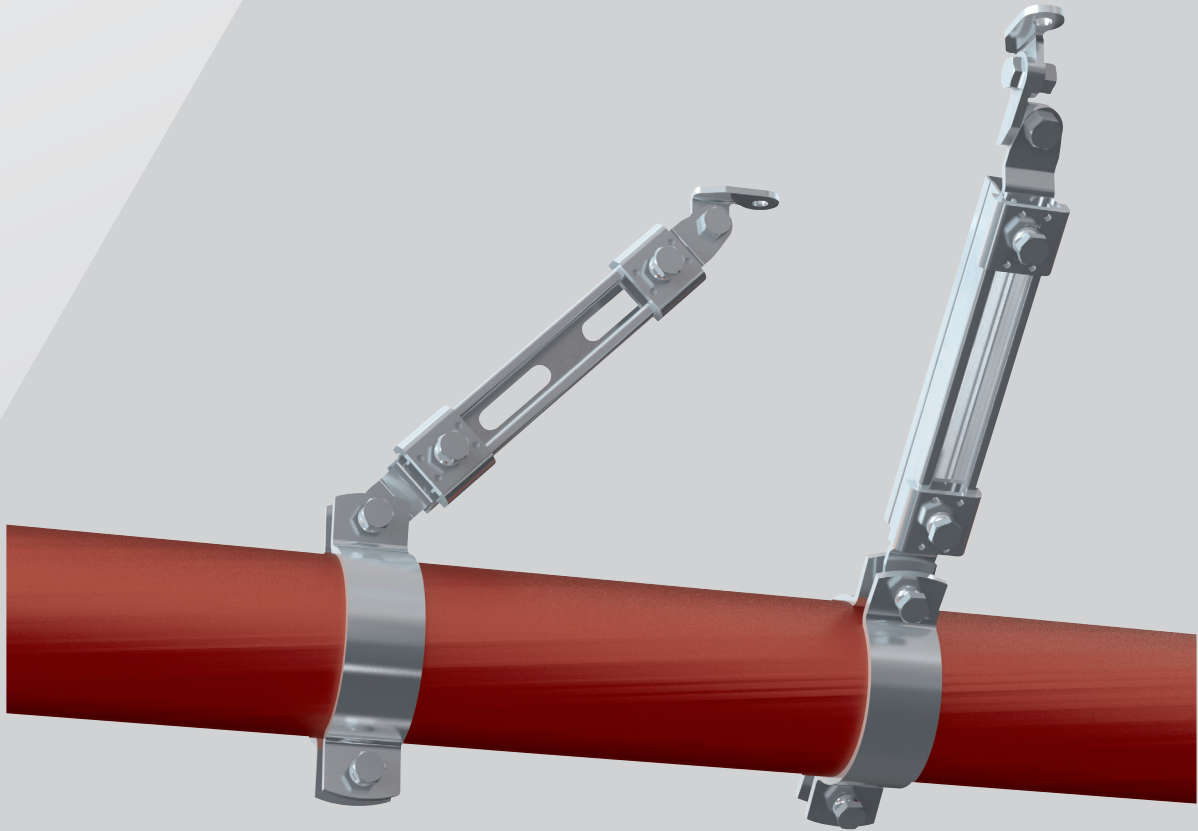
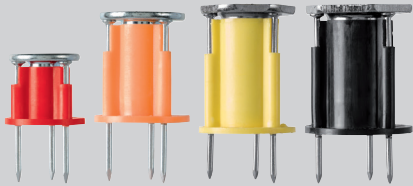
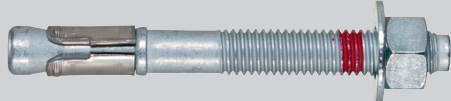




MECHANICAL ANCHORS FOR SEISMIC BRACING

NFPA 13 seismic bracing anchor load tables



HILTI MECHANICAL ANCHORS AND CAST-IN ANCHORS FOR SEISMIC BRACING IN ACCORDANCE WITH NFPA 13

Hilti post-installed mechanical anchors and single point cast-in-place anchors are common, cost effective methods for attaching both structural and non-structural elements to concrete base materials. Non-structural elements, such as fire sprinkler pipes; electrical conduit and cable trays; heating, ventilation and air conditioning (HVAC) equipment and ductwork are especially suited for Hilti anchoring systems.

For fire sprinkler pipe applications, Hilti anchors have been effectively used for many years to support the gravity loaded hangers as well as the sway bracing for resisting the lateral and vertical motion resulting from seismic loads.

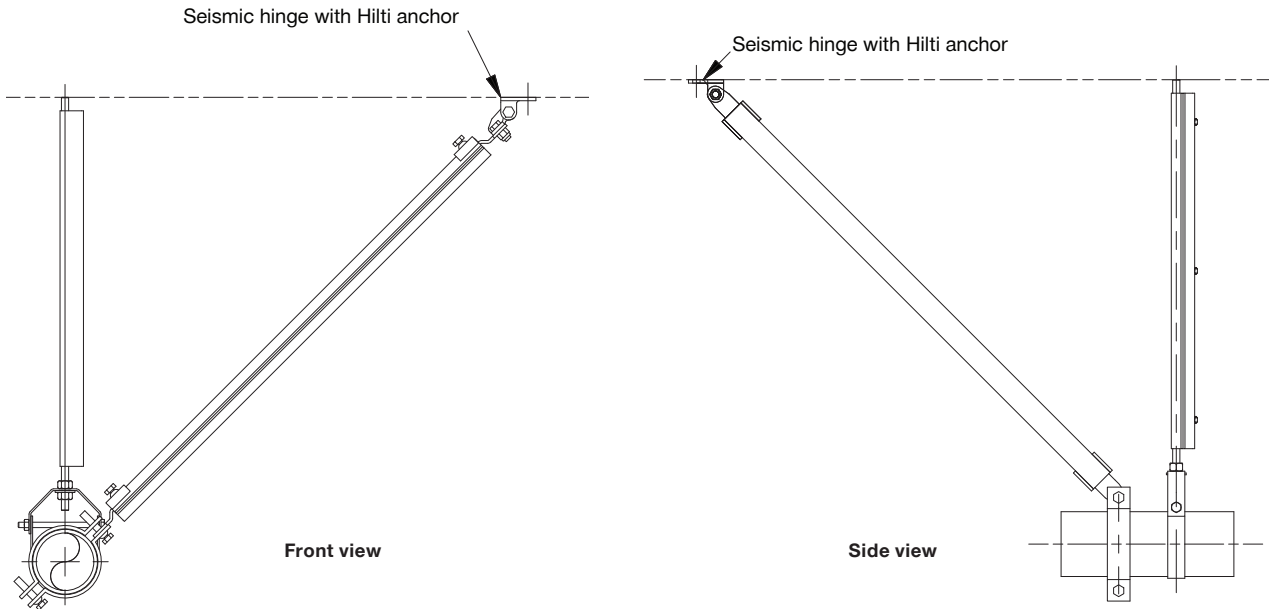


Figure 1 — Typical sprinkler pipe hanger with seismic sway

While Hilti anchors can be designed and installed to support gravity loads of the pipe through the attachment of the hanger to the concrete, this document will focus on the design of the anchorage to attach the sway brace assembly to the concrete structure. Contact Hilti for more information related to Hilti anchors to support the vertical pipe hanger.

In a seismic event the earthquake forces are resisted by the transverse and longitudinal sway bracing and the sway braces will transfer the loads through a fastener that is attached to the concrete. In general, the capacity of the fastener in concrete is dictated by a design per ACI 318-14 Chapter 17, and the design of the sway brace components is dictated by NFPA 13-16 Section 9.3.5.

Note: For simplicity, this document will reference the 2016 NFPA-13 document sections.

This document will not cover the design of the components of the pipe support hangers or sway bracing. Rather, this document will provide the maximum horizontal load that can be applied to the sway brace, F_{pw} , based on the Hilti fastener type and embedment depth, fastener load capacity, the concrete strength and configuration, the sway brace to fastener connector (seismic hinge) geometry, and the brace angle. See Figure 2 on the following page. F_{pw} does not consider the adequacy of the seismic hinge or other components of the sway bracing or vertical hanger. The design engineer of record must ensure all of these components are suitable for the application and design loads.

This document is a supplement to the Hilti North American Product Technical Guide, Volume 2, Anchor Fastening Technical Guide, Edition 19 (PTG Ed. 19). Please refer to the publication in its entirety, which is available at www.hilti.com or www.hilti.ca, for complete details including data development, product specifications, general suitability, installation, corrosion and spacing and edge distance guidelines, for the Hilti anchoring systems noted within.

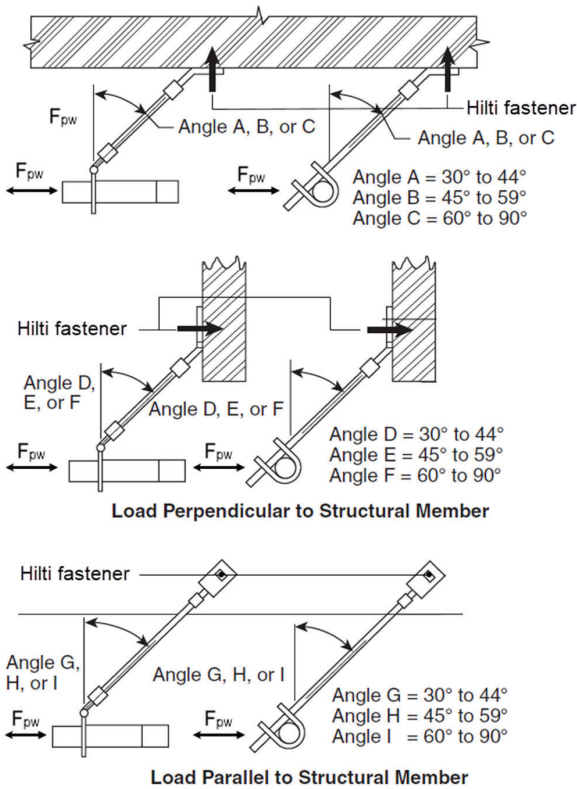


Figure 2 — Sway brace load, F_{pw} , from typical sway brace configuration (Source: NFPA 13 2016 Edition Figure 9.3.5.12.1)

Horizontal earthquake load design per NFPA-13

The maximum horizontal earthquake load, F_{pw} that will not exceed the allowable capacity of the anchor, can be derived from NFPA 13-16 Eq. A.9.3.5.12.2a:

$$\left(\frac{T}{T_{allow}}\right) + \left(\frac{V}{V_{allow}}\right) \leq 1.2$$

where:

T = applied service tension load, including the effect of prying = $F_{pw} \times P_r$ for all Angle Categories

F_{pw} = horizontal earthquake load

P_r = prying factor based on fitting geometry and brace angle from vertical as determined from NFPA 13-16 A.9.3.5.12.2

T_{allow} = allowable service tension load

V = applied service shear load =

Angle Category A, B, and C: $V = F_{pw}$

Angle Category D, E, and F: $V = \frac{F_{pw}}{\tan\theta}$

Angle Category G, H, and I: $V = \frac{F_{pw}}{\sin\theta}$

θ = brace angle (see Figure 2)

V_{allow} = allowable service shear load

T/T_{allow} shall not be greater than 1.0

V/V_{allow} shall not be greater than 1.0

Substituting for T and V for the various angle categories:

Angle Category A, B, and C:

$$\left(\frac{F_{pw} \cdot P_r}{T_{allow}}\right) + \left(\frac{F_{pw}}{V_{allow}}\right) \leq 1.2$$

where:

$$F_{pw} \cdot P_r / T_{allow} \leq 1.0$$

$$F_{pw} / V_{allow} \leq 1.0$$

Angle Category D, E, and F:

$$\left(\frac{F_{pw} \cdot P_r}{T_{allow}}\right) + \left(\frac{F_{pw} / \tan\theta}{V_{allow}}\right) \leq 1.2$$

where:

$$F_{pw} \cdot P_r / T_{allow} \leq 1.0$$

$$(F_{pw} / \tan\theta) / V_{allow} \leq 1.0$$

Angle Category G, H, and I:

$$\left(\frac{F_{pw} \cdot P_r}{T_{allow}}\right) + \left(\frac{F_{pw} / \sin\theta}{V_{allow}}\right) \leq 1.2$$

where:

$$F_{pw} \cdot P_r / T_{allow} \leq 1.0$$

$$(F_{pw} / \sin\theta) / V_{allow} \leq 1.0$$

Design Tables for Pre-calculated Horizontal Earthquake Load

The design tables starting on page 7 determine the maximum horizontal load, F_{pw} , that will satisfy NFPA 13-16 Eq. A.9.3.5.12.2a, for various Hilti post-installed and cast-in anchors used in conjunction with various seismic brace swivel attachments to attach the sway brace to concrete.

Notes:

- T_{allow} and V_{allow} used as the calculation basis for F_{pw} in the tables are determined from a strength design calculation according to ACI 318-14 Ch. 17 and converted to allowable values per NFPA 13-16 A.9.3.5.12.8.3(D).
- Anchor calculation assumes cracked concrete condition and seismic design category C through F.
- Minimum edge distance noted in tables assumes a single anchor with one nearby edge with the shear load perpendicular toward the edge. For an anchor in a corner, the distance to the edge parallel to the direction of the shear must be at least 1.5 times the minimum edge distance noted in the table.
- Minimum spacing distance noted in tables assumes two anchors in the middle of the concrete with no edge distance reductions.
- Seismic brace swivel attachment prying factors noted in the tables are from data published according to the following documents
 - Hilti MQS-SP-L-1/2" and MQS-SP-T-1/2" seismic hinge prying factors taken from Hilti Statement on the Prying Factors in regard to Hilti Seismic hinge (all sizes) technical document, dated November 18, 2019.
 - Tolco™ Figure 909, 910, and 980 swivel brace attachment prying factors taken from Seismic Bracing Anchor Load Charts B-Line series technical publication no. BR309004EN, dated October 2019
 - Afcon™ AF075, AF076, AF077, and AF771 swivel brace attachment prying factors taken from Anvil International Pipe Hangers and Supports technical publication no. 165, with a revision date of January 29, 2018.
 - The above noted documents are subject to change and only valid for the dates listed in the referenced documents.
 - TOLCO™ trademark is owned by Eaton Corporation plc.
 - AFCON™ trademark is owned by Anvil International LLC.
- Prying factors are provided that give the highest value for the given angle category. The corresponding value of P_r and F_{pw} will be conservative for the other angles within the angle category.
- For angle categories D to I, the angle, θ , is selected that leads to the highest value for the applied shear load, V . The corresponding value of F_{pw} will be conservative for the other angles within the angle category. $\theta = 30^\circ$ for Angle D and G, $\theta = 45^\circ$ for Angle E and H, and $\theta = 60^\circ$ for Angle F and I.
- F_{pw} does not consider the adequacy of the seismic hinge or other components of the sway bracing or vertical hanger. The design engineer of record must ensure all components are suitable for the application and design loads.
- Prying factors noted for the attachment to concrete over metal deck assume the seismic swivel brace has its full bearing area in contact with the metal deck.
- Values in tables are applicable for noted concrete compressive strength and for concrete with higher compressive strengths.
- For applications outside of the above noted parameters, contact Hilti for assistance.

