Tentative Interim Amendment

NFPA 13

Standard for the Installation of Sprinkler Systems

2002 Edition

Reference: Various
TIA 02-1 (NFPA 13)
(SC 03-7-8 / Log No. 748)

Pursuant to Section 5 of the NFPA Regulations Governing Committee Projects, the National Fire Protection Association has issued the following Tentative Interim Amendment to NFPA 13, Standard for the Installation of Sprinkler Systems, 2002 edition. The TIA was processed by the Automatic Sprinkler Systems Committee, and was issued by the Standards Council on July 17, 2003, with an effective date of August 6, 2003.

A Tentative Interim Amendment is tentative because it has not been processed through the entire standards-making procedures. It is interim because it is effective only between editions of the standard. A TIA automatically becomes a proposal of the proponent for the next edition of the standard; as such, it then is subject to all of the procedures of the standards-making process

1. Reword Sections 9.3.5.6, 9.3.5.6.1, A.9.3.5.6.1, 9.3.5.6.2 and 9.3.5.7 to read as follows:

9.3.5.6* Horizontal Seismic Loads

9.3.5.6.1 The horizontal seismic load for the braces shall be determined as required by the authority having jurisdiction. The weight of the system being braced (Wp) shall be taken as 1.15 times the weight of the water-filled piping. [See A.9.3.5.6.1]

A 9.3.5.6.1 The several factors used in the computation of the horizontal seismic load should be available from the project architect or structural engineer. Sprinkler systems are emergency systems and as such should be designed for an Importance Factor (Ip) of 1.5. Seismic load equations allow the reduction of the seismic force by a Component Response Modification Factor (Rp), that reflects the ductility of the system; systems where braced piping are primarily joined by threaded fittings should be considered less ductile than systems where braced piping are joined by welded or mechanical type fittings. While research continues in understanding the performance of sprinkler piping under seismic loads, the good performance of properly braced sprinkler piping in past earthquakes suggests that properly braced systems perform with high ductility, which currently relates to an Rp factor of 3.5.

9.3.5.6.2 Where the authority having jurisdiction does not specify the horizontal seismic load, the horizontal seismic force acting on the braces shall be determined based on a horizontal force of Fp= 0.5 Wp, where Fp is the horizontal force factor and Wp is 1.15 times the weight of the water filled piping.

9.3.5.7 Where the horizontal seismic loads used exceed 0.5 Wp and the brace angle is less than 45 degrees from vertical or where the horizontal seismic load exceeds 1.0 Wp and the brace angle is less than 60 degrees from vertical, the braces shall be arranged to resist the net vertical reaction produced by the horizontal load.

