ROLL-KRAFT®

ON-TIME DELIVERY. FIRST-TIME PERFORMANCE.

TUBE, PIPE & ROLL FORMING TOOLING | TRAINING

CUSTOMER TOOLING SETUP MANUAL

PERFORMANCE IT'S RIGHT ROLL-KRAFT OR IT'S ON US GUARANTEE

On-Time Delivery. First-Time Performance.

Thank you for choosing Roll-Kraft for your tooling needs. We are committed to delivering your product on the agreed upon delivery date. While we understand that, on rare occasions, circumstances may prevent on-time delivery, we are dedicated to doing our best to never miss a delivery date request. Be assured that even with our already ***98% on-time delivery performance*** rate, we are in constant pursuit of improving this number.

Roll-Kraft is very proud that over the past two years, we have achieved an industry-leading ***97% first-time performance*** rate right out-of-the-box for our customers. To help ensure our product achieves first-time performance for you, we have provided information from our engineering and technical teams to guarantee our product will perform to your expectations.

Roll-Kraft is dedicated and committed to improving these already industry-leading averages, allowing our customers to ***experience first-time performance and on-time delivery rates unmatched by any competitor in the industry.***

In this package, you'll find:

- ***Standard Operating Procedures*** – A step-by-step guide for best results.
- ***Setup Chart for your Tube and Pipe Tooling*** – Our engineers have created your setup chart based on our years of experience to achieve desired outcome of your tooling in shortest possible time.
- ***Drawings*** – All of your drawing records for your tooling.

We hope that you find the contents of this package valuable, and that it helps you get your new tooling up and running in the most efficient manner possible.

If you have any questions, please do not hesitate to call us directly at 888-953-9400 and a live operator will direct your call to the appropriate party to get you a quick answer. Alternatively, visit roll-kraft.com for a full archive of technical resources including articles and videos. You'll also have access to our Ask the Doctor feature for fast responses to any technical question you may have.

Thank you again for choosing Roll-Kraft and we look forward to serving your tooling needs in the future.

Sincerely,

Chuck Gehrisch
Chairman & CEO
Roll-Kraft

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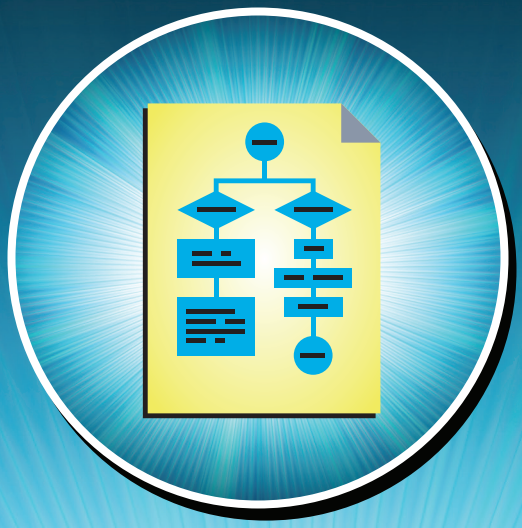
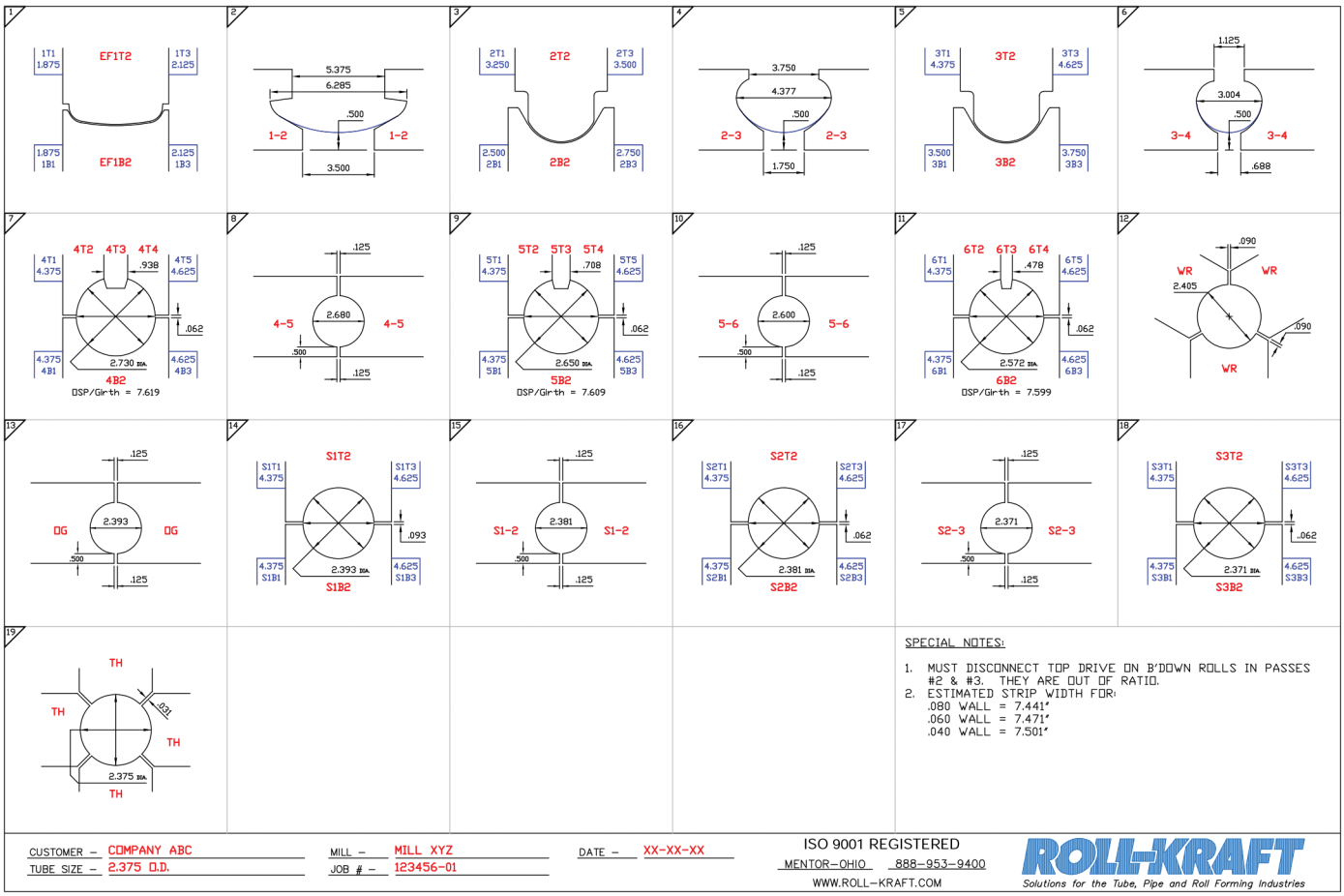


STANDARD OPERATING PROCEDURES

Tube & Pipe Setup Package Setup sequence

1) Obtain a setup chart and/or roll tooling drawings for the job.



2) Thoroughly read the shop order to determine what is needed to complete the order.
3) Inform the tooling department of the appropriate roll tooling (and cutoff jaws) that are needed.
4) Check the availability of the material needed for the job.
5) The assumption at this stage is that the integrity and the alignment of the mill are good.

- If not, please visit the Roll-Kraft website for information on maintaining your mill
- https://www.roll-kraft.com/
- https://www.roll-kraft.com/performance-services/roll-kraft-resources/e-books/

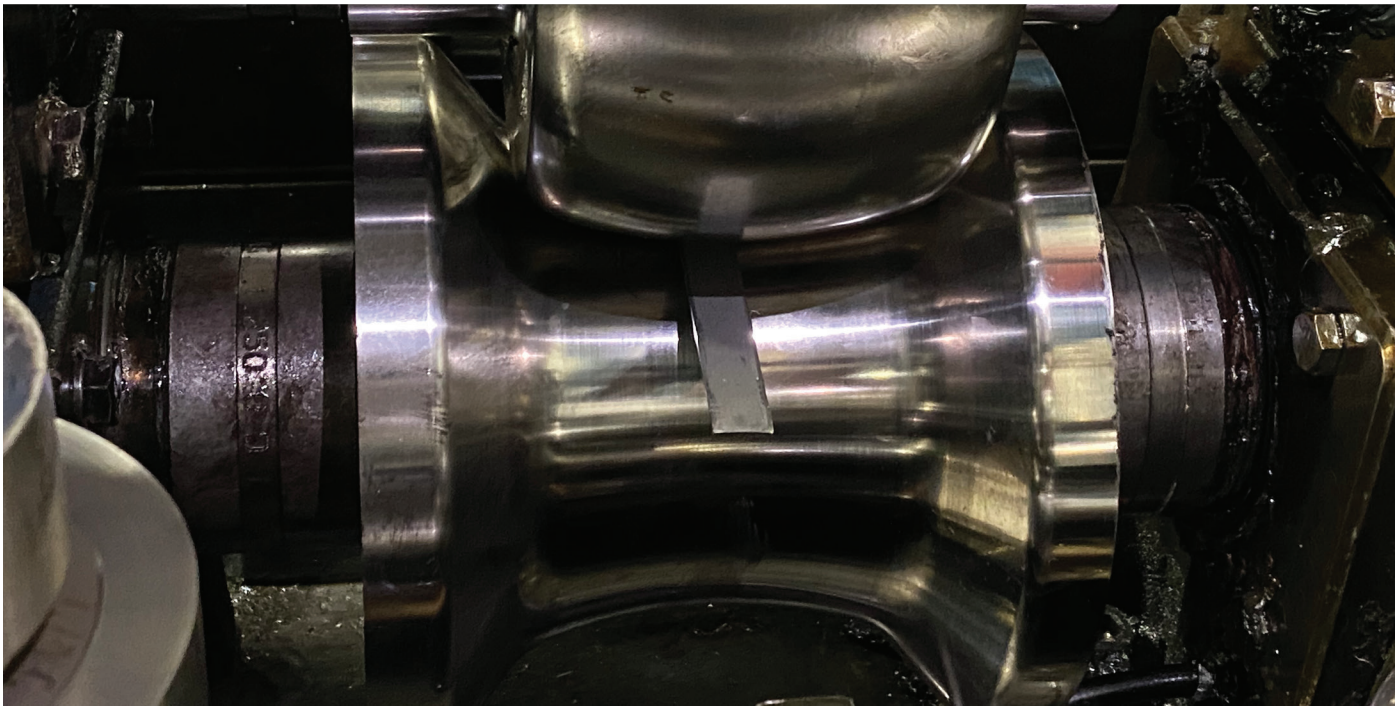
PRE-GAPPING AND SETUP

Pre-gap the rolls on the mill using the setup chart as reference.

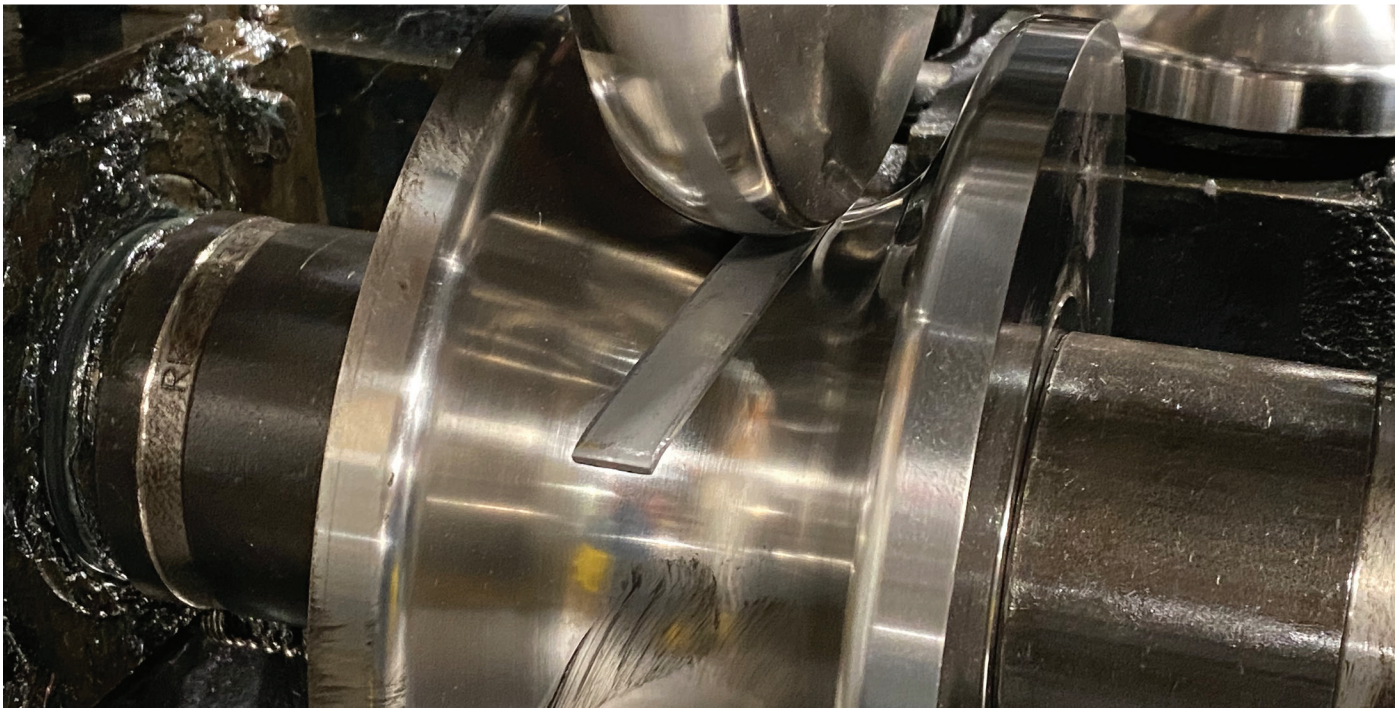
- Driven breakdown passes
- Cut a coupon from the material to be run. Clean up the edges and use this coupon to adjust (preset) the gap between the top and bottom rolls.

STANDARD OPERATING PROCEDURES

PRE-GAPPING BREAKDOWN ROLLS WITH SAMPLE PIECE OF MATERIAL.



POSITION MATERIAL IN CENTER (DRIVE POINT).



STANDARD OPERATING PROCEDURES

DRIVEN FIN PASSES:

- Use feeler gauge to set the proper rim gap listed on the setup chart (check inboard and outboard side to verify top and bottom rolls are parallel). A straight edge is another tool to verify the rolls are parallel.