Design Example:

We will use a carbon steel 1/2-in. diameter x 3-1/4-in. effective embedment depth Hilti KWIK Bolt TZ (KB-TZ) expansion anchor to attach a Hilti seismic lateral brace into 3,000 psi normal weight concrete. We will assume the concrete is cracked for the seismic design. We will assume the anchor is in the middle of a concrete slab (no edge or anchor spacing influence). We will use a Hilti MQS-SP-L-1/2" seismic hinge with a brace angle of 45 degrees (Angle B) attached to the underside of the concrete. Prying factor for this specific hinge in angle category B is 1.580.

The LRFD tension and shear capacity of the KB-TZ is determined through a calculation per ACI 318-14 Ch. 17 based on the design variables from ICC-ES ESR-1917. A design using the Hilti PROFIS Engineering design software yielded the following LRFD capacities (design is performed in cracked concrete with seismic reduction factors per ACI 318-14 17.2.3.4.4):

$$T_{LRFD} = 2,625 \text{ lb.}$$

$$V_{LRFD} = 3,572 \text{ lb.}$$

To convert the values to an Allowable Stress Design (ASD) value, multiply the LRFD value by 0.43 (NFPA 13-16 A.9.3.5.12.8.3(D)).

$$T_{allow} = 2,625 \cdot 0.43 = 1,129 \text{ lb.}$$

$$V_{allow} = 3,572 \cdot 0.43 = 1,536 \text{ lb.}$$

We will calculate a maximum horizontal shear, $F_{pw} = 585 \text{ lb.}$ Thus:

$$\left(\frac{F_{pw} \cdot P_r}{T_{allow}}\right) + \left(\frac{F_{pw}}{V_{allow}}\right) = \left(\frac{585 \cdot 1.580}{1,129}\right) + \left(\frac{585}{1,536}\right) = 1.20 \leq 1.2 \text{ OK}$$

$$F_{pw} \cdot P_r / T_{allow} = 585 \cdot 1.580 / 1,129 = 0.82 \leq 1.0 \text{ OK}$$

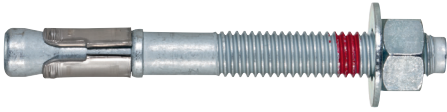
$$F_{pw} / V_{allow} = 585 / 1,536 = 0.38 \leq 1.0 \text{ OK}$$

∴ Maximum horizontal load, $F_{pw} = 585 \text{ lb.}$

Alternatively, the maximum horizontal load, F_{pw} , can be determined from the shortcut tables starting on page 7. Going to page 7, F_{pw} can be selected as shown (refer to the Hilti MQS-SP-L-1/2" table, using Angle B, for the 1/2x3-1/4 KB-TZ anchor).

Nominal anchor dia.	Effective embed.	Min. edge distance	Min. spacing distance	Min. concrete thickness	Hilti MQS-SP-L-1/2" and MQS-SP-T-1/2"										
					A	B	C		D	E	F	G	H	I	
					30°-44°	45°-59°	60°-74°	75°-90°	30°-44°	45°-59°	60°-90°	30°-44°	45°-59°	60°-90°	
in	in	in	in	in	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr
1/2	2	4	6	6	4.100	1.580	0.870	1.850	1.520	2.320	3.440	3.710	2.620	184	225
	3-1/4	6-1/2	9-3/4	6	275	585	844	524	485	443	328	261	370	453	

CONTENTS



CARBON STEEL KWIK BOLT TZ

7

The Hilti KB-TZ is the most versatile anchor of the group and is most often used for pipe supports in seismic areas. The design capacity is the best of its class while remaining a cost effective solution that is easy to install. The anchor is available in 3/8-in. to 3/4-in. diameters and is supported by ICC-ES ESR-1917 and has FM and UL listings for fire-sprinkler applications.

3,000 psi flat slab concrete

7

4,000 psi flat slab concrete

8

5,000 psi flat slab concrete

9

6,000 psi flat slab concrete

10

3,000 and 4,000 psi lightweight concrete over metal deck

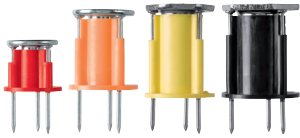
11

3-in. deck profiles (i.e. W2, W3)

11

1-1/2-in. deck profiles (i.e. B)

12



KCS-WF

13

The KCS-WF cast-in anchor has a single internal thread and is an easy installation solution for flat concrete slabs that requires no drilling after the concrete is cast. The anchor is available in 1/4-in. to 3/4-in. inner thread diameters (3/8-in. to 3/4-in. diameters are applicable for seismic bracing) and is supported by ICC-ES ESR-4006 and has FM and UL listings for fire-sprinkler applications.

3,000 psi flat slab concrete

13

4,000 psi flat slab concrete

14

5,000 psi flat slab concrete

15

6,000 psi flat slab concrete

16



KCM-WF/-PD

17

The KCM-WF/-PD cast-in anchor has multiple internal threads for ultimate flexibility for many pipe sizes and is intended for flat concrete slabs. The anchor is available in 1/4-in. to 3/4-in. inner thread diameters (3/8-in. to 3/4-in. diameters are applicable for seismic bracing) and is supported by ICC-ES ESR-4145 and has FM and UL listings for fire-sprinkler applications.

3,000 psi flat slab concrete

17

4,000 psi flat slab concrete

18

5,000 psi flat slab concrete

19

6,000 psi flat slab concrete

20



KCM-MD

21

The KCM-MD cast-in anchor has been optimized for installation in concrete over metal deck applications. With a short plate option for direct installation on the deck or a long plate option to span the lower flutes, the KCM-MD has tremendous flexibility for the fire sprinkler pipe installer. Short plate anchors are shown in this supplement. The KCM-MD is supported by ICC-ES ESR-4145 and has FM and UL listings for fire-sprinkler applications.

3,000 and 4,000 psi lightweight concrete over metal deck

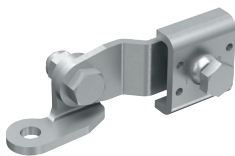
21

3-in. deck profiles (i.e. W2, W3)

21

1-1/2-in. deck profiles (i.e. B)

22



HILTI MQS-SP-L-1/2" AND MQS-SP-T-1/2"

The Hilti Seismic Hinge MQS-SP is a versatile and quick connect solution for seismic bracing attachments. FM rated for seismic solutions for the lateral or transversal brace assembly. Contact Hilti for more information on the seismic hinge and other Hilti pipe support solutions.

Maximum allowable pipe horizontal load, F_{pw} (lb)
Carbon steel Hilti KWIK Bolt TZ in 3,000 psi normal weight cracked concrete

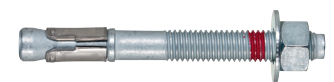
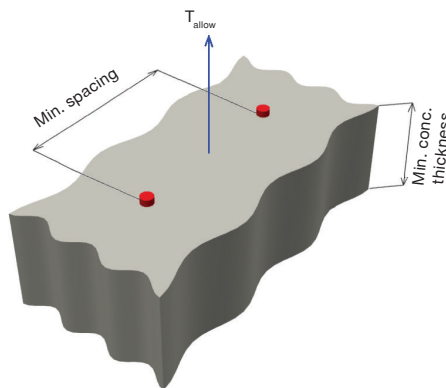
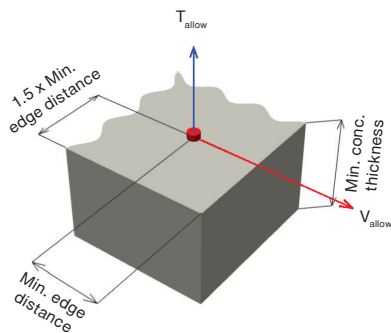
Nominal anchor dia. in	Effective embed. in	Min. edge distance in	Min. spacing distance in	Min. concrete thickness in	Hilti MQS-SP-L-1/2" and MQS-SP-T-1/2"											
					A		B		C		D	E	F	G	H	I
					30°-44° Pr	45°-59° Pr	60°-74° Pr	75°-90° Pr	30°-44° Pr	45°-59° Pr	60°-90° Pr	30°-44° Pr	45°-59° Pr	60°-90° Pr		
1/2	2	4	6	6	4.100	1.580	0.870	1.850	1.520	2.320	3.440	3.710	2.620	184	225	
	3-1/4	6-1/2	9-3/4	6	275	585	844	524	485	443	328	261	370	453		

Nominal anchor dia. in	Effective embed. in	Min. edge distance in	Min. spacing distance in	Min. concrete thickness in	Tolco™ Figure 909 seismic brace											
					A		B		C		D	E	F	G	H	I
					30°-44° Pr	45°-59° Pr	60°-74° Pr	75°-90° Pr	30°-44° Pr	45°-59° Pr	60°-90° Pr	30°-44° Pr	45°-59° Pr	60°-90° Pr		
3/8	1-1/2	8	8	6	2.626	1.002	0.870	1.230	1.513	1.487	2.226	2.460	1.740	1.420		
	2	3-1/2	6	6	113	229	250	200	144	175	136	100	142	173		
	2-3/4	3-1/2	8-1/4	6	181	342	369	304	212	270	231	152	215	263		
1/2	2	4	6	6	230	404	431	365	248	330	301	183	258	316		
	3-1/4	6-1/2	9-3/4	6	199	390	423	344	244	303	248	172	243	298		
5/8	3-1/8	8-1/2	9-3/8	6	403	780	844	689	486	610	507	345	487	597		
	4	8-1/4	12	6	411	857	939	745	541	649	484	372	526	645		
3/4	3-1/4	12-1/4	9-3/4	6	557	1079	1167	953	672	843	701	477	674	826		
	3-3/4	12	11-1/4	6	436	1016	1126	870	648	748	514	435	615	753		
	4-3/4	10	14-1/4	8	540	1186	1306	1023	752	886	637	512	724	886		

Nominal anchor dia. in	Effective embed. in	Min. edge distance in	Min. spacing distance in	Min. concrete thickness in	Tolco™ Figure 910/980 seismic brace											
					A		B		C		D	E	F	G	H	I
					30°-44° Pr	45°-59° Pr	60°-74° Pr	75°-90° Pr	30°-44° Pr	45°-59° Pr	60°-90° Pr	30°-44° Pr	45°-59° Pr	60°-90° Pr		
3/8	1-1/2	8	8	6	3.275	1.156	0.910	1.739	1.461	1.850	2.895	3.478	2.459	2.008		
	2	3-1/2	6	6	93	209	243	156	147	149	105	78	111	135		
	2-3/4	3-1/2	8-1/4	6	152	315	360	244	216	234	180	122	172	211		
1/2	2	4	6	6	197	377	422	301	252	290	244	151	213	261		
	3-1/4	6-1/2	9-3/4	6	167	358	412	272	248	260	191	136	192	236		
5/8	3-1/8	8-1/2	9-3/8	6	338	716	823	548	495	524	390	274	387	474		
	4	8-1/4	12	6	329	778	913	576	553	549	373	288	407	499		
3/4	3-1/4	12-1/4	9-3/4	6	467	991	1139	758	685	725	540	379	536	656		
	3-3/4	12	11-1/4	6	349	912	1091	658	665	618	395	329	465	570		
	4-3/4	10	14-1/4	8	433	1071	1268	784	770	745	490	392	554	679		

Nominal anchor dia. in	Effective embed. in	Min. edge distance in	Min. spacing distance in	Min. concrete thickness in	Afcon™ AF075/AF076/AF077 seismic brace											
					A		B		C		D	E	F	G	H	I
					30°-44° Pr	45°-59° Pr	60°-90° Pr	30°-44° Pr	45°-59° Pr	60°-90° Pr	30°-44° Pr	45°-59° Pr	60°-90° Pr			
1/2	2	4	6	6	3.724	2.150	1.375	2.150	2.150	2.250	2.750	1.945	1.588			
	3-1/4	6-1/2	9-3/4	6	148	233	320	197	233	245	167	251	333			

Nominal anchor dia. in	Effective embed. in	Min. edge distance in	Min. spacing distance in	Min. concrete thickness in	Afcon™ AF771 seismic brace											
					A		B		C		D	E	F	G	H	I
					30°-44° Pr	45°-59° Pr	60°-90° Pr	30°-44° Pr	45°-59° Pr	60°-90° Pr	30°-44° Pr	45°-59° Pr	60°-90° Pr			
1/2	2	4	6	6	4.170	2.000	0.964	1.966	2.385	2.964	1.929	1.364	1.113			
	3-1/4	6-1/2	9-3/4	6	132	246	399	209	215	186	211	322	437			
5/8	3-1/8	8-1/2	9-3/8	6	271	495	797	418	434	381	423	645	881			
	4	8-1/4	12	6	259	516	879	455	447	364	461	691	920			
3/4	3-1/4	12-1/4	9-3/4	6	374	685	1103	578	601	527	585	893	1219			
	3-3/4	12	11-1/4	6	274	572	1046	534	480	386	542	802	1028			
	4-3/4	10	14-1/4	8	381	659	941	627	594	478	635	947	1248			



3,000 psi
NWC

Maximum allowable pipe horizontal load, F_{pw} (lb)
Carbon steel Hilti KWIK Bolt TZ in 4,000 psi normal weight cracked concrete

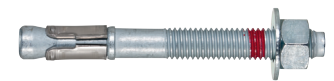
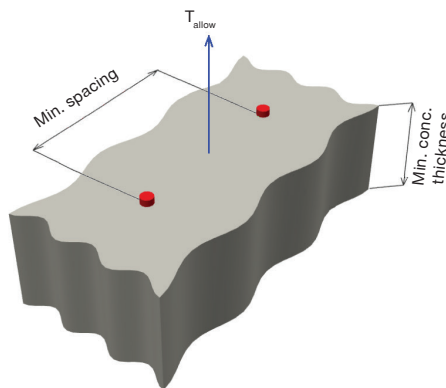
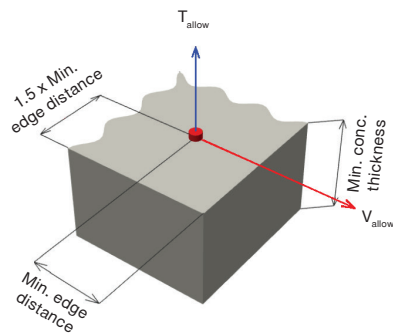
Nominal anchor dia. in	Effective embed. in	Min. edge distance in	Min. spacing distance in	Min. concrete thickness in	Hilti MQS-SP-L-1/2" and MQS-SP-T-1/2"											
					A		B		C		D	E	F	G	H	I
					30°-44° Pr	45°-59° Pr	60°-74° Pr	75°-90° Pr	30°-44° Pr	45°-59° Pr	60°-90° Pr	30°-44° Pr	45°-59° Pr	60°-90° Pr		
1/2	2	4	6	6	4.100	1.580	0.870	1.850	1.520	2.320	3.440	3.710	2.620	2.140		
	3-1/4	6-1/2	9-3/4	6	156	336	488	300	281	254	185	150	212	260		
					316	644	910	580	523	494	379	289	409	501		