***2.** Replace Figure 9.3.5.9.1 and its associated Tables and Modify Section A.9.3.5.9 to read as follows:*

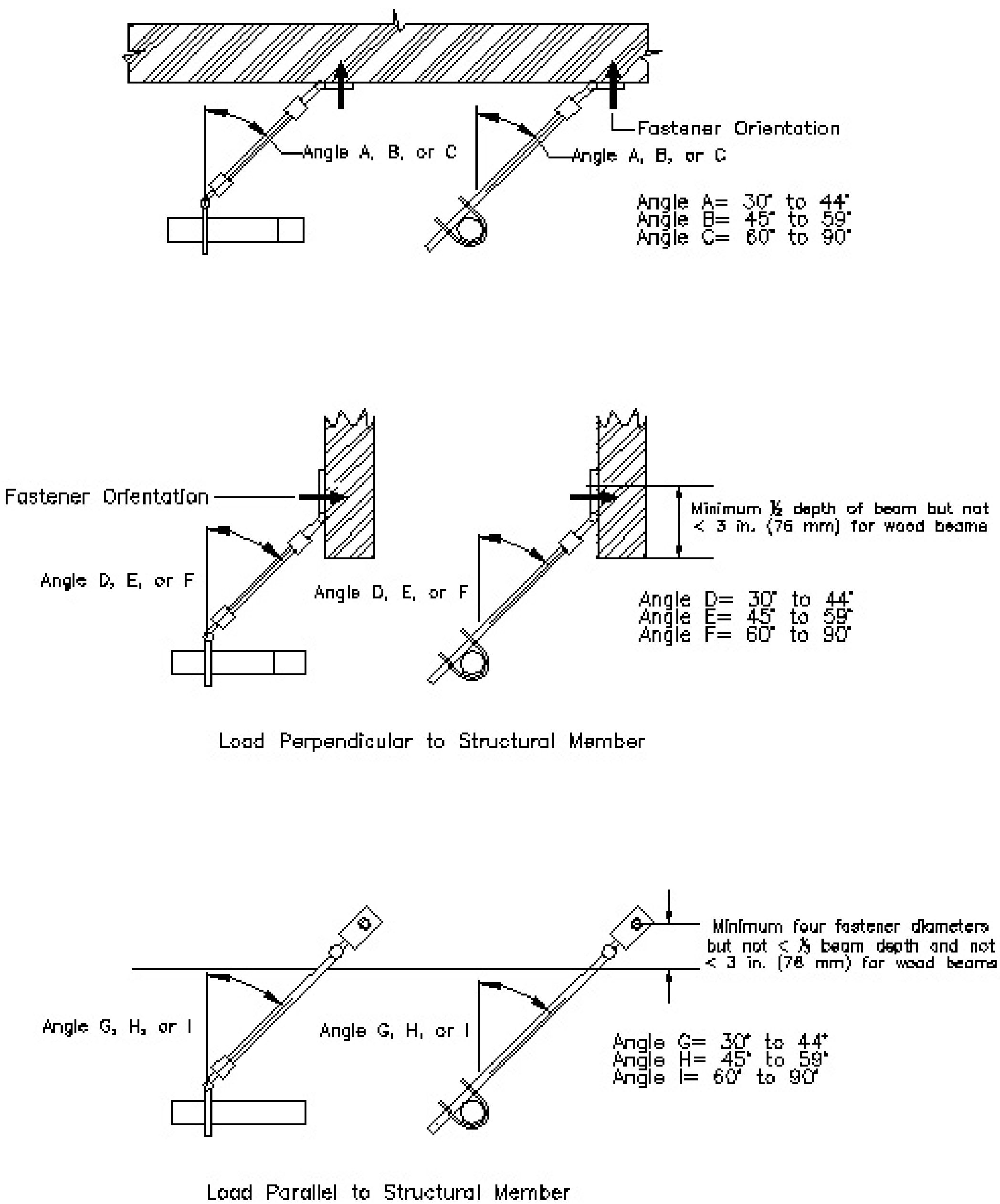

Figure 9.3.5.9.1 Maximum Loads for Various Types of Structure and Maximum Loads for Various Types of Fasteners to Structure.

Through Bolts in Sawn Lumber or Glue Laminated Timbers (Load Perpendicular to Grain)

Length of Bolt in Timber (in.)	Bolt Diameter (in.) 1/2									5/8									3/4								
	A	B	C	D	E	F	G	H	I	A	B	C	D	E	F	G	H	I	A	B	C	D	E	F	G	H	I
1 1/2	115	165	200	135	230	395	130	215	310	135	190	235	155	270	460	155	255	380	155	220	270	180	310	530	170	300	450
2 1/2	140	200	240	160	280	480	165	275	410	160	225	280	185	320	550	190	320	495	180	255	310	205	360	615	215	365	575
3 1/2	175	250	305	200	350	600	200	330	485	200	285	345	230	400	685	235	405	635	220	310	380	255	440	755	260	455	730
5 1/2	*	*	*	*	*	*	*	*	*	280	395	485	325	560	960	315	515	735	310	440	535	360	620	1065	360	610	925

Lag Screws and Lag Bolts in Wood (Load Perpendicular to Grain - Holes Predrilled Using Good Practice)

Length Under Head (in.)	Lag Bolt Diameter (in.) 3/8									1/2									5/8								
	A	B	C	D	E	F	G	H	I	A	B	C	D	E	F	G	H	I	A	B	C	D	E	F	G	H	I
3 1/2	165	190	200	170	220	310	80	120	170	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
4 1/2	180	200	200	175	235	350	80	120	170	300	355	380	315	400	550	145	230	325	*	*	*	*	*	*	*	*	*
5 1/2	190	200	200	175	245	380	80	120	170	320	370	380	320	420	610	145	230	325	435	525	555	425	550	775	195	320	460
6 1/2	195	205	200	175	250	400	80	120	170	340	375	380	325	435	650	145	230	325	465	540	555	430	570	840	195	320	460

Note: Wood fastener maximum capacity values are based on 2001 National Design Specifications (NDS) for wood with a specific gravity of 0.35. Values for other types of wood can obtained by multiplying the above values by the following factors:

Specific Gravity of Wood	Multiplier
0.36 thru 0.49	1.17
0.50 thru 0.65	1.25
0.66 thru 0.73	1.50

Wedge Anchors in Normal Weight Concrete										
Diameter (in)	Embedment (in)	A	B	C	D	E	F	G	H	I
3/8	3	120	290	615	540	465	410	385	545	665
1/2	4	210	510	1085	955	825	720	690	975	1195
5/8	5	300	730	1550	1415	1200	1035	1085	1530	1875
3/4	6	385	945	2005	1920	1600	1335	1800	2545	3120

