SECTION MODULUS REQ'D FOR 1 1/2 SCH 10 BRANCH W/ 2ft SPAN (UNI STRUT ON TOP OF JOISTS) = .12 (PER NFPA 13, TABLE 9.1.1.7.1 (a))

1-5/8" x 1-5/8" STRUT IS ADEQUATE WITH SECTION MODULES = 2.03 (PER DATA SHEET)

SECTION MODULUS REQ'D FOR 1 1/2 SCH 10 BRANCH W/ 4ft SPAN (UNI STRUT ON BOTTOM OF JOISTS) = .24 (PER NFPA 13, TABLE 9.1.1.7.1 (a))

2-7/16" x 1-5/8" STRUT IS ADEQUATE WITH SECTION MODULUS = .395 (PER DATA SHEET)

REV 1

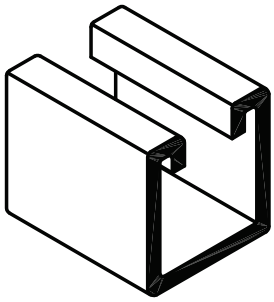
Table 9.1.1.7.1(a) Section Modulus Required for Trapeze Members (in.^{3})

Nominal Diameter of Pipe Being Supported – Schedule 10 Steel												
Span (ft)	**1**	**1.25**	**1.5**	**2**	**2.5**	**3**	**3.5**	**4**	**5**	**6**	**8**	**10**
1.5	0.08	0.08	0.09	0.09	0.10	0.11	0.12	0.13	0.15	0.18	0.26	0.34
2.0	0.11	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.20	0.24	0.34	0.45
2.5	0.14	0.14	0.15	0.16	0.18	0.21	0.23	0.25	0.30	0.36	0.50	0.69
3.0	0.16	0.17	0.18	0.19	0.20	0.22	0.24	0.26	0.31	0.36	0.51	0.67
3.5	0.19	0.20	0.21	0.22	0.24	0.26	0.28	0.30	0.36	0.42	0.60	0.78
4.0	0.22	0.22	0.24	0.25	0.27	0.30	0.32	0.34	0.41	0.48	0.68	0.89
4.5	0.24	0.25	0.27	0.28	0.30	0.33	0.36	0.38	0.46	0.54	0.77	1.01
5.0	0.27	0.28	0.30	0.31	0.34	0.37	0.40	0.43	0.51	0.60	0.85	1.12
5.5	0.30	0.31	0.33	0.34	0.37	0.41	0.44	0.47	0.56	0.66	0.94	1.23
6.0	0.33	0.34	0.35	0.38	0.41	0.44	0.48	0.51	0.61	0.71	1.02	1.34
6.5	0.35	0.36	0.38	0.41	0.44	0.48	0.52	0.56	0.66	0.77	1.11	1.45
7.0	0.38	0.39	0.41	0.44	0.47	0.52	0.56	0.60	0.71	0.83	1.19	1.56
7.5	0.41	0.42	0.44	0.47	0.51	0.55	0.60	0.64	0.76	0.89	1.28	1.68
8.0	0.43	0.45	0.47	0.50	0.54	0.59	0.63	0.68	0.82	0.95	1.36	1.79
8.5	0.46	0.48	0.50	0.53	0.58	0.63	0.67	0.73	0.87	1.01	1.45	1.90
9.0	0.49	0.50	0.53	0.56	0.61	0.66	0.71	0.77	0.92	1.07	1.53	2.01
9.5	0.52	0.53	0.56	0.60	0.64	0.70	0.75	0.81	0.97	1.13	1.62	2.12
10.0	0.54	0.56	0.59	0.63	0.68	0.74	0.79	0.85	1.02	1.19	1.70	2.23
10.5	0.57	0.59	0.62	0.66	0.71	0.78	0.83	0.90	1.07	1.25	1.79	2.35
11.0	0.60	0.62	0.65	0.69	0.74	0.81	0.87	0.94	1.12	1.31	1.87	2.46
11.5	0.63	0.64	0.68	0.72	0.78	0.85	0.91	0.98	1.17	1.37	1.96	2.57
12.0	0.65	0.67	0.71	0.75	0.81	0.89	0.95	1.02	1.22	1.43	2.04	2.68
12.5	0.68	0.70	0.74	0.78	0.85	0.92	0.99	1.07	1.27	1.49	2.13	2.79
13.0	0.71	0.73	0.77	0.81	0.88	0.96	1.03	1.11	1.33	1.55	2.21	2.90
13.5	0.73	0.76	0.80	0.85	0.91	1.00	1.07	1.15	1.38	1.61	2.30	3.02
14.0	0.76	0.78	0.83	0.88	0.95	1.03	1.11	1.20	1.43	1.67	2.38	3.13
14.5	0.79	0.81	0.86	0.91	0.98	1.07	1.15	1.24	1.48	1.73	2.47	3.24
15.0	0.82	0.84	0.89	0.94	1.02	1.11	1.19	1.28	1.53	1.79	2.56	3.35
15.5	0.84	0.87	0.92	0.97	1.05	1.14	1.23	1.32	1.58	1.85	2.64	3.46
16.0	0.87	0.90	0.95	1.00	1.08	1.18	1.27	1.37	1.63	1.91	2.73	3.58

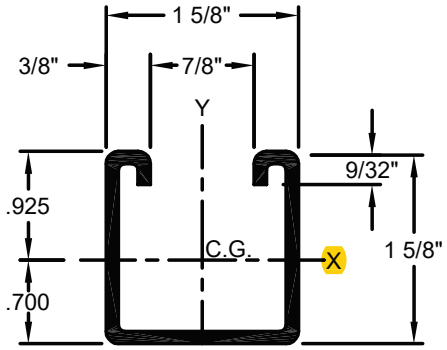
Nominal Diameter of Pipe Being Supported – Schedule 40 Steel												
Span (ft)	**1**	**1.25**	**1.5**	**2**	**2.5**	**3**	**3.5**	**4**	**5**	**6**	**8**	**10**
1.5	0.08	0.09	0.09	0.1	0.11	0.12	0.14	0.15	0.18	0.22	0.30	0.41
2.0	0.11	0.11	0.12	0.13	0.15	0.16	0.18	0.20	0.24	0.29	0.40	0.55
2.5	0.14	0.14	0.15	0.16	0.17	0.18	0.20	0.21	0.25	0.30	0.43	0.56
3.0	0.16	0.17	0.18	0.20	0.22	0.25	0.27	0.30	0.36	0.43	0.60	0.82
3.5	0.19	0.20	0.21	0.23	0.26	0.29	0.32	0.35	0.42	0.51	0.70	0.96
4.0	0.22	0.23	0.24	0.26	0.29	0.33	0.36	0.40	0.48	0.58	0.80	1.10
4.5	0.25	0.26	0.27	0.29	0.33	0.37	0.41	0.45	0.54	0.65	0.90	1.23
5.0	0.27	0.29	0.30	0.33	0.37	0.41	0.45	0.49	0.60	0.72	1.00	1.37
5.5	0.30	0.31	0.33	0.36	0.40	0.45	0.50	0.54	0.66	0.79	1.10	1.51
6.0	0.33	0.34	0.36	0.39	0.44	0.49	0.54	0.59	0.72	0.87	1.20	1.64
6.5	0.36	0.37	0.40	0.42	0.48	0.54	0.59	0.64	0.78	0.94	1.31	1.78
7.0	0.38	0.40	0.43	0.46	0.52	0.58	0.63	0.69	0.84	1.01	1.41	1.92
7.5	0.41	0.43	0.46	0.49	0.55	0.62	0.68	0.74	0.90	1.08	1.51	2.06
8.0	0.44	0.46	0.49	0.52	0.59	0.66	0.72	0.79	0.96	1.16	1.61	2.19
8.5	0.47	0.48	0.52	0.56	0.63	0.70	0.77	0.84	1.02	1.23	1.71	2.33
9.0	0.49	0.51	0.55	0.59	0.66	0.74	0.81	0.89	1.08	1.30	1.81	2.47
9.5	0.52	0.54	0.58	0.62	0.70	0.78	0.86	0.94	1.14	1.37	1.91	2.60
10.0	0.55	0.57	0.61	0.65	0.74	0.82	0.90	0.99	1.20	1.45	2.01	2.74
10.5	0.58	0.60	0.64	0.69	0.77	0.86	0.95	1.04	1.26	1.52	2.11	2.88
11.0	0.60	0.63	0.67	0.72	0.81	0.91	0.99	1.09	1.32	1.59	2.21	3.01
11.5	0.63	0.66	0.70	0.75	0.85	0.95	1.04	1.14	1.38	1.66	2.31	3.15
12.0	0.66	0.68	0.73	0.78	0.88	0.99	1.08	1.19	1.44	1.73	2.41	3.29
12.5	0.69	0.71	0.76	0.82	0.92	1.03	1.13	1.24	1.5	1.81	2.51	3.43
13.0	0.71	0.74	0.79	0.85	0.96	1.07	1.17	1.29	1.56	1.88	2.61	3.56
13.5	0.74	0.77	0.82	0.88	0.99	1.11	1.22	1.34	1.62	1.95	2.71	3.70
14.0	0.77	0.80	0.85	0.91	1.03	1.15	1.26	1.39	1.68	2.02	2.81	3.84
14.5	0.80	0.83	0.88	0.95	1.07	1.19	1.31	1.43	1.74	2.1	2.91	3.97
15.0	0.82	0.86	0.91	0.98	1.10	1.24	1.35	1.48	1.8	2.17	3.01	4.11
15.5	0.85	0.88	0.94	1.01	1.14	1.28	1.4	1.53	1.86	2.24	3.11	4.25
16.0	0.88	0.91	0.97	1.05	1.18	1.32	1.44	1.58	1.92	2.31	3.21	4.39

For SI units, 1 in. = 25.4 mm; 1 ft = 0.3048 m.

