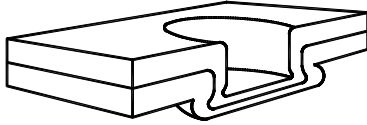
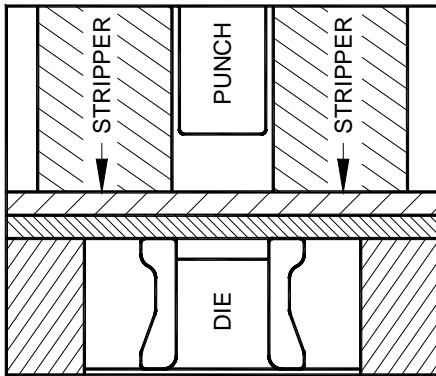


# Tog-L-Loc



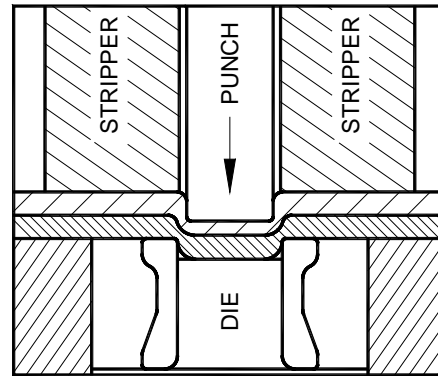
Tog-L-Loc is a circular, leakproof joint formed by drawing the metals into a circular "cup" and then expanding the diameter to form a 360° radial lock below the bottom sheet.

## How The Joining Process Works



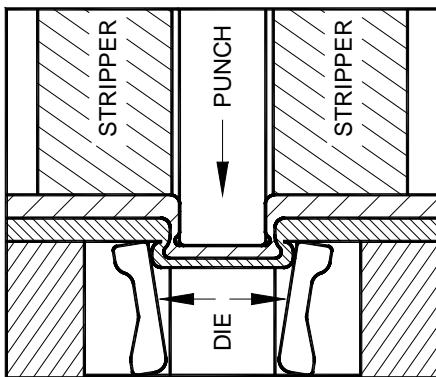
1. CLAMPS

A stripper clamps the metals between the punch and die guard.



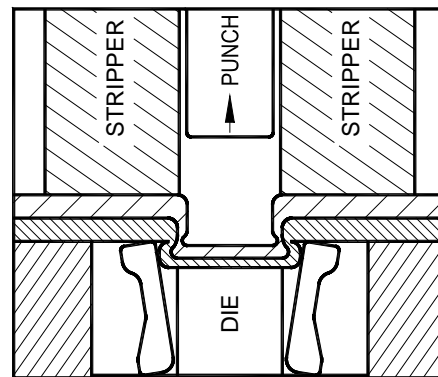
2. DRAWS

The non-piercing punch draws the metals into the die.



3. LOCKS

The punch continues to travel, squeezing the metals.



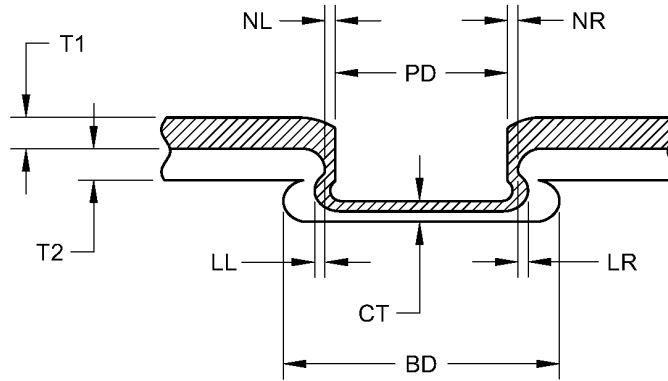
4. STRIPS

As the punch retracts, the stripper allows the punch to be removed.

The lateral flow of metal is accommodated by the patented moving (self-cleaning) die blades, forming a lock of greater diameter than the drawn section which accounts for the high strength and vibration resistance of Tog-L-Loc. This entire sequence takes place in a single motion or press stroke.

**TOG-L-LOC | V-LOC | LANCE-N-LOC INFORMATION**

**TECHNICAL DESCRIPTION  
TOG-L-LOC JOINT**

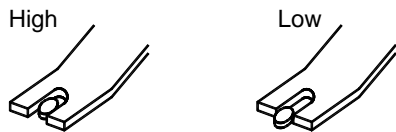
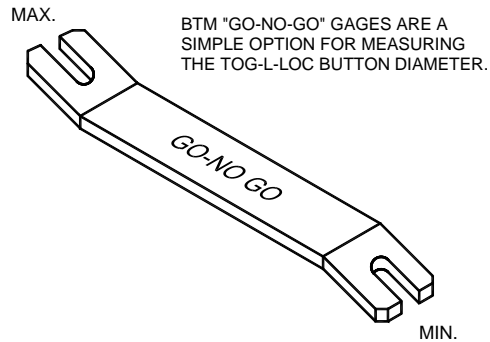


- CT** = **Cap Thickness**
- BD** = **Button Diameter**
- LL** = **interLock Left**
- LR** = **interLock Right**
- NL** = **Neck Left**
- NR** = **Neck Right**
- PD** = **Punch Diameter [mm] (nominal joint size [mm])**
- T1** = **Thickness punch side material**
- T2** = **Thickness die side material**

**Note:** The preferred method by which joint quality is verified is measuring the “Cap Thickness” (ref. “CT” in diagram above) to ensure compliance with prescribed joint data parameters.

An alternative method by which joint quality is verified is measurement of “Button Diameter” (BD) with a Go-No Go Gage:

TOG-L-LOC JOINTS CAN BE CHECKED NON-DESTRUCTIVELY USING THIS SIMPLE GAGE. THE “BUTTON” MUST MEASURE WITHIN THE TOLERANCE OF THE GAGE.



MEASURING JOINT BUTTON DIAMETER (BD).

TOG-L-LOC | V-LOC | LANCE-N-LOC INFORMATION

**TOG-L-LOC  
FORCE REQUIREMENTS**

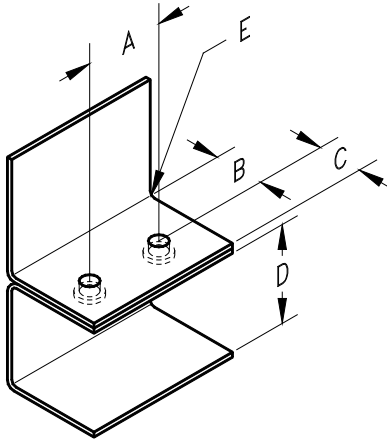
JOINT SIZE	PREFERRED STRIPPER SIZE	STRIPPER CONTACT FORCE	STYLE ELASTOMER	MATERIAL THICKNESS (STEEL)	FORCE REQUIRED	ACCEPTABLE POWER SOURCES		
						AIR	A/O	HYD.
3.0mm TL [.12"]	SS-10 YELLOW	0.89kN [200 lbs.]	940	0.5mm to 0.5mm [.020" to .020"]	18.3kN [4,117 lbs.]	44.5kN [5 TON] TOGGLE PRESS	26.7kN [3 TON]	Ø44.5mm [1.75"] BORE @ 170 BAR [2500PSI] MIN.
				0.9mm to 0.9mm [.034" to .034"]	16.5kN [3,711 lbs.]			
				1.4mm to 1.4mm [.057" to .057"]	14.9kN [3,340 lbs.]			
				0.5mm to 0.5mm [.020" to .020"]	17.6kN [3,963 lbs.]			
				0.9mm to 0.9mm [.034" to .034"]	16.8kN [3,766 lbs.]			
				1.4mm to 1.4mm [.057" to .057"]	16.6kN [3,723 lbs.]			
3.8mm TL [.15"]	SS-20 YELLOW	1.1kN [250 lbs.]			22.2kN [5,000 lbs.]	Charted force values for TL-3.8 joint are calculated. Data obtained from testing will be entered as it becomes available.		
JOINT SIZE	PREFERRED STRIPPER SIZE	STRIPPER CONTACT FORCE	STYLE ELASTOMER	MATERIAL THICKNESS (STEEL)	FORCE REQUIRED	ACCEPTABLE POWER SOURCES		
						AIR	A/O	HYD.
4.6mm TL [.18"]	SS-20 YELLOW	1.3kN [300 lbs.]	940	0.5mm to 0.5mm [.020" to .020"]	27.6kN [6,202 lbs.]	88.9kN [10 TON] TOGGLE PRESS	44.5kN [5 TON]	Ø50.8mm [2.00"] BORE @ 170 BAR [2500PSI] MIN.
				1.1mm to 1.1mm [.045" to .045"]	27.5kN [6,192 lbs.]			
				2.2mm to 2.2mm [.087" to .087"]	27.1kN [6,101 lbs.]			
				0.5mm to 0.5mm [.020" to .020"]	31.8kN [7,150 lbs.]			
				1.1mm to 1.1mm [.045" to .045"]	27.3kN [6,134 lbs.]			
				2.2mm to 2.2mm [.087" to .087"]	26.8kN [6,034 lbs.]			
JOINT SIZE	PREFERRED STRIPPER SIZE	STRIPPER CONTACT FORCE	STYLE ELASTOMER	MATERIAL THICKNESS (STEEL)	FORCE REQUIRED	ACCEPTABLE POWER SOURCES		
						AIR	A/O	HYD.
5.5mm TL [.22"]	SS-25 RED	2.3kN [525 lbs.]	940	0.7mm to 0.7mm [.028" to .028"]	41.6kN [9,350 lbs.]	88.9kN [10 TON] TOGGLE PRESS	106.8kN [12 TON]	Ø63.5mm [2.50"] BORE @ 164 BAR [2410PSI] MIN.
				1.4mm to 1.4mm [.057" to .057"]	38.0kN [8,537 lbs.]			
				3.0mm to 3.0mm [.120" to .120"]	42.2kN [9,478 lbs.]			
JOINT SIZE	PREFERRED STRIPPER SIZE	STRIPPER CONTACT FORCE	STYLE ELASTOMER	MATERIAL THICKNESS (STEEL)	FORCE REQUIRED	ACCEPTABLE POWER SOURCES		
						AIR	A/O	HYD.
6.4mm TL [.25"]	SS-30 YELLOW	3.3kN [750 lbs.]	940	0.7mm to 0.7mm [.028" to .028"]	63.9kN [14,364 lbs.]	107.9kN [20 TON] TOGGLE PRESS	106.8kN [12 TON]	Ø82.6 [3.25"] BORE @ 148 BAR [2170PSI] MIN.
				1.9mm to 1.9mm [.074" to .074"]	45.7kN [10,280 lbs.]			
				3.0mm to 3.0mm [.120" to .120"]	57.4kN [12,913 lbs.]			
				0.7mm to 0.7mm [.028" to .028"]	63.8kN [14,338 lbs.]			
				1.9mm to 1.9mm [.074" to .074"]	43.4kN [9,752 lbs.]			
				3.0mm to 3.0mm [.120" to .120"]	56.9kN [12,789 lbs.]			
7.6mm TL [.30"]	SPECIAL	4.4kN [1000 lbs.]			80.0kN [18,000 lbs.]	Charted force values for TL-7.6 joint are calculated. Data obtained from testing will be entered as it becomes available.		

Notes: The chart should be used as a guide for power source selection only.

The forces listed in the chart are based on a test conducted 2000-10-24 with BTM mild steel coupons. The press was a BTM 12 Ton A/O equipped with an AccuForce system. Each force value is the average of 10 samples.

TOG-L-LOC | V-LOC | LANCE-N-LOC INFORMATION

**TOG-L-LOC STANDARD  
DIE JOINT CENTERS  
Minimum Distances**

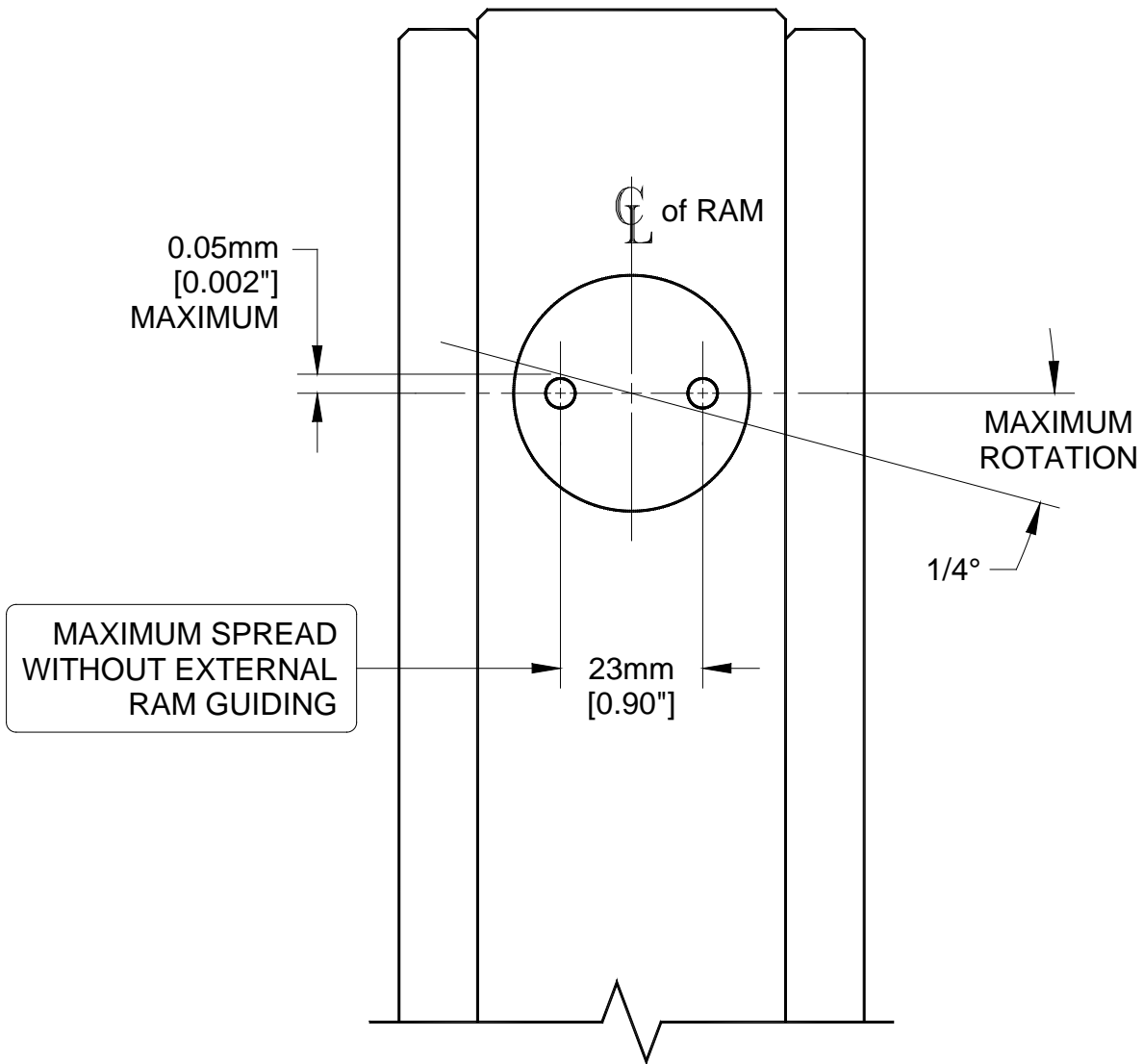


Notes:

- As “E” (bend radius) increases from 0.8 [.03”], add amount of increase to “B” dimension.
- All noted dimensions are minimum values unless otherwise specified.
- If “C” dimension increases, “D” dimension may also be affected.
- \* Making Tog-L-Loc joints with noted minimum distances requires a special stripper block.

TOG-L-Loc Tool	DIM	3.0mm [.12”]	3.8mm [.15”]	4.6mm [.18”]	5.5mm [.22”]	6.4mm [.25”]
Short Insert 3 Bladed Elastomer 	*A	14.73 [.580”]	12.70 [.500”]	14.73 [.580”]	19.05 [.750”]	22.22 [.875”]
	B	8.1 [.32”]	7.1 [.28”]	8.1 [.32”]	10.3 [.41”]	12.0 [.47”]
	C	3.0 [.12”]	3.8 [.15”]	4.6 [.18”]	5.5 [.22”]	6.4 [.25”]
	D	26.0 [1.02”]	26.0 [1.02”]	26.0 [1.02”]	32.0 [1.26”]	35.0 [1.38”]
	E	0.8 [.03”]	0.8 [.03”]	0.8 [.03”]	0.8 [.03”]	0.8 [.03”]
Style "A" 2 Bladed 	*A	14.50 [.571”]	14.50 [.571”]	16.00 [.630”]	18.00 [.709”]	20.30 [.799”]
	B	5.8 [.23”]	5.8 [.23”]	5.8 [.23”]	6.9 [.27”]	8.4 [.33”]
	C	3.0 [.12”]	3.8 [.15”]	4.6 [.18”]	5.5 [.22”]	6.4 [.25”]
	D	35.0 [1.38”]	35.0 [1.38”]	35.0 [1.38”]	38.1 [1.50”]	47.6 [1.88”]
	E	0.8 [.03”]	0.8 [.03”]	0.8 [.03”]	0.8 [.03”]	0.8 [.03”]
Style "A" 3 Bladed Elastomer 	*A	11.18 [.440”]	12.70 [.500”]	14.73 [.580”]	19.05 [.750”]	22.22 [.875”]
	B	6.4 [.25”]	7.1 [.28”]	8.1 [.32”]	10.3 [.41”]	12.0 [.47”]
	C	3.0 [.12”]	3.8 [.15”]	4.6 [.18”]	5.5 [.22”]	6.4 [.25”]
	D	35 [1.38”]	35 [1.38”]	35 [1.38”]	35 [1.38”]	52.3 [2.06”]
	E	0.8 [.03”]	0.8 [.03”]	0.8 [.03”]	0.8 [.03”]	0.8 [.03”]
940 Series Short Insert (or SSI) 	*A	12.50 [.492”]	14.00 [.551”]	16.50 [.650”]	19.50 [.768”]	22.50 [.886”]
	B	6.8 [.27”]	7.5 [.30”]	8.8 [.35”]	10.3 [.41”]	11.8 [.46”]
	C	3.0 [.12”]	3.8 [.15”]	4.6 [.18”]	5.5 [.22”]	6.4 [.25”]
	D	24.0 [.94”]	28.5 [1.12”]	28.5 [1.12”]	35.5 [1.40”]	40.0 [1.57”]
	E	0.8 [.03”]	0.8 [.03”]	0.8 [.03”]	0.8 [.03”]	0.8 [.03”]
940 Series "Mini" Short Insert 	*A	11.00 [.433”]	12.50 [.492”]	14.00 [.551”]	16.50 [.650”]	21.00 [.827”]
	B	6.1 [.24”]	6.8 [.27”]	7.5 [.30”]	8.8 [.35”]	11.0 [.43”]
	C	3.0 [.12”]	3.8 [.15”]	4.6 [.18”]	5.5 [.22”]	6.4 [.25”]
	D	24.0 [.94”]	24.5 [.96”]	28.5 [1.12”]	35.5 [1.40”]	40.0 [1.57”]
	E	0.8 [.03”]	0.8 [.03”]	0.8 [.03”]	0.8 [.03”]	0.8 [.03”]
<b>Joint Data Limits - "Mini" 940</b>						
Max. Total Mat'l Thickness		1.8 [.07”]	---	2.0 [.08”]	2.5 [.10”]	3.3 [.13”]
Max. Anvil Depth		1.02 [.040”]	1.27 [.050”]	1.14 [.045”]	1.4 [.055”]	1.65 [.065”]
Max. Button Dia.		4.95 [.195”]	6.10 [.240”]	7.11 [.280”]	8.64 [.340”]	10.16 [.400”]

**AIR TOGGLE PRESS  
TOG-L-LOC JOINT CENTERS**

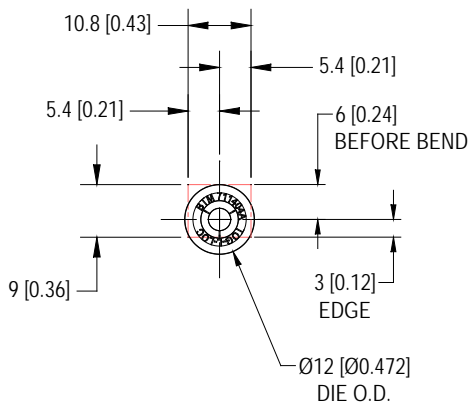


**TOG-L-LOC | V-LOC | LANCE-N-LOC INFORMATION**

**3.0 TOG-L-LOC  
JOINT FLANGE  
MINIMUM DISTANCES  
(FOR SINGLE JOINTS)**

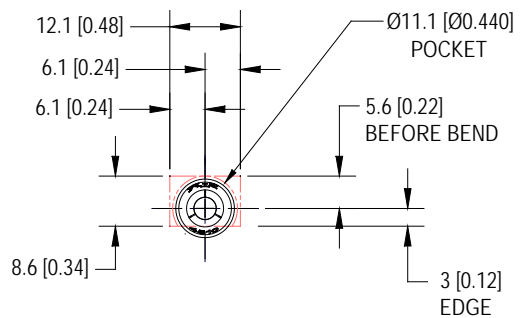
**TL-3.0-940**

REF. 718200AE ASSY



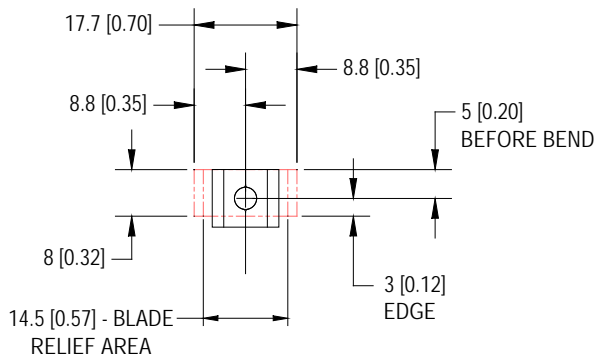
**TL-3.0-3B**

REF. 006707 ASSY  
(STYLE "A" DIE)



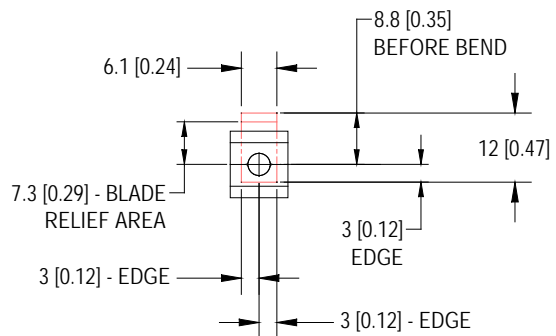
**TL-3.0-2B**

REF. 000474 ASSY



**TL-3.0-2B**

REF. 000474 ASSY



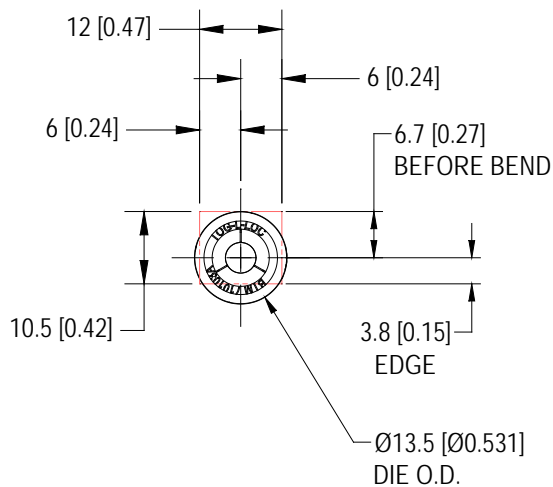
**NOTES:**

- "EDGE" NOTATION REFERS TO MINIMUM DISTANCE FROM JOINT CENTER TO EDGE OF PART.
- "BEFORE BEND" REFERS TO DISTANCE TO BEGINNING OF RADIUS ON A BENT FLANGE IF TOG-L-LOC DIE IS ON THE INSIDE OF A BEND ON THE CUSTOMER PART.
- MINIMUM 1.5mm [.06"] PART SUPPORT SHOWN ADJACENT TO "BLADE RELIEF AREA" ON VIEWS FOR 2 BLADED DIE ASSEMBLIES.

