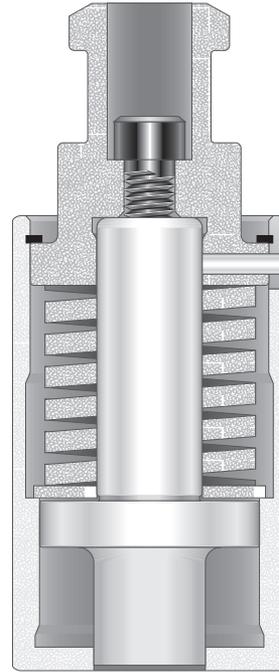


Die



Die Shim

Package 6 each: .004(0.1),
.008(0.2), .012(0.3)



This tool is used in the 33 mm station but has a maximum punch size capability of 1.023(26.0) diameter/diagonal.

Perforating Assembly

Tang Assembly

Tang assembly includes tang, spring, washer, draw bolt and retaining ring. Does NOT include insert punch or fully guided stripper.

SALVAGNINI TYPE III TOOLING SYSTEM

HIGH SPEED STEEL PUNCHES • HIGHLY WEAR RESISTANT DIES
TOUGHENED STRIPPERS • OEM COMPATIBLE
MAXIMA® COATING AVAILABLE • SLUG FREE® DIE AVAILABLE



MT™ TOOLING SYSTEM

MT™ Tooling

High performance MTTM Tooling designed for improved productivity.

- High Speed Steel punches for superior edge wear resistance
- Near polished punch flanks with 1/4 degree back taper eliminate galling
- Superior compatibility with Mate manufactured multi tool assemblies
- Close stripper to punch clearance for superior alignment
- Highly wear resistant die steel for exceptional strength
- Slug Free® Die geometry eliminates slug pulling for improved hole quality
- Maxima® coating available on punches for extended tool life



MT™ 8mm
Maximum 0.315(8.00)
diameter/diagonal

MT™ 16mm
Maximum 0.630(16.00)
diameter/diagonal

MT™ 24mm
Maximum 0.945(24.00)
diameter/diagonal

	Punch		Punch		Punch
	Stripper		Stripper		Stripper
	Slug Free® Die		Slug Free® Die		Slug Free® Die
	Shims		Shims		Shims
20 Each; 0.004(0.10) 0.006(0.15) 0.008(0.20) 0.020(0.51)		20 Each; 0.004(0.10) 0.006(0.15) 0.008(0.20) 0.020(0.51)		20 Each; 0.004(0.10) 0.006(0.15) 0.008(0.20) 0.020(0.51)	

MT™ Tooling Stripper and Die Puller Tools

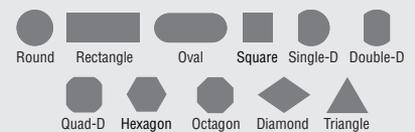
MT™ 8mm Stripper and Die Puller Set
(Includes Stripper and Die Puller, Magnet Pen and Retrieving Tool)

MT™ 16mm Stripper and Die Puller Set
(Includes Stripper and Die Puller, Magnet Pen and Retrieving Tool)

MT™ 24mm Stripper and Die Puller Set
(Includes Stripper and Die Puller, Magnet Pen and Retrieving Tool)

Complete Kit for MT™ Tooling
(Includes 8mm, 16mm and 24mm stripper and die puller sets)

*STANDARD SHAPES



XMT™ TOOLING SYSTEM

Get better punching performance, longer tool life and more versatility with new MATE XMT™ tooling

Benefits Include:

- Improved punch guiding
- Increased grind life
- Ability to punch thicker materials
- Optional shear
- Adjustable stripping force for protection against sheet metal marking

Mate's XMT Tooling includes these standard features:

- HSS M2 hardened punches (62 Rc)
- Punches have 1/4° total back taper for better stripping
- Maxima® coating available
- Nitride hardening available
- 24mm range
- Hardened strippers for greater wear resistance
- A2 hardened dies (to 60 Rc)
- Slug Free® die design with uniform clearance