Nominal anchor dia. in	Effective embed. in	Min. edge distance in	Min. spacing distance in	Min. concrete thickness in	Tolco™ Figure 909 seismic brace											
					A		B		C		D	E	F	G	H	I
					30°-44° Pr	45°-59° Pr	60°-74° Pr	75°-90° Pr	30°-44° Pr	45°-59° Pr	60°-90° Pr	30°-44° Pr	45°-59° Pr	60°-90° Pr		
3/8	1-1/2	8	8	6	2.626	1.002	0.870	1.230	1.513	1.487	2.226	2.460	1.740	1.420		
	2	3-1/2	6	6	131	264	288	231	166	203	157	116	163	200		
	2-3/4	3-1/2	8-1/4	6	202	369	396	331	228	296	260	165	234	286		
1/2	2	4	6	6	254	431	457	393	263	357	336	196	278	340		
	3-1/4	6-1/2	9-3/4	6	230	451	488	397	281	350	286	199	281	344		
5/8	3-1/8	8-1/2	9-3/8	6	450	845	910	752	524	670	576	376	532	652		
	4	8-1/4	12	6	465	941	1026	823	591	720	559	411	582	713		
3/4	3-1/4	12-1/4	9-3/4	6	623	1169	1259	1041	725	926	797	520	736	901		
	3-3/4	12	11-1/4	6	503	1128	1246	971	717	839	593	485	686	841		
	4-3/4	10	14-1/4	8	623	1309	1435	1136	826	989	735	568	803	984		
					839	1635	1771	1443	1020	1274	1048	721	1020	1250		

Nominal anchor dia. in	Effective embed. in	Min. edge distance in	Min. spacing distance in	Min. concrete thickness in	Tolco™ Figure 910/980 seismic brace											
					A		B		C		D	E	F	G	H	I
					30°-44° Pr	45°-59° Pr	60°-74° Pr	75°-90° Pr	30°-44° Pr	45°-59° Pr	60°-90° Pr	30°-44° Pr	45°-59° Pr	60°-90° Pr		
3/8	1-1/2	8	8	6	3.275	1.156	0.910	1.739	1.461	1.850	2.895	3.478	2.459	2.008		
	2	3-1/2	6	6	107	241	280	181	169	172	121	90	128	156		
	2-3/4	3-1/2	8-1/4	6	171	342	387	268	232	258	208	134	190	232		
1/2	2	4	6	6	218	404	449	327	267	316	274	164	232	284		
	3-1/4	6-1/2	9-3/4	6	193	413	476	314	287	300	220	157	222	272		
5/8	3-1/8	8-1/2	9-3/8	6	379	780	889	604	534	580	450	302	427	523		
	4	8-1/4	12	6	380	858	999	643	603	613	430	321	454	557		
3/4	3-1/4	12-1/4	9-3/4	6	525	1079	1230	836	738	802	623	418	591	724		
	3-3/4	12	11-1/4	6	403	1017	1208	740	734	704	456	370	523	641		
	4-3/4	10	14-1/4	8	500	1187	1394	878	845	836	565	439	621	760		
					702	1500	1727	1143	1040	1093	806	571	808	990		

Nominal anchor dia. in	Effective embed. in	Min. edge distance in	Min. spacing distance in	Min. concrete thickness in	Afcon™ AF075/AF076/AF077 seismic brace											
					A		B		C		D	E	F	G	H	I
					30°-44° Pr	45°-59° Pr	60°-90° Pr	30°-44° Pr	45°-59° Pr	60°-90° Pr	30°-44° Pr	45°-59° Pr	60°-90° Pr			
1/2	2	4	6	6	3.724	2.150	1.375	2.150	2.150	2.250	2.750	1.945	1.588			
	3-1/4	6-1/2	9-3/4	6	171	269	369	228	269	283	193	290	385			
					342	521	703	432	521	571	371	560	753			

Nominal anchor dia. in	Effective embed. in	Min. edge distance in	Min. spacing distance in	Min. concrete thickness in	Afcon™ AF771 seismic brace											
					A		B		C		D	E	F	G	H	I
					30°-44° Pr	45°-59° Pr	60°-90° Pr	30°-44° Pr	45°-59° Pr	60°-90° Pr	30°-44° Pr	45°-59° Pr	60°-90° Pr			
1/2	2	4	6	6	4.170	2.000	0.964	1.966	2.385	2.964	1.929	1.364	1.113			
	3-1/4	6-1/2	9-3/4	6	153	284	461	241	248	215	244	371	505			
5/8	3-1/8	8-1/2	9-3/8	6	312	549	863	455	484	440	460	707	976			
	4	8-1/4	12	6	299	578	964	501	503	420	508	766	1030			
3/4	3-1/4	12-1/4	9-3/4	6	431	759	1194	630	669	608	637	978	1350			
	3-3/4	12	11-1/4	6	317	660	1160	595	554	446	603	897	1178			
	4-3/4	10	14-1/4	8	439	741	1048	694	681	552	703	1054	1402			
					627	979	1342	876	904	787	886	1349	1838			



**4,000 psi
NWC**

Maximum allowable pipe horizontal load, F_{pw} (lb)
Carbon steel Hilti KWIK Bolt TZ in 5,000 psi normal weight cracked concrete

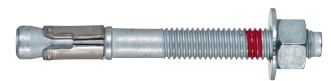
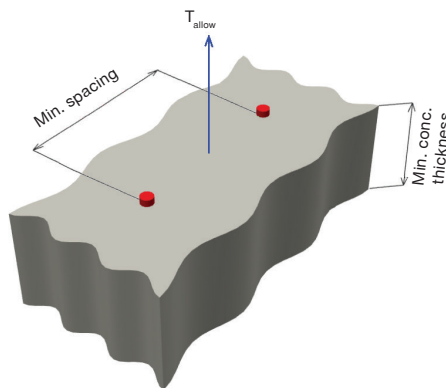
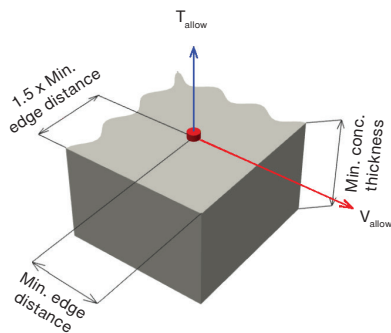
Nominal anchor dia.	Effective embed.	Min. edge distance	Min. spacing distance	Min. concrete thickness	Hilti MQS-SP-L-1/2" and MQS-SP-T-1/2"											
					A		B		C		D	E	F	G	H	I
					30°-44°	45°-59°	60°-74°	75°-90°	30°-44°	45°-59°	60°-90°	30°-44°	45°-59°	60°-90°		
in	in	in	in	in	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr		
1/2	2	4	6	6	4.100	1.580	0.870	1.850	1.520	2.320	3.440	3.710	2.620	2.140		
	3-1/4	6-1/2	9-3/4	6	174	376	546	336	314	283	207	168	237	290		
					346	692	961	625	553	535	424	312	441	540		

Nominal anchor dia.	Effective embed.	Min. edge distance	Min. spacing distance	Min. concrete thickness	Tolco™ Figure 909 seismic brace											
					A		B		C		D	E	F	G	H	I
					30°-44°	45°-59°	60°-74°	75°-90°	30°-44°	45°-59°	60°-90°	30°-44°	45°-59°	60°-90°		
in	in	in	in	in	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr		
3/8	1-1/2	8	8	6	2.626	1.002	0.870	1.230	1.513	1.487	2.226	2.460	1.740	1.420		
	2	3-1/2	6	6	144	286	311	251	179	221	176	125	177	217		
	2-3/4	3-1/2	8-1/4	6	219	390	417	351	240	316	284	176	248	304		
1/2	2	4	6	6	273	452	477	414	275	378	364	207	292	358		
	3-1/4	6-1/2	9-3/4	6	257	503	546	444	314	392	320	222	314	384		
5/8	3-1/8	8-1/2	9-3/8	6	489	896	961	803	554	718	630	401	567	695		
	4	8-1/4	12	6	509	1008	1095	886	631	780	625	443	626	767		
3/4	3-1/4	12-1/4	9-3/4	6	677	1240	1330	1110	766	993	872	555	785	962		
	3-3/4	12	11-1/4	6	562	1220	1342	1055	773	915	663	527	746	913		
	4-3/4	10	14-1/4	8	690	1408	1538	1229	886	1074	822	614	869	1064		
					915	1742	1881	1546	1083	1372	1166	773	1093	1339		

Nominal anchor dia.	Effective embed.	Min. edge distance	Min. spacing distance	Min. concrete thickness	Tolco™ Figure 910/980 seismic brace											
					A		B		C		D	E	F	G	H	I
					30°-44°	45°-59°	60°-74°	75°-90°	30°-44°	45°-59°	60°-90°	30°-44°	45°-59°	60°-90°		
in	in	in	in	in	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr		
3/8	1-1/2	8	8	6	3.275	1.156	0.910	1.739	1.461	1.850	2.895	3.478	2.459	2.008		
	2	3-1/2	6	6	120	261	303	197	183	189	135	99	140	171		
	2-3/4	3-1/2	8-1/4	6	186	363	408	288	244	277	230	144	203	249		
1/2	2	4	6	6	236	425	469	348	278	337	299	174	246	302		
	3-1/4	6-1/2	9-3/4	6	215	462	532	351	321	336	246	176	248	304		
5/8	3-1/8	8-1/2	9-3/8	6	414	831	941	651	563	625	503	325	460	563		
	4	8-1/4	12	6	425	922	1067	698	643	667	481	349	493	604		
3/4	3-1/4	12-1/4	9-3/4	6	573	1149	1301	900	779	864	696	450	636	779		
	3-3/4	12	11-1/4	6	451	1103	1303	809	791	770	510	405	572	701		
	4-3/4	10	14-1/4	8	559	1282	1496	956	905	912	632	478	676	828		
					769	1605	1836	1236	1103	1184	901	618	874	1070		

Nominal anchor dia.	Effective embed.	Min. edge distance	Min. spacing distance	Min. concrete thickness	Afcon™ AF075/AF076/AF077 seismic brace											
					A		B		C		D	E	F	G	H	I
					30°-44°	45°-59°	60°-90°	30°-44°	45°-59°	60°-90°	30°-44°	45°-59°	60°-90°			
in	in	in	in	in	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr		
1/2	2	4	6	6	3.724	2.150	1.375	2.150	2.150	2.250	2.750	1.945	1.588			
	3-1/4	6-1/2	9-3/4	6	191	300	413	255	300	317	216	324	430			
					374	564	753	461	564	625	398	604	819			

Nominal anchor dia.	Effective embed.	Min. edge distance	Min. spacing distance	Min. concrete thickness	Afcon™ AF771 seismic brace											
					A		B		C		D	E	F	G	H	I
					30°-44°	45°-59°	60°-90°	30°-44°	45°-59°	60°-90°	30°-44°	45°-59°	60°-90°			
in	in	in	in	in	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr		
1/2	2	4	6	6	4.170	2.000	0.964	1.966	2.385	2.964	1.929	1.364	1.113			
	3-1/4	6-1/2	9-3/4	6	171	317	515	270	277	240	273	415	564			
5/8	3-1/8	8-1/2	9-3/8	6	342	593	914	485	525	492	490	756	1053			
	4	8-1/4	12	6	334	629	1032	539	549	470	545	827	1120			
3/4	3-1/4	12-1/4	9-3/4	6	473	820	1265	670	726	680	677	1046	1456			
	3-3/4	12	11-1/4	6	354	723	1253	645	619	498	654	977	1291			
	4-3/4	10	14-1/4	8	491	811	1136	749	746	617	759	1143	1531			
					693	1063	1443	937	985	880	947	1450	1992			



5,000 psi
NWC

Maximum allowable pipe horizontal load, F_{pw} (lb) Carbon steel Hilti KWIK Bolt TZ in 6,000 psi normal weight cracked concrete

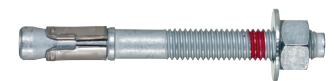
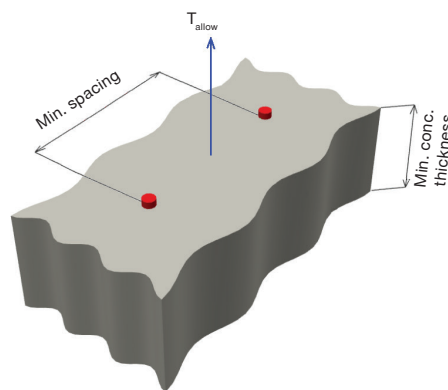
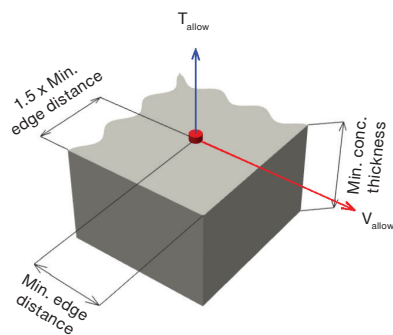
Nominal anchor dia. in	Effective embed. in	Min. edge distance in	Min. spacing distance in	Min. concrete thickness in	Hilti MQS-SP-L-1/2" and MQS-SP-T-1/2"											
					A		B		C		D	E	F	G	H	I
					30°-44° Pr	45°-59° Pr	60°-74° Pr	75°-90° Pr	30°-44° Pr	45°-59° Pr	60°-90° Pr	30°-44° Pr	45°-59° Pr	60°-90° Pr		
1/2	2	4	6	6	4.100	1.580	0.870	1.850	1.520	2.320	3.440	3.710	2.620	318		
	3-1/4	6-1/2	9-3/4	6	373	731	1003	663	577	570	464	331	468	573		

Nominal anchor dia. in	Effective embed. in	Min. edge distance in	Min. spacing distance in	Min. concrete thickness in	Tolco™ Figure 909 seismic brace											
					A		B		C		D	E	F	G	H	I
					30°-44° Pr	45°-59° Pr	60°-74° Pr	75°-90° Pr	30°-44° Pr	45°-59° Pr	60°-90° Pr	30°-44° Pr	45°-59° Pr	60°-90° Pr		
3/8	1-1/2	8	8	6	2.626	1.002	0.870	1.230	1.513	1.487	2.226	2.460	1.740	1.420		
	2	3-1/2	6	6	155	302	327	266	188	235	193	133	188	231		
	2-3/4	3-1/2	8-1/4	6	233	407	434	369	250	333	305	184	261	319		
1/2	2	4	6	6	289	468	493	431	284	395	389	215	304	373		
	3-1/4	6-1/2	9-3/4	6	282	552	598	486	345	429	351	243	344	421		
5/8	3-1/8	8-1/2	9-3/8	6	523	938	1003	844	578	758	678	422	597	731		
	4	8-1/4	12	6	547	1064	1152	939	664	830	685	470	664	814		
3/4	3-1/4	12-1/4	9-3/4	6	723	1298	1388	1168	800	1049	938	584	826	1011		
	3-3/4	12	11-1/4	6	616	1298	1424	1127	820	980	727	563	796	976		
	4-3/4	10	14-1/4	8	743	1492	1625	1307	936	1147	901	653	924	1132		

