UNITED SCAFFOLD SUPPLY COMPANY INC

FORMWORK & SCAFFOLDING

Ring-Loc System
Technical Manual

Canada: CAN/CSA – S269.2 – M87

USA: ANSI/ASSE A10.8-2001

Ring-Loc System Technical Manual 2015

United Scaffold Supply Company Inc

www.unitedscaffold.ca

info@unitedscaffold.ca

Table of Contents

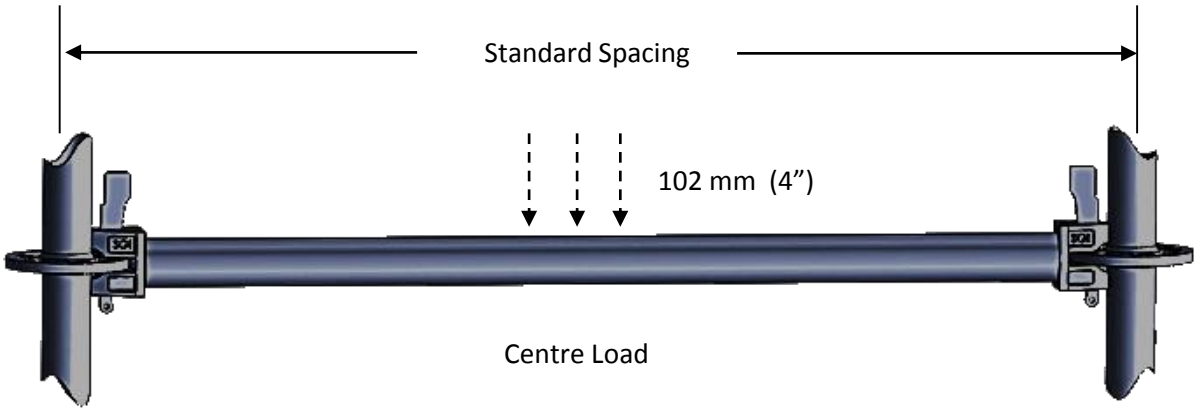
Engineering Data & Component Allowable Loads

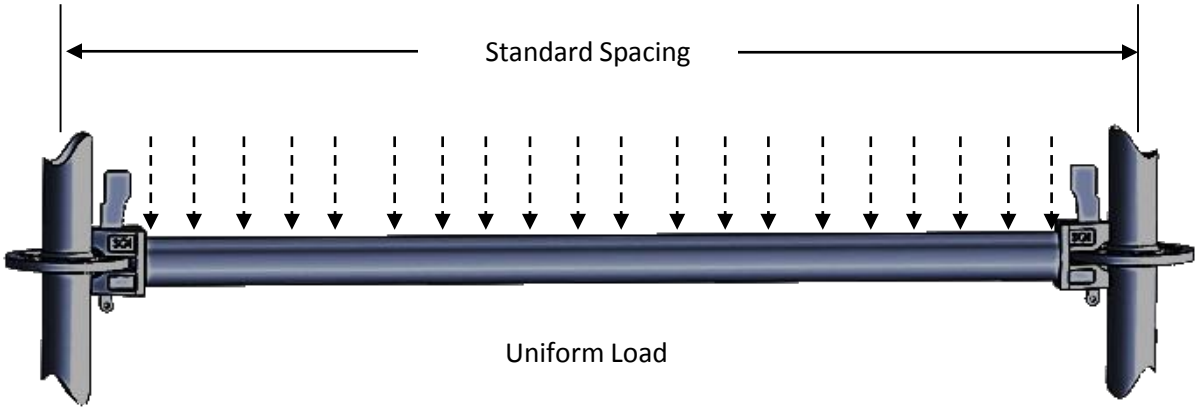
- All Allowable Compression load test is done in accordance with CSA Standard S269.2 M87
- Testing in accordance with CAN/CSA – S269.2 – M87 & ANSI/SSFI SC100, (4:1 factor ratio) & ANSI/ASSE A10.8, EN74-SEC7.2
- Steel Tube test in accordance with ASTM E1019-08 and D1976-07 Mod
- Aluminum Tube test in accordance with ASTM A370-10
- Rosette Tested in accordance with ASTM E415.08 & ASTM E23-07 ae1 +20 & -40 °C
- All Welding is carried out in accordance with CSA S269-2-M87 W59-03
- Anchor Points Personal Protection Equipment (PPE) - The test standard is according to the Canadian Standards Association/ Z259.2.1-98 & Z259.2.2 -98

Vertical Shear Test

Ledgers

Ledger Length		Allowable Center Load (CSA)		Allowable Uniform Load (CSA)		Allowable Center Load (ANSI)		Allowable Uniform Load (ANSI)		Part No.
m	in	kN	lb	kN/m	lb/ft	kN	lb	kN/m	lb/ft	
3.05	10’	1.1	250	0.74	53	1.1	250	0.74	53	060201
2.13	7’ 0”	1.62	362	1.57	108	1.62	362	1.57	108	060202
1.57	5’ 2”	2.27	510	2.90	200	2.27	510	2.90	200	060203
1.15	3’ 10”	2.80	640	4.70	320	2.80	640	4.70	320	060204
0.65	2’ 2”	5.56	1250	17.5	1200	5.56	1250	17.5	1200	060205

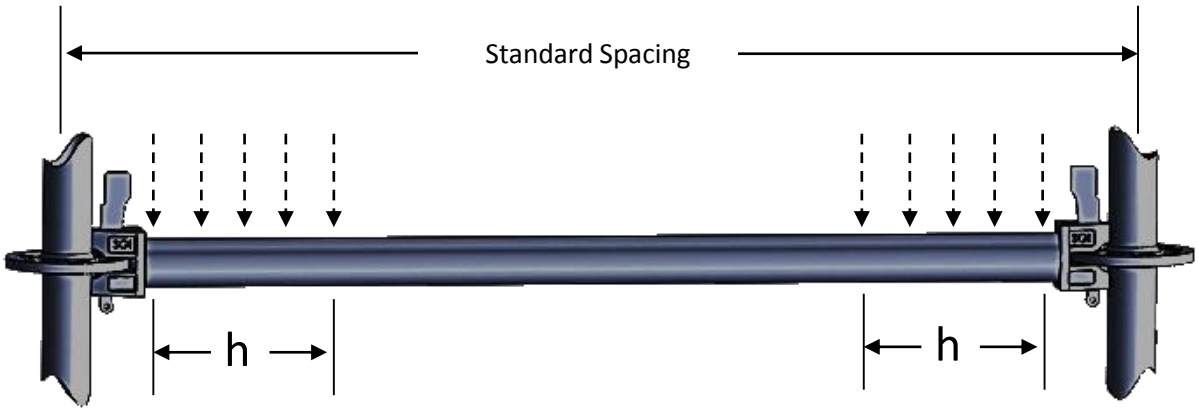




Ledger Test

Ledgers

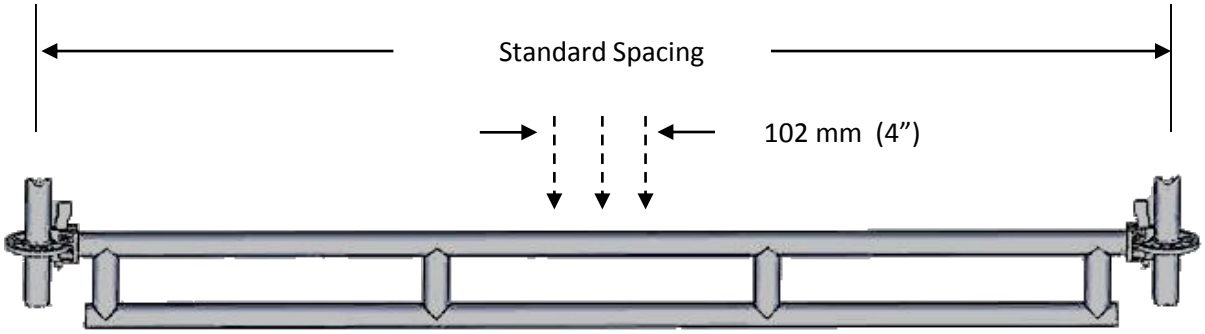
Ledger Length		Loading Distance (h)		Loaded Symmetrically at ends (CSA)				Loaded Symmetrically at ends (ANSI)				Part No.
m	in	m	in	kN	lb	kN/m	lb/ft	kN	lb	kN/m	lb/ft	
1.57	5’ 2”	0.48	19”	2.6	585	5.4	370	2.6	585	5.4	370	060203
1.57	5’2”	0.56	22”	2.2	500	4.0	274	2.2	500	4.0	274	060203
1.15	3’ 10”	0.48	19”	2.6	585	5.4	370	2.6	585	5.4	370	060204



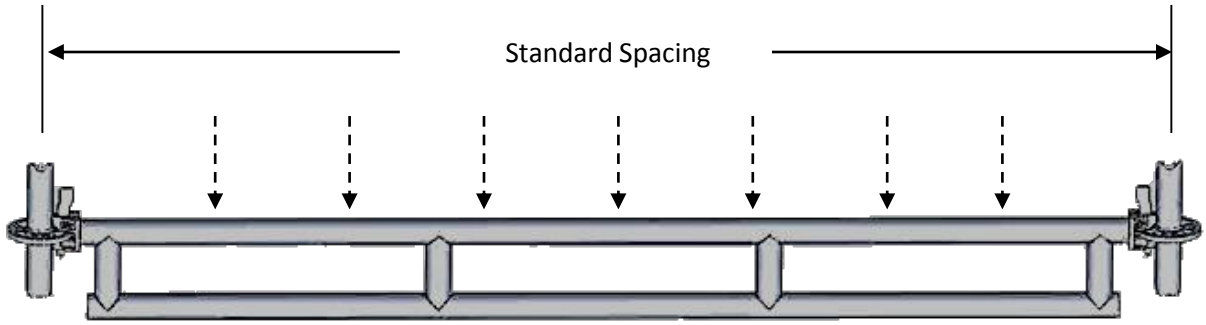
Double Ledger Test

Double Ledgers

Truss Ledger Length		Allowable Center Load (CSA)		Allowable Uniform Load (CSA)		Allowable Center Load (ANSI)		Allowable Uniform Load (ANSI)		Part No.
m	in	kN	lb	kN/m	lb/ft	kN	lb	kN/m	lb/ft	
3.05	10’ 0”	6.5	1460	5.4	367	6.5	1460	5.4	367	060701
2.13	7’ 0”	8.9	2000	10.4	714	8.9	2000	10.4	714	060702

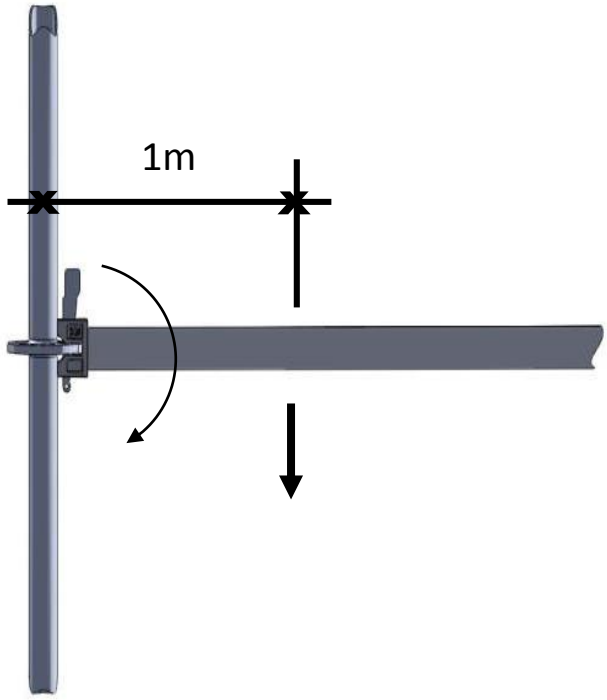


Centre Load



Uniform Load

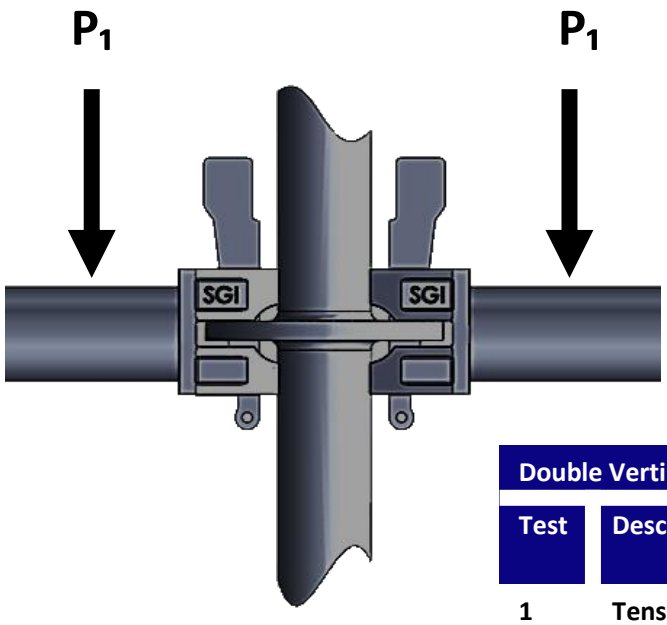
45° Cross Brace at Rosette/Moment at Ledger Rosette



Moment Ledger/Rosette Test		
Test	**Description**	**Maximum Load (lb/ft)**
1	**Moment Ledger/Rosette Test**	**1007**
2	**Moment Ledger/Rosette Test**	**1276**
3	**Moment Ledger/Rosette Test**	**1169**
4	**Moment Ledger/Rosette Test**	**1157**

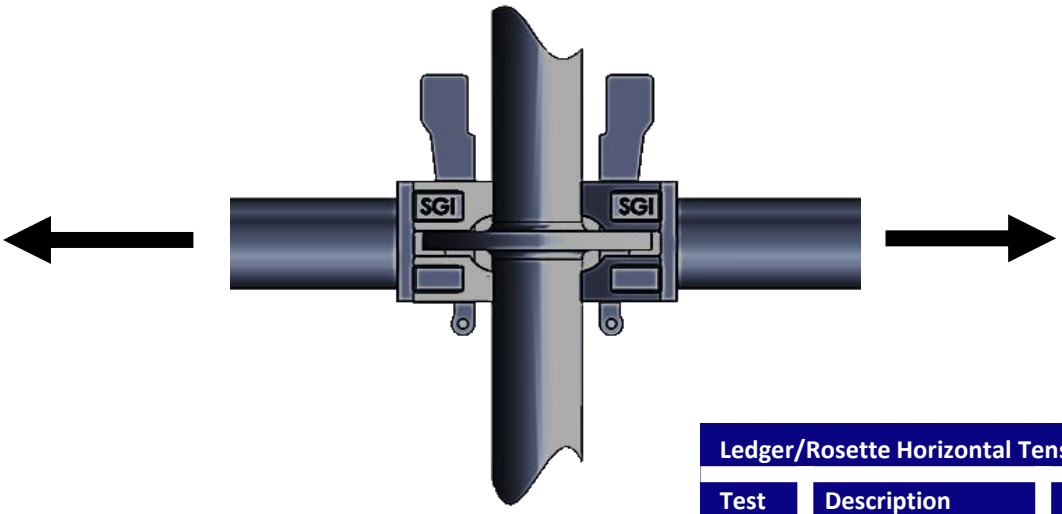
45° Cross Brace at Rosette		
Test	**Description**	**Maximum Load (lb/ft)**
1	45° Cross Brace at Rosette	**7700**
2	45° Cross Brace at Rosette	**8450**
3	45° Cross Brace at Rosette	**8200**
4	45° Cross Brace at Rosette	**7900**

Vertical Shear/Tension Test



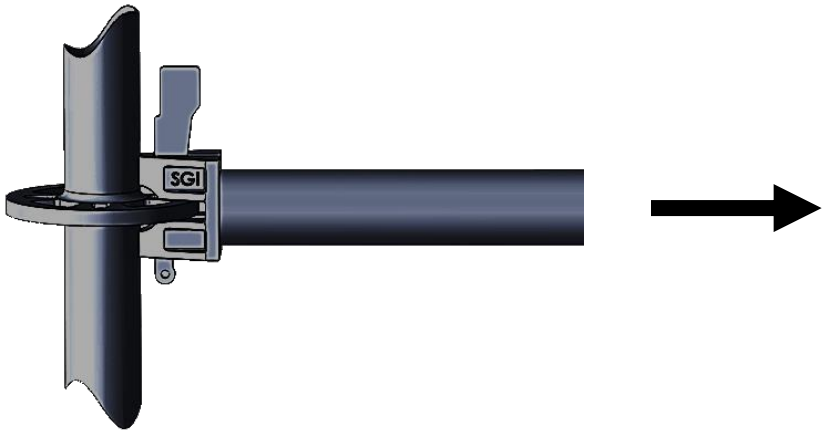
P_1 = Safe Working Load = 4930/2 = 2465 lbs

Double Vertical Shear Ledger/Rosette Test			
Test	**Description**	**Load (lb/ft)**	**4:1 Safety Factor (lbs)**
1	Tension/Rosette	19722	4930

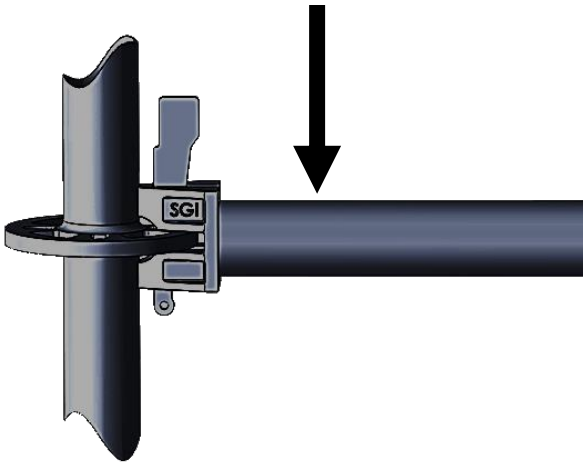


Ledger/Rosette Horizontal Tensile Test – Double Load			
Test	**Description**	**Load (lb/ft)**	**4:1 Safety Factor (lbs)**
1	Rosette Deflection	10440	2610

