

Minimum Hanger Rod Diameter (Table 4a)



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Table 4a Minimum Diameter of Hanger Rod* (in inches)
 (Refer to Bottom Table for Anchor Capacities if attached to concrete)

Supported Wt per Hanger Rod (lbs)	Force (lb) Force Class	250	500	1000	2000	5000	10000
		I	II	III	IV	V	VI
100 250 500 1000 2000	Strut Angle 60 degrees from Horizontal Plane	0.38	0.50	0.75	1.00		
		0.50	0.63	0.75	1.00		
		0.63	0.63	0.88	1.00		
		0.75	0.75	0.88	1.12		
		0.88	1.00	1.12	1.25		
100 250 500 1000 2000	Strut Angle 45 degrees from Horizontal Plane	0.38	0.50	0.63	0.75	1.12	
		0.38	0.50	0.63	0.75	1.25	
		0.50	0.63	0.75	0.88	1.25	
		0.63	0.75	0.75	1.00	1.25	
		0.88	0.88	1.00	1.12		
100 250 500 1000 2000	Strut Angle 30 degrees from Horizontal Plane	0.38	0.38	0.50	0.63	0.88	1.25
		0.38	0.50	0.50	0.63	1.00	1.25
		0.50	0.50	0.63	0.75	1.00	1.25
		0.63	0.63	0.75	0.88	1.12	
		0.88	0.88	1.00	1.00	1.25	
100 250 500 1000 2000	--All Cables-- Strut Angle 0 degrees from Horizontal Plane	0.38	0.38	0.38	0.38	0.38	0.38
		0.38	0.38	0.38	0.38	0.38	0.38
		0.50	0.50	0.50	0.50	0.50	0.50
		0.63	0.63	0.63	0.63	0.63	0.63
		0.88	0.88	0.88	0.88	0.88	0.88

Supported Wt per Hanger Rod (lbs)	Strut Angle	Minimum Diameter of KNC Hanger Rod Anchor* (in inches)					
		250	500	1000	2000	5000	10000
100 250 500 1000 2000	Strut Angle 60 degrees from Horizontal Plane	0.75	1.25				
		0.88	1.25				
		1.25	1.25				
		1.25					
100 250 500 1000 2000	Strut Angle 45 degrees from Horizontal Plane	0.63	0.88	1.25			
		0.75	1.00	1.25			
		1.25	1.25	1.25			
		1.25					
100 250 500 1000 2000	Strut Angle 30 degrees from Horizontal Plane	0.50	0.63	0.88	1.25		
		0.75	0.88	1.25	1.25		
		1.00	1.25	1.25			
		1.25	1.25				
100 250 500 1000 2000	--All Cables-- Strut Angle 0 degrees from Horizontal Plane	0.38	0.38	0.38	0.38	0.38	0.38
		0.63	0.63	0.63	0.63	0.63	0.63
		0.88	0.88	0.88	0.88	0.88	0.88
		1.25	1.25	1.25	1.25	1.25	1.25

Notes: All above capacities are based on LRF [Strength] based loads, a 5:1 Safety Factor and a 1.33 Allowable overload factor applicable to Wind and Seismic Loadings.

All Anchor capacities are based on ICBO allowables, some sizes may have to be increased if embedded into the tensile side of a structural member.

* If Cables are used in lieu of Struts, All Hanger Rod and Anchor Sizes will be equal to the Values listed for Struts in the "0" degree angle Table.

KINETICS™ Seismic Design Manual

HANGER ROD, ROD STIFFENER, AND STRUT TABLES (4a, 4b, AND 4c)



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Hanger Rod Stiffener and Strut Tables (Table 4b & 4c)



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Table 4b

Hanger Rod Stiffening Tables

Maximum Unstiffened Hanger Rod Length (in)
Cable Angle (x) degrees from Horizontal

Force Class	60°							45°							30°							0°
	Rod Size							Rod Size							Rod Size							Rod Size
	0.38	0.50	0.62	0.75	0.88	1.00	1.25	0.38	0.50	0.62	0.75	0.88	1.00	1.25	0.38	0.50	0.62	0.75	0.88	1.00	1.25	All
I	6	10	17	25	35	45	73	7	14	22	33	45	60	97	10	18	29	43	60	79	127	Unlimited
II	4	7	12	18	24	32	52	5	10	16	23	32	42	68	7	13	20	31	42	56	90	Unlimited
III	-	5	8	12	17	23	37	4	7	11	16	23	30	48	5	9	14	22	30	39	64	Unlimited
IV	-	-	6	9	12	16	26	-	5	8	12	16	21	34	3	6	10	15	21	28	45	Unlimited
V	-	-	-	-	8	10	16	-	-	-	7	10	13	22	-	4	6	10	13	18	28	Unlimited
VI	-	-	-	-	-	-	12	-	-	-	-	7	9	15	-	-	-	7	9	12	20	Unlimited

