CALDERWOOD ENGINEERING
222 RIVER ROAD
RICHMOND, ME 04357
PH. (207) 737-2007 FAX (207) 737-2008

August 10th, 2020

Town Manager
Town of Bowdoinham
13 School Street,
Bowdoinham, ME 04008

RE: Bowdoinham Recycling Building Modifications

To whom it may concern,

This memo is to address the modifications required for the Bowdoinham Recycling center building.

Calderwood Engineering inspected the Bowdoinham Recycling center on June 24th, 2020. Calderwood Engineering had previously inspected the building on August 21st, 2013, and noted several areas of the building that required modification to bring the building up to code. During the inspection on June 24th, 2020, Calderwood Engineering noted that none of the proposed changes had been made. Attached to this Memo are the details and memo provided in 2013. All of the changes outlined in that memo, as well as the modifications below must be performed to bring the building up to code. The only part of the existing memo that no longer applied is the cost estimate, which does not reflect 2020 prices. In addition to the existing modifications, Calderwood Engineering found the following issues.

On the 1st floor, there are (4) columns located under a set of Lally columns placed on the 2nd floor. Currently, (1) column is located off center and leaves the beam on top of the columns with 1" of bearing. This column must be repositioned to have a minimum of 2.5" of bearing length.

On the Northeast corner of the building, the wall next to existing door frame is not connected to the foundation. Calderwood Engineering has designed a connection between the existing timber wall frame to the concrete footing by installing a sill plate and connecting this to the existing door frame. See the attached details.

On the Southeast corner of the building, several of the 2x4's in the exterior wall have deteriorated and must be replaced. Calderwood Engineering noted at least (11) that must be replaced, however the exact number must be determined in the field. These 2x4's have been exposed to the elements due to the lack of sheathing or any type of facing on the exterior of the building. As noted in the attached memo from 2013, ½" plywood/OSB should be added to all exterior wall that are not covered by plywood or by planking.

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Attached are the supporting calculations, details, and the memo and details provided in 2013.

Should you have any further questions please feel free to contact us directly.

Respectfully Submitted

Thad D. Chamberlain, EI

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STATE OF MAINE
ERIC T. CALDERWOOD
No. 9099
LICENSED
PROFESSIONAL ENGINEER

Project: 11-Town of Bowdoinham-20; 01-Recycling Center-20
Client: Town of Bowdoinham

Construction Engineering Design: Calderwood Engineering
Design Computations by: Thad Chamberlain, EI
Design Check by: Eric Calderwood, PE

Project Notes:
Check Bowdoinham Recycling Building, determine capacity of additional members not addressed in the calculations and details dated December 2013.

References: NDS 2012, ASCE 7-14, IBC 2009

Check Design of additional beam supporting second floor:

(4) 2x8's at single span between additional support columns:

$b_{beam} := 1.5\ \text{in}$ $\quad$ $d_{beam} := 7.25\ \text{in}$

$L_{beam} := 12\ \text{ft}$ — spacing between columns

$w_1 := 3\ \text{ft} + 2\ \text{in}$ — distance from center of column to center of exterior column

$w_2 := 8\ \text{ft} + 10.25\ \text{in}$ — distance from center of column to center of interior column

$\sigma_{LL} := 125\ \text{psf}$ — light storage warehouse (From Table 4-1, ASCE 7)

$\sigma_{floor} := 5\ \text{psf}$ — timber framing, assume 5psf (see pg 6 of 93 of original calculations)

Calculate total load applied by beam:

$$w_{beam} := \left(\sigma_{LL} + \sigma_{floor}\right) \cdot \left(\frac{w_1}{2} + \frac{w_2}{2}\right) + 45\ \text{pcf} \cdot \left(4 \cdot b_{beam} \cdot d_{beam}\right) = 794.948\ \text{plf}$$

$$P_{beam} := \frac{w_{beam} \cdot L_{beam}}{2} = 4.77\ \text{kip}$$

This is the reaction load at the end of the beam

Calculate beam in bearing:

$F_{cperp} := 335\ \text{psi}$ — SPF No.2 South, Ref. NDS 2012

$l_{bear} := 2.5\ \text{in}$ — length of bearing

$C_m := 1.0$ $\quad$ $C_t := 1.0$ $\quad$ $C_i := 1.0$ — NDS 4.3.3/4/8

$$C_b := \frac{l_{bear} + 0.375\ \text{in}}{l_{bear}} = 1.15$$ NDS 3.10-2

$$F_{cperp}' := F_{cperp} \cdot C_m \cdot C_t \cdot C_i \cdot C_b = 385.25\ \text{psi}$$ NDS Table 4.3.1

$$A_{bear} := l_{bear} \cdot b_{beam} = 3.75\ \text{in}^2$$ total bearing area of single beam