Tension/Vertical Shear Test



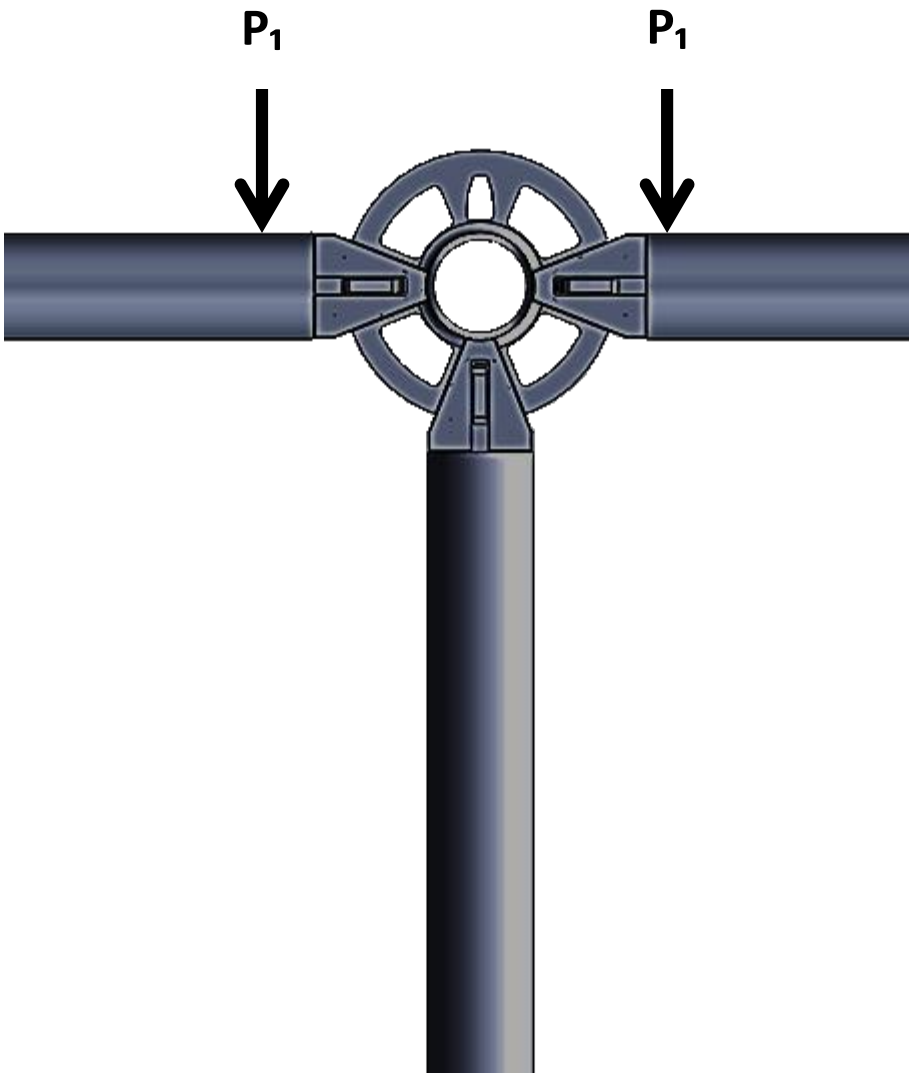
Tension Ledger/Rosette Test – Single Load			
Test	Description	Load (lb/ft)	4:1 Safety Factor
1	Horizontal Shear test	11350	2838



Single Vertical Shear Ledger/Rosette Test			
Test	Description	Load (lb/ft)	4:1 Safety Factor
1	Vertical Shear Test	10944	2736

Shear Test

Horizontal Shear Ledger/Rosette Test			
Test	Description	Load (lb/ft)	4:1 Safety Factor (lbs)
1	Horizontal Shear Test	23545	5886



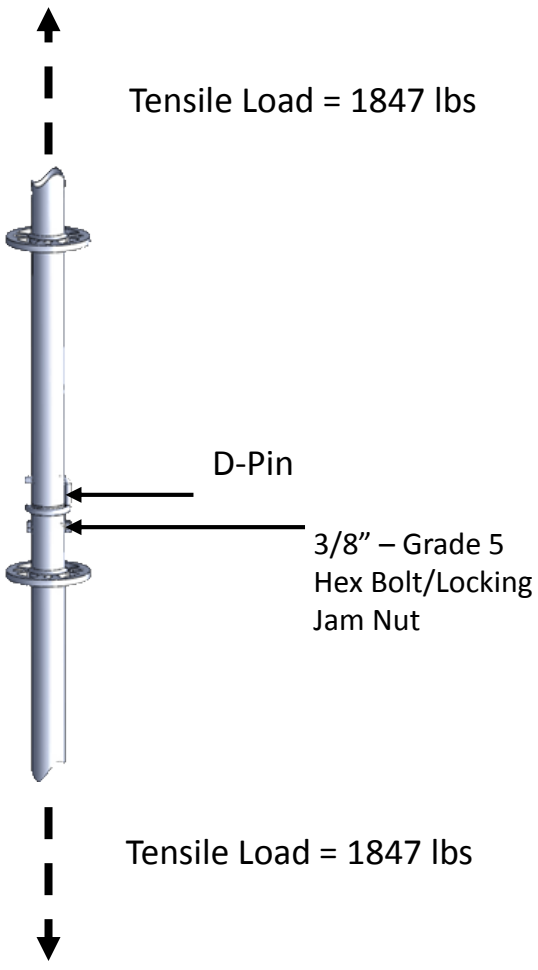
Horizontal Shear Test - Rosette/Ledger test

P_1 = Safe Working Load = 5886/2 = 2943 lbs

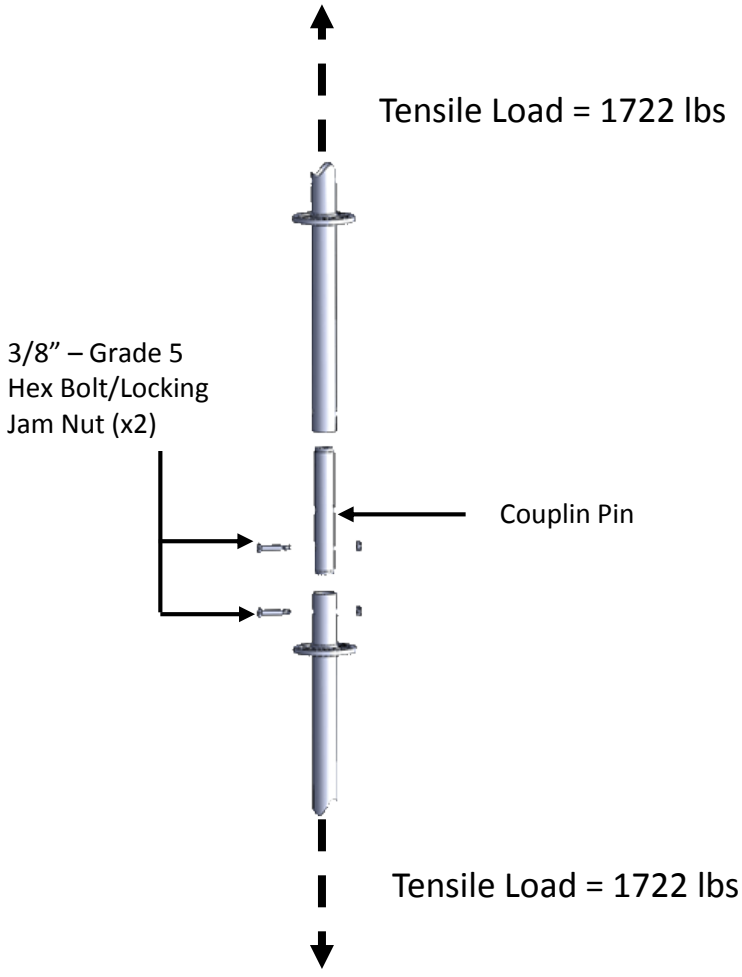
Tensile Test

Tensile Test using D-Pin vs Hex Bolt

Coupling Type	Maximum Allowable Tensile Load	
	kN	Lb/ft
A) Standard D-Pin	8.20	1847
B) 3/8” – Hex Bolt	7.05	1722



A) Test using standard D-Pin & Grade 5 Hex Bolt/Self Locking Jam Nut



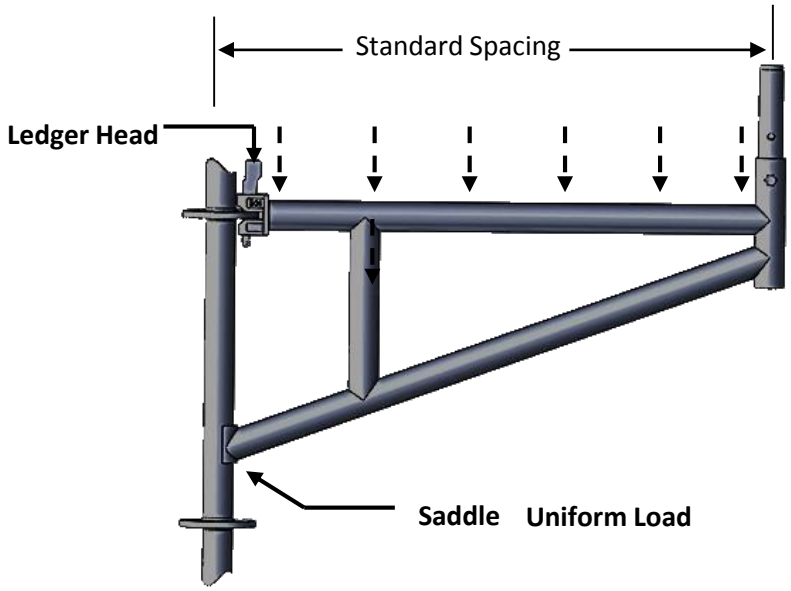
B) Test using Grade 5 Hex Bolt & Self Locking Jam Nut

Coupling Pins are designed to resist nominal tensile loads, such as those created by uplift and/or overturning loads. When Suspending (hanging) scaffold, the coupling pin can be bolted using D-pin or Grade 5 Hex Bolt & Self Locking Jam Nut. The appropriate loads must be used carefully.

Side Bracket with Single Head Ledger

Side Bracket with Single Ledger Head Test

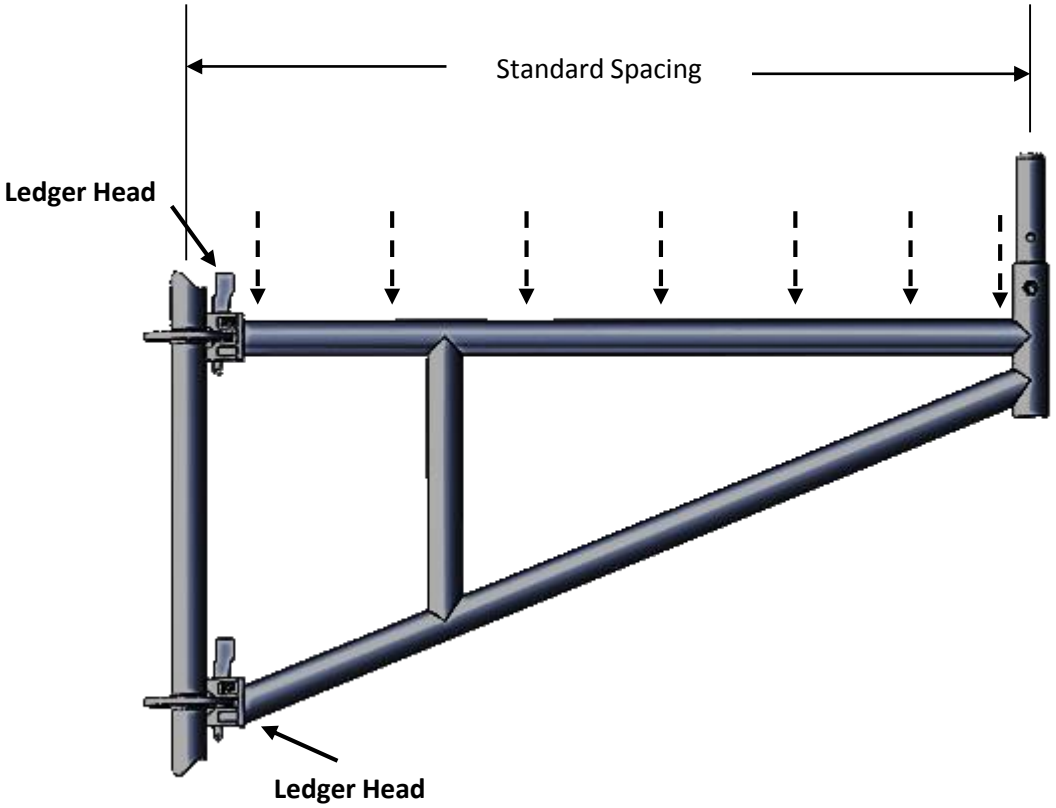
Description	Length		Allowable Uniform Load (CSA)		Allowable Uniform Load (ANSI)		Part No.
	m	in	kN	lb/ft	kN	lb/ft	
Side Bracket 2’2”	0.65	2’2”	4.89	1100	4.89	1100	060601
Side Bracket 2’11”	0.88	2’11”	4.89	1100	4.89	1100	060602
Wall Side Bracket 2’2”	0.65	2’2”	4.89	1100	4.89	1100	060603
Wall Side Bracket 2’11”	0.88	2’11”	4.89	1100	4.89	1100	060604



Side Bracket with Double Head Ledger

Side Bracket with Double Ledger Head Test

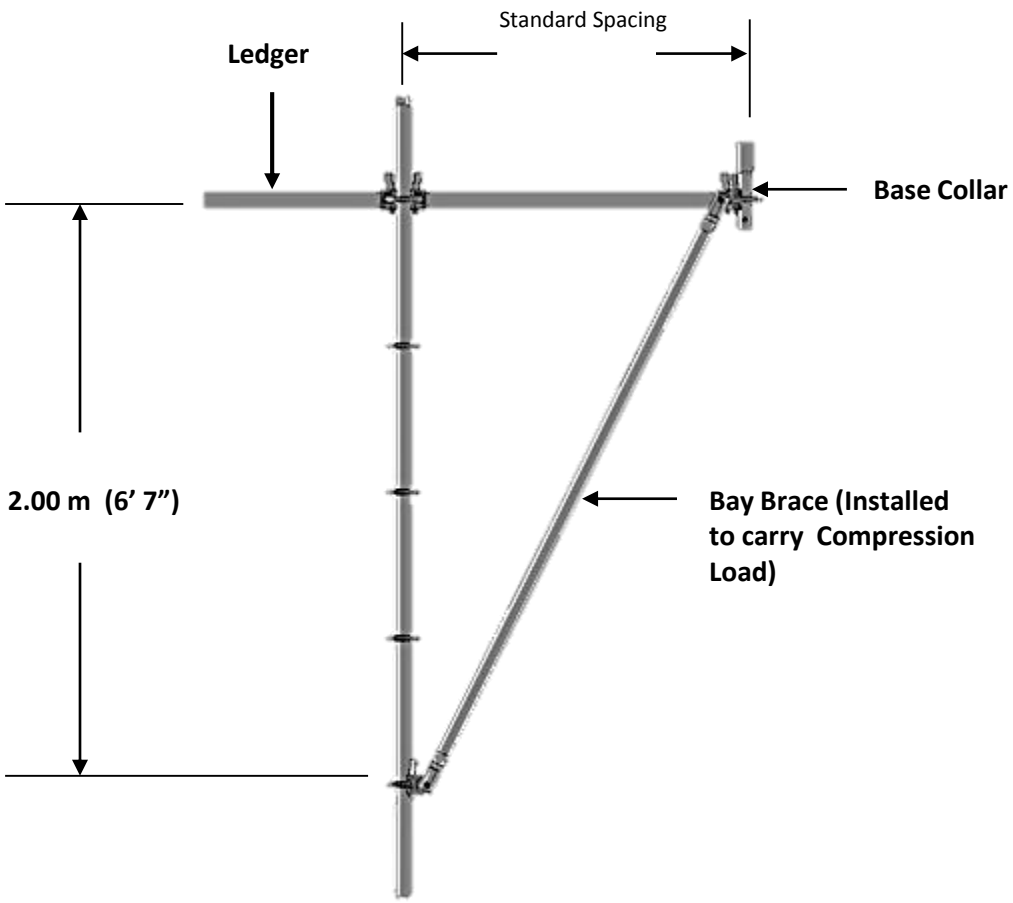
Length		Allowable Uniform Load (CSA)		Allowable Uniform Load (ANSI)		Part No.
m	in	kN	lb/ft	kN	lb/ft	
1.15	3’10”	4.89	1100	4.89	1100	060603



Cantilever Assembly

Cantilever Assembly Components

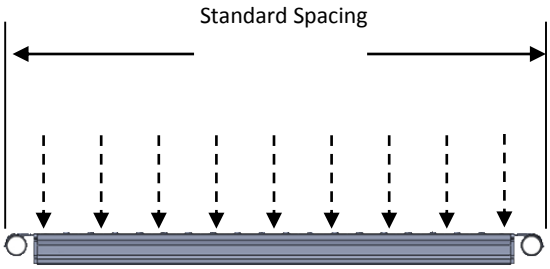
Length of Ledger		Allowable Concentrated Load (CSA)				Allowable Concentrated Load (ANSI)				Part No.
		Single Bay Brace		Double Bay Brace		Single Bay Brace		Double Bay Brace		
m	in	kN	lb/ft	kN	lb/ft	kN	lb/ft	kN	lb/ft	
1.15	3’10”	2.38	536	4.79	1076	2.38	536	4.79	1076	060202
1.57	5’2”	2.16	485	3.54	796	2.16	485	3.54	796	060203
2.13	7’	1.85	416	2.56	580	1.85	416	2.56	580	060204