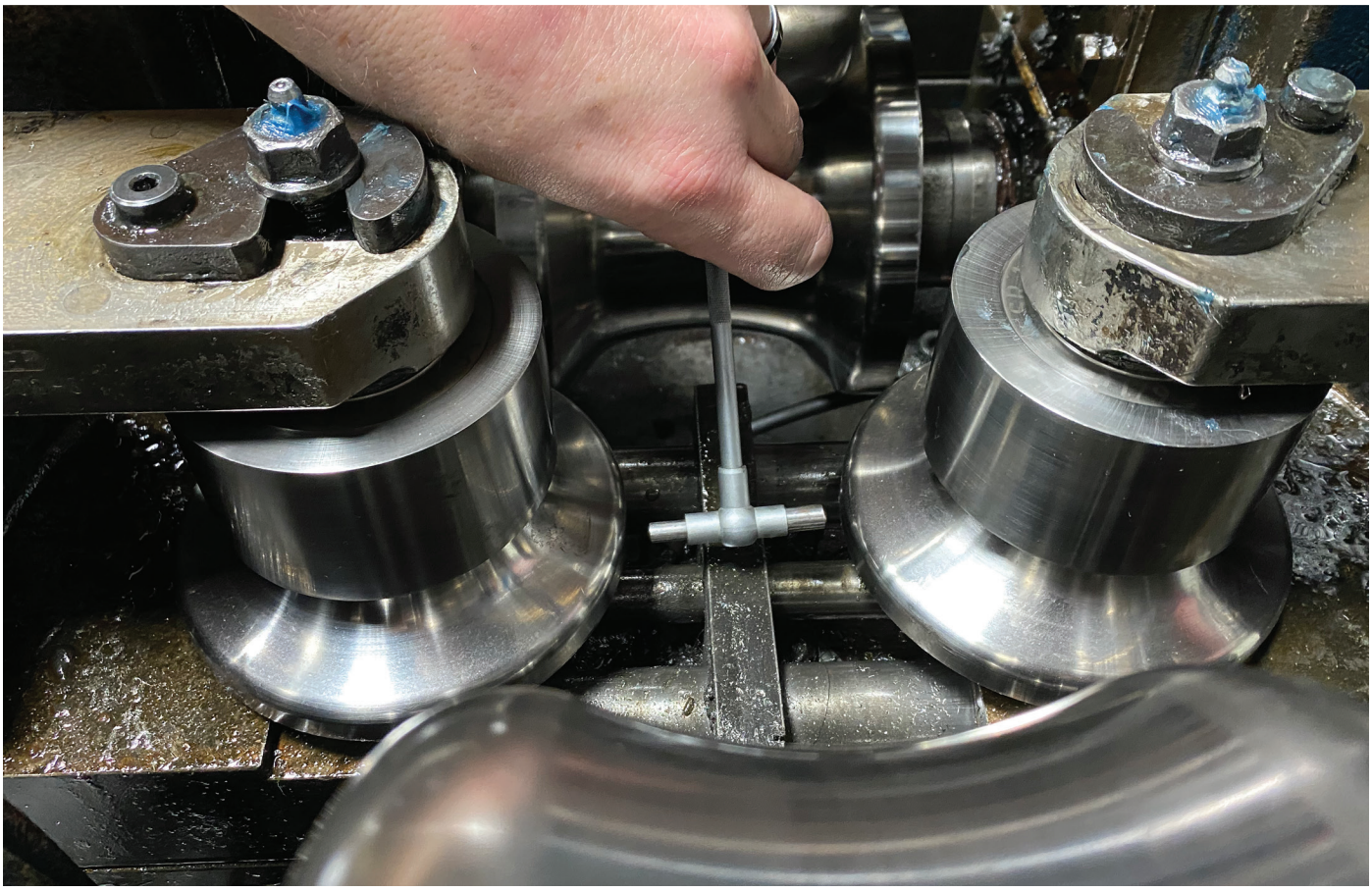
DRIVEN SIZING PASSES:

- Use feeler gauge to set the proper rim gap listed on the setup chart (check inboard and outboard side to verify top and bottom rolls are parallel). A straight edge is another tool to verify the rolls are parallel.

SIDE ROLL PASSES:

- For wider rim gaps such as in the breakdown section, set a pair of calipers to the rim gap dimension listed on the setup chart and then take a telescoping gauge and snap it to the dimension you've set on the calipers. You can then use your telescoping gauge as a gapping tool to pre-gap the rim clearance on a particular pass. Repeat this process for the remaining side passes with wider rim gaps. For narrower rim gaps, use a feeler gauge to pre-gap each of the side passes to the figures on the setup chart.

SETTING WIDE RIM CLEARANCES WITH TELESCOPING GAUGES.



STANDARD OPERATING PROCEDURES

WELD BOX:

- For 2-, 3-, and 4-roll weld box configurations, it's best to use a plug gauge (if available) to set the weld rolls. The O.D. of this plug gauge should match the welded tube size listed on the setup chart. Using a plug gauge also allows you to set the weld rolls under load removing any backlash and should make for little or no adjustment when final sizing the tube at the weld box. It also makes it easy to see if the contours of the rolls match the plug indicating proper roll alignment and condition of the weld rolls.

- After setting the weld rolls with the plug gauge, check the rim clearances per the setup chart. They should be equal and uniform.

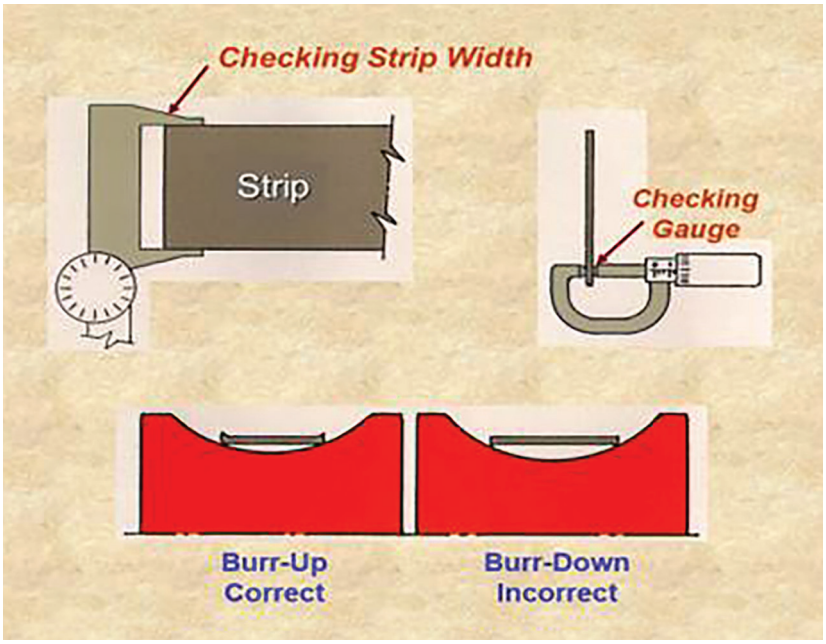
- If a plug gauge is not available, a feeler gauge can be used to set the rim gaps called out on the setup chart. Some additional adjustment may be required when final sizing the weld box using this method.

TURKS HEAD:

- It is best to use a plug gauge (if available) to set the Turks head rolls. In a round application, the O.D. of this gauge should be the same as the final tube dimension found on the setup chart coming out of the last driven sizing station. In multiple Turks heads that are used for final forming of shapes, make a plug gauge to match that of the shape outlined in the setup chart for each location. Using a plug gauge also allows you to set the Turks head rolls under load removing any backlash and should make for little or no adjustment when the tube exits the (each) Turks head.

- After setting the rolls with the plug gauge, check the rim clearances per the setup chart. They should be equal and uniform.

- If a plug gauge is not available, a feeler gauge can be used to set the rim gaps called out on the setup chart; however, some additional adjustment may be required using this method.



THREADING THE MILL

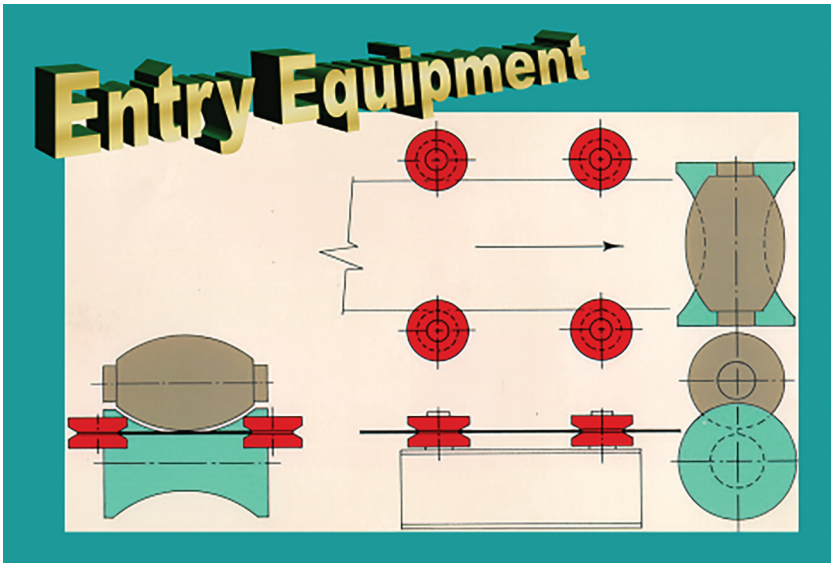
- Check to make sure the strip is correct in width and thickness before threading the mill using an appropriate measuring device (ex. calipers and micrometers). Strip wants to be presented "burr up" entering the first breakdown pass.

- Taper the leading end of the strip using an appropriate cutting device based on the thickness and type of material (ex., tin snips for light wall, abrasive grinding wheel for heavy wall or high tensile strength materials). Tapering the strip allows for the end of the strip to be pulled in by the drive point of the breakdown rolls. It also creates a taper effect on top of the tube for a nice lead-in going into the fin section, weld box, and sizing section.

TAPER END OF STRIP FOR EASY THREADING OF MATERIAL.

- Thread the strip into the entry table guide rolls and right up to the first breakdown roll. The point of the taper will pull the strip right into the breakdowns as you jog the mill forward.

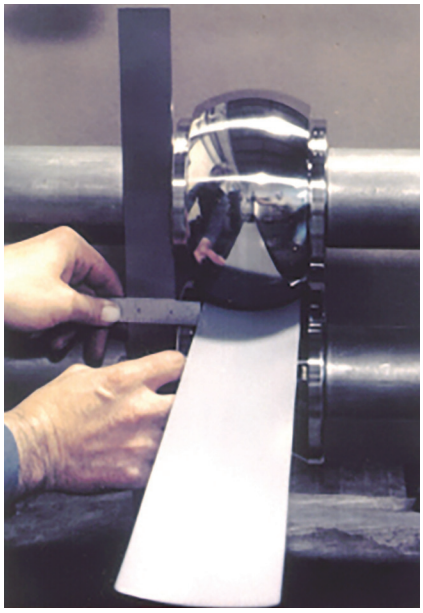
STANDARD OPERATING PROCEDURES

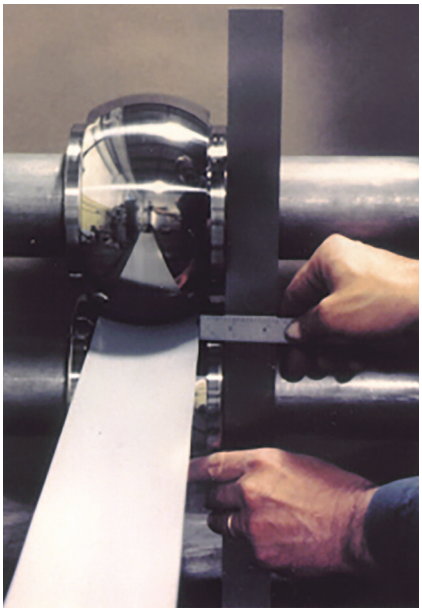


- Once the strip is through the first breakdown, you need to check the entry guide table to make sure that the material is centered to the first breakdown pass.

- In most cases you can visually see if the strip is centered or not, but a sure way to verify this, especially for smaller, narrower strip widths, is by measuring from the strip edge to the face of the bottom roll on both the inboard and outboard side of the first breakdown pass. The measurements should be equal. If not, make the appropriate adjustments to the entry guide rolls.

CHECKING CENTERING OF STRIP BEFORE ENTERING FIRST BREAKDOWN.
LEFT SIDE MEASUREMENT SHOULD BE THE SAME AS THE RIGHT SIDE MEASUREMENT.