Nominal anchor dia. in	Effective embed. in	Min. edge distance in	Min. spacing distance in	Min. concrete thickness in	Tolco™ Figure 910/980 seismic brace											
					A		B		C		D	E	F	G	H	I
					30°-44° Pr	45°-59° Pr	60°-74° Pr	75°-90° Pr	30°-44° Pr	45°-59° Pr	60°-90° Pr	30°-44° Pr	45°-59° Pr	60°-90° Pr		
3/8	1-1/2	8	8	6	3.275	1.156	0.910	1.739	1.461	1.850	2.895	3.478	2.459	2.008		
	2	3-1/2	6	6	129	277	319	211	192	202	148	105	149	183		
	2-3/4	3-1/2	8-1/4	6	199	380	425	304	254	293	248	152	215	263		
1/2	2	4	6	6	251	442	485	365	288	354	321	183	258	317		
	3-1/4	6-1/2	9-3/4	6	236	506	583	385	351	368	270	192	272	333		
5/8	3-1/8	8-1/2	9-3/8	6	444	873	983	689	587	663	548	345	488	597		
	4	8-1/4	12	6	458	976	1124	745	677	713	527	372	527	645		
3/4	3-1/4	12-1/4	9-3/4	6	614	1207	1359	954	812	917	758	477	674	826		
	3-3/4	12	11-1/4	6	494	1177	1384	870	839	828	559	435	615	753		
	4-3/4	10	14-1/4	8	612	1362	1582	1024	955	978	692	512	724	887		

Nominal anchor dia. in	Effective embed. in	Min. edge distance in	Min. spacing distance in	Min. concrete thickness in	Afcon™ AF075/AF076/AF077 seismic brace											
					A		B		C		D	E	F	G	H	I
					30°-44° Pr	45°-59° Pr	60°-90° Pr	30°-44° Pr	45°-59° Pr	60°-90° Pr	30°-44° Pr	45°-59° Pr	60°-90° Pr			
1/2	2	4	6	6	3.724	2.150	1.375	2.150	2.150	2.250	2.750	1.945	1.588			
	3-1/4	6-1/2	9-3/4	6	210	329	452	279	329	347	237	355	471			

Nominal anchor dia. in	Effective embed. in	Min. edge distance in	Min. spacing distance in	Min. concrete thickness in	Afcon™ AF771 seismic brace											
					A		B		C		D	E	F	G	H	I
					30°-44° Pr	45°-59° Pr	60°-90° Pr	30°-44° Pr	45°-59° Pr	60°-90° Pr	30°-44° Pr	45°-59° Pr	60°-90° Pr			
1/2	2	4	6	6	4.170	2.000	0.964	1.966	2.385	2.964	1.929	1.364	1.113			
	3-1/4	6-1/2	9-3/4	6	187	347	564	295	304	263	299	455	618			
5/8	3-1/8	8-1/2	9-3/8	6	368	630	956	509	559	537	514	797	1118			
	4	8-1/4	12	6	366	673	1088	570	590	514	577	879	1198			
3/4	3-1/4	12-1/4	9-3/4	6	509	872	1323	704	774	744	711	1103	1547			
	3-3/4	12	11-1/4	6	388	779	1332	688	674	546	698	1045	1389			
	4-3/4	10	14-1/4	8	538	871	1211	796	803	676	805	1218	1641			



6,000 psi
NWC

Maximum allowable pipe horizontal load, F_{pw} (lb)
Carbon steel Hilti KWIK Bolt TZ in the soffit of 3,000 psi or 4,000 psi
lightweight concrete over metal deck — 3-in W-deck profiles¹

Nominal anchor dia.	Effective embed.	Min. edge distance	Min. spacing distance	Min. concrete thickness	Hilti MQS-SP-L-1/2" and MQS-SP-T-1/2"								
					3,000 psi				4,000 psi				
					A	B	C	A	B	C	A	B	C
					30°-44°	45°-59°	60°-74°	75°-90°	30°-44°	45°-59°	60°-74°	75°-90°	30°-44°
in	in	in	in	in	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr
1/2	2	1	6	2-1/2	4.100	1.580	0.870	1.850	4.100	1.580	0.870	1.850	
	3-1/4	1	9-3/4	2-1/2	73	180	280	159	84	201	308	178	
					134	319	487	282	155	356	533	316	

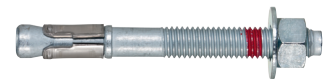
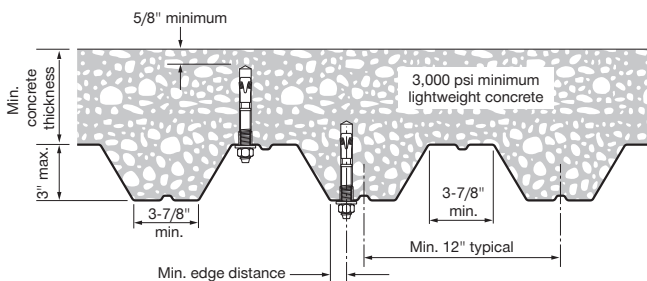
Nominal anchor dia.	Effective embed.	Min. edge distance	Min. spacing distance	Min. concrete thickness	Tolco™ Figure 909 seismic brace								
					3,000 psi				4,000 psi				
					A	B	C	A	B	C	A	B	C
					30°-44°	45°-59°	60°-74°	75°-90°	30°-44°	45°-59°	60°-74°	75°-90°	30°-44°
in	in	in	in	in	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	
3/8	1-1/2	1	8	2-1/2	2.626	1.002	0.870	1.230	2.626	1.002	0.870	1.230	
	2	1	6	2-1/2	77	158	172	137	86	173	188	152	
	2-3/4	1	8-1/4	2-1/2	105	199	215	177	117	215	231	192	
					162	291	312	262	179	312	332	283	
1/2	2	1	6	2-1/2	114	254	280	219	131	280	308	243	
	3-1/4	1	9-3/4	2-1/2	209	444	487	385	239	488	533	426	
5/8	3-1/8	1	9-3/8	2-1/2	160	373	413	319	184	414	457	356	
	4	1	12	3-1/4	307	628	686	547	345	687	747	603	
3/4	3-1/4	1	9-3/4	2-1/2	235	477	520	417	264	521	565	458	
	3-3/4	1	11-1/4	3-1/4	253	550	605	475	292	606	664	527	

Nominal anchor dia.	Effective embed.	Min. edge distance	Min. spacing distance	Min. concrete thickness	Tolco™ Figure 910/980 seismic brace								
					3,000 psi				4,000 psi				
					A	B	C	A	B	C	A	B	C
					30°-44°	45°-59°	60°-74°	75°-90°	30°-44°	45°-59°	60°-74°	75°-90°	30°-44°
in	in	in	in	in	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	
3/8	1-1/2	1	8	2-1/2	3.275	1.156	0.910	1.739	3.275	1.156	0.910	1.739	
	2	1	6	2-1/2	62	143	168	107	72	158	183	119	
	2-3/4	1	8-1/4	2-1/2	88	184	210	141	99	199	226	156	
1/2	2	1	6	2-1/2	138	271	305	214	153	292	326	234	
	3-1/4	1	9-3/4	2-1/2	91	229	271	167	105	254	299	187	
5/8	3-1/8	1	9-3/8	2-1/2	168	402	473	297	194	444	518	331	
	4	1	12	3-1/4	128	335	400	241	148	373	443	272	
3/4	3-1/4	1	9-3/4	2-1/2	248	571	667	426	286	628	728	474	
	3-3/4	1	11-1/4	3-1/4	192	434	506	325	221	477	551	362	
					203	497	587	365	234	550	645	408	

Nominal anchor dia.	Effective embed.	Min. edge distance	Min. spacing distance	Min. concrete thickness	Afcon™ AF075/AF076/AF077 seismic brace					
					3,000 psi			4,000 psi		
					A	B	C	A	B	C
					30°-44°	45°-59°	60°-90°	30°-44°	45°-59°	60°-90°
in	in	in	in	in	Pr	Pr	Pr	Pr	Pr	Pr
1/2	2	1	6	2-1/2	3.724	2.150	1.375	3.724	2.150	1.375
	3-1/4	1	9-3/4	2-1/2	80	139	201	93	158	224
					147	250	355	170	281	394

Nominal anchor dia.	Effective embed.	Min. edge distance	Min. spacing distance	Min. concrete thickness	Afcon™ AF771 seismic brace					
					3,000 psi			4,000 psi		
					A	B	C	A	B	C
					30°-44°	45°-59°	60°-90°	30°-44°	45°-59°	60°-90°
in	in	in	in	in	Pr	Pr	Pr	Pr	Pr	Pr
1/2	2	1	6	2-1/2	4.170	2.000	0.964	4.170	2.000	0.964
	3-1/4	1	9-3/4	2-1/2	72	149	261	83	167	288
					132	265	455	152	298	500
5/8	3-1/8	1	9-3/8	2-1/2	101	210	384	116	242	426
	4	1	12	3-1/4	195	382	643	225	427	703
3/4	3-1/4	1	9-3/4	2-1/2	151	292	488	174	326	533
	3-3/4	1	11-1/4	3-1/4	178	307	438	184	366	622

¹ Anchor may be placed in upper or lower flute. Prying factors noted assume the seismic swivel brace has its full bearing area in contact with the metal deck.



3,000 psi or 4,000 psi
Lightweight over metal deck
3-in W-deck

Maximum allowable pipe horizontal load, F_{pw} (lb)
Carbon steel Hilti KWIK Bolt TZ in the soffit of 3,000 psi or 4,000 psi
lightweight concrete over metal deck — 1-1/2-in B-deck profiles¹

Nominal anchor dia.	Effective embed.	Min. edge distance	Min. spacing distance	Min. concrete thickness	Hilti MQS-SP-L-1/2" and MQS-SP-T-1/2"							
					3,000 psi				4,000 psi			
					A	B	C		A	B	C	
					30°-44°	45°-59°	60°-74°	75°-90°	30°-44°	45°-59°	60°-74°	75°-90°
					Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr
in	in	in	in	in	4.100	1.580	0.870	1.850	4.100	1.580	0.870	1.850
1/2	2	3/4	6	2-1/2	68	170	266	149	78	190	293	168
	3-1/4	3/4	9-3/4	2-1/2	154	351	524	312	177	390	571	348

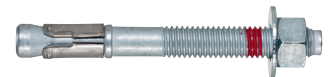
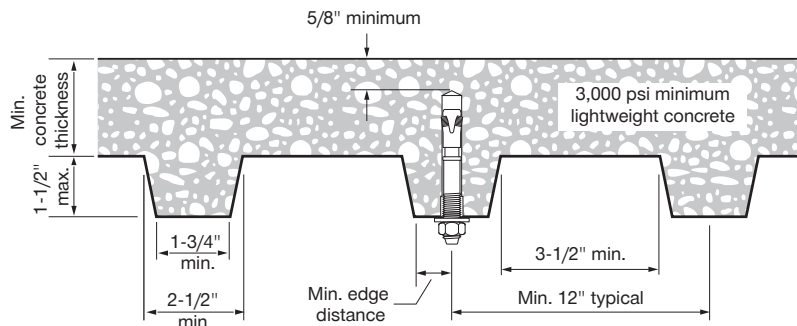
Nominal anchor dia.	Effective embed.	Min. edge distance	Min. spacing distance	Min. concrete thickness	Tolco™ Figure 909 seismic brace							
					3,000 psi				4,000 psi			
					A	B	C		A	B	C	
					30°-44°	45°-59°	60°-74°	75°-90°	30°-44°	45°-59°	60°-74°	75°-90°
					Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr
in	in	in	in	in	2.626	1.002	0.870	1.230	2.626	1.002	0.870	1.230
3/8	1-1/2	3/4	8	2-1/2	73	166	183	142	84	184	202	159
	2	3/4	6	2-1/2	126	246	267	217	141	267	288	237
1/2	2	3/4	6	2-1/2	106	240	266	206	122	266	293	230
	3-1/4	3/4	9-3/4	2-1/2	236	480	524	420	266	525	571	462
5/8	3-1/8	3/4	9-3/8	2-1/2	230	486	534	422	263	535	584	467

Nominal anchor dia.	Effective embed.	Min. edge distance	Min. spacing distance	Min. concrete thickness	Tolco™ Figure 910/980 seismic brace							
					3,000 psi				4,000 psi			
					A	B	C		A	B	C	
					30°-44°	45°-59°	60°-74°	75°-90°	30°-44°	45°-59°	60°-74°	75°-90°
					Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr
in	in	in	in	in	3.275	1.156	0.910	1.739	3.275	1.156	0.910	1.739
3/8	1-1/2	3/4	8	2-1/2	58	149	178	108	67	166	196	122
	2	3/4	6	2-1/2	105	226	260	172	118	246	281	190
1/2	2	3/4	6	2-1/2	85	216	257	157	98	241	284	176
	3-1/4	3/4	9-3/4	2-1/2	192	438	510	327	222	481	556	364
5/8	3-1/8	3/4	9-3/8	2-1/2	185	441	518	326	213	487	568	364

Nominal anchor dia.	Effective embed.	Min. edge distance	Min. spacing distance	Min. concrete thickness	Afcon™ AF075/AF076/AF077 seismic brace					
					3,000 psi			4,000 psi		
					A	B	C	A	B	C
					30°-44°	45°-59°	60°-90°	30°-44°	45°-59°	60°-90°
					Pr	Pr	Pr	Pr	Pr	Pr
in	in	in	in	in	3.724	2.150	1.375	3.724	2.150	1.375
1/2	2	3/4	6	2-1/2	75	129	189	86	148	212
	3-1/4	3/4	9-3/4	2-1/2	169	278	388	195	311	429

Nominal anchor dia.	Effective embed.	Min. edge distance	Min. spacing distance	Min. concrete thickness	Afcon™ AF771 seismic brace					
					3,000™ psi			4,000 psi		
					A	B	C	A	B	C
					30°-44°	45°-59°	60°-90°	30°-44°	45°-59°	60°-90°
					Pr	Pr	Pr	Pr	Pr	Pr
in	in	in	in	in	4.170	2.000	0.964	4.170	2.000	0.964
1/2	2	3/4	6	2-1/2	67	139	247	77	157	273
	3-1/4	3/4	9-3/4	2-1/2	151	294	492	174	328	538
5/8	3-1/8	3/4	9-3/8	2-1/2	145	291	499	167	327	548

¹ Anchor may be placed in upper or lower flute. Prying factors noted assume the seismic swivel brace has its full bearing area in contact with the metal deck.