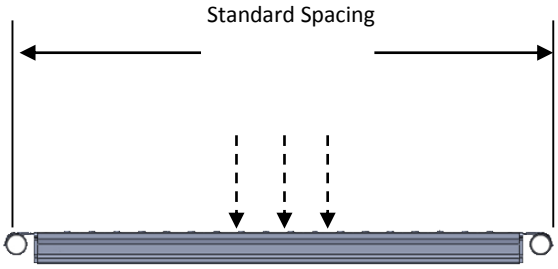


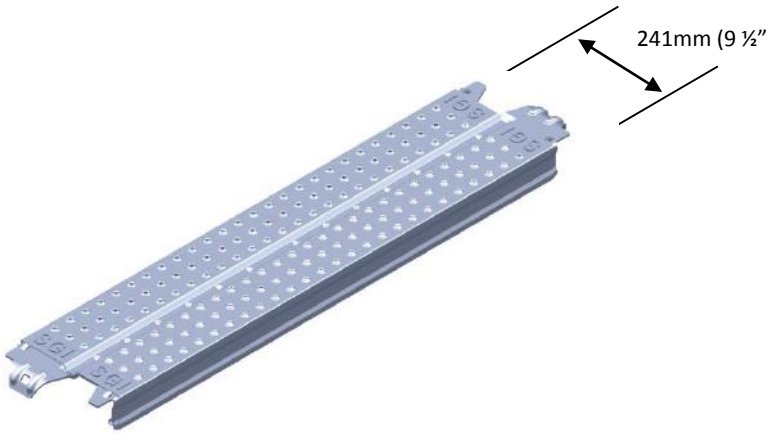
Steel Plank

Steel Plank Test

Plank Length		Allowable Concentrated Load (CSA)		Allowable Uniform Load (CSA)		Allowable Concentrated Load (ANSI)		Allowable Uniform Load (ANSI)		Part No.
m	in	kN	lb	kN/m	lb/ft²	kN	lb	kN/m	lb/ft²	
1.15	2’2”	1.6	350	1.2	78.1	1.6	500	1.2	234.00	061701
1.57	3’10”	1.6	350	1.2	78.9	1.6	500	1.2	234.00	061702
1.57	5’2”	1.6	350	1.2	79.10	1.6	500	1.2	234.00	061703
2.13	7’	1.6	350	1.2	77.32	1.6	500	1.2	234.00	061704
3.05	10’	1.1	250	0.60	38.80	1.6	430	.60	90.00	061705







Lattice Girder

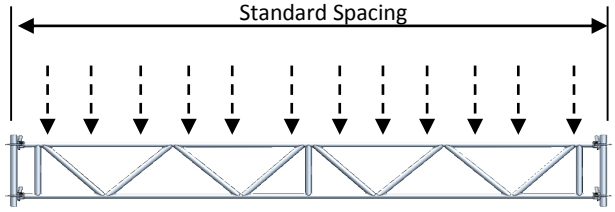
Lattice Girder

Length		Allowable Uniform Load (CSA)		Allowable Uniform Load (ANSI)		Part No.
m	in	kN	lb	kN	lb	
4.26	14’	5.3	360	5.3	360	060801
5.18	17’	4.3	295	4.3	295	060802
6.39	21’	3.5	240	3.5	240	060803
8.52	28’	2.6	180	2.6	180	060804

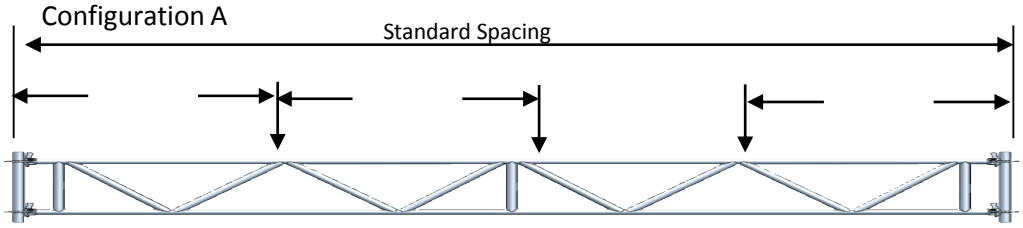
Multiple Concentrated Point Loads

Config.	Qty. of Load Points	Equal Spacing (d)		Allowable Load at each Point (P)	
		m	in	kN	Lb
A	3	2.13	7’0”	4.4	1000
B	2	2.13	7’0”	6.7	1500
C	1	2.59	8’6”	8.9	2000
D	1	2.13	7’0”	8.9	2000

Note: This chart is based on Lattice Girder strength only. The maximum load must be determined from either platform material strength, standard load capacity or the chart above, whichever is less.

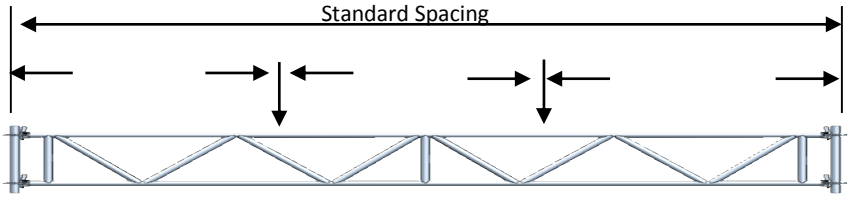


Configuration A

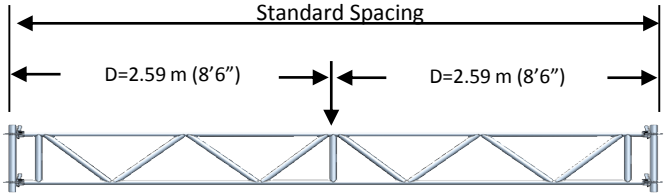


D=2.13 m (7’0”) D=2.13 m (7’0”) D=2.13 m (7’0”) D=2.13 m (7’0”)

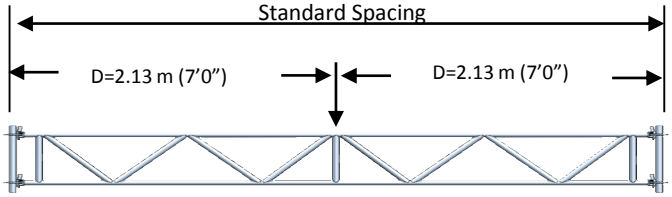
Configuration B



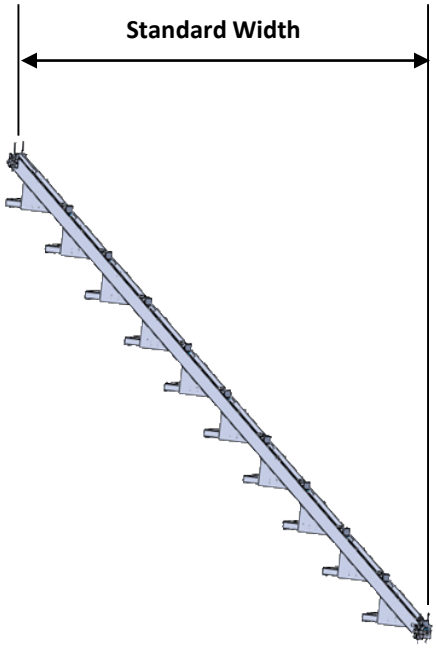
Configuration C (Load Mid Span)

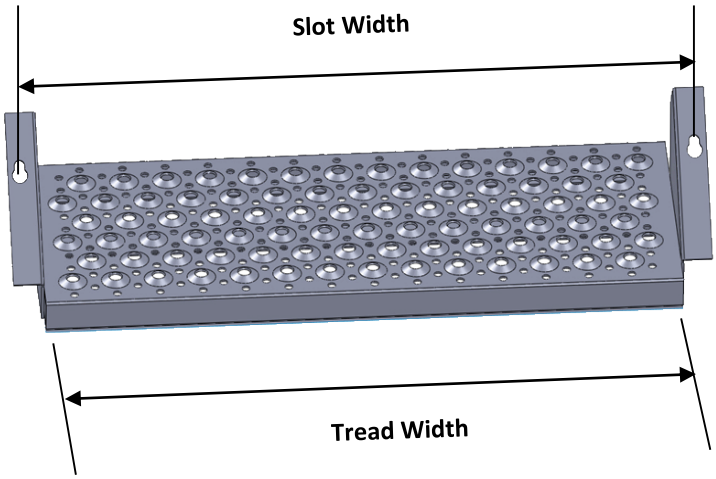


Configuration D (Load Mid Span)



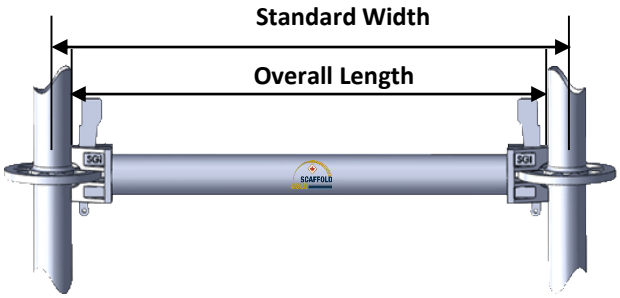
Stair Stringer Set





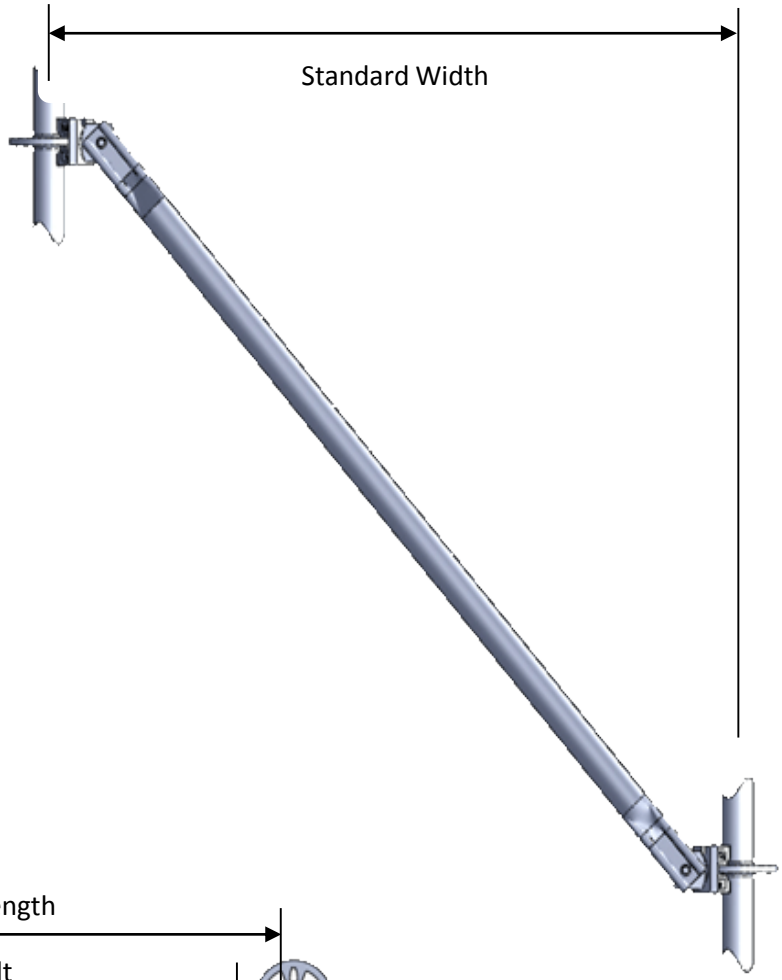
Standard Width		Stringer Length		Weight	
m	ft	m	ft	kg	lbs
2.13	7’	2.99	9’10”	21	46

Tread Width		Slot Spacing		Weight		Uniform Load (4:1 safety Factor)
m	ft	m	ft	kg	lbs	
.81	32”	.86	34”	7.4	16.3	1979 lbs

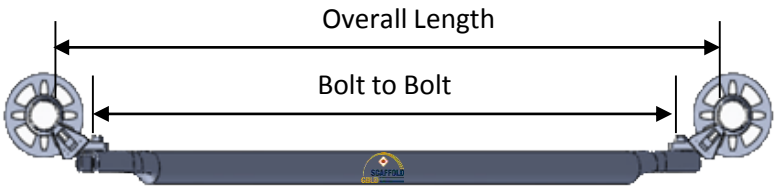


Standard Width		Overall Length		Weight		Centre Load (4:1 Safety Factor)	Uniform Load (4:1 Safety Factor)
m	in	m	in	kg	lbs		
1.07	3’6”	1.04	3’4”	4.4	9.6	833 lbs	1113 lbs

Bay Brace

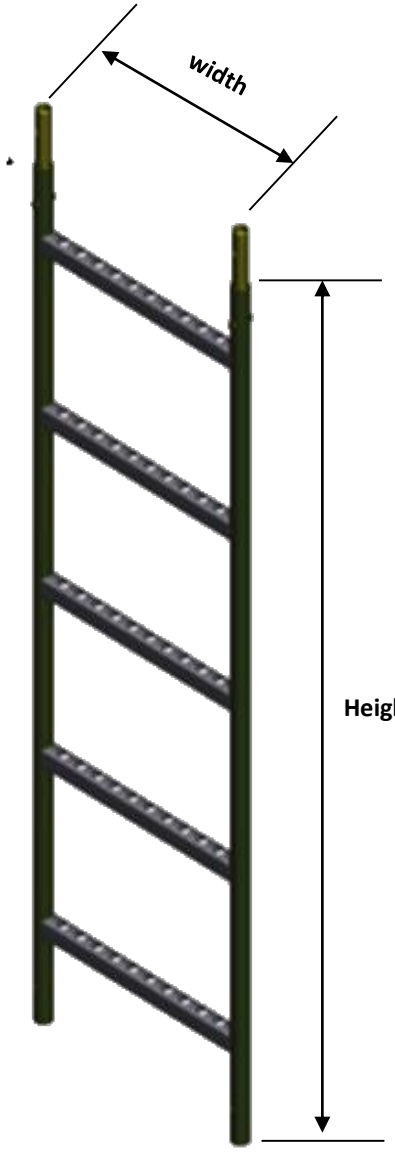


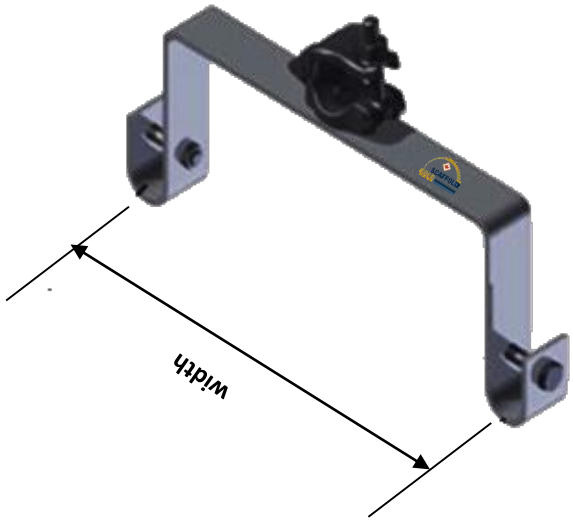
Bolt to Bolt		
Size	m	ft
10’	3.52	11’6”
7’	2.81	9’3”
5’2”	2.45	8’
3’10”	2.23	7’4”



Standard Width		Overall Length		Weight		Allowable Uniform Load		Part No.
m	in	m	in	kgs	lbs	kN/m	lb/ft	
2.13	7’	2.96	9’ 9”	7.9	17.4	0.90	61.7	060402

Access Ladder & Ladder Bracket





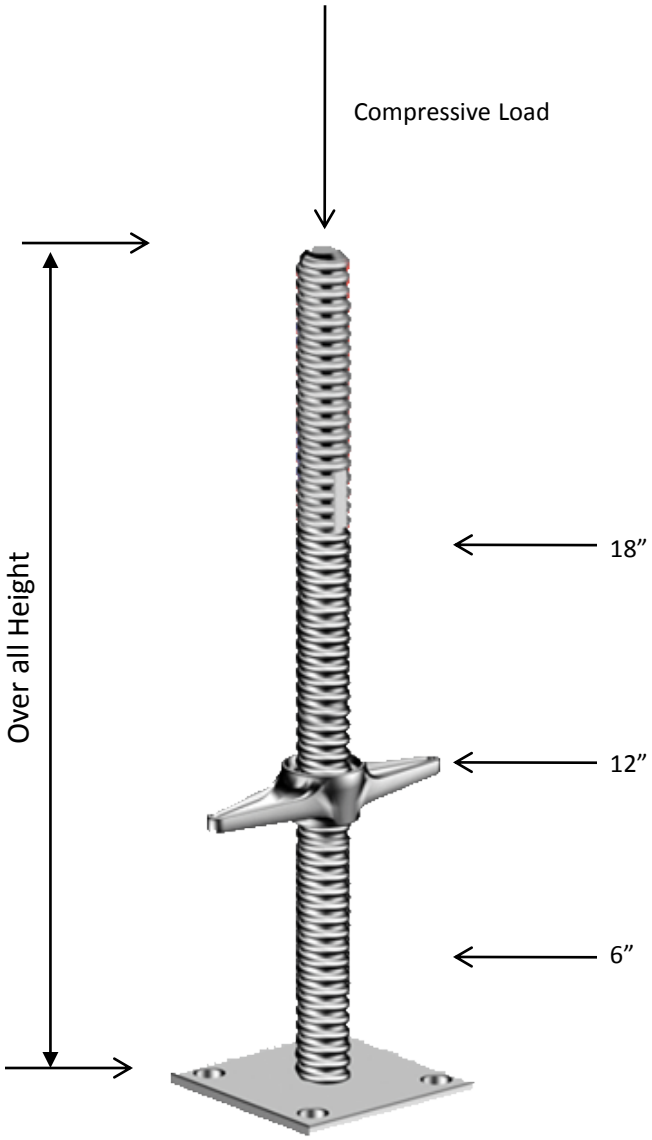
Bracket Width		Weight		Part #
m	in	kg	lbs	
0.43	17”	3.0	6.6	061201

Ladder Height		Ladder Width		Weight		Allowable Uniform load		Part #
m	in	m	in	kg	lbs	kN/m	lb/ft	
1.52	5’	.43	17”	6.5	14.3	0.75	51.4	061101
.91	3’	.43	17”	4.2	9.24	0.75	51.4	061102

Screw Jack

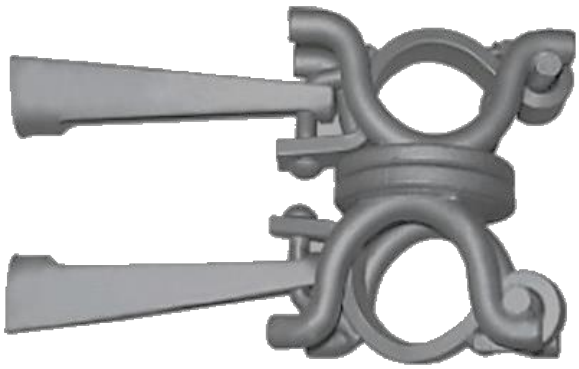
Screw Jack Compression Test

Test	Mode	Load (lb)	4:1 Safety Factor
6”	Compression Test	80450	20110
12”	Compression Test	75390	18845
18”	Compression Test	66120	16530



Wedge Clamp

Right Angle Wedge Clamp



Swivel Wedge Clamp

Loading

SSFI specifies that load must be applied in 500 lb increments, with a one-minute wait before applying the next 500 lb. EN 74 merely states that, after a particular pre-load has been applied, the clamp "shall be subjected to a uniformly increasing load."