**3.8 TOG-L-LOC  
JOINT FLANGE**  
**MINIMUM DISTANCES**  
(FOR SINGLE JOINTS)

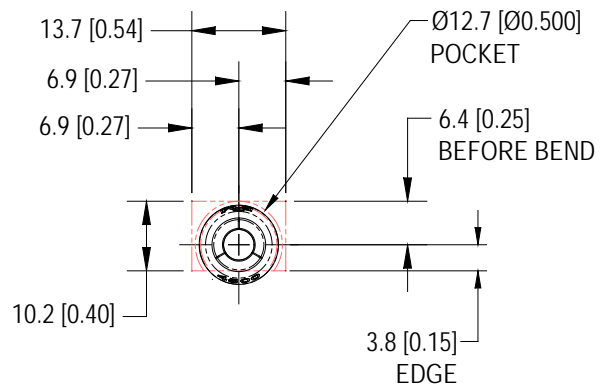
**TL-3.8-940**

REF. 794600AE ASS'Y



**TL-3.8-3B**

REF. 796900A ASS'Y



**NOTES:**

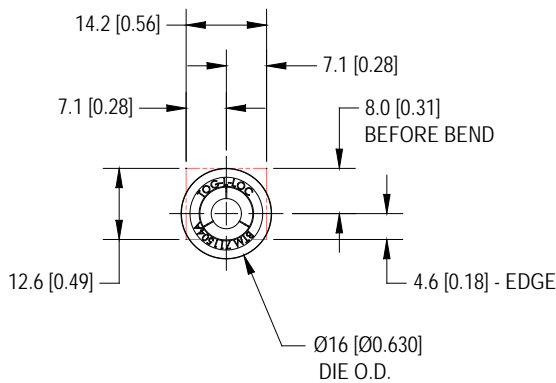
- "EDGE" NOTATION REFERS TO MINIMUM DISTANCE FROM JOINT CENTER TO EDGE OF PART.
- "BEFORE BEND" REFERS TO DISTANCE TO BEGINNING OF RADIUS ON A BENT FLANGE IF TOG-L-LOC DIE IS ON THE INSIDE OF A BEND ON THE CUSTOMER PART.
- MINIMUM 1.5mm [.06"] PART SUPPORT SHOWN ADJACENT TO "BLADE RELIEF AREA" ON VIEWS FOR 2 BLADED DIE ASSEMBLIES.

**TOG-L-LOC | V-LOC | LANCE-N-LOC INFORMATION**

**4.6 TOG-L-LOC  
JOINT FLANGE  
MINIMUM DISTANCES  
(FOR SINGLE JOINTS)**

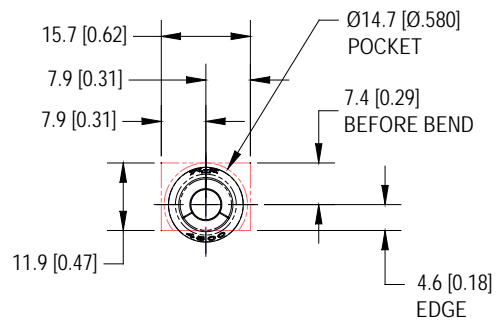
**TL-4.6-940**

REF. 716000AE ASS'Y



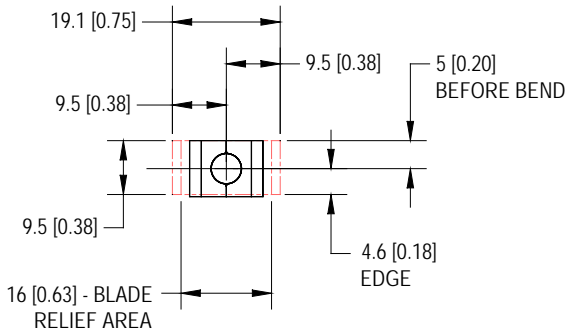
**TL-4.6-3B**

REF. 004223 ASS'Y



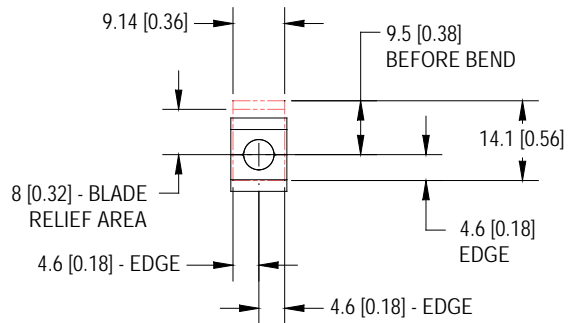
**TL-4.6-2B**

REF. 001221 ASS'Y



**TL-4.6-2B**

REF. 001221 ASS'Y



**NOTES:**

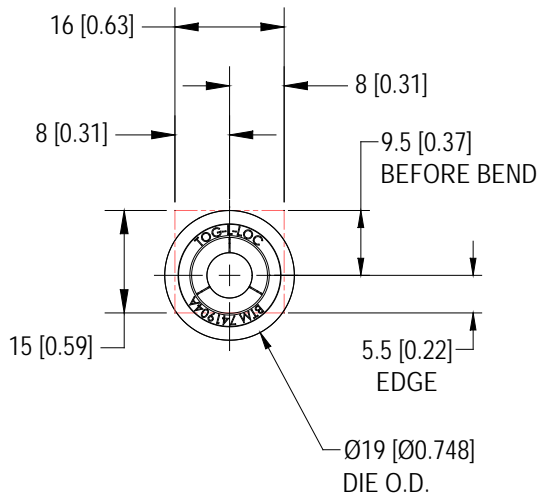
- "EDGE" NOTATION REFERS TO MINIMUM DISTANCE FROM JOINT CENTER TO EDGE OF PART.
- "BEFORE BEND" REFERS TO DISTANCE TO BEGINNING OF RADIUS ON A BENT FLANGE IF TOG-L-LOC DIE IS ON THE INSIDE OF A BEND ON THE CUSTOMER PART.
- MINIMUM 1.5mm [.06"] PART SUPPORT SHOWN ADJACENT TO "BLADE RELIEF AREA" ON VIEWS FOR 2 BLADED DIE ASSEMBLIES.



**5.5 TOG-L-LOC  
JOINT FLANGE  
MINIMUM DISTANCES  
(FOR SINGLE JOINTS)**

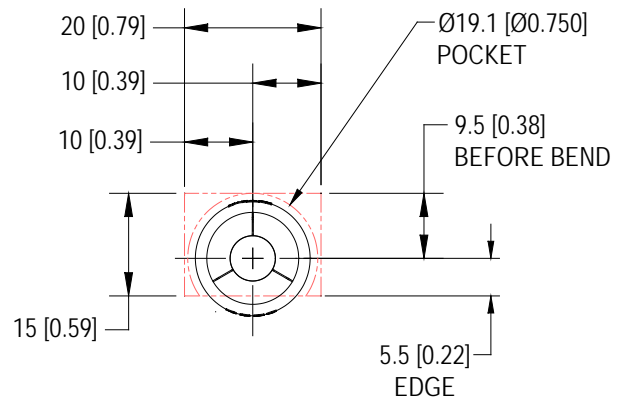
**TL-5.5-940**

REF. 742100AE ASS'Y



**TL-5.5-3B**

REF. 739100A ASS'Y



**NOTES:**

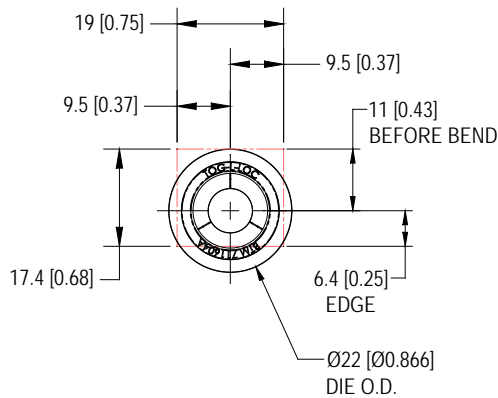
- "EDGE" NOTATION REFERS TO MINIMUM DISTANCE FROM JOINT CENTER TO EDGE OF PART.
- "BEFORE BEND" REFERS TO DISTANCE TO BEGINNING OF RADIUS ON A BENT FLANGE IF TOG-L-LOC DIE IS ON THE INSIDE OF A BEND ON THE CUSTOMER PART.
- MINIMUM 1.5mm [.06"] PART SUPPORT SHOWN ADJACENT TO "BLADE RELIEF AREA" ON VIEWS FOR 2 BLADED DIE ASSEMBLIES.

**TOG-L-LOC | V-LOC | LANCE-N-LOC INFORMATION**

**6.4 TOG-L-LOC  
JOINT FLANGE  
MINIMUM DISTANCES  
(FOR SINGLE JOINTS)**

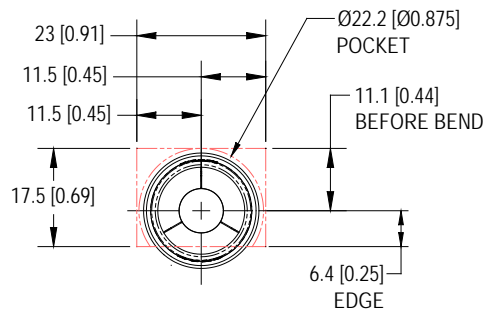
**TL-6.4-940**

REF. 744700AE ASS'Y



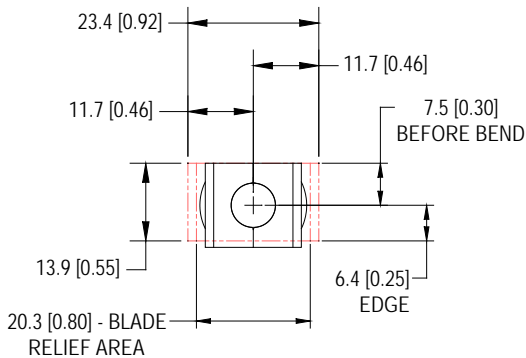
**TL-6.4-3B**

REF. 013907 ASS'Y



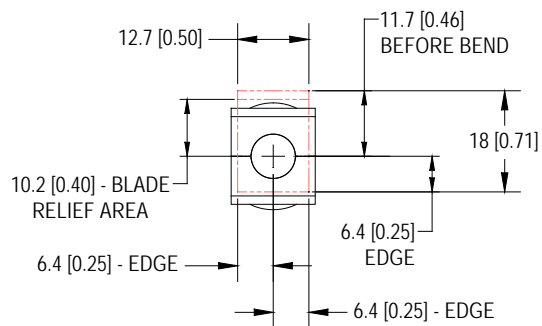
**TL-6.4-2B**

REF. 799500A ASS'Y



**TL-6.4-2B**

REF. 799500A ASS'Y

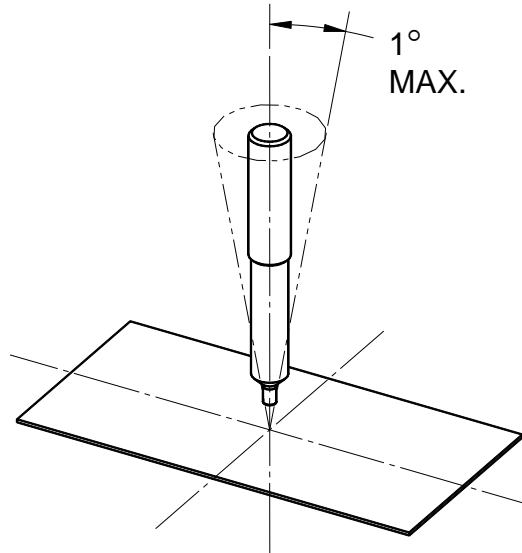


**NOTES:**

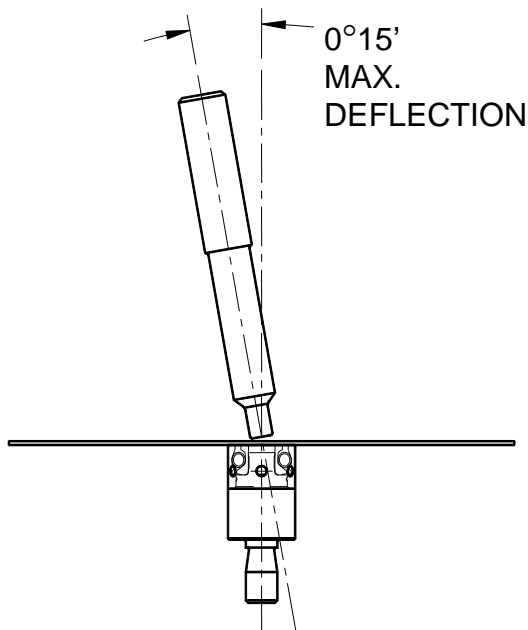
- "EDGE" NOTATION REFERS TO MINIMUM DISTANCE FROM JOINT CENTER TO EDGE OF PART.
- "BEFORE BEND" REFERS TO DISTANCE TO BEGINNING OF RADIUS ON A BENT FLANGE IF TOG-L-LOC DIE IS ON THE INSIDE OF A BEND ON THE CUSTOMER PART.
- MINIMUM 1.5mm [.06"] PART SUPPORT SHOWN ADJACENT TO "BLADE RELIEF AREA" ON VIEWS FOR 2 BLADED DIE ASSEMBLIES.

**TOG-L-LOC  
DESIGN PARAMETERS**

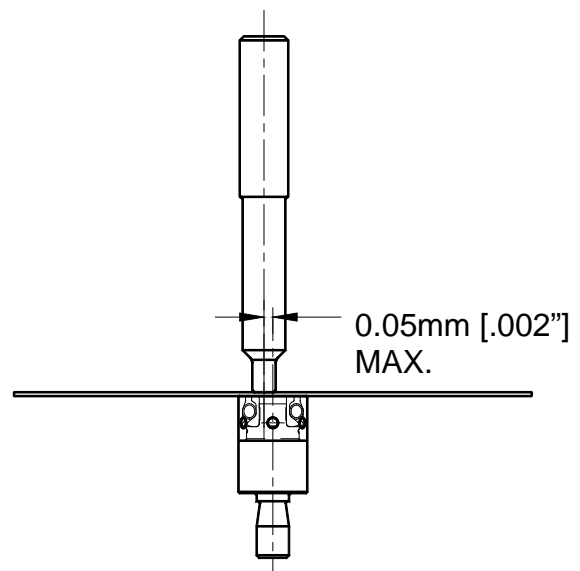
**PERPENDICULARITY  
TO WORK SURFACE**



**PUNCH TO DIE  
LINEAR ALIGNMENT**



**PUNCH TO DIE  
CONCENTRICITY**




TOG-L-LOC | V-LOC | LANCE-N-LOC INFORMATION

**TOG-L-LOC JOINT DATA**  
**MAXIMUM BUTTON DIAMETER**

Values in the chart below, for maximum Button Diameter (BD), are the absolute maximum --- including any tolerance noted in the Button Diameter specification (ex: BD spec of Ø7.75 +0.25/-0.00 = maximum BD value of Ø8.00mm).

**Max. Button Diameter (BD)**



940 Dies		Style "A" Die Ass'y No.	Max. BD (Including Tolerance)
	TL-3.0-940M	710200AE	4.95 [.195]
	TL-3.0-940	718200AE	5.84 [.230]
	TL-3.8-940M	PD220800AE	6.10 [.240]
	TL-3.8-940	794600AE	6.35 [.250]
	TL-4.6-940M	710100AE	7.11 [.280]
	TL-4.6-940	716000AE	8.00 [.315]
	TL-5.5-940M	767500AE	8.64 [.340]
	TL-5.5-940	742100AE	9.78 [.385]
	TL-6.4-940M	710900AE	10.16 [.400]
	TL-6.4-940	747700AE	11.18 [.440]
	TL-7.6-940M	767700A (SSI Only)	12.50 [.492]
	TL-7.6-940	779600AE (SSI Only)	14.22 [.560]

3 Bladed Elastomer Die		Style "A" Die Ass'y No.	Max. BD (Including Tolerance)
	TL-3.0-3B	006707	6.35 [.250]
	TL-3.8-3B	796900A	7.11 [.280]
	TL-4.6-3B	004223	8.13 [.320]
	TL-5.5-3B	739100A	10.03 [.395]
	TL-6.4-3B	013907	12.06 [.475]

**TOG-L-LOC  
PUNCH INFORMATION****General Design Guidelines**

- The Punch should be guided a minimum of 28.5mm [1.12"] in the Punch Retainer.
- The location tolerance to the centerline of the Punch hole should be 0.013mm [ $\pm 0.0005$ "].
- The "940" Punch mounting is preferred. While the set screw method is still acceptable.
- If possible use an M8x1.25 (or  $5/16 - 24$ ) set screw to retain a whistle notch Punch, M6x1.0 (or  $1/4 - 28$ ) should be the minimum. The set screw should be perpendicular to the centerline of the Punch.
- The Punch should have some means of adjustment. A Backing Plate or set screw behind the Holder would be an example.
- The hole size and tolerance for a standard 3/8" diameter Punch would be:  $\text{Ø}9.525 +0.005/-0.000$  mm (or  $\text{Ø}0.3750 +.0002 /-.0000$  In.)
- The hole size and tolerance for a standard 1/2" diameter Punch would be:  $\text{Ø}12.700 +0.005/-0.000$  mm (or  $\text{Ø}0.5000 +.0002 /-.0000$  In.)
- The hole size and tolerance for a standard 10mm diameter 940 Punch would be:  $\text{Ø}10H6$  (or  $\text{Ø}0.3937 +.0004 /-.0000$  In.)
- The hole size and tolerance for a standard 13mm diameter 940 Punch would be:  $\text{Ø}13H6$  (or  $\text{Ø}0.5118 +.0004 /-.0000$  In.)
- The surface that the Punch seats on should be through hardened. Typically, this material is 6150 with a hardness of 50-54 on the Rockwell "C" scale.

