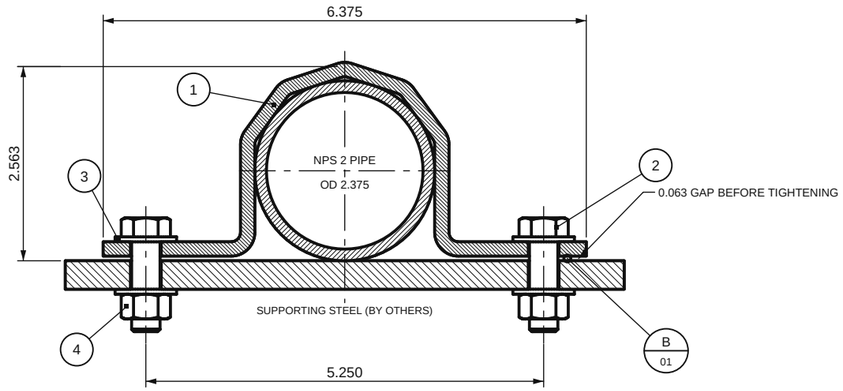


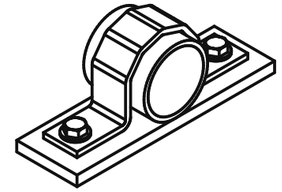
1 / 01 **TOP VIEW**

SCALE 1:2



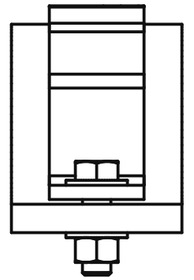
2 / 01 **SECTION A-A**

SCALE 1:2



4 / 01 **ISOMETRIC VIEW**

SCALE 1:4



3 / 01 **RIGHT SIDE**

SCALE 1:2

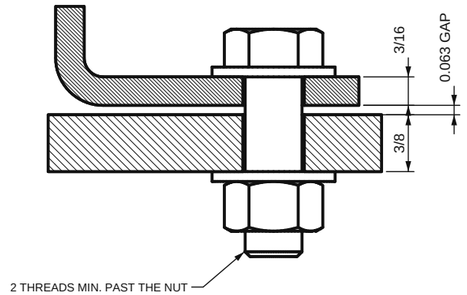
PARTS LIST

ITEM	QTY	DESCRIPTION	MATERIAL	LB
1	1	PIPE STRAP, FLAT BAR 3/16 x 1-1/4, 7 BENDS (SHEET 02)	ASTM A36	0.64
2	2	HEX BOLT 3/8-16 UNC x 1-1/4	ASTM A307 GR A	
3	4	FLAT WASHER 3/8 NARROW, OD 0.812	ASTM F844	
4	2	HEX NUT 3/8-16 UNC	ASTM A563 GR A	

PIPE	NPS 2 PIPE, OD 2.375
FIT	GRIP: ARCH FORMED TO THE PIPE; FEET 0.063 ABOVE THE STEEL UNTIL TIGHTENED
HOLES IN THE STEEL	2 x Ø13/32 AT 5.250 CENTRES, ON THE PIPE CENTRE LINE
BOLT LENGTH	1-1/4 THROUGH STEEL 3/8 THICK, 2 THREADS PAST THE NUT

NOTES

1. DRAWN FROM THE 3D MODEL: VIEWS ARE PROJECTIONS OF THE SOLIDS; SECTION A-A CUTS THROUGH THE MIDDLE OF THE STRAP.
2. SET THE PIPE ON THE STEEL, FIT THE STRAP, TIGHTEN THE NUTS EVENLY UNTIL BOTH FEET BEAR ON THE STEEL.
3. GEOMETRY AND FABRICATION ONLY: THE STRAP AND THE BOLTS ARE NOT SIZED FOR ANY LOAD.
4. PIPE AND SUPPORTING STEEL BY OTHERS, SHOWN SHORT FOR REFERENCE.