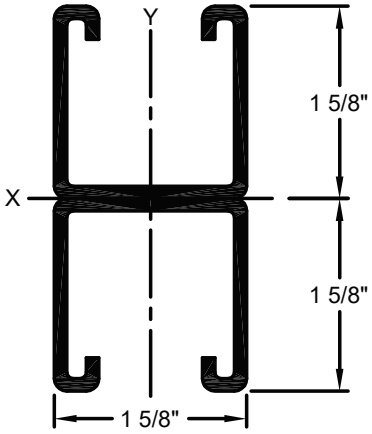
Note: The table is based on a maximum bending stress of 15 ksi and a midspan concentrated load from 15 ft (4.6 m) of water-filled pipe, plus 250 lb (114 kg).



Metal thickness is12 Ga. (.105")



A-12



A-12A

ELEMENTS OF SECTION

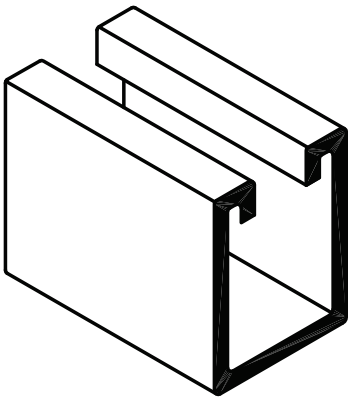
CHANNEL CATALOG NUMBER	WEIGHT LBS/FT.	AREA OF SECTION SQ. IN.	AXIS X-X			AXIS Y-Y		
			I (IN.^{4})	S (IN.^{3})	R (IN.)	I (IN.^{4})	S (IN.^{3})	R (IN.)
A-12	1.89	.583	.188	.203	.581	.257	.316	.680
A-12A	3.78	1.166	.920	.566	.910	.514	.632	.680

I = Moment of inertia S = Section modulus R = Radius of gyration

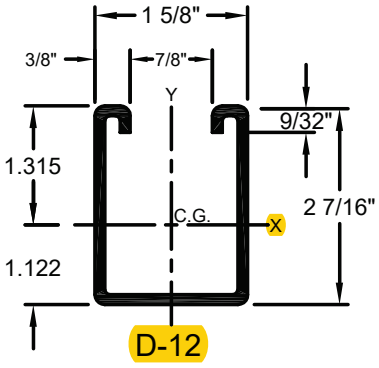
BEAM AND COLUMN LOADS DATA

CHANNEL CATALOG NUMBER	BEAM SPAN OR UNBRACED COLUMN HEIGHT	UNIFORM LOAD AT STRESS OF 25,000 PSI (LBS.)	DEFLECTION AT STRESS OF 25,000 PSI (IN.)	UNIFORM LOAD (LBS.) WHEN MAXIMUM DEFLECTION = $\frac{SPAN}{240}$	MAXIMUM ALLOWABLE LOAD OF COLUMN (LBS.)
A-12	18"	2213	.031	2213	11300
	24"	1680	.055	1680	9700
	30"	1340	.086	1340	8850
	36"	1125	.125	1125	8600
	42"	950	.168	950	7550
	48"	855	.225	757	6720
	60"	690	.356	484	5800
	72"	555	.594	336	4970
	84"	490	.693	247	4250
	96"	433	.915	189	3500
	120"	335	1.382	121	2100
A-12A	18"	6530	.018	6530	24340
	24"	4895	.033	4895	21800
	30"	3800	.050	3800	21500
	36"	3100	.070	3100	21000
	42"	2700	.097	2700	20600
	48"	2300	.124	2300	19900
	60"	1930	.203	1930	17950
	72"	1560	.284	1560	15940
	84"	1360	.393	1210	14750
	96"	1200	.438	926	12650
	120"	953	.680	593	8000

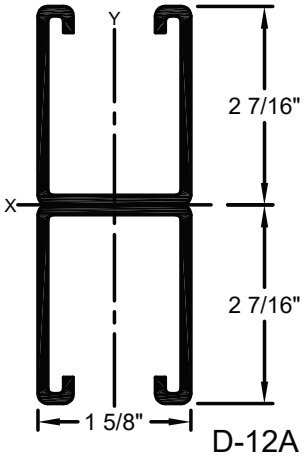
Beam loads: Loads listed are uniformly distributed, for loads concentrated at center of span multiply uniform load at table by .5 and multiply the deflection by .8. When deflection is not a factor use stress of 25,000 psi. When deflection is a factor use deflection of $\frac{SPAN}{240}$
Column loads: Loads listed are for unbraced heights as listed. Modulus of elasticity = 29,000,000 psi.
Slotted or punched channel reduce load rating 10%.



Metal thickness is 12 Ga. (.105")



ELEMENTS OF SECTION



D-12A

CHANNEL CATALOG NUMBER	WEIGHT LBS/FT.	AREA OF SECTION SQ. IN.	AXIS X-X			AXIS Y-Y		
			I (IN.^{4})	S (IN.^{3})	R (IN.)	I (IN.^{4})	S (IN.^{3})	R (IN.)
D-12	2.47	.725	.520	.395	.847	.337	.415	.682
D-12A	4.94	1.450	2.865	1.175	1.405	.674	.830	.682

I = Moment of inertia S = Section modulus R = Radius of gyration

BEAM AND COLUMN LOADS DATA

CHANNEL CATALOG NUMBER	BEAM SPAN OR UNBRACED COLUMN HEIGHT	UNIFORM LOAD AT STRESS OF 25,000 PSI (LBS.)	DEFLECTION AT STRESS OF 25,000 PSI (IN.)	UNIFORM LOAD (LBS.) WHEN MAXIMUM DEFLECTION = $\frac{SPAN}{240}$	MAXIMUM ALLOWABLE LOAD OF COLUMN (LBS.)
D-12	18"	4400	.022	4400	10500
	24"	3280	.039	3280	9800
	30"	2650	.062	2650	9650
	36"	2180	.088	2180	9000
	42"	1880	.120	1880	8800
	48"	1620	.154	1620	8150
	60"	1320	.246	1320	6900
	72"	1100	.354	930	5850
	84"	930	.475	684	5000
	96"	820	.626	523	4450
	120"	645	.962	335	3200
D-12A	18"	13000	.012	13000	18500
	24"	9800	.021	9800	18450
	30"	7700	.032	7700	18380
	36"	6450	.047	6450	18300
	42"	5450	.063	5450	18200
	48"	4800	.083	4800	18100
	60"	3850	.130	3850	17900
	72"	3200	.187	3200	17550
	84"	2750	.255	2750	16650
	96"	2420	.335	2420	14800
	120"	1920	.519	1846	9000

Beam loads: Loads listed are uniformly distributed, for loads concentrated at center of span multiply uniform load at table by .5 and multiply the deflection by .8. When deflection is not a factor use stress of 25,000 psi. When deflection is a factor use deflection of $\frac{SPAN}{240}$.

Column loads: Loads listed are for unbraced heights as listed. Modulus of elasticity = 29,000,000 psi.

Slotted or punched channel reduce load rating 10%.

SECTION MODULUS REQ'D FOR 1½" SCH 10 BRANCH W/ 2ft+ SPAN FOR STEEL TRAPEZE MEMBER = .12 (PER NFPA 13, TABLE 9.1.1.7.1(a))

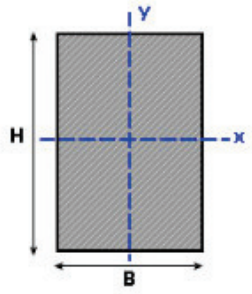
SECTION MODULUS REQ'D FOR WOOD MEMBER: .12 x 14.5 = 1.74

SECTION MODULUS OF WOOD 2x6 LAYED FLAT (PER ONLINE CALCULATOR) = 2.062

REV 1

SECTION MODULUS CALCULATOR

Section modulus is the moment of inertia of the area of the cross section of a structural member divided by the distance from the neutral axis to the farthest point of the section; a measure of the flexural strength of the beam.



Beam Cross Section	Rectangle
Unit System (Quick selection)	○Metric ◉Inch

INPUT PARAMETERS

Parameter	Value	
Height [H]	1.5	inch
Width [B]	5.5	

Calculate

RESULTS

Parameter	Value	
Section modulus [S_{xx}]	2.062	inch^3
Section modulus [S_{yy}]	7.562	

Section moduls required wood Vs. Steel

Understanding this is crucial for every designer. We must be aware that steel has a 3 times higher modulus than aluminum, 20 times higher modulus than SMC, and 40 times higher modulus than DLFT. This means that for aluminum to compete against steel the section modulus has to be 3 times greater than steel. May 8, 2015

LinkedIn
https://www.linkedin.com › pulse › significance-section-...

Significance of Section Modulus in Lightweighting - LinkedIn

The modular ratio is the relationship between the elastic moduli of both materials and has a nondimensional value on the order of 14.5 for steel over wood. In other words, steel is about 14.5 times stronger than wood. Mar 27, 2018

Coastal Engineering Co.
https://coastalengineeringcompany.com › calculating-h...

