AAA Technology & Specialties Co., Inc.

Houston, Texas

AAA Technology & Specialties Co., Inc.

Sizing Variable Spring Hangers

AAA Technology & Specialties Co., Inc.

What is a Variable Spring Hanger or Support?

AAA Technology & Specialties Co., Inc.

Hanger

– indicates that the pipe is being supported from above?

AAA Technology & Specialties Co., Inc.

Variable Spring

– indicates that the hanger member contains a spring coil which when deflected will resist with a varying load.

AAA Technology & Specialties Co., Inc.

Support

– indicates that the pipe is being supported from below?

AAA Technology & Specialties Co., Inc.

Variable Spring Coil

- When the spring coil is compressed, the resistance load increases
- When the spring coil is allowed to extend, the resistance load decreases

AAA Technology & Specialties Co., Inc.

When:

1. a pipe is supported by a variable spring hanger or support &
2. the pipe moves vertically,

Support load exerted by the variable spring hanger varies.

AAA Technology & Specialties Co., Inc.

- If the pipe being supported moves down, the support load will increase.
- If the pipe being supported moves up, the support load will decrease.

Variable Spring Hangers

HANGER SIZE AND SERIES SELECTION CHART

LOAD TABLE IN POUNDS FOR SPRING HANGER SELECTION

ROD DIAMETER

WORKING RANGE INCHES					1/2"							5/8"			3/4"			1"		1 1/4"		1 1/2"	1 3/4"	2"	2 1/4"	2 1/2"	2 3/4"	3"	SPRING DEFLECTION INCHES				
					SPRING HANGER SIZE																												
E110	E100	E98	E268	E82	000	00	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	E82	E268	E98	E100	E110
					7	19	45	63	81	105	141	189	252	336	450	600	780	1020	1350	1800	2400	3240	4500	6000	7980	10620	14100	18750	25005	0	0	0	0	0
					7	20	47	66	84	109	147	197	263	350	469	625	813	1063	1406	1875	2500	3375	4688	6250	8313	11063	14688	19531	26047					
					8	22	49	68	88	114	153	205	273	364	488	650	845	1105	1463	1950	2600	3510	4875	6500	8645	11505	15275	20313	27089					
					9	24	51	71	91	118	159	213	284	378	506	675	878	1148	1519	2025	2700	3645	5063	6750	8978	11948	15863	21094	28131					
0	0	0	0	0	10	26	53	74	95	123	165	221	294	392	525	700	910	1190	1575	2100	2800	3780	5250	7000	9310	12390	16450	21875	29173	½	½	1	1 ½	2
					11	28	54	76	98	127	170	228	305	406	544	725	943	1233	1631	2175	2900	3915	5438	7250	9643	12833	17038	22656	30214					
					12	30	56	79	101	131	176	236	315	420	563	750	975	1275	1688	2250	3000	4050	5625	7500	9975	13275	17625	23438	31256					
					12	31	58	81	105	136	182	244	326	434	581	775	1008	1318	1744	2325	3100	4185	5813	7750	10308	13718	18213	24219	32298					
2	1 ½	1	½	¼	14	34	60	84	108	140	188	252	336	448	600	800	1040	1360	1800	2400	3200	4320	6000	8000	10640	14160	18800	25000	33340	½	1	2	3	4
					14	35	62	87	111	144	194	260	347	462	619	825	1073	1403	1856	2475	3300	4455	6188	8250	10973	14603	19388	25781	34382					
					15	38	64	89	115	149	200	268	357	476	638	850	1105	1445	1913	2550	3400	4590	6375	8500	11305	15045	19975	26563	35424					
					16	40	66	92	118	153	206	276	368	490	656	875	1138	1488	1969	2625	3500	4725	6563	8750	11638	15488	20563	27344	36466					
4	3	2	1	½	17	41	68	95	122	158	212	284	378	504	675	900	1170	1530	2025	2700	3600	4860	6750	9000	11970	15930	21150	28125	37508	¾	1 ½	3	4 ½	6
					18	43	69	97	125	162	217	291	389	518	694	925	1203	1573	2081	2775	3700	4995	6938	9250	12303	16373	21738	28906	38549					
					19	45	71	100	128	166	223	299	399	532	713	950	1235	1615	2138	2850	3800	5130	7125	9500	12635	16815	22325	29688	39591					
					20	47	73	102	132	171	229	307	410	546	731	975	1268	1658	2194	2925	3900	5265	7313	9750	12968	17258	22913	30469	40633					
6	4 ½	3	1 ½	¾	21	49	75	105	135	175	235	315	420	560	750	1000	1300	1700	2250	3000	4000	5400	7500	10000	13300	17700	23500	31250	41675	1	2	4	6	8
					21	50	77	108	138	179	241	323	431	574	769	1025	1333	1743	2306	3075	4100	5535	7688	10250	13633	18143	24088	32031	42717					
					22	53	79	110	142	184	247	331	441	588	788	1050	1365	1785	2363	3150	4200	5670	7875	10500	13965	18585	24675	32813	43759					
					23	55	81	113	145	188	253	339	452	602	806	1075	1398	1828	2419	3225	4300	5805	8063	10750	14298	19028	25263	33594	44801					
8	6	4	2	1	24	56	83	116	149	193	259	347	462	616	825	1100	1430	1870	2475	3300	4400	5940	8250	11000	14630	19470	25850	34375	45843	1 ¼	2 ½	5	7 ½	10
					25	58	84	118	152	197	264	354	473	630	844	1125	1463	1913	2531	3375	4500	6075	8438	11250	14963	19913	26438	35156	46884					
					26	60	86	121	155	201	270	362	483	644	863	1150	1495	1955	2588	3450	4600	6210	8625	11500	15295	20355	27025	35938	47926					
					27	62	88	123	159	206	276	370	494	658	881	1175	1528	1998	2644	3525	4700	6345	8813	11750	15628	20798	27613	36719	48968					
10	7 ½	5	2 ½	1 ¼	28	64	90	126	162	210	282	378	504	672	900	1200	1560	2040	2700	3600	4800	6480	9000	12000	15960	21240	28200	37500	50010	1 ½	3	6	9	12
					28	66	92	129	165	214	288	386	515	686	919	1225	1593	2083	2756	3675	4900	6615	9188	12250	16293	21683	28788	38281	51052					
					29	68	94	131	169	219	294	394	525	700	938	1250	1625	2125	2813	3750	5000	6750	9375	12500	16625	22125	29375	39063	52094					
					30	70	96	134	172	223	300	402	536	714	956	1275	1658	2168	2869	3825	5100	6885	9563	12750	16958	22563	29963	39844	53136					
					31	72	98	137	176	228	306	410	546	728	975	1300	1690	2210	2925	3900	5200	7020	9750	13000	17290	23010	30550	40625	54178	1 ¾	3 ½	7	10 ½	14
					000	00	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22					