EN 74 specifies that the combination of slippage and rotation of the clamp must not exceed 7 mm (just over ¼"). SSFI merely wants to know when the clamp breaks.
EN 74 has a requirement that an applied load of 10 kN (2,248lb) must not cause the clamp to slip more than 5 mm (slightly under ¼"). SSFI specifies that the slip capacity is reached when the clamp slips ¼" down the tube. In both cases, if the clamp fails before that value, the failure load is the determining factor.

CSA requires that the failure load and any type of deformation, such as buckling, is to be recorded as well as the load at which the deformation began to take place.

Description	Slip Load +20° c lb = kN	Slip Load - 40° c lb = kN	Weight		Part #
			Kg	Lbs	
Right Angle Wedge Clamp 1.90" x 1.90"	9123 lb = 33.7 kN Less 7 mm deflection	11000 lb = 40.7 kN Less 5mm deflection	1.5	3.3	061601
Swivel Wedge Clamp 1.90" x 1.90"	3212 lb = 11.9 kN Less 5 mm deflection	3128 Lb = 11.6 kN Less 5 mm deflection	1.6	3.5	061602

Ring-Loc System Test Program

TEST CERTIFICATE — EAR-CONTROLLED DATA
Date: 8/23/2013
P.O. No.: 2013-8-22
W/O No.: SCA022-08-13-22490-2

SIDE BRACKET LOAD TEST

Test Item: 3'10" Side bRacket
Test Method: ANSI/SSFI SC100-5/05

Point Load

Sample #	Max Load (lbs)	Load at 4:1 Safety Factor (lbs	(%) Deviation from Average	End Result
1	4,100	1,025	0	Deflection of vertical post
2	4,100	1,025	0	Deflection of vertical post
3	4,100	1,025	0	Deflection of vertical post
Average	4,100	1,025	….	….


Point Load Test


Deflection of Post

Ring-Loc System Test Program

TEST CERTIFICATE — EAR-CONTROLLED DATA

Date: 6/28/2013
P.O. No.: CAN/CSA SW
W/O No.: SCA022-06-17-19477-1

SLIP LOAD TEST RESULTS

Test Item: Swivel Clamp with T-Bolt (part # 061607)
Test Method: CAN CSA S269.2-M87, Section 11.3.3.2
Rigid tube angled at 45°

Coupler bolts tightened to a torque of 40 ft.lbs (54 kNm)

Specimen #	Load at ¼"(6.35 mm) Travel (lbs)	Load (kN)	Deviation from Average (%)
1	2500	11.1	9
2	2500	11.1	9
3	3000	13.3	9
4	3000	13.3	9
Average	**2,750**	12.2	….
Average at 4:1 SF	**690**	3.6	….

Slip Load Test Setup

During testing, the coupler slipped at the vertical tube, as well as the secured angled tube. In addition, it was observed that the coupler attached to the angled tube underwent rotation during the downward force application. The reported load values were taken after a slip travel of ¼" (6.35 mm) had been reached.

Ring-Loc System Test Program

TEST CERTIFICATE — EAR-CONTROLLED DATA

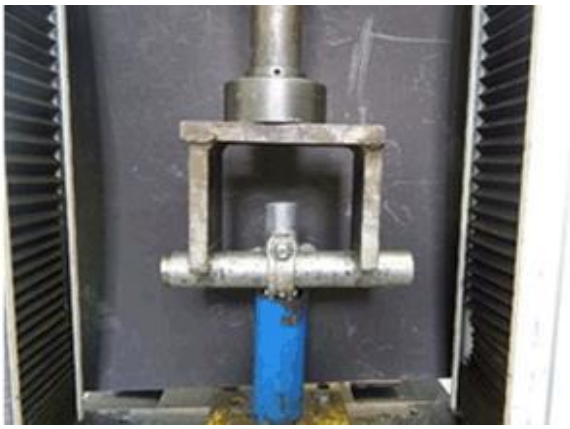
Date: 6/28/2013
P.O. No.: CAN/CSA SW
W/O No.: SCA022-06-17-19477-1

DISTORTION LOAD TEST RESULTS

Test Item: Swivel Clamp with T-Bolt (part # 061607)
Test Method: CAN CSA S269.2-M87, Section 11.3.3.2
Tested on Galvanized Tubes

Bolts tightened to a torque of 40 ft.lbs (54 kNm)

Specimen #	Load (lbs)	Load (kN)	Deviation from Average (%)	Test Result
1	12,190	54.2	3	Coupler Connector Shear
2	13,195	58.7	5	Coupler Connector Shear
3	12,170	54.1	3	Coupler Connector Shear
4	12,710	56.5	1	Coupler Connector Shear
Average	**12,565**	**55.9**	….	….
Average at 4:1 SF	**3,140**	**14.0**	….	….



Typical Distortion Load Test Setup

Typical Distortion Load Test Result

Ring-Loc System Test Program

TEST CERTIFICATE — EAR-CONTROLLED DATA

Date: 6/28/2013
P.O. No.: CAN/CSA RA
W/O No.: SCA022-06-17-19477-2

SLIP LOAD TEST RESULTS

Test Item: Rigid Clamp with T-Bolt (Part # 061607)
Test Method: CAN CSA S269.2-M87, Section 11.3.3.2
Tested on Galvanized Tubes

Coupler bolts tightened to a torque of 40 ft.lbs (54 kNm)

Specimen #	Load at ¼"(6.35 mm) Travel (lbs)	Load (kN)	Deviation from Average (%)
1	2500	11.1	9
2	2500	11.1	9
3	3000	13.3	9
4	3000	13.3	9
Average	**2,750**	12.2	….
Average at 4:1 SF	**690**	3.6	….

Slip Load Test Setup

Ring-Loc System Test Program

TEST CERTIFICATE — EAR-CONTROLLED DATA

Date: 6/28/2013
P.O. No.: CAN/CSA RA
W/O No.: SCA022-06-17-19477-2

DISTORTION LOAD TEST RESULTS

Test Item: Rigid Clamp with T-Bolt (Part # 061607)
Test Method: CAN CSA S269.2-M87, Section 11.3.3.2
Tested on Galvanized Tubes

Bolts tightened to a torque of 40 ft.lbs (54 kNm)

Specimen #	Load (lbs)	Load (kN)	Deviation from Average (%)	Test Result
1	17,460	77.7	5	Clamp Housing at Rivet
2	18,355	81.6	10	Clamp Housing at Rivet
3	16,245	72.3	2	Clamp Housing at Rivet
4	14,545	64.7	13	Clamp Housing at Rivet
Average	**16,651**	74.1	….	….
Average at 4:1 SF	**4,165**	18.5	….	….

Typical Distortion Load Test Setup

Typical Distortion Load Test Result

Ring-Loc System Test Program

TEST CERTIFICATE — EAR-CONTROLLED DATA

Date: 6/28/2013
P.O. No.: ANSI SW
W/O No.: SCA022-06-17-19477-3

SLIP LOAD TEST RESULTS

Test Item: Swivel Clamp with T-Bolt
Test Method: ANSI/SSFI SC100-5/05, SEC 5.1.4.1
Tested on Galvanized Tubes

Coupler bolts tightened to a torque of 40 ft.lbs

Specimen #	Load at ¼" Travel (lbs)	Load (lbs) at 4:1 Safety Factor	Deviation from Average (%)
1	6505	1626	7
2	6980	1745	<1
3	7500	1875	7
Average	**6995**	1750	….

Slip Load Test Setup

Ring-Loc System Test Program

TEST CERTIFICATE — EAR-CONTROLLED DATA
Date: 6/28/2013
P.O. No.: ANSI SW
W/O No.: SCA022-06-17-19477-3

CENTER RIVET STRENGHT TEST RESULTS

Test Item: Swivel Clamp with T-Bolt
Test Method: ANSI/SSFI SC100-5/05, SEC 5.1.4.3
Tested on Galvanized Tubes

Bolts tightened to a torque of 40 ft.lbs (54 kNm)

Specimen #	Maximum Load (lbs)	Load (lbs) at 4:1 Safety Factor	Deviation from Average (%)	Test Result
1	10,870	2715	2	Clamp Housing at Rivet
2	11,865	2965	7	Clamp Housing at Rivet
3	10,655	2665	7	Clamp Housing at Rivet
Average	**11,130**	2785	….	….

Typical Test Setup

Typical Test Result

Ring-Loc System Test Program

TEST CERTIFICATE — EAR-CONTROLLED DATA

Date: 6/28/2013
P.O. No.: ANSI RA
W/O No.: SCA022-06-17-19477-4

SLIP LOAD TEST RESULTS

Test Item: Rigid Clamp with T-Bolt
Test Method: ANSI/SSFI SC100-5/05, SEC 5.1.4.1
Tested on Galvanized Tubes

Coupler bolts tightened to a torque of 40 ft.lbs

Specimen #	Load at ¼" Travel (lbs)	Load (lbs) at 4:1 Safety Factor	Deviation from Average (%)
1	3005	750	10
2	3500	875	5
3	3500	875	5
Average	**3335**	835	….

Slip Load Test Setup

Ring-Loc System Test Program

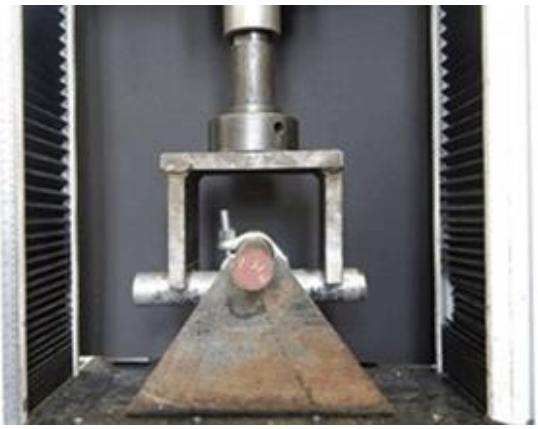
TEST CERTIFICATE — EAR-CONTROLLED DATA
Date: 6/28/2013
P.O. No.: ANSI RA
W/O No.: SCA022-06-17-19477-4

STRENGHT TEST RESULTS

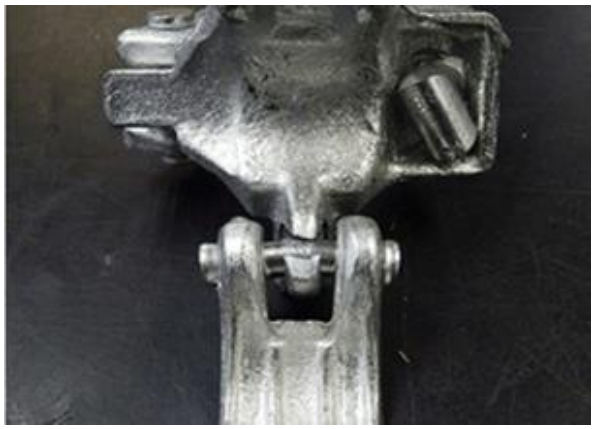
Test Item: Swivel Clamp with T-Bolt
Test Method: ANSI/SSFI SC100-5/05, SEC 5.1.4.2
Tested on Galvanized Tubes

Bolts tightened to a torque of 40 ft.lbs (54 kNm)

Specimen #	Maximum Load (lbs)	Load (lbs) at 4:1 Safety Factor	Deviation from Average (%)	Test Result
1	12,185	3,045	5	Clamp Housing at Rivet
2	11,795	2,950	5	Clamp Housing at Rivet
3	13,380	3,345	7	Clamp Housing at Rivet
Average	**12,450**	3,115	….	….



Typical Test Setup



Typical Test Result

TEST CERTIFICATE — EAR-CONTROLLED DATA

Date: 6/28/2013
P.O. No.: ANSI Bolt Torque
W/O No.: SCA022-06-17-19477-5

OVER TIGHTENING TEST

Test Item: T-Bolt
Test Method: ANSI/SSFI SC100-5/05, SEC 5.1.5.2
Tested on Galvanized Tubes

Sample ID	Maximum Applied Torque Load (ft.lbs)	End Result
1	120	No Damage
2	120	No Damage
3	120	No Damage
Average	**120**	….

The 120 ft.lbs was established by multiplying by three the common recommended torque of 40 ft.lbs

BOLT MAXIMUM TORQUE TEST

Test Item: T-Bolt
Test Method: ANSI/SSFI SC100-5/05, SEC 5.1.5.1
Tested on Galvanized Tubes

Sample ID	Maximum Applied Torque Load (ft.lbs)	Failure Mode
1	260	Coupler Bolt Shear
2	230	Coupler Bolt Shear
3	210	Coupler Bolt Shear
Average	**235**	….

Ring-Loc System Test Program

TEST CERTIFICATE — EAR-CONTROLLED DATA

Date: 6/28/2013
P.O. No.: ANSI Bolt Torque
W/O No.: SCA022-06-17-19477-5

Samples 1, 2, and 3

Ring-Loc System Test Program

TEST CERTIFICATE — EAR-CONTROLLED DATA
Date: 6/28/2013
P.O. No.: ANSI IBC (ult)
W/O No.: SCA022-06-17-19477-6

TUBE CLAMP SLIP LOAD TEST RESULTS

Test Item: I-Beam Clamp (Part # 061803)
Test Method: ANSI/SSFI SC100-5/05
Tested on Galvanized Tubes

Coupler bolts tightened to a torque of 40 ft.lbs

Specimen #	Load at ¼" Travel (lbf)	Load (lbs) at 4:1 Safety Factor	Deviation from Average (%)
1	4360	1090	5
2	3770	945	9
3	4350	1090	5
Average	**4160**	1040	….

Typical Tube Slip Load Test Setup

Ring-Loc System Test Program

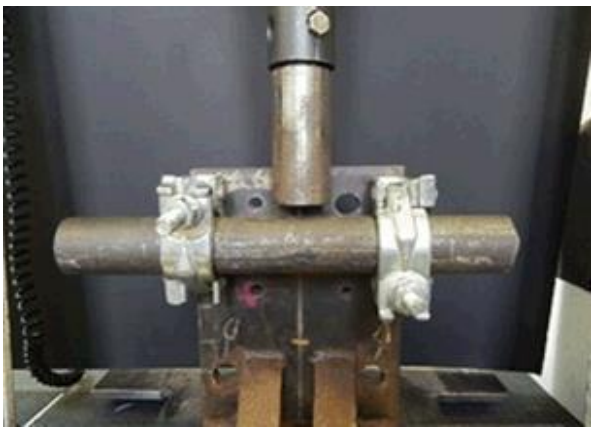
TEST CERTIFICATE — EAR-CONTROLLED DATA
Date: 6/28/2013
P.O. No.: ANSI IBC (ult)
W/O No.: SCA022-06-17-19477-6

BEAM CLAMP SLIP LOAD TEST RESULTS

Test Item: I-Beam Clamp (Part # 061803)
Test Method: ANSI/SSFI SC100-5/05
Tested on Galvanized Tubes

Coupler bolts tightened to a torque of 40 ft.lbs

Specimen #	Load at ¼" Travel (lbf)	Load (lbs) at 4:1 Safety Factor	Deviation from Average (%)
1	3,730	935	2
2	3,790	950	1
3	3,950	990	3
Average	**3,825**	955	….



Typical Beam Slip Load Test Setup

Ring-Loc System Test Program

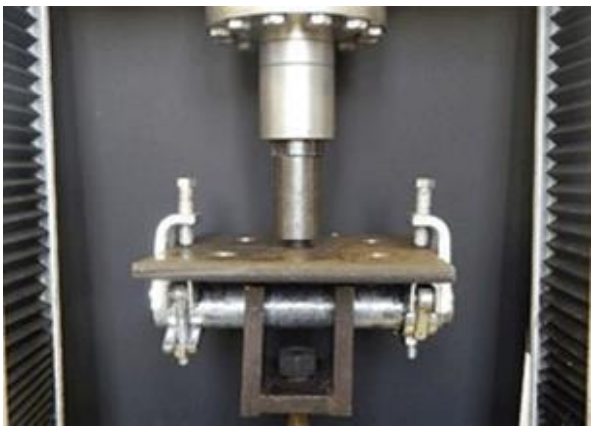
TEST CERTIFICATE — EAR-CONTROLLED DATA
Date: 6/28/2013
P.O. No.: ANSI IBC (ult)
W/O No.: SCA022-06-17-19477-6

ULTIMATE LOAD TEST RESULTS

Test Item: I-Beam Clamp (Part # 061803)
Test Method: ANSI/SSFI SC100-5/05
Tested on Galvanized Tubes

Bolts tightened to a torque of 40 ft.lbs

Specimen #	Maximum Load (lbs)	Load (lbs) at 4:1 Safety Factor	Deviation from Average (%)	Test Result
1	19,440	4,860	6	Beam Clamp Bolt Shear
2	19,270	4,870	7	Beam Clamp Bolt Shear
3	23,655	5,915	14	Beam Clamp Bolt Shear
4	20,675	5,170	<1	Beam Clamp Bolt Shear
Average	**12,450**	5,190	….	….



Ultimate Test Setup

Typical Test Result

TEST CERTIFICATE — EAR-CONTROLLED DATA

Date: 7/1/2013
P.O. No.: Thiel
W/O No.: SCA022-06-17-19477-7

SLEEVE COUPLER SLIP LOAD TEST RESULTS

Test Item: Sleeve Coupler (Part # 061603)
Test Method: EN74, Sec 7.2
Tested on Galvanized Tubes

Coupler wedge tightened with a 500 g hammer until the jarring blow was reached.

Specimen #	Load at 2mm Travel (kN)	Load (lbs) at 0.197 in Travel (lbs)	Test Result
1	6.4	1,430	Fail
2	6.9	1,560	Fail
3	10.5	2,360	Pass
4	8.4	1,885	Fail
5	9.0	2,024	Pass
Average	**8.2**	**1,850**	**Fail**
Requirement	**9.0 min**	**2024**	….