REMAINING DOCUMENT UNCHANGED

TOLBrace™ Seismic Bracing Calculations

Project Address: CHC Puyallup Garage
201 W. Main St
Puyallup, WA
Job # 23-090

Contractor: Archer Construction
Address: 7855 S. 206th Street
Kent, WA 98032
Phone:
License:

EATON
Powering Business Worldwide

Calculations based on 2016 NFPA Pamphlet #13

Brace Information

Maximum Brace Length	7' 0" (2.134 m)
Diameter of Brace	1" Sch.40
Type of Brace	Sch. 40
Angle of Brace	60° Min.
Least Rad. of Gyration	0.42" (11 mm)
L/R Value	200
Max Horizontal Load	1604 lbs (728 kg)

Fastener Information

Orientation to Connecting Surface NFPA Type F

Fastener

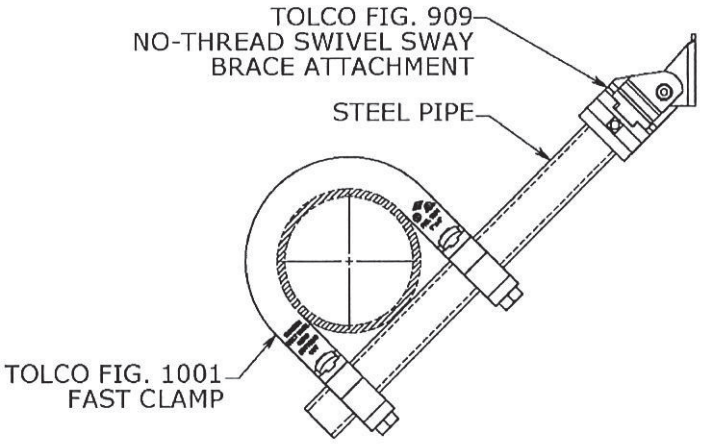
Type	Through-Bolt
Diameter	1/2in.
Length	3-1/2in.
Maximum Load	600 lbs (272 kg)
Prying Factor	N/A

TOLCO™ Brace Components

TOLCO™ Component	Listed Load	Adjusted Loa
Fig. 1001 Clamp	2015 lbs (914 kg)	1745 lbs (792 kg)
Fig.909 No-Thread Swivel	2015 lbs (914 kg)	1745 lbs (792 kg)
See Fastener Information		

*Calculation Based on CONCENTRIC Loading
*Please Note: These calculations are for TOLCO™ components only. Use of any other components voids these calculations and the listing of the assembly.

Seismic Brace Assembly Detail



Brace Identification on Plans W1 (4")

Brace Type Lateral [X] Longitudinal [ ] 4-Way [ ]

Sprinkler System Load Calculation (Fpw = CpWp)

Cp = 0.67

Diameter	Type	Length	Total Length	Weight Per Unit Length	Total Weight
4" (100 mm)	Sch. 40	21 ft (6.4 m)	21 ft (6.4 m)	16.4 lb/ft (24.41 kg/m)	344 lbs (156 kg)
1.5" (40 mm)	Sch. 40	115 ft (35.1 m)	115 ft (35.1 m)	3.61 lb/ft (5.37 kg/m)	415 lbs (188 kg)
1" (25 mm)	Sch. 40	9 ft (2.7 m)	9 ft (2.7 m)	2.05 lb/ft (3.05 kg/m)	18 lbs (8 kg)

Subtotal Weight	777 lbs (352 kg)
Wp (incl. 15%)	894 lbs (405 kg)
Total (Fpw)	599 lbs (272 kg)
Maximum Fpw per 9.3.5.5.2 (if applicable)	2385 lb (1081 kg)

Main Size	Type/Sch.	Spacing (ft)
4"	Sch. 40	21

TOLBrace™ Seismic Calculation

CHC Puyallup Garage

Job # 23-090

201 W. Main St

Brace Identification	W1 (4")
Brace Type (Per NFPA#13)	NFPA Type F
Braced Pipe (ft)	4" Sch.40 Steel Pipe
Spacing of Brace	21' 0" (6.4 m)
Orientation of Brace	Lateral
Bracing Material	1" Sch.40
Maximum Brace Length	7' 0" (2.13 m)
Slenderness Ratio used for Load Calculation	200
True Angle of Brace for Calculation	60°
Type of Fastener	1/2in. X 3-1/2in. Through-Bolt
Length of Fastener	3-1/2in.

Summary of Pipe within Zone of Influence

4" Sch.40 Steel Pipe (101.6 mm)	21 ft (6.4 m)
1.5" Sch.40 Steel Pipe (38.1 mm)	115 ft (35.1 m)
1" Sch.40 Steel Pipe (25.4 mm)	9 ft (2.7 m)

WASHINGTON STATE
CERTIFICATE OF COMPETENCY
FIRE PROTECTION SPRINKLER SYSTEMS
Theodore M. Queen
4930-0205-C Level 3
Archer Construction, Inc.
ARCHEI*219DR
11-22-23
Date
Signature
Expires
DEC 31, 23

G-Factor Used 0.67

Allowance for Heads and Fittings	15%

Conclusions

Total Adjusted Load of Pipe in Zone of Influence	599 lbs (272 kg)
Material Capacity	1604 lbs (728 kg)
Fastener Capacity	600 lbs (272 kg)
Fig. 1001 Clamp	1745 lbs (792 kg)
Fig.909 No-Thread Swivel	1745 lbs (792 kg)
Structural Member	Beam

Calculations prepared by Queen

* The description of the Structural Member is for informational purposes only.
TOLBrace™ software calculates the brace assembly only, not the structure it is attached to.
Calculated with TOLBrace™ 8
Visit us at www.tolco.com

TOLBrace™ Seismic Bracing Calculations

Project Address: CHC Puyallup Garage
201 W. Main St
Puyallup, WA
Job # 23-090

Contractor: Archer Construction
Address: 7855 S. 206th Street
Kent, WA 98032
Phone:
License:

EATON
Powering Business Worldwide

Calculations based on 2016 NFPA Pamphlet #13

Brace Information

Maximum Brace Length	7' 0" (2.134 m)
Diameter of Brace	1" Sch.40
Type of Brace	Sch. 40
Angle of Brace	60° Min.
Least Rad. of Gyration	0.42" (11 mm)
L/R Value	200
Max Horizontal Load	1604 lbs (728 kg)

Fastener Information

Orientation to Connecting Surface NFPA Type F

Fastener

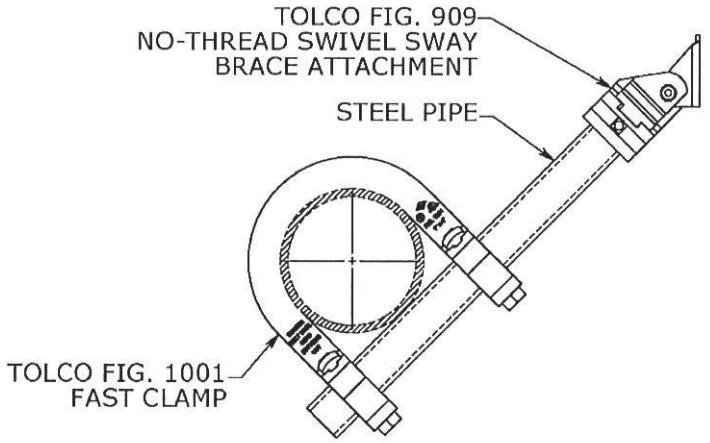
Type	Through-Bolt
Diameter	1/2in.
Length	3-1/2in.
Maximum Load	600 lbs (272 kg)
Prying Factor	N/A

TOLCO™ Brace Components

TOLCO™ Component	Listed Load	Adjusted Loa
Fig. 1001 Clamp	2015 lbs (914 kg)	1745 lbs (792 kg)
Fig.909 No-Thread Swivel	2015 lbs (914 kg)	1745 lbs (792 kg)
See Fastener Information		

*Calculation Based on CONCENTRIC Loading
*Please Note: These calculations are for TOLCO™ components only. Use of any other components voids these calculations and the listing of the assembly.

Seismic Brace Assembly Detail



Brace Identification on Plans W1 (3")

Brace Type Lateral [X] Longitudinal [ ] 4-Way [ ]

Sprinkler System Load Calculation (Fpw = CpWp)

Cp = 0.67

Diameter	Type	Length	Total Length	Weight Per Unit Length	Total Weight
3" (80 mm)	Sch. 40	25 ft (7.6 m)	25 ft (7.6 m)	10.82 lb/ft (16.1 kg/m)	270 lbs (122 kg)
1.5" (40 mm)	Sch. 40	130 ft (39.6 m)	130 ft (39.6 m)	3.61 lb/ft (5.37 kg/m)	469 lbs (213 kg)
1" (25 mm)	Sch. 40	15 ft (4.6 m)	15 ft (4.6 m)	2.05 lb/ft (3.05 kg/m)	31 lbs (14 kg)

Subtotal Weight	770 lbs (349 kg)
Wp (incl. 15%)	885 lbs (402 kg)
Total (Fpw)	593 lbs (269 kg)
Maximum Fpw per 9.3.5.5.2 (if applicable)	1278 lb (579 kg)

Main Size	Type/Sch.	Spacing (ft)
3"	Sch. 40	25

TOLBrace™ Seismic Calculation

CHC Puyallup Garage Job # 23-090

201 W. Main St

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Brace Identification	W1 (3")
Brace Type (Per NFPA#13)	NFPA Type F
Braced Pipe (ft)	3" Sch.40 Steel Pipe
Spacing of Brace	25' 0" (7.62 m)
Orientation of Brace	Lateral
Bracing Material	1" Sch.40
Maximum Brace Length	7' 0" (2.13 m)
Slenderness Ratio used for Load Calculation	200
True Angle of Brace for Calculation	60°
Type of Fastener	1/2in. X 3-1/2in. Through-Bolt
Length of Fastener	3-1/2in.