Punch



Stripper



Slug Free® Die

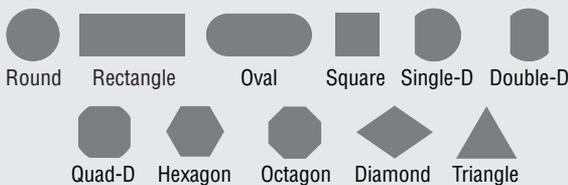


Shims



20 Each;
0.004(0.10)
0.006(0.15)
0.008(0.20)
0.020(0.51)

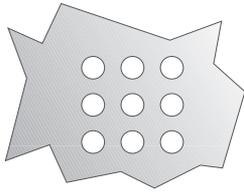
***STANDARD SHAPES**



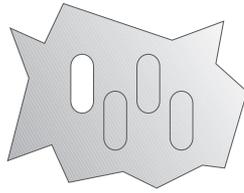
XMT™ TOOLING SYSTEM



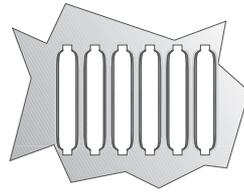
SPECIAL ASSEMBLIES



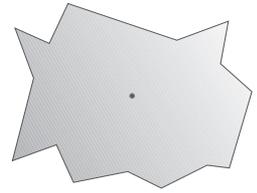
Cluster—Round



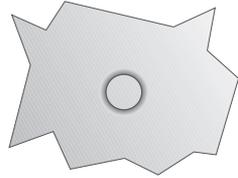
Cluster—Shape



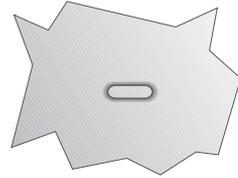
Card Guide



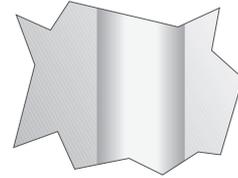
Centerpoint



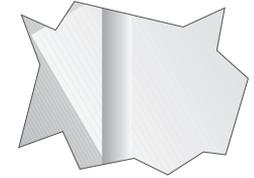
Countersink—Round



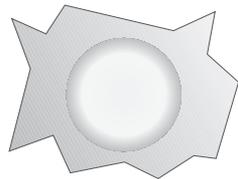
Countersink—Shape



Emboss—Beading



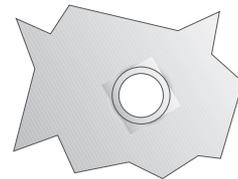
Emboss—Edgeform



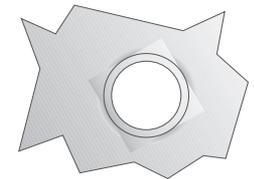
Emboss—Formed



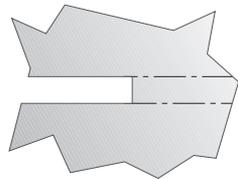
Emboss—Cold Forged



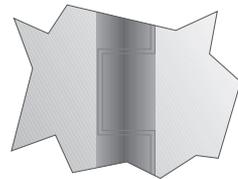
Extrusion—Tapping



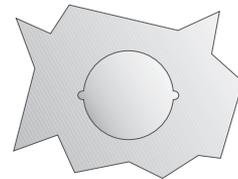
Extrusion—Flanged Hole



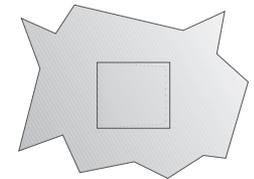
Guided Shearing



Hinge Tool



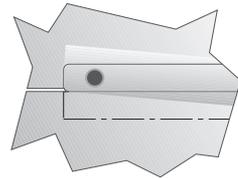
Knockout



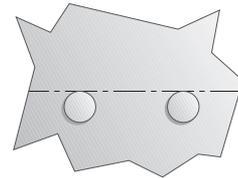
Lance And Form



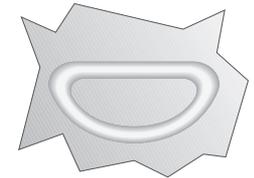
Louver



Scissors tool®



Shearbutton



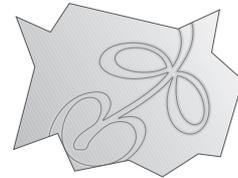
Rollerball®



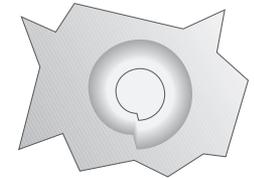
Sheetmarker®



Stamping—Alpha Numeric



Stamping—V-line



Threadform

HIGH PERFORMANCE FORMING TOOLS

24

Cluster

Use:

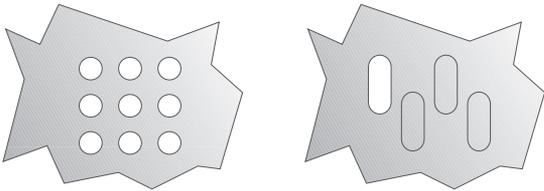
To produce multiple holes with minimal hits.