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Check Design of additional beam supporting second floor:

$$f_{cperp} := \frac{P_{beam}}{A_{bear} \cdot 4} = 317.979 \text{ psi}$$

$$Check := \text{if } f_{cperp} \le F_{cperp}' \;\; \| \text{"Ok for bearing"} \;\; \text{else} \;\; \| \text{"Check"} \quad = \text{"Ok for bearing"}$$

2.5 inches of bearing is required for the 2x8's, shift column as required to provide enough bearing for each beam, or install additional 6x6 column.

Check concrete blocks under Truss columns:

Existing 7"x7"x5" concrete blocks in compression:

$P_{vert} := 19440 \text{ lbf} = 19.44 \text{ kip}$	See page 84 of 94 of previous design calculations This is the factored load in the columns supporting the truss
$f'_c := 2 \text{ ksi}$	no information on existing concrete blocks, assume 2ksi
$b_{conc} := 6 \text{ in}$	concrete block dimension (7" square block, assume some section loss to 6" square block)
$t_{conc} := 5 \text{ in}$	thickness of concrete block
$A_1 := b_{conc} \cdot b_{conc} = 36 \text{ in}^2$	bearing area on concrete block
$B_n := 0.85 \cdot f'_c \cdot A_1 = 61.2 \text{ kip}$	unfactored bearing capacity of block (ACI 318, Table 22.8.3.2)
$\phi_{bearing} := 0.65$	(ACI 318, Table 21.2.1)

$$\phi B_n := \phi_{bearing} \cdot B_n = 39.78 \text{ kip}$$

$$Check := \text{if } P_{vert} \le \phi B_n \;\; \| \text{"Concrete Ok for Bearing"} \;\; \text{else} \;\; \| \text{"Check"} \quad = \text{"Concrete Ok for Bearing"}$$

Concete blocks are ok for bearing, should be monitored for section loss

Capacities of Tapcon Blue Anchors:

Buildex Tapcon®
#1 CHOICE OF PROFESSIONALS

PERFORMANCE TABLES
BLUE, WHITE, AND STAINLESS

ULTIMATE TENSION AND SHEAR VALUES (LBS/KN) IN CONCRETE

ANCHOR DIA In.(mm)	MIN. DEPTH OF EMBEDMENT In.(mm)	f'c = 2000 PSI (13.8 MPa)		f'c = 3000 PSI (20.7 MPa)		f'c = 4000 PSI (27.6 MPa)		f'c = 5000 PSI (34.5 MPa)	
		TENSION Lbs. (kN)	SHEAR Lbs. (kN)	TENSION Lbs. (kN)	SHEAR Lbs. (kN)	TENSION Lbs. (kN)	SHEAR Lbs. (kN)	TENSION Lbs. (kN)	SHEAR Lbs. (kN)
3/16 (4.8)	1 (25.4)	600 (2.7)	720 (3.2)	625 (2.8)	720 (3.2)	650 (2.9)	720 (3.2)	800 (3.6)	860 (3.8)
	1-1/4 (31.8)	845 (3.7)	720 (3.2)	858 (3.8)	720 (3.2)	870 (3.9)	720 (3.2)	1,010 (4.5)	860 (3.8)
	1-1/2 (38.1)	1,090 (4.8)	860 (3.8)	1,090 (4.8)	860 (3.8)	1,090 (4.8)	860 (3.8)	1,220 (4.8)	860 (3.8)
	1-3/4 (44.5)	1,450 (6.5)	870 (3.9)	1455 (6.5)	870 (3.9)	1,460 (6.5)	990 (4.4)	1,730 (7.7)	990 (4.4)
1/4 (6.4)	1 (25.4)	750 (3.3)	900 (4.0)	775 (3.4)	900 (4.0)	800 (3.6)	1,360 (6.1)	950 (4.2)	1,440 (6.4)
	1-1/4 (31.8)	1,050 (4.7)	900 (4.0)	1,160 (5.2)	900 (4.0)	1,270 (5.6)	1,360 (6.1)	1,515 (6.7)	1,440 (6.4)
	1-1/2 (38.1)	1,380 (6.1)	1,200 (5.3)	1,600 (7.2)	1,200 (5.3)	1,820 (8.1)	1,380 (6.1)	2,170 (9.7)	1,670 (7.4)
	1-3/4 (44.5)	2,020 (9.0)	1,670 (7.4)	2,200 (9.8)	1,670 (7.4)	2,380 (10.6)	1,670 (7.4)	2,770 (12.3)	1,670 (7.4)

Safe working loads for single installation under static loading should not exceed 25% of the ultimate load capacity.