Summary of Pipe within Zone of Influence

3" Sch.40 Steel Pipe (76.2 mm)	25 ft (7.6 m)
1.5" Sch.40 Steel Pipe (38.1 mm)	130 ft (39.6 m)
1" Sch.40 Steel Pipe (25.4 mm)	15 ft (4.6 m)

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Archer Construction, Inc.
ARCHEI*219DR
11-22-23
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Signature
Expires
DEC 31, 23

G-Factor Used 0.67

Allowance for Heads and Fittings	15%
Conclusions	
Total Adjusted Load of Pipe in Zone of Influence	594 lbs (269 kg)
Material Capacity	1604 lbs (728 kg)
Fastener Capacity	600 lbs (272 kg)
Fig. 1001 Clamp	1745 lbs (792 kg)
Fig.909 No-Thread Swivel	1745 lbs (792 kg)
Structural Member	Beam

Calculations prepared by Queen

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TOLBrace™ Seismic Bracing Calculations

Project Address: CHC Puyallup Garage
201 W. Main St
Puyallup, WA
Job # 23-090

Contractor: Archer Construction
Address: 7855 S. 206th Street
Kent, WA 98032
Phone:
License:

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Calculations based on 2016 NFPA Pamphlet #13

Brace Information

Maximum Brace Length	7' 0" (2.134 m)
Diameter of Brace	1" Sch.40
Type of Brace	Sch. 40
Angle of Brace	60° Min.
Least Rad. of Gyration	0.42" (11 mm)
L/R Value	200
Max Horizontal Load	1604 lbs (728 kg)

Fastener Information

Orientation to Connecting Surface NFPA Type F

Fastener

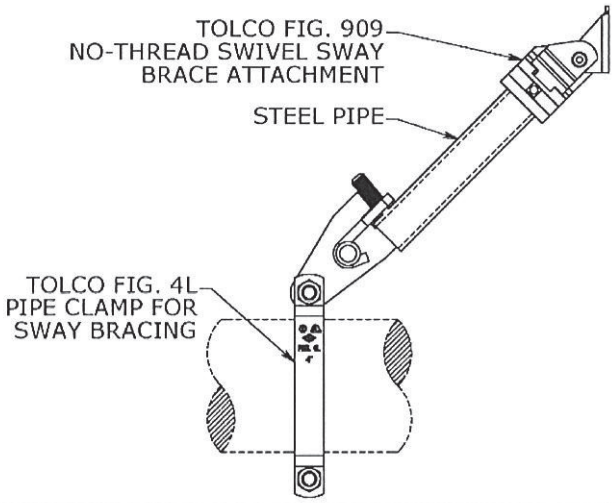
Type	Through-Bolt
Diameter	1/2in.
Length	3-1/2in.
Maximum Load	600 lbs (272 kg)
Prying Factor	N/A

TOLCO™ Brace Components

TOLCO™ Component	Listed Load	Adjusted Loa
Fig. 4L Clamp	2015 lbs (914 kg)	1745 lbs (792 kg)
Fig.909 No-Thread Swivel	2015 lbs (914 kg)	1745 lbs (792 kg)
See Fastener Information		

*Calculation Based on CONCENTRIC Loading
*Please Note: These calculations are for TOLCO™ components only. Use of any other components voids these calculations and the listing of the assembly.

Seismic Brace Assembly Detail



Brace Identification on Plans W2 (4")

Brace Type Lateral [ ] Longitudinal [X] 4-Way [ ]

Sprinkler System Load Calculation (Fpw = CpWp)

Cp = 0.67

Diameter	Type	Length	Total Length	Weight Per Unit Length	Total Weight
4" (100 mm)	Sch. 40	47 ft (14.3 m)	47 ft (14.3 m)	16.4 lb/ft (24.41 kg/m)	771 lbs (350 kg)

Subtotal Weight	771 lbs (350 kg)
Wp (incl. 15%)	887 lbs (402 kg)
Total (Fpw)	594 lbs (269 kg)
Maximum Fpw per 9.3.5.5.2 (if applicable)	N/A

Main Size	Type/Sch.	Spacing (ft)
4"	Sch. 40	47

TOLBrace™ Seismic Calculation

CHC Puyallup Garage

Job # 23-090

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Brace Identification	W2 (4")
Brace Type (Per NFPA#13)	NFPA Type F
Braced Pipe (ft)	4" Sch.40 Steel Pipe
Spacing of Brace	47' 0" (14.33 m)
Orientation of Brace	Longitudinal
Bracing Material	1" Sch.40
Maximum Brace Length	7' 0" (2.13 m)
Slenderness Ratio used for Load Calculation	200
True Angle of Brace for Calculation	60°
Type of Fastener	1/2in. X 3-1/2in. Through-Bolt
Length of Fastener	3-1/2in.

Summary of Pipe within Zone of Influence

4" Sch.40 Steel Pipe (101.6 mm)	47 ft (14.3 m)

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G-Factor Used 0.67

Allowance for Heads and Fittings	15%
Conclusions	
Total Adjusted Load of Pipe in Zone of Influence	594 lbs (269 kg)
Material Capacity	1604 lbs (728 kg)
Fastener Capacity	600 lbs (272 kg)
Fig. 4L Clamp	1745 lbs (792 kg)
Fig.909 No-Thread Swivel	1745 lbs (792 kg)
Structural Member	Wood Beam

Calculations prepared by Queen

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TOLBrace™ Seismic Bracing Calculations

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Kent, WA 98032
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Calculations based on 2016 NFPA Pamphlet #13

Brace Information

Maximum Brace Length	7' 0" (2.134 m)
Diameter of Brace	1" Sch.40
Type of Brace	Sch. 40
Angle of Brace	60° Min.
Least Rad. of Gyration	0.42" (11 mm)
L/R Value	200
Max Horizontal Load	1604 lbs (728 kg)

Fastener Information

Orientation to Connecting Surface NFPA Type F

Fastener

Type	Through-Bolt
Diameter	1/2in.
Length	3-1/2in.
Maximum Load	600 lbs (272 kg)
Prying Factor	N/A

TOLCO™ Brace Components

TOLCO™ Component	Listed Load	Adjusted Loa
Fig. 4L Clamp	2015 lbs (914 kg)	1745 lbs (792 kg)
Fig.909 No-Thread Swivel	2015 lbs (914 kg)	1745 lbs (792 kg)
See Fastener Information		

*Calculation Based on CONCENTRIC Loading
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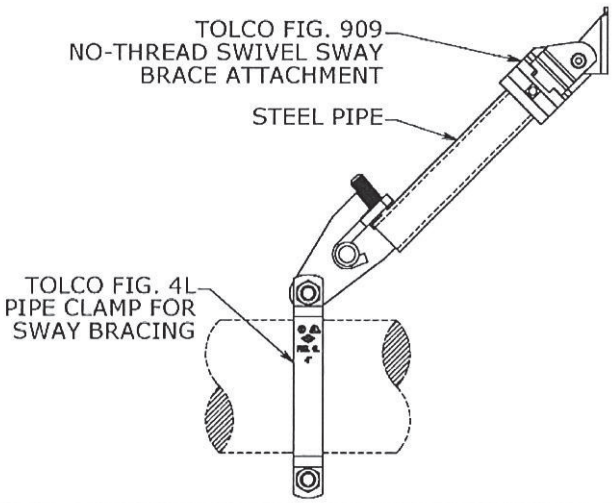
Seismic Brace Assembly Detail



Brace Identification on Plans W2 (3")

Brace Type Lateral [ ] Longitudinal [X] 4-Way [ ]

Sprinkler System Load Calculation (Fpw = CpWp)

Cp = 0.67

Diameter	Type	Length	Total Length	Weight Per Unit Length	Total Weight
3" (80 mm)	Sch. 40	70 ft (21.3 m)	70 ft (21.3 m)	10.82 lb/ft (16.1 kg/m)	757 lbs (343 kg)

Subtotal Weight	757 lbs (343 kg)
Wp (incl. 15%)	871 lbs (395 kg)
Total (Fpw)	583 lbs (265 kg)
Maximum Fpw per 9.3.5.5.2 (if applicable)	N/A

Main Size	Type/Sch.	Spacing (ft)
3"	Sch. 40	70

TOLBrace™ Seismic Calculation

CHC Puyallup Garage Job # 23-090

201 W. Main St

Brace Identification	W2 (3")
Brace Type (Per NFPA#13)	NFPA Type F
Braced Pipe (ft)	3" Sch.40 Steel Pipe
Spacing of Brace	70' 0" (21.34 m)
Orientation of Brace	Longitudinal
Bracing Material	1" Sch.40
Maximum Brace Length	7' 0" (2.13 m)
Slenderness Ratio used for Load Calculation	200
True Angle of Brace for Calculation	60°
Type of Fastener	1/2in. X 3-1/2in. Through-Bolt
Length of Fastener	3-1/2in.