TOG-L-LOC | V-LOC | LANCE-N-LOC INFORMATION

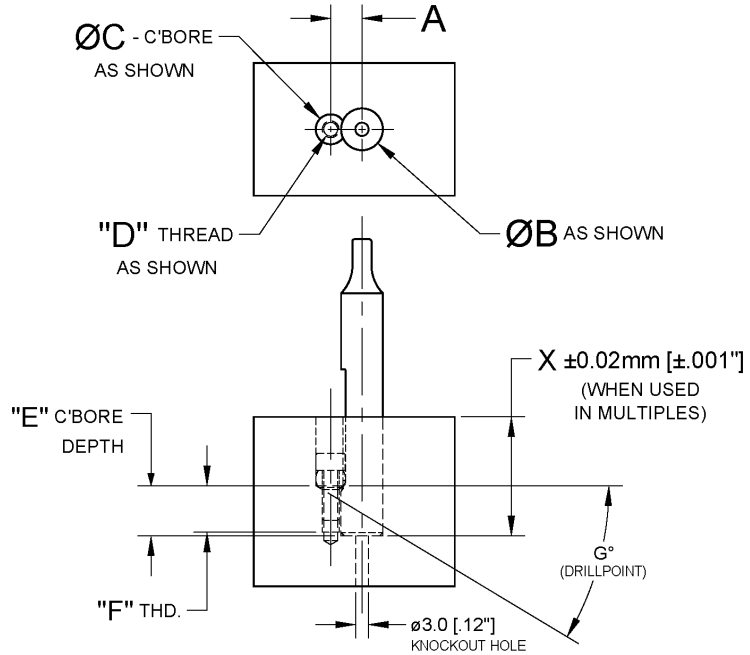
**TOG-L-LOC  
PUNCH INFORMATION**

**940 Series Punch Retention**

(With "wrap" between Punch and 940 Retaining Washer)

REF. PUNCH DRAWING NUMBERS:

- 3.0 TOG-L-LOC: 713800A
- 3.8 TOG-L-LOC: 793600A
- 4.6 TOG-L-LOC: 713900A
- 5.5 TOG-L-LOC: 739000A
- 6.4 TOG-L-LOC: PD201200A
- 7.6 TOG-L-LOC: 780100A



	3.0 Tog-L-Loc	3.8 Tog-L-Loc	4.6 Tog-L-Loc	5.5 Tog-L-Loc	6.4 Tog-L-Loc	7.6 Tog-L-Loc
<b>A</b>	7.49 <sup>+0.13</sup> / <sub>-0.06</sub> [.295 <sup>+0.005</sup> / <sub>-0.000</sub> ]	7.49 <sup>+0.13</sup> / <sub>-0.06</sub> [.295 <sup>+0.005</sup> / <sub>-0.000</sub> ]	7.49 <sup>+0.13</sup> / <sub>-0.06</sub> [.295 <sup>+0.005</sup> / <sub>-0.000</sub> ]	7.49 <sup>+0.13</sup> / <sub>-0.06</sub> [.295 <sup>+0.005</sup> / <sub>-0.000</sub> ]	10.03 <sup>+0.13</sup> / <sub>-0.06</sub> [.395 <sup>+0.005</sup> / <sub>-0.000</sub> ]	11.51 <sup>+0.13</sup> / <sub>-0.06</sub> [.453 <sup>+0.005</sup> / <sub>-0.000</sub> ]
<b>B</b>	Ø10H6 [.3937 <sup>+0.004</sup> / <sub>-0.0000</sub> ]	Ø10H6 [.3937 <sup>+0.004</sup> / <sub>-0.0000</sub> ]	Ø10H6 [.3937 <sup>+0.004</sup> / <sub>-0.0000</sub> ]	Ø10H6 [.3937 <sup>+0.004</sup> / <sub>-0.0000</sub> ]	Ø13H6 [.5118 <sup>+0.004</sup> / <sub>-0.0000</sub> ]	Ø16H6 [.6299 <sup>+0.004</sup> / <sub>-0.0000</sub> ]
<b>C</b>	7.14 <sup>+0.05</sup> / <sub>-0.00</sub> [.281 <sup>+0.002</sup> / <sub>-0.000</sub> ]	7.14 <sup>+0.05</sup> / <sub>-0.00</sub> [.281 <sup>+0.002</sup> / <sub>-0.000</sub> ]	7.14 <sup>+0.05</sup> / <sub>-0.00</sub> [.281 <sup>+0.002</sup> / <sub>-0.000</sub> ]	7.14 <sup>+0.05</sup> / <sub>-0.00</sub> [.281 <sup>+0.002</sup> / <sub>-0.000</sub> ]	10.16 <sup>+0.05</sup> / <sub>-0.00</sub> [.400 <sup>+0.002</sup> / <sub>-0.000</sub> ]	10.16 <sup>+0.05</sup> / <sub>-0.00</sub> [.400 <sup>+0.002</sup> / <sub>-0.000</sub> ]
<b>D</b>	M4x0.7-6H	M4x0.7-6H	M4x0.7-6H	M4x0.7-6H	M6x1.0-6H	M6x1.0-6H
<b>E</b>	11.81 <sup>+0.00</sup> / <sub>-0.13</sub> [.465 <sup>+0.000</sup> / <sub>-0.005</sub> ]	11.81 <sup>+0.00</sup> / <sub>-0.13</sub> [.465 <sup>+0.000</sup> / <sub>-0.005</sub> ]	11.81 <sup>+0.00</sup> / <sub>-0.13</sub> [.465 <sup>+0.000</sup> / <sub>-0.005</sub> ]	11.81 <sup>+0.00</sup> / <sub>-0.13</sub> [.465 <sup>+0.000</sup> / <sub>-0.005</sub> ]	11.63 [.458]	13.13 [.517]
<b>F</b>	11.2 [.44]	11.2 [.44]	11.2 [.44]	11.2 [.44]	15.2 [.60]	15.2 [.60]
<b>G</b>	20°	20°	20°	20°	31°	31°

**Set Screw Punch Retention**

Ø9.52 [3/8"] PUNCH:

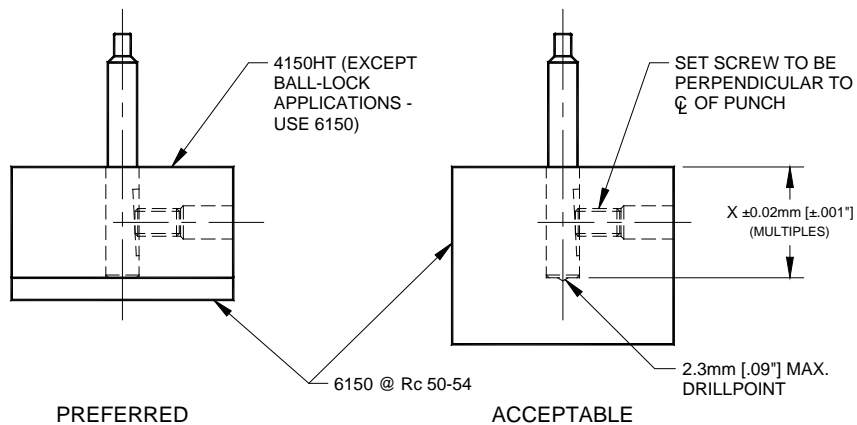
HOLE SIZE:  
Ø9.525 +0.005/-0.000 mm  
Ø.3750 +.0002/-0.0000 In.

- 3.0 Tog-L-Loc: 004933/006622
- 3.8 Tog-L-Loc: 797001A/797001C
- 4.6 Tog-L-Loc: 002798/006624
- 5.5 Tog-L-Loc: 018934/018936

Ø12.7 [1/2"] PUNCH:

HOLE SIZE:  
Ø12.700 +0.005/-0.000 mm  
Ø.5000 +.0002/-0.0000 In.

- 6.4 Tog-L-Loc: 012121/014708



TOG-L-LOC | V-LOC | LANCE-N-LOC INFORMATION

**TOG-L-LOC  
DIE INFORMATION**

**“940” Series Die Assembly**

- The location tolerance to the centerline of the Die hole should be  $\pm 0.013\text{mm}$  [ $\pm .0005$ ”].
- 940 Series Dies require a knock out hole from the back side.
- Because the 940 Die has a built in Blade Shield the top of the Die should not be flush with the detail it’s mounted in. If Anvil strength is not an issue, the typical design method would expose the ring of small holes in the Guard Can.
- The 940 Die is better suited for applications exposed to coolants and lubricants.
- Compared with a set screw, the 940 retention method is less likely to come loose during normal machine cycling.

**3 Bladed Elastomer**

- The location tolerance to the centerline of the Die hole should be  $\pm 0.013\text{mm}$  [ $\pm .0005$ ”].
- 3 Bladed Style “A” Dies require a knock out hole from the back side.
- 3 Bladed Style “A” Dies should have as much material protecting the Blades as possible.
- Due to incompatibility between specific components of die compounds and the standard Polyurethane (Yellow) Elastomer Rings, (2) alternative Elastomer Rings may be used.

Following is a basic guide for usage of the alternatives.

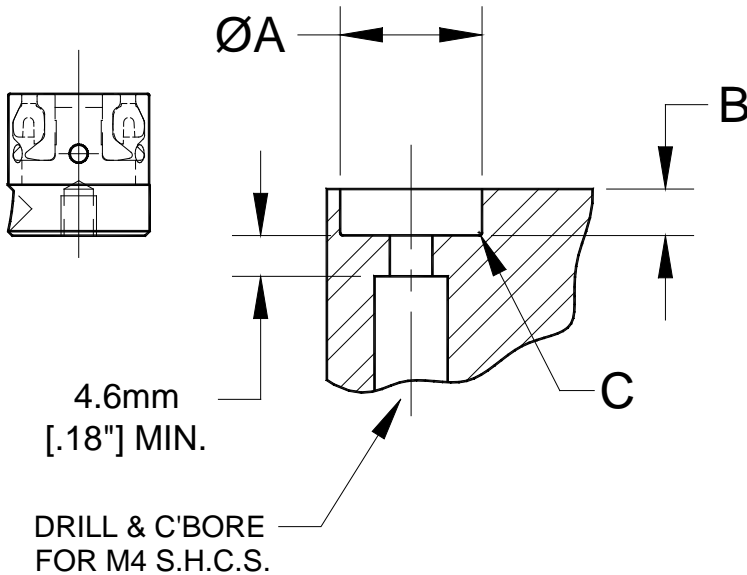
<u>Problem Die Compound Component</u>	<u>Elastomer Type to Use</u>
Isopropanol Vanishing Oil	Butyl (Black) Nitrile (blue)

TOG-L-LOC | V-LOC | LANCE-N-LOC INFORMATION

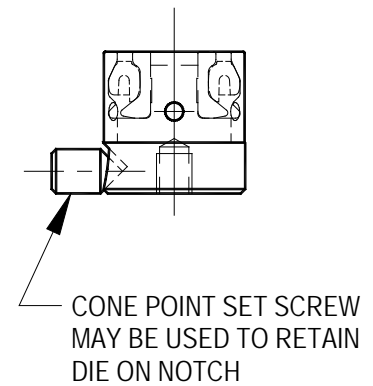
**TOG-L-LOC  
DIE INFORMATION**

TOG-L-LOC "940" SERIES SHORT INSERT DIE ASSEMBLY

Preferred Retention Method:



Acceptable Retention Method:



Note:  
Only use this means of retention in cases where there is insufficient room for the head of the S.H.C.S. (as shown in the "Preferred Retention Method").

	3.0 Tog-L-Loc	4.6 Tog-L-Loc	5.5 Tog-L-Loc	6.4 Tog-L-Loc
<b>A</b>	Ø12H6 [.4724 <sup>+.0004</sup> <sub>-.0000</sub> ]	Ø16H6 [.6299 <sup>+.0004</sup> <sub>-.0000</sub> ]	Ø19H6 [.7480 <sup>+.0005</sup> <sub>-.0000</sub> ]	Ø22H6 [.8661 <sup>+.0005</sup> <sub>-.0000</sub> ]
<b>B</b>	5.0 [.20"]	5.7 [.22"]	7.0 [.28"]	8.0 [.31"]
<b>C</b>	0.50 <sup>+0.00</sup> <sub>-0.25</sub> [.020 <sup>+0.000</sup> <sub>-.010</sub> ]	0.50 <sup>+0.00</sup> <sub>-0.25</sub> [.020 <sup>+0.000</sup> <sub>-.010</sub> ]	0.50 <sup>+0.00</sup> <sub>-0.25</sub> [.020 <sup>+0.000</sup> <sub>-.010</sub> ]	0.50 <sup>+0.00</sup> <sub>-0.25</sub> [.020 <sup>+0.000</sup> <sub>-.010</sub> ]

**Note:** "B" dimension denotes minimum guide on die assembly. Pocket depth may exceed "B" dimension, but should remain below the top of the 940 die guard.



TOG-L-LOC | V-LOC | LANCE-N-LOC INFORMATION

**TOG-L-LOC  
DIE INFORMATION**

**940 TOG-L-LOC "SSI" (STEPPED SHORT INSERT) DIE MOUNTING  
FOR ALL TOG-L-LOC JOINT SIZES**

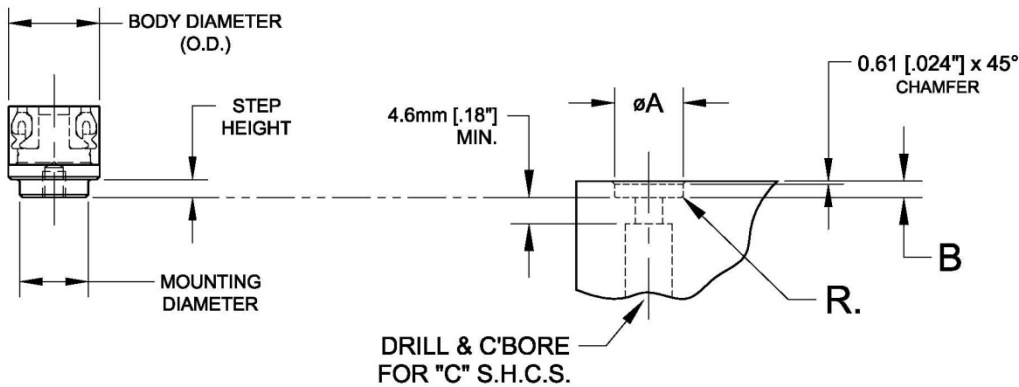
REF. DIE NUMBERS:

940 MINI DIE ASSY'S

- 3.0 TOG-L-LOC: 751800AE
- 3.8 TOG-L-LOC: PD220000AE
- 4.6 TOG-L-LOC: 751900AE
- 5.5 TOG-L-LOC: 752000AE
- 6.4 TOG-L-LOC: 752100AE
- 7.6 TOG-L-LOC: 767700A

940 "STANDARD" DIE ASSY'S

- 3.0 TOG-L-LOC: 751000AE
- 3.8 TOG-L-LOC: 793700AE
- 4.6 TOG-L-LOC: 751100AE
- 5.5 TOG-L-LOC: 743400AE
- 6.4 TOG-L-LOC: 751200AE
- 7.6 TOG-L-LOC: 779600AE

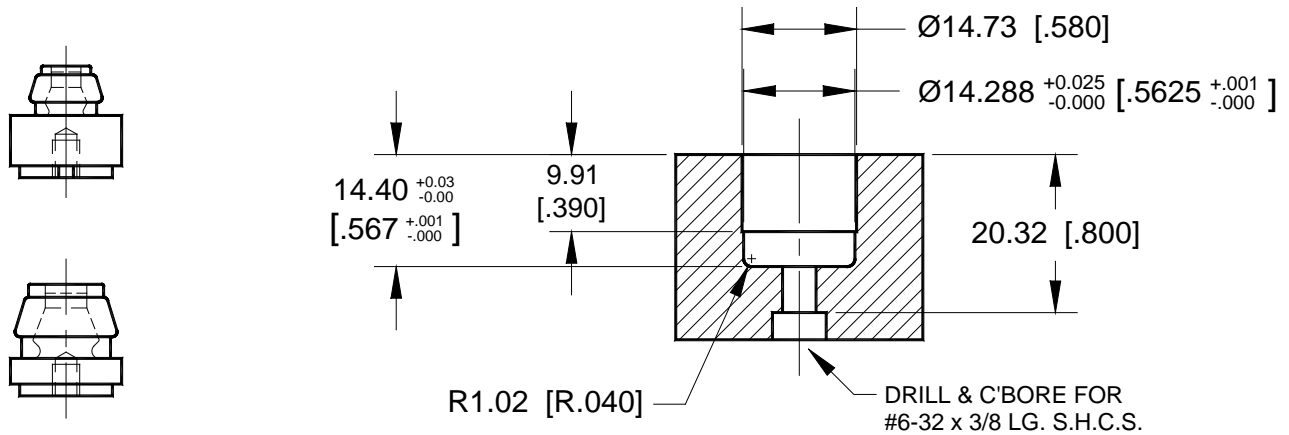


940 MINI & STANDARD DIES						
	3.0 Tog-L-Loc	3.8 Tog-L-Loc	4.6 Tog-L-Loc	5.5 Tog-L-Loc	6.4 Tog-L-Loc	7.6 Tog-L-Loc
<b>A</b>	Ø8H6 [.3150 <sup>+0.003</sup> / <sub>-.0000</sub> ]	MINI = Ø10H6 [.3937 <sup>+0.0004</sup> / <sub>-.0000</sub> ] STD. = Ø12H6 [.4724 <sup>+0.0004</sup> / <sub>-.0000</sub> ]	Ø12H6 [.4724 <sup>+0.0004</sup> / <sub>-.0000</sub> ]	Ø14H6 [.5512 <sup>+0.0004</sup> / <sub>-.0000</sub> ]	Ø18H6 [.7087 <sup>+0.0005</sup> / <sub>-.0000</sub> ]	Ø20H6 [.7874 <sup>+0.0005</sup> / <sub>-.0000</sub> ]
<b>B</b>	2.24 ±0.13 [.088 ±.005]	2.84 ±0.13 [.112 ±.005]	2.84 ±0.13 [.112 ±.005]	2.84 ±0.13 [.112 ±.005]	3.84 ±0.13 [.151 ±.005]	3.84 ±0.13 [.151 ±.005]
<b>C</b>	M4x0.7	M4x0.7	M4x0.7	M4x0.7	M4x0.7	M5x0.8
<b>R</b>	---	R0.25 [.010] MAX.	MINI = R0.25 [.010] MAX. STD. = R0.33 ±0.13 [.013 ±.005]	R0.33 ±0.13 [.013 ±.005]	R0.33 ±0.13 [.013 ±.005]	R0.36 ±0.13 [.014 ±.005]

NOTES: 940 MINI DIES HAVE A SMALLER BODY DIAMETER (O.D.) THAN THE 940 "STANDARD" DIES, AND HAVE CORRESPONDING LIMITATIONS ON THE TOG-L-LOC JOINT BUTTON DIAMETER THAT CAN BE PRODUCED WITH THE DIE. SEE THE CUSTOMER TEMPLATE OR DESIGN GUIDE DOCUMENT FOR MORE INFORMATION.

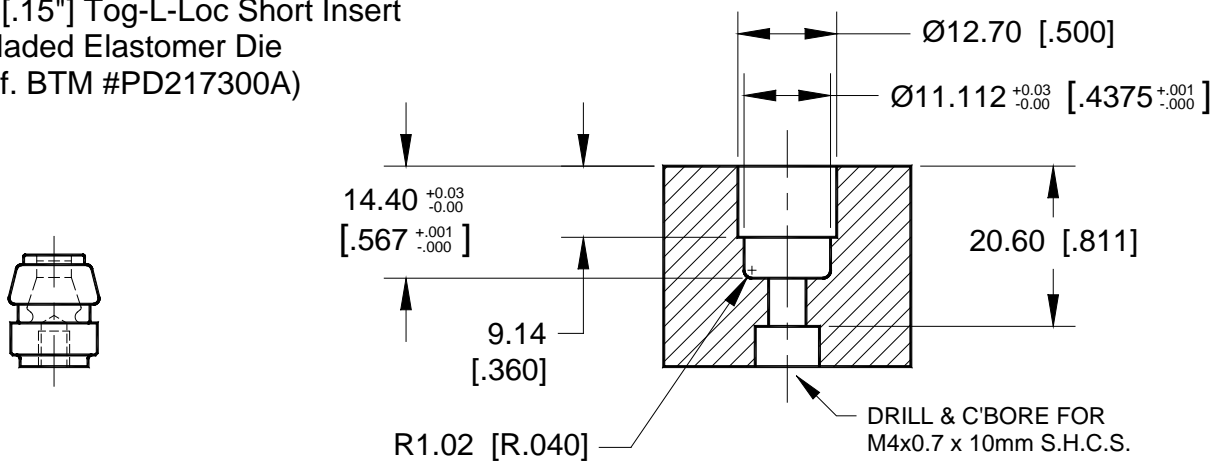
**TOG-L-LOC DIE  
POCKET INFORMATION**

3.0 [.12"] Tog-L-Loc Short Insert 3 Bladed Elastomer Die (Ref. BTM #013310)



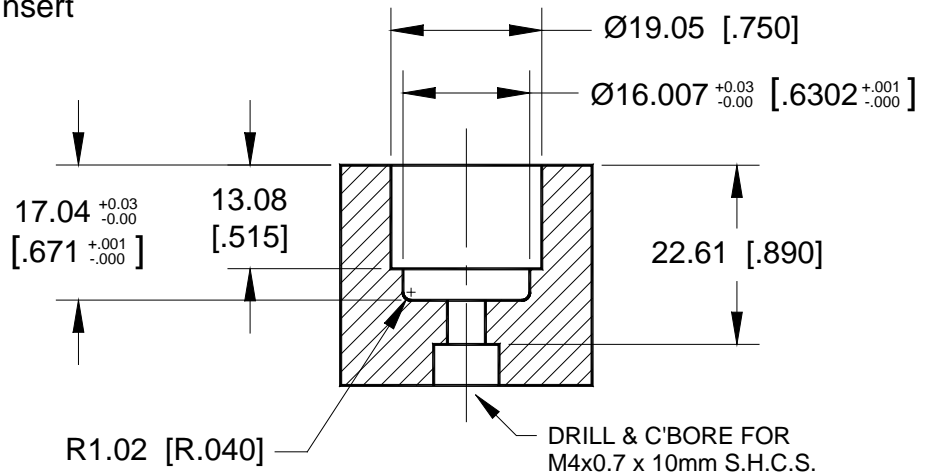
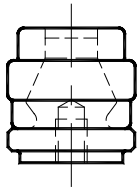
4.6 [.18"] Tog-L-Loc Short Insert 3 Bladed Elastomer Die (Ref. BTM #013263)

3.8 [.15"] Tog-L-Loc Short Insert  
3 Bladed Elastomer Die  
(Ref. BTM #PD217300A)

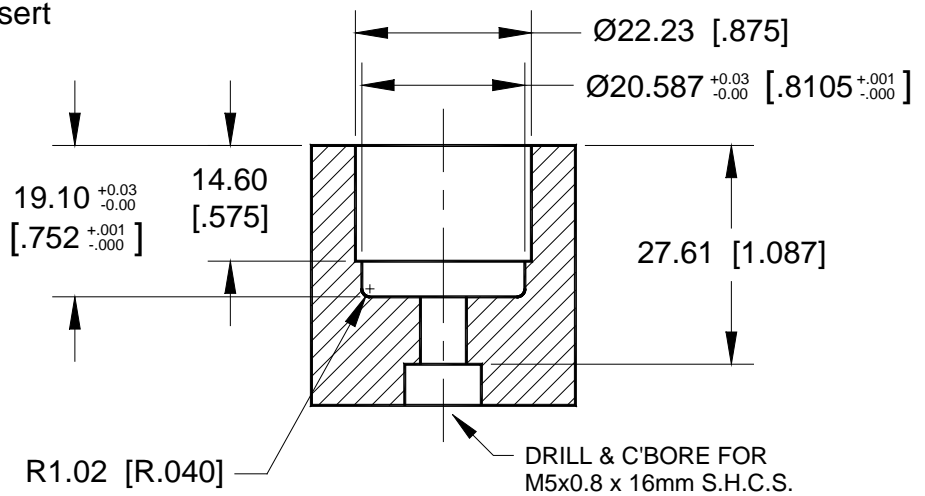
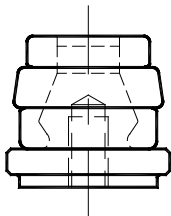


**TOG-L-LOC DIE  
POCKET INFORMATION**

5.5 [.22"] Tog-L-Loc Short Insert  
3 Bladed Elastomer Die  
(Ref. BTM #742200A)



6.4 [.25"] Tog-L-Loc Short Insert  
3 Bladed Elastomer Die  
(Ref. BTM #015071)



**TOG-L-LOC DIE  
MOUNTING INFORMATION**

**940 TOG-L-LOC STYLE "A" DIE MOUNTING  
FOR 3.0, 3.8, 4.6 & 5.5 TOG-L-LOC JOINTS**

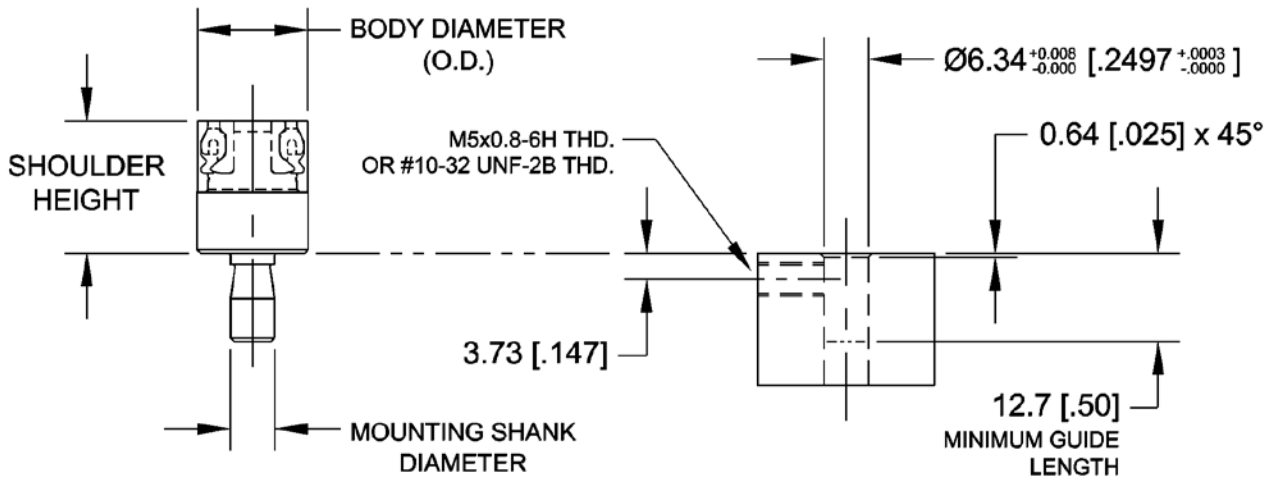
**REF. DIE NUMBERS:**

940 MINI DIE ASSY'S

3.0 TOG-L-LOC: 710200AE  
 3.8 TOG-L-LOC: PD220800AE  
 4.6 TOG-L-LOC: 710100AE  
 5.5 TOG-L-LOC: 767500AE

940 "STANDARD" DIE ASSY'S

3.0 TOG-L-LOC: 718200AE  
 3.8 TOG-L-LOC: 794600AE  
 4.6 TOG-L-LOC: 716000AE  
 5.5 TOG-L-LOC: 742100AE



**NOTES:** 940 MINI DIES HAVE A SMALLER BODY DIAMETER (O.D.) THAN THE 940 "STANDARD" DIES, AND HAVE CORRESPONDING LIMITATIONS ON THE TOG-L-LOC JOINT BUTTON DIAMETER THAT CAN BE PRODUCED WITH THE DIE. SEE THE CUSTOMER TEMPLATE OR DESIGN GUIDE DOCUMENT FOR MORE INFORMATION.