ULTIMATE TENSION AND SHEAR VALUES (LBS/KN) IN HOLLOW BLOCK

ANCHOR DIA In.(mm)	ANCHOR EMBEDMENT In.(mm)	LIGHTWEIGHT BLOCK		MEDIUM WEIGHT BLOCK	
		TENSION Lbs. (kN)	SHEAR Lbs. (kN)	TENSION Lbs. (kN)	SHEAR Lbs. (kN)
3/16 (4.8)	1 (25.4)	220 (1.0)	400 (1.8)	340 (1.5)	730 (3.2)
1/4 (6.4)	1 (25.4)	250 (1.1)	620 (1.8)	500 (2.2)	1,000 (4.4)

Safe working loads for single installation under static loading should not exceed 25% of the ultimate load capacity.
NOTE: 3/16" Tapcon requires 5/32" bit, 1/4" Tapcon requires 3/16" bit.

ALLOWABLE EDGE AND SPACING DISTANCES

PARAMETER	ANCHOR DIA. In.(mm)	NORMAL WEIGHT CONCRETE			CONCRETE MASONRY UNITS (CMU)		
		FULL CAPACITY (Critical Distance Inches)	REDUCED CAPACITY (Minimal Distnce Inches)	LOAD REDUCTION FACTOR	FULL CAPACITY (Critical Distance Inches)	REDUCED CAPACITY (Minimal Distance Inches)	LOAD REDUCTION FACTOR
Spacing Between Anchors - Tension	3/16 1/4	3 4	1-1/2 2	0.73 0.66	3 4	1-1/2 2	1.00 0.84
Spacing Between Anchors - Shear	3/16 1/4	3 4	1-1/2 2	0.83 0.82	3 4	1-1/2 2	1.00 0.81
Edge Distance - Tension	3/16 1/4	1-7/8 2-1/2	1 1-1/4	0.83 0.82	3 4	2 2	0.91 0.81
Edge Distance - Shear	3/16 1/4	2-1/4 3	1-1/8 1-1/2	0.70 0.59	3 4	2 2	0.93 0.80

For SI: 1 inch = 25.4 mm

Design connection for existing wall to foundation at swinging door:

Determine applied load:

$w_{gap} := 2.5\ ft$ — width of section not connected to floor

$h_{gap} := 15\ ft + 3\ in$ — height of section not connected to floor

Wind load on this section of wall:

$V_{wind} := 115\ mph$ — wind speed (ASCE 7-16, Figure 26.5-1b) Category 2 building

$k_d := 0.85$ — ASCE 7-16, Table 26.6-1
$k_z := 0.85$ — ASCE 7-16, Table 26.10-1 (less than 15ft above ground level)
$k_e := 1.00$ — ASCE 7-16, Table 26.9-1
$k_{zt} := 1.0$ — ASCE 7-16, 26.8.2

$$q_z := 0.00256 \cdot k_z \cdot k_{zt} \cdot k_d \cdot k_e \cdot \left(\frac{V_{wind}}{mph}\right)^2 \cdot psf = 24.461\ psf$$ ASCE 7-16, 26.10-1

$G := 0.85$ — Gust effect factor, ASCE 7-16, 26.11.1
$Gcp_i := -0.18$ — ASCE 7-16, Table 26.13-1
$C_p := 0.8$ — ASCE 7-16, Figure 27.3-1

$$P_{wind} := \left(q_z \cdot C_p \cdot G - q_z \cdot Gcp_i\right) \cdot \frac{h_{gap}}{2} \cdot w_{gap} = 0.401\ kip$$ ASCE 7-16, 27.3-1

This is the wind load reaction at each end of the wall section, design connection to footing to carry this applied load:
Install nail plate (2x4) into concrete slab with concrete screws, install 4x4 block under existing end wall column and nail column to block, and block to nail plate.