Tube Slip Load Test Setup

Ring-Loc System Test Program

TEST CERTIFICATE — EAR-CONTROLLED DATA

Date: 7/1/2013
P.O. No.: Thiel
W/O No.: SCA022-06-17-19477-7

BENDING MOMENT TEST RESULTS

Test Item: Sleeve Coupler (Part # 061603)
Test Method: EN74, Sec 7.2
Tested on Galvanized Tubes

Specimen #	Load at ¼" (5 mm) Travel (kN)	Load at ¼" (5 mm) Travel (kN)	Maximum Load (kN)	Maximum Load (lbs)
1	13.79	3,100	28.84	6.484
2	14.01	3,150	42.42	9.537
3	14.55	3,270	44.82	10.076
4	13.30	2,990	31.38	7.054
5	12.90	2,900	29.16	6.555
Average	**13.71**	3,082	35.32	7,941
Moment	**2.74 kNm**	….	….	….

Bending Moment Test Setup
Moment based on two 8" point load application
Coupler wedge tightened with a 500 g hammer until the jarring blow was reached

Ring-Loc System Test Program

TEST CERTIFICATE — EAR-CONTROLLED DATA
Date: 8/19/2013
P.O. No.: 2013-08-22
W/O No.: SCA022-08-13-22492-1

WHEEL BRAKE LOAD TEST RESULT

Test Method: ANSI/SSFI SC100-5/05

Sample #	Torque Load (ft.lbs)	% Deviation from Average
1	24.5	1
2	25.0	3
3	23.5	3
Average	**24.3**	….

ULTIMATE LOAD TEST

Test Method: ANSI/SSFI SC100-5/05

5 degree angle between the stem and the vertical plane

Sample #	Torque Load (ft.lbs)	Load at 4:1 safety Factor (lbs)	% Deviation from Average	Result
1	16,165	4,040	1	Stem deflection at bearing
2	15,525	3,880	3	Stem deflection at bearing
3	16,175	4,045	1	Stem deflection at bearing
Average	**15,955**	3,990	….	

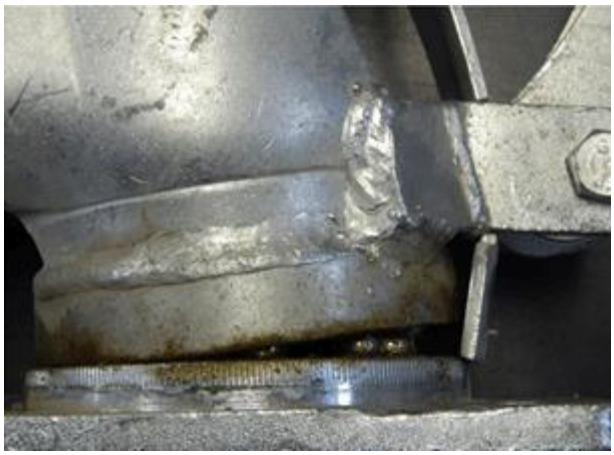
Ring-Loc System Test Program

TEST CERTIFICATE — EAR-CONTROLLED DATA

Date: 8/19/2013
P.O. No.: 2013-08-22
W/O No.: SCA022-08-13-22492-1

Ultimate Load Test, 5˚ offset

Typical Ultimate Load Test Result



Ultimate Load Test Result

Ring-Loc System Test Program

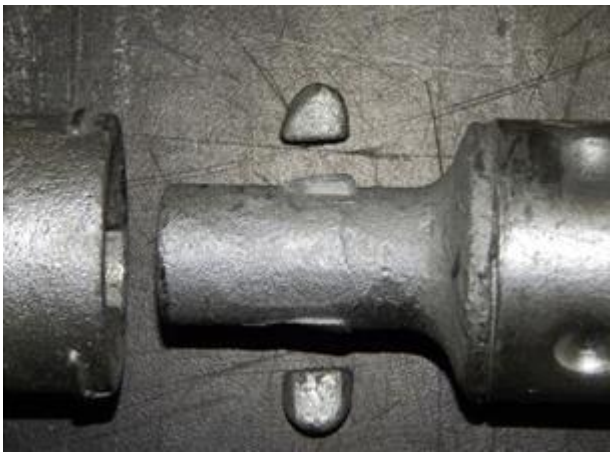
TEST CERTIFICATE — EAR-CONTROLLED DATA
Date: 8/28/2013
P.O. No.: 2013-8-22
W/O No.: SCA022-08-26-23145-1

TENSION TEST RESULTS

Test Item: Scaffold tube End Connector
Test Method: ANSI/SSFI SC 100-5/05, Section 5.1.3.1

Specimen #	Maximum Load (lbf)	Load (lbf) at 4:1 Safety Factor	Deviation from Average (%)	Test Result
1	21,330	5,330	3	Joint Failure
2	20,300	5,075	7	Joint Failure
3	24,000	6,000	10	Joint Failure
Average	**21,880**	5,470	….	

Tension Test Setup



Typical Tension Test Result

Ring-Loc System Test Program

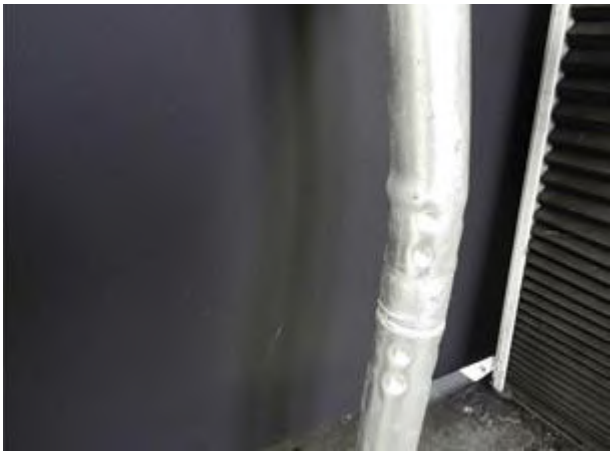
TEST CERTIFICATE — EAR-CONTROLLED DATA
Date: 8/28/2013
P.O. No.: 2013-8-22
W/O No.: SCA022-08-26-23145-1

COMPRESSION TESTING RESULTS

Test Item: Scaffold tube End Connectors
Test Method: ANSI/SSFI SC 100-5/05, Section 5.1.3.2

Specimen #	Maximum Load (lbf)	Load (lbf) at 4:1 Safety Factor	Deviation from Average (%)	Test Result
1	35,920	8,980	1	Tube Defection
2	36,475	9,120	2	Tube Defection
3	34,715	8,680	3	Tube Defection
Average	**35,703**	8,925	….	….

Compression Test Setup



Typical Compression Test Result

Ring-Loc System Test Program

TEST CERTIFICATE — EAR-CONTROLLED DATA
Date: 8/28/2013
P.O. No.: 2013-8-22
W/O No.: SCA022-08-26-23145-1

BUCKLE LOAD TESTING

Test Item: Scaffold tube End Connectors
Test Method: ANSI/SSFI SC 100-5/05, Section 5.1.3.3

Specimen #	Maximum Load (lbf)	Load (lbf) at 4:1 Safety Factor	Deviation from Average (%)	Test Result
1	14,490	3,620	10	Deflection at locking pin
2	11,860	2,970	9	Deflection at locking pin
3	12,960	3,240	2	Deflection at locking pin
Average	**13,100**	3,280	….	….


Buckle Test Setup


Typical Deflection at Connection

Ring-Loc System Test Program

TEST CERTIFICATE — EAR-CONTROLLED DATA

Date: 8/27/2013
P.O. No.: 2013-8-22
W/O No.: SCA022-07-29-21547-2

POINT LOAD TEST RESULTS

Test Item: 10' Steel Walk Board
Test Method: ANSI A10.8, ANSI/SSFI SC 100-5/05

Test #	Dimensions (in) (l x w)	Area (ft^2)	Maximum Load (lbs)	Load at 4:1 Safety Factor (lbs)	Load (lbs) Per sq. ft.	% Deviation From Average	Maximum Allowable Deflection (in)	Measured Deflection at 250 lbs (in)
1	120 x 9	7.5	1,780	445	60	3	2.0	1.0
2	120 x 9	7.5	1,780	445	60	3	2.0	1.0
3	120 x 9	7.5	1,610	400	60	6	2.0	1.0
Average	**….**	….	1,720	430	60	….	….	….

10' Point Load Setup

10' Point Load Test Result

Ring-Loc System Test Program

TEST CERTIFICATE — EAR-CONTROLLED DATA

Date: 8/27/2013
P.O. No.: 2013-8-22
W/O No.: SCA022-07-29-21547-2

UNIFORMLY DISTRIBUTED TEST RESULTS

Test Item: 10' Steel Walk Board
Test Method: ANSI A10.8, ANSI/SSFI SC 100-5/05

Test #	Dimensions (in) (1 x w)	Area (ft^2)	Maximum Load (lbs)	Load at 4:1 Safety Factor (lbs)	Load (lbs) Per sq. ft.	% Deviation From Average	Load Capacity Rating
1	120 x 9	7.5	2,170	540	100	1	Medium Duty
2	120 x 9	7.5	2,170	540	100	1	Medium Duty
3	120 x 9	7.5	2,100	525	70	2	Medium Duty
Average	**….**	….	2,150	535	90	….	….

10' Uniformly Distributed Load Test Setup

10' Uniformly Distributed Load Test Result

Ring-Loc System Test Program

TEST CERTIFICATE — EAR-CONTROLLED DATA

Date: 7/31/2013
P.O. No.: 2013-8-22
W/O No.: SCA022-07-29-21547-1

POINT LOAD TEST RESULTS

Test Item: 7' Steel Walk Board
Test Method: ANSI A10.8, ANSI/SSFI SC 100-5/05

Test #	Dimensions (in) (l x w)	Area (ft^2)	Maximum Load (lbs)	Load at 4:1 Safety Factor (lbs)	% Deviation From Average	Maximum Allowable Deflection (in)	Measured Deflection at 250 lbs (in)
1	80 x 9	5	1,925	480	5	1.4	0.8
2	80 x 9	5	2,090	520	3	1.4	0.8
3	80 x 9	5	2,060	515	2	1.4	0.8
Average	**….**	….	2,025	500	….	….	….

7' Point Load Setup

7' Point Load Test Result

Ring-Loc System Test Program

TEST CERTIFICATE — EAR-CONTROLLED DATA

Date: 8/27/2013
P.O. No.: 2013-8-22
W/O No.: SCA022-07-29-21547-2

UNIFORMLY DISTRIBUTED TEST RESULTS

Test Item: 7' Steel Walk Board
Test Method: ANSI A10.8, ANSI/SSFI SC 100-5/05

Test #	Dimensions (in) (l x w)	Area (ft^2)	Maximum Load (lbs)	Load at 4:1 Safety Factor (lbs)	% Deviation From Average	Load Capacity Rating
1	80 x 9	5	4,775	1,190	2	Heavy Duty
2	80 x 9	5	4,520	1,130	3	Heavy Duty
3	80 x 9	5	4,775	1,190	2	Heavy Duty
Average	**….**	….	4,690	1,170	….	….

7' Uniformly Distributed Load Test Setup

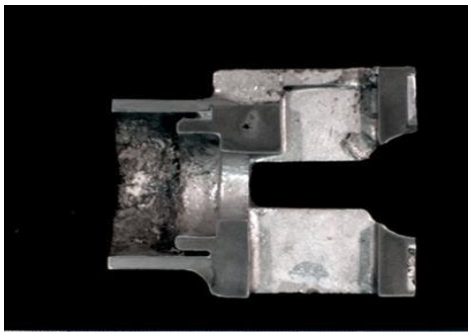
7' Uniformly Distributed Load Test Result

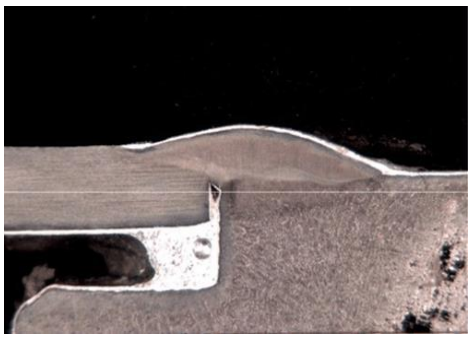
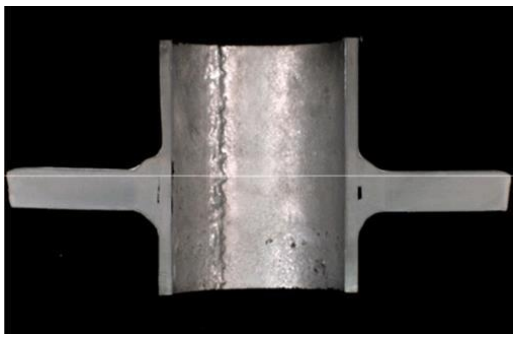
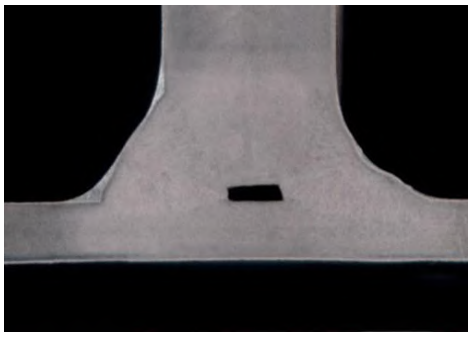
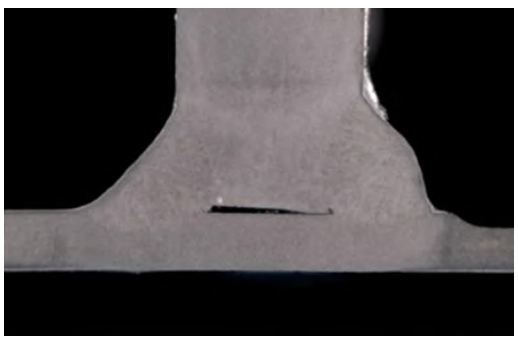
Ring-Loc System Test Program

TEST CERTIFICATE — EAR-CONTROLLED DATA

Date: 9/26/2013
P.O. No.: 2013-8-22
W/O No.: SCA022-08-26-23139-1

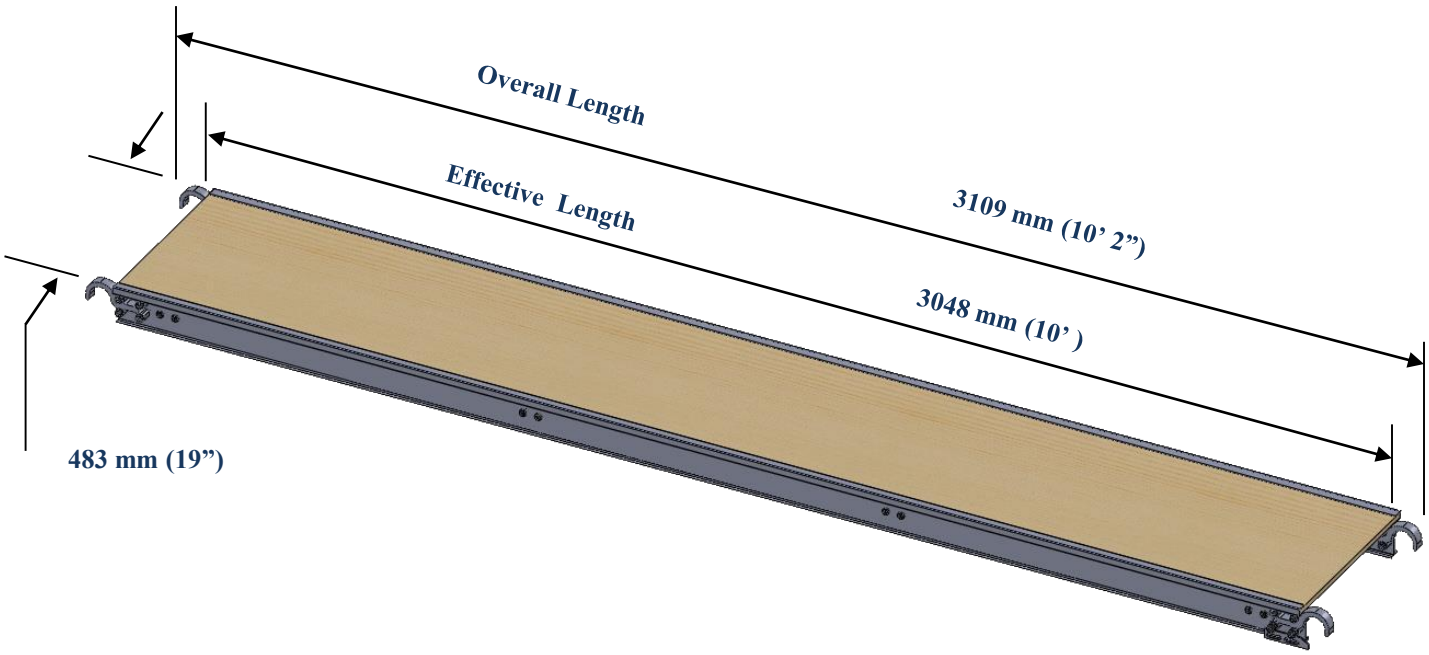
Element Materials Technology completed a series of testing on Scaffold Gold ring system towers. From that tested inventory, the lab selected one 7’ ledger and one 2M vertical ring for examination of the welds used to attach the ledger head to the horizontal tube and the rosette ring to the vertical tube. The weld profiles are provided below. The welds on the 7’ ledger head are uniform in nature, with good weld penetration and fusion. There is an area of porosity in the base material of the head, but this is not diminishing the integrity of the weld. The weld of the rosette is also consistent and uniform in nature, with good fusion and weld penetration