Typical Application:

- Material thickness from 0.020(0.50) to 0.157(4.00).
- Other restraints 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 to top height 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.



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.



SPECIAL ASSEMBLIES



HIGH PERFORMANCE FORMING TOOLS

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.



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.
- Diameter—0.374(9.50) (M-10).

Comments:

- Additional inverted dies are required to accommodate alternate material thickness.



Hinge

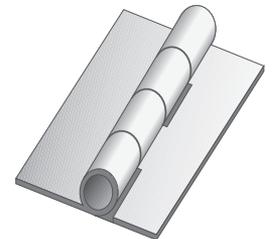
Use:
To create hinge knuckles as integral elements on sheet metal components.

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.



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

HIGH PERFORMANCE FORMING TOOLS

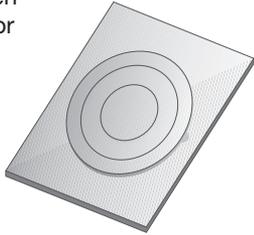
26

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.

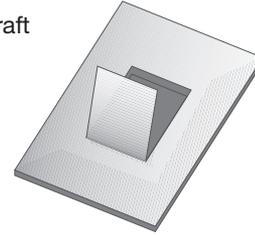


Lance And Form

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-to-top 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.

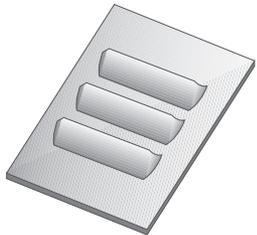


Louver

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.



Stamp—Alpha Numeric

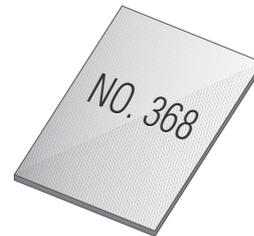
Use:
To provide indelible marking of alpha-numeric characters on the top or bottom of the sheet.

- 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.

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



SPECIAL ASSEMBLIES



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

Ask for part Number
LIT00002



HIGH PERFORMANCE FORMING TOOLS

V-Line Inscription

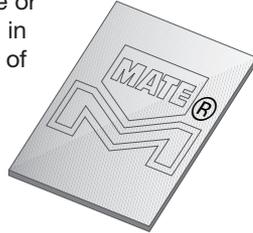
Use:
To produce logos, messages or symbols.

Typical Application:

- Material thickness from 0.032(0.80) up to machine capacity.
- Maximum size is dependent on station size and 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.



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.



Rollerball®

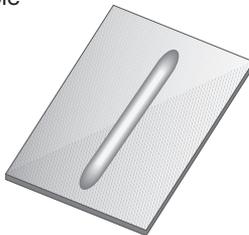
Use:
The Rollerball® is an exciting new concept designed by Mate Precision Tooling to take advantage of the extended programming capabilities of hydraulic and other punch presses capable of operating in the x and y axis with the ram down. The Rollerball® gives you the benefit of making forms not possible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



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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TONNAGE, CLEARANCE

Calculate Punching Force

Punches without shear

Formula:

- Punch perimeter in inches (mm) x
- Material thickness in inches (mm) x
- Material shear strength in lbs/in² (kN/mm²) =
- Punching force in lbs (Kn)

To convert to **Imperial Tons:** divide **lbs** by **2000**

To convert to **Metric Tons:** divide **kN** by **9.81**

Punch Perimeter—simply the linear distance around a punch of any shape.

Material Thickness—is the width of the workpiece or sheet that the punch must penetrate in making a hole.