Design Nail Plate:

2x Nail plate, calculate number of concrete anchors required to carry wind loads:
(2) 1/4" Tapcon Blue Concrete Screws or equivalent:

$N_{screw} := 3$ $\qquad \phi_{screw} := 0.25\ in$

$V_{screw} := 900\ lbf$ — assuming 1" of embedment into 2ksi concrete
$f_{red\_spacing} := 0.82$ — Reduction for 2in spacing (minimum allowable)
$f_{red\_edge} := 0.59$ — Reduction for 1-1/2" edge distance (Minimum allowable)

$$V_{allow} := V_{screw} \cdot f_{red\_spacing} \cdot f_{red\_edge} = 0.435\ kip$$

Check := if $N_{screw} \cdot V_{allow} \ge P_{wind}$
  ‖ "Screws Ok for applied loads"
else
  ‖ "Check"
= "Screws Ok for applied loads"

Ok with (2) Anchor screws, check with Powder Actuated nails:

Design Nail Plate:

Check design with Powder actuated nails:

$V_{nail} := 166\ \text{lbf}$ This is the shear strength of a single Powder Actuated nail, with 1" of embedment (assuming using the 1516SDC with 2-1/2" overall length, in 2ksi concrete)

$N_{nail} := 3$ Number of nails

$Check := \text{if } (N_{nail} \cdot V_{nail}) \ge P_{wind}$ = "Ok for Shear" (3) Nails Required

‖ "Ok for Shear"

else

‖ "Check"

Contractor may use either (3) 1516SDC Powder Actuated nails or 1/4" Tapcon Blue Concrete screws

Ramset DRIVING JOBSITE SPEED

PERFORMANCE/SUBMITTAL

Ramset fasteners may be specified by their type or catalog number to satisfy fastening requirements.

PIN SPECIFICATIONS

- Made from AISI 1060-1065 steel. Austempered to a core hardness of 52-56 Rc
- Typical tensile strength: 270,000 psi
- Typical shear strength: 162,000 psi
- STANDARD FINISHES
  Proprietary black
  Mechanical zinc plate to a minimum thickness of .0002 meets requirements of ASTM B695—Class 5 Type 1
  Ramguard

APPROVALS/LISTINGS

- ICC Evaluation Service, Inc.
  #ESR-2690 Sill Plate
  #ESR-1799 Powder Pins & Clips
- City of Los Angeles
  #RR-22668 Powder pins

ICC ES

FASTENERS IN NORMAL WEIGHT CONCRETE

PART NUMBER SERIES	SHANK DIAMETER (INCH)	MINIMUM PENETRATION (INCH)	INSTALLED IN STONE AGGREGATE CONCRETE CONCRETE COMPRESSIVE STRENGTH ALLOWABLE LOAD - *Ultimate Load*					
			2000 PSI		4000 PSI		6000 PSI	
			TENSION (LBS)	SHEAR (LBS)	TENSION (LBS)	SHEAR (LBS)	TENSION (LBS)	SHEAR (LBS)
1500/1600 SERIES	0.145	3/4	**50** *655*	**66** *739*	**100** *511*	**104** *552*	....	....
		1	**152** *943*	**166** *1229*	**157** *937*	**182** *1342*	....	....
		1-1/4	**159** *1078*	**265** *1665*	**179** *1043*	**267** *1538*	....	....
		1-1/2	**154** *1450*	**340** *2027*	**209** *1357*	**342** *1712*	....	....
SP SERIES	0.150	3/4	....	....	**150** *803*	**105** *786*	**81** *493*	**82** *454*
SP SERIES	.150/.180	1	**154** *1043*	**200** *1173*	**243** *1307*	**175** *1037*	**189** *1125*	**210** *1177*
		1-1/4	**207** *1553*	**230** *1636*	**298** *1749*	**218** *1471*	**213** *1568*	**305** *1780*
		1-1/2	....	....	**384** *2126*	**391** *1957*	**239** *1886*	**594** *2968*
1900 SERIES	0.145	3/4	**105** *694*	**71** *458*	**101** *685*	**99** *627*	....	....