Aluminum Plydeck

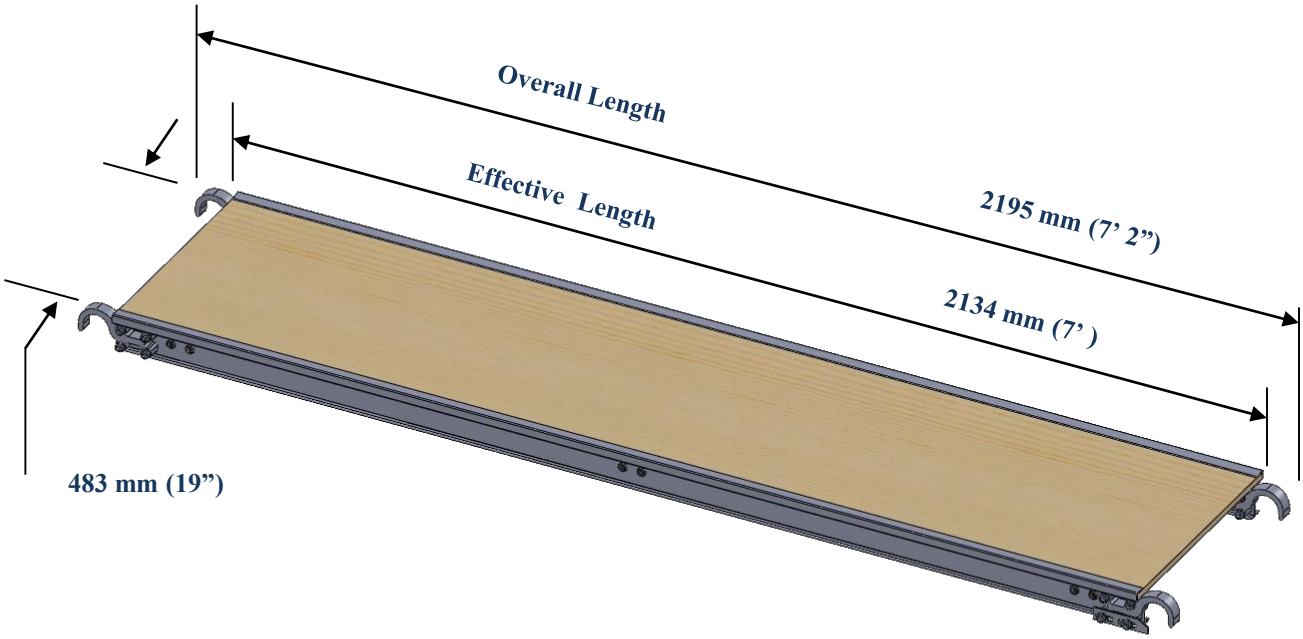
Description	Overall Length		Effective Length		Weight		Part #
	m	in	m	in	kg	lbs	
10’ x 19” Aluminum Plydeck	3.11	10’’ 2”	3.05	10’	18.22	40.17	070401



Test ID	Maximum Load (lbs)	Maximum Load (lbs) At 4:1 Safety Factor	Deviation From Average	Result
1	3030	758	6.69%	Maximum Yield
2	2840	710	0%	Maximum Yield
3	2840	710	0%	Maximum Yield
4	2650	663	6.69%	Maximum Yield
Avg.	2840	710	6.69%	

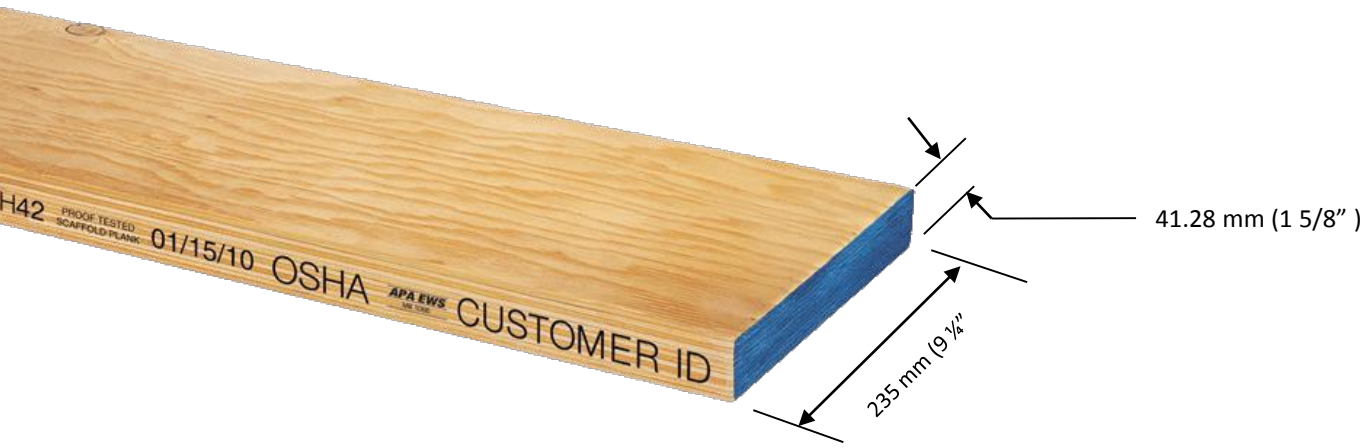
Aluminum Plydeck

Description	Overall Length		Effective Length		Weight		Part #
	m	in	m	in	kg	lbs	
7’ x 19” Aluminum Plydeck	2.20	7’2”	2.13	7’	13.24	29.19	070402



Test ID	Maximum Load (lbs)	Maximum Load (lbs) At 4:1 Safety Factor	Deviation From Average	Result
1	6370	1592	9.07%	Maximum Yield
2	5310	1327	9.07%	Maximum Yield
3	5520	1380	5.48%	Maximum Yield
4	6160	1540	5.48%	Maximum Yield
Avg.	5840	1459	7.28%	

1-5/8” x 9 ½” LVL Scaffold Plank



1-5/8" x 9 ½” SGI - LVL Scaffold Plank Design Properties and Specifications

CN (Canada Conditions)

Dry Use Conditions3				
Load Conditions	1-5/8" x 9-1/2"	1-5/8" x 11-3/4"	1-5/8" x 9-1/2"	1-5/8" x 11-3/4"
50 psf	9' - 6"	9' - 6"	9' - 6"	9' - 6"
75 psf	8' - 5"	8' - 5"	8' - 5"	8' - 5"
500	6' - 0"	7' - 4"	6' - 0"	7' - 4"
Workers & Tools (25 psf + 250 plf)	8' - 6"	8' - 6"	8' - 6"	8' - 6"
Workers & Materials (75 psf + 265 plf)	7' - 0"	7' - 0"	7' - 0"	7' - 0"

Wet Use Conditions4				
Load Condition	1-5/8" x 9-1/2"	1-5/8" x 11-3/4"	1-5/8" x 9-1/2"	1-5/8" x 11-3/4"
50 psf	9' - 1"	9' - 1"	9' - 1"	9' - 1"
75 psf	8' - 1"	8' - 1"	8' - 1"	8' - 1"
500	5' - 2"	6' - 4"	5' - 2"	6' - 4"
Workers & Tools (25 psf + 250 plf)	8' - 1"	8' - 1"	8' - 1"	8' - 1"
Workers & Materials (75 psf + 265 plf)	6' - 4"	6' - 4"	6' - 4"	6' - 4"

Service Condition	Stiffness EI x 10 ^{5} (lb –in^2)	Allowable Moment (lb – in)	Allowable Shear (lb – in)
Dry Use	**6.08**	**968**	**157**
Wet Use	**5.41**	**842**	**117**

ADDITIONAL SPECIFICATIONS:
Species: Douglas Fir
Adhesive: Waterproof Phenolic
Edges: Eased for easy handling

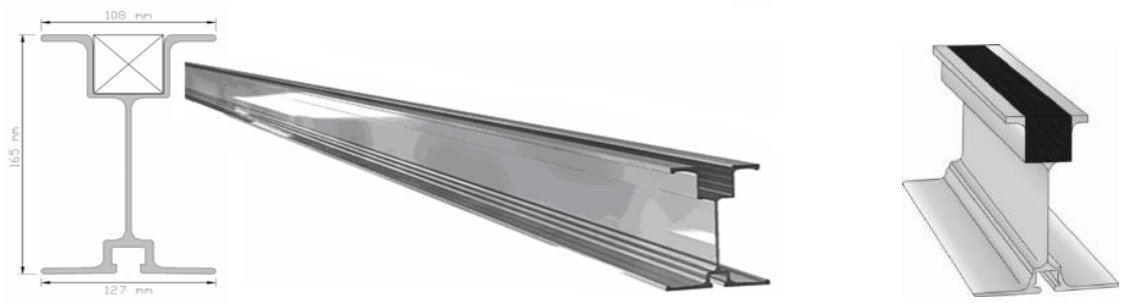
I-Beam Engineering Data

Metric Values

Span (m)	Allowable Deflection (mm)	1 Span (kN/m)	* (D = 6mm Max)	2 Span (kN/m)	* (D = 6mm Max)	3 Span (kN/m)	* (D = 6mm Max)
1.20	3.33	56.96 M		50.40 R		52.50 R	
1.50	4.17	36.45 M		36.45 M		42.00 R	
1.80	5.00	22.86 D		25.32 M		31.64 M	
2.10	5.83	14.40 D		18.60 M		23.25 M	
2.40	6.67	9.65 D	8.68 *	14.24 M		17.80 M	16.39 *
2.70	7.50	6.77 D	5.42 *	11.25 M		12.79 D	10.23 *
3.00	8.33	4.94 D	3.56 *	9.11 M	8.56 *	9.32 D	6.71 *
3.30	9.17	3.71 D	2.43 *	7.53 M	5.85 *	7.01 D	4.59 *
3.60	10.00	2.86 D	1.71 *	6.33 M	4.13 *	5.40 D	3.24 *

Imperial Values

Span (ft)	Allowable Deflection (in)	1 Span (/ft)	* (D = 6mm Max)	2 Span (/ft)	* (D = 6mm Max)	3 Span (/ft)	* (D = 6mm Max)
4.00	0.13	3784 M		3399 R		3541 R	
5.00	0.17	2422 M		2422 M		2833 R	
6.00	0.20	1495 D		1682 M		2102 M	
7.00	0.23	941 D		1235 M		1544 M	
8.00	0.27	631 D	591 *	946 M		1182 M	116 *
9.00	0.30	443 D	369 *	747 M		836 D	697 *
10.50	0.35	279 D	199 *	549 M	480 *	527 D	376 *
11.00	0.37	243 D	165 *	500 M	398 *	458 D	312 *
12.00	0.40	187 D	117 *	420 M	281 *	353 D	220 *



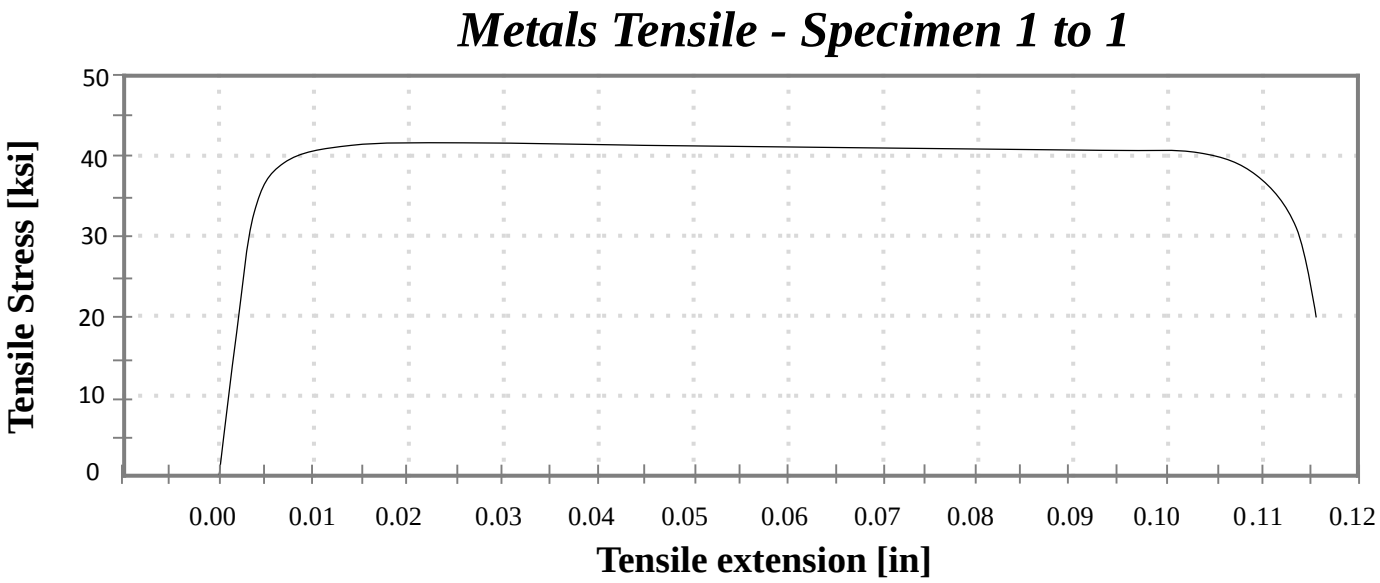
6.5” I-Beam Metal Tensile Data

Alloy 6061-T6
Test Specification ASTM B557-10
Material Specification ASTM B221-09
Typical wall thickness less than 0.249"
ASTM E8-08 - Standard test method for tension testing of metallic materials.

Sample file name: 1677 52073-1-1.is_metal (6.5” Alum. I-Beam)

Die No.	1677
Order No.	52073
Item No.	1
Lot No.	1
Analyst Name	Alex Agopsowicz

Method saved date: 2/20/2012 10:35:21 AM



Specimen No.	Tensile Stress Yield (Offset 0.2%) [Limit > 35] ksi	Tensile Strength [Limit > 38] ksi	Manually Calculated Total Elongation [%][Limit > 8%] ksi
A	39.175	41.803	10.50

Aluminum Tube Metal Tensile Data

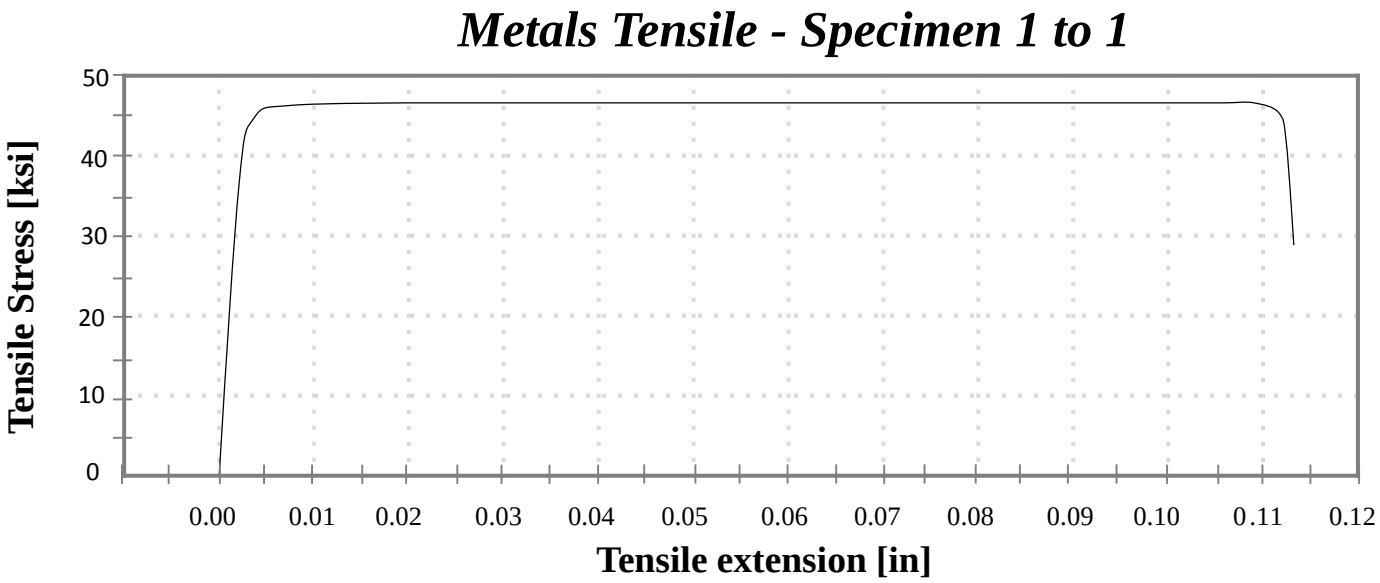
Alloy 6061-T6

Test Specification ASTM B557-10
Material Specification ASTM B221-09
Typical wall thickness less than 0.249"
ASTM E8-08 - Standard test method for tension testing of metallic materials.