**TOG-L-LOC DIE  
MOUNTING INFORMATION**

**940 TOG-L-LOC STYLE "A" DIE MOUNTING  
FOR 6.4 TOG-L-LOC JOINTS**

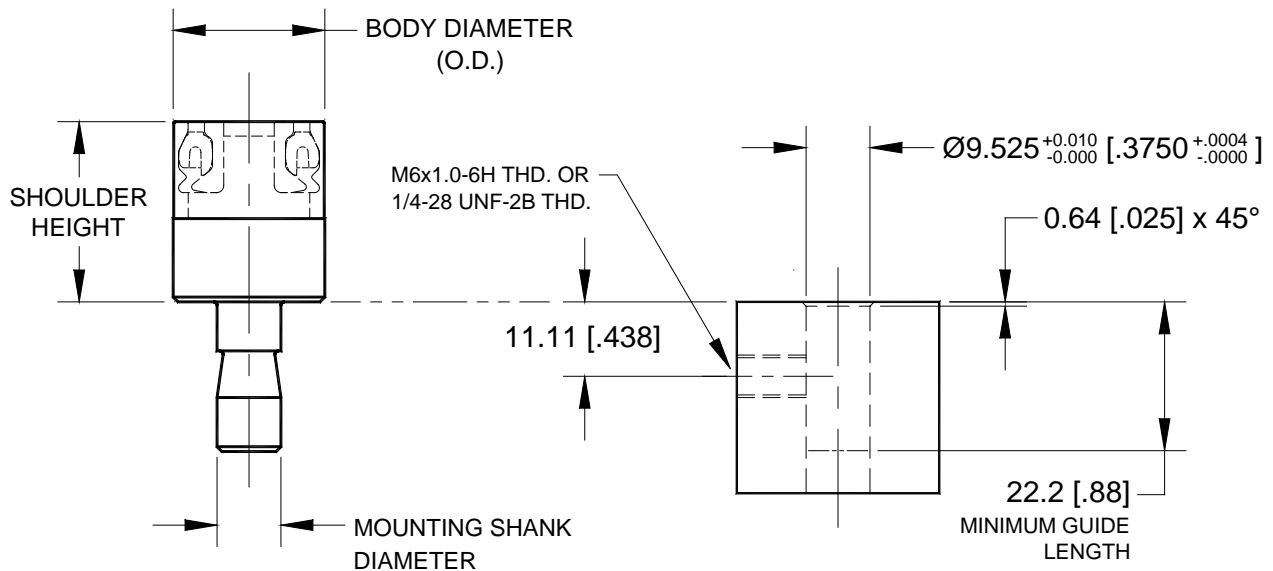
REF. DIE NUMBERS:

940 MINI DIE ASSY'S

940 "STANDARD" DIE ASSY'S

6.4 TOG-L-LOC: 710900A

6.4 TOG-L-LOC: 744700A



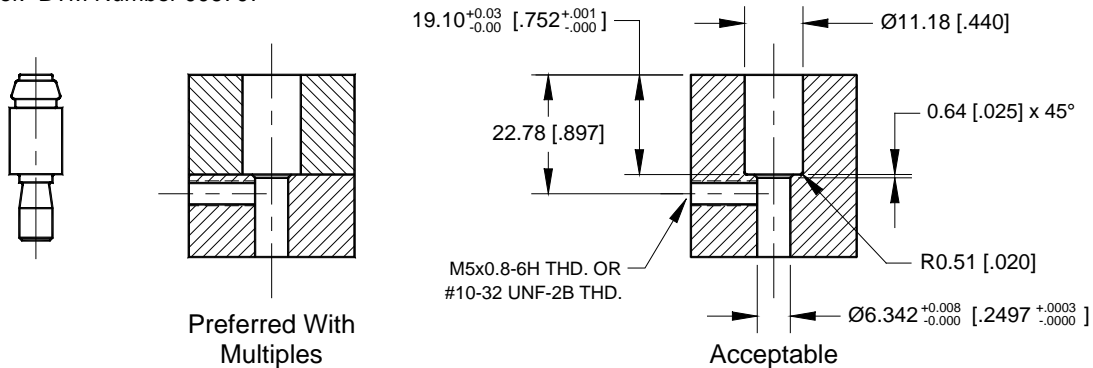
NOTES: 940 MINI DIES HAVE A SMALLER BODY DIAMETER (O.D.) THAN THE 940 "STANDARD" DIES, AND HAVE CORRESPONDING LIMITATIONS ON THE TOG-L-LOC JOINT BUTTON DIAMETER THAT CAN BE PRODUCED WITH THE DIE. SEE THE CUSTOMER TEMPLATE OR DESIGN GUIDE DOCUMENT FOR MORE INFORMATION.

TOG-L-LOC | V-LOC | LANCE-N-LOC INFORMATION

**TOG-L-LOC DIE  
POCKET INFORMATION**

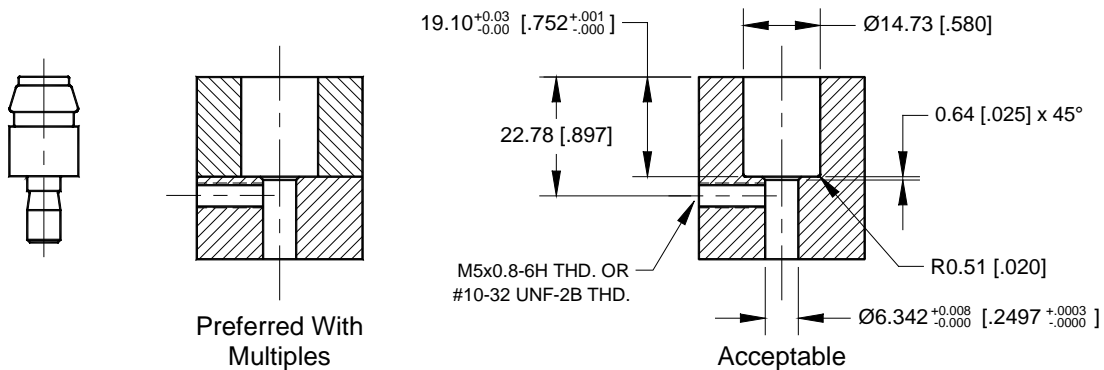
3.0 [.12"] Tog-L-Loc Style "A" 3 Bladed Elastomer Die

Ref: BTM Number 006707



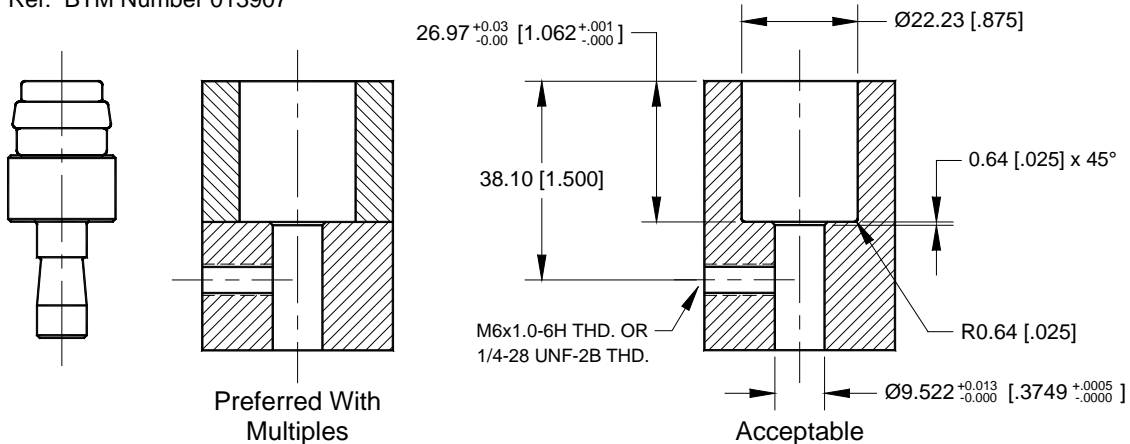
4.6 [.18"] Tog-L-Loc Style "A" 3 Bladed Elastomer Die

Ref: BTM Number 004223



6.4 [.25"] Tog-L-Loc Style "A" 3 Bladed Elastomer Die

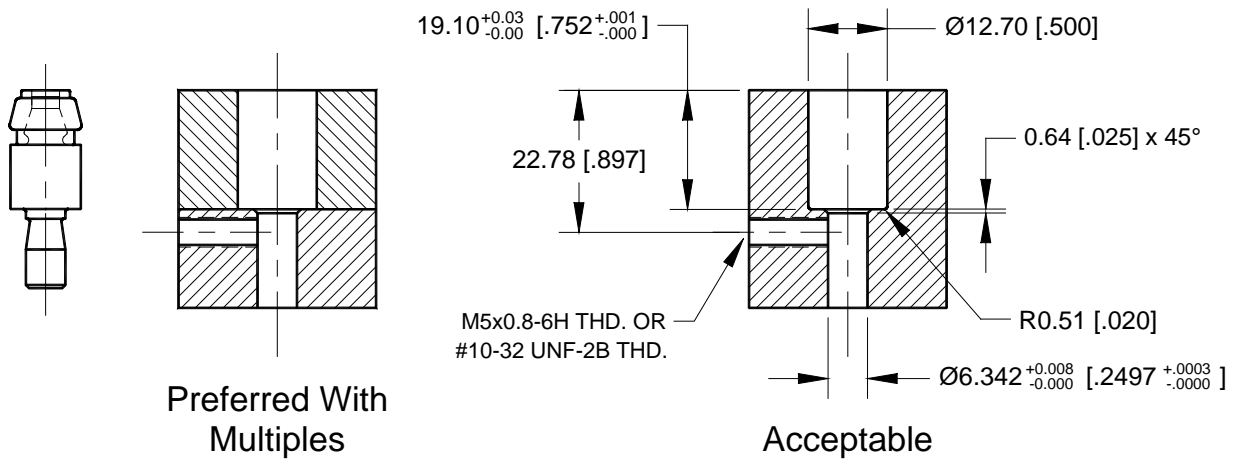
Ref: BTM Number 013907



**TOG-L-LOC DIE  
POCKET INFORMATION**

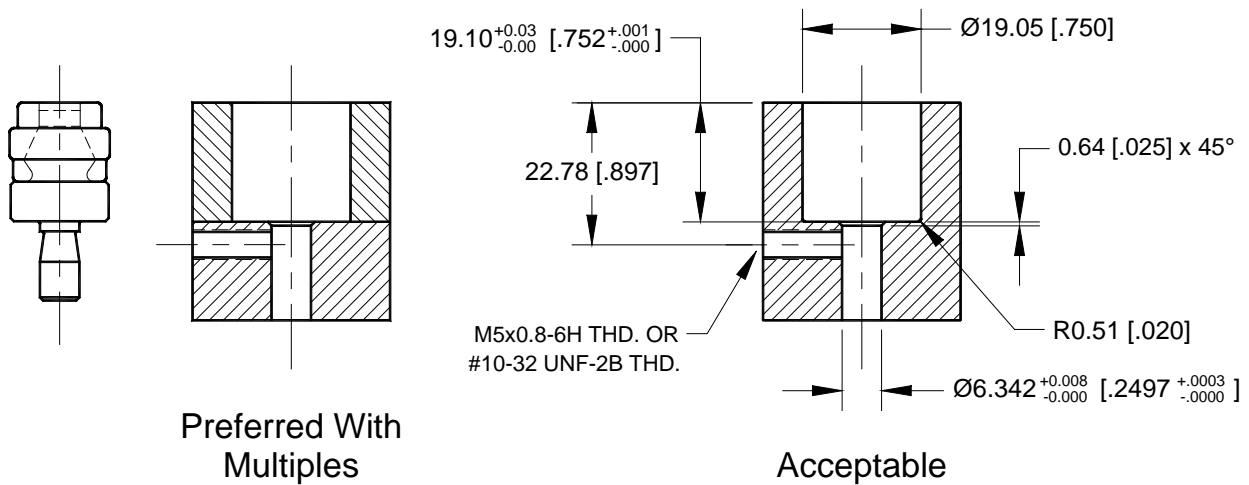
**3.8 [.15"] Tog-L-Loc Style "A" 3 Bladed Elastomer Die**

Ref: BTM Number 796900A



**5.5 [.22"] Tog-L-Loc Style "A" 3 Bladed Elastomer Die**

Ref: BTM Number 739100A

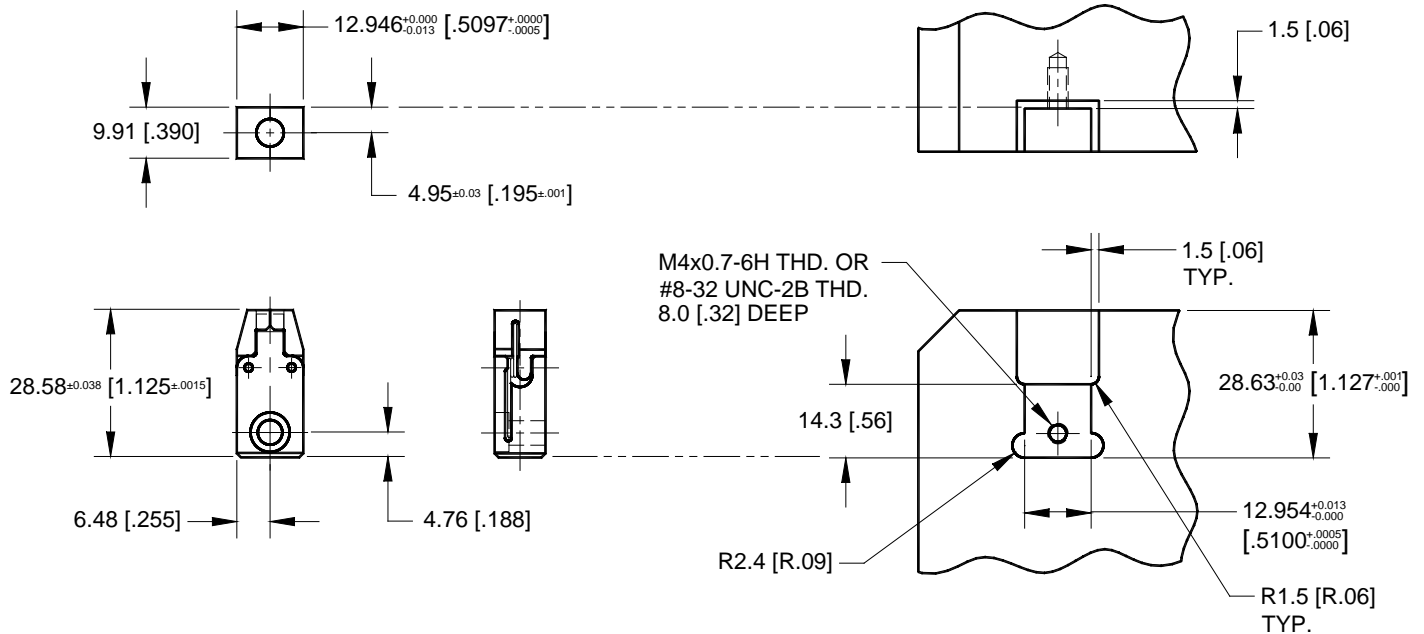


**TOG-L-LOC DIE  
POCKET INFORMATION**

2 Bladed Tog-L-Loc Style "A" Combo Block Die Assembly

- 2 Bladed Dies require a clearance pocket for the Blades to open freely.
- The locational tolerance to the centerline of the Die should be  $\pm 0.013$  [.0005"].
- A hardened Die Block or Anvil should be used; preferably 4150HT steel.
- Style "A" Combo Block Die pocket dimensions are shown below.

TOP OF DIE BLADES MUST BE FLUSH WITH SURROUNDING AREA FOR PROTECTION.



Style "A" Combo Block Die Assemblies

- 3.0 [.12"] Tog-L-Loc - Ref. BTM Number 013765
- 4.6 [.18"] Tog-L-Loc - Ref. BTM Number 006040

Style "A" Combo Block Die Set Up

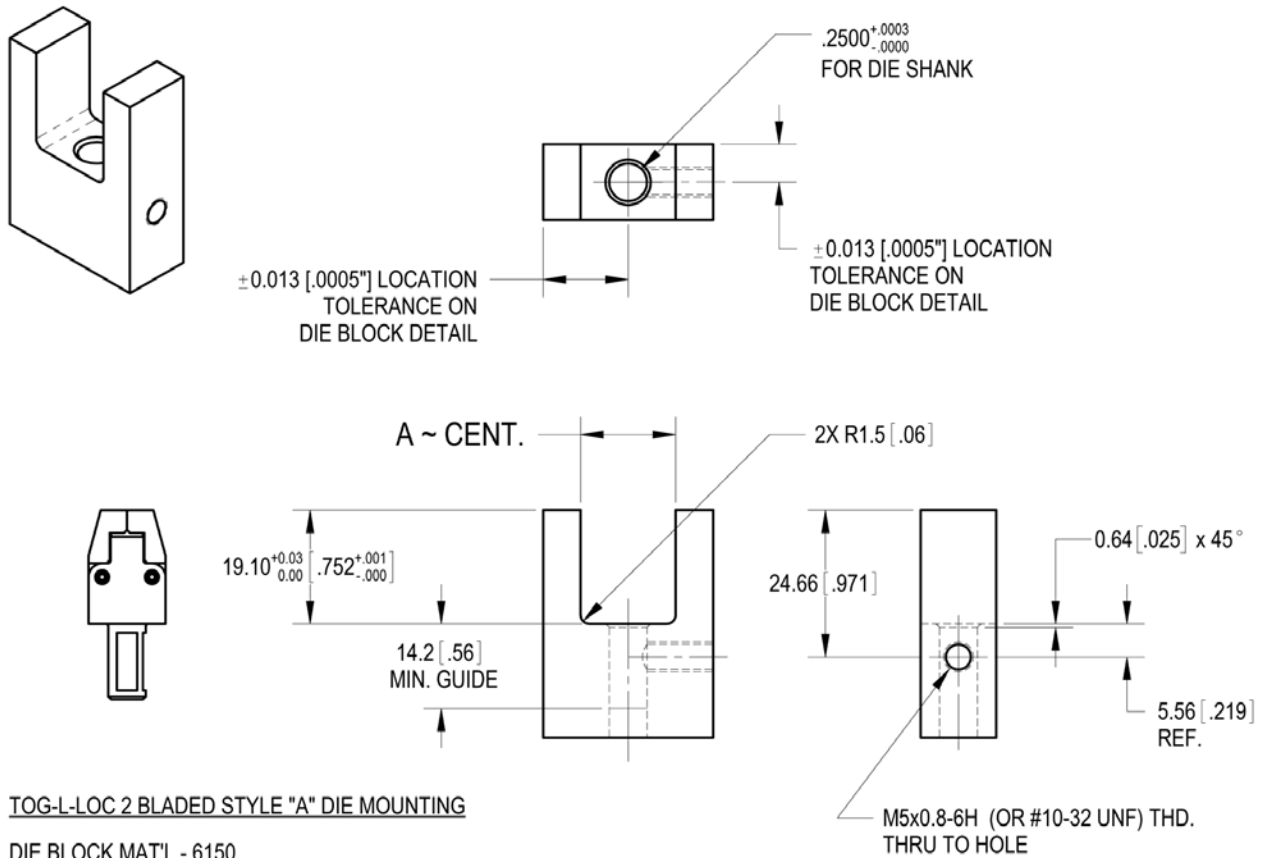


**TOG-L-LOC | V-LOC | LANCE-N-LOC INFORMATION**

**TOG-L-LOC DIE  
POCKET INFORMATION**

2 Bladed Tog-L-Loc Style "A" Die Assembly

- 2 Bladed Dies require a clearance pocket for the Blades to open freely.
- The locational tolerance to the centerline of the Die should be  $\pm 0.013$  [.0005"].
- A hardened Die Block or Anvil should be used.
- Style "A" Die pocket dimensions are shown below.