Note 1: ALLOWABLE loads are shown in the LARGE BOLD font, *Ultimate* loads are shown in *smaller italic* font. **Note 2:** Testing conducted in accordance with ICC AC70 & ASTM E1190. **Note 3:** Safety factors are based on coefficient of variation. In accordance with ICC AC70, the safety factor will be no less than 5. **Note 4:** Values shown in concrete are for the fastener only. Connected members must be investigated separately. **Note 5:** Cyclic, fatigue, shock loads, and other design criteria may require a different safety factor. **Note 6:** Job site testing may be required to determine actual job site values. **Note 7:** Minimum edge distance is 3 inches unless otherwise approved. **Note 8:** For SI: 1 lbf = 4.448 N, 1 inch = 25.4 mm, 1 ksi = 6.89MPa

INSTALLED IN CONCRETE - CONCRETE COMPRESSIVE STRENGTH

PART NUMBER SERIES	SHANK DIA	EMBED	4000psi Normal Wt		6000psi Normal Wt		3000 Lt Wt on W Deck Lower Flute	
			Tension	Shear	Tension	Shear	Tension	Shear
TE SERIES	0.157	3/4	71	137	109	142	106	265
		1	278	216	214	400	152	327
		1-1/4	377	317	415	349	164	330
		1-1/2	242	479	-----	-----	238	448
TEC100 90° Ceiling Clip	0.157	7/8	207	-----	-----	-----	88	-----

Notes:
1) Fasteners tested to ASTM E1190 & ICC-ES AC70 (March 1, 2010)
2) Allowable loads are shown
3) Allowable loads and safety factors are based on coefficient of variation in accordance with ICC AC70, the safety factor will be no less than 5
4) Values shown for steel base materials have the pointed end of the fastener driven through the steel plate

INSTALLED IN A36 STRUCTURAL STEEL

PART NUMBER SERIES	SHANK DIA	SHANK TYPE	3/16		1/4		3/8		1/2	
			Tension	Shear	Tension	Shear	Tension	Shear	Tension	Shear
TE SERIES	0.157	KNURLED	323	606	562	673	934	820	603	766

INSTALLED IN A572-GR50 STRUCTURAL STEEL

PART NUMBER SERIES	SHANK DIA	SHANK TYPE	3/16		1/4		3/8		1/2	
			Tension	Shear	Tension	Shear	Tension	Shear	Tension	Shear
TE SERIES	0.157	KNURLED	442	676	630	662	760	725	582	532

FASTENERS IN NORMAL WEIGHT CONCRETE / STEEL

WWW.RAMSET.COM MADE IN AMERICA Ramset 41

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Design connection from nail plate to block to wall end column:

#8 wood screw:

$N_{screw} := 3$

$W := 82 \ \frac{lbf}{in}$ Table 11.2b, NDS 2012 withdrawal of #8 wood screws

$Z := 78 \ \frac{lbf}{in}$ Table 11L, NDS 2012 for #8 wood screws with 1in side member thickness (conservatively)

$C_D := 1.6$ NDS Table 2.3.2, wind load factor

$C_M := 1.0$ $C_t := 1.0$ $C_g := 1.0$ $C_\Delta := 1.0$

$C_{eg} := 1.0$ $C_{di} := 1.0$ $C_{tn} := 1.0$ Toe nail factor for screws is 1.0

$Z' := Z \cdot C_D \cdot C_M \cdot C_t \cdot C_g \cdot C_\Delta \cdot C_{eg} \cdot C_{di} \cdot C_{tn} = 124.8 \ \frac{lbf}{in}$ Table 10.3.1, NDS 2012

$W' := W \cdot C_D \cdot C_t \cdot C_{eg} \cdot C_{tn} = 131.2 \ \frac{lbf}{in}$ Table 10.3.1, NDS 2012

$W_{applied} := \frac{P_{wind}}{\cos(45 \ deg)} = 567.109 \ lbf$ total withdrawal force

$L_{embed} := 1.5 \ in = 1.5 \ in$ this is the required embedment depth into the nail plate, at a 45deg angle

$W_{resist} := (W' \cdot L_{embed}) \cdot N_{screw} = 590.4 \ lbf$

Check := if $W_{applied} \le W_{resist}$ = "Ok for Withdrawal"
  "Ok for Withdrawal"
else
  "Check"

$Z_{resist} := (Z' \cdot L_{embed}) \cdot N_{screw} = 561.6 \ lbf$

Check := if $P_{wind} \le Z_{resist}$ = "Ok for Shear"
  "Ok for Shear"
else
  "Check"

(3) #8 wood screws required to carry applied wind loads, conservatively use GRK-RSS 1/4" Diameter screws, these do not split the wood and are stronger than wood screws.