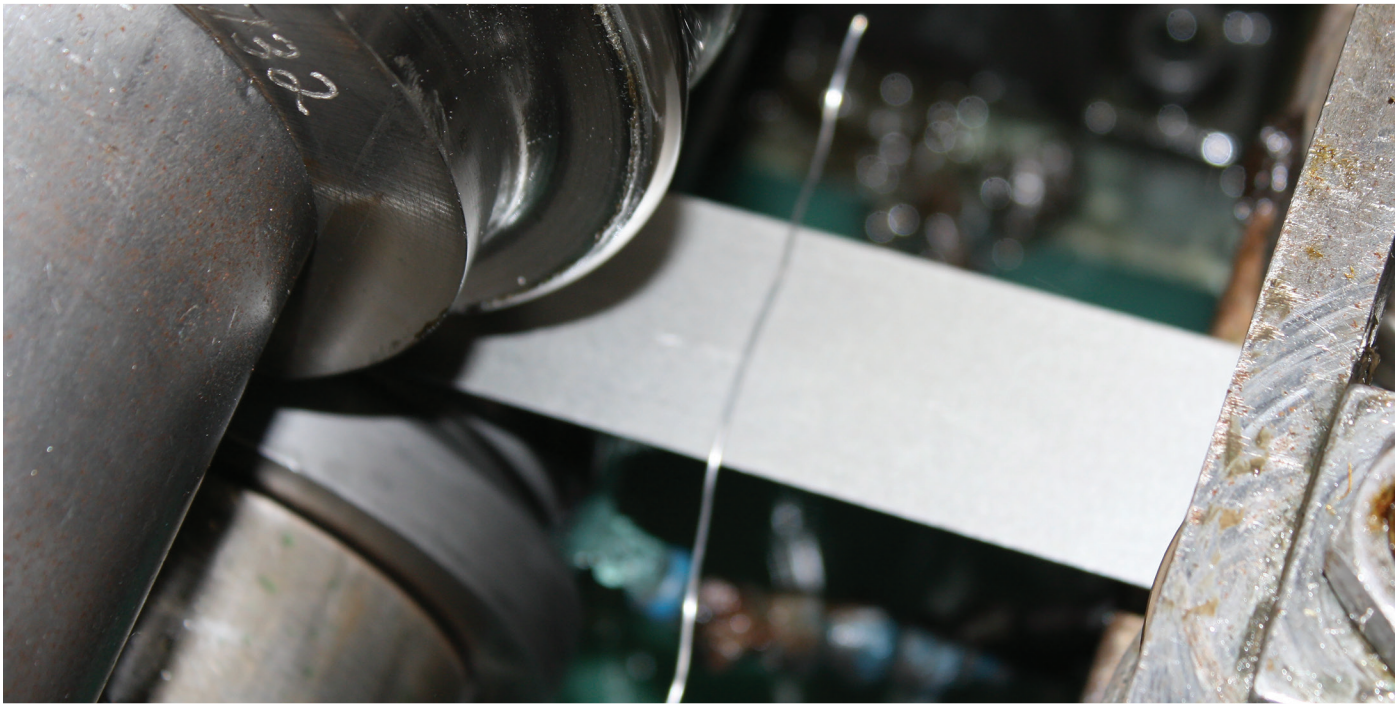




- Do a progressive setup. This means jog the material through the first driven breakdown, through the first set of side rolls (if your mill configuration has side passes), and into the second driven breakdown and stop. Starting at this point to make your first setup checks (instead of threading strip through the entire mill first) will help avoid marking of the strip and tooling and save on wasted material.
- Check/validate pressure settings on the breakdowns using solder.
    - Lay a piece of solder (use .015” to .020” thick) on top of the strip in front of the first driven breakdown pass and then jog it through the pass.

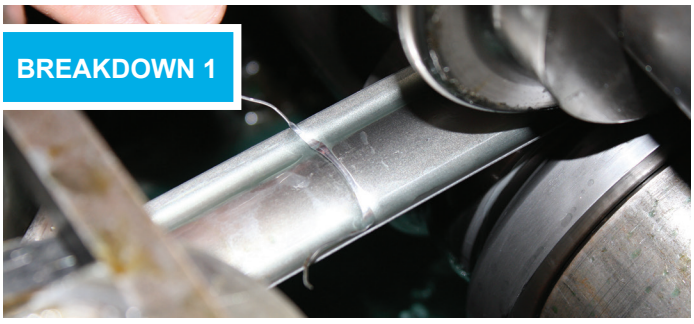
STANDARD OPERATING PROCEDURES

PLACE THE SOLDER ACROSS THE STRIP, JUST BEFORE EACH BREAKDOWN PASS, AND JOG THROUGH THE MILL.

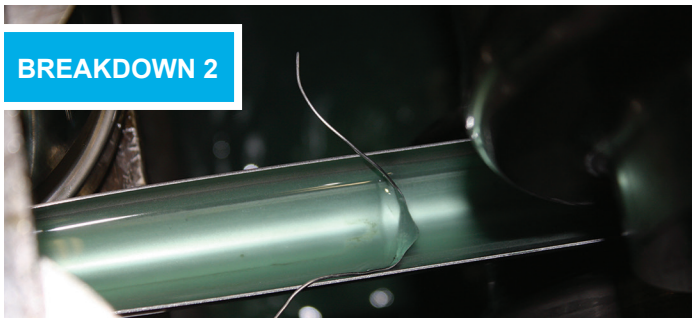


THE SOLDER VALIDATES THE OPERATOR'S "FEEL" (PRESSURE ADJUSTMENT) FOR EACH BREAKDOWN STAND.

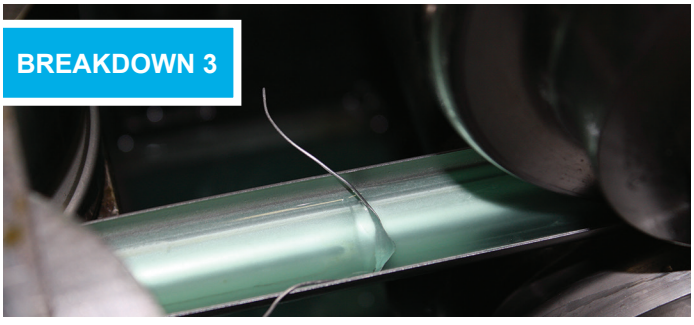
BREAKDOWN 1



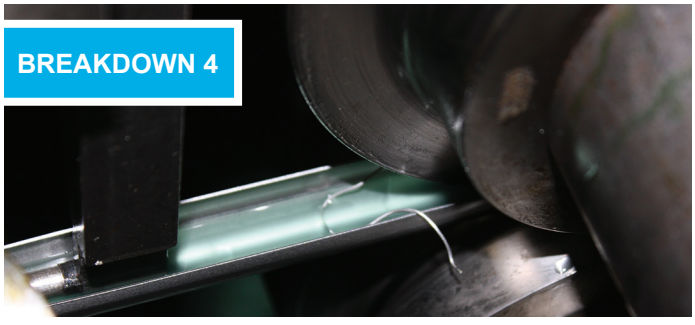
BREAKDOWN 2



BREAKDOWN 3



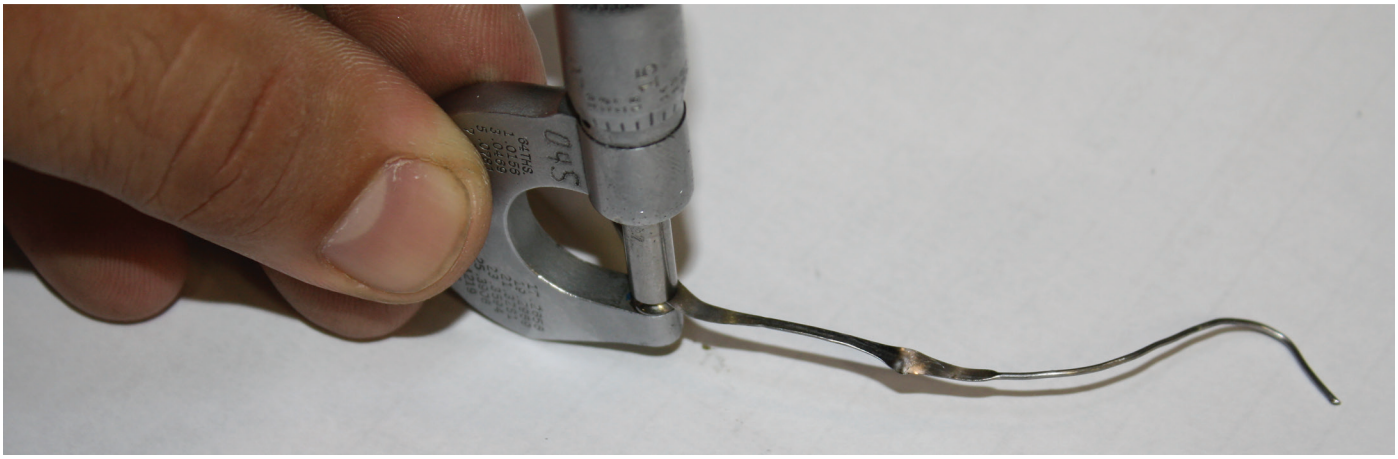
BREAKDOWN 4



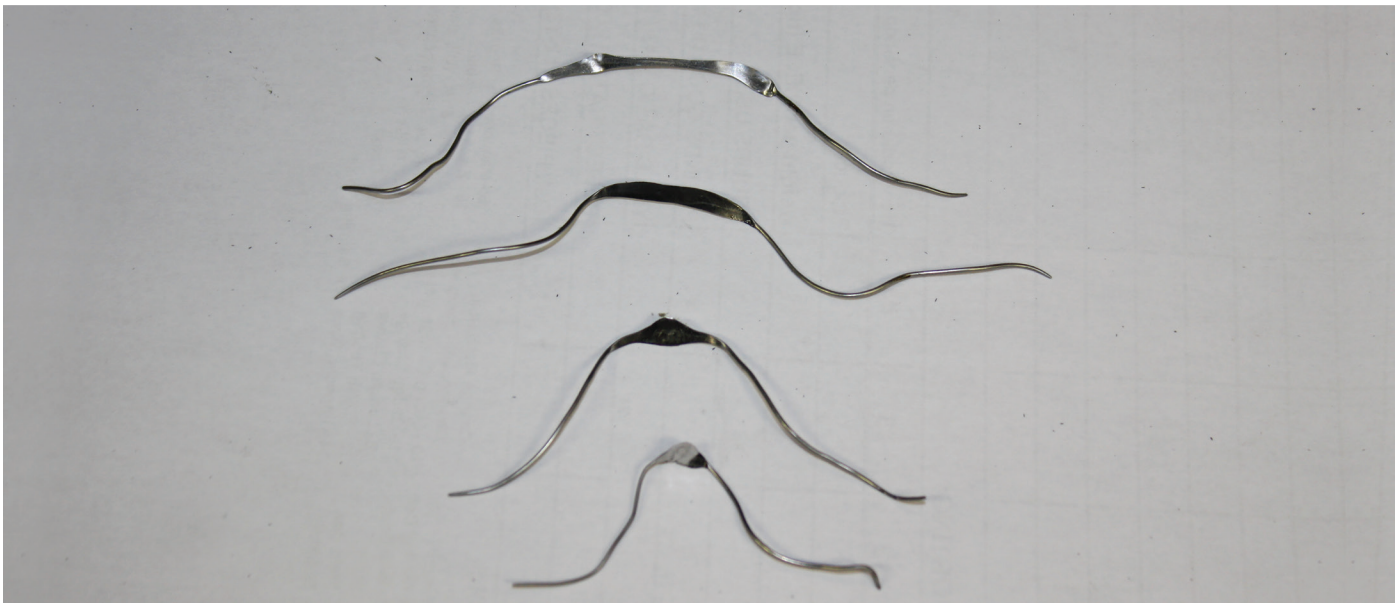
- Use a ball end micrometer to measure in the center of the thinnest/widest part of the solder (which would be the throat (drive point) of the roll). Target measurement: approximately .003” to .005” thickness. If too thick or too thin, make the appropriate adjustment to the breakdown pass to obtain the correct setting. Mic the inboard and outboard side as well as this can tell you if you have an alignment or shaft parallelism issue (the outside measurements could be slightly larger due to clearances built into the rolls.) This will be the standard and repeated on the remaining driven breakdown passes. This will allow for consistent setup, validating the operator’s adjustment and ensuring predictable strip growth (girth) every time regardless of who sets up the mill.

THINNING OF SOLDER SHOULD BE EQUAL ON BOTH SIDES. IF NOT, THE CAUSE COULD BE THAT THE TOP SHAFT OR SHOULDER ALIGNMENT IS NOT PARALLEL.

MEASURE THE THINNEST (WIDEST PART OF THE SOLDER) OUT OF EACH PASS AND DOCUMENT.