B / 01 **DETAIL B**

SCALE 1:1

SAMPLE
NOT FOR CONSTRUCTION

UNITS	**INCHES**
BAR	A36 3/16 x 1-1/4
BOLTS	3/8-16 UNC, 2
HOLES	Ø13/32 NORMAL FIT
FOOT BENDS	R 0.125 INSIDE
TOLERANCES	FORMED ±1/32, HOLES ±1/64
FINISH	AS ORDERED

REV	DATE	DESCRIPTION	INITIAL
A	13 Nov 2026	ISSUED FOR REVIEW (SAMPLE)	RS

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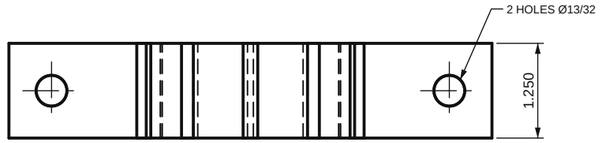
PIPE STRAP — GENERAL ARRANGEMENT

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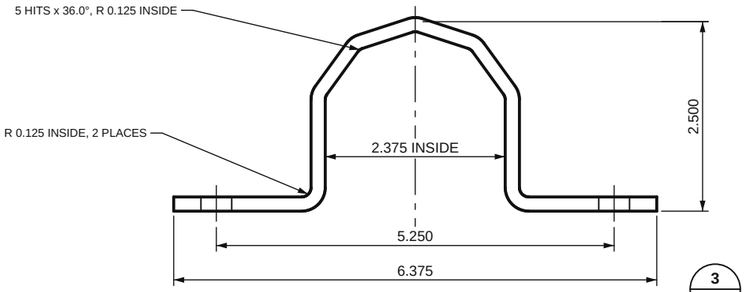
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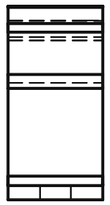
1 02 **TOP VIEW**

SCALE 1:2



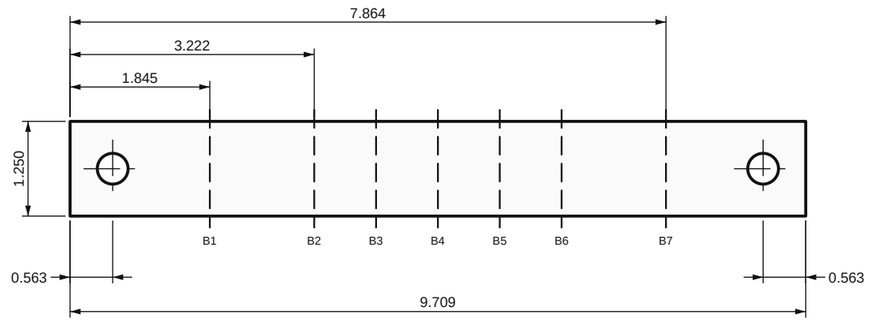
2 02 **FRONT VIEW, AS FORMED**

SCALE 1:2



3 02 **RIGHT SIDE**

SCALE 1:2



4 02 **FLAT PATTERN, PIPE FACE UP**

SCALE 1:2

BEND TABLE

BEND	ANGLE	DIR.	INSIDE R	K	ALLOWANCE	CENTRE LINE FROM LEFT END
B1	90°	DOWN	0.125	0.40	0.314	1.845
B2	36°	UP	0.125	0.40	0.126	3.222
B3	36°	UP	0.125	0.40	0.126	4.038
B4	36°	UP	0.125	0.40	0.126	4.854
B5	36°	UP	0.125	0.40	0.126	5.671
B6	36°	UP	0.125	0.40	0.126	6.487
B7	90°	DOWN	0.125	0.40	0.314	7.864