**3,000 psi or
4,000 psi
Lightweight over
metal deck
1-1/2-in B-deck**

Maximum allowable pipe horizontal load, F_{pw} (lb)
Hilti KCS-WF in 3,000 psi normal weight cracked concrete with Grade A36 threaded rod (or stronger)

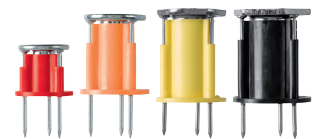
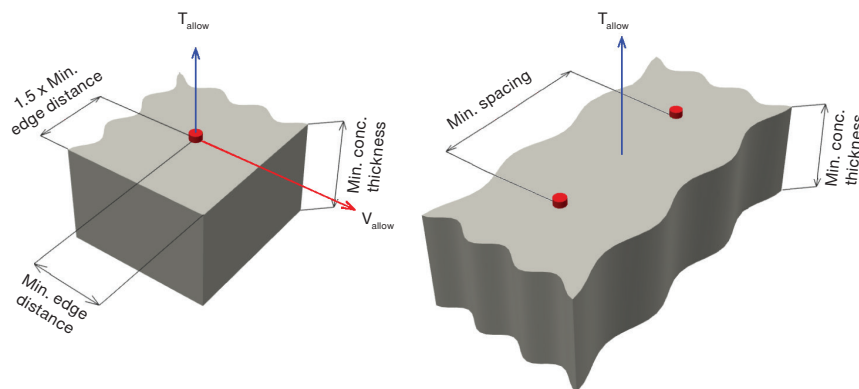
Nominal anchor internal dia.	Effective embed.	Min. edge distance	Min. spacing distance	Min. concrete thickness	Hilti MQS-SP-L-1/2" and MQS-SP-T-1/2"									
					A	B	C		D	E	F	G	H	I
					30°-44°	45°-59°	60°-74°	75°-90°	30°-44°	45°-59°	60°-90°	30°-44°	45°-59°	60°-90°
in	in	in	in	in	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr
1/2	1.63	5-3/4	5	6	4.100	1.580	0.870	1.850	1.520	2.320	3.440	3.710	2.620	2.140
					151	319	459	286	264	242	180	143	202	247

Nominal anchor internal dia.	Effective embed.	Min. edge distance	Min. spacing distance	Min. concrete thickness	Tolco™ Figure 909 seismic brace									
					A	B	C		D	E	F	G	H	I
					30°-44°	45°-59°	60°-74°	75°-90°	30°-44°	45°-59°	60°-90°	30°-44°	45°-59°	60°-90°
in	in	in	in	in	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr
3/8	1.11	4	3-1/2	6	2.626	1.002	0.870	1.230	1.513	1.487	2.226	2.460	1.740	1.420
1/2	1.63	5-3/4	5	6	124	239	258	211	149	187	156	106	149	183
5/8	1.90	6-1/2	5-3/4	6	220	424	459	375	264	332	278	188	265	325
3/4	1.83	6	5-1/2	6	276	532	576	471	332	417	349	236	333	408
					260	501	542	444	312	393	329	222	314	384

Nominal anchor internal dia.	Effective embed.	Min. edge distance	Min. spacing distance	Min. concrete thickness	Tolco™ Figure 910/980 seismic brace									
					A	B	C		D	E	F	G	H	I
					30°-44°	45°-59°	60°-74°	75°-90°	30°-44°	45°-59°	60°-90°	30°-44°	45°-59°	60°-90°
in	in	in	in	in	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr
3/8	1.11	4	3-1/2	6	3.275	1.156	0.910	1.739	1.461	1.850	2.895	3.478	2.459	2.008
1/2	1.63	5-3/4	5	6	104	219	252	168	151	161	120	84	119	145
5/8	1.90	6-1/2	5-3/4	6	185	390	448	299	269	286	214	149	211	259
3/4	1.83	6	5-1/2	6	232	489	562	375	338	359	268	187	265	325
					218	461	529	353	318	338	253	176	250	306

Nominal anchor internal dia.	Effective embed.	Min. edge distance	Min. spacing distance	Min. concrete thickness	Afcon™ AF075/AF076/AF077 seismic brace									
					A	B	C	D	E	F	G	H	I	
					30°-44°	45°-59°	60°-90°	30°-44°	45°-59°	60°-90°	30°-44°	45°-59°	60°-90°	
in	in	in	in	in	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr
1/2	1.63	5-3/4	5	6	3.724	2.150	1.375	2.150	2.150	2.250	2.750	1.945	1.588	
					166	256	350	215	256	275	184	276	368	

Nominal anchor internal dia.	Effective embed.	Min. edge distance	Min. spacing distance	Min. concrete thickness	Afcon™ AF771 seismic brace								
					A	B	C	D	E	F	G	H	I
					30°-44°	45°-59°	60°-90°	30°-44°	45°-59°	60°-90°	30°-44°	45°-59°	60°-90°
in	in	in	in	in	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr
1/2	1.63	5-3/4	5	6	4.170	2.000	0.964	1.966	2.385	2.964	1.929	1.364	1.113
5/8	1.90	6-1/2	5-3/4	6	148	270	434	228	237	209	230	351	481
3/4	1.83	6	5-1/2	6	186	339	544	286	298	262	289	441	603
					176	319	513	269	280	247	272	416	568



**3,000 psi
NWC**

Maximum allowable pipe horizontal load, F_{pw} (lb)
Hilti KCS-WF in 4,000 psi normal weight cracked concrete with Grade A36 threaded rod (or stronger)

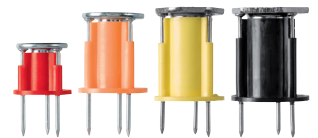
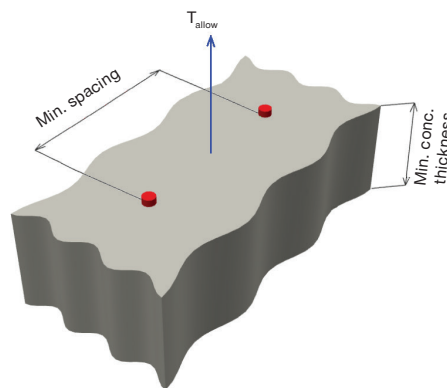
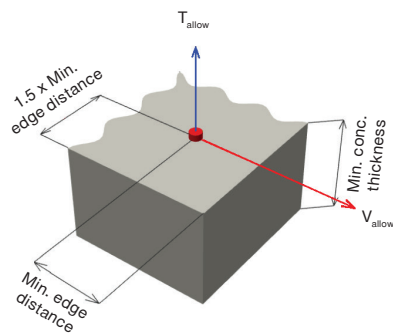
Nominal anchor internal dia.	Effective embed.	Min. edge distance	Min. spacing distance	Min. concrete thickness	Hilti MQS-SP-L-1/2" and MQS-SP-T-1/2"											
					A		B		C		D	E	F	G	H	I
					30°-44°	45°-59°	60°-74°	75°-90°	30°-44°	45°-59°	60°-90°	30°-44°	45°-59°	60°-90°		
in	in	in	in	in	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr		
1/2	1.63	5-3/4	5	6	4.100	1.580	0.870	1.850	1.520	2.320	3.440	3.710	2.620	2.140		
					174	362	517	325	297	276	208	162	230	281		

Nominal anchor internal dia.	Effective embed.	Min. edge distance	Min. spacing distance	Min. concrete thickness	Tolco™ Figure 909 seismic brace											
					A		B		C		D	E	F	G	H	I
					30°-44°	45°-59°	60°-74°	75°-90°	30°-44°	45°-59°	60°-90°	30°-44°	45°-59°	60°-90°		
in	in	in	in	in	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr		
3/8	1.11	4	3-1/2	6	2.626	1.002	0.870	1.230	1.513	1.487	2.226	2.460	1.740	1.420		
1/2	1.63	5-3/4	5	6	142	273	295	242	170	214	181	121	171	210		
5/8	1.90	6-1/2	5-3/4	6	251	479	517	425	298	377	320	212	300	368		
3/4	1.83	6	5-1/2	6	319	615	665	544	383	482	404	272	385	472		
					300	579	626	512	361	453	380	256	362	444		

Nominal anchor internal dia.	Effective embed.	Min. edge distance	Min. spacing distance	Min. concrete thickness	Tolco™ Figure 910/980 seismic brace											
					A		B		C		D	E	F	G	H	I
					30°-44°	45°-59°	60°-74°	75°-90°	30°-44°	45°-59°	60°-90°	30°-44°	45°-59°	60°-90°		
in	in	in	in	in	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr		
3/8	1.11	4	3-1/2	6	3.275	1.156	0.910	1.739	1.461	1.850	2.895	3.478	2.459	2.008		
1/2	1.63	5-3/4	5	6	119	251	288	193	173	185	139	96	136	167		
5/8	1.90	6-1/2	5-3/4	6	211	441	505	339	303	325	247	170	240	294		
3/4	1.83	6	5-1/2	6	268	566	649	433	391	415	310	217	306	375		
					252	532	611	407	367	390	292	204	288	353		

Nominal anchor internal dia.	Effective embed.	Min. edge distance	Min. spacing distance	Min. concrete thickness	Afcon™ AF075/AF076/AF077 seismic brace											
					A		B		C		D	E	F	G	H	I
					30°-44°	45°-59°	60°-90°	30°-44°	45°-59°	60°-90°	30°-44°	45°-59°	60°-90°			
in	in	in	in	in	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr		
1/2	1.63	5-3/4	5	6	3.724	2.150	1.375	2.150	2.150	2.250	2.750	1.945	1.588			
					190	292	396	244	292	317	208	314	420			

Nominal anchor internal dia.	Effective embed.	Min. edge distance	Min. spacing distance	Min. concrete thickness	Afcon™ AF771 seismic brace											
					A		B		C		D	E	F	G	H	I
					30°-44°	45°-59°	60°-90°	30°-44°	45°-59°	60°-90°	30°-44°	45°-59°	60°-90°			
in	in	in	in	in	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr			
1/2	1.63	5-3/4	5	6	4.170	2.000	0.964	1.966	2.385	2.964	1.929	1.364	1.113			
5/8	1.90	6-1/2	5-3/4	6	171	308	489	257	270	241	260	398	547			
3/4	1.83	6	5-1/2	6	215	392	629	330	344	303	334	510	697			
					203	369	592	311	323	285	314	480	656			



**4,000 psi
NWC**

Maximum allowable pipe horizontal load, F_{pw} (lb)
Hilti KCS-WF in 5,000 psi normal weight cracked concrete with Grade A36 threaded rod (or stronger)

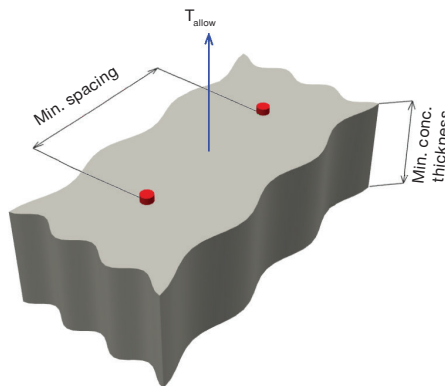
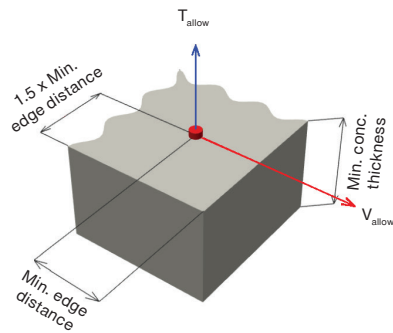
Nominal anchor internal dia.	Effective embed.	Min. edge distance	Min. spacing distance	Min. concrete thickness	Hilti MQS-SP-L-1/2" and MQS-SP-T-1/2"									
					A	B	C		D	E	F	G	H	I
					30°-44°	45°-59°	60°-74°	75°-90°	30°-44°	45°-59°	60°-90°	30°-44°	45°-59°	60°-90°
in	in	in	in	in	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr
1/2	1.63	5-3/4	5	6	4.100	1.580	0.870	1.850	1.520	2.320	3.440	3.710	2.620	2.140
					192	389	547	351	314	299	232	175	248	303

Nominal anchor internal dia.	Effective embed.	Min. edge distance	Min. spacing distance	Min. concrete thickness	Tolco™ Figure 909 seismic brace									
					A	B	C		D	E	F	G	H	I
					30°-44°	45°-59°	60°-74°	75°-90°	30°-44°	45°-59°	60°-90°	30°-44°	45°-59°	60°-90°
in	in	in	in	in	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr
3/8	1.11	4	3-1/2	6	2.626	1.002	0.870	1.230	1.513	1.487	2.226	2.460	1.740	1.420
1/2	1.63	5-3/4	5	6	155	290	312	258	180	230	198	129	183	224
5/8	1.90	6-1/2	5-3/4	6	273	509	547	454	315	404	350	227	321	393
3/4	1.83	6	5-1/2	6	357	687	743	608	428	538	451	304	430	527
					337	650	703	575	405	509	426	287	406	498

Nominal anchor internal dia.	Effective embed.	Min. edge distance	Min. spacing distance	Min. concrete thickness	Tolco™ Figure 910/980 seismic brace									
					A	B	C		D	E	F	G	H	I
					30°-44°	45°-59°	60°-74°	75°-90°	30°-44°	45°-59°	60°-90°	30°-44°	45°-59°	60°-90°
in	in	in	in	in	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr
3/8	1.11	4	3-1/2	6	3.275	1.156	0.910	1.739	1.461	1.850	2.895	3.478	2.459	2.008
1/2	1.63	5-3/4	5	6	130	268	305	208	183	199	155	104	147	180
5/8	1.90	6-1/2	5-3/4	6	230	470	535	365	321	351	275	183	258	317
3/4	1.83	6	5-1/2	6	299	632	725	484	436	463	347	242	342	419
					283	597	686	457	412	438	328	229	323	396

Nominal anchor internal dia.	Effective embed.	Min. edge distance	Min. spacing distance	Min. concrete thickness	Afcon™ AF075/AF076/AF077 seismic brace									
					A	B	C	D	E	F	G	H	I	
					30°-44°	45°-59°	60°-90°	30°-44°	45°-59°	60°-90°	30°-44°	45°-59°	60°-90°	
in	in	in	in	in	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr
1/2	1.63	5-3/4	5	6	3.724	2.150	1.375	2.150	2.150	2.250	2.750	1.945	1.588	
					208	316	424	261	316	347	224	339	457	

Nominal anchor internal dia.	Effective embed.	Min. edge distance	Min. spacing distance	Min. concrete thickness	Afcon™ AF771 seismic brace								
					A	B	C	D	E	F	G	H	I
					30°-44°	45°-59°	60°-90°	30°-44°	45°-59°	60°-90°	30°-44°	45°-59°	60°-90°
in	in	in	in	in	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr
1/2	1.63	5-3/4	5	6	4.170	2.000	0.964	1.966	2.385	2.964	1.929	1.364	1.113
5/8	1.90	6-1/2	5-3/4	6	189	332	519	274	293	269	277	427	590
3/4	1.83	6	5-1/2	6	241	438	702	369	384	338	373	569	779
					227	414	664	349	363	320	353	538	736



Maximum allowable pipe horizontal load, F_{pw} (lb)
Hilti KCS-WF in 6,000 psi normal weight cracked concrete with Grade A36 threaded rod (or stronger)