Material Shear Strength—is a measure of the maximum internal stress before a given material begins to shear. This property is expressed as a numerical factor. Shear strengths for common materials are;

Material	Shear Strength —lbs/in ² (kN/mm ²)
Aluminum 5052 H32	25000 (0.1724)
Brass	35000 (0.2413)
Mild Steel	50000 (0.3447)
Stainless Steel	75000 (0.5171)

Example:

Using a 20.00mm square in 3.00 mm mild steel;

- Punch perimeter = 80.00mm
- Material thickness = 3.00mm
- Material shear strength = 0.3447 Kn/mm²

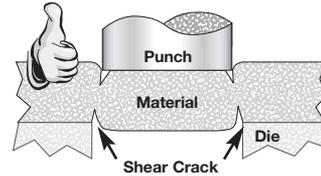
80.00 x 3.00 x 0.3447 kN/mm² = 82.70 kN

Die Clearance

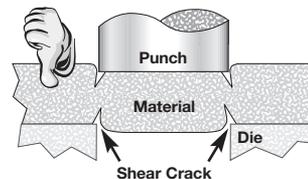
What is Die Clearance?

Die clearance is equal to the space between the punch and die when the punch enters the die opening. It is always expressed as the TOTAL Clearance.

Why Use Proper Clearance?



Optimum Clearance—shear cracks join, balancing punching force, piece part quality and tool life.



Clearance Too Small—secondary cracks are created, raising punching force and shortening tool life.

Recommended Die Clearance

Die Clearance in terms of % of material thickness;

- Minimum Life Clearance 15%
- **Optimum Clearance 20-25%**
- Extended Life Clearance 30%
- Heavy Duty Clearance 30%

Visit mate.com to download a die clearance chart

Benefits of Using Correct Die Clearance:

- Longer tool life.
- Better Stripping.
- Smaller average burr height and thickness.
- Cleaner, more uniform holes.
- Little or no shavings.
- Reduced galling.
- Flatter work pieces.
- More accurate hole locations.
- Lowest force required to pierce the material.

Recommended Total Die Clearance

Material Thickness	Aluminum Total Clearance	Mild Steel Total Clearance	Stainless Steel Total Clearance
0.039(1.00)	0.006(0.15)	0.008(0.20)	0.008(0.20)
0.059(1.50)	0.009(0.23)	0.012(0.30)	0.016(0.40)
0.079(2.00)	0.012(0.30)	0.016(0.40)	0.020(0.50)
0.118(3.00)	0.024(0.60)	0.030(0.75)	0.035(0.90)
0.157(4.00)	0.031(0.80)	0.039(1.00)	0.047(1.20)
0.197(5.00)	0.039(1.00)	0.049(1.25)	0.069(1.75)
0.250(6.35)	0.063(1.60)	0.079(2.00)	0.088(2.22)



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

Ask for part Number
LIT00002

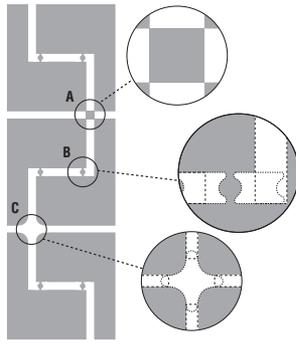


TIPS AND TECHNIQUES

Three methods for separating parts using long, narrow rectangles

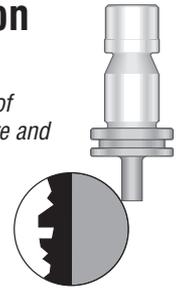
SHAKE-AND-BREAK

— 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 .008 (0.20) 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.



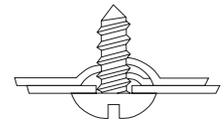
When galling occurs on punch tips

(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. 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.



Eliminating cost for bolts and lockwashers

If thread forms can be programmed into a part. Cost for bolts and lockwashers can be eliminated. 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.



When punches get 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.

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 .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.