MATERIAL	FLAT BAR 3/16 x 1-1/4, ASTM A36
CUT LENGTH	9.709
HOLES	2 x Ø13/32 (0.406), 0.563 FROM THE ENDS
WEIGHT	0.64 LB

NOTES

1. DRILL OR PUNCH THE HOLES IN THE FLAT, THEN FORM. DEBURR AND BREAK SHARP EDGES.
2. ARCH: 5 HITS OF 36.0° WITH A R 0.125 PUNCH IN A 1.500 V-DIE, 0.816 APART; THE FACETS TOUCH THE PIPE, THE LARGEST GAP 0.055. BEND ORDER AND THE ANGLES TO BEND TO: SHEET 03. CHECK THE 2.375 INSIDE AND THE 2.500 HEIGHT AFTER FORMING.
3. ALLOWANCE = 3.1416 x ANGLE / 180 x (R + K x T), K BY R/T. MAKE A TEST BEND AND ADJUST THE CUT LENGTH BEFORE CUTTING A BATCH.
4. MID-PLANE LENGTH x WIDTH x THICKNESS LESS THE HOLES = SOLID VOLUME OF THE 3D MODEL (DIFF 0.003 %).
5. HOLE TO END 0.563, AT LEAST 0.563 (1.5 x THE BOLT).

SAMPLE
NOT FOR CONSTRUCTION

UNITS	**INCHES**
BAR	A36 3/16 x 1-1/4
BOLTS	3/8-16 UNC, 2
HOLES	Ø13/32 NORMAL FIT
FOOT BENDS	R 0.125 INSIDE
TOLERANCES	FORMED ±1/32, HOLES ±1/64
FINISH	AS ORDERED

REV	DATE	DESCRIPTION	INITIAL
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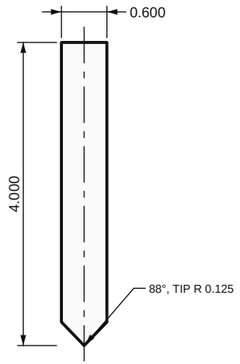
PIPE STRAP — ITEM 1 STRAP

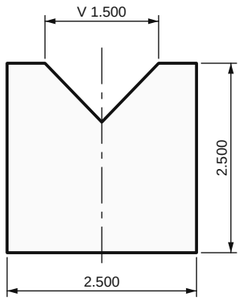
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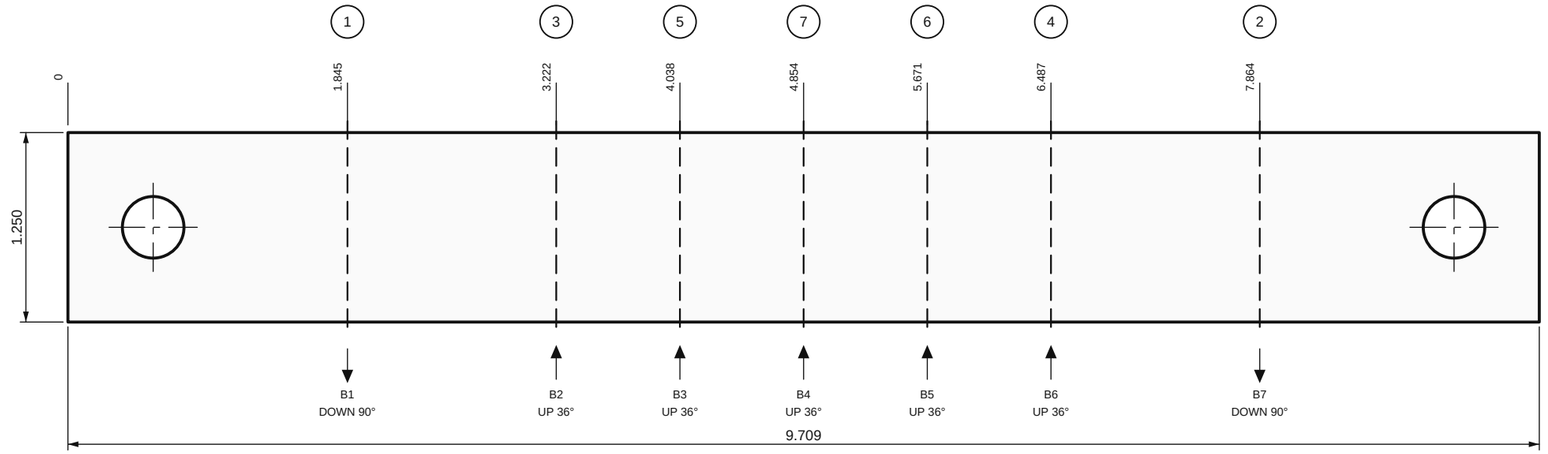
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T 03 **TOOLING**