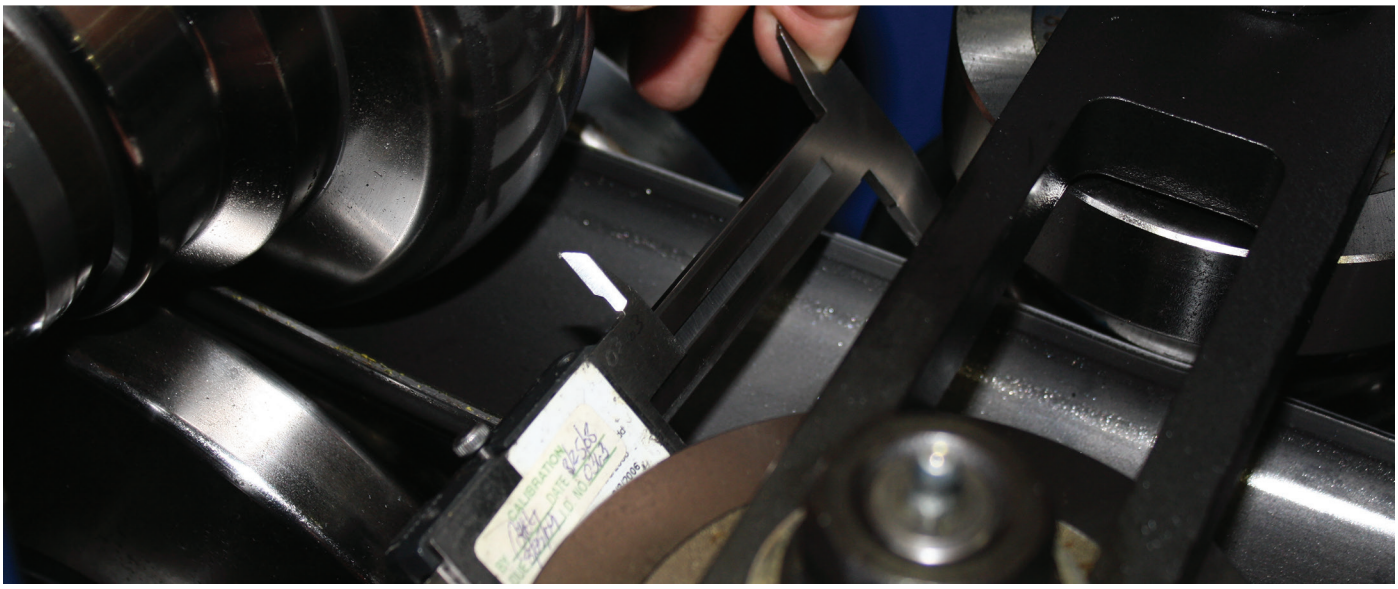


THE THINNEST POINT IN ALL BREAKDOWN PASSES SHOULD BE THE SAME THICKNESS

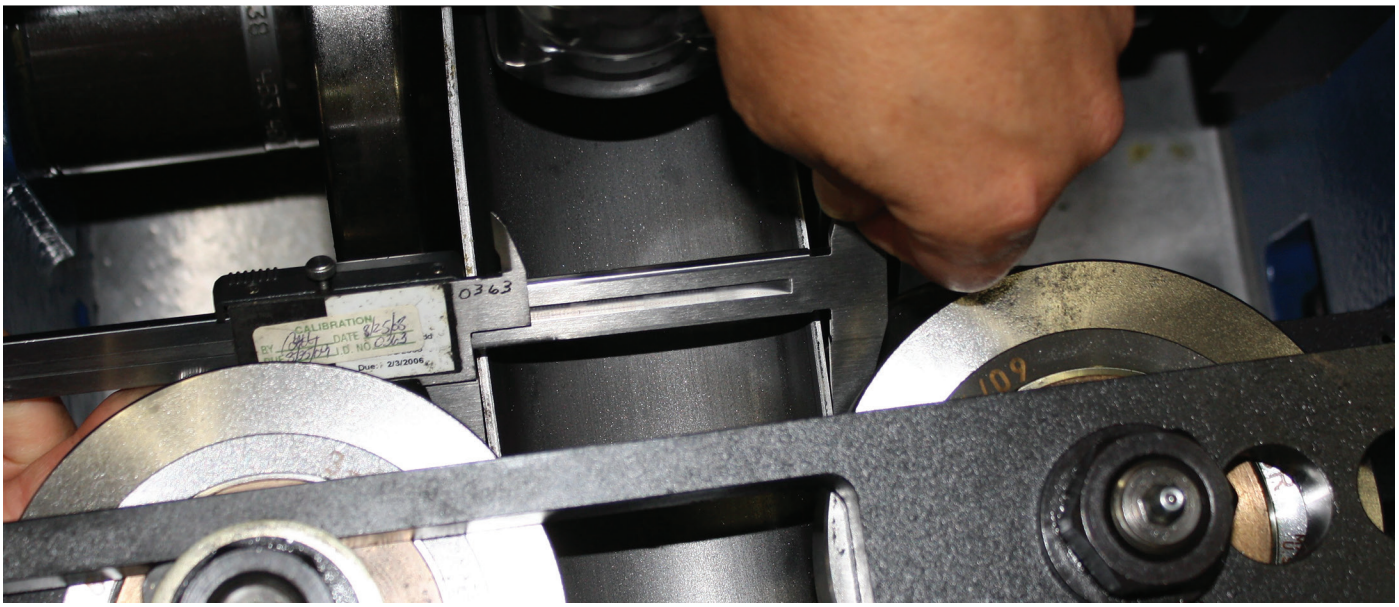


- Locate the jaws of the calipers as close to the exit side of the breakdown side pass rolls as possible. Measure the tube size coming out of each of the side passes with a pair of calipers and compare it to the setup chart. Adjust as necessary; however, jog the mill a little before taking another reading so the formation has a chance to settle down and the new setting can exit the side pass.

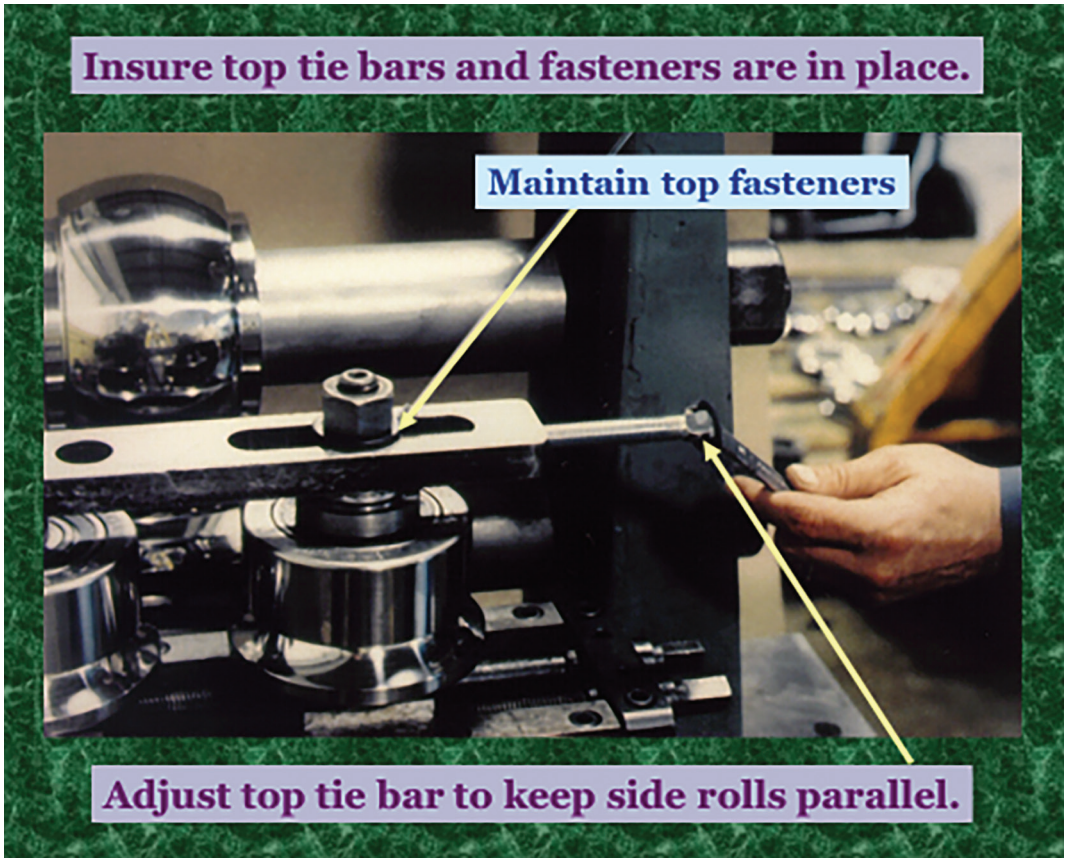
SWING JAWS OF CALIPERS AS CLOSE TO THE EXIT SIDE OF THE SIDE PASS YOU ARE MEASURING.



COMPARE THIS MEASUREMENT TO THE SETUP CHART AND ADJUST THE SIDE PASS AS REQUIRED.

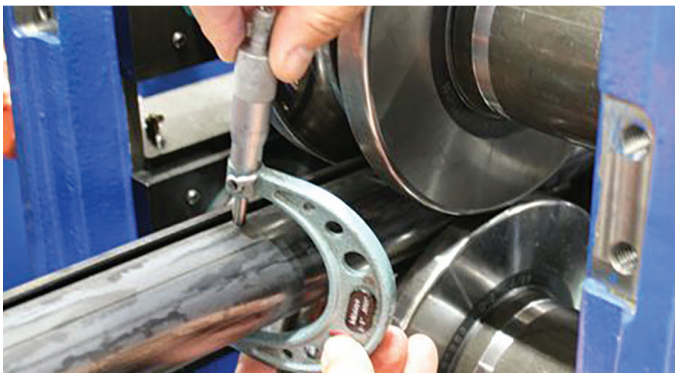


- If your side pass stands incorporate top tie bars, use a straight edge to ensure the top of the rolls are parallel after making any adjustments in the breakdown section.



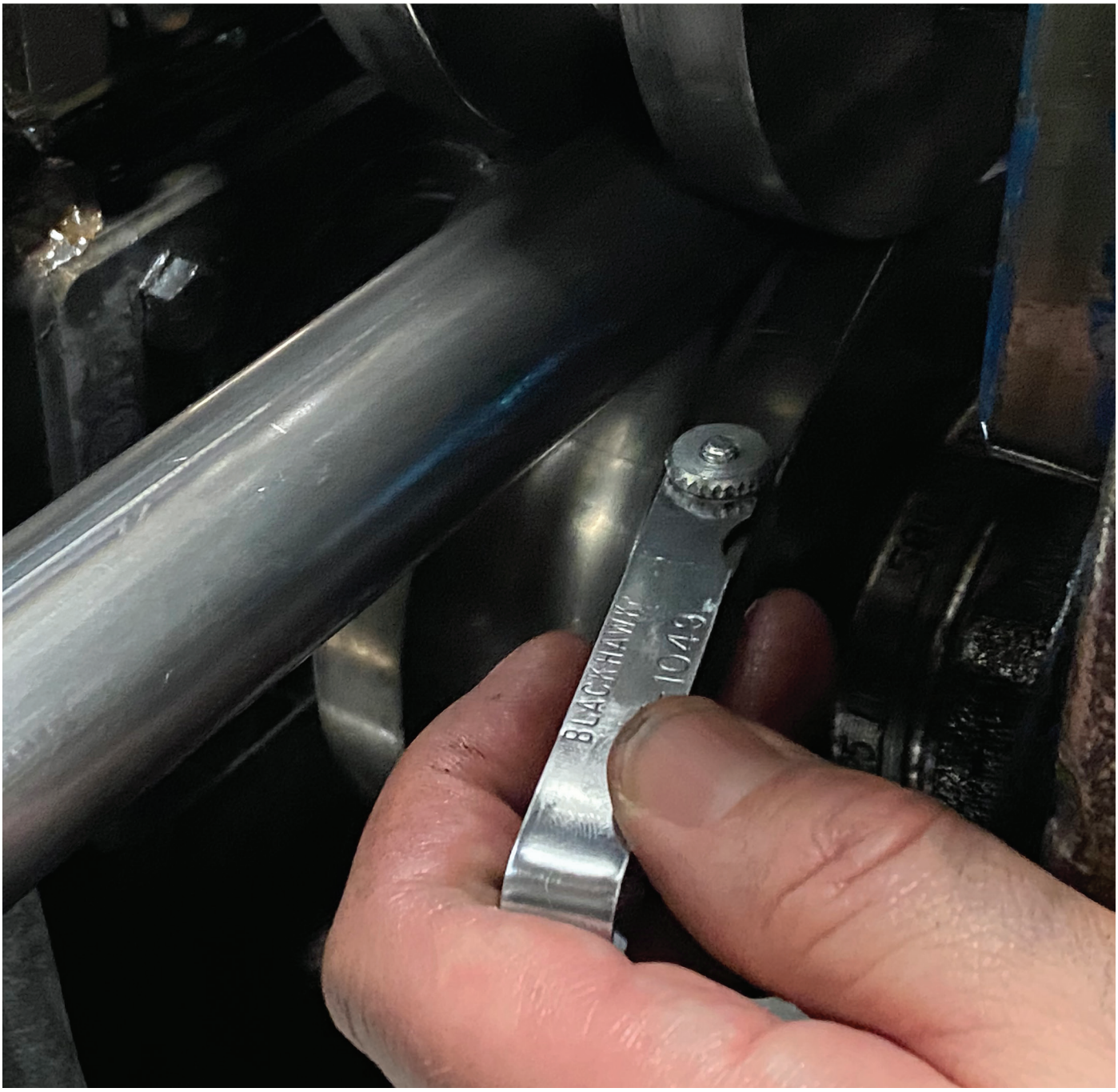
- Continue jogging the material through the remaining breakdown passes (one pass at a time), checking the pressure of each driven breakdown stand with solder and the dimension of each breakdown side pass stand until you reach the first fin pass.
- Jog the material into the first driven fin pass. On smaller tube mills, you can measure the tube as close as you can to the exit side of the driven fin pass and compare this measurement to the information on the setup chart. On larger tube mills and on applications that run higher yield/tensile materials with appreciable spring back you should use a pi tape to measure the OSP and compare it to the setup chart. (Note: Using a pi tape to measure the OSP out of each driven fin pass is the most accurate and preferred way to check the driven fin passes.) Also, check the rim gaps with feeler gauges, or solder, to ensure the top and bottom rolls are parallel with each other.
  Use of a straight edge will also validate the rolls are parallel. Make adjustments as necessary to obtain the measurements from the setup chart. (Again, always jog the mill a few inches after each adjustment before taking your next reading.)

MEASURE DIAGONALLY ON EACH SIDE AND COMPARE TO THE SETUP CHART.



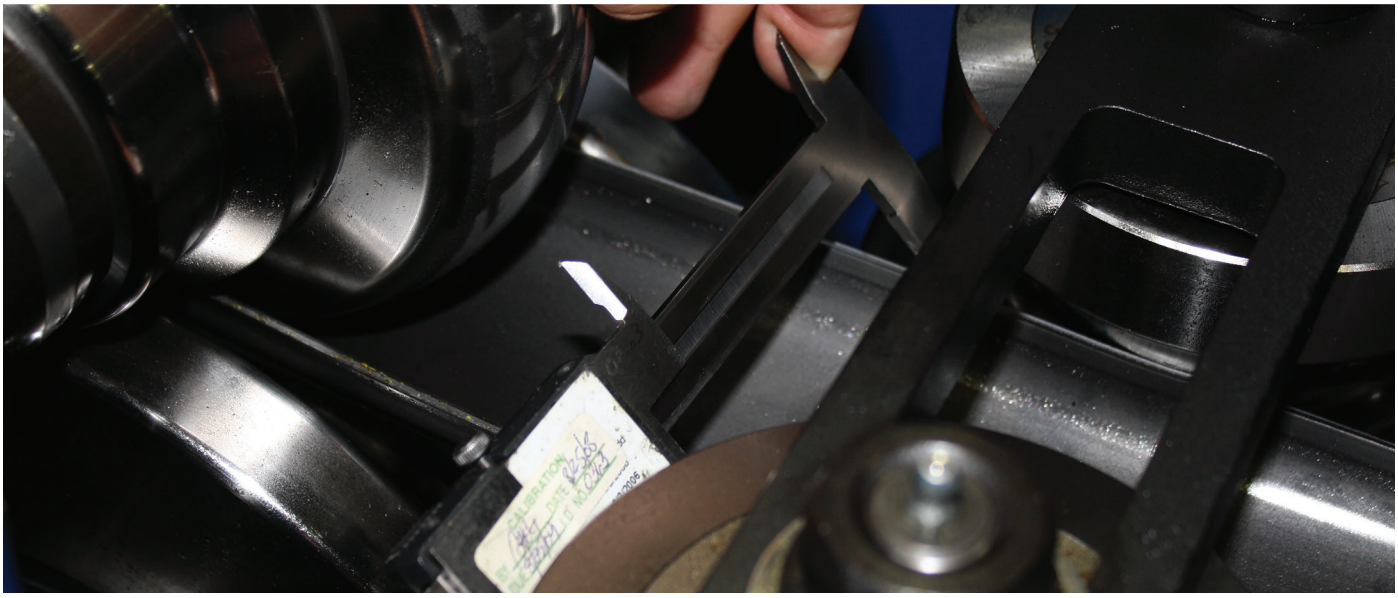
CHECKING THE OSP OUT OF EACH DRIVEN FIN PASS, AND COMPARING IT TO THE SETUP CHART.