Summary of Pipe within Zone of Influence

3" Sch.40 Steel Pipe (76.2 mm)	70 ft (21.3 m)

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G-Factor Used 0.67	
Allowance for Heads and Fittings	15%
Conclusions	
Total Adjusted Load of Pipe in Zone of Influence	584 lbs (265 kg)
Material Capacity	1604 lbs (728 kg)
Fastener Capacity	600 lbs (272 kg)
Fig. 4L Clamp	1745 lbs (792 kg)
Fig.909 No-Thread Swivel	1745 lbs (792 kg)
Structural Member	Wood Beam

Calculations prepared by Queen

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Brace Information

Maximum Brace Length	7' 0" (2.134 m)
Diameter of Brace	1" Sch.40
Type of Brace	Sch. 40
Angle of Brace	60° Min.
Least Rad. of Gyration	0.42" (11 mm)
L/R Value	200
Max Horizontal Load	1604 lbs (728 kg)

Fastener Information

Orientation to Connecting Surface NFPA Type F

Fastener

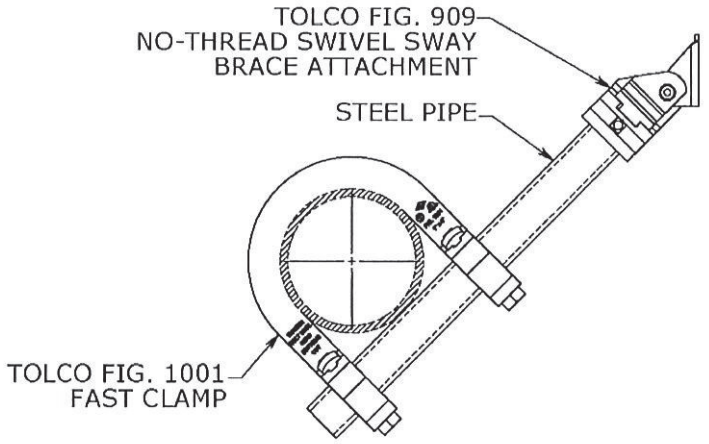
Type	Lag-Screw
Diameter	1/2in.
Length	5-1/2in.
Maximum Load	610 lbs (277 kg)
Prying Factor	N/A

TOLCO™ Brace Components

TOLCO™ Component	Listed Load	Adjusted Loa
Fig. 1001 Clamp	2015 lbs (914 kg)	1745 lbs (792 kg)
Fig.909 No-Thread Swivel	2015 lbs (914 kg)	1745 lbs (792 kg)
See Fastener Information		

*Calculation Based on CONCENTRIC Loading
*Please Note: These calculations are for TOLCO™ components only. Use of any other components voids these calculations and the listing of the assembly.

Seismic Brace Assembly Detail



Brace Identification on Plans W3 (4")

Brace Type Lateral [X] Longitudinal [ ] 4-Way [ ]

Sprinkler System Load Calculation (Fpw = CpWp)

Cp = 0.67

Diameter	Type	Length	Total Length	Weight Per Unit Length	Total Weight
4" (100 mm)	Sch. 40	21 ft (6.4 m)	21 ft (6.4 m)	16.4 lb/ft (24.41 kg/m)	344 lbs (156 kg)
1.5" (40 mm)	Sch. 40	115 ft (35.1 m)	115 ft (35.1 m)	3.61 lb/ft (5.37 kg/m)	415 lbs (188 kg)
1" (25 mm)	Sch. 40	9 ft (2.7 m)	9 ft (2.7 m)	2.05 lb/ft (3.05 kg/m)	18 lbs (8 kg)

Subtotal Weight	777 lbs (352 kg)
Wp (incl. 15%)	894 lbs (405 kg)
Total (Fpw)	599 lbs (272 kg)
Maximum Fpw per 9.3.5.5.2 (if applicable)	2385 lb (1081 kg)

Main Size	Type/Sch.	Spacing (ft)
4"	Sch. 40	21

TOLBrace™ Seismic Calculation

CHC Puyallup Garage

Job # 23-090

201 W. Main St

Brace Identification	W3 (4")
Brace Type (Per NFPA#13)	NFPA Type F
Braced Pipe (ft)	4" Sch.40 Steel Pipe
Spacing of Brace	21' 0" (6.4 m)
Orientation of Brace	Lateral
Bracing Material	1" Sch.40
Maximum Brace Length	7' 0" (2.13 m)
Slenderness Ratio used for Load Calculation	200
True Angle of Brace for Calculation	60°
Type of Fastener	1/2in. x 5-1/2in. Lag-Screw
Length of Fastener	5-1/2in.

Summary of Pipe within Zone of Influence

4" Sch.40 Steel Pipe (101.6 mm)	21 ft (6.4 m)
1.5" Sch.40 Steel Pipe (38.1 mm)	115 ft (35.1 m)
1" Sch.40 Steel Pipe (25.4 mm)	9 ft (2.7 m)

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G-Factor Used 0.67

Allowance for Heads and Fittings	15%

Conclusions

Total Adjusted Load of Pipe in Zone of Influence	599 lbs (272 kg)
Material Capacity	1604 lbs (728 kg)
Fastener Capacity	610 lbs (277 kg)
Fig. 1001 Clamp	1745 lbs (792 kg)
Fig.909 No-Thread Swivel	1745 lbs (792 kg)
Structural Member	Beam

Calculations prepared by Queen

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TOLBrace™ Seismic Bracing Calculations

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Calculations based on 2016 NFPA Pamphlet #13

Brace Information

Maximum Brace Length	7' 0" (2.134 m)
Diameter of Brace	1" Sch.40
Type of Brace	Sch. 40
Angle of Brace	60° Min.
Least Rad. of Gyration	0.42" (11 mm)
L/R Value	200
Max Horizontal Load	1604 lbs (728 kg)

Fastener Information

Orientation to Connecting Surface NFPA Type F

Fastener

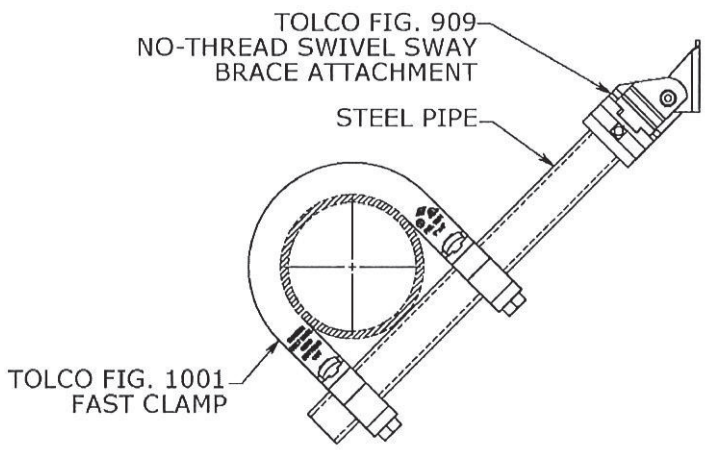
Type	Lag-Screw
Diameter	1/2in.
Length	5-1/2in.
Maximum Load	610 lbs (277 kg)
Prying Factor	N/A

TOLCO™ Brace Components

TOLCO™ Component	Listed Load	Adjusted Loa
Fig. 1001 Clamp	2015 lbs (914 kg)	1745 lbs (792 kg)
Fig.909 No-Thread Swivel	2015 lbs (914 kg)	1745 lbs (792 kg)
See Fastener Information		

*Calculation Based on CONCENTRIC Loading
*Please Note: These calculations are for TOLCO™ components only. Use of any other components voids these calculations and the listing of the assembly.

Seismic Brace Assembly Detail



Brace Identification on Plans W3 (4") Alternate

Brace Type Lateral [X] Longitudinal [ ] 4-Way [ ]

Sprinkler System Load Calculation (Fpw = CpWp)

Cp = 0.67

Diameter	Type	Length	Total Length	Weight Per Unit Length	Total Weight
4" (100 mm)	Sch. 40	25 ft (7.6 m)	25 ft (7.6 m)	16.4 lb/ft (24.41 kg/m)	410 lbs (186 kg)
1.5" (40 mm)	Sch. 40	99 ft (30.2 m)	99 ft (30.2 m)	3.61 lb/ft (5.37 kg/m)	357 lbs (162 kg)
1" (25 mm)	Sch. 40	5 ft (1.5 m)	5 ft (1.5 m)	2.05 lb/ft (3.05 kg/m)	10 lbs (5 kg)

Subtotal Weight	777 lbs (352 kg)
Wp (incl. 15%)	894 lbs (405 kg)
Total (Fpw)	599 lbs (272 kg)
Maximum Fpw per 9.3.5.5.2 (if applicable)	2385 lb (1081 kg)

Main Size	Type/Sch.	Spacing (ft)
4"	Sch. 40	25

TOLBrace™ Seismic Calculation

CHC Puyallup Garage

Job # 23-090

201 W. Main St

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Brace Identification	W3 (4") Alternate
Brace Type (Per NFPA#13)	NFPA Type F
Braced Pipe (ft)	4" Sch.40 Steel Pipe
Spacing of Brace	25' 0" (7.62 m)
Orientation of Brace	Lateral
Bracing Material	1" Sch.40
Maximum Brace Length	7' 0" (2.13 m)
Slenderness Ratio used for Load Calculation	200
True Angle of Brace for Calculation	60°
Type of Fastener	1/2in. x 5-1/2in. Lag-Screw
Length of Fastener	5-1/2in.