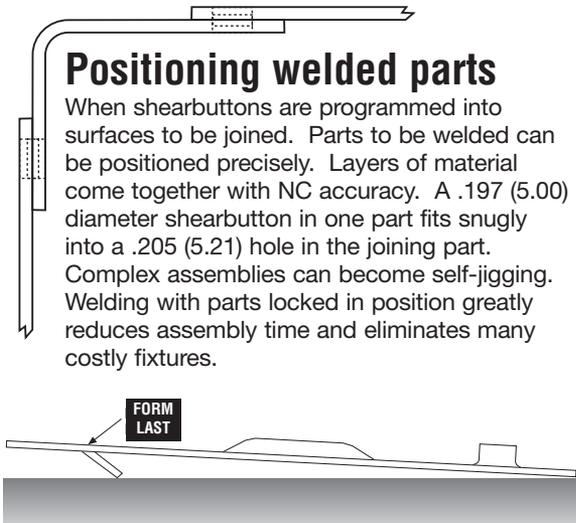
Noise reduction

Use heavy duty tooling when punching .118 (3.00) material or thicker to help reduce noise. Heavy Duty tooling is manufactured with punch shear (rooftop, whisper, one way) which creates less noise when punching. For best hole quality, a flat punch, (a punch without shear), is recommended.



Positioning welded parts

When shearbuttons are programmed into surfaces to be joined. Parts to be welded can be positioned precisely. Layers of material come together with NC accuracy. A .197 (5.00) diameter shearbutton in one part fits snugly into a .205 (5.21) 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.



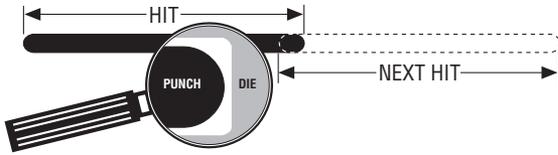
Form-down last

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.

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FOR MORE TOOLING PRODUCT INFORMATION



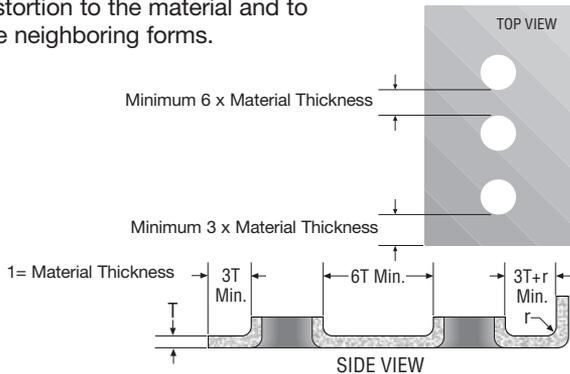
A smooth slitting tip...



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.

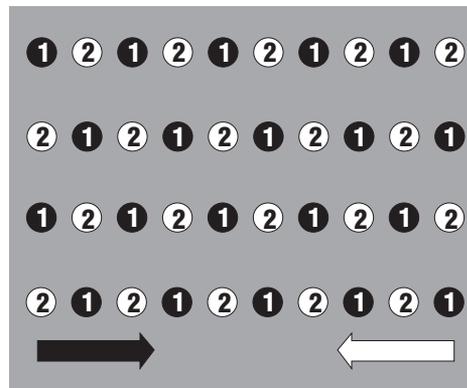
Recommended minimum distances between holes, forms and edges of sheets

Holes and forms placed closer to each other or to the edge of the sheet than shown below will cause distortion to the material and to the neighboring forms.



Combatting material warp

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.



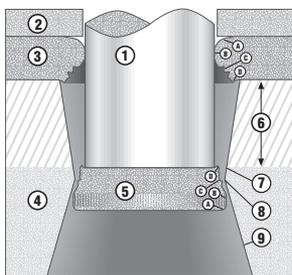
"Clearance corners" in dies control corner burrs



Why put a radius in the corners of rectangular and square dies with 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.

Slug Free® Die

The recommended penetration of the material into a Slug Free die is .118 (3.00). For thick material Slug Free design is an option on Trumpf style dies made by Mate.



- Slug Free® Die Components**
1. Punch
 2. Stripper
 3. Material
 4. Slug Free® Die
 5. Slug
 6. Grind Life
 7. Entry - Constricting Taper
 8. Pressure Point
 9. Exit - Relief Taper

- Hole/Slug Geometry**
- A. Rollover
 - B. Burnish
 - C. Fracture
 - D. Burr

The secret to finest 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. It should be at least two times as large as the final stamped image. Email electronic files or ship it by mail with protection against bending or other damage — fax quality won't do.



See **MATE** Form Tool Ordering Guide for forming tool ordering specifications...

Ask for part Number **LIT00002**





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