TOG-L-LOC 2 BLADED STYLE "A" DIE MOUNTING

DIE BLOCK MAT'L - 6150  
DIE BLOCK HARDNESS - Rc 50-54

JOINT SIZE	REF. ASSEMBLY NO.	"A" DIMENSION
3.0 TOG-L-LOC	000474	.57 $\frac{+.02}{-.00}$ [14.5 $\frac{+.05}{-.00}$ ]
3.8 TOG-L-LOC	PD204200A	.57 $\frac{+.02}{-.00}$ [14.5 $\frac{+.05}{-.00}$ ]
4.6 TOG-L-LOC	001221	.63 $\frac{+.02}{-.00}$ [16.0 $\frac{+.05}{-.00}$ ]

**NOTE:**

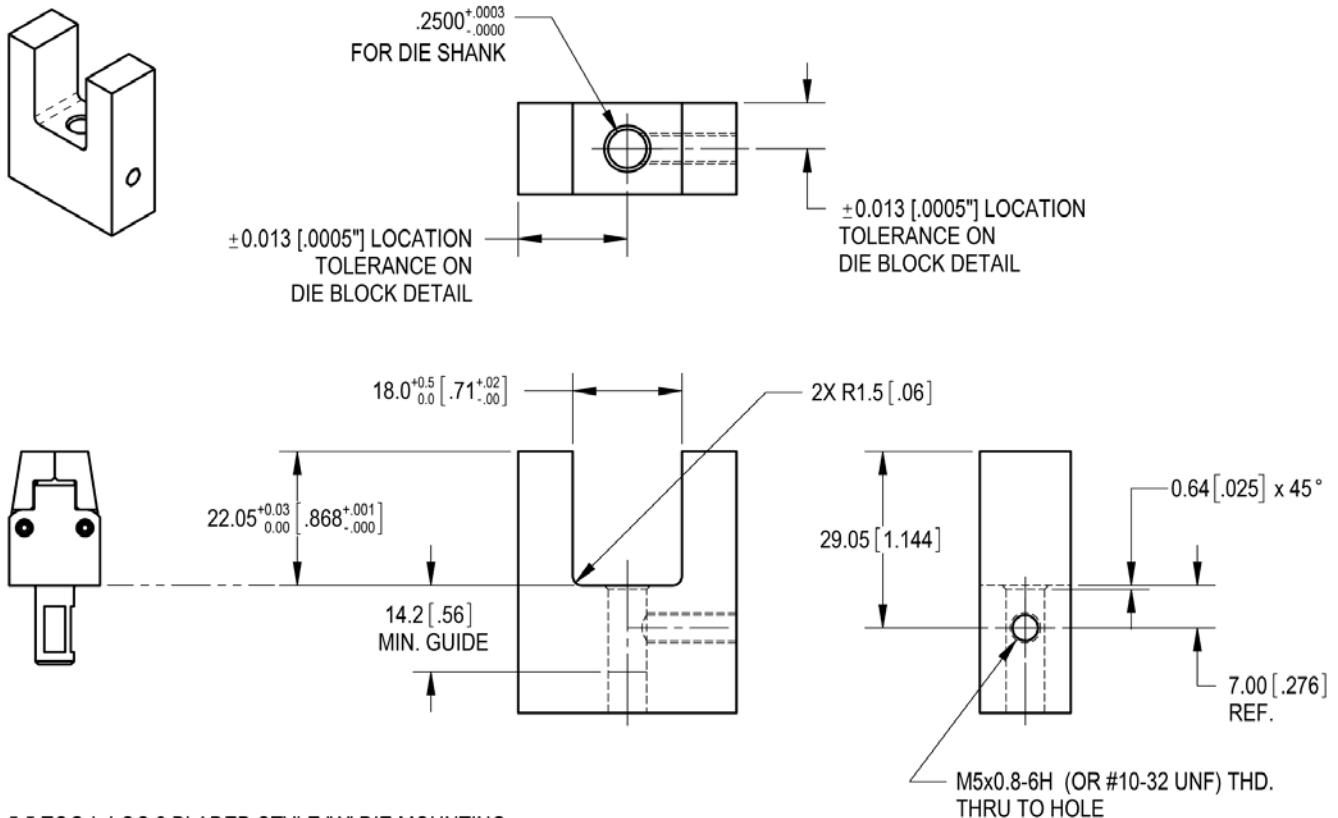
DRAWING PROVIDES DIE MOUNTING DIMENSIONS AND SPECIFICATIONS ONLY. DESIGN OF REMAINDER OF DIE BLOCK IS BASED ON SPECIFIC CUSTOMER APPLICATION.

**TOG-L-LOC | V-LOC | LANCE-N-LOC INFORMATION**

**TOG-L-LOC DIE  
POCKET INFORMATION**

2 Bladed 5.5 Tog-L-Loc Style "A" Die Assembly

- 2 Bladed Dies require a clearance pocket for the Blades to open freely.
- The locational tolerance to the centerline of the Die should be  $\pm 0.013$  [.0005"].
- A hardened Die Block or Anvil should be used.
- Style "A" Die pocket dimensions are shown below.



**5.5 TOG-L-LOC 2 BLADED STYLE "A" DIE MOUNTING**

REF. BTM DIE ASSEMBLY #PD239200A

DIE BLOCK MAT'L - 6150  
DIE BLOCK HARDNESS - Rc 50-54

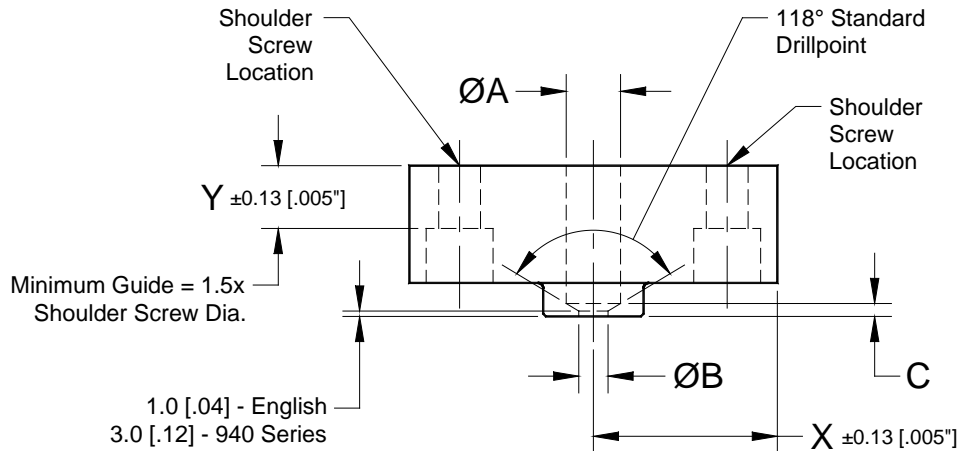
**NOTE:**

DRAWING PROVIDES DIE MOUNTING DIMENSIONS AND SPECIFICATIONS ONLY. DESIGN OF REMAINDER OF DIE BLOCK IS BASED ON SPECIFIC CUSTOMER APPLICATION.

TOG-L-LOC | V-LOC | LANCE-N-LOC INFORMATION

**TOG-L-LOC  
STRIPPER INFORMATION**

Stripper blocks should be made of 6150 steel, with a Rockwell hardness of Rc 50-54. Contact Force is measured when the Tog-L-Loc Punch contacts the work piece. The recommended Stripper contact force for 3.0 [.12"] TL is 0.89kN [200lbs] per joint. The recommended Stripper contact force for 3.8 [.15"] TL is 1.1kN [250lbs] per joint. The recommended Stripper contact force for 4.6 [.18"] TL is 1.3kN [300lbs] per joint. The recommended Stripper contact force for 5.5 [.22"] TL is 2.3kN [525lbs] per joint. The recommended Stripper contact force for 6.4 [.25"] TL is 3.3kN [750lbs] per joint. The location tolerance to the centerline of Punch clearance hole(s) should be  $\pm 0.13$  [.005"]. The location tolerance to the centerline of the Shoulder Screws should be  $\pm 0.013$  [.0005"]. The basic dimensions for Strippers are shown below. When using round tip strippers, tip diameter should be larger than the die pocket diameter. The tolerance on shoulder screw holes can be found on the Shoulder Screw Dimensions & Tolerances page in this section.

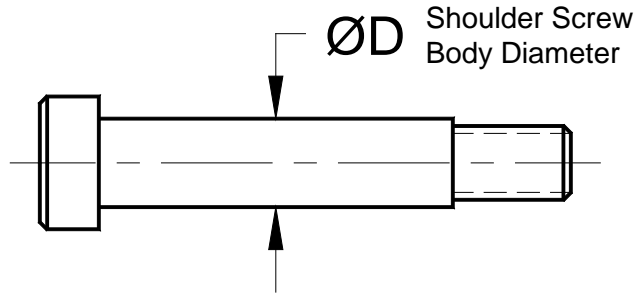


Note: See chart for A, B, and C dimensions. X and Y dimensions determined per application.

Punch Size	A	A "940"	B	C	C "940"
3.0mm [.12"]	Ø10.3 [13/32"]	Ø11.1 [7/16"]	Ø4.0 [5/32"]	2.9 [.12"]	5.2 [.20"]
3.8mm [.15"]	Ø10.3 [13/32"]	Ø11.1 [7/16"]	Ø4.8 [3/16"]	2.7 [.11"]	4.9 [.19"]
4.6mm [.18"]	Ø10.3 [13/32"]	Ø11.1 [7/16"]	Ø5.6 [7/32"]	2.5 [.10"]	4.7 [.18"]
5.5mm [.22"]	Ø10.3 [13/32"]	Ø11.1 [7/16"]	Ø6.4 [1/4"]	2.2 [.09"]	4.4 [.17"]
6.4mm [.25"]	Ø13.5 [17/32"]	Ø14.3 [9/16"]	Ø7.1 [9/32"]	2.0 [.08"]	4.2 [.16"]

TOG-L-LOC | V-LOC | LANCE-N-LOC INFORMATION

**SOCKET HEAD SHOULDER SCREW  
DIMENSIONS & TOLERANCES**



ANSI Inch Shoulder Screws

"D" Dia.			Hole Callout Inch	Recommended Seating Torque	
Basic	Max.	Min.*		in-lbs.	N-m
1/4	.248	.247	.250±.001	45	5
5/16	.3105	.3095	.3125±.001	112	13
3/8	.373	.372	.375±.001	230	26
1/2	.498	.497	.500±.001	388	44
5/8	.623	.622	.625±.001	990	112
3/4	.748	.747	.750±.001	1,975	223
7/8	.873	.872	.875±.001	3,490	394
1	.998	.997	1.000±.001	3,490	394
1 1/4	1.248	1.247	1.250±.001	5,610	634
1 1/2	1.498	1.496	1.500±.001	12,000	1356
1 3/4	1.748	1.746	1.750±.001	16,000	1808
2	1.998	1.996	2.000±.001	30,000	3390

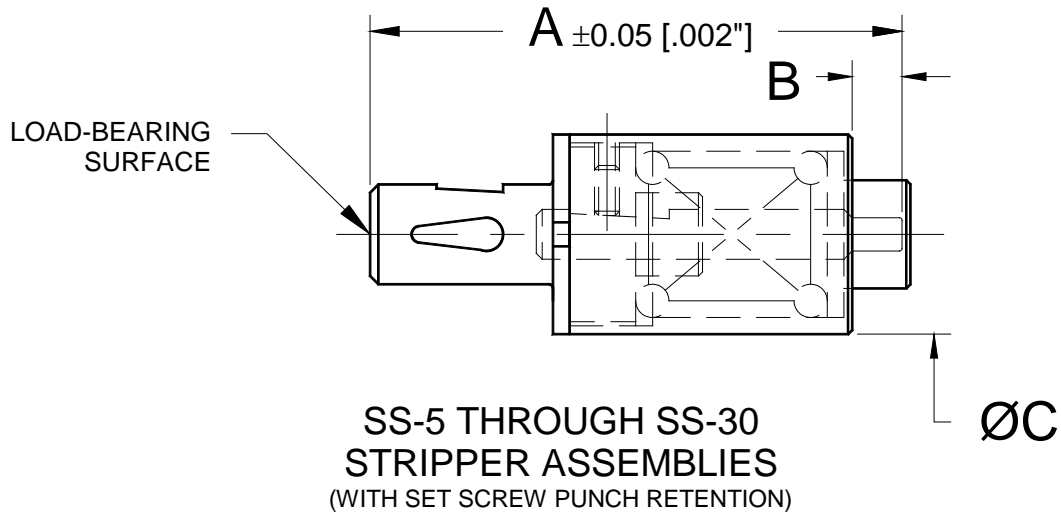
\* Min. for Holo-Krome sizes 1/4 thru 1 1/4 is .001 less than Unbrako min.

ANSI Metric Shoulder Screws

"D" Dia.			Hole Callout			Recommended Seating Torque	
Max.	Min.	ISO	Metric	ISO	Inch	N-m	in-lbs.
6.00	5.982	h8	6.020 <sup>+048</sup> <sub>-.000</sub>	E10	.238±.001	7	60
8.00	7.978	h8	8.025 <sup>+058</sup> <sub>-.000</sub>	E10	.317±.001	12	105
10.00	9.978	h8	10.025 <sup>+058</sup> <sub>-.000</sub>	E10	.396±.001	29	255
12.00	11.973	h8	12.032 <sup>+043</sup> <sub>-.000</sub>	E9	.475±.001	57	500
16.00	15.973	h8	16.032 <sup>+043</sup> <sub>-.000</sub>	E9	.632±.001	100	885
20.00	19.967	h8	20.040 <sup>+052</sup> <sub>-.000</sub>	E9	.790±.001	240	2125
24.00	23.967	h8	24.040 <sup>+052</sup> <sub>-.000</sub>	E9	.948±.001	470	4160

Shoulder screw Diameters & Seating Torques taken from Unbrako catalog

**STANDARD STRIPPER ASSEMBLY  
DIMENSIONS & TOLERANCES**



Standard Tog-L-Loc Stripper Package

Stripper Package	Tip Length	A	B	C
SS-5	Short Tip	101.60 [4.000]	9.5 [.38]	19.1 [.75]
SS-5	Extended Tip	127.00 [5.000]	34.9 [1.38]	19.1 [.75]
SS-10	Short Tip	101.60 [4.000]	9.5 [.38]	25.4 [1.00]
SS-10	Extended Tip	127.00 [5.000]	34.9 [1.38]	25.4 [1.00]
SS-20	Short Tip	101.60 [4.000]	9.5 [.38]	38.1 [1.50]
SS-20	Extended Tip	127.00 [5.000]	34.9 [1.38]	38.1 [1.50]
SS-30	Short Tip	139.70 [5.500]	12.7 [.50]	57.1 [2.25]
SS-30	Extended Tip	165.10 [6.500]	38.1 [1.50]	57.1 [2.25]

# 3.0 Tog-L-Loc Tooling

BTM Corporation  
300 Davis Rd.  
Marysville, MI USA  
48040  
Ph: 810-364-4567  
Fax: 810-364-6178  
www.btmcorp.com

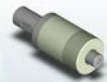


## Punch Side

Note: Information provided for reference when applying Tog-L-Loc tooling. When ordering assemblies (or individual components), refer to the BTM drawing number noted in the chart for order numbers.

<b>Punches</b>		 Punch Length				 Punch Length		
		71mm [2.795"] Lg.	80mm [3.150"] Lg.	90mm [3.543"] Lg.	100mm [3.937"] Lg.	69.85mm [2.750"] Lg.	95.25mm [3.750"] Lg.	
<b>940 &amp; Ball Lock</b> 10mm Mounting Dia.						<b>WNF</b> 9.52 [.375"] Mounting Dia.		
0.25 [.010"] PTR	940	713800A	713800B	713800C	713800D	0.25 [.010"] PTR	004933	006622
	Ball Lock	769000A	769000B	769000C	769000D			
0.51 [.020"] PTR	940	713800E	713800F	713800G	713800H	0.51 [.020"] PTR	006011	006623
	Ball Lock	769000E	769000F	769000G	769000H			

940 Retainer Screw Sub-Assembly		BTM Assembly Number
		018217

<b>Punch Holder Assemblies</b>					
Punch Retention Method		SS20 Die Set Mounting	Ø19.05 [.750"] Shank English Mounting	Ø20mm Shank Metric Mounting	Thin Holder Die Set Mounting
<b>940</b>	SS10	---	PD258800J	787700J	737400B
	SS20	713400A	020540	022516	
<b>WNF</b>	SS10	---	006644	018879	---
	SS20	---	---	---	
<b>Ball Lock</b>	SS10	---	---	---	737400J
	SS20	772100A	---	PD264000A	

### Notes:

**WNF** = Whistle Notch Flat (set screw) retention.

940 **Retainer Screw Sub-Assembly** is not included with 940 punches and must be ordered separately.

Punch holders with shank mounting have both ball lock and whistle notch flat retention.

### 3.0 Tog-L-Loc Requirements:

Force Req'd = 18kN [2 tons] in typical mild steel application.  
Stripper Contact Force = 0.9kN [200 lbs.] in typical mild steel application.

**SS10 - 0.9kN [200 lbs.] Contact - Punch Holder Ass'y - Spring Life:**  
Long life: 1.8mm [.07"] max. total material joined.  
Average life: 3.0mm [.11"] max. total material joined.

**SS20 - 1.2kN [300 lbs.] Contact - Punch Holder Ass'y Spring Life:**  
Long life: 2.8mm [.11"] max. total material joined.  
Average life: 4.0mm [.16"] max. total material joined.

# 3.0 Tog-L-Loc Tooling

## Die Side

### Die Assemblies

Note: Information provided for reference when applying Tog-L-Loc tooling. When ordering assemblies (or individual components), refer to the BTM drawing number noted in the chart for order numbers.

BTM Corporation  
300 Davis Rd.  
Marysville, MI USA  
48040  
Ph: 810-364-4567  
Fax: 810-364-6178  
www.btmcorp.com



<b>940</b>		940M (Mini)	Standard 940	Joining Aluminum
Style "A"		710200AE	718200AE	---
Short Insert		710300AE	711400AE	---
Stepped Short Insert (SSI)		751800AE	751000AE	---
40mm Lg. (Extension Assembly)		PD220200A	PD220300A	N/A
60mm Lg. (Extension Assembly)		PD220200B	PD220300B	N/A
80mm Lg. (Extension Assembly)		PD220200C	PD220300C	N/A
100mm Lg. (Extension Assembly)		PD220200D	PD220300D	N/A

**Note:** Mount SSI Die Assembly (select Die Assembly based on joining requirements) in Extension Assembly. The overall length of Extension Assembly noted in the left column (above) is the combined height of the Die Assembly and Extension.

Die Style	Die Holders & Assemblies		Round Holder For 40mm, 60mm, 80mm & 100mm 940 & 940M Extension Assemblies	Thin Holder For 40mm, 60mm, 80mm & 100mm 940 & 940M Extension Assemblies
	Style "A" Ø19.05 [.750"] Shank 50.8mm [2.000"] OAL English Mounting	Style "A" Ø20mm Shank 50.8mm [2.000"] OAL Metric Mounting		
<b>940</b>			715500A	737400A
<b>3B</b>	017838	019467	---	---

## 2B (2 Pivoting Blades)

Style "A"		000474
Style "A" Combo Block		013765

## 3B (3 Bladed Elastomer)

Style "A"		Standard	006707
		Aluminum	---
Short Insert		Standard	013310
		Aluminum	---

940 Retainer Screw Sub-Assembly		BTM Assembly Number	
		018217	
940 Elastomer Assembly Tool		BTM Assembly Number	
		Mini 940	710200G
		Standard	711400J

### Notes:

940 Retainer Screw Sub-Assembly is not included with 940 dies and must be ordered separately.

Die holders with shank mounting have both ball lock and whistle notch flat retention.

### 3.0 Tog-L-Loc Requirements:

Force Req'd = 18kN [2 tons] in typical mild steel application.

### Maximum BD (Button Diameter) - Including tolerance:

940M (Mini) = 4.9mm [.195"]

940 = 5.8mm [.230"]

3B = 6.4mm [.250"]

# 3.8 Tog-L-Loc Tooling

BTM Corporation  
 300 Davis Rd.  
 Marysville, MI USA  
 48040  
 Ph: 810-364-4567  
 Fax: 810-364-6178  
 www.btmcorp.com



## Punch Side

Note: Information provided for reference when applying Tog-L-Loc tooling. When ordering assemblies (or individual components), refer to the BTM drawing number noted in the chart for order numbers.

<b>Punches</b>		 Punch Length				 Punch Length		
		71mm [2.795"] Lg.	80mm [3.150"] Lg.	90mm [3.543"] Lg.	100mm [3.937"] Lg.	<b>WNF</b> 9.52 [.375"] Mounting	69.85mm [2.750"] Lg.	95.25mm [3.750"] Lg.
0.25 [.010"] PTR	940	793600A	793600C	793600E	793600G	0.25 [.010"] PTR	797001A	797001C
	Ball Lock	PD261200A	PD261200C	PD261200E	PD261200G		0.51 [.020"] PTR	797001B
0.51 [.020"] PTR	940	793600B	793600D	793600F	793600H	0.51 [.020"] PTR		797001B
	Ball Lock	PD261200B	PD261200D	PD261200F	PD261200H			

940 Retainer Screw Sub-Assembly		BTM Assembly Number
		018217

<b>Punch Holder Assemblies</b>					
Punch Retention Method		Die Set Mounting	Ø19.05 [.750"] Shank English Mounting	Ø20mm Shank Metric Mounting	Thin Holder Die Set Mounting
<b>940</b>	SS10	---	---	PD237700A	737400D
	SS20	794500A	793900A	793900K	
<b>WNF</b>	SS10	---	PD235500A	---	---
	SS20	---	797000A	797000E	
<b>Ball Lock</b>		PD266600A	---	PD264100A	737400J

### Notes:

**WNF** = Whistle Notch Flat (set screw) retention.

940 **Retainer Screw Sub-Assembly** is not included with 940 punches and must be ordered separately.

Punch holders with shank mounting have both ball lock and whistle notch flat retention.

### 3.8 Tog-L-Loc Requirements:

Force Req'd = 22kN [2.5 tons] in typical mild steel application.

Stripper Contact Force = 1.1kN [250 lbs]. in typical mild steel application.

### SS20 Punch Holder Ass'y Spring Life:

Long life: 2.8mm [.11"] max. total material joined.

Average life: 4.0mm [.16"] max. total material joined.