Summary of Pipe within Zone of Influence

4" Sch.40 Steel Pipe (101.6 mm)	25 ft (7.6 m)
1.5" Sch.40 Steel Pipe (38.1 mm)	99 ft (30.2 m)
1" Sch.40 Steel Pipe (25.4 mm)	5 ft (1.5 m)

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Expires
DEC 31, 23

G-Factor Used 0.67

Allowance for Heads and Fittings	15%

Conclusions

Total Adjusted Load of Pipe in Zone of Influence	599 lbs (272 kg)
Material Capacity	1604 lbs (728 kg)
Fastener Capacity	610 lbs (277 kg)
Fig. 1001 Clamp	1745 lbs (792 kg)
Fig.909 No-Thread Swivel	1745 lbs (792 kg)
Structural Member	Beam

Calculations prepared by Queen

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TOLBrace™ Seismic Bracing Calculations

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Address: 7855 S. 206th Street
Kent, WA 98032
Phone:
License:

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Calculations based on 2016 NFPA Pamphlet #13

Brace Information

Maximum Brace Length	7' 0" (2.134 m)
Diameter of Brace	1" Sch.40
Type of Brace	Sch. 40
Angle of Brace	60° Min.
Least Rad. of Gyration	0.42" (11 mm)
L/R Value	200
Max Horizontal Load	1604 lbs (728 kg)

Fastener Information

Orientation to Connecting Surface NFPA Type F

Fastener

Type	Lag-Screw
Diameter	1/2in.
Length	5-1/2in.
Maximum Load	610 lbs (277 kg)
Prying Factor	N/A

TOLCO™ Brace Components

TOLCO™ Component	Listed Load	Adjusted Loa
Fig. 1001 Clamp	2015 lbs (914 kg)	1745 lbs (792 kg)
Fig.909 No-Thread Swivel	2015 lbs (914 kg)	1745 lbs (792 kg)
See Fastener Information		

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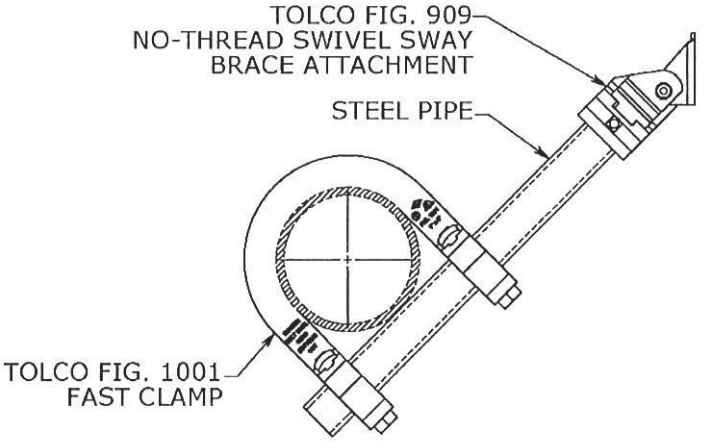
*Please Note: These calculations are for TOLCO™ components only. Use of any other components voids these calculations and the listing of the assembly.

Seismic Brace Assembly Detail



Brace Identification on Plans W3 (3")

Brace Type Lateral [X] Longitudinal [ ] 4-Way [ ]

Sprinkler System Load Calculation (Fpw = CpWp)

Cp = 0.67

Diameter	Type	Length	Total Length	Weight Per Unit Length	Total Weight
3" (80 mm)	Sch. 40	25 ft (7.6 m)	25 ft (7.6 m)	10.82 lb/ft (16.1 kg/m)	270 lbs (122 kg)
1.5" (40 mm)	Sch. 40	130 ft (39.6 m)	130 ft (39.6 m)	3.61 lb/ft (5.37 kg/m)	469 lbs (213 kg)
1" (25 mm)	Sch. 40	15 ft (4.6 m)	15 ft (4.6 m)	2.05 lb/ft (3.05 kg/m)	31 lbs (14 kg)

Subtotal Weight	770 lbs (349 kg)
Wp (incl. 15%)	885 lbs (402 kg)
Total (Fpw)	593 lbs (269 kg)
Maximum Fpw per 9.3.5.5.2 (if applicable)	1278 lb (579 kg)

Main Size	Type/Sch.	Spacing (ft)
3"	Sch. 40	25

TOLBrace™ Seismic Calculation

CHC Puyallup Garage

Job # 23-090

201 W. Main St

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Brace Identification	W3 (3")
Brace Type (Per NFPA#13)	NFPA Type F
Braced Pipe (ft)	3" Sch.40 Steel Pipe
Spacing of Brace	25' 0" (7.62 m)
Orientation of Brace	Lateral
Bracing Material	1" Sch.40
Maximum Brace Length	7' 0" (2.13 m)
Slenderness Ratio used for Load Calculation	200
True Angle of Brace for Calculation	60°
Type of Fastener	1/2in. x 5-1/2in. Lag-Screw
Length of Fastener	5-1/2in.

Summary of Pipe within Zone of Influence

3" Sch.40 Steel Pipe (76.2 mm)	25 ft (7.6 m)
1.5" Sch.40 Steel Pipe (38.1 mm)	130 ft (39.6 m)
1" Sch.40 Steel Pipe (25.4 mm)	15 ft (4.6 m)

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DEC 31, 23

G-Factor Used 0.67

Allowance for Heads and Fittings	15%

Conclusions

Total Adjusted Load of Pipe in Zone of Influence	594 lbs (269 kg)
Material Capacity	1604 lbs (728 kg)
Fastener Capacity	610 lbs (277 kg)
Fig. 1001 Clamp	1745 lbs (792 kg)
Fig.909 No-Thread Swivel	1745 lbs (792 kg)
Structural Member	Beam

Calculations prepared by Queen

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Puyallup, WA
Job # 23-090

Contractor: Archer Construction
Address: 7855 S. 206th Street
Kent, WA 98032
Phone:
License:

EATON
Powering Business Worldwide

Calculations based on 2016 NFPA Pamphlet #13

Brace Information

Maximum Brace Length	7' 0" (2.134 m)
Diameter of Brace	1" Sch.40
Type of Brace	Sch. 40
Angle of Brace	60° Min.
Least Rad. of Gyration	0.42" (11 mm)
L/R Value	200
Max Horizontal Load	1604 lbs (728 kg)

Fastener Information

Orientation to Connecting Surface NFPA Type F

Fastener

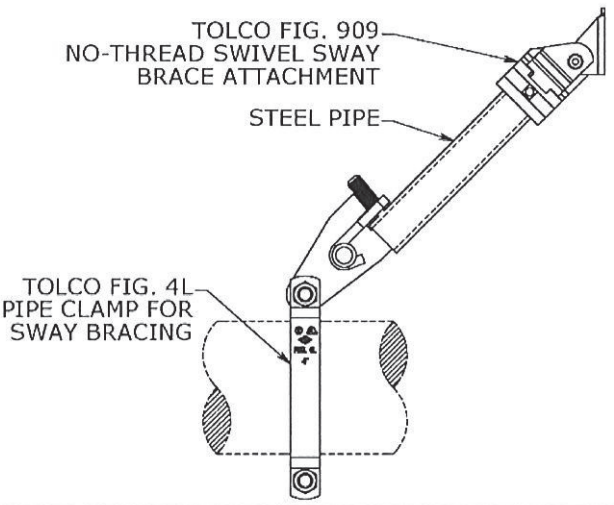
Type	Lag-Screw
Diameter	1/2in.
Length	5-1/2in.
Maximum Load	610 lbs (277 kg)
Prying Factor	N/A

TOLCO™ Brace Components

TOLCO™ Component	Listed Load	Adjusted Loa
Fig. 4L Clamp	2015 lbs (914 kg)	1745 lbs (792 kg)
Fig.909 No-Thread Swivel	2015 lbs (914 kg)	1745 lbs (792 kg)
See Fastener Information		

*Calculation Based on CONCENTRIC Loading
*Please Note: These calculations are for TOLCO™ components only. Use of any other components voids these calculations and the listing of the assembly.

Seismic Brace Assembly Detail



Brace Identification on Plans W4 (4")

Brace Type Lateral [ ] Longitudinal [X] 4-Way [ ]

Sprinkler System Load Calculation (Fpw = CpWp)

Cp = 0.67

Diameter	Type	Length	Total Length	Weight Per Unit Length	Total Weight
4" (100 mm)	Sch. 40	47 ft (14.3 m)	47 ft (14.3 m)	16.4 lb/ft (24.41 kg/m)	771 lbs (350 kg)

Subtotal Weight	771 lbs (350 kg)
Wp (incl. 15%)	887 lbs (402 kg)
Total (Fpw)	594 lbs (269 kg)
Maximum Fpw per 9.3.5.5.2 (if applicable)	N/A

Main Size	Type/Sch.	Spacing (ft)
4"	Sch. 40	47

TOLBrace™ Seismic Calculation

CHC Puyallup Garage Job # 23-090

201 W. Main St

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Brace Identification	W4 (4")
Brace Type (Per NFPA#13)	NFPA Type F
Braced Pipe (ft)	4" Sch.40 Steel Pipe
Spacing of Brace	47' 0" (14.33 m)
Orientation of Brace	Longitudinal
Bracing Material	1" Sch.40
Maximum Brace Length	7' 0" (2.13 m)
Slenderness Ratio used for Load Calculation	200
True Angle of Brace for Calculation	60°
Type of Fastener	1/2in. x 5-1/2in. Lag-Screw
Length of Fastener	5-1/2in.

Summary of Pipe within Zone of Influence

4" Sch.40 Steel Pipe (101.6 mm)	47 ft (14.3 m)

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G-Factor Used 0.67

Allowance for Heads and Fittings	15%
Conclusions	
Total Adjusted Load of Pipe in Zone of Influence	594 lbs (269 kg)
Material Capacity	1604 lbs (728 kg)
Fastener Capacity	610 lbs (277 kg)
Fig. 4L Clamp	1745 lbs (792 kg)
Fig.909 No-Thread Swivel	1745 lbs (792 kg)
Structural Member	Wood Beam

Calculations prepared by Queen

* The description of the Structural Member is for informational purposes only.
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TOLBrace™ Seismic Bracing Calculations

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Brace Information

Maximum Brace Length	7' 0" (2.134 m)
Diameter of Brace	1" Sch.40
Type of Brace	Sch. 40
Angle of Brace	60° Min.
Least Rad. of Gyration	0.42" (11 mm)
L/R Value	200
Max Horizontal Load	1604 lbs (728 kg)

Fastener Information

Orientation to Connecting Surface NFPA Type F

Fastener

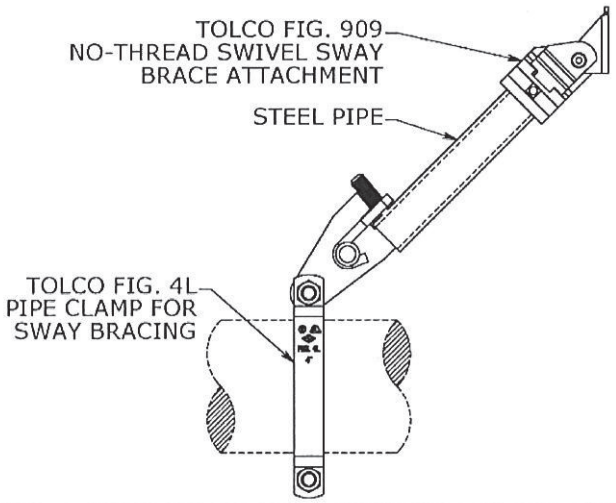
Type	Lag-Screw
Diameter	1/2in.
Length	5-1/2in.
Maximum Load	610 lbs (277 kg)
Prying Factor	N/A

TOLCO™ Brace Components

TOLCO™ Component	Listed Load	Adjusted Loa
Fig. 4L Clamp	2015 lbs (914 kg)	1745 lbs (792 kg)
Fig.909 No-Thread Swivel	2015 lbs (914 kg)	1745 lbs (792 kg)
See Fastener Information		

*Calculation Based on CONCENTRIC Loading
*Please Note: These calculations are for TOLCO™ components only. Use of any other components voids these calculations and the listing of the assembly.