CHECK RIM CLEARANCES WITH FEELER GAGES, OR SOLDER.

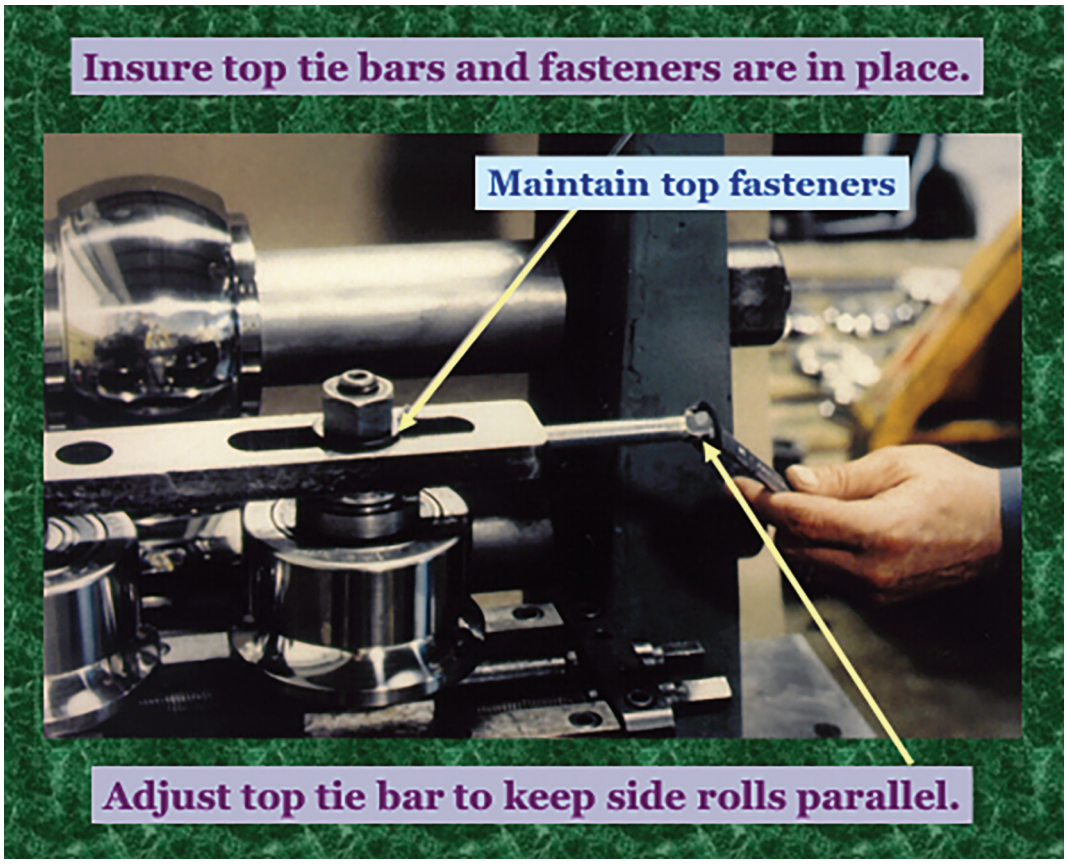


- On mills that are configured with side pass stands between each driven fin pass, measure the tube size coming out of each fin side pass with a pair of calipers and compare it to the setup chart. Locate the jaws of the calipers as close to the exit side of the side pass rolls as possible. Make adjustments as necessary. (Again, always jog the mill a few inches after each adjustment before taking your next reading.)

SWING JAWS OF CALIPERS AS CLOSE TO THE EXIT SIDE OF THE SIDE PASS YOU ARE MEASURING.



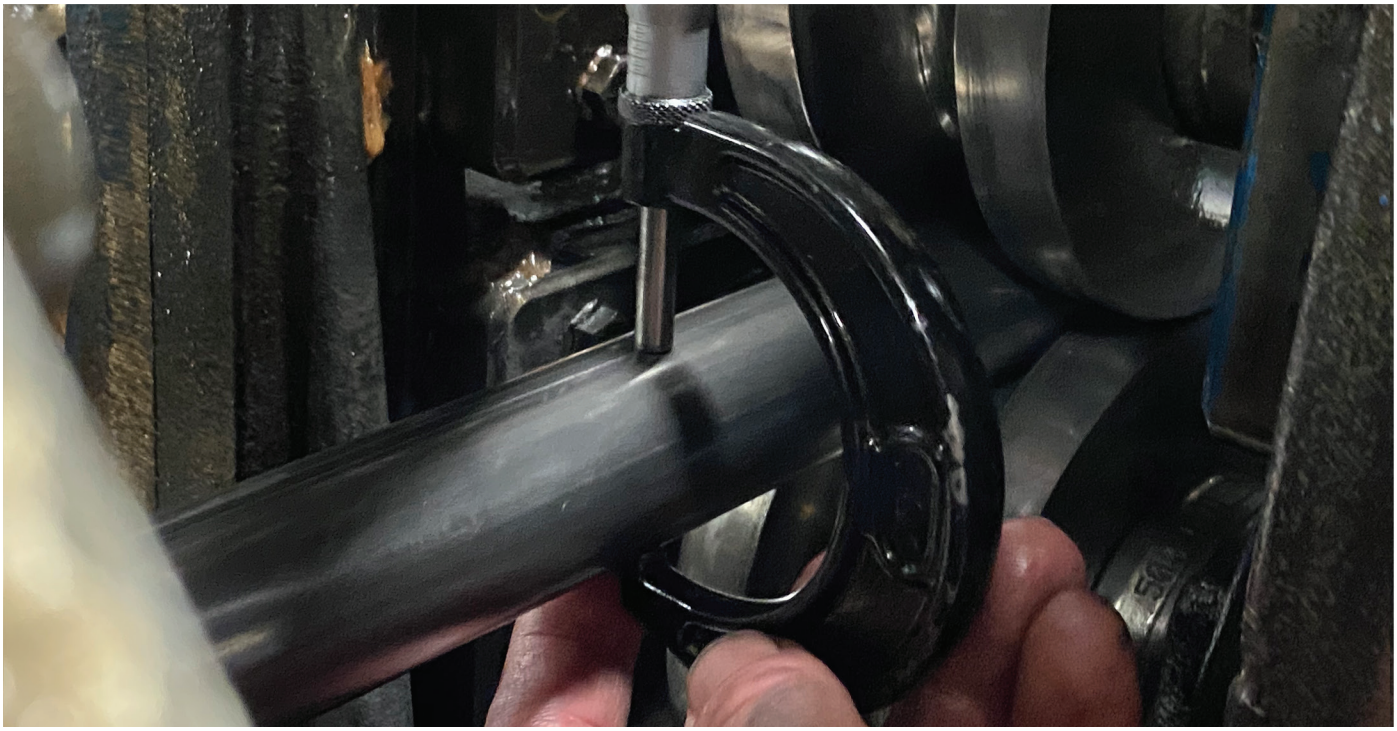
- If your side pass stand incorporates top tie bars, again use a straight edge to ensure the top of the rolls are parallel after making any adjustments in the fin section.



- Continue jogging the material through the remaining fin passes (one pass at a time), checking the measurements of each driven and side pass until you reach the weld box.
- Once the strip is through the weld box, make a quick check with your finger on the exit side of the weld rolls to see if the edges feel parallel and match up properly. As stated earlier, if you used a plug gauge to pre-gap the weld rolls, little or no adjustment should be required to properly weld/size the tube. Make adjustments as necessary. In order to check the size at this stage, the tube must be welded with the O.D. weld bead removed (scarfed).
    - If possible, to save on wasted material, start the mill up slowly and weld and scarf the tube while threading it through the cooling section. Stop the mill before entering the sizing section and jog it the rest of the way through the sizing rolls, Turks head rolls, and the cutoff jaws.
    - If this is not possible, jog the tube through the cooling section, sizing rolls, Turks head rolls and cutoff jaws. Then start the mill up slowly, weld and scarf the tube.
- Only run enough welded tube to allow you to check the size and the shape initially out of the weld box. Check the welded tube size with a pi tape to see how it compares to the setup chart. Then, check the tube with micrometers on the vertical (top), horizontal (side) and diagonals to check the ovality. The goal is for the tube to be round. Adjust the weld rolls as necessary to achieve proper size and shape (ovality) before sending it down to the sizing section.

MEASURING THE OD OF THE WELDED TUBE WITH A PI TAPE.

MEASURING THE WELDED VERTICAL DIMENSION WITH A MICROMETER.

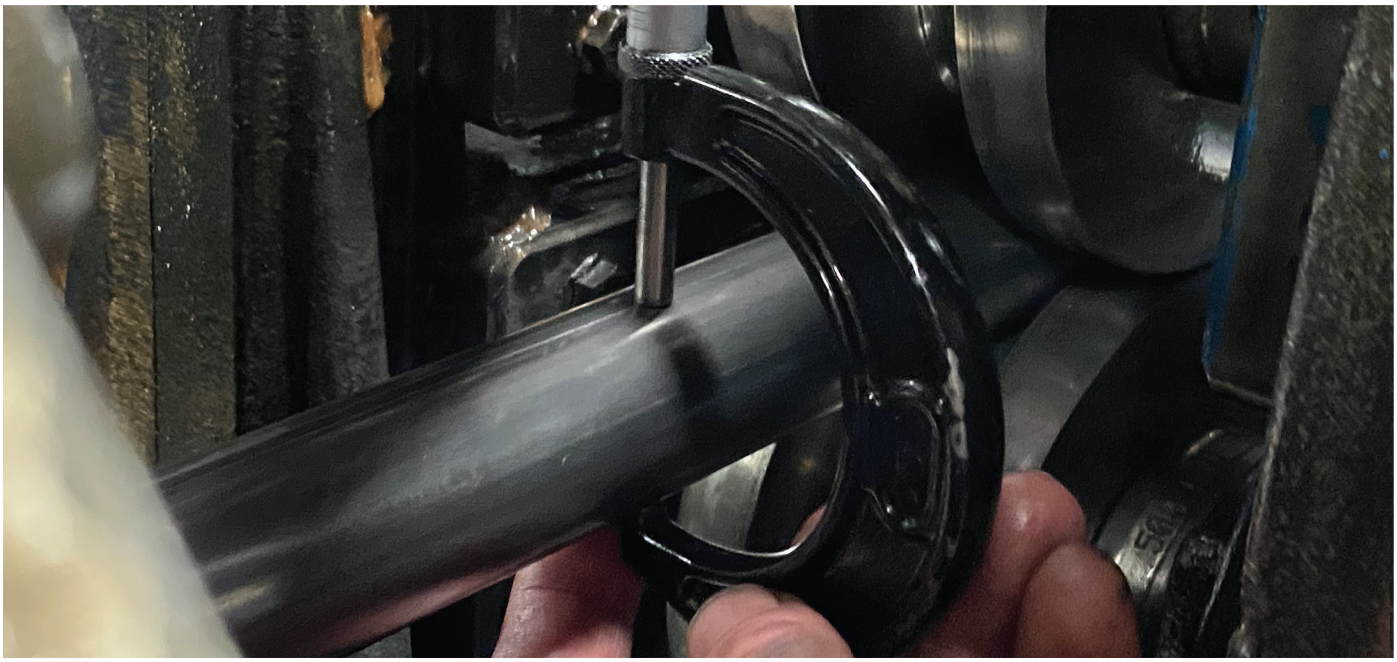


MEASURING THE WELDED HORIZONTAL DIMENSION WITH A MICROMETER.

MEASURING THE WELDED DIAGONAL DIMENSION WITH A MICROMETER.

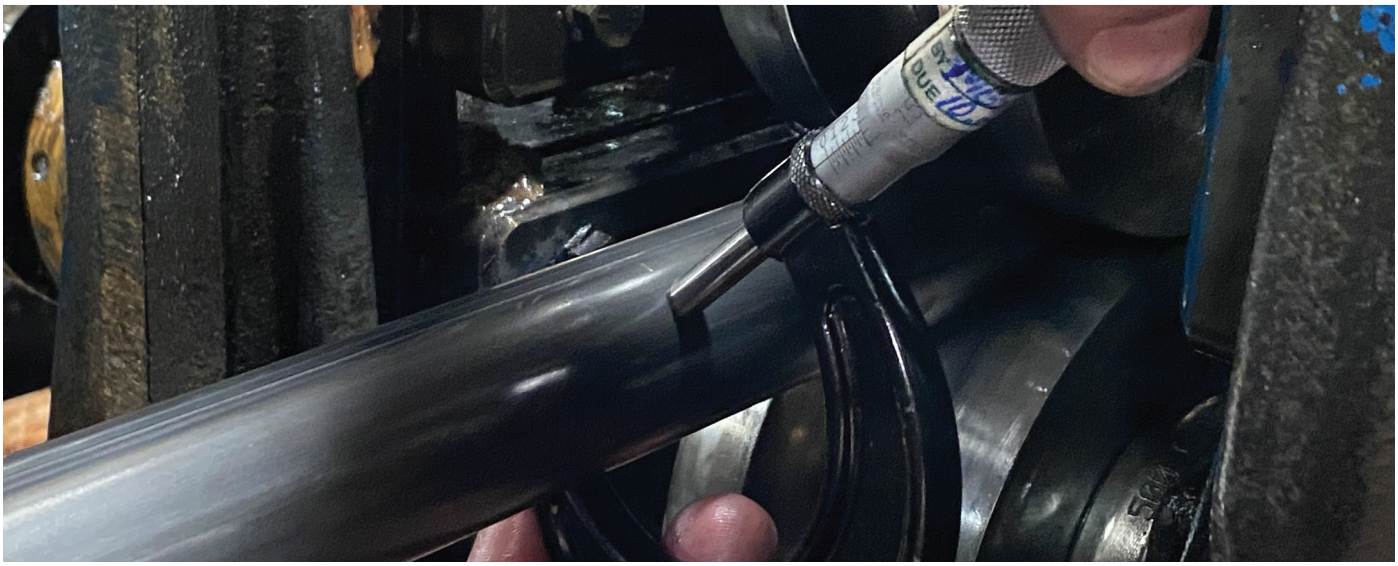
- Once you have a welded, properly sized, and scarfed tube, you can send it to the sizing section to final-size the tube. Since you have already pre-gapped the rolls in the sizing section, the settings should be close, but will no doubt require some refinement. The primary goal is the tube must be round out of each driven sizing pass.
- Using micrometers check the vertical (top), horizontal (side), and diagonal dimensions out of the first driven sizing pass and compare it to the setup chart. Make adjustments as required to match the dimension on the chart by adjusting the previous sizing side pass and the driven sizing pass to obtain the proper dimension. The diagonals should be equal. If they are not, this indicates a shoulder misalignment, upper and lower shafts not parallel, or an alignment issue. Use a straight edge, feeler gauge, or solder to check this condition and make adjustments as necessary. (Again, always jog the mill a few inches after each adjustment before taking your next reading.)