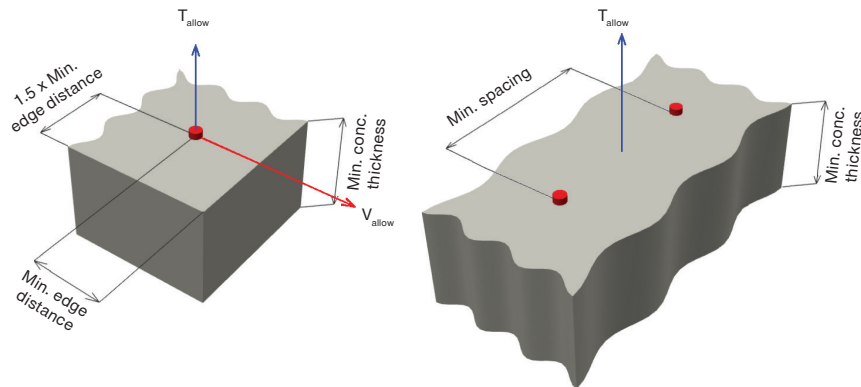
Nominal anchor internal dia.	Effective embed.	Min. edge distance	Min. spacing distance	Min. concrete thickness	Hilti MQS-SP-L-1/2" and MQS-SP-T-1/2"																			
					A		B		C		D		E		F		G		H		I			
					30°-44°	45°-59°	60°-74°	75°-90°	30°-44°	45°-59°	60°-90°	30°-44°	45°-59°	60°-90°	30°-44°	45°-59°	60°-90°	30°-44°	45°-59°	60°-90°				
in	in	in	in	in	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr					
1/2	1.63	5-3/4	5	6	4.100	1.580	0.870	1.850	1.520	2.320	3.440	3.710	2.620	2.140	207	413	573	373	329	320	255	186	264	323

Nominal anchor internal dia.	Effective embed.	Min. edge distance	Min. spacing distance	Min. concrete thickness	Tolco™ Figure 909 seismic brace																			
					A		B		C		D		E		F		G		H		I			
					30°-44°	45°-59°	60°-74°	75°-90°	30°-44°	45°-59°	60°-90°	30°-44°	45°-59°	60°-90°	30°-44°	45°-59°	60°-90°	30°-44°	45°-59°	60°-90°				
in	in	in	in	in	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	
3/8	1.11	4	3-1/2	6	2.626	1.002	0.870	1.230	1.513	1.487	2.226	2.460	1.740	1.420	166	305	328	273	189	244	214	137	193	237
1/2	1.63	5-3/4	5	6	293	534	573	479	330	428	377	239	338	415	293	534	573	479	330	428	377	239	338	415
5/8	1.90	6-1/2	5-3/4	6	391	753	815	667	469	590	494	333	471	577	391	753	815	667	469	590	494	333	471	577
3/4	1.83	6	5-1/2	6	368	709	767	628	442	556	466	314	444	544	368	709	767	628	442	556	466	314	444	544

Nominal anchor internal dia.	Effective embed.	Min. edge distance	Min. spacing distance	Min. concrete thickness	Tolco™ Figure 910/980 seismic brace																			
					A		B		C		D		E		F		G		H		I			
					30°-44°	45°-59°	60°-74°	75°-90°	30°-44°	45°-59°	60°-90°	30°-44°	45°-59°	60°-90°	30°-44°	45°-59°	60°-90°	30°-44°	45°-59°	60°-90°				
in	in	in	in	in	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	
3/8	1.11	4	3-1/2	6	3.275	1.156	0.910	1.739	1.461	1.850	2.895	3.478	2.459	2.008	141	283	321	221	192	213	171	111	157	192
1/2	1.63	5-3/4	5	6	248	495	560	389	335	373	302	194	275	336	248	495	560	389	335	373	302	194	275	336
5/8	1.90	6-1/2	5-3/4	6	328	692	795	530	478	508	380	265	375	459	328	692	795	530	478	508	380	265	375	459
3/4	1.83	6	5-1/2	6	309	652	749	499	450	478	358	250	353	433	309	652	749	499	450	478	358	250	353	433

Nominal anchor internal dia.	Effective embed.	Min. edge distance	Min. spacing distance	Min. concrete thickness	Afcon™ AF075/AF076/AF077 seismic brace																				
					A		B		C		D		E		F		G		H		I				
					30°-44°	45°-59°	60°-90°	30°-44°	45°-59°	60°-90°	30°-44°	45°-59°	60°-90°	30°-44°	45°-59°	60°-90°	30°-44°	45°-59°	60°-90°						
in	in	in	in	in	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr		
1/2	1.63	5-3/4	5	6	3.724	2.150	1.375	2.150	2.150	2.250	2.750	1.945	1.588	224	337	449	275	337	374	238	361	490	224	337	449

Nominal anchor internal dia.	Effective embed.	Min. edge distance	Min. spacing distance	Min. concrete thickness	Afcon™ AF771 seismic brace																				
					A		B		C		D		E		F		G		H		I				
					30°-44°	45°-59°	60°-90°	30°-44°	45°-59°	60°-90°	30°-44°	45°-59°	60°-90°	30°-44°	45°-59°	60°-90°	30°-44°	45°-59°	60°-90°						
in	in	in	in	in	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr		
1/2	1.63	5-3/4	5	6	4.170	2.000	0.964	1.966	2.385	2.964	1.929	1.364	1.113	205	354	545	289	314	295	292	451	629	205	354	545
5/8	1.90	6-1/2	5-3/4	6	264	480	770	404	421	371	409	624	854	264	480	770	404	421	371	409	624	854	264	480	770
3/4	1.83	6	5-1/2	6	249	452	725	381	397	350	385	588	804	249	452	725	381	397	350	385	588	804	249	452	725



6,000 psi NWC

Maximum allowable pipe horizontal load, F_{pw} (lb)
Hilti KCM-WF and KCM-PD in 3,000 psi normal weight cracked concrete ¹

Anchor size in	Nominal rod diameter in	Min. edge distance in	Min. spacing distance in	Min. concrete thickness in	Hilti MQS-SP-L-1/2" and MQS-SP-T-1/2"													
					A 30°-44°		B 45°-59°		C 60°-74°		D 75°-90°		E 30°-44°		F 45°-59°		G 60°-90°	
					Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	
3/8"-1/2"	1/2	4	5	6	4.100	1.580	0.870	1.850	1.520	2.320	3.440	3.710	2.620	2.140				
3/8"-1/2"-5/8"	1/2 ⁽¹⁾	5-1/4	6-1/4	6	210	444	639	398	367	337	251	199	281	344				
3/8"-1/2"-5/8"-3/4"	1/2 ⁽¹⁾	7-3/4	9	6	376	797	1149	714	660	604	448	356	504	618				

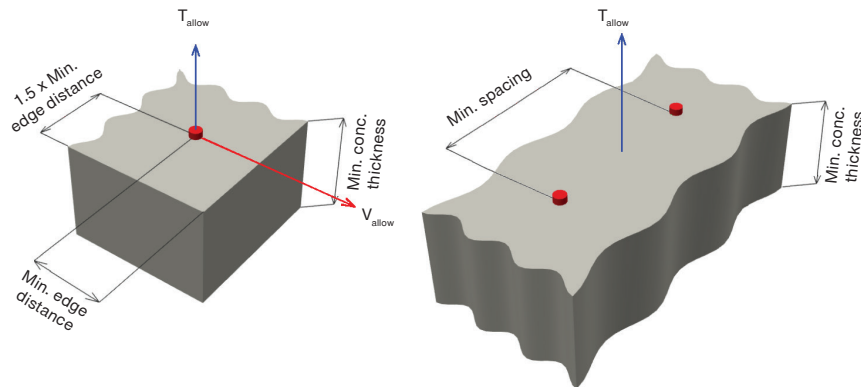
Anchor size in	Nominal rod diameter in	Min. edge distance in	Min. spacing distance in	Min. concrete thickness in	Tolco™ Figure 909 seismic brace													
					A 30°-44°		B 45°-59°		C 60°-74°		D 75°-90°		E 30°-44°		F 45°-59°		G 60°-90°	
					Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	
1/4"-3/8"	3/8	4	3-1/2	6	124	240	259	212	149	188	157	106	150	184				
3/8"-1/2"	1/2	4	5	6	219	422	456	373	263	331	277	187	264	323				
3/8"-1/2"-5/8"	1/2 ⁽¹⁾	5-1/4	6-1/4	6	307	591	639	523	368	463	388	261	370	453				
	5/8	5-1/4	6-1/4	6	307	591	639	523	368	463	388	261	370	453				
3/8"-1/2"-5/8"-3/4"	1/2 ⁽¹⁾	7-3/4	9	6	549	1062	1149	939	662	830	693	469	664	813				
	5/8 ⁽¹⁾	7-3/4	9	6	587	1261	1386	1092	798	948	693	546	772	945				
	3/4	7-3/4	9	8	560	1102	1196	970	689	855	693	485	686	840				

Anchor size in	Nominal rod diameter in	Min. edge distance in	Min. spacing distance in	Min. concrete thickness in	Tolco™ Figure 910/980 seismic brace													
					A 30°-44°		B 45°-59°		C 60°-74°		D 75°-90°		E 30°-44°		F 45°-59°		G 60°-90°	
					Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	
1/4"-3/8"	3/8	4	3-1/2	6	104	220	253	169	152	162	121	84	119	146				
3/8"-1/2"	1/2	4	5	6	184	388	445	297	268	284	213	149	210	257				
3/8"-1/2"-5/8"	1/2 ⁽¹⁾	5-1/4	6-1/4	6	257	543	624	416	375	398	298	208	294	360				
	5/8	5-1/4	6-1/4	6	257	543	624	416	375	398	298	208	294	360				
3/8"-1/2"-5/8"-3/4"	1/2 ⁽¹⁾	7-3/4	9	6	461	975	1121	746	674	714	532	373	528	646				
	5/8 ⁽¹⁾	7-3/4	9	6	471	1141	1346	839	816	799	532	420	594	727				
	3/4	7-3/4	9	8	468	1009	1166	766	702	732	532	383	541	663				

Anchor size in	Nominal rod diameter in	Min. edge distance in	Min. spacing distance in	Min. concrete thickness in	Afcon™ AF075/AF076/AF077 seismic brace													
					A 30°-44°		B 45°-59°		C 60°-90°		D 30°-44°		E 45°-59°		F 60°-90°		G 30°-44°	
					Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	
3/8"-1/2"	1/2	4	5	6	3.724	2.150	1.375	2.150	2.150	2.250	2.750	1.945	1.588					
3/8"-1/2"-5/8"	1/2 ⁽¹⁾	5-1/4	6-1/4	6	165	255	348	214	255	274	183	274	366					
3/8"-1/2"-5/8"-3/4"	1/2 ⁽¹⁾	7-3/4	9	6	231	357	487	300	357	383	256	384	512					
	5/8	7-3/4	9	6	414	640	874	539	640	685	459	689	918					

Anchor size in	Nominal rod diameter in	Min. edge distance in	Min. spacing distance in	Min. concrete thickness in	Afcon™ AF771 seismic brace													
					A 30°-44°		B 45°-59°		C 60°-90°		D 30°-44°		E 45°-59°		F 60°-90°		G 30°-44°	
					Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	
3/8"-1/2"	1/2	4	5	6	4.170	2.000	0.964	1.966	2.385	2.964	1.929	1.364	1.113					
3/8"-1/2"-5/8"	1/2 ⁽¹⁾	5-1/4	6-1/4	6	148	269	431	226	236	208	229	350	478					
	5/8	5-1/4	6-1/4	6	207	376	604	317	330	291	321	490	670					
3/8"-1/2"-5/8"-3/4"	1/2 ⁽¹⁾	7-3/4	9	6	207	376	604	317	330	291	321	490	670					
	5/8 ⁽¹⁾	7-3/4	9	6	370	675	1085	569	592	520	576	879	1201					
	3/4	7-3/4	9	8	414	707	1006	668	646	520	677	1012	1339					

¹ Only ASTM A193 Grade B7, ASTM A325, or ASTM F1554 Grade 105 threaded rod is permitted with smaller interior thread diameter. A36 threaded rod (or stronger) can be used with largest thread diameter per insert.



**3,000 psi
NWC**

Maximum allowable pipe horizontal load, F_{pw} (lb) Hilti KCM-WF and KCM-PD in 4,000 psi normal weight cracked concrete ¹

Anchor size in	Nominal rod diameter in	Min. edge distance in	Min. spacing distance in	Min. concrete thickness in	Hilti MQS-SP-L-1/2" and MQS-SP-T-1/2"																			
					A 30°-44°		B 45°-59°		C 60°-74°		D 75°-90°		E 30°-44°		F 45°-59°		G 60°-90°		H 30°-44°		I 45°-59°			
					Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	
3/8"-1/2"	1/2	4	5	6	4.100	1.580	0.870	1.850	1.520	2.320	3.440	3.710	2.620	2.140	174	367	528	329	303	279	207	164	232	285
3/8"-1/2"-5/8"	1/2 ⁽¹⁾	5-1/4	6-1/4	6	243	513	738	460	424	390	290	230	325	398	243	513	738	460	424	390	290	230	325	398
3/8"-1/2"-5/8"-3/4"	1/2 ⁽¹⁾	7-3/4	9	6	431	877	1238	790	712	673	518	394	558	683	431	877	1238	790	712	673	518	394	558	683

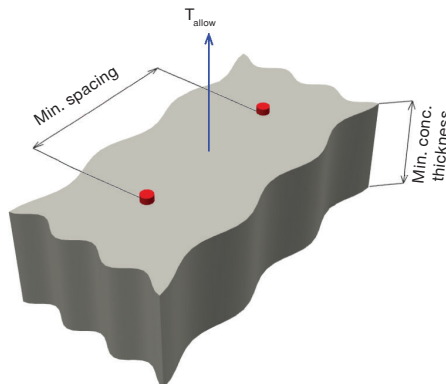
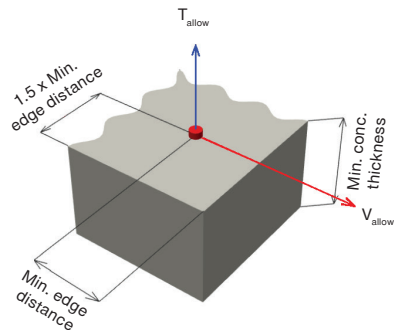
Anchor size in	Nominal rod diameter in	Min. edge distance in	Min. spacing distance in	Min. concrete thickness in	Tolco™ Figure 909 seismic brace																			
					A 30°-44°		B 45°-59°		C 60°-74°		D 75°-90°		E 30°-44°		F 45°-59°		G 60°-90°		H 30°-44°		I 45°-59°			
					Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr		
1/4"-3/8"	3/8	4	3-1/2	6	143	274	296	243	171	215	182	122	172	210	143	274	296	243	171	215	182	122	172	210
3/8"-1/2"	1/2	4	5	6	253	488	528	432	304	382	320	216	305	374	253	488	528	432	304	382	320	216	305	374
3/8"-1/2"-5/8"	1/2 ⁽¹⁾	5-1/4	6-1/4	6	354	683	738	604	425	535	448	302	427	523	354	683	738	604	425	535	448	302	427	523
	5/8	5-1/4	6-1/4	6	354	683	738	604	425	535	448	302	427	523	354	683	738	604	425	535	448	302	427	523
3/8"-1/2"-5/8"-3/4"	1/2 ⁽¹⁾	7-3/4	9	6	614	1150	1238	1024	713	912	785	512	724	887	614	1150	1238	1024	713	912	785	512	724	887
	5/8 ⁽¹⁾	7-3/4	9	6	675	1388	1519	1209	875	1056	800	605	855	1047	675	1388	1519	1209	875	1056	800	605	855	1047
	3/4	7-3/4	9	8	627	1198	1293	1062	745	942	798	531	751	920	627	1198	1293	1062	745	942	798	531	751	920