Seismic Brace Assembly Detail



Brace Identification on Plans W4 (3")

Brace Type Lateral [ ] Longitudinal [X] 4-Way [ ]

Sprinkler System Load Calculation (Fpw = CpWp)

Cp = 0.67

Diameter	Type	Length	Total Length	Weight Per Unit Length	Total Weight
3" (80 mm)	Sch. 40	70 ft (21.3 m)	70 ft (21.3 m)	10.82 lb/ft (16.1 kg/m)	757 lbs (343 kg)

Subtotal Weight	757 lbs (343 kg)
Wp (incl. 15%)	871 lbs (395 kg)
Total (Fpw)	583 lbs (265 kg)
Maximum Fpw per 9.3.5.5.2 (if applicable)	N/A

Main Size	Type/Sch.	Spacing (ft)
3"	Sch. 40	70

TOLBrace™ Seismic Calculation

CHC Puyallup Garage

Job # 23-090

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Brace Identification	W4 (3")
Brace Type (Per NFPA#13)	NFPA Type F
Braced Pipe (ft)	3" Sch.40 Steel Pipe
Spacing of Brace	70' 0" (21.34 m)
Orientation of Brace	Longitudinal
Bracing Material	1" Sch.40
Maximum Brace Length	7' 0" (2.13 m)
Slenderness Ratio used for Load Calculation	200
True Angle of Brace for Calculation	60°
Type of Fastener	1/2in. x 5-1/2in. Lag-Screw
Length of Fastener	5-1/2in.

Summary of Pipe within Zone of Influence

3" Sch.40 Steel Pipe (76.2 mm)	70 ft (21.3 m)

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G-Factor Used 0.67	
Allowance for Heads and Fittings	15%
Conclusions	
Total Adjusted Load of Pipe in Zone of Influence	584 lbs (265 kg)
Material Capacity	1604 lbs (728 kg)
Fastener Capacity	610 lbs (277 kg)
Fig. 4L Clamp	1745 lbs (792 kg)
Fig.909 No-Thread Swivel	1745 lbs (792 kg)
Structural Member	Wood Beam

Calculations prepared by Queen

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Brace Information

Maximum Brace Length	7' 0" (2.134 m)
Diameter of Brace	1" Sch.40
Type of Brace	Sch. 40
Angle of Brace	60° Min.
Least Rad. of Gyration	0.42" (11 mm)
L/R Value	200
Max Horizontal Load	1604 lbs (728 kg)

Fastener Information

Orientation to Connecting Surface NFPA Type I

Fastener

Type	Through-Bolt
Diameter	1/2in.
Length	3-1/2in.
Maximum Load	485 lbs (220 kg)
Prying Factor	N/A

TOLCO™ Brace Components

TOLCO™ Component	Listed Load	Adjusted Loa
Fig. 4L Clamp	2015 lbs (914 kg)	1745 lbs (792 kg)
Fig.909 No-Thread Swivel	2015 lbs (914 kg)	1745 lbs (792 kg)
See Fastener Information		

*Calculation Based on CONCENTRIC Loading
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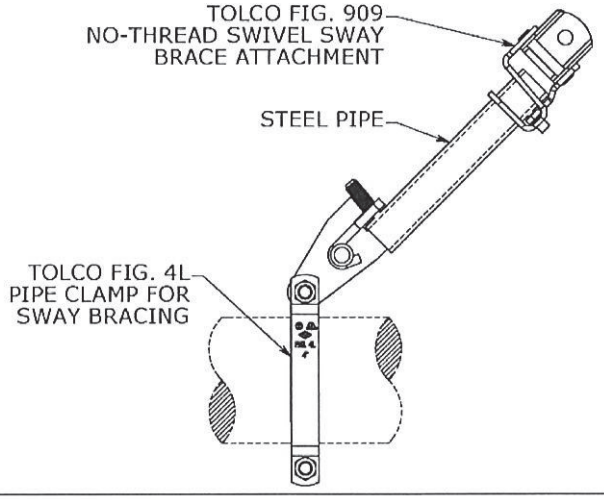
Seismic Brace Assembly Detail



Brace Identification on Plans W6 (4")

Brace Type Lateral [ ] Longitudinal [X] 4-Way [ ]

Sprinkler System Load Calculation (Fpw = CpWp)

Cp = 0.67

Diameter	Type	Length	Total Length	Weight Per Unit Length	Total Weight
4" (100 mm)	Sch. 40	38 ft (11.6 m)	38 ft (11.6 m)	16.4 lb/ft (24.41 kg/m)	623 lbs (283 kg)

Subtotal Weight	623 lbs (283 kg)
Wp (incl. 15%)	716 lbs (325 kg)
Total (Fpw)	480 lbs (218 kg)
Maximum Fpw per 9.3.5.5.2 (if applicable)	N/A

Main Size	Type/Sch.	Spacing (ft)
4"	Sch. 40	38

TOLBrace™ Seismic Calculation

CHC Puyallup Garage

Job # 23-090

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Brace Identification	W6 (4")
Brace Type (Per NFPA#13)	NFPA Type I
Braced Pipe (ft)	4" Sch.40 Steel Pipe
Spacing of Brace	38' 0" (11.58 m)
Orientation of Brace	Longitudinal
Bracing Material	1" Sch.40
Maximum Brace Length	7' 0" (2.13 m)
Slenderness Ratio used for Load Calculation	200
True Angle of Brace for Calculation	60°
Type of Fastener	1/2in. X 3-1/2in. Through-Bolt
Length of Fastener	3-1/2in.

Summary of Pipe within Zone of Influence

4" Sch.40 Steel Pipe (101.6 mm)	38 ft (11.6 m)

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G-Factor Used 0.67

Allowance for Heads and Fittings	15%
Conclusions	
Total Adjusted Load of Pipe in Zone of Influence	480 lbs (218 kg)
Material Capacity	1604 lbs (728 kg)
Fastener Capacity	485 lbs (220 kg)
Fig. 4L Clamp	1745 lbs (792 kg)
Fig.909 No-Thread Swivel	1745 lbs (792 kg)
Structural Member	Wood Beam

Calculations prepared by Queen

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Brace Information

Maximum Brace Length	7' 0" (2.134 m)
Diameter of Brace	1" Sch.40
Type of Brace	Sch. 40
Angle of Brace	60° Min.
Least Rad. of Gyration	0.42" (11 mm)
L/R Value	200
Max Horizontal Load	1604 lbs (728 kg)

Fastener Information

Orientation to Connecting Surface NFPA Type I

Fastener

Type	Through-Bolt
Diameter	1/2in.
Length	3-1/2in.
Maximum Load	485 lbs (220 kg)
Prying Factor	N/A

TOLCO™ Brace Components

TOLCO™ Component	Listed Load	Adjusted Loa
Fig. 4L Clamp	2015 lbs (914 kg)	1745 lbs (792 kg)
Fig.909 No-Thread Swivel	2015 lbs (914 kg)	1745 lbs (792 kg)
See Fastener Information		

*Calculation Based on CONCENTRIC Loading
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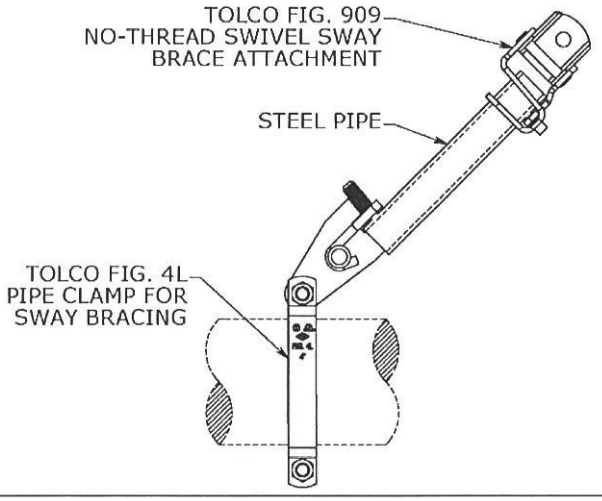
Seismic Brace Assembly Detail



Brace Identification on Plans W6 (3")

Brace Type Lateral [ ] Longitudinal [X] 4-Way [ ]

Sprinkler System Load Calculation (Fpw = CpWp)

Cp = 0.67

Diameter	Type	Length	Total Length	Weight Per Unit Length	Total Weight
3" (80 mm)	Sch. 40	57 ft (17.4 m)	57 ft (17.4 m)	10.82 lb/ft (16.1 kg/m)	617 lbs (280 kg)

Subtotal Weight	617 lbs (280 kg)
Wp (incl. 15%)	710 lbs (322 kg)
Total (Fpw)	475 lbs (216 kg)
Maximum Fpw per 9.3.5.5.2 (if applicable)	N/A

Main Size	Type/Sch.	Spacing (ft)
3"	Sch. 40	57

TOLBrace™ Seismic Calculation

CHC Puyallup Garage — Job # 23-090

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Brace Identification	W6 (3")
Brace Type (Per NFPA#13)	NFPA Type I
Braced Pipe (ft)	3" Sch.40 Steel Pipe
Spacing of Brace	57' 0" (17.37 m)
Orientation of Brace	Longitudinal
Bracing Material	1" Sch.40
Maximum Brace Length	7' 0" (2.13 m)
Slenderness Ratio used for Load Calculation	200
True Angle of Brace for Calculation	60°
Type of Fastener	1/2in. X 3-1/2in. Through-Bolt
Length of Fastener	3-1/2in.