MEASURING THE VERTICAL DIMENSION WITH A MICROMETER IN THE DRIVEN SIZING SECTION.

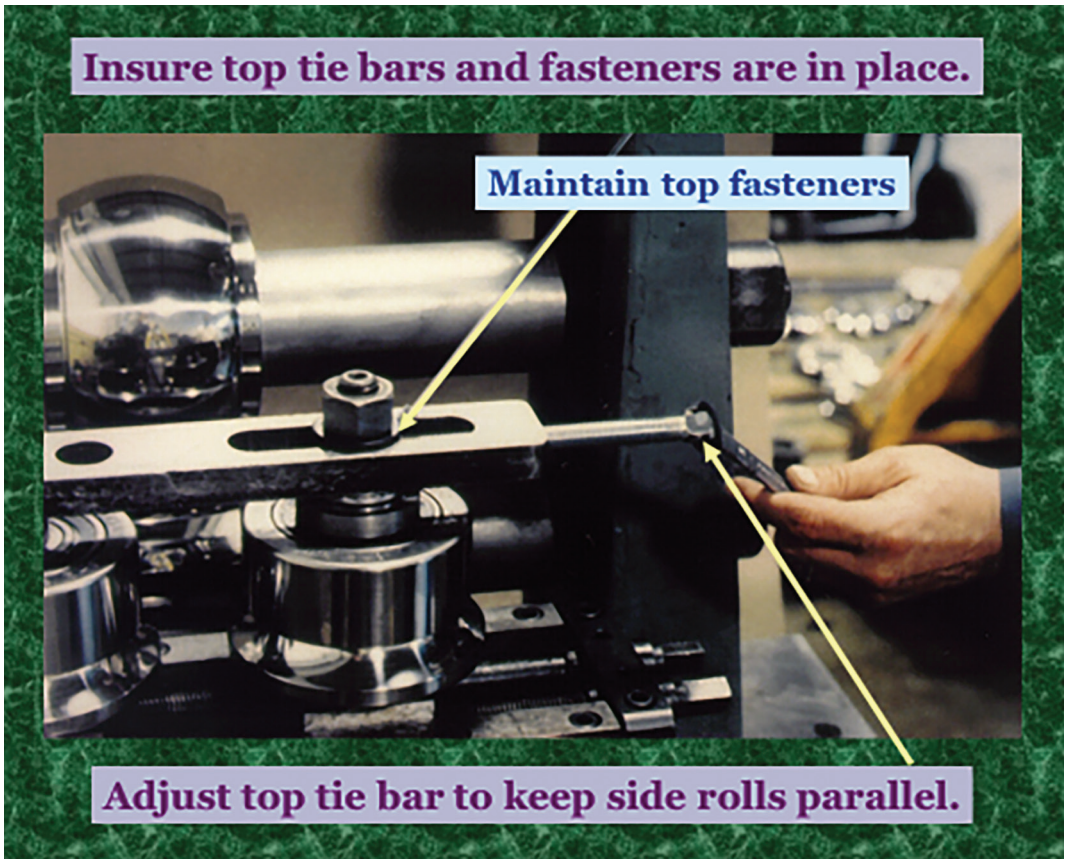


MEASURE THE HORIZONTAL MEASUREMENT.

DON'T FORGET DIAGONAL MEASUREMENT OUT OF SIZING SECTION.



- As each driven sizing pass is sized correctly, jog the tube all the way through to the next driven sizing pass and repeat the process for all of the remaining driven sizing passes.
- If your side pass stand incorporates top tie bars, again use a straight edge to ensure the top of the rolls are parallel after making any adjustments in the sizing section.



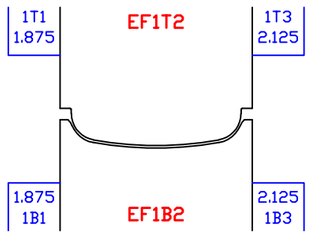
- Last, you will need to check the Turks head rolls. Take a measurement on the exit side of the Turks head rolls. For round tube, there should be no influence on the size of the finished tube by the Turks head rolls. The Turks head unit (in the round application) is to straighten the tube only, do no sizing. In multiple Turks head applications, these units form (size) the final shapes and straighten the tube. As stated earlier, if you used a plug gauge to pre-gap the Turks head rolls, no adjustment should be required here. Again, check the vertical (top), horizontal (sides), and diagonals to make sure the tube is round and the same size as it left the last driven sizing station in the round application. Shapes, measure accordingly to match the profiles out of each Turks head as outlined on the setup chart.

RECORD THE SETTINGS

Note: The rim clearances on the setup chart are a theoretical starting point for when the roll set is new, or freshly reworked. Rim clearances are our allowance for adjustment to compensate for wear of the tooling. After the first initial run, you want to record all the rim clearances in all driven and side passes stations before the material is run out of the mill. This will serve as a starting point for the next time this size is put back on the mill. In other words, you will be starting where you left off the last time, saving valuable setup time and scrap. These measurements will also serve as documentation to help determine wear rates of the tooling for your tooling maintenance program.

SETUP CHART

1



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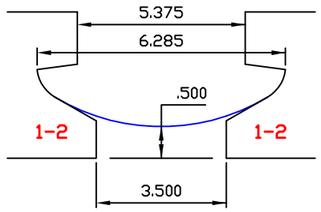

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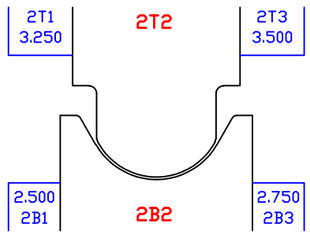

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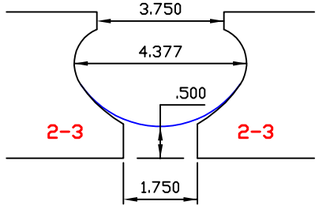

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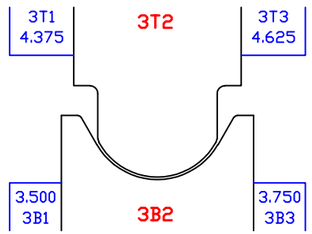

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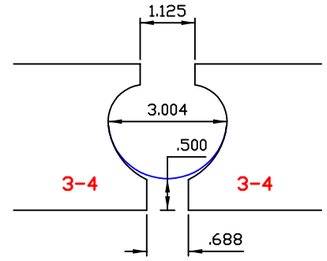

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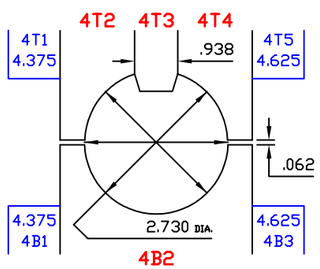
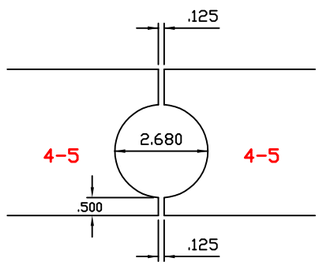


DSP/Girth = 7.619

8



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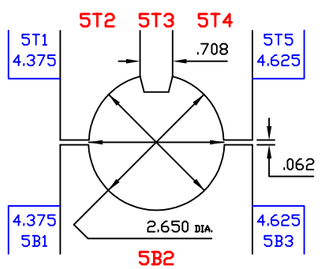
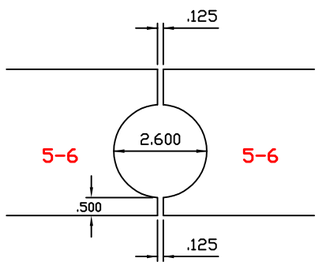


DSP/Girth = 7.609

10



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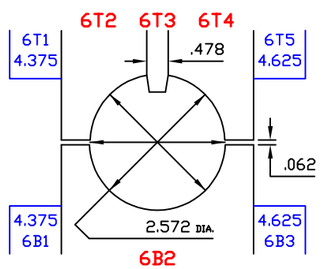
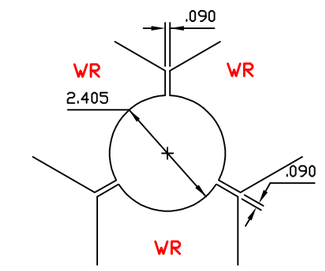


DSP/Girth = 7.599

12



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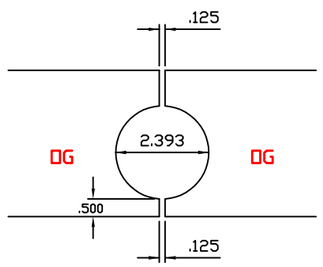

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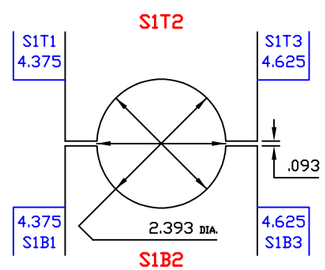

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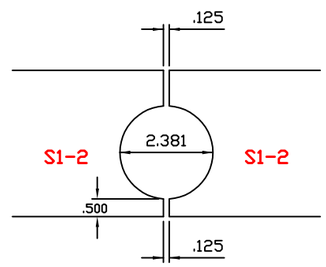

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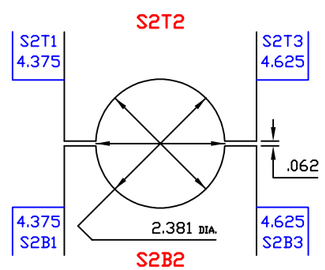

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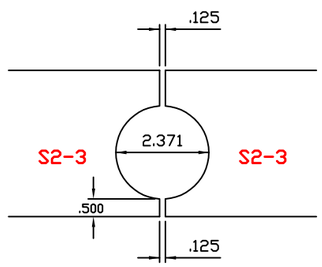

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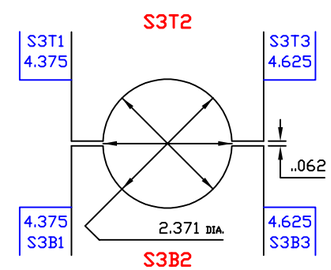

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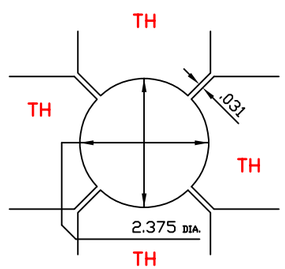


SPECIAL NOTES:

1. MUST DISCONNECT TOP DRIVE ON B'DOWN ROLLS IN PASSES #2 & #3. THEY ARE OUT OF RATIO.
2. ESTIMATED STRIP WIDTH FOR:
   .080 WALL = 7.441"
   .060 WALL = 7.471"
   .040 WALL = 7.501"

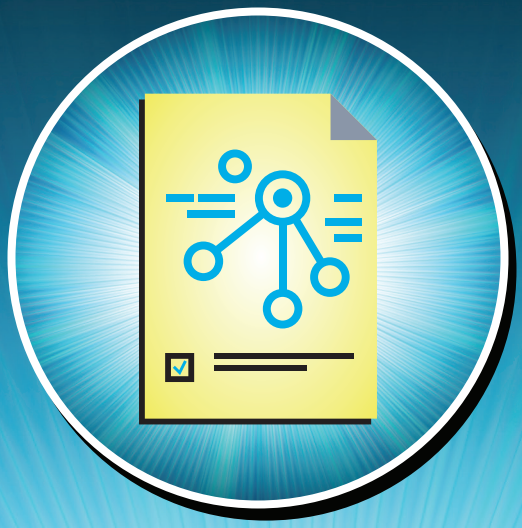
CUSTOMER – COMPANY ABC
TUBE SIZE – 2.375 O.D.