Sample file name: 1090 51659-2-2.is_metal (Aluminum Tube)

Die No.	1090
Order No.	51659
Item No.	2
Lot No.	2
Analyst Name	Alvinhor

Method saved date: 2/20/2012 10:35:21 AM



Specimen No.	Tensile Stress Yield (Offset 0.2%) [Limit > 35] ksi	Tensile Strength [Limit > 38] ksi	Manually Calculated Total Elongation [%][Limit > 8%] ksi
A	44.765	47.499	9.30

Tube Specification Chart

	Standard & Ledger		Base Brace		Alum. Tube SH40	
Specification	Metric	Imperial	Metric	Imperial	Metric	Imperial
OD	48.3 mm	1.90 in	48.30mm	1.90 in	48.3 mm	1.90 in
Wall	3.18 mm	0.125 in	2.40mm	0.095 in	3.7 mm	1.448 in
Area	456 mm	0.709 in^2	360 mm^2	0.56 in^2	515 mm^2	0.799 in^2
Yield	346 mpa	50,000 psi	346 mpa	50,000 psi	313 mpa	45.5 ksi
Tensile	482.8 mpa	70,000 psi	482.8 mpa	70,000 psi	338 mpa	49.00 ksi
Elongation (min)	22 %	22 %	22 %	22%	22 %	22 %
Section Modulus	4.6 x 10^3 mm^3	0.28 in^3	3790 mm^3	0.2319 in^3	12940 mm^4	0.310 in^4
Moment of Inertia	116 x 10^3 mm^4	0.267 in^4	91.4 x 10^3 mm^4	91.40 x 10^3 mm^4	5359 mm^3	0.327 in^3
Radius of Gyration	16.00 mm	0.634 in	16.25 mm	0.639 in	15.82 mm	0.624 in

Steel Tube Specification: Tested in accordance with ASTM E1019-08 and D1976-07 Mod.
Tensile test - ASTM A370-10

Tested By: Exova Burlington

Aluminum Tube SH40 Specification: CSA S269.2/CAN3-S157 6061 – T6,
Test Procedure: ASTM A370

Tested By: Acuren Group Inc. material Engineering & Testing

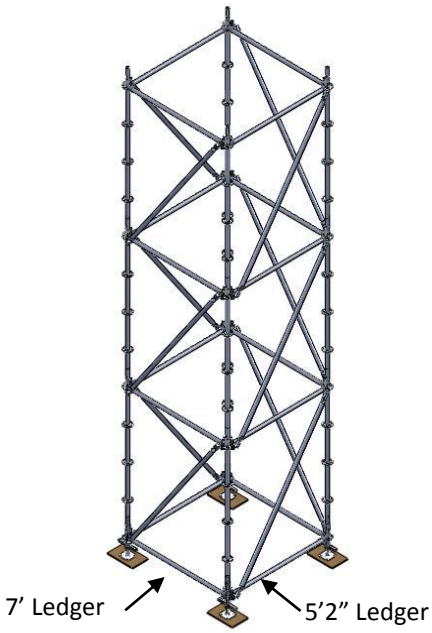
Rosette Testing

Position	Dimensions	Test Temperature	Energy Absorbed	Average
	mm	°C	Ft. lbf	Ft. lbf
#177	10 x 7.5 x 2V	- 40	95, 102, 107	101.30
#178	10 x7.5 x 2V	+20	104, 102, 105	103.70

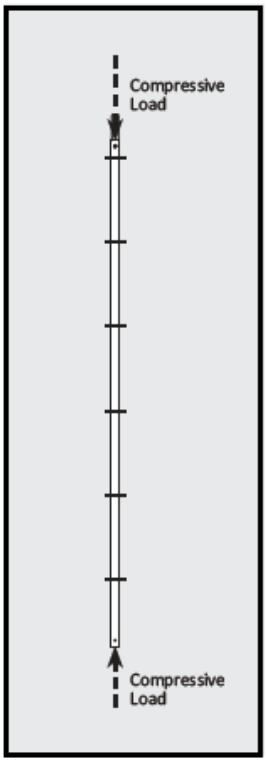
Specification: Tested in accordance with ASTM E415.08 & Charpy Test AST E23-07 AE1
Tested By: Exova Burlington

Ring-Loc System Test Program

Unbraced Standard	Maximum Allowable Compression Load (When Rated for Scaffold Use)	
Length (m)	KN	
2 m	22.69	5100



2M Standard Tower – 3 Tier



Three Tier Compression Test:

- Tested in Accordance with CAN/CSA – S269.2 – M87 (4:1 safety factor ratio)
- Over and exceed O.S.H.A. Regulation in USA
- The Allowable leg-load for Ring System is 22.69 KN/leg (5100 /leg
- The vertical unbraced length of STANDARD is 2.00 meters
- Bottom Screw Jack at 6” extension
- All Compression Load, Capacity and PPE test is done by **INTERTEK**

Ring-Loc System Test Program

TEST CERTIFICATE — EAR-CONTROLLED DATA
Date: 8/26/2013
P.O. No.: 2013-8-22
W/O No.: SCA022-07-16-20900-1

2M Ring-Loc System Tower

Test Item: 3 TIER SYSTEM/FRAME SCAFFOLD TEST RESULTS
Test Method: ANSI/SSFI SC 100-5/05

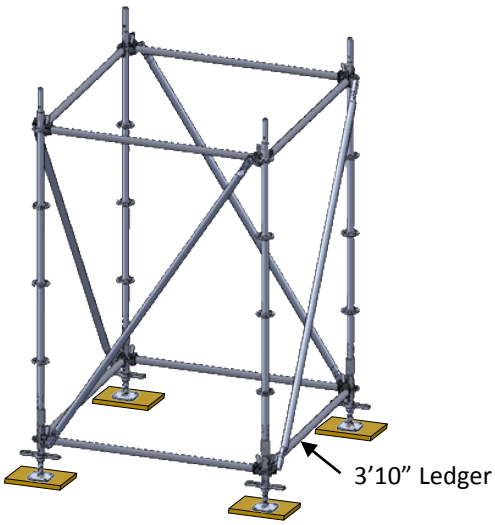
Sample	Yield Load (lbs)	Load (lbs) per Leg	Load (lbs) per leg at 4:1 Safety Factor (lbs)	Deviation From Average %
1	77,280	19,320	4,830	7%
2	67,415	16,855	4,215	7%
3	72,350	18,090	4,520	0%
Average	**72,350**	18,090	4,520	….

Test Setup

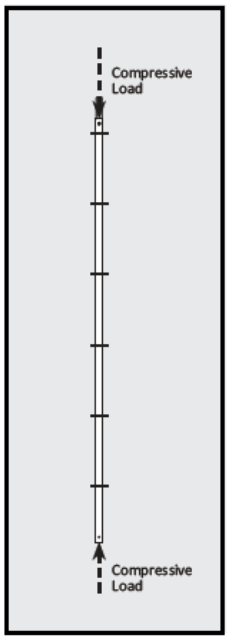
Representative Deflection

Ring-Loc System Test Program

Unbraced Standard	Maximum Allowable Compression Load (When Rated for Scaffold Use)	
Length (m)	KN	
2 m	19.62	4410



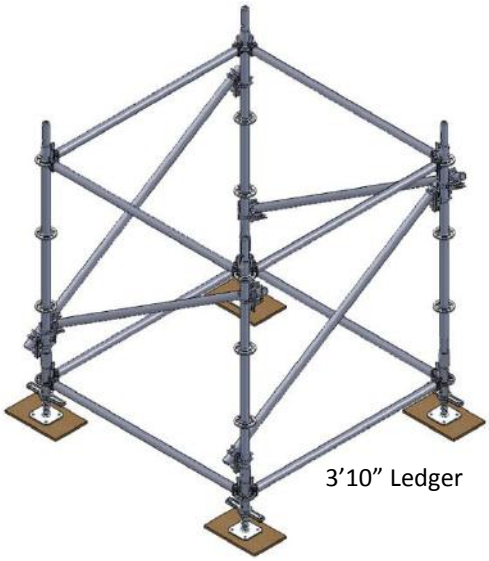
2M Tower with Bay Brace



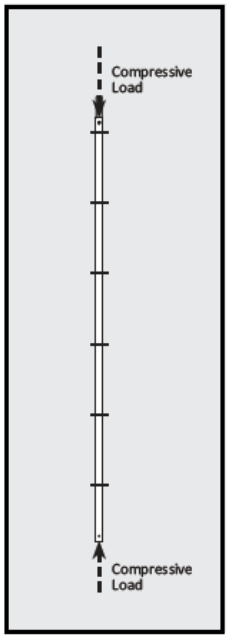
- Tested in Accordance with CAN/CSA – S269.2 – M87 (4:1 safety factor) allow up to 15% deviation from each individual test result
- Over and exceed O.S.H.A. Regulation in USA
- Bay Brace must be installed at the same vertical increments as the ledger
- The load based on Bay Brace connected to standard at the same level as ledger
- Bottom Screw Jack at 6” extension

Ring-Loc System Test Program

Unbraced Standard	Maximum Allowable Compression Load (When Rated for Scaffold Use)	
Length (m)	kN	
1.5 m	24.42	5489



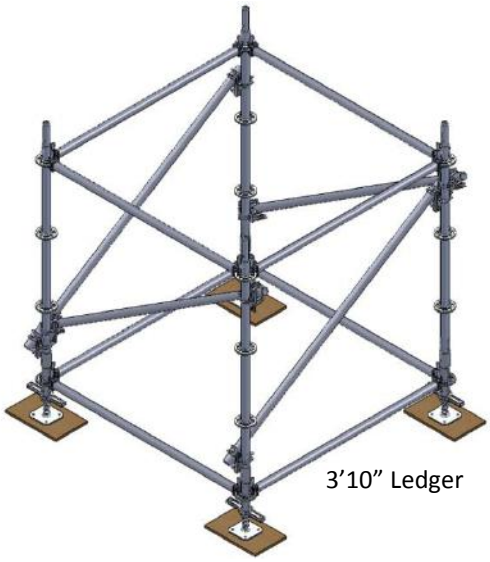
1.5M Standard Tower with Aluminum Tube & Clamp

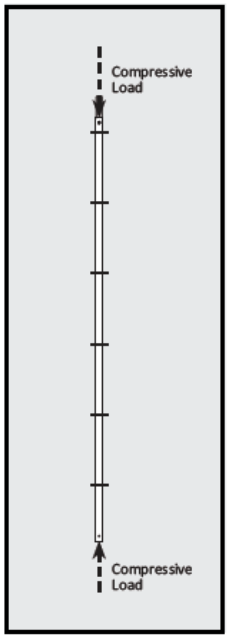


- Tested in Accordance with CAN/CSA – S269.2 – M87 (4:1 safety factor) allow up to 15% deviation from each individual test result
- Over and exceed O.S.H.A. Regulation in USA
- Bay Brace must be installed at the same vertical increments as the ledger
- The load based on Bay Brace connected to standard at the same level as ledger
- Bottom Screw Jack at 6” extension

Ring-Loc System Test Program

Unbraced Standard	Maximum Allowable Compression Load (When Rated for Scaffold Use)	
Length (m)	kN	
1 m	30.43	6841





1M Standard Tower with Aluminum Tube & Clamp

- Tested in Accordance with CAN/CSA – S269.2 – M87 (4:1 safety factor) allow up to 15% deviation from each individual test result
- Over and exceed O.S.H.A. Regulation in USA
- Bay Brace must be installed at the same vertical increments as the ledger
- The load based on Bay Brace connected to standard at the same level as ledger
- Bottom Screw Jack at 6” extension

Ring-Loc System Test Program

Anchor Points Personal Protection Equipment (TIE OFF and PPE)

Scaffold Gold All Round System

The test standard is according to the Canadian Standards Association/ Z259.2.1-98 & Z259.2.2 -98 (Reaffirmed 2004):

- CAN/ CSA Z259.2.1-98: Fall Arrester , Vertical Lifeline & Rails
-CAN/ CSA Z259.2.2-98: Self Retracting Devices For Person Fall – Arrester System

Tie Off and Personal Protection Equipment

When using personal protective equipment against falls from a height, all valid Standards and safety regulations are to be taken into consideration.

According to the CAN/ CSA Z259.2.1 & CSA/ Z2592.2-98 Standard the test results complete as:

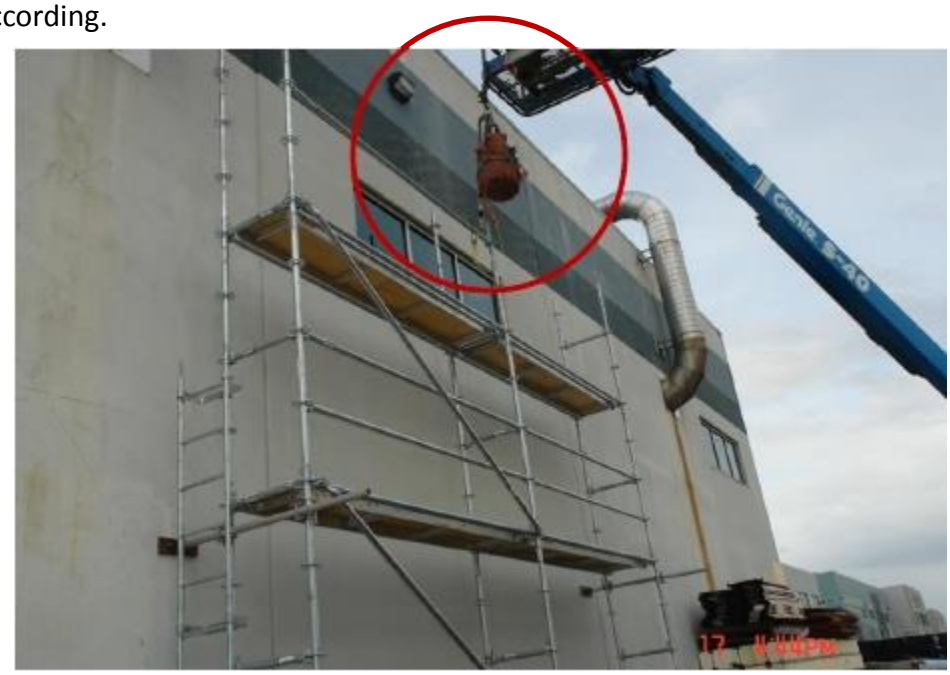
- EnergyAbsorbers
- Retracting Devices for the person Fall – Arrester System
- Full body harness
- Connectors
- Tie off and Personal protective equipmentagainst falls from a height

Ring-Loc System Test Program

Anchor Points Personal Protection Equipment (Tie off and PPE)

Test Procedures

The tests were carried out on typical scaffolding arrangements with standard bay lengthsof 3.00 M and standard level heights of 2.00M. The scaffold was anchored to the wall According.



The Following test equipmentwas used:

- All-Round System (Z 359-1-2007 5000 22kN) Breaking Strength
- Connectors (two classes of carabiners open gate 11kN and close gate 27kN) between rope and pipe hook
- 2.5 M fibre rope with 16 mm (includinglengths of connectors) Breaking Load at is 220.7kN
- 100 kg test mass with 200 mm as specified CAN/CSA – Z259.2.2-98 (2004)

Ring-Loc System Test Program

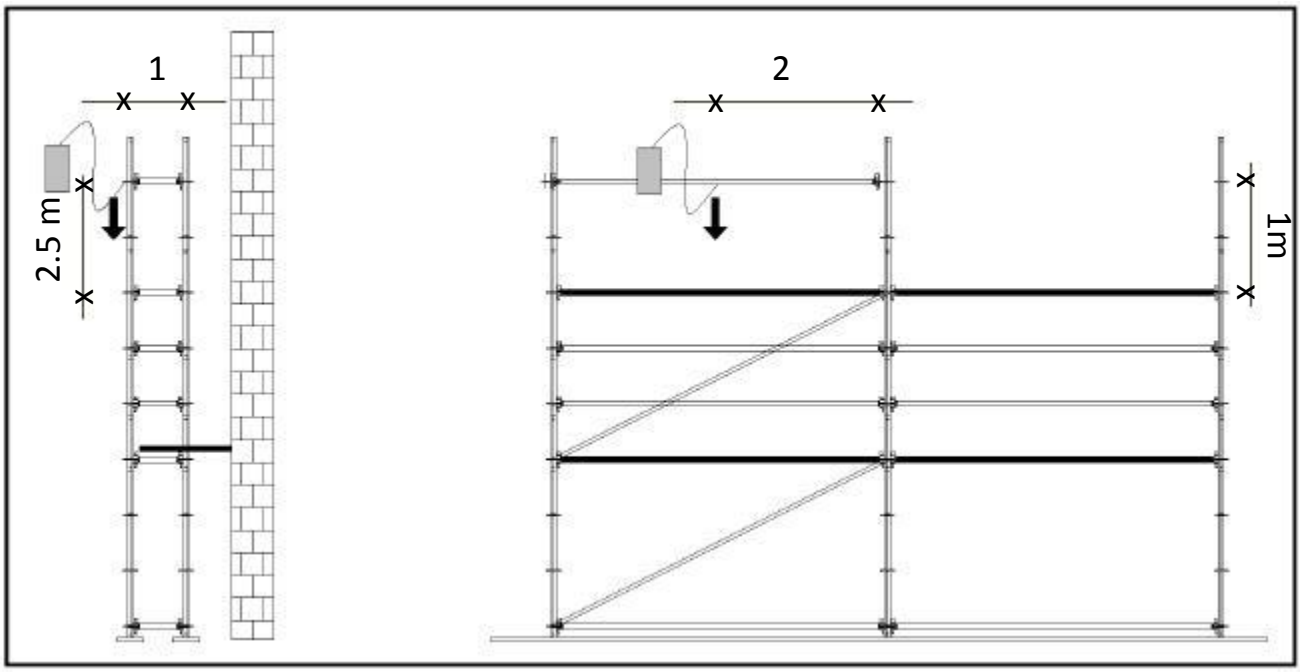
Anchor Points Personal Protection Equipment (PPE)

The mass, hangingon a crane with a magnet lock/unlock release, was
Positioned in front of the scaffold with a distance 1=30 cm between centerline
Of mass and centerline of outer vertical.

The height was 1.60M above deck level (giving the centre of mass of a human body)

The distance B of the anchor point at the scaffold was varied in order to test the most unfavorable situations (worst-case)

Two situations were checked:
1 - 30 cm (mass near vertical resultingin max. shearing forces)
2 - 150 cm (mass in middle of bay resultingin max. bending)



Ring-Loc System Test Program

Anchor Points Personal ProtectionEquipment (Tie Off and PPE)

Test Results

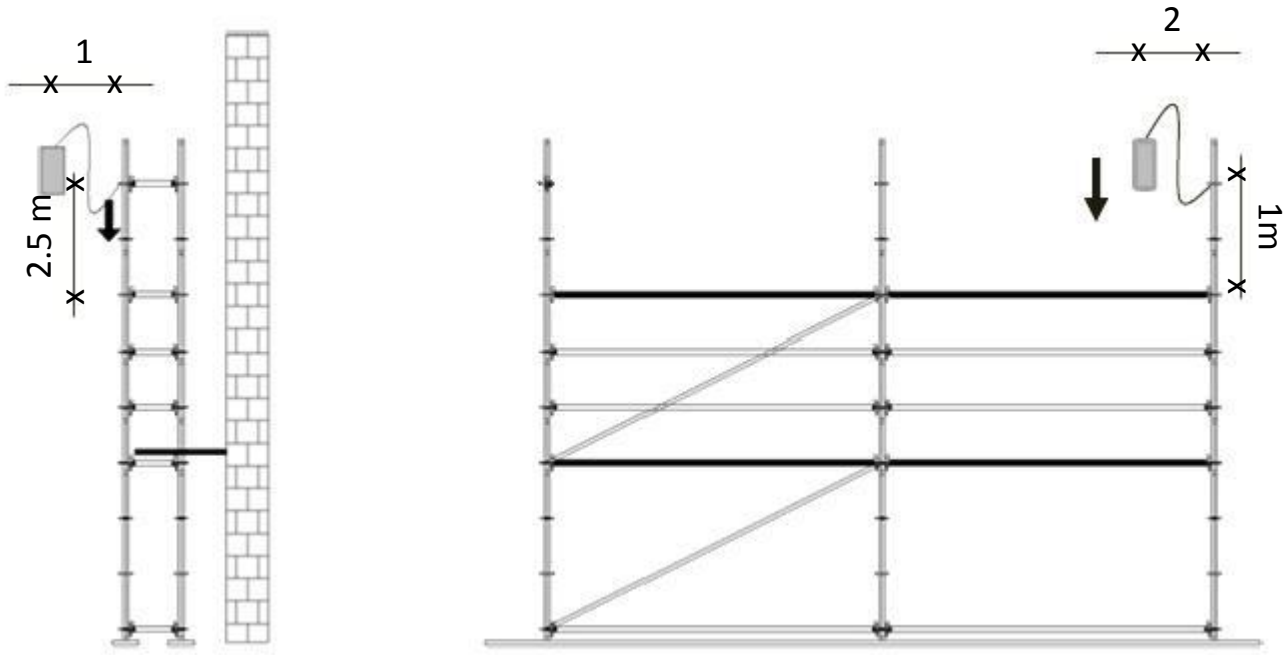
The requirement for a successful test was that fall of the mass could be stopped without Touching the ground. Any damage of the scaffold components was allowed as long as the Mass could be kept for at least 5 minutes after the fall (making sure that the scaffold is still able to keep the mass during the rescue process).