SCALE 1:2



F 03 **FLAT PATTERN, PIPE FACE UP: BENDS IN ORDER**

SCALE 1:1

STEP	BEND	ON THE DIE	BEND (AS DRAWN)	FINISHED	BEND TO	GAUGE	RAM (EST.)
1	B1	PIPE FACE DOWN	DOWN 90.0°	90.0°	87.9°	1.845 OFF THE LEFT END	0.564
2	B7	PIPE FACE DOWN	DOWN 90.0°	90.0°	87.9°	1.845 OFF THE RIGHT END	0.564
3	B2	PIPE FACE UP	UP 36.0°	144.0°	142.4°	MARKED LINE UNDER THE PUNCH TIP	0.213
4	B6	PIPE FACE UP	UP 36.0°	144.0°	142.4°	MARKED LINE UNDER THE PUNCH TIP	0.213
5	B3	PIPE FACE UP	UP 36.0°	144.0°	142.4°	MARKED LINE UNDER THE PUNCH TIP	0.213
6	B5	PIPE FACE UP	UP 36.0°	144.0°	142.4°	MARKED LINE UNDER THE PUNCH TIP	0.213
7	B4	PIPE FACE UP	UP 36.0°	144.0°	142.4°	MARKED LINE UNDER THE PUNCH TIP	0.213

PUNCH	STRAIGHT 88°, TIP R 0.125, BODY 0.600, 4.0 HIGH
DIE	V 1.500, 88°, SHOULDERS R 0.120, TOP 2.500
BEND LENGTH	1-1/4 (THE BAR WIDTH)
FORCE PER BEND	1.36 TON (13.0 TON/FT)
ORDER	FEET FIRST, THEN THE ARCH, ARCH HITS FROM THE OUTSIDE IN

NOTES

1. THE ORDER WAS CHECKED STEP BY STEP ON THE MODEL: THE PART AT THE BOTTOM OF EACH STROKE AGAINST THE PUNCH, THE RAM, THE DIE AND THE BED. EVERY STEP CLEARS THE TOOLS, THE CLOSEST BY 0.036.
2. UP AND DOWN ARE SEEN FROM THE PIPE FACE, AS THE FLAT IS DRAWN: A DOWN BEND IS MADE WITH THE PIPE FACE DOWN ON THE DIE. TURN THE BLANK OVER WHERE THE 'ON THE DIE' COLUMN CHANGES.
3. MARK THE BEND LINES ON THE BLANK FROM THE CUT FILE (BEND_UP AND BEND_DOWN LAYERS) WHERE THE BACK GAUGE CANNOT REACH A FLAT END.
4. RAM TRAVEL AND SPRINGBACK FROM AN ELASTIC-PLASTIC BEAM MODEL OF THE BAR ON THE DIE SHOULDERS (A36, YIELD 40 KSI); A CALCULIX FINITE-ELEMENT CHECK GAVE THE SAME SPRINGBACK WITHIN 0.02° AND A RAM TRAVEL 4 TO 12 % SHORTER. SET THE FINAL STOP BY A TEST BEND.
5. FORCE = 575 x T² / V TONS PER FOOT x 58 / 60 FOR A36 (THE FABRICATOR, BENSON). CHECK THE BRAKE'S RATING AND THE DIE'S LOAD LIMIT.

SAMPLE
NOT FOR CONSTRUCTION

UNITS: **INCHES**
BAR: A36 3/16 x 1-1/4
BOLTS: 3/8-16 UNC, 2
HOLES: Ø13/32 NORMAL FIT
FOOT BENDS: R 0.125 INSIDE
TOLERANCES: FORMED ±1/32, HOLES ±1/64
FINISH: AS ORDERED

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