Summary of Pipe within Zone of Influence

3" Sch.40 Steel Pipe (76.2 mm)	57 ft (17.4 m)

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G-Factor Used 0.67	
Allowance for Heads and Fittings	15%
Conclusions	
Total Adjusted Load of Pipe in Zone of Influence	475 lbs (215 kg)
Material Capacity	1604 lbs (728 kg)
Fastener Capacity	485 lbs (220 kg)
Fig. 4L Clamp	1745 lbs (792 kg)
Fig.909 No-Thread Swivel	1745 lbs (792 kg)
Structural Member	Wood Beam

Calculations prepared by Queen

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Brace Information

Maximum Brace Length	7' 0" (2.134 m)
Diameter of Brace	1" Sch.40
Type of Brace	Sch. 40
Angle of Brace	60° Min.
Least Rad. of Gyration	0.42" (11 mm)
L/R Value	200
Max Horizontal Load	1604 lbs (728 kg)

Fastener Information

Orientation to Connecting Surface NFPA Type I

Fastener

Type	Lag-Screw
Diameter	1/2in.
Length	4-1/2in.
Maximum Load	325 lbs (147 kg)
Prying Factor	N/A

TOLCO™ Brace Components

TOLCO™ Component	Listed Load	Adjusted Loa
Fig. 4L Clamp	2015 lbs (914 kg)	1745 lbs (792 kg)
Fig.909 No-Thread Swivel	2015 lbs (914 kg)	1745 lbs (792 kg)
See Fastener Information		

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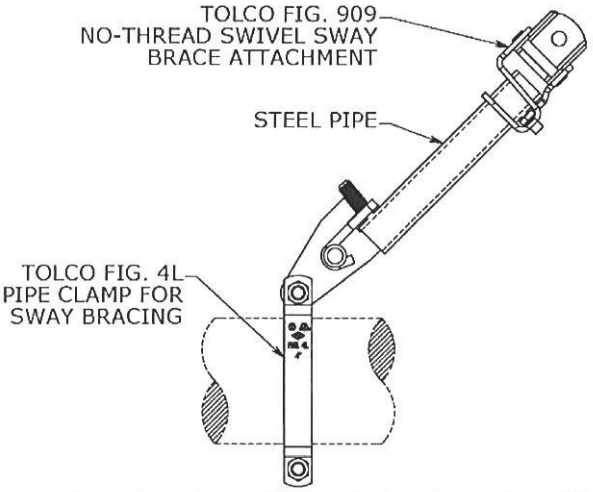
Seismic Brace Assembly Detail



Brace Identification on Plans W8 (4")

Brace Type Lateral [ ] Longitudinal [X] 4-Way [ ]

Sprinkler System Load Calculation (Fpw = CpWp)

Cp = 0.67

Diameter	Type	Length	Total Length	Weight Per Unit Length	Total Weight
4" (100 mm)	Sch. 40	25 ft (7.6 m)	25 ft (7.6 m)	16.4 lb/ft (24.41 kg/m)	410 lbs (186 kg)

Subtotal Weight	410 lbs (186 kg)
Wp (incl. 15%)	471 lbs (214 kg)
Total (Fpw)	316 lbs (143 kg)
Maximum Fpw per 9.3.5.5.2 (if applicable)	N/A

Main Size	Type/Sch.	Spacing (ft)
4"	Sch. 40	25

TOLBrace™ Seismic Calculation

CHC Puyallup Garage

Job # 23-090

201 W. Main St

Brace Identification	W8 (4")
Brace Type (Per NFPA#13)	NFPA Type I
Braced Pipe (ft)	4" Sch.40 Steel Pipe
Spacing of Brace	25' 0" (7.62 m)
Orientation of Brace	Longitudinal
Bracing Material	1" Sch.40
Maximum Brace Length	7' 0" (2.13 m)
Slenderness Ratio used for Load Calculation	200
True Angle of Brace for Calculation	60°
Type of Fastener	1/2in. x 4-1/2in. Lag-Screw
Length of Fastener	4-1/2in.

Summary of Pipe within Zone of Influence

4" Sch.40 Steel Pipe (101.6 mm)	25 ft (7.6 m)

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G-Factor Used 0.67

Allowance for Heads and Fittings	15%
Conclusions	
Total Adjusted Load of Pipe in Zone of Influence	316 lbs (143 kg)
Material Capacity	1604 lbs (728 kg)
Fastener Capacity	325 lbs (147 kg)
Fig. 4L Clamp	1745 lbs (792 kg)
Fig.909 No-Thread Swivel	1745 lbs (792 kg)
Structural Member	Wood Beam

Calculations prepared by Queen

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Brace Information

Maximum Brace Length	7' 0" (2.134 m)
Diameter of Brace	1" Sch.40
Type of Brace	Sch. 40
Angle of Brace	60° Min.
Least Rad. of Gyration	0.42" (11 mm)
L/R Value	200
Max Horizontal Load	1604 lbs (728 kg)

Fastener Information

Orientation to Connecting Surface NFPA Type I

Fastener

Type	Lag-Screw
Diameter	1/2in.
Length	4-1/2in.
Maximum Load	325 lbs (147 kg)
Prying Factor	N/A

TOLCO™ Brace Components

TOLCO™ Component	Listed Load	Adjusted Loa
Fig. 4L Clamp	2015 lbs (914 kg)	1745 lbs (792 kg)
Fig.909 No-Thread Swivel	2015 lbs (914 kg)	1745 lbs (792 kg)
See Fastener Information		

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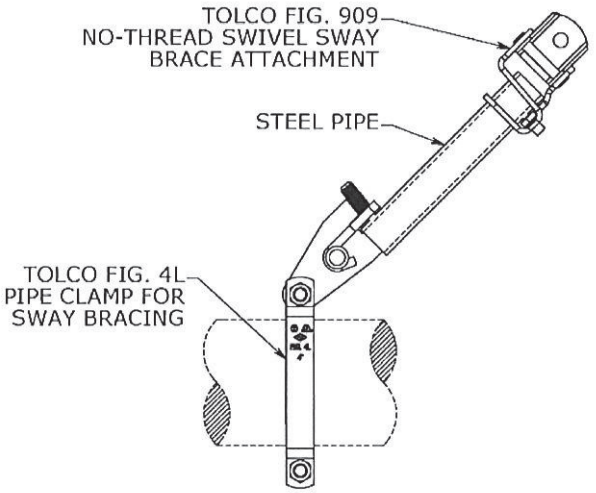
Seismic Brace Assembly Detail



Brace Identification on Plans W8 (3")

Brace Type Lateral [ ] Longitudinal [X] 4-Way [ ]

Sprinkler System Load Calculation (Fpw = CpWp)

Cp = 0.67

Diameter	Type	Length	Total Length	Weight Per Unit Length	Total Weight
3" (80 mm)	Sch. 40	38 ft (11.6 m)	38 ft (11.6 m)	10.82 lb/ft (16.1 kg/m)	411 lbs (186 kg)

Subtotal Weight	411 lbs (186 kg)
Wp (incl. 15%)	473 lbs (214 kg)
Total (Fpw)	317 lbs (144 kg)
Maximum Fpw per 9.3.5.5.2 (if applicable)	N/A

Main Size	Type/Sch.	Spacing (ft)
3"	Sch. 40	38

TOLBrace™ Seismic Calculation

CHC Puyallup Garage — Job # 23-090

201 W. Main St

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Brace Identification	W8 (3")
Brace Type (Per NFPA#13)	NFPA Type I
Braced Pipe (ft)	3" Sch.40 Steel Pipe
Spacing of Brace	38' 0" (11.58 m)
Orientation of Brace	Longitudinal
Bracing Material	1" Sch.40
Maximum Brace Length	7' 0" (2.13 m)
Slenderness Ratio used for Load Calculation	200
True Angle of Brace for Calculation	60°
Type of Fastener	1/2in. x 4-1/2in. Lag-Screw
Length of Fastener	4-1/2in.

Summary of Pipe within Zone of Influence

3" Sch.40 Steel Pipe (76.2 mm)	38 ft (11.6 m)

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G-Factor Used 0.67	
Allowance for Heads and Fittings	15%
Conclusions	
Total Adjusted Load of Pipe in Zone of Influence	317 lbs (144 kg)
Material Capacity	1604 lbs (728 kg)
Fastener Capacity	325 lbs (147 kg)
Fig. 4L Clamp	1745 lbs (792 kg)
Fig.909 No-Thread Swivel	1745 lbs (792 kg)
Structural Member	Wood Beam

Calculations prepared by Queen

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