MILL – MILL XYZ
JOB # – 123456-01

DATE – XX-XX-XX

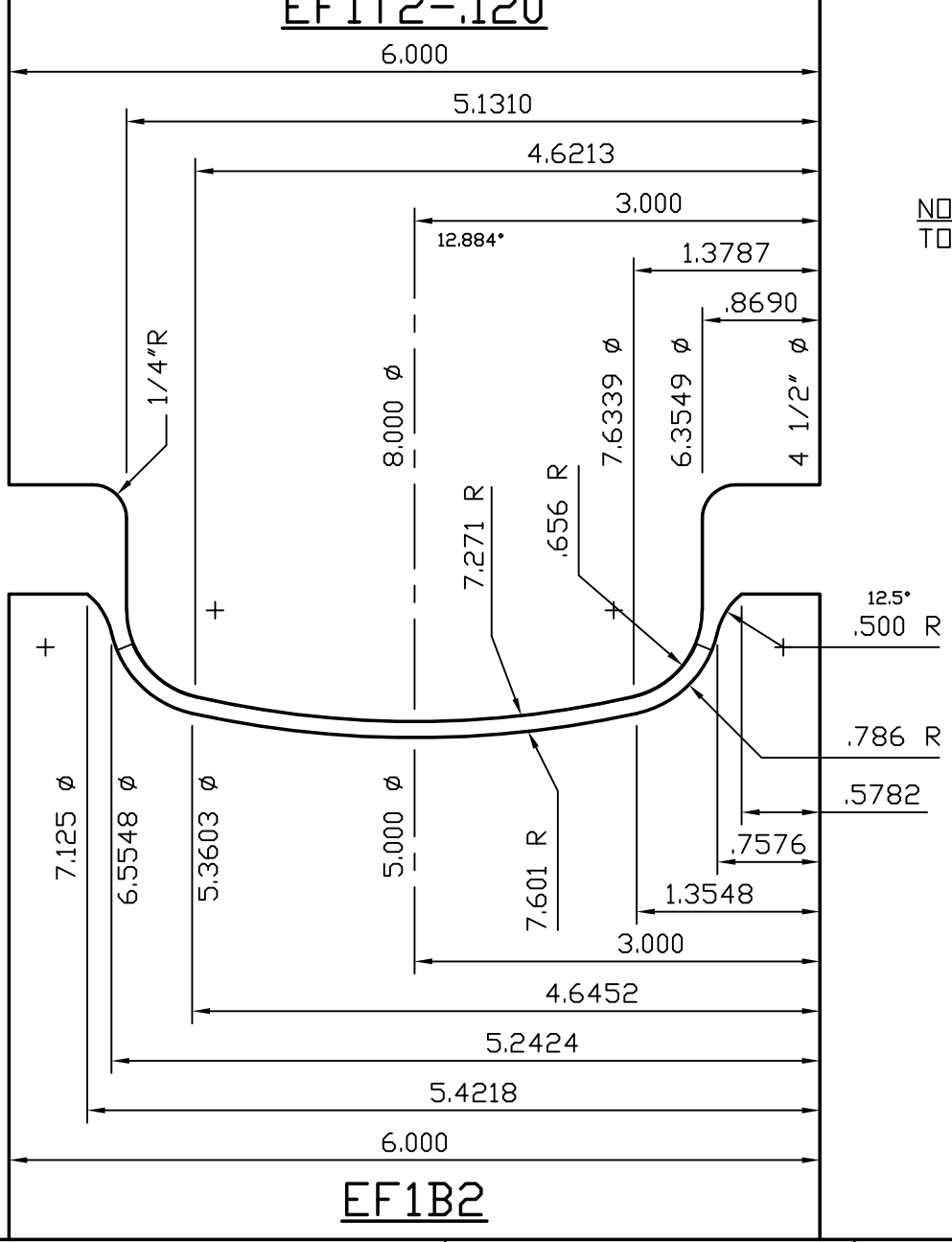
ISO 9001 REGISTERED
MENTOR–OHIO 888–953–9400
WWW.ROLL–KRAFT.COM

ROLL-KRAFT
Solutions for the Tube, Pipe and Roll Forming Industries



DRAWINGS

EF1T2-.120



EF1B2

NOTE:
TOP ROLL IDLES

SPACERS

1T1	~	1.750 LG
1T3	~	" "
1B1	~	1.750 LG
1B3	~	" "

TOP STAMP GROOVE-NOT REQ'D
ETCH ON OB 5.1310 FACE

BOT OB STAMP GROOVE
4 3/4" ID X 5 1/2" OD X 1/32" DP

EFT100				EFB100			
		.125					
A 12.884°			A	A 12.5			A
B 7.271			R	B 12.5			A
C .656			R	C 7.596	7.601		R
D .250			R	D .781	.786		R
E 8.030	8.000		ø	E .500			R
F 4.500			ø	F 5.030	5.000		ø
G 6.000			W	G 7.155	7.125		ø
I 3.000			W	I 6.000			W
K .000			C	R .2500	.2490		T
L .047			T	# .	41238		
R .2500	.2490		T				
# .	41237						

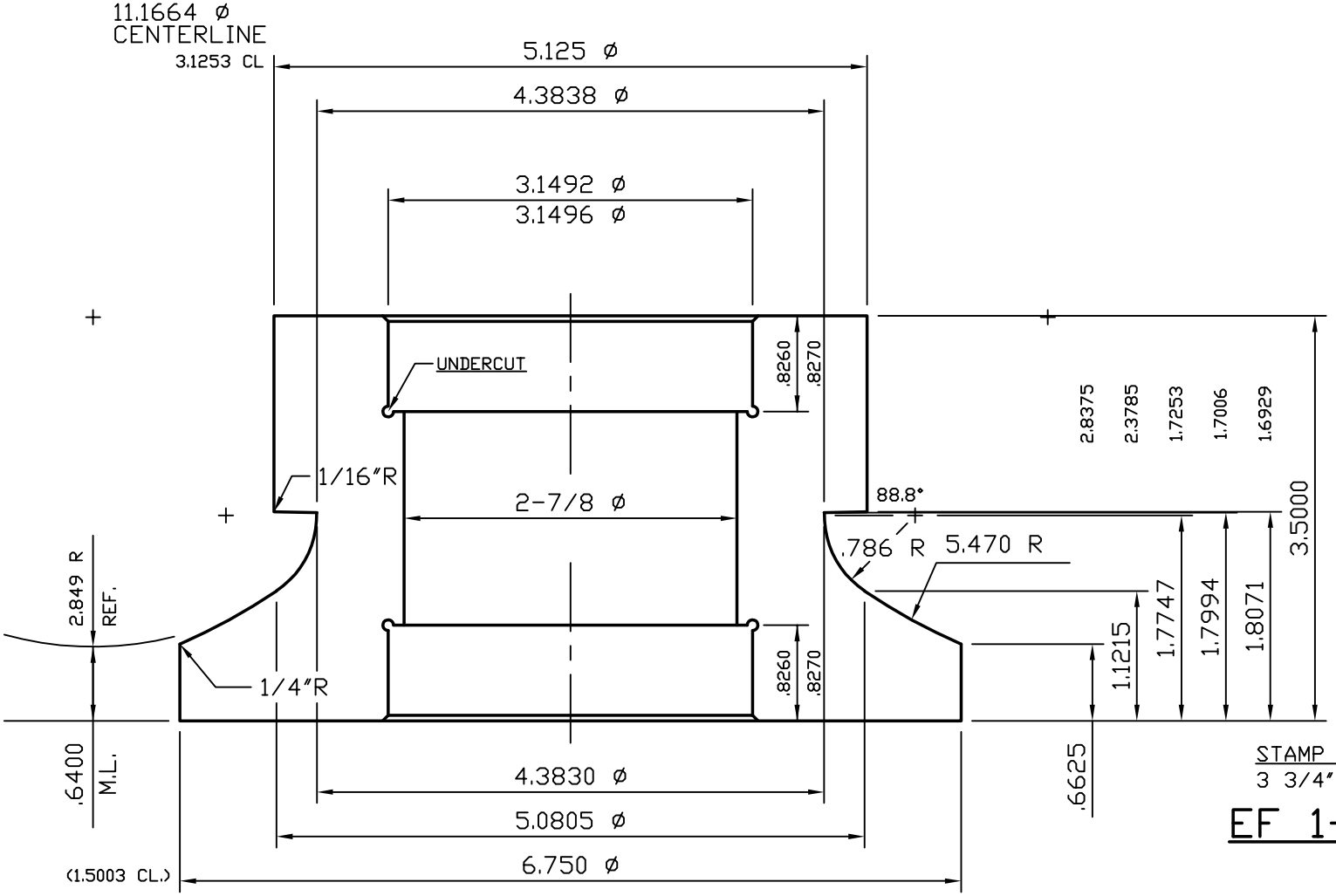
CUSTOMER	MILL #9 MILL	R.S. 9 1/2"	ROLL-KRAFT MENTOR, OHIO - (888) 953-9400	ELECTRONIC FILE IS MASTER
BORE 2.5000/2.5010	MATERIAL D-2	TUBE SIZE 1.562 O.D.	DATE	DES. BY / DRWG. NO.
KEYWAY 21/32 X 11/32	HARDEN 59-61 'RC'	GAGE .120	02-18-20	BR / 129695-01-1-.120

.68 : 1 SCALE

TOP: .562 FLAT @ 7.6574 DIA. (CL = .010)

.125

	SR165		
A	88.8		A
B	56.2		A
C	1.800		A
D	.786		R
E	5.470		R
F	.063		R
G	.250		R
H	.1970		W
I	3.500		W
J	11.1664		ø
K	5.125		ø
L	4.383		ø
M	6.750		ø
R	.0780	.0930	T
#		41252	



STAMP RELIEF TOP FACE
3 3/4" ID X 4 1/2" OD X 1/32" DP

EF 1-2 SR (2 REQ'D)

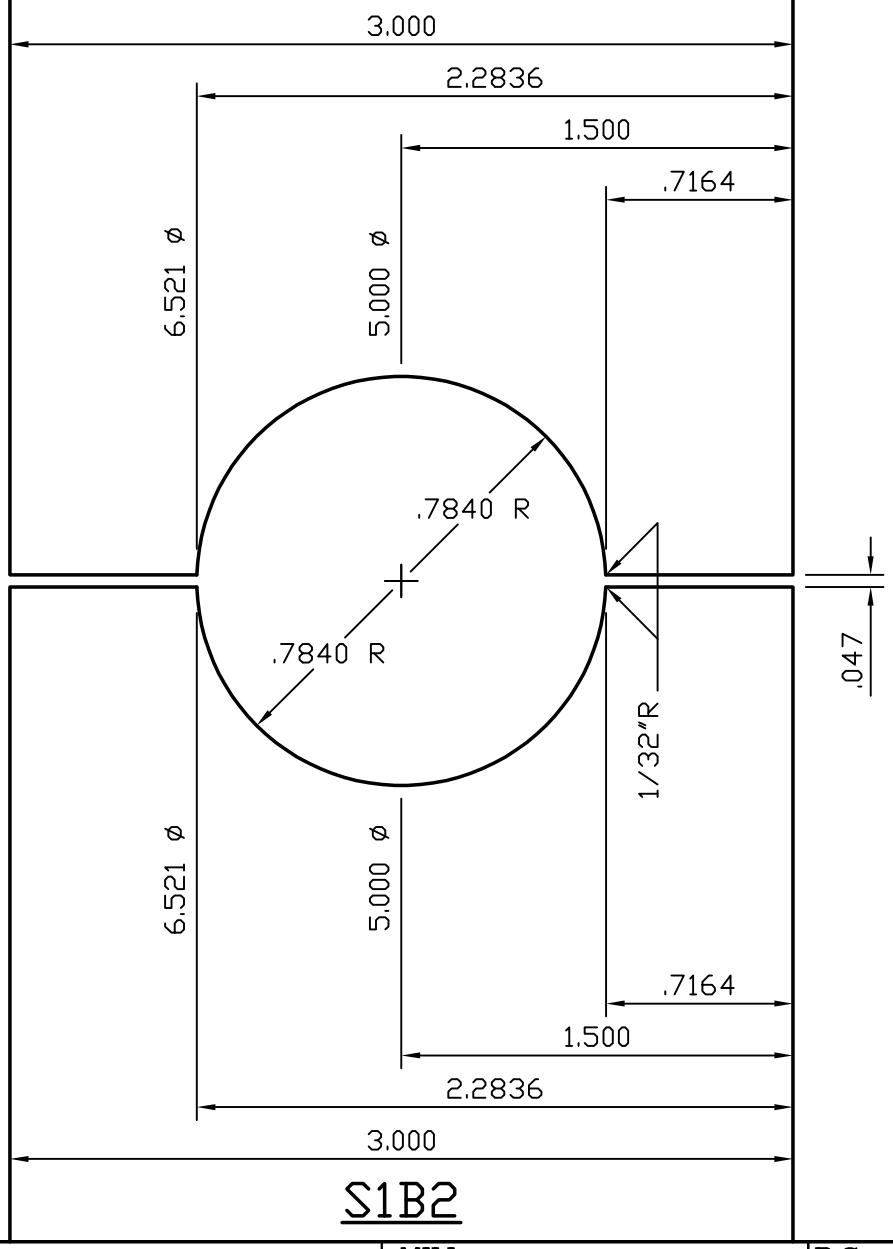
CUSTOMER		MILL: #9 MILL	R.S.: -----	ROLL-KRAFT MENTOR, OHIO - (888) 953-9400 — ELECTRONIC FILE IS MASTER
BORE: See Detail	MATERIAL: D-2	TUBE SIZE: 1.562 O.D.		DATE: 02-18-20 / DES. BY: BR / DRWG. NO.: 129695-01-1-2
KEYWAY: None	HARDEN: 59-61 'RC'	GAGE: -----		

.65 : 1 SCALE

.1970 ML 1.800° ANG.

CCAMT = .078 CCLGT = .000
CCANG = 33.800°

S1T2



S1B2

SPACERS

S1T1	~	2.500 LG
S1T3	~	" "
S1B1	~	2.500 LG
S1B3	~	" "

TOP OB STAMP GROOVE
4 1/2" ID X 5 1/4" OD X 1/32" DP

BOT OB STAMP GROOVE
4 1/2" ID X 5 1/4" OD X 1/32" DP

FNB120

A	69.583		A
B	.7790	.7840	R
C	.862	.867	R
D	.031		R
E	5.030	5.000	ø
F	6.551	6.521	ø
G	3.000		W
R	.2500	.2490	T
#		41249	

.125

CUSTOMER		MILL: #9 MILL	R.S.: 8"
BORE: 2.5000/2.5010	MATERIAL: D-2	TUBE SIZE: 1.562 O.D.	
KEYWAY: 21/32 X 11/32	HARDEN: 59-61 'RC'	GAGE: .120	