Wedge Anchors in Lightweight Concrete Filled Metal Decking										
Diameter (in)	Embedment (in)	A	B	C	D	E	F	G	H	I
3/8	1 1/4	75	175	375	-	-	-	-	-	-
1/2	2 1/4	100	245	520	-	-	-	-	-	-
5/8	2 1/4	150	370	780	-	-	-	-	-	-
3/4	3 1/4	160	390	825	-	-	-	-	-	-

Undercut Anchors in Normal Weight Concrete										
Diameter (mm)	Embedment (in)	A	B	C	D	E	F	G	H	I
M10	4	305	745	1125	1165	1105	1050	650	920	1125
M12	5	460	1130	1645	1740	1665	1595	950	1345	1645
M16	7 1/2	825	2020	2930	3110	2980	2860	1695	2395	2930

Note: These are minimum values to be used for a generic anchors in normal weight concrete slabs, lightweight concrete metal filled decking and a table for undercut anchors in normal weight concrete. Anchors with special listings shall be installed in accordance with their requirements.

Connections to Steel (Values Assume Bolt Perpendicular to Mounting Surface)																	
Diameter of Unfinished Steel Bolt (in.)																	
1/4									3/8								
A	B	C	D	E	F	G	H	I	A	B	C	D	E	F	G	H	I
400	500	600	300	500	650	325	458	565	900	1200	1400	800	1200	1550	735	1035	1278
Diameter of Unfinished Steel Bolt (in.)																	
1/2									5/8								
A	B	C	D	E	F	G	H	I	A	B	C	D	E	F	G	H	I
1600	2050	2550	1450	2050	2850	1300	1830	2260	2500	3300	3950	2250	3300	4400	2045	2880	3557

A.9.3.5.9 Current fasteners for anchoring to concrete are referred to as post installed anchors. There are several types of post installed anchors that include expansion anchors, chemical or adhesive anchors and undercut anchors. The criteria in Tables 9.3.5.8.9 (a), (b) and (c) are based on the use of a wedge expansion anchors and undercut anchors. Use of other anchors in concrete should be in accordance with the listing provisions of the anchor. Anchorage designs are usable under ASD methods. Values in tables 9.3.5.8.9 (a), (b) and (c) are based on an 8 to 1 safety factor in tension and a 4 to 1 in shear for allowable loads. Wedge anchors are torque-controlled expansion anchors that are set by applying a torque to the anchors nut, which causes the anchor to rise while the wedge stays in place. This causes the wedge to be pulled onto a coned section of the anchor and presses the wedge against the wall of the hole. Undercut anchors may or may not be torque-controlled. Typically, the main hole is drilled, a special second drill bit is inserted into the hole and flare is drilled at the base of the main hole. Some anchors are self-drilling and do not require a second drill bit. The anchor is then inserted into the hole and when torque is applied the bottom of the anchor flares out into the flared hole and a mechanical lock is obtained. Consideration should be given with respect to the position near the edge of a slab and the spacing of anchors. Typically for full capacity in tables 9.3.5.8.9 (a), (b), and (c) the edge distance should be 1-1/2 times the embedment and 3 times the embedment for spacing between anchors.

3. Modify section 9.3.5.3.1 to read as follows, and add a new annex section A.9.3.5.3.1 to read as follows,

9.3.5.3 Lateral Sway Bracing.

9.3.5.3.1* Lateral sway bracing-shall be provided on all feed and cross mains regardless of size and all branch lines and other piping with a diameter of 2½ in. (63.5 mm) and larger. Lateral brace assemblies in straight runs of pipe shall capable of resisting the anticipated seismic loads and spaced to a maximum interval not exceeding 40 ft (12.2 m) on center. The load capacity of the brace assembly shall be determined by the capacity of its weakest component.

A.9.3.5.3.1 A brace assembly includes the brace member, the attachment components to pipe and building and their fasteners. There are primarily two considerations in determining the spacing of lateral earthquake braces in straight runs of pipe: (1) Deflection, and (2) Stress. Both deflection and stress tend to increase with the spacing of the braces. The larger the mid-span deflection, the greater the chance of impact with adjacent structural/non-structural components. The higher the stress in the pipe, the greater the chance of rupture in the pipe or coupling. For properly sized braces, the 40 ft maximum spacing between lateral braces in straight runs of pipe result in defections and stresses consistent with the minimum required clearances in this standard and modern building codes. In the longitudinal direction, there is no deflection consideration, but the pipe must transfer the load to the longitudinal braces without inducing large axial stresses in the pipe and the couplings.

4. Delete Section 9.3.5.3.3.

5. Renumber Sections 9.3.5.3.4 through 9.3.5.3.8 as Sections 9.3.5.3.5 through 9.3.5.3.7.