This kind of tests make sure that the dynamic load bearing capacity of the anchor points is at least 6.00 kN with a safety factor 0f 1.5 (resultingin max. dynamic loads of at least 9.00 kN)

The Max. Load bearing capacity of 6.00 kN is chosen according to the max. forces allowable To a human body in fall and stopped by a fall arrest system with a shock absorber (necessary equipment)

Anchor Point at vertical

Anchor point at **ROSETTE** of vertical 1.00 m above deck level
1=30 cm, 2=30 cm from vertical, falling depthI=2.50 m
Result: test successful



Ring-Loc System Test Program

Anchor Points Personal Protection Equipment (PPE)

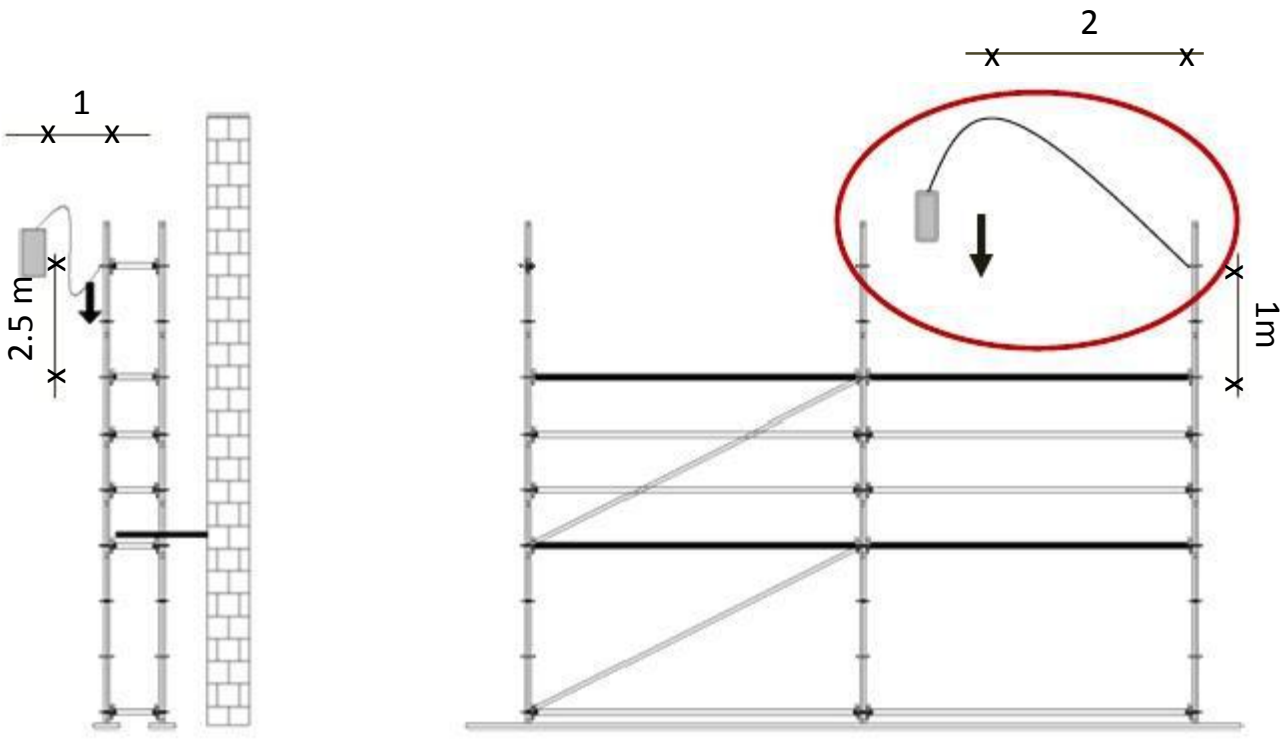
4.1 Anchor Point at Vertical
Anchor point at **ROSETT** of vertical 1.00 m above deck level
A=30 cm, b=30 cm from vertical, falling depth I=2.50 m
Result: **test successful**

Ring-Loc System Test Program

Anchor Points Personal Protection Equipment (Tie Off and PPE)

Anchor Point at Vertical

Anchor point at **ROSETTE** of vertical 1.00 m above deck level
1=30 cm, 2=250 cm from vertical, falling depthI=2.50 m
Result: **test successful**



Ring-Loc System Test Program

Anchor Points Personal Protection Equipment (Tie Off and PPE)

Anchor Point at Vertical

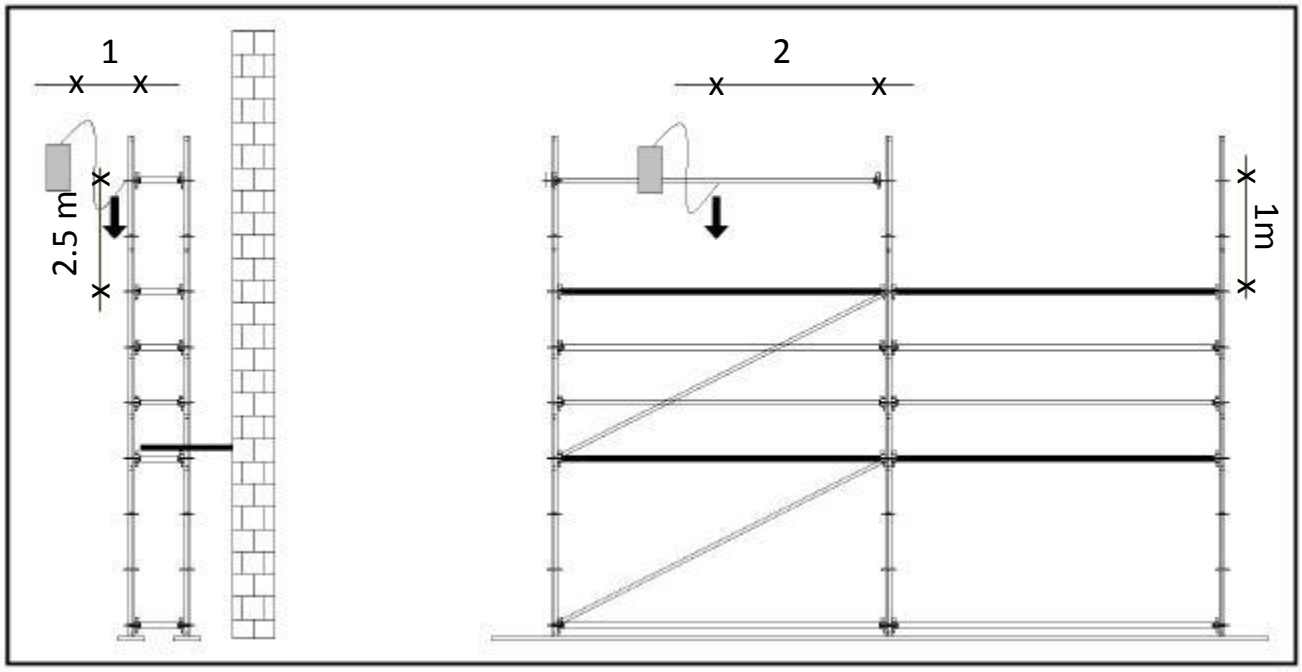
Anchor point at **ROSETTE** of vertical 1.00 m above deck level
1=30 cm, 2=250 cm from vertical, falling depthI=2.50 m
Result: **test successful**

Ring-Loc System Test Program

Anchor Points Personal Protection Equipment (Tie Off and PPE)

Anchor Point at the centre of Ledger

Anchor point at Ledger 1.00 m above deck level (top guardrail)
1=30 cm, 2=150 cm from vertical, falling depthI=2.50 m
Result: **test successful**



Ring-Loc System Test Program

Anchor Points Personal Protection Equipment (Tie Off and PPE)

Anchor Point at the centre of Ledger

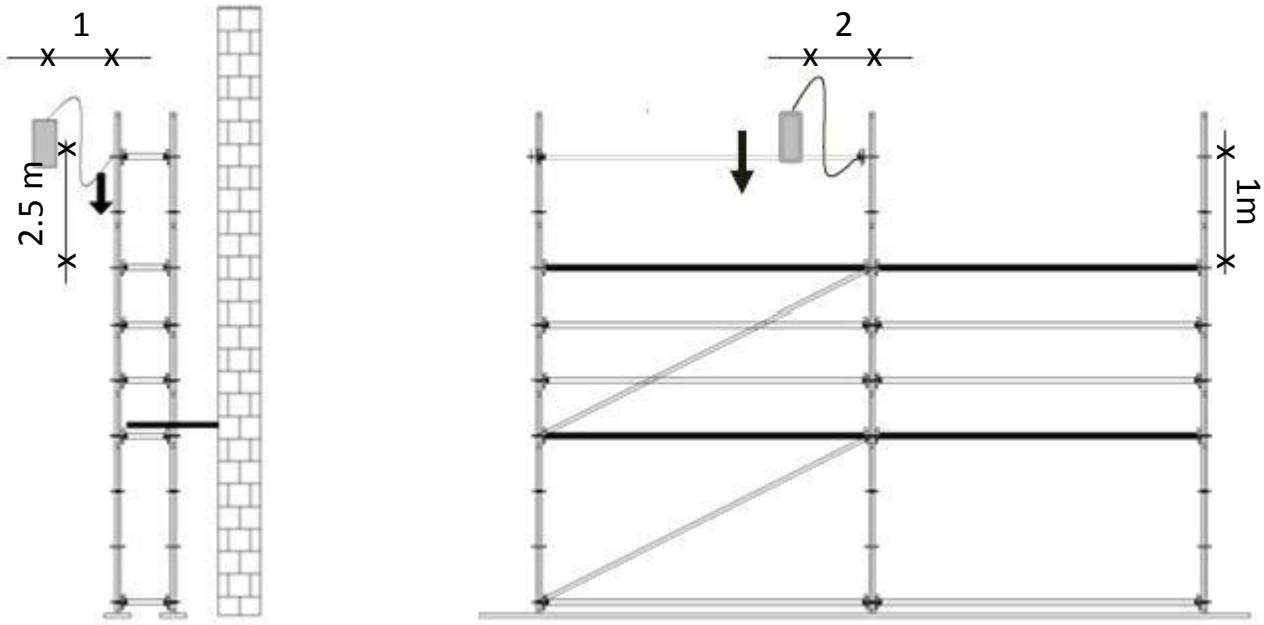
Anchor point at Ledger 1.00 m above deck level (top guardrail)
1=30 cm, 2=150 cm from vertical, falling depthI=2.50 m
Result: **test successful**

Ring-Loc System Test Program

Anchor Points Personal Protection Equipment (Tie Off and PPE)

Anchor Point at the End of Ledger

Anchor point at Ledger UH 1.00 m above deck level (top guardrail)
1=30 cm, 2=30 cm from vertical, falling depthI=2.50 m
Result: **test successful**

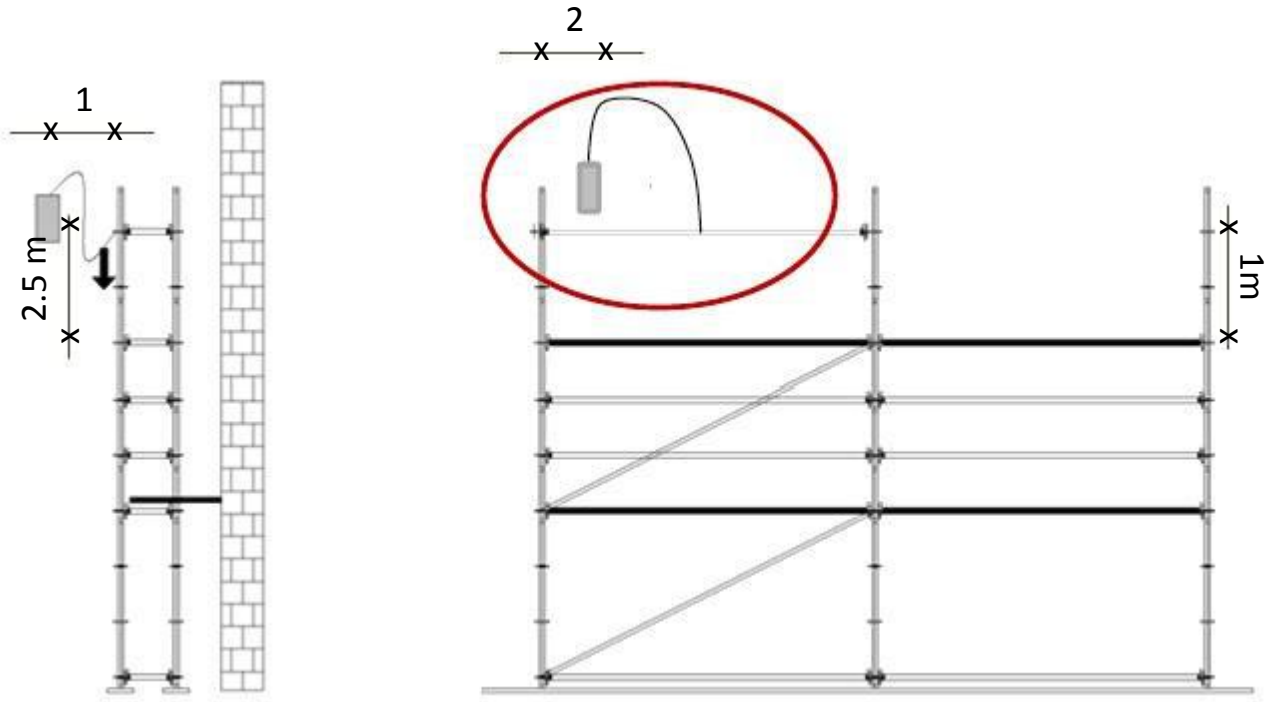


Ring-Loc System Test Program

Anchor Points Personal Protection Equipment (Tie Off and PPE)

Anchor Point at the Centre of Guardrail

Anchor point at Guardrail 1.00 m above deck level (top guardrail)
1=30 cm, 2=30 cm from vertical, falling depthI=2.50 m
Result: **test successful**



Ring-Loc System Test Program

Anchor Points Personal Protection Equipment (Tie Off and PPE)

Anchor Point at the Centre of Guardrail

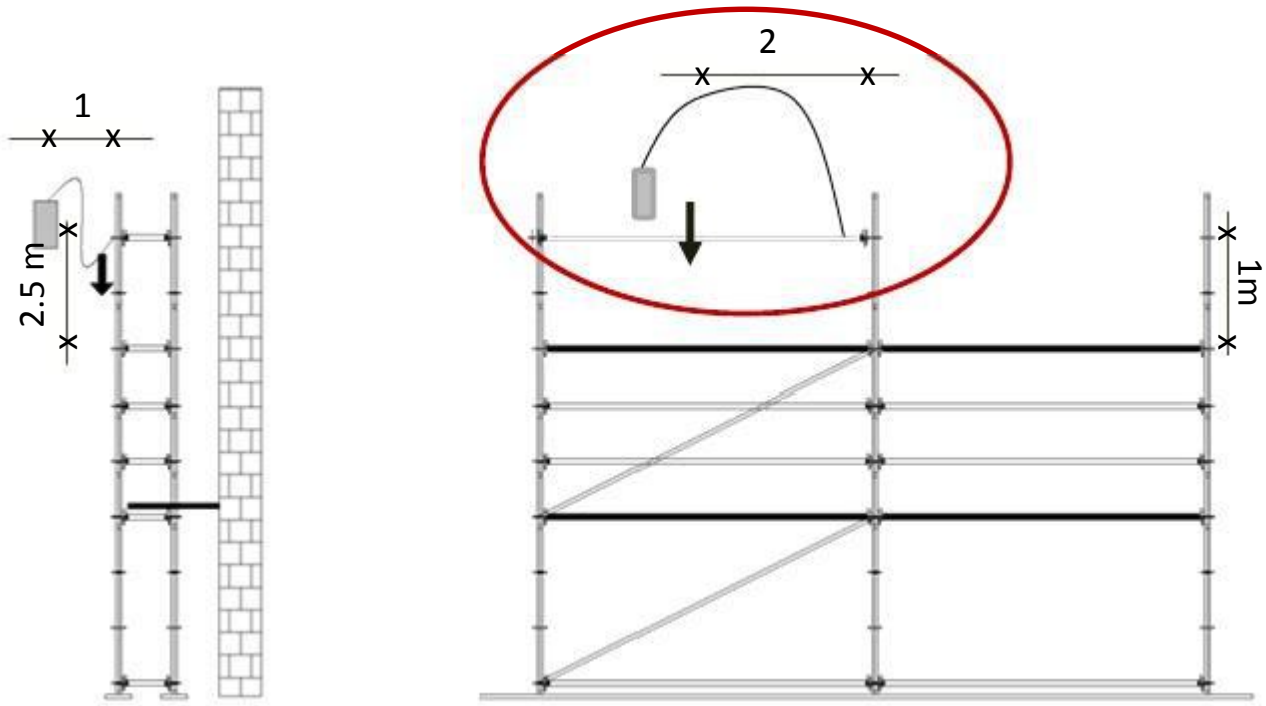
Anchor point at Guardrail 1.00 m above deck level (top guardrail)
1=30 cm, 2=30 cm from vertical, falling depthI=2.50 m
Result: **test successful**

Ring-Loc System Test Program

Anchor Points Personal Protection Equipment (Tie Off and PPE)

Anchor Point at the End of Guardrail

Anchor point at Guardrail 1.00 m above deck level (top guardrail)
1=30 cm, 2=150 cm from vertical, falling depthI=2.50 m
Result: **test successful**



Ring-Loc System Test Program

Anchor Points Personal Protection Equipment (Tie Off and PPE)

Anchor Point at the End of Guardrail

Anchor point at Guardrail 1.00 m above deck level (top guardrail)
1=30 cm, 2=150 cm from vertical, falling depthI=2.50 m
Result: **test successful**