Anchor size in	Nominal rod diameter in	Min. edge distance in	Min. spacing distance in	Min. concrete thickness in	Tolco™ Figure 910/980 seismic brace																			
					A 30°-44°		B 45°-59°		C 60°-74°		D 75°-90°		E 30°-44°		F 45°-59°		G 60°-90°		H 30°-44°		I 45°-59°			
					Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr		
1/4"-3/8"	3/8	4	3-1/2	6	120	252	289	194	174	185	140	97	137	168	120	252	289	194	174	185	140	97	137	168
3/8"-1/2"	1/2	4	5	6	213	449	515	344	310	329	246	172	243	298	213	449	515	344	310	329	246	172	243	298
3/8"-1/2"-5/8"	1/2 ⁽¹⁾	5-1/4	6-1/4	6	297	627	720	481	433	460	344	240	340	416	297	627	720	481	433	460	344	240	340	416
	5/8	5-1/4	6-1/4	6	297	627	720	481	433	460	344	240	340	416	297	627	720	481	433	460	344	240	340	416
3/8"-1/2"-5/8"-3/4"	1/2 ⁽¹⁾	7-3/4	9	6	517	1062	1210	823	726	790	615	412	582	713	517	1062	1210	823	726	790	615	412	582	713
	5/8 ⁽¹⁾	7-3/4	9	6	544	1262	1477	939	894	895	615	469	664	813	544	1262	1477	939	894	895	615	469	664	813
	3/4	7-3/4	9	8	527	1102	1263	847	759	812	615	424	599	734	527	1102	1263	847	759	812	615	424	599	734

Anchor size in	Nominal rod diameter in	Min. edge distance in	Min. spacing distance in	Min. concrete thickness in	Afcon™ AF075/AF076/AF077 seismic brace																		
					A 30°-44°		B 45°-59°		C 60°-90°		D 30°-44°		E 45°-59°		F 60°-90°		G 30°-44°		H 45°-59°		I 60°-90°		
					Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	
3/8"-1/2"	1/2	4	5	6	3.724	2.150	1.375	2.150	2.150	2.250	2.750	1.945	1.588	191	295	403	248	295	317	211	317	423	298
3/8"-1/2"-5/8"	1/2 ⁽¹⁾	5-1/4	6-1/4	6	267	412	563	347	412	443	295	444	592	267	412	563	347	412	443	295	444	592	298
3/8"-1/2"-5/8"-3/4"	1/2 ⁽¹⁾	7-3/4	9	6	467	710	958	588	710	779	505	763	1026	467	710	958	588	710	779	505	763	1026	298

Anchor size in	Nominal rod diameter in	Min. edge distance in	Min. spacing distance in	Min. concrete thickness in	Afcon™ AF771 seismic brace																		
					A 30°-44°		B 45°-59°		C 60°-90°		D 30°-44°		E 45°-59°		F 60°-90°		G 30°-44°		H 45°-59°		I 60°-90°		
					Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	
3/8"-1/2"	1/2	4	5	6	4.170	2.000	0.964	1.966	2.385	2.964	1.929	1.364	1.113	171	311	499	262	273	241	265	405	553	298
3/8"-1/2"-5/8"	1/2 ⁽¹⁾	5-1/4	6-1/4	6	239	435	698	366	382	336	370	566	774	239	435	698	366	382	336	370	566	774	298
	5/8	5-1/4	6-1/4	6	239	435	698	366	382	336	370	566	774	239	435	698	366	382	336	370	566	774	298
3/8"-1/2"-5/8"-3/4"	1/2 ⁽¹⁾	7-3/4	9	6	425	748	1174	620	659	601	626	963	1330	425	748	1174	620	659	601	626	963	1330	298
	5/8 ⁽¹⁾	7-3/4	9	6	478	795	1117	738	731	601	747	1123	1501	478	795	1117	738	731	601	747	1123	1501	298
	3/4	7-3/4	9	8	474	729	990	643	675	601	651	996	1365	474	729	990	643	675	601	651	996	1365	298

¹ Only ASTM A193 Grade B7, ASTM A325, or ASTM F1554 Grade 105 threaded rod is permitted with smaller interior thread diameter. A36 threaded rod (or stronger) can be used with largest thread diameter per insert.



**4,000 psi
NWC**

Maximum allowable pipe horizontal load, F_{pw} (lb)
Hilti KCM-WF and KCM-PD in 5,000 psi normal weight cracked concrete ¹

Anchor size in	Nominal rod diameter in	Min. edge distance in	Min. spacing distance in	Min. concrete thickness in	Hilti MQS-SP-L-1/2" and MQS-SP-T-1/2"																			
					A 30°-44°		B 45°-59°		C 60°-74°		D 75°-90°		E 30°-44°		F 45°-59°		G 60°-90°		H 30°-44°		I 45°-59°			
					Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	
3/8"-1/2"	1/2	4	5	6	4.100	1.580	0.870	1.850	1.520	2.320	3.440	3.710	2.620	2.140	194	398	564	358	324	304	232	178	253	309
3/8"-1/2"-5/8"	1/2 ⁽¹⁾	5-1/4	6-1/4	6	272	575	827	515	475	436	325	257	364	446										
3/8"-1/2"-5/8"-3/4"	1/2 ⁽¹⁾	7-3/4	9	6	472	942	1308	851	752	729	579	425	601	736										

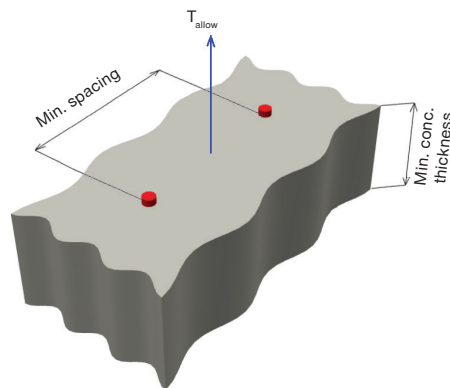
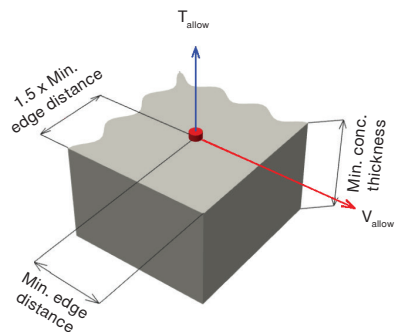
Anchor size in	Nominal rod diameter in	Min. edge distance in	Min. spacing distance in	Min. concrete thickness in	Tolco™ Figure 909 seismic brace																			
					A 30°-44°		B 45°-59°		C 60°-74°		D 75°-90°		E 30°-44°		F 45°-59°		G 60°-90°		H 30°-44°		I 45°-59°			
					Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr		
1/4"-3/8"	3/8	4	3-1/2	6	156	292	315	260	181	232	200	130	184	226										
3/8"-1/2"	1/2	4	5	6	277	523	564	465	325	414	354	233	329	403										
3/8"-1/2"-5/8"	1/2 ⁽¹⁾	5-1/4	6-1/4	6	397	765	827	677	476	599	501	338	478	586										
	5/8	5-1/4	6-1/4	6	397	765	827	677	476	599	501	338	478	586										
3/8"-1/2"-5/8"-3/4"	1/2 ⁽¹⁾	7-3/4	9	6	667	1220	1308	1093	754	978	860	546	773	946										
	5/8 ⁽¹⁾	7-3/4	9	6	741	1491	1625	1305	936	1145	894	653	923	1131										
	3/4	7-3/4	9	8	683	1273	1370	1135	789	1012	875	568	803	983										

Anchor size in	Nominal rod diameter in	Min. edge distance in	Min. spacing distance in	Min. concrete thickness in	Tolco™ Figure 910/980 seismic brace																			
					A 30°-44°		B 45°-59°		C 60°-74°		D 75°-90°		E 30°-44°		F 45°-59°		G 60°-90°		H 30°-44°		I 45°-59°			
					Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr		
1/4"-3/8"	3/8	4	3-1/2	6	132	270	307	209	184	201	157	105	148	181										
3/8"-1/2"	1/2	4	5	6	233	483	551	373	331	358	275	186	264	323										
3/8"-1/2"-5/8"	1/2 ⁽¹⁾	5-1/4	6-1/4	6	333	703	807	538	485	515	386	269	381	466										
	5/8	5-1/4	6-1/4	6	333	703	807	538	485	515	386	269	381	466										
3/8"-1/2"-5/8"-3/4"	1/2 ⁽¹⁾	7-3/4	9	6	565	1131	1280	886	766	851	688	443	627	768										
	5/8 ⁽¹⁾	7-3/4	9	6	608	1360	1582	1021	955	975	688	511	722	884										
	3/4	7-3/4	9	8	576	1177	1339	914	803	877	688	457	646	792										

Anchor size in	Nominal rod diameter in	Min. edge distance in	Min. spacing distance in	Min. concrete thickness in	Afcon™ AF075/AF076/AF077 seismic brace																		
					A 30°-44°		B 45°-59°		C 60°-90°		D 30°-44°		E 45°-59°		F 60°-90°		G 30°-44°		H 45°-59°		I 60°-90°		
					Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	
3/8"-1/2"	1/2	4	5	6	3.724	2.150	1.375	2.150	2.150	2.250	2.750	1.945	1.588	210	321	435	267	321	351	229	345	463	
3/8"-1/2"-5/8"	1/2 ⁽¹⁾	5-1/4	6-1/4	6	299	462	630	388	462	496	331	497	663										
3/8"-1/2"-5/8"-3/4"	1/2 ⁽¹⁾	7-3/4	9	6	510	769	1025	628	769	853	542	823	1116										

Anchor size in	Nominal rod diameter in	Min. edge distance in	Min. spacing distance in	Min. concrete thickness in	Afcon™ AF771 seismic brace																		
					A 30°-44°		B 45°-59°		C 60°-90°		D 30°-44°		E 45°-59°		F 60°-90°		G 30°-44°		H 45°-59°		I 60°-90°		
					Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	
3/8"-1/2"	1/2	4	5	6	4.170	2.000	0.964	1.966	2.385	2.964	1.929	1.364	1.113	191	339	534	282	298	269	285	437	602	
3/8"-1/2"-5/8"	1/2 ⁽¹⁾	5-1/4	6-1/4	6	268	487	781	410	427	377	415	634	866										
	5/8	5-1/4	6-1/4	6	268	487	781	410	427	377	415	634	866										
3/8"-1/2"-5/8"-3/4"	1/2 ⁽¹⁾	7-3/4	9	6	466	808	1244	660	715	672	666	1030	1435										
	5/8 ⁽¹⁾	7-3/4	9	6	535	869	1210	795	800	672	805	1216	1637										
	3/4	7-3/4	9	8	520	790	1062	686	733	672	694	1067	1477										

¹ Only ASTM A193 Grade B7, ASTM A325, or ASTM F1554 Grade 105 threaded rod is permitted with smaller interior thread diameter. A36 threaded rod (or stronger) can be used with largest thread diameter per insert.



**5,000 psi
NWC**

Maximum allowable pipe horizontal load, F_{pw} (lb) Hilti KCM-WF and KCM-PD in 6,000 psi normal weight cracked concrete ¹

Anchor size in	Nominal rod diameter in	Min. edge distance in	Min. spacing distance in	Min. concrete thickness in	Hilti MQS-SP-L-1/2" and MQS-SP-T-1/2"																			
					A 30°-44°		B 45°-59°		C 60°-74°		D 75°-90°		E 30°-44°		F 45°-59°		G 60°-90°		H 30°-44°		I 45°-59°			
					Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	
3/8"-1/2"	1/2	4	5	6	209	422	590	380	339	325	254	190	269	329	298	629	905	564	520	477	355	281	398	488
3/8"-1/2"-5/8"	1/2 ⁽¹⁾	5-1/4	6-1/4	6	298	629	905	564	520	477	355	281	398	488	508	996	1364	903	785	777	634	451	638	781
3/8"-1/2"-5/8"-3/4"	1/2 ⁽¹⁾	7-3/4	9	6	508	996	1364	903	785	777	634	451	638	781										

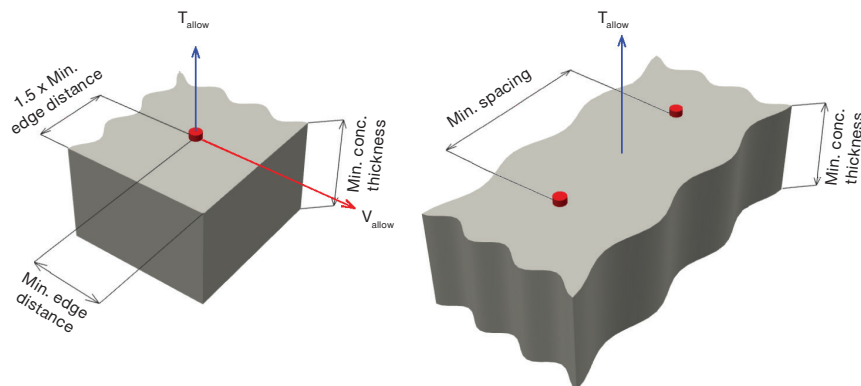
Anchor size in	Nominal rod diameter in	Min. edge distance in	Min. spacing distance in	Min. concrete thickness in	Tolco™ Figure 909 seismic brace																							
					A 30°-44°		B 45°-59°		C 60°-74°		D 75°-90°		E 30°-44°		F 45°-59°		G 60°-90°		H 30°-44°		I 45°-59°							
					Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr						
1/4"-3/8"	3/8	4	3-1/2	6	167	306	328	274	189	245	215	137	194	237	297	549	590	491	340	438	381	245	347	425				
3/8"-1/2"	1/2	4	5	6	297	549	590	491	340	438	381	245	347	425	434	837	905	740	521	655	548	370	523	641				
3/8"-1/2"-5/8"	1/2 ⁽¹⁾	5-1/4	6-1/4	6	434	837	905	740	521	655	548	370	523	641	5/8	5-1/4	6-1/4	6	428	816	880	724	507	642	546	362	512	627
3/8"-1/2"-5/8"-3/4"	1/2 ⁽¹⁾	7-3/4	9	6	712	1277	1364	1149	786	1032	924	574	812	995	5/8 ⁽¹⁾	7-3/4	9	6	797	1577	1713	1386	987	1220	979	693	980	1201
	3/4	7-3/4	9	8	730	1335	1432	1196	825	1070	941	598	846	1036														