# 3.8 Tog-L-Loc Tooling

BTM Corporation  
300 Davis Rd.  
Marysville, MI US/  
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Ph: 810-364-4567  
Fax: 810-364-6178  
www.btmcorp.com



## Die Side

Note: Information provided for reference when applying Tog-L-Loc tooling. When ordering assemblies (or individual components), refer to the BTM drawing number noted in the chart for order numbers.

### Die Assemblies

<b>940</b>		940M (Mini)	Standard 940	Joining Aluminum
Style "A"		PD220800AE	794600AE	PD214300AE
Short Insert		N/A	N/A	N/A
Stepped Short Insert (SSI)		PD220000AE	793700AE	---
40mm Lg. (Extension Assembly)		PD220400A	796800A	N/A
60mm Lg. (Extension Assembly)		PD220400B	796800B	N/A
80mm Lg. (Extension Assembly)		PD220400C	796800C	N/A
100mm Lg. (Extension Assembly)		PD220400D	796800D	N/A

Note: Mount SSI Die Assembly (select Die Assembly based on joining requirements) in Extension Assembly. The overall length of Extension Assembly noted in the left column (above) is the combined height of the Die Assembly and Extension.

### Die Holders & Assemblies

Die Style	Style "A" Ø19.05 [.750"] Shank 50.8mm [2.000"] OAL English Mounting	Style "A" Ø20mm Shank 50.8mm [2.000"] OAL Metric Mounting	Round Holder For 40mm, 60mm, 80mm & 100mm Standard 940 Extension Assembly	Thin Holder For 40mm, 60mm, 80mm & 100mm Standard 940 Extension Assembly
<b>940</b>	017838	019467	796800E	---
<b>3B</b>	034476	018892	---	---

## 2B (2 Pivoting Blades)

Style "A"		PD204200A
Style "A" Combo Block		---

## 3B (3 Bladed Elastomer)

Style "A"		Standard	796900A
		Aluminum	---
Short Insert		Standard	PD217300A
		Aluminum	---

940 Retainer Screw Sub-Assembly		BTM Assembly Number	
		018217	
940 Elastomer Assembly Tool		BTM Assembly Number	
		Mini 940	---
		Standard	793900J

### Notes:

940 **Extension Assemblies** are used to mount 940 SSI die assemblies (height of extension plus die ass'y equals noted length - 40, 60, 80 or 100mm).

940 **Retainer Screw Sub-Assembly** is not included with 940 dies and must be ordered separately.

Die holders with shank mounting have both ball lock and whistle notch flat retention.

### 3.8 Tog-L-Loc Requirements:

Force Req'd = 22kN [2.5 tons] in typical mild steel application.

### Maximum BD (Button Diameter) - Including tolerance:

940M (Mini) = 6.1mm [.240"]

940 = 6.4mm [.250"]

3B = 7.1mm [.280"]



# 4.6 Tog-L-Loc Tooling

BTM Corporation  
300 Davis Rd.  
Marysville, MI USA  
48040  
Ph: 810-364-4567  
Fax: 810-364-6178  
www.btmcorp.com



## Punch Side

Note: Information provided for reference when applying Tog-L-Loc tooling. When ordering assemblies (or individual components), refer to the BTM drawing number noted in the chart for order numbers.

<b>Punches</b>		 Punch Length				 Punch Length		
		71mm [2.795"] Lg.	80mm [3.150"] Lg.	90mm [3.543"] Lg.	100mm [3.937"] Lg.	<b>WNF</b> 9.52 [.375"] Mounting	69.85mm [2.750"] Lg.	95.25mm [3.750"] Lg.
0.25 [.010"] PTR	940	713900A	713900B	713900C	713900D	0.25 [.010"] PTR	002798	006624
	Ball Lock	769100A	769100B	769100C	769100D			
0.51 [.020"] PTR	940	713900E	713900F	713900G	713900H	0.51 [.020"] PTR	002992	006636
	Ball Lock	769100E	769100F	769100G	769100H			

940 Retainer Screw Sub-Assembly		BTM Assembly Number
		018217

<b>Punch Holder Assemblies</b>					
Punch Retention Method		SS20 Die Set Mounting	Ø19.05 [.750"] Shank English Mounting	Ø20mm Shank Metric Mounting	Thin Holder Die Set Mounting
<b>940</b>	SS10	---	---	787700A	737400D
	SS20	713400A	018855	018925	
<b>WNF</b>	SS10	---	006746	---	---
	SS20	---	015405	021745	
<b>Ball Lock</b>	SS10	---	---	---	737400J
	SS20	772200A	---	PD263900A	

### Notes:

**WNF** = Whistle Notch Flat (set screw) retention.

940 **Retainer Screw Sub-Assembly** is not included with 940 punches and must be ordered separately.

Punch holders with shank mounting have both ball lock and whistle notch flat retention.

### 4.6 Tog-L-Loc Requirements:

Force Req'd = 28kN [3.1 tons] in typical mild steel application.  
Stripper Contact Force = 1.2kN [300 lbs.] in typical mild steel application.

**SS10 - 0.9kN [200 lbs.] Contact - Punch Holder Ass'y - Spring Life:**

(For light duty application)

Long life: 1.8mm [.07"] max. total material joined.

Average life: 3.0mm [.11"] max. total material joined.

**SS20 - 1.2kN [300 lbs.] Contact - Punch Holder Ass'y Spring Life:**

Long life: 2.8mm [.11"] max. total material joined.

Average life: 4.0mm [.16"] max. total material joined.

# 4.6 Tog-L-Loc Tooling

## Die Side

### Die Assemblies

Note: Information provided for reference when applying Tog-L-Loc tooling. When ordering assemblies (or individual components), refer to the BTM drawing number noted in the chart for order numbers.

BTM Corporation  
300 Davis Rd.  
Marysville, MI USA  
48040  
Ph: 810-364-4567  
Fax: 810-364-6178  
www.btmcorp.com



<b>940</b>		940M (Mini)	Standard 940	Joining Aluminum
Style "A"		710100AE	716000AE	761700AE
Short Insert		710400AE	711500AE	760100AE
Stepped Short Insert (SSI)		751900AE	751100AE	793300AE
40mm Lg. (Extension Assembly)		796800A	N/A	N/A
60mm Lg. (Extension Assembly)		796800B	PD220900B	N/A
80mm Lg. (Extension Assembly)		796800C	PD220900C	N/A
100mm Lg. (Extension Assembly)		796800D	PD220900D	N/A

Note: Mount SSI Die Assembly (select Die Assembly based on joining requirements) in Extension Assembly. The overall length of Extension Assembly noted in the left column (above) is the combined height of the Die Assembly and Extension.

Die Style	Die Holders & Assemblies			
Style "A"	Style "A" Ø19.05 [.750"] Shank 50.8mm [2.000"] OAL English Mounting	Style "A" Ø20mm Shank 50.8mm [2.000"] OAL Metric Mounting	Round Holder For 60mm, 80mm & 100mm Standard 940 Extension Ass'y	Thin Holder For 60mm, 80mm & 100mm Standard 940 Extension Ass'y
<b>940</b>	017838	019467	713600A	737400C
<b>3B</b>	007689	018892	---	---

## 2B (2 Pivoting Blades)

Style "A"		001221
Style "A" Combo Block		006040

## 3B (3 Bladed Elastomer)

Style "A"		Standard	004223
		Aluminum	017896
Short Insert		Standard	013263
		Aluminum	017916

940 Retainer Screw Sub-Assembly		BTM Assembly Number	
		018217	
940 Elastomer Assembly Tool		BTM Assembly Number	
		Mini 940	710100U
		Standard	711500L

### Notes:

940 Retainer Screw Sub-Assembly is not included with 940 dies and must be ordered separately.

Die holders with shank mounting have both ball lock and whistle notch flat retention.

### 4.6 Tog-L-Loc Requirements:

Force Req'd = 28kN [3.1 tons] in typical mild steel application.

### Maximum BD (Button Diameter) - Including tolerance:

940M (Mini) = 7.1mm [.280"]

940 = 8.0mm [.315"]

3B = 8.1mm [.320"]



# 5.5 Tog-L-Loc Tooling

BTM Corporation  
300 Davis Rd.  
Marysville, MI USA  
48040  
Ph: 810-364-4567  
Fax: 810-364-6178  
www.btmcorp.com



## Punch Side

Note: Information provided for reference when applying Tog-L-Loc tooling. When ordering assemblies (or individual components), refer to the BTM drawing number noted in the chart for order numbers.

<b>Punches</b>		 Punch Length				 Punch Length		
		71mm [2.795"] Lg.	80mm [3.150"] Lg.	90mm [3.543"] Lg.	100mm [3.937"] Lg.	9.52 [0.375"] Mounting	69.85mm [2.750"] Lg.	95.25mm [3.750"] Lg.
0.25 [.010"] PTR	940	739000A	739000C	739000E	739000G	0.25 [.010"] PTR	018934	018936
	Ball Lock	PD237400A	PD237400C	PD237400E	PD237400G		0.51 [.020"] PTR	018935
0.51 [.020"] PTR	940	739000B	739000D	739000F	739000H	0.51 [.020"] PTR		018935
	Ball Lock	PD237400B	PD237400D	PD237400F	PD237400H			

940 Retainer Screw Sub-Assembly		BTM Assembly Number
		018217

<b>Punch Holder Assemblies</b>					
Punch Retention Method		Die Set Mounting	Ø19.05 [.750"] Shank English Mounting	Ø20mm Shank Metric Mounting	Thin Holder Die Set Mounting
<b>940</b>	SS20	PD244300A	PD241400A	PD244200A	737400D
	SS25	PD241800A	PD244400A	PD244500A	
<b>WNF</b>	SS20	---	PD244600A	PD244800A	---
	SS25	---	---	---	
<b>Ball Lock</b>	SS20	PD244900A	---	PD266000A	737400J
	SS25	PD265900A	---	PD265800A	

### Notes:

**WNF** = Whistle Notch Flat (set screw) retention.

940 Retainer Screw Sub-Assembly is not included with 940 punches and must be ordered separately.

Punch holders with shank mounting have both ball lock and whistle notch flat retention.

### 5.5 Tog-L-Loc Requirements:

Force Req'd = 42kN [4.7 tons] in typical mild steel application.  
Stripper Contact Force = 2.3kN [525 lbs.] in typical mild steel application.

**SS20** - 1.2kN [300 lbs.] Contact - Punch Holder Ass'y Spring Life:  
(For light duty application)  
Long life: 2.8mm [.11"] max. total material joined.  
Average life: 4.0mm [.16"] max. total material joined.

**SS25** - 2.3kN [525 lbs.] Contact - Punch Holder Ass'y Spring Life:  
Long life: 2.5mm [.10"] max. total material joined.  
Average life: 5.0mm [.20"] max. total material joined.

# 5.5 Tog-L-Loc Tooling

BTM Corporation  
300 Davis Rd.  
Marysville, MI USA  
48040  
Ph: 810-364-4567  
Fax: 810-364-6178  
www.btmcorp.com



## Die Side

Note: Information provided for reference when applying Tog-L-Loc tooling. When ordering assemblies (or individual components), refer to the BTM drawing number noted in the chart for order numbers.

### Die Assemblies

<b>940</b>		940M (Mini)	Standard 940	Joining Aluminum
Style "A"		767500AE	742100AE	762100AE
Short Insert		747700AE	741900AE	762200AE
Stepped Short Insert (SSI)		752000AE	743400AE	779300AE
40mm Lg. (Extension Assembly)		N/A	N/A	N/A
60mm Lg. (Extension Assembly)		PD220500B	PD220600B	N/A
80mm Lg. (Extension Assembly)		PD220500C	PD220600C	N/A
100mm Lg. (Extension Assembly)		PD220500D	PD220600D	N/A

Note: Mount SSI Die Assembly (select Die Assembly based on joining requirements) in Extension Assembly. The overall length of Extension Assembly noted in the left column (above) is the combined height of the Die Assembly and Extension.

Die Style				
	Style "A" Ø19.05 [.750"] Shank 50.8mm [2.000"] OAL English Mounting	Style "A" Ø20mm Shank 50.8mm [2.000"] OAL Metric Mounting	Round Holder For 60mm, 80mm & 100mm Standard 940 Extension Ass'y	Thin Holder For 60mm, 80mm & 100mm Standard 940 Extension Ass'y
<b>940</b>	017838	019467	743500A	737400H
<b>3B</b>	013888	018893	---	---

## 2B (2 Pivoting Blades)

Style "A"		PD239200A
Style "A" Combo Block		---

## 3B (3 Bladed Elastomer)

Style "A"		Standard	739100A
		Aluminum	---
Short Insert		Standard	742200A
		Aluminum	---

940 Retainer Screw Sub-Assembly		BTM Assembly Number	
		018217	
940 Elastomer Assembly Tool		BTM Assembly Number	
		Mini 940	747700K
		Standard	741900N

### Notes:

940 Retainer Screw Sub-Assembly is not included with 940 dies and must be ordered separately.

Die holders with shank mounting have both ball lock and whistle notch flat retention.

### 5.5 Tog-L-Loc Requirements:

Force Req'd = 42kN [4.7 tons] in typical mild steel application.

### Maximum BD (Button Diameter) - Including tolerance:

940M (Mini) = 8.6mm [.340"]

940 = 9.8mm [.385"]

3B = 10.0mm [.395"]

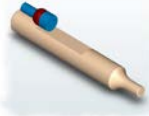



# 6.4 Tog-L-Loc Tooling

BTM Corporation  
 300 Davis Rd.  
 Marysville, MI USA  
 48040  
 Ph: 810-364-4567  
 Fax: 810-364-6178  
 www.btm.corp.com

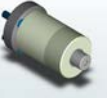





## Punch Side

Note: Information provided for reference when applying Tog-L-Loc tooling. When ordering assemblies (or individual components), refer to the BTM drawing number noted in the chart for order numbers.

<b>Punches</b>					
		Punch Length		Punch Length	
<b>940 &amp; Ball Lock</b> 13mm Mounting Dia.		100mm [3.937"] Lg.	125mm [4.921"] Lg.	<b>BW</b> BALL LOCK & WHISTLE NOTCH FLAT (ON SAME PUNCH) 12.70 [.500"] Mounting Dia.	95.25mm [3.750"] Lg.    120.65mm [4.750"] Lg.
0.25 [.010"] PTR	940	PD201200A	PD201200B	0.25 [.010"] PTR	014707    014708
	Ball Lock	792901A	792901B		0.51 [.020"] PTR
0.51 [.020"] PTR	940	PD201200C	PD201200D	0.51 [.020"] PTR	
	Ball Lock	792901C	792901D		

940 Retainer Screw Sub-Assembly (M6)		BTM Assembly Number
		023228

<b>Punch Holder Assemblies</b>					
Punch Retention Method		Die Set Mounting	Ø19.05 [.750"] Shank English Mounting	Ø20mm Shank Metric Mounting	Thin Holder Die Set Mounting
<b>940</b>	SS20	---	---	020533	PD214600A
	SS30	PD214400A	PD214500A	---	
<b>WNF</b>	SS20	---	013737	---	---
	SS30	---	013732	---	
<b>Ball Lock</b>	SS20	---	---	---	737400K
	SS30	792900A	---	PD266100A	

### Notes:

**WNF** = Whistle Notch Flat (set screw) retention.

940 Retainer Screw Sub-Assembly (M6) - BTM #023228 is not included with 940 punches and must be ordered separately.

Punch holders with shank mounting have both ball lock and whistle notch flat retention.

### 6.4 Tog-L-Loc Requirements:

Force Req'd = 58kN [6.5 tons] in typical mild steel application.  
 Stripper Contact Force = 3.3kN [750 lbs.] in typical mild steel application.

**SS20 - 1.2kN [300 lbs.] Contact - Punch Holder Ass'y Spring Life:**  
 (For light duty application)

Long life: 2.8mm [.11"] max. total material joined.  
 Average life: 4.0mm [.16"] max. total material joined.

**SS30 - 3.3kN [750 lbs.] Contact - Punch Holder Ass'y Spring Life:**

Long life: 5.1mm [.20"] max. total material joined.  
 Average life: 6.9mm [.27"] max. total material joined.

# 6.4 Tog-L-Loc Tooling

## Die Side

Note: Information provided for reference when applying Tog-L-Loc tooling. When ordering assemblies (or individual components), refer to the BTM drawing number noted in the chart for order numbers.

BTM Corporation  
300 Davis Rd.  
Marysville, MI USA  
48040  
Ph: 810-364-4567  
Fax: 810-364-6178  
www.btmcorp.com



### Die Assemblies

<b>940</b>		940M (Mini)	Standard 940	Joining Aluminum
Style "A"		710900AE	744700AE	744800AE
Short Insert		710500AE	711600AE	760400AE
Stepped Short Insert (SSI)		752100AE	751200AE	779400AE
40mm Lg. (Extension Assembly)		N/A		N/A
60mm Lg. (Extension Assembly)		PD214700B		N/A
80mm Lg. (Extension Assembly)		PD214700C		N/A
100mm Lg. (Extension Assembly)		PD214700D		N/A

**Note:** Mount SSI Die Assembly (select Die Assembly based on joining requirements) in Extension Assembly. The overall length of Extension Assembly noted in the left column (above) is the combined height of the Die Assembly and Extension.

<b>Die Holders &amp; Assemblies</b>						
<b>Die Style</b>		Ø19.05 [ .750"] Shank 50.8mm [2.000"] OAL English Mounting	Ø25.4 [1.000"] Shank 50.8mm [2.000"] OAL English Mounting	Ø20mm Shank 50.8mm [2.000"] OAL Metric Mounting	Round Holder For 60mm, 80mm & 100mm 940 Extension Assemblies	Thin Holder For 60mm, 80mm & 100mm 940 Extension Assemblies
<b>940</b>	Style "A"	---	---	---	PD214800A	PD214900A
	Short Insert	---	---	---		
<b>3B</b>	Style "A"	---	013906	---	---	---
	Short Insert	015097	---	---		

## 2B (2 Pivoting Blades)

Style "A"		---
Style "A" Combo Block		---

## 3B (3 Bladed Elastomer)

Style "A"		Standard	013907
		Aluminum	018308
Short Insert		Standard	015071
		Aluminum	018177

940 Retainer Screw Sub-Ass'y (M6)		BTM Assembly Number	
		023228	
940 Elastomer Assembly Tool		BTM Assembly Number	
		Mini 940	710500X
		Standard	711600N

### Notes:

940 Retainer Screw Sub-Assembly (M6) - BTM #023228 is not included with 940 dies and must be ordered separately.

Die holders with shank mounting have both ball lock and whistle notch flat retention.

6.4 Tog-L-Loc Requirements:  
Force Req'd = 58kN [6.5 tons] in typical mild steel application.

Maximum BD (Button Diameter) - Including tolerance:

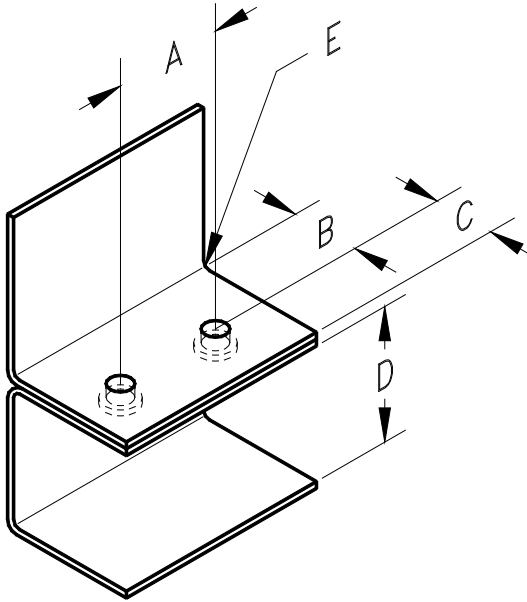
940M (Mini) = 10.2mm [.400"]

940 = 11.2mm [.440"]

3B = 12.1mm [.475"]

**TOG-L-LOC | V-LOC | LANCE-N-LOC INFORMATION**

**V-LOC STANDARD  
DIE JOINT CENTERS  
Minimum Distances**



**Notes:**

- As “E” (bend radius) increases from 0.8 [.03”], add amount of increase to “B” dimension.
- All noted dimensions are minimum values unless otherwise specified.
- If “C” dimension increases, “D” dimension may also be affected.
- \* V-LOC joints formed utilizing single point tooling.

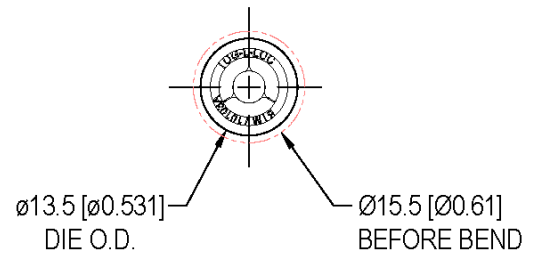
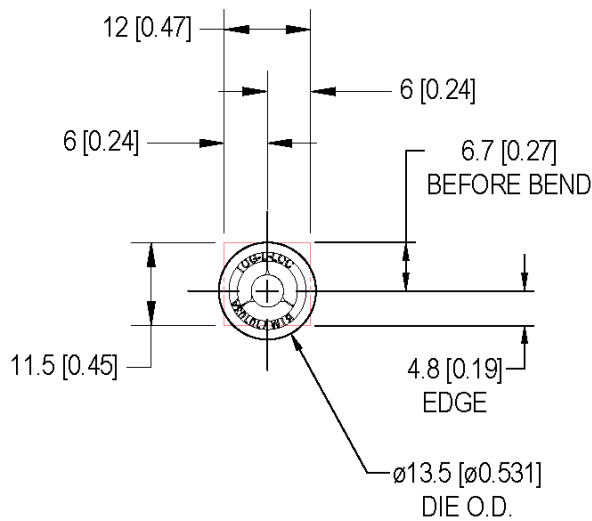
V-Loc Tool	DIM	3.8mm [.15"]	4.6mm [.18"]	5.5mm [.22"]	6.4mm [.25"]
940-SSI (Stepped Short Insert)	*A	11.4 [.45"]	13.5 [.53"]	15.9 [.62"]	18.1 [.71"]
	B	7.5 [.30"]	8.8 [.35"]	10.3 [.41"]	11.8 [.46"]
	C	4.8 [.19"]	5.6 [.22"]	6.5 [.26"]	10 [.39"]
	D	28.5 [1.12"]	28.5 [1.12"]	35.5 [1.40"]	40.0 [1.57"]
	E	0.8 [.03"]	0.8 [.03"]	0.8 [.03"]	0.8 [.03"]



**3.8 V-LOC**  
**MINIMUM DISTANCES**  
**(FOR SINGLE JOINTS)**

FLANGE  
VL-3.8-940

INSIDE BOSS  
VL-3.8-940



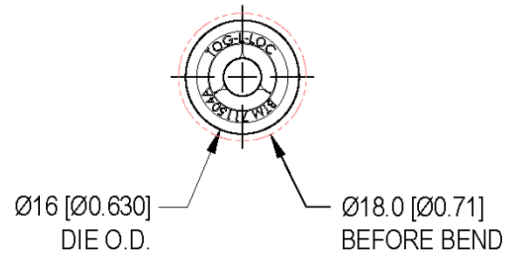
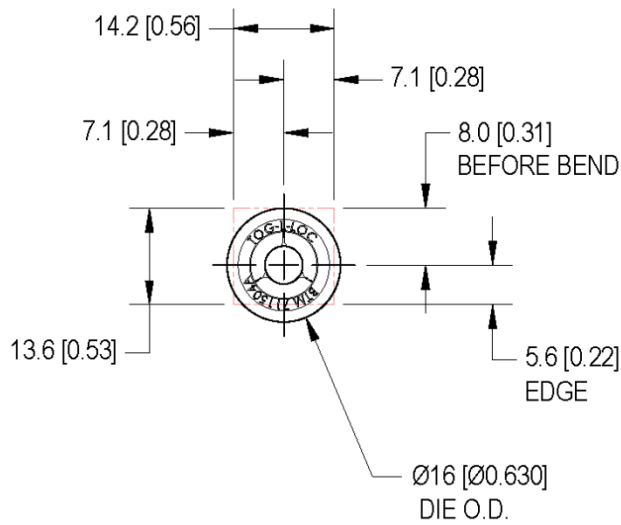
**NOTES:**

- "EDGE" NOTATION REFERS TO MINIMUM DISTANCE FROM JOINT CENTER TO EDGE OF PART.
- "BEFORE BEND" REFERS TO DISTANCE TO BEGINNING OF RADIUS ON A BENT FLANGE IF V-LOC DIE IS ON THE INSIDE OF A BEND ON THE CUSTOMER PART.