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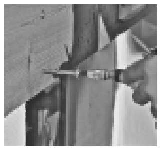
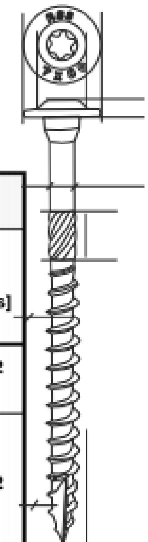
rss.pdf 2 2014-12-19 10:40 AM

RSS™ Technical Data

Building Code Approved with a Limited Lifetime Warranty.
Scan to view to view for detailed
IBC/IRC Code Compliant ESR #2442



RSS™ Rugged Structural Screws: Ideal for anywhere you would use a traditional lag screw and more. High tensile torque and shear strength means a 5/16" diameter RSS™ screw has the same strength as a 1/2" lag screw. Available from #10 up to 3/8" diameters in lengths from 1-1/2" to 16". Approved for use in all applications that include treated lumber. Also available in *PHE*INOX™ Stainless Steel, RSS™ JTS used for joists and trusses, RSS™ LPS for structural insulated panel systems and RSS™ LTF designed for log home and timber frames.



	FASTENER DESIGNATION	OVERALL LENGTH[1] (inches)	LENGTH OF THREAD[2] (inches)	MINOR THREAD DIAMETER[3] (inches)	SHANK DIAMETER[3] (inches)	OUTSIDE THREAD DIAMETER[3] (inches)	ALLOWABLE STEEL STRENGTH		
							Bending Yield Strength[4] F_{yb} (psi)	Tensile (psi) [pounds]	Shear (psi) [pounds]
RSS	1/4 x 2 1/2"	2 3/8	1 1/2	0.150	0.169	0.239	170,427	188,301 [3,336]	127,792 [2,264]
RSS	1/4 x 3 1/8"	3 1/8	2						
RSS	1/4 x 3 1/2"	3 1/2	2 3/8						
RSS	5/16 x 2 1/2"	2 3/8	1 1/2	0.174	0.199	0.280	190,920	178,051 [4,247]	123,592 [2,948]
RSS	5/16 x 2 3/4"	2 3/4	1 3/4						
RSS	5/16 x 3 1/8"	3 1/8	2 1/8						
RSS	5/16 x 3 1/2"	3 1/2	2 1/2						
RSS	5/16 x 4"	3 7/8	2 3/4						
RSS	5/16 x 5 1/8"	5	3 1/2						
RSS	5/16 x 6"	5 7/8	3 7/8						
RSS	3/8 x 3 1/8"	3 1/8	2 1/8	0.191	0.223	0.310	178,080	203,809 [5,824]	129,305 [3,695]
RSS	3/8 x 4"	3 7/8	2 3/4						
RSS	3/8 x 5 1/8"	5 1/8	3 1/2						
RSS	3/8 x 6"	5 7/8	4						
RSS	3/8 x 7 1/4"	7	4 1/2						
RSS	3/8 x 8"	7 7/8	4 3/8						
RSS	3/8 x 10"	9 3/4	5						
RSS	3/8 x 12"	11 7/8	5 7/8						
RSS	3/8 x 14 1/8"	14 1/8	5 7/8						
RSS	3/8 x 16"	15 5/8	5 3/4						
LPS	1/4 x 8"	7 7/8	2 7/8	0.152	0.172	0.238	172,620	172,950 [3,155]	109,635 [2,000]
LTF	3/8 x 8"	7 7/8	3 7/8	0.191	0.220	0.310	167,580	179,390 [5,144]	114,525 [3,284]
LTF	3/8 x 10"	9 7/8	3 7/8						
LTF	3/8 x 12"	11 3/4	3 7/8						
PHE INOX	1/4 x 2 1/2"	2 3/8	1 1/2	0.152	0.170	0.237	111,460	103,799 [1,886]	90,260 [1,640]
PHE INOX	5/16 x 2 1/2"	2 3/8	1 5/8	0.171	0.195	0.276	118,360	104,767 [2,419]	86,880 [2,006]
PHE INOX	5/16 x 3 1/8"	3 1/8	2 1/8						
PHE INOX	5/16 x 4"	3 7/8	2 1/2						
PHE INOX	5/16 x 5 1/8"	5 1/8	3 3/8						
PHE INOX	5/16 x 6"	5 7/8	3 7/8						
JTS	1/4 x 3 3/8"	3 3/8	1 3/8	0.153	0.173	0.240	226,373	180,999 [3,312]	126,131 [2,308]
JTS	1/4 x 5"	5	1 5/8						
JTS	1/4 x 6 3/4"	6 3/4	1 1/2						

For **SI:** 1 inch = 25.4 mm; 1 psi = 6.9 kPa.

ULTIMATE LOAD VALUES TENSILE AND SHEAR