Anchor size in	Nominal rod diameter in	Min. edge distance in	Min. spacing distance in	Min. concrete thickness in	Tolco™ Figure 910/980 seismic brace																							
					A 30°-44°		B 45°-59°		C 60°-74°		D 75°-90°		E 30°-44°		F 45°-59°		G 60°-90°		H 30°-44°		I 45°-59°							
					Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr						
1/4"-3/8"	3/8	4	3-1/2	6	141	283	321	222	192	213	171	111	157	192	251	508	577	396	346	380	301	198	280	343				
3/8"-1/2"	1/2	4	5	6	251	508	577	396	346	380	301	198	280	343	364	769	883	589	531	564	422	294	416	510				
3/8"-1/2"-5/8"	1/2 ⁽¹⁾	5-1/4	6-1/4	6	364	769	883	589	531	564	422	294	416	510	5/8	5-1/4	6-1/4	6	360	751	860	578	516	554	422	289	409	501
3/8"-1/2"-5/8"-3/4"	1/2 ⁽¹⁾	7-3/4	9	6	605	1187	1337	939	799	903	748	469	664	813	5/8 ⁽¹⁾	7-3/4	9	6	665	1443	1669	1092	1006	1043	753	546	772	945
	3/4	7-3/4	9	8	618	1238	1401	970	839	932	753	485	686	840														

Anchor size in	Nominal rod diameter in	Min. edge distance in	Min. spacing distance in	Min. concrete thickness in	Afcon™ AF075/AF076/AF077 seismic brace																		
					A 30°-44°		B 45°-59°		C 60°-90°		D 30°-44°		E 45°-59°		F 60°-90°		G 30°-44°		H 45°-59°		I 60°-90°		
					Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	
3/8"-1/2"	1/2	4	5	6	226	343	459	282	343	378	243	368	496	328	505	690	425	505	543	362	544	725	
3/8"-1/2"-5/8"	1/2 ⁽¹⁾	5-1/4	6-1/4	6	328	505	690	425	505	543	362	544	725	548	818	1080	660	818	916	573	874	1193	
3/8"-1/2"-5/8"-3/4"	1/2 ⁽¹⁾	7-3/4	9	6	548	818	1080	660	818	916	573	874	1193										

Anchor size in	Nominal rod diameter in	Min. edge distance in	Min. spacing distance in	Min. concrete thickness in	Afcon™ AF771 seismic brace																					
					A 30°-44°		B 45°-59°		C 60°-90°		D 30°-44°		E 45°-59°		F 60°-90°		G 30°-44°		H 45°-59°		I 60°-90°					
					Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr				
3/8"-1/2"	1/2	4	5	6	206	361	561	296	318	294	300	462	640	293	533	855	449	467	412	454	693	948				
3/8"-1/2"-5/8"	1/2 ⁽¹⁾	5-1/4	6-1/4	6	293	533	855	449	467	412	454	693	948	5/8	5-1/4	6-1/4	6	293	524	833	438	461	412	443	679	932
3/8"-1/2"-5/8"-3/4"	1/2 ⁽¹⁾	7-3/4	9	6	501	859	1301	692	762	733	699	1085	1523	5/8 ⁽¹⁾	7-3/4	9	6	585	932	1287	843	860	736	853	1294	1753
	3/4	7-3/4	9	8	559	842	1122	722	783	736	729	1127	1570													

¹ Only ASTM A193 Grade B7, ASTM A325, or ASTM F1554 Grade 105 threaded rod is permitted with smaller interior thread diameter. A36 threaded rod (or stronger) can be used with largest thread diameter per insert.



**6,000 psi
NWC**

Maximum allowable pipe horizontal load, F_{pw} (lb)
Hilti KCM-MD in the soffit of 3,000 psi or 4,000 psi lightweight concrete over metal deck
3-in W-deck profiles ^{1,2}

Anchor size	Nominal rod diameter	Min. edge distance	Min. spacing distance	Min. concrete thickness	Hilti MQS-SP-L-1/2" and MQS-SP-T-1/2"							
					3,000 psi				4,000 psi			
					A 30°-44° Pr	B 45°-59° Pr	C 60°-74° Pr 75°-90° Pr		A 30°-44° Pr	B 45°-59° Pr	C 60°-74° Pr 75°-90° Pr	
in	in	in	in	in	4.100	1.580	0.870	1.850	4.100	1.580	0.870	1.850
3/8"-1/2"	1/2	11/16	6	2-1/2	116	276	420	244	135	308	459	273
3/8"-1/2"-5/8"	1/2	7/8	7-1/2	3-1/4	133	305	455	271	154	338	495	302

Anchor size	Nominal rod diameter	Min. edge distance	Min. spacing distance	Min. concrete thickness	Tolco™ Figure 909 seismic brace							
					3,000 psi				4,000 psi			
					A 30°-44° Pr	B 45°-59° Pr	C 60°-74° Pr 75°-90° Pr		A 30°-44° Pr	B 45°-59° Pr	C 60°-74° Pr 75°-90° Pr	
in	in	in	in	in	2.626	1.002	0.870	1.230	2.626	1.002	0.870	1.230
1/4"-3/8"	3/8	11/16	5-1/2	2-1/2	131	257	279	226	147	279	301	248
3/8"-1/2"	3/8	11/16	6	2-1/2	180	368	402	321	202	402	437	353
	1/2	11/16	6	2-1/2	182	383	420	332	207	421	459	367
3/8"-1/2"-5/8"	1/2	7/8	7-1/2	3-1/4	205	417	455	364	230	456	495	401
	5/8	7/8	7-1/2	3-1/4	208	471	521	405	240	521	574	451
5/8"-3/4"	5/8	7/8	7-1/2	3-1/4	208	451	496	390	240	497	544	432
	3/4	7/8	7-1/2	3-1/4	208	471	521	405	240	521	574	451

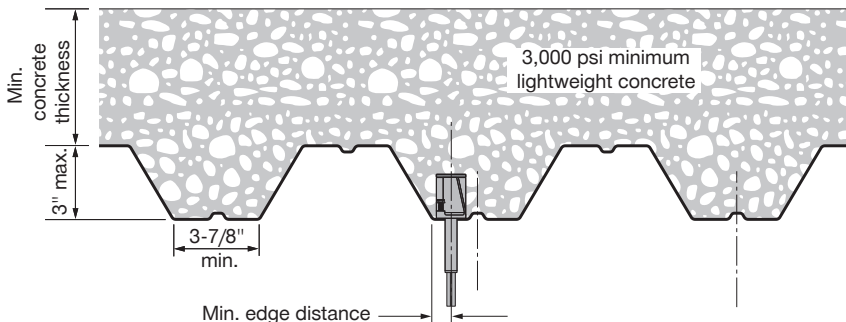
Anchor size	Nominal rod diameter	Min. edge distance	Min. spacing distance	Min. concrete thickness	Tolco™ Figure 910/980 seismic brace							
					3,000 psi				4,000 psi			
					A 30°-44° Pr	B 45°-59° Pr	C 60°-74° Pr 75°-90° Pr		A 30°-44° Pr	B 45°-59° Pr	C 60°-74° Pr 75°-90° Pr	
in	in	in	in	in	3.275	1.156	0.910	1.739	3.275	1.156	0.910	1.739
1/4"-3/8"	3/8	11/16	5-1/2	2-1/2	109	235	272	179	123	257	294	198
3/8"-1/2"	3/8	11/16	6	2-1/2	146	334	391	250	168	368	426	278
	1/2	11/16	6	2-1/2	146	347	408	256	168	383	447	286
3/8"-1/2"-5/8"	1/2	7/8	7-1/2	3-1/4	167	380	443	284	192	417	482	316
	5/8	7/8	7-1/2	3-1/4	167	424	505	308	193	471	557	346
5/8"-3/4"	5/8	7/8	7-1/2	3-1/4	167	408	482	299	193	451	529	335
	3/4	7/8	7-1/2	3-1/4	167	424	505	308	193	471	557	346

Anchor size	Nominal rod diameter	Min. edge distance	Min. spacing distance	Min. concrete thickness	Afcon™ AF075/AF076/AF077 seismic brace					
					3,000 psi			4,000 psi		
					A 30°-44° Pr	B 45°-59° Pr	C 60°-90° Pr	A 30°-44° Pr	B 45°-59° Pr	C 60°-90° Pr
in	in	in	in	in	3.724	2.150	1.375	3.724	2.150	1.375
3/8"-1/2"	1/2	11/16	6	2-1/2	128	217	306	148	243	340

Anchor size	Nominal rod diameter	Min. edge distance	Min. spacing distance	Min. concrete thickness	Afcon™ AF771 seismic brace					
					3,000 psi			4,000 psi		
					A 30°-44° Pr	B 45°-59° Pr	C 60°-90° Pr	A 30°-44° Pr	B 45°-59° Pr	C 60°-90° Pr
in	in	in	in	in	4.170	2.000	0.964	4.170	2.000	0.964
3/8"-1/2"	1/2	11/16	6	2-1/2	114	230	393	132	257	431
3/8"-1/2"-5/8"	1/2	7/8	7-1/2	3-1/4	131	255	427	151	285	466
	5/8	7/8	7-1/2	3-1/4	131	273	485	151	309	535
5/8"-3/4"	5/8	7/8	7-1/2	3-1/4	131	268	463	151	300	510
	3/4	7/8	7-1/2	3-1/4	147	254	372	151	309	535

1 Anchor may be placed in upper or lower flute. Prying factors noted assume the seismic swivel brace has its full bearing area in contact with the metal deck.

2 Only ASTM A193 Grade B7, ASTM A325, or ASTM F1554 Grade 105 threaded rod is permitted with smaller interior thread diameter. A36 threaded rod (or stronger) can be used with largest thread diameter per insert.



**3,000 psi or
4,000 psi
Lightweight over
metal deck
3-in W-deck**

Maximum allowable pipe horizontal load, F_{pw} (lb)
Hilti KCM-MD in the soffit of 3,000 psi or 4,000 psi lightweight concrete over metal deck
1-1/2-in B-deck profiles ^{1,2}

Anchor size	Nominal rod diameter	Min. edge distance	Min. spacing distance	Min. concrete thickness	Hilti MQS-SP-L-1/2" and MQS-SP-T-1/2"								
					3,000 psi				4,000 psi				
					A	B	C		A	B	C		
					30°-44°	45°-59°	60°-74°	75°-90°	30°-44°	45°-59°	60°-74°	75°-90°	
in	in	in	in	in	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr
3/8"-1/2"	1/2	7/8	6	2-1/2	4.100	1.580	0.870	1.850	4.100	1.580	0.870	1.850	
					40	103	187	88	46	119	212	102	

Anchor size	Nominal rod diameter	Min. edge distance	Min. spacing distance	Min. concrete thickness	Tolco™ Figure 909 seismic brace							
					3,000 psi				4,000 psi			
					A	B	C		A	B	C	
					30°-44°	45°-59°	60°-74°	75°-90°	30°-44°	45°-59°	60°-74°	75°-90°
in	in	in	in	in	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr
1/4"-3/8"	3/8	7/8	5-1/2	2-1/2	2.626	1.002	0.870	1.230	2.626	1.002	0.870	1.230
3/8"-1/2"	1/2	7/8	6	2-1/2	60	144	161	123	69	161	179	138
3/8"-1/2"-5/8"	5/8	7/8	7-1/2	3-1/4	62	163	187	132	72	188	212	153
3/8"-1/2"-5/8"	5/8	7/8	7-1/2	3-1/4	68	179	206	146	79	206	237	168
5/8"-3/4" ³	3/4	7/8	7-1/2	3-1/4	449	932	1020	810	507	1021	1113	894

Anchor size	Nominal rod diameter	Min. edge distance	Min. spacing distance	Min. concrete thickness	Tolco™ Figure 910/980 seismic brace							
					3,000 psi				4,000 psi			
					A	B	C		A	B	C	
					30°-44°	45°-59°	60°-74°	75°-90°	30°-44°	45°-59°	60°-74°	75°-90°
in	in	in	in	in	Pr	Pr	Pr	Pr	Pr	Pr	Pr	Pr
1/4"-3/8"	3/8	7/8	5-1/2	2-1/2	3.275	1.156	0.910	1.739	3.275	1.156	0.910	1.739
3/8"-1/2"	1/2	7/8	6	2-1/2	48	129	156	90	55	145	173	104
3/8"-1/2"-5/8"	5/8	7/8	7-1/2	3-1/4	50	141	179	94	58	163	205	108
3/8"-1/2"-5/8"	5/8	7/8	7-1/2	3-1/4	55	155	197	103	63	179	227	119
5/8"-3/4" ³	3/4	7/8	7-1/2	3-1/4	360	846	992	627	416	932	1084	699

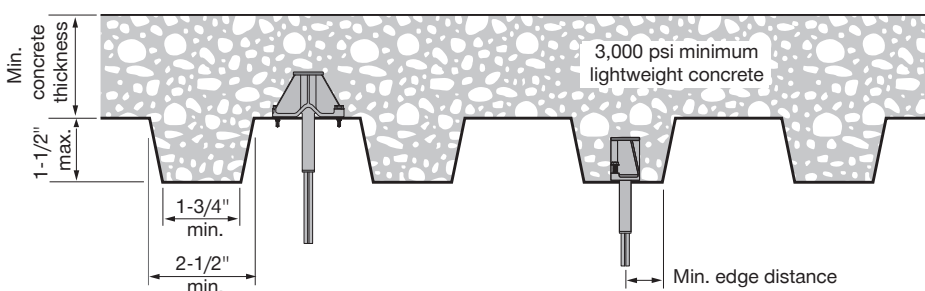
Anchor size	Nominal rod diameter	Min. edge distance	Min. spacing distance	Min. concrete thickness	Afcon™ AF075/AF076/AF077 seismic brace					
					3,000 psi			4,000 psi		
					A	B	C	A	B	C
					30°-44°	45°-59°	60°-90°	30°-44°	45°-59°	60°-90°
in	in	in	in	in	Pr	Pr	Pr	Pr	Pr	Pr
3/8"-1/2"	1/2	7/8	6	2-1/2	3.724	2.150	1.375	3.724	2.150	1.375
					44	76	118	51	88	137

Anchor size	Nominal rod diameter	Min. edge distance	Min. spacing distance	Min. concrete thickness	Afcon™ AF771 seismic brace					
					3,000 psi			4,000 psi		
					A	B	C	A	B	C
					30°-44°	45°-59°	60°-90°	30°-44°	45°-59°	60°-90°
in	in	in	in	in	Pr	Pr	Pr	Pr	Pr	Pr
3/8"-1/2"	1/2	7/8	6	2-1/2	4.170	2.000	0.964	4.170	2.000	0.964
3/8"-1/2"-5/8"	5/8	7/8	7-1/2	3-1/4	39	81	169	45	94	195
3/8"-1/2"-5/8"	5/8	7/8	7-1/2	3-1/4	43	89	186	49	103	214
5/8"-3/4" ³	3/4	7/8	7-1/2	3-1/4	317	531	748	327	629	1046

1 Anchor may be placed in upper or lower flute. Prying factors noted assume the seismic swivel brace has its full bearing area in contact with the metal deck.

2 Only ASTM A193 Grade B7, ASTM A325, or ASTM F1554 Grade 105 threaded rod is permitted with smaller interior thread diameter. A36 threaded rod (or stronger) can be used with largest thread diameter per insert.

3 5/8" - 3/4" only applicable for upper flute location.





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*14001 US only

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