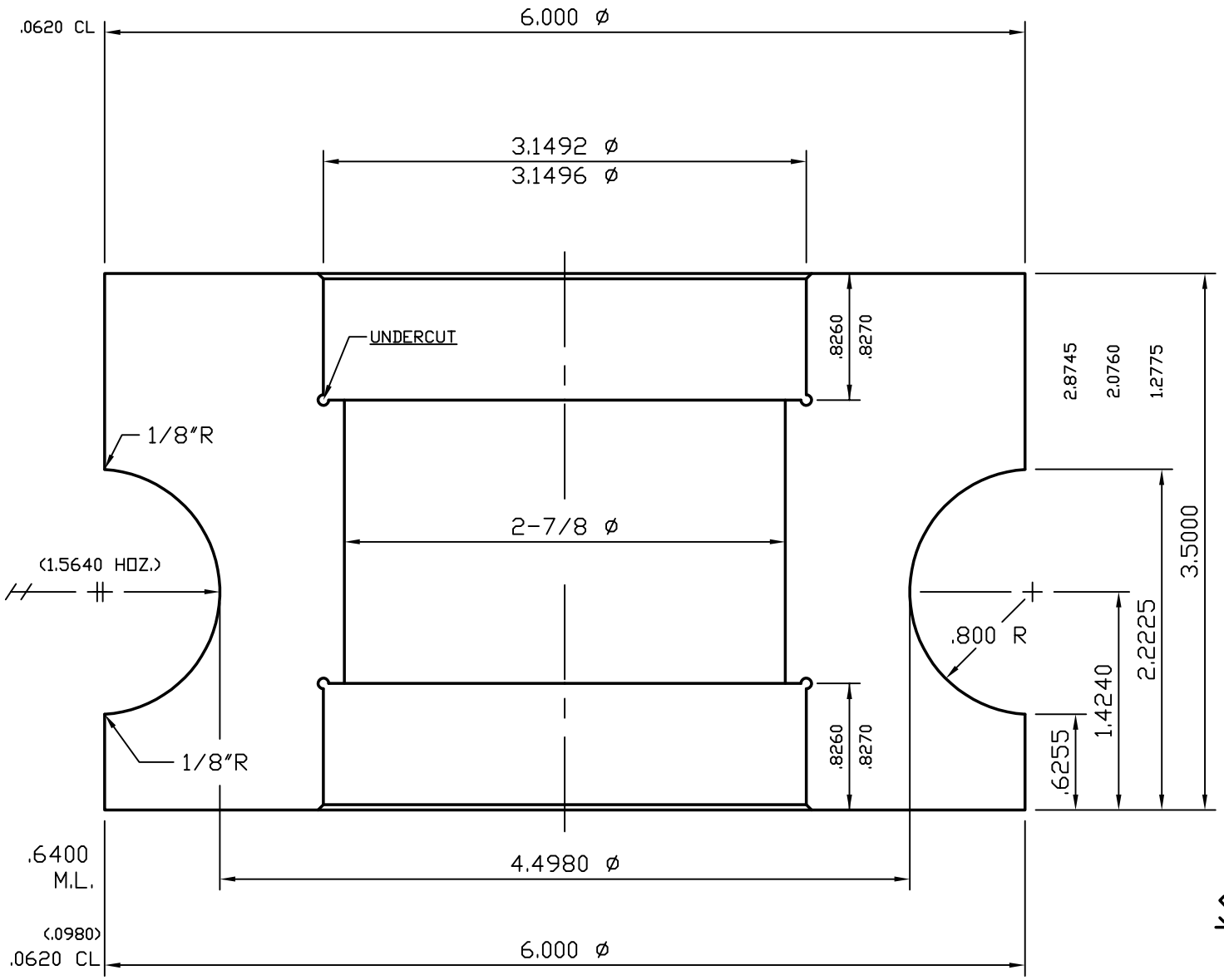
ROLL-KRAFT
MENTOR, OHIO - (888) 953-9400

ELECTRONIC FILE IS MASTER

DATE	DES. BY	DRWG. NO.
02-18-20	BR	129695-01-S1

1.26 : 1 SCALE

TOP: .867 R CL. @ 69.583° (CCAMT= .004 CCLGT= .250)



.125

	SR410		
B	.795	.800	R
C	.125		R
D	.125		R
E	6.030	6.000	ø
F	6.030	6.000	ø
G	1.4240		W
I	3.500		W
J	4.528	4.498	ø
R	.2500	.2490	T
#		41258	

STAMP RELIEF TOP FACE
4 1/4" ID X 5" OD X 1/32" DP

S1-2 SR (2 REQ'D)

CUSTOMER	MILL	R.S.
	#9 MILL	-----

BORE	MATERIAL	TUBE SIZE
See Detail	D-2	1.562 O.D.

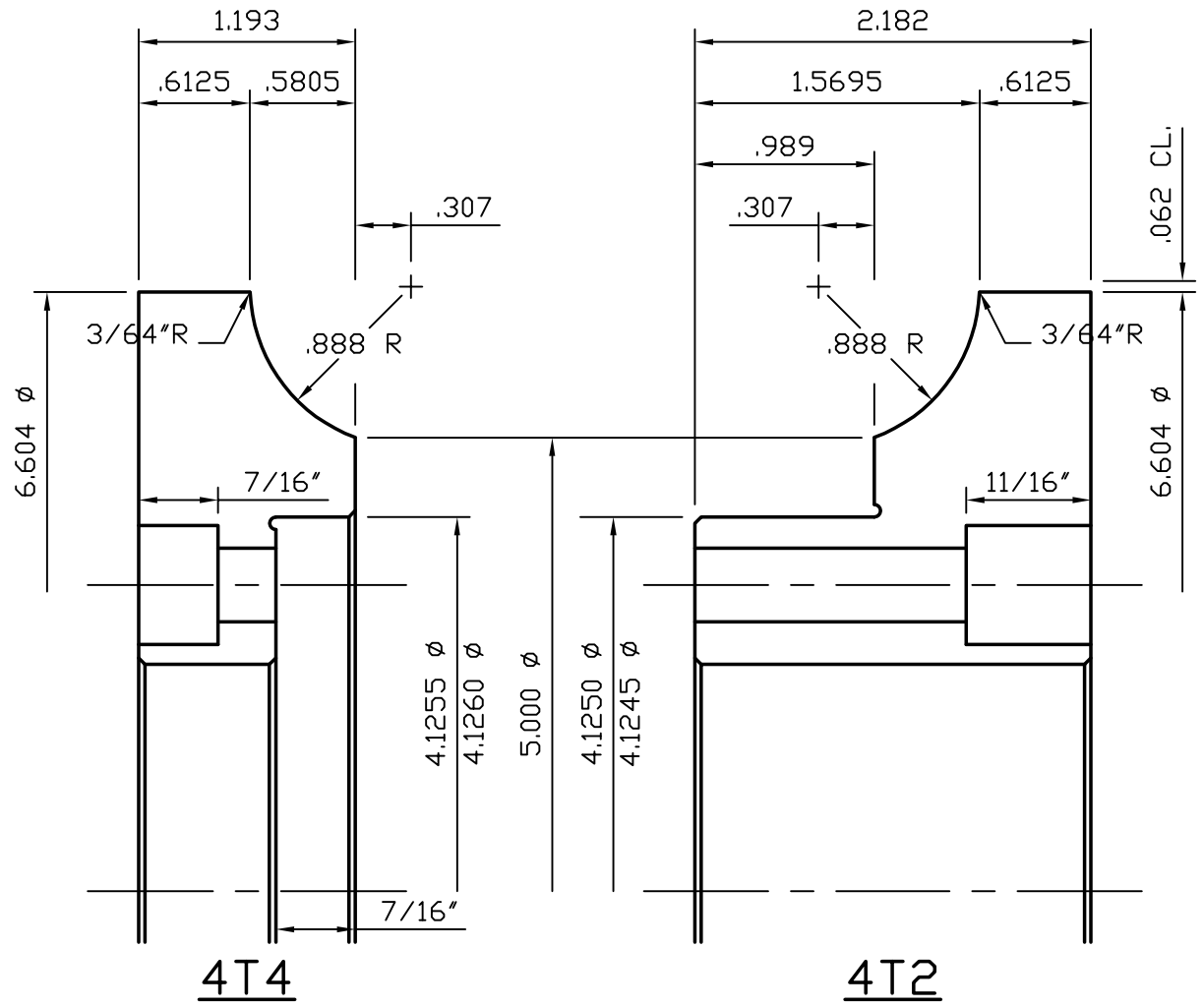
KEYWAY	HARDEN	GAGE
None	59-61 'RC'	-----

ROLL-KRAFT
MENTOR, OHIO - (888) 953-9400

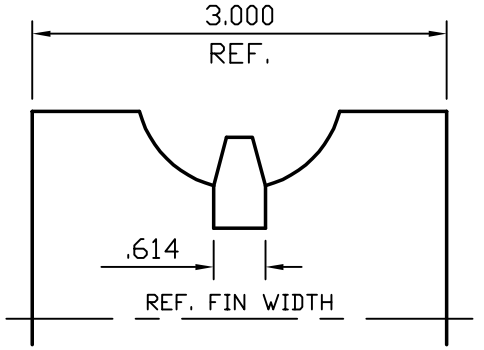
ELECTRONIC FILE IS MASTER

DATE	DES. BY	DRWG. NO.
02-18-20	BR	129695-01-S1-2

.89 : 1 SCALE



4T4 4T2



STAMP GROOVE BOTH PCS EXT FACE
4 3/8" ID X 5 1/8" OD X 1/32" DP

FNT160		.125
A 71.552		A
B .883	.888	R
C 1.024	1.029	R
D .048		R
E 6.634	6.604	ø
F .052	.062	C
G 1.193		W
I .307		C
R .2500	.2490	T
#	41243	

SPACERS

4T1	~	3.250 LG
4T5	~	" "

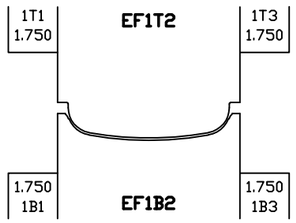
DRILLING
13/32 ø DRILL THRU & 21/32 ø C'BORE
AS SHOWN (5) HOLES EQUALLY
SPACED 36° FROM KWY. ON A
3.375ø BOLT CIRCLE FOR
3/8-16NC x 2 1/4 LG. SHCS & ALLENUTS

CUSTOMER		MILL #9 MILL		R.S. 9 1/2"	ROLL-KRAFT MENTOR, OHIO - (888) 953-9400 ELECTRONIC FILE IS MASTER
BORE 2.5000/2.5010	MATERIAL D-2	TUBE SIZE 1.562 O.D.			
KEYWAY 21/32 X 11/32	HARDEN 59-61 'RC'	GAGE .120	DATE 02-18-20	DES. BY BR	DRWG. NO. 129695-01-4T

.89 : 1 SCALE

TOP: 1.029 R CL. @ 71.552° (CCAMT= .005 CCLGT= .250)

1



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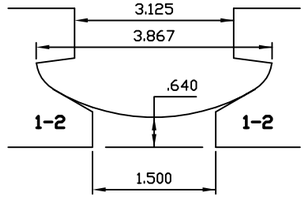

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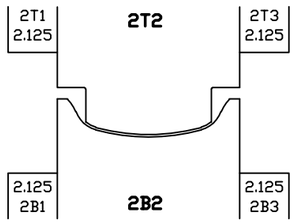

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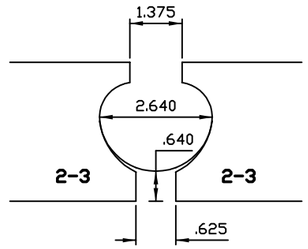

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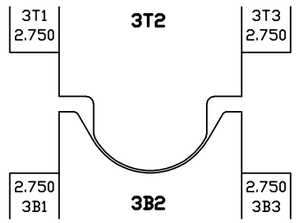

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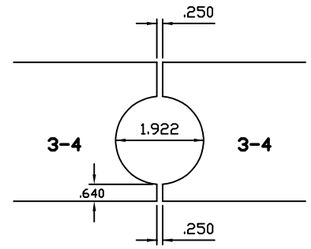

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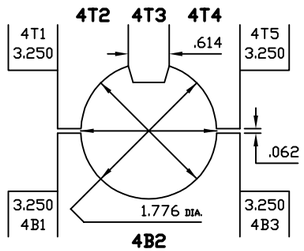
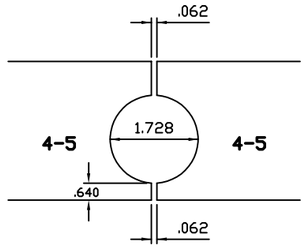


□SP/Girth = 4.953

8



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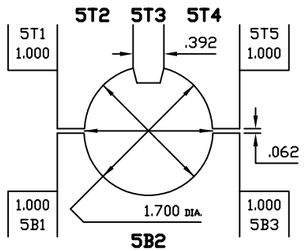
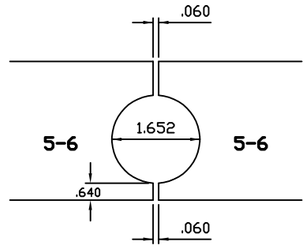


□SP/Girth = 4.945

10



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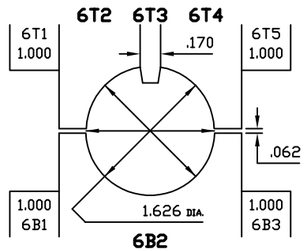
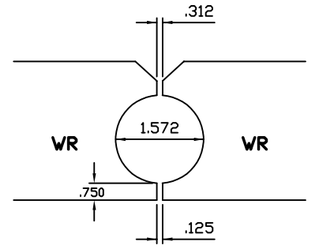


□SP/Girth = 4.938

12



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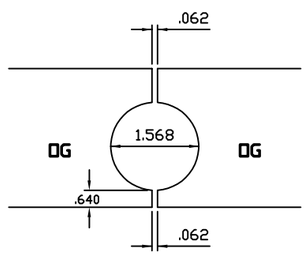

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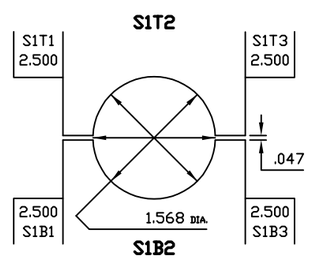

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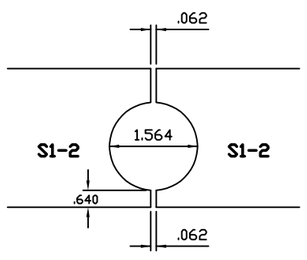

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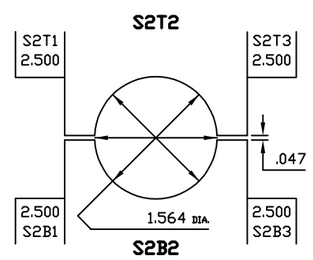

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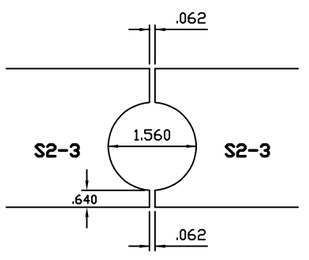

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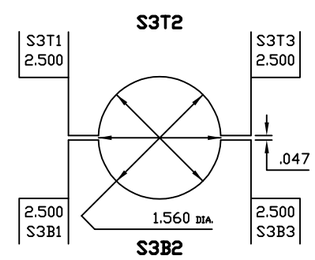

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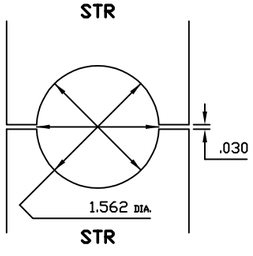

20

Special Notes:
- WELD ROLLS NOT SUPPLIED

CUSTOMER –

TUBE SIZE – 1.562 O.D.

MILL – #9 MILL

JOB # – 129695-01

DATE – 02-18-20

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