**4.6 V-LOC**  
**MINIMUM DISTANCES**  
**(FOR SINGLE JOINTS)**

FLANGE  
VL-4.6-940

INSIDE BOSS  
VL-4.6-940

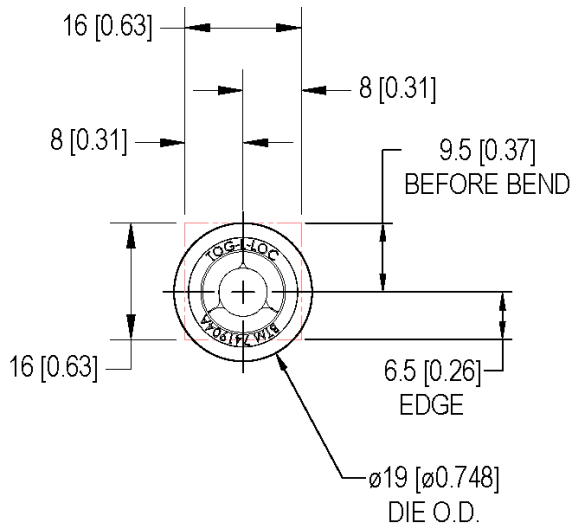


**NOTES:**

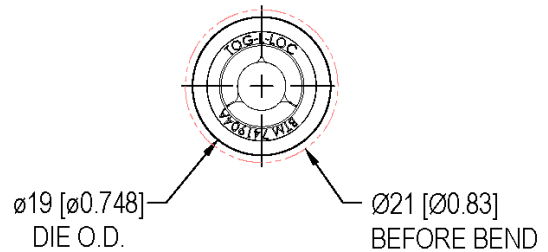
- "EDGE" NOTATION REFERS TO MINIMUM DISTANCE FROM JOINT CENTER TO EDGE OF PART.
- "BEFORE BEND" REFERS TO DISTANCE TO BEGINNING OF RADIUS ON A BENT FLANGE IF V-LOC DIE IS ON THE INSIDE OF A BEND ON THE CUSTOMER PART.

**5.5 V-LOC**  
**MINIMUM DISTANCES**  
**(FOR SINGLE JOINTS)**

**FLANGE**  
**VL-5.5-940**



**INSIDE BOSS**  
**VL-5.5-940**



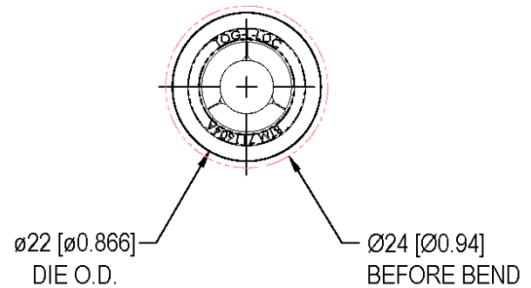
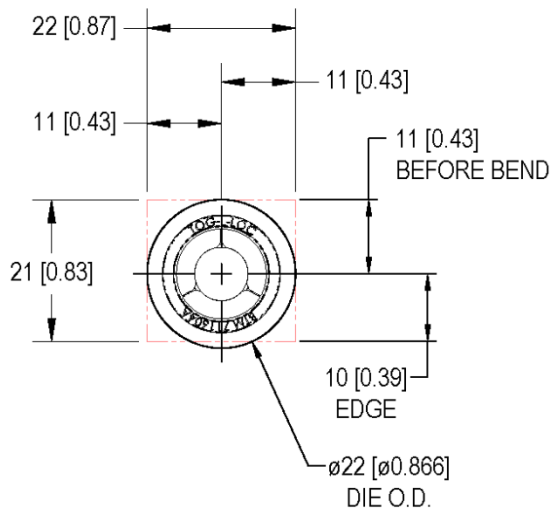
**NOTES:**

- "EDGE" NOTATION REFERS TO MINIMUM DISTANCE FROM JOINT CENTER TO EDGE OF PART.
- "BEFORE BEND" REFERS TO DISTANCE TO BEGINNING OF RADIUS ON A BENT FLANGE IF V-LOC DIE IS ON THE INSIDE OF A BEND ON THE CUSTOMER PART.

**6.4 V-LOC**  
**MINIMUM DISTANCES**  
**(FOR SINGLE JOINTS)**

**FLANGE**  
**VL-6.4-940**

**INSIDE BOSS**  
**VL-6.4-940**

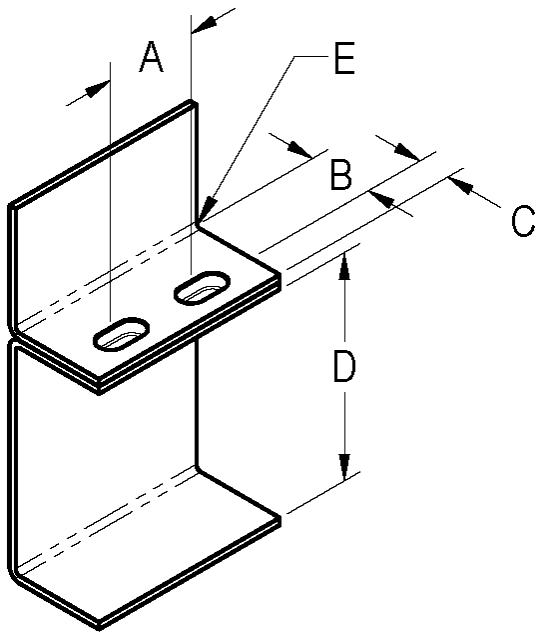


**NOTES:**

- "EDGE" NOTATION REFERS TO MINIMUM DISTANCE FROM JOINT CENTER TO EDGE OF PART.
- "BEFORE BEND" REFERS TO DISTANCE TO BEGINNING OF RADIUS ON A BENT FLANGE IF V-LOC DIE IS ON THE INSIDE OF A BEND ON THE CUSTOMER PART.

**TOG-L-LOC | V-LOC | LANCE-N-LOC INFORMATION**

**OVAL-LOC STANDARD  
DIE JOINT CENTERS  
Minimum Distances**

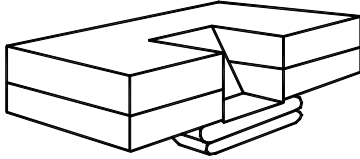


**Notes:**

- As “E” (bend radius) increases from 0.8 [.03”], add amount of increase to “B” dimension.
- All noted dimensions are minimum values unless otherwise specified.
- If “C” dimension increases, “D” dimension may also be affected.
- \* Oval-Loc joints formed utilizing single point tooling.

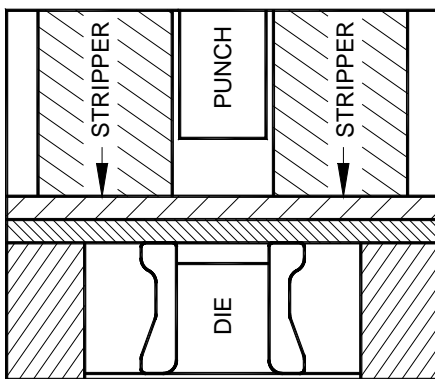
Oval-Loc Tool	DIM	3x6	4x8
940-SSI (Stepped Short Insert)	*A	14.5 [.57"]	17.5 [.69"]
	B	10.3 [.41"]	11.8 [.46"]
	C	4.0 [.16"]	5.0 [.20"]
	D	35.5 [1.40"]	40.0 [1.57"]
	E	0.8 [.03"]	0.8 [.03"]

# Lance-N-Loc



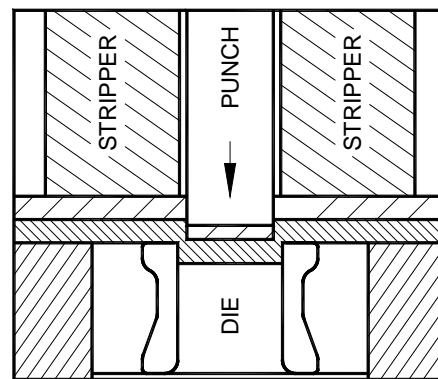
Lance-N-Loc is a rectangular joint formed by drawing the metals into a rectangular "cup" and then expanding the sides to form a lock below the bottom sheet.

## How The Joining Process Works



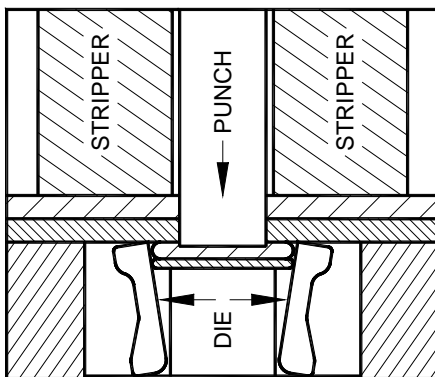
1. CLAMPS

A stripper clamps the metals between the punch and die guard.



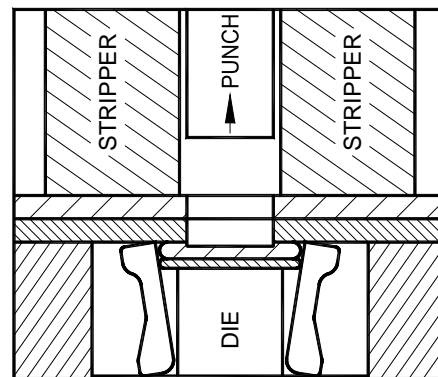
2. DRAWS

The punch shears two edges & draws the metals into the die.



3. LOCKS

The punch continues to travel, squeezing the metals.



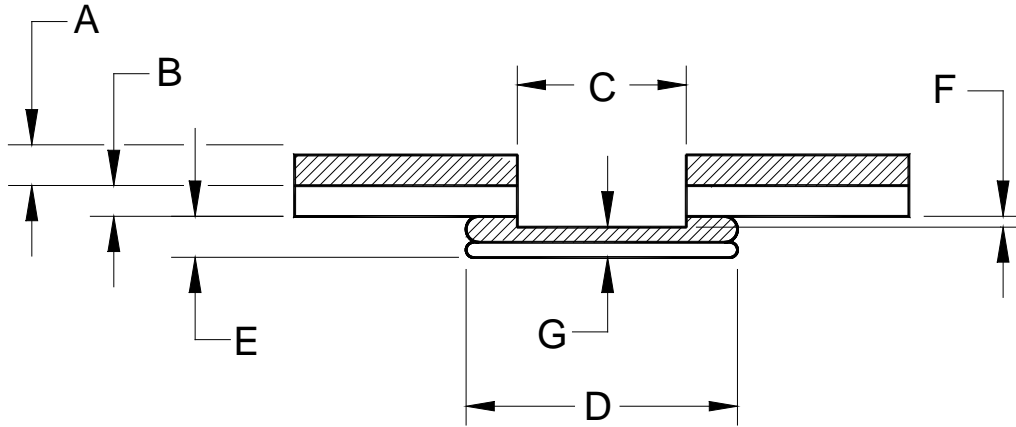
4. STRIPS

As the punch retracts, the stripper allows the punch to be removed.

The lateral flow of metal is accommodated by the patented moving (self-cleaning) die blades, forming a lock of greater width than the drawn section which accounts for the high strength of Lance-N-Loc. This entire sequence takes place in a single motion or press stroke.

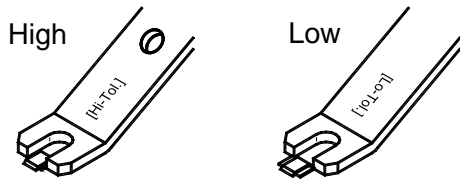
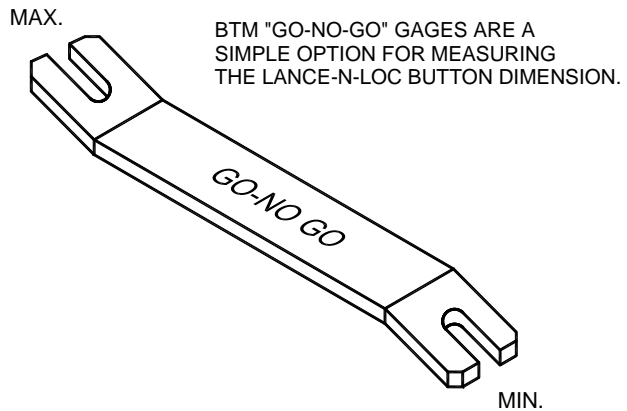
**TOG-L-LOC | V-LOC | LANCE-N-LOC INFORMATION**

**LANCE-N-LOC JOINT  
TECHNICAL DESCRIPTION**



- A** = PUNCH SIDE MATERIAL
- B** = DIE SIDE MATERIAL
- C** = JOINT SIZE (PUNCH TIP)
- D** = BUTTON DIMENSION
- E** = CAP HEIGHT
- F** = PUNCH ENTRY INTO DIE (ESTIMATED 2/3 OF ANVIL DEPTH)
- G** = CAP THICKNESS

LANCE-N-LOC JOINTS CAN BE CHECKED NON-DESTRUCTIVELY USING THIS SIMPLE GAGE. THE "BUTTON" MUST MEASURE WITHIN THE TOLERANCE OF THE GAGE.



MEASURING JOINT BUTTON DIMENSION (BD).

TOG-L-LOC | V-LOC | LANCE-N-LOC INFORMATION

**LANCE-N-LOC  
FORCE REQUIREMENTS**

JOINT SIZE	PREFERRED STRIPPER SIZE	STRIPPER CONTACT FORCE	STYLE	MATERIAL THICKNESS (STEEL)	FORCE REQUIRED	ACCEPTABLE POWER SOURCES		
						AIR	A/O	HYD.
3.0mm LL [.12"]	SS-10 YELLOW	0.89kN [200 lbs.]	ELASTOMER	0.4mm to 0.4mm [.017" to .017"]	19.5kN [4,386 lbs.]	44.5kN [5 TON] TOGGLE PRESS	44.5kN [5 TON]	Ø44.5mm [1.75"] BORE @ 170 BAR [2500PSI] MIN.
				1.9mm to 1.9mm [.074" to .074"]	29.3kN [6,578 lbs.]			
JOINT SIZE	PREFERRED STRIPPER SIZE	STRIPPER CONTACT FORCE	STYLE	MATERIAL THICKNESS (STEEL)	FORCE REQUIRED	ACCEPTABLE POWER SOURCES		
						AIR	A/O	HYD.
4.6mm LL [.18"]	SS-20 YELLOW	1.3kN [300 lbs.]	ELASTOMER	0.6mm to 0.6mm [.022" to .022"]	30.0kN [6,741 lbs.]	88.9kN [10 TON] TOGGLE PRESS	106.8kN [12 TON]	Ø82.6mm [3.25"] BORE @ 117.7 BAR [1730PSI] MIN.
				3.0mm to 3.0mm [.120" to .120"]	51.2kN [11,512 lbs.]			

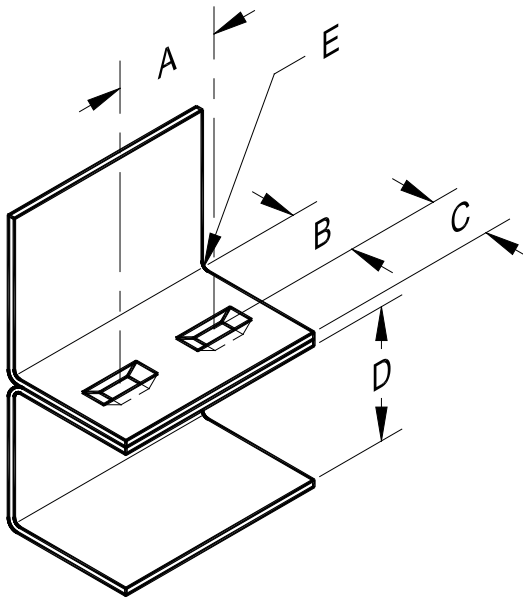
Notes:

- The chart should be used as a guide for power source selection only.
- The forces listed in the chart are based on a test conducted 10/24/00 with BTM mild steel coupons. The press was a BTM 12 Ton A/O equipped with an AccuForce system.
- Each force value is the average of 10 samples.



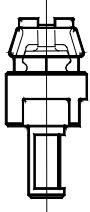
**TOG-L-LOC | V-LOC | LANCE-N-LOC INFORMATION**

**LANCE-N-LOC STANDARD  
DIE JOINT CENTERS  
Minimum Distances**



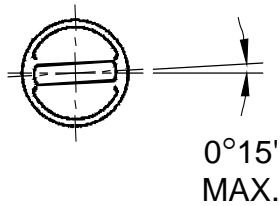
**NOTES:**

- AS "E" RADIUS INCREASES FROM .03 ADD INCREASE TO "B".
- ALL DIMENSIONS ARE MINIMUM UNLESS SPECIFIED.
- IF "C" DIMENSION INCREASES "D" COULD BE AFFECTED
- \* MAKING JOINTS WITH THESE MINIMUM DISTANCES REQUIRES A SPECIAL STRIPPER

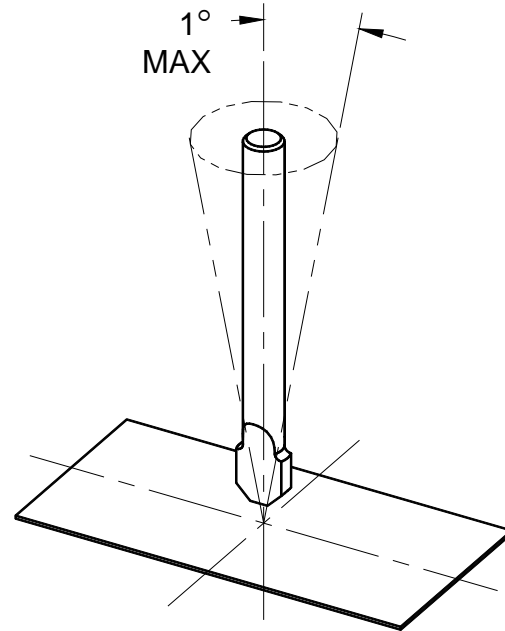
Tool	Dimension	Joint Size	
		3.0 [.12"]	4.6 [.18"]
Style "A" 2 Bladed Elastomer Die Ass'y 	*A	14.7 [.58"]	19.0 [.75"]
	B	8.1 [.32"]	10.4 [.41"]
	C	3.0 [.12"]	4.6 [.18"]
	D	35.0 [1.38"]	35.0 [1.38"]
	E	0.8 [.03"]	0.8 [.03"]

**LANCE-N-LOC  
DESIGN PARAMETERS**

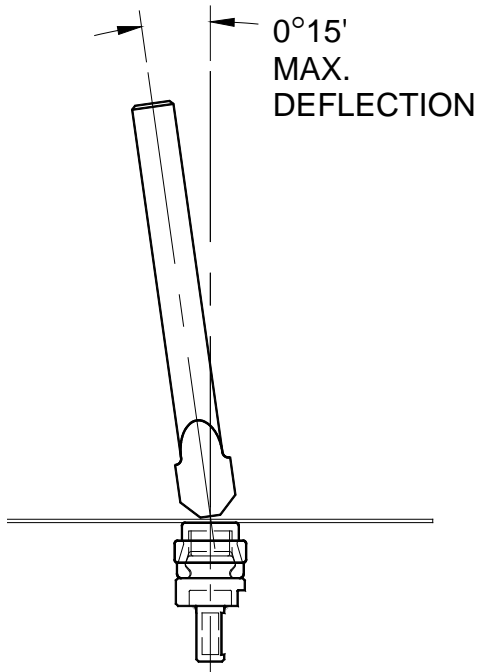
**PUNCH TO DIE  
RADIAL ORIENTATION**



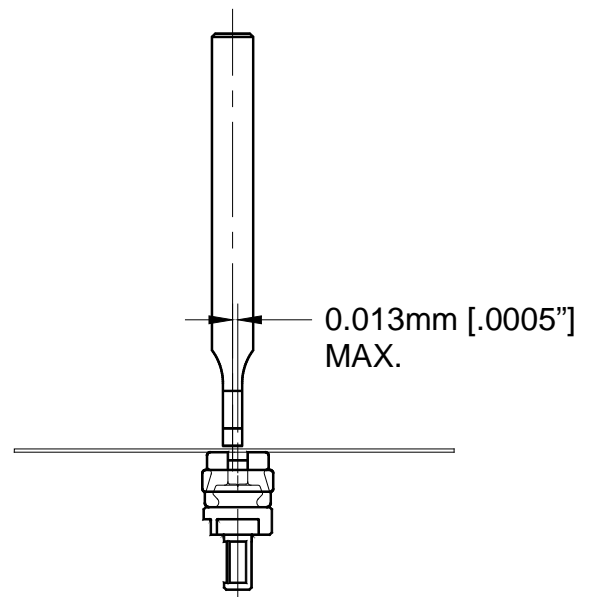
**PERPENDICULARITY  
TO WORK SURFACE**



**PUNCH TO DIE  
LINEAR ALIGNMENT**



**PUNCH TO DIE  
CONCENTRICITY**



**LANCE-N-LOC  
PUNCH INFORMATION****General Design Guidelines**

- The Punch should be guided a minimum of 28.5mm [1.12"] in the Punch Retainer.
- The location tolerance to the centerline of the Punch hole should be 0.013mm [ $\pm 0.0005$ "].
- The Ball Lock Punch mounting is preferred.
- The Punch should have some means of adjustment. A Backing Plate or set screw behind the Holder would be an example.
- The hole size and tolerance for a standard 3/8" diameter Punch would be:  
 $\text{Ø}9.525 +0.005/-0.000$  mm (or  $\text{Ø}0.3750 +.0002 /-.0000$  In.)
- The hole size and tolerance for a standard 1/2" diameter Punch would be:  
 $\text{Ø}12.700 +0.005/-0.000$  mm (or  $\text{Ø}0.5000 +.0002 /-.0000$  In.)
- The surface that the Punch seats on should be through hardened. Typically, this material is 6150 with a hardness of 50-54 on the Rockwell "C" scale.