Hanger Rod Dia	Schedule 40 Pipe				Angle Stiffeners			
	0.75	1	1.25	1.5	1.0 x 1.0 x .12	1.5 x 1.5 x .25	2.0 x 2.0 x .12	2.0 x 2.0 x .25
0.38	10.1	15.4	23.1	29.1	5.0	12.7	14.5	19.8
0.50	5.4	8.3	12.5	15.7	2.7	6.8	7.8	10.7
0.62	3.4	5.2	7.8	9.8	1.7	4.3	4.9	6.6
0.75	2.3	3.5	5.2	6.5	1.1	2.9	3.3	4.4
0.88	1.6	2.5	3.7	4.7	-	2.1	2.3	3.2
1.00	1.2	1.9	2.8	3.6	-	1.6	1.8	2.4
1.25	-	1.2	1.8	2.2	-	-	-	1.1

Max Length Governed by Buckling (Euler). As Stiffener is not a Primary Load Bearing Member and Compressive Load is Intermittent kL/r factor not applied.

Instructions for Use of the above Tables

- 1) Determine the appropriate Force Class for the Hanger Rod in Question.
- 2) Determine the Maximum Angle between the Restraint Cable or Strut and Horizontal.
- 3) Determine the Hanger Rod used (or to be used) at the Restraint Location.
- 4) Determine the Un-Stiffened Hanger Rod Length (Distance from anchor point to pipe or duct support bracket on Hanger Rod).
- 5) Using the Maximum Unstiffened Hanger Rod Length Table Determine if Installed Length exceeds Max Length.
- 6) If above length is exceeded, Determine ratio between installed Length and Max Length (If Installed Length is 32 in and Max Length is 16 inches, the ratio is 32/16 or 2. If a fraction, round up to the next largest whole number.)
- 7) Select an appropriate stiffener using the Rod Stiffener Table based on the existing Hanger Rod Dia, Multiplier and Max Stiffener length.
- 8) Read off at the top of the column the size of the required stiffener (Sch 40 pipe and Typical Angles are listed).
- 9) 2 clamps (minimum) are required to attach the stiffener to the hanger rod. The spacing between clamps cannot exceed the Maximum Length listed in the first Table.

Table 4c

Seismic Strut Sizing Table

Maximum Length of Strut (in inches)

Force (lb) Force Class	Strut Material (A36 Angle)	250	500	1000	2000	5000	10000	Strut Material (A36 Angle)	250	500	1000	2000	5000	10000
		I	II	III	IV	V	VI		I	II	III	IV	V	VI
Strut Angle 60 degrees from Horizontal	1.0 x 1.0 x .12	32	23	16	11	-	-	2.5 x 2.5 x .25	98	98	91	64	41	29
	1.5 x 1.5 x .25	58	58	41	29	18	-	2.5 x 2.5 x .38	97	97	97	77	48	34
	2.0 x 2.0 x .12	80	66	47	33	21	-	3.0 x 3.0 x .38	117	117	117	102	65	46
	2.0 x 2.0 x .25	78	78	64	45	29	20	4.0 x 4.0 x .38	158	158	158	158	101	71
Strut Angle 45 degrees from Horizontal	1.0 x 1.0 x .12	38	27	19	13	-	-	2.5 x 2.5 x .25	98	98	98	76	48	34
	1.5 x 1.5 x .25	58	58	49	35	22	15	2.5 x 2.5 x .38	97	97	97	91	58	41
	2.0 x 2.0 x .12	80	79	56	39	25	-	3.0 x 3.0 x .38	117	117	117	117	77	54
	2.0 x 2.0 x .25	78	78	76	54	34	24	4.0 x 4.0 x .38	158	158	158	158	120	85
Strut Angle 30 degrees from Horizontal	1.0 x 1.0 x .12	39	30	21	15	-	-	2.5 x 2.5 x .25	98	98	98	84	53	38
	1.5 x 1.5 x .25	58	58	54	38	24	17	2.5 x 2.5 x .38	97	97	97	97	64	45
	2.0 x 2.0 x .12	80	80	62	44	28	19	3.0 x 3.0 x .38	117	117	117	117	85	60
	2.0 x 2.0 x .25	78	78	78	60	38	27	4.0 x 4.0 x .38	158	158	158	158	132	94
Strut Angle 0 degrees from Horizontal	1.0 x 1.0 x .12	39	32	23	16	-	-	2.5 x 2.5 x .25	98	98	98	91	57	41
	1.5 x 1.5 x .25	58	58	58	41	26	18	2.5 x 2.5 x .38	97	97	97	97	69	48
	2.0 x 2.0 x .12	80	80	66	47	30	21	3.0 x 3.0 x .38	117	117	117	117	91	65
	2.0 x 2.0 x .25	78	78	78	64	40	29	4.0 x 4.0 x .38	158	158	158	158	142	101

See Appendix A8.1.1, A8.2.1, A8.3.1 for Tabulated Values of Rod Stiffeners (4b) for various conditions

HANGER ROD, ROD STIFFENER, AND STRUT TABLES (4a, 4b, AND 4c)



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