TOG-L-LOC | V-LOC | LANCE-N-LOC INFORMATION

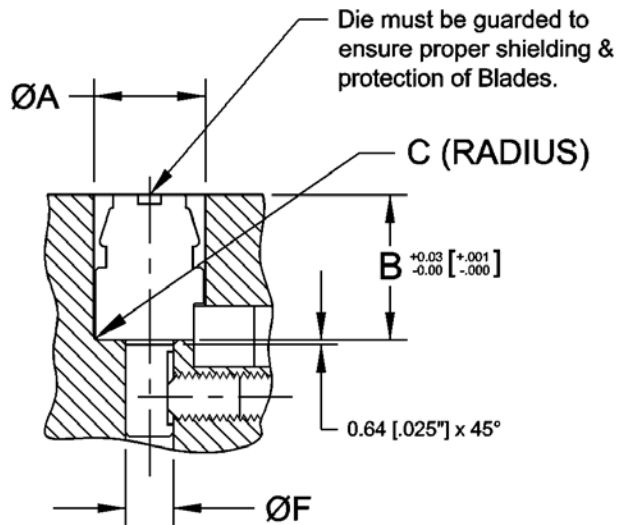
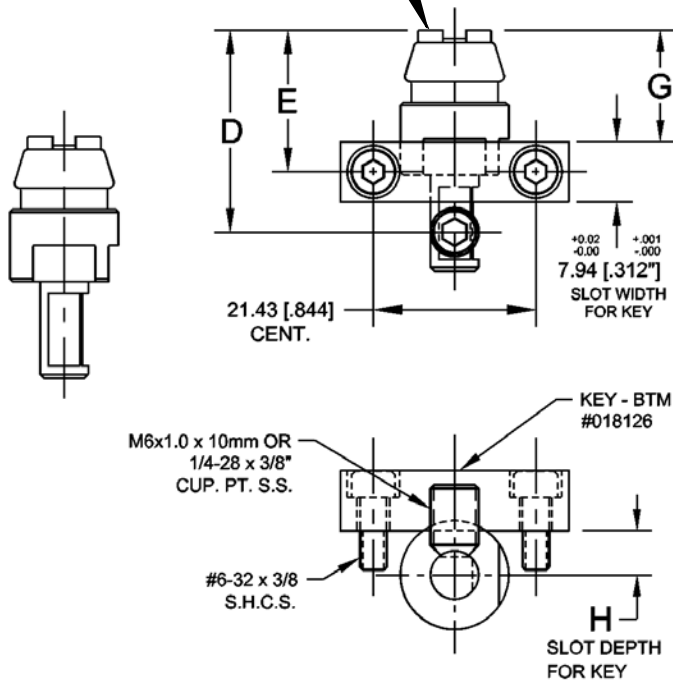
**LANCE-N-LOC DIE  
POCKET INFORMATION**

Style "A" 2 Bladed Elastomer Die Assemblies

3.0 [.12"] Lance-N-Loc - Ref. BTM Number 013797

4.6 [.18"] Lance-N-Loc - Ref. BTM Number 016380

Lance-N-Loc Assembly must be mounted in Die Block or Holder and guarded to ensure proper shielding and protection of Blades.



Die must be guarded to ensure proper shielding & protection of Blades.

	Lance-N-Loc Joint Size	
	3.0 [.12"]	4.6 [.18"]
A	14.73 [.580"]	19.05 [.750"]
B	19.10 [.752"]	19.10 [.752"]
C	0.51 [.020"]	0.64 [.025"]
D	26.59 [1.047"]	27.79 [1.094"]
E	18.64 [.734"]	19.84 [.781"]
F	6.342+0.008/-0.000 [.2497+.0003/-.0000]	6.342+0.008/-0.000 [.2497+.0003/-.0000]
G	14.68 [.578"]	15.88 [.625"]
H	5.84±0.02 [.230±.001]	6.22±0.02 [.245±.001]

**TOG-L-LOC | V-LOC | LANCE-N-LOC INFORMATION**

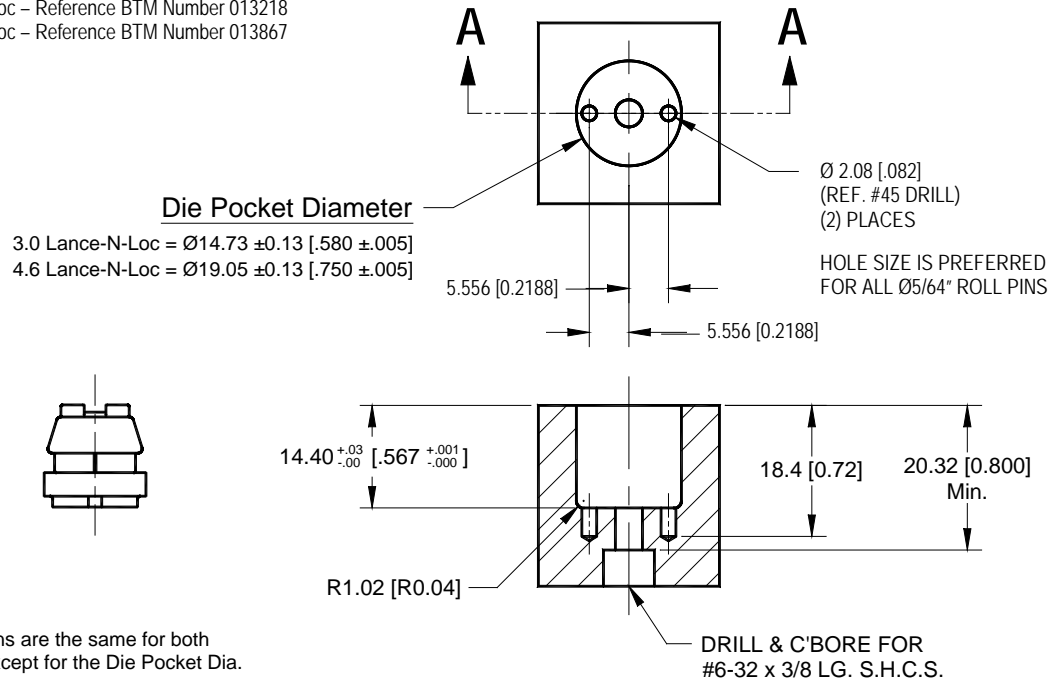
**LANCE-N-LOC DIE  
POCKET INFORMATION**

LANCE-N-LOC 2 BLADED ELASTOMER (2BE) SHORT INSERT (SI) DIE MOUNTING

FOR NOTED LANCE-N-LOC DIES WITH Ø5/64" ROLL PINS ONLY (NOT FOR 940 DIE ASSEMBLIES)

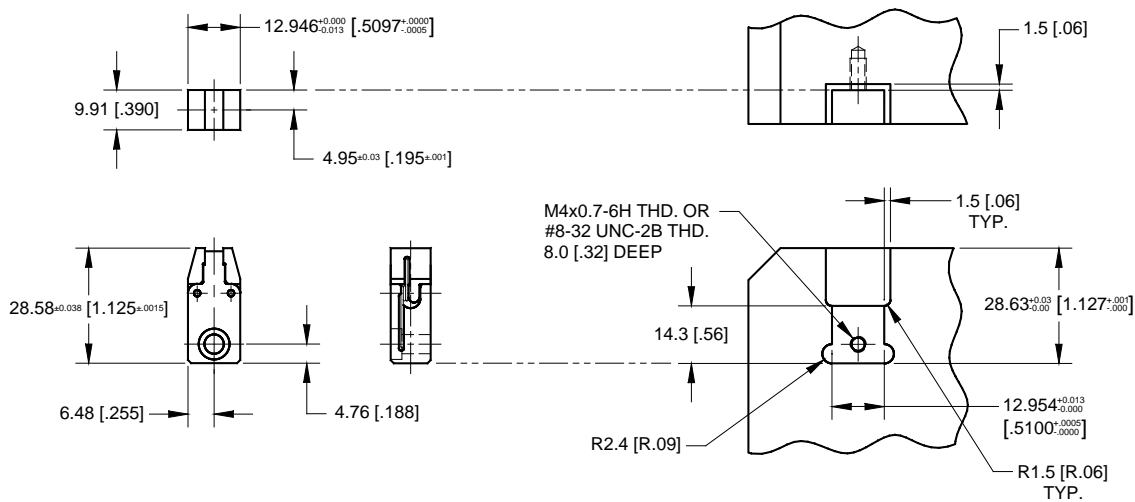
3.0 Lance-N-Loc – Reference BTM Number 013218

4.6 Lance-N-Loc – Reference BTM Number 013867



Note:  
 All dimensions are the same for both  
 joint sizes except for the Die Pocket Dia.

Style "A" Combo Block Die Set Up



Style "A" Combo Block Die Assemblies

3.0 [.12"] Lance-N-Loc - Ref. BTM Number 013781  
 4.6 [.18"] Lance-N-Loc - Ref. BTM Number 013847

2 bladed dies require a clearance pocket for the blades to open freely.  
 The location tolerance to the centerline of die should be  $\pm 0.13$  [.0005"]  
 A hardened die block is required; preferably a minimum of 4150HT steel.

TOG-L-LOC | V-LOC | LANCE-N-LOC INFORMATION

**LANCE-N-LOC DIE  
POCKET INFORMATION**

**940 LANCE-N-LOC "SSI" (STEPPED SHORT INSERT) DIE MOUNTING  
FOR NOTED LANCE-N-LOC DIES WITH Ø2mm ROLL PIN ONLY**

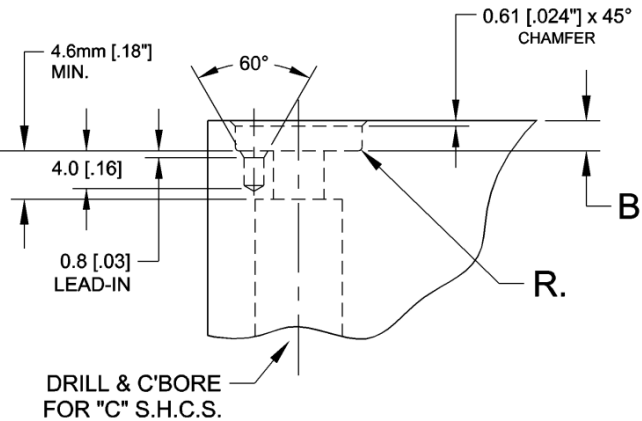
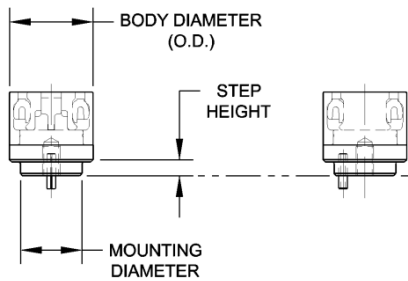
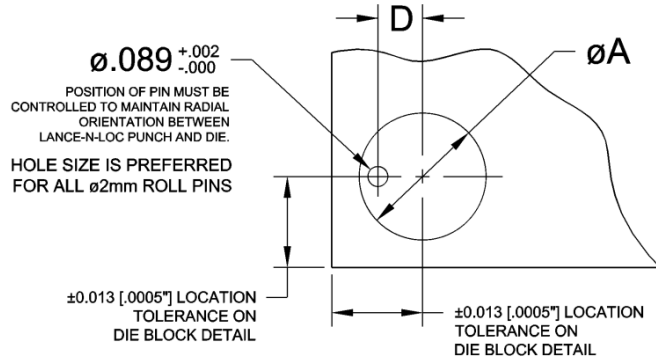
REF. DIE NUMBERS:

**940 DIE ASSEMBLIES**

- 4.6 LANCE-N-LOC: PD265000AE
- 5.5 LANCE-N-LOC: PD267500AE

NOTE:

NOT ALL DIES NOTED ABOVE ARE "BTM STANDARD." VERIFY AVAILABILITY WITH BTM USA PRIOR TO DESIGNING INTO LANCE-N-LOC JOINING APPLICATION.



**LANCE-N-LOC 940 SSI DIE MOUNTING**

DIE BLOCK MATERIAL - 6150  
DIE BLOCK HARDNESS - Rc 50-54

940 LANCE-N-LOC DIES					
	3.0 Lance-N-Loc	3.8 Lance-N-Loc	4.6 Lance-N-Loc	5.5 Lance-N-Loc	6.4 Lance-N-Loc
<b>A</b>	---	---	Ø14H6 [.5512 <sup>+.0004</sup> / <sub>-.0000</sub> ]	Ø18H6 [.7087 <sup>+.0005</sup> / <sub>-.0000</sub> ]	---
<b>B</b>	---	---	2.84 ±0.13 [.112 ±.005]	3.84 ±0.13 [.151 ±.005]	---
<b>C</b>	---	---	M4x0.7	M4x0.7	---
<b>D</b>	---	---	5.000±0.013 [.1969±.0005]	6.500±0.013 [.2559±.0005]	---
<b>R</b>	---	---	R0.33 ±0.13 [.013 ±.005]	R0.33 ±0.13 [.013 ±.005]	---

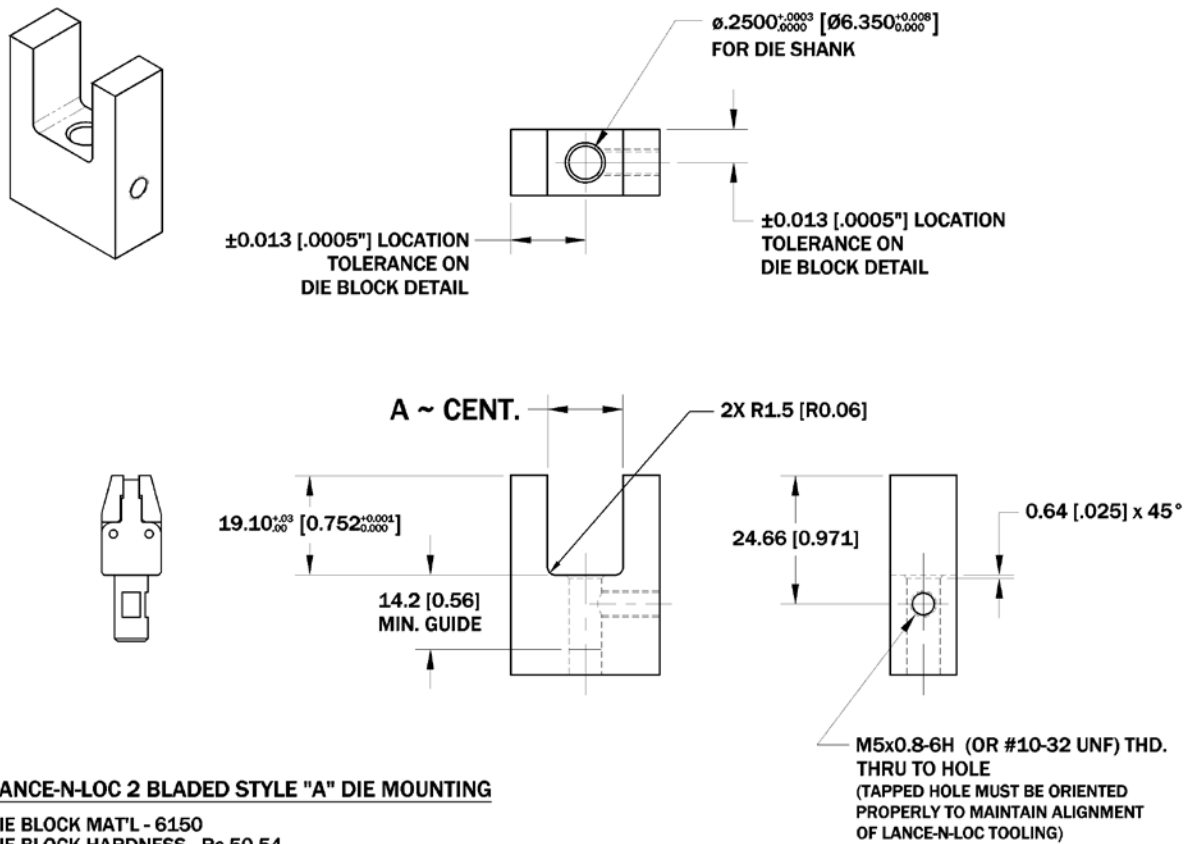
NOTES: ENGINEERING GUIDE PROVIDES DIE MOUNTING DIMENSIONS AND REFERENCE SPECS ONLY. DESIGN OF REMAINDER OF DIE BLOCK IS BASED ON INDIVIDUAL CUSTOMER APPLICATION.

TOG-L-LOC | V-LOC | LANCE-N-LOC INFORMATION

**LANCE-N-LOC DIE  
POCKET INFORMATION**

2 Bladed Lance-N-Loc Style "A" Die Assembly

- 2 Bladed Die Assemblies must be mounted in a pocket that provides shielding and protection (for Die Blades) along with sufficient clearance for Blades to open freely as Lance-N-Loc joint button is formed.
- The locational tolerance to the centerline of Die should be  $\pm 0.013$  [".0005"].
- A hardened Die Block or Anvil must be used (see specification below).
- All Lance-N-Loc design parameters, previously noted, must be met or exceeded when applying tooling.
- Style "A" Die Pocket dimensions are shown below.



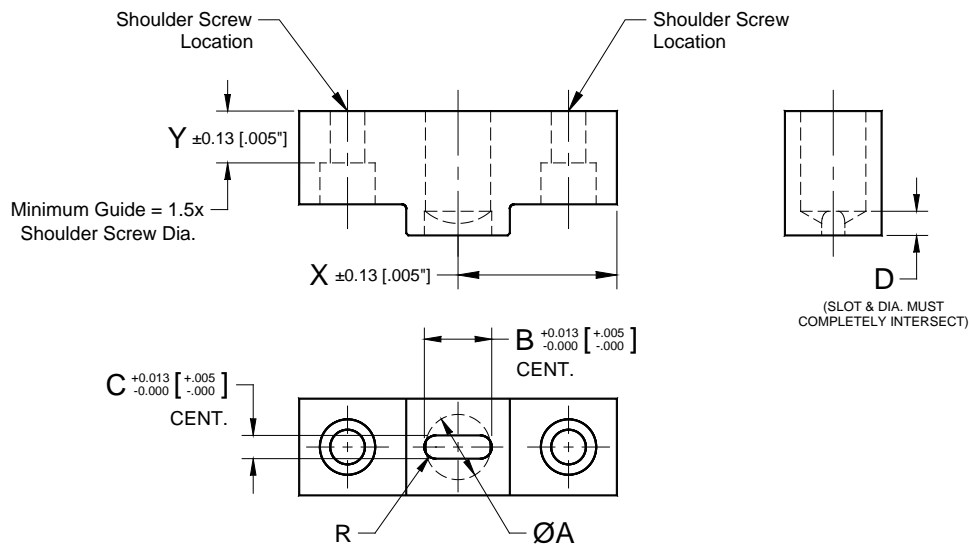
JOINT SIZE	REF. ASSEMBLY NO.	"A" DIMENSION
3.0 LANCE-N-LOC	000699	.57 <sup>+0.02</sup> / <sub>-0.00</sub> [14.5 <sup>+0.5</sup> / <sub>-0.0</sub> ]
4.6 LANCE-N-LOC	001277	.60 <sup>+0.02</sup> / <sub>-0.00</sub> [15.2 <sup>+0.5</sup> / <sub>-0.0</sub> ]

**NOTE:**  
DRAWING PROVIDES DIE MOUNTING DIMENSIONS AND SPECIFICATIONS ONLY. DESIGN OF REMAINDER OF DIE BLOCK IS BASED ON INDIVIDUAL CUSTOMER APPLICATION.

TOG-L-LOC | V-LOC | LANCE-N-LOC INFORMATION

**LANCE-N-LOC  
STRIPPER INFORMATION**

- Strippers should be made of 6150 steel, with a Rockwell hardness of Rc 50-54.
- Contact Force is measured when the Lance-N-Loc Punch contacts the work piece.
- The recommended Stripper contact force for 3.0 [.12"] LL is 0.89kN [200lbs] per joint.
- The recommended Stripper contact force for 4.6 [.18"] LL is 1.3kN [300lbs] per joint.
- The recommended Stripper contact force for 6.4 [.25"] LL is 3.3kN [750lbs] per joint.
- The location tolerance to the centerline of the Punch clearance hole(s) should be  $\pm 0.13$  [.005"].
- The location tolerance to the centerline of the Shoulder Screws should be  $\pm 0.013$  [.0005"].
- The basic dimensions for Strippers are shown below.
- When using round tip Strippers, tip diameter should be larger than the Die pocket diameter.
- The tolerance on Shoulder Screw holes can be found on the Shoulder Screw Dimensions & Tolerances page in this section.



Note: See chart for A, B, C and D dimensions. X and Y dimensions determined per application.

Punch Size	A	B	C	D
3.0mm [.12"]	Ø15.1 [19/32"]	14.99 [.590"]	3.81 [.150"]	6.1 [.24"]
4.6mm [.18"]	Ø15.1 [19/32"]	14.99 [.590"]	5.33 [.210"]	5.6 [.22"]