					SPRING HANGER SIZE																												
					SPRING RATE - POUNDS / INCH																												
				E82			30	42	54	70	94	126	168	224	300	400	520	680	900	1200	1600	2160	3000	4000	5320	7080	9400	12500	16670	E82				
			E268		7	15	15	21	27	35	47	63	84	112	150	200	260	340	450	600	800	1080	1500	2000	2660	3540	4700	6250	8335		E268			
		E98			4	7	7.5	10.5	13.5	17.5	23.5	31.5	42	56	75	100	130	170	225	300	400	540	750	1000	1330	1770	2350	3125	4167			E98		
	E100						5	7	9	11.6	15.6	21	28	37.3	50	66.6	86.6	113.3	150	200	266.6	360	500	667	867	1180	1566.6	2083.3	2778.3				E100	
E110							3.75	5.25	6.75	8.75	11.75	15.75	21	28	37.5	50	65	85	112.5	150	200	270	375	500	665	885	1175	1562.5	2083.75					E110

AAA Technology

Next

Variable Spring Hangers

HANGER SIZE AND SERIES SELECTION CHART

LOAD TABLE IN POUNDS FOR SPRING HANGER SELECTION

ROD DIAMETER

WORKING RANGE INCHES						1/2"						5/8"			3/4"			1"		1 1/4"		1 1/2"	1 3/4"	2"	2 1/4"	2 1/2"	3"	3 1/4"	3"	SPRING DEFLECTION INCHES				
						SPRING HANGER SIZE																												
E110	E100	E98	E268	E82	000	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	E82	E268	E98	E100	E110
					7	45	63	81	105	141	189	252	336	450	600	780	1020	1350	1800	2400	3240	4500	6000	7980	10620	14100	18750	25005	0	0	0	0	0
					7	47	66	84	109	147	197	263	350	469	625	813	1063	1406	1875	2500	3375	4688	6250	8313	11063	14688	19531	26047					
					8	49	68	88	114	153	205	273	364	488	650	845	1105	1463	1950	2600	3510	4875	6500	8645	11505	15275	20313	27089					
					9	51	71	91	118	159	213	284	378	506	675	878	1148	1519	2025	2700	3645	5063	6750	8978	11948	15863	21094	28131					
0	0	0	0	0	10	53	74	95	123	165	221	294	392	525	700	910	1190	1575	2100	2800	3780	5250	7000	9310	12390	16450	21875	29173	½	½	1	1 ½	2
					11	54	76	98	127	170	228	305	406	544	725	943	1233	1631	2175	2900	3915	5438	7250	9643	12833	17038	22656	30214					
					12	56	79	101	131	176	236	315	420	563	750	975	1275	1688	2250	3000	4050	5625	7500	9975	13275	17625	23438	31256					
					12	58	81	105	136	182	244	326	434	581	775	1008	1318	1744	2325	3100	4185	5813	7750	10308	13718	18213	24219	32298					
2	1 ½	1	½	¼	14	60	84	108	140	188	252	336	448	600	800	1040	1360	1800	2400	3200	4320	6000	8000	10640	14160	18800	25000	33340	½	1	2	3	4
					14	62	87	111	144	194	260	347	462	619	825	1073	1403	1856	2475	3300	4455	6188	8250	10973	14603	19388	25781	34382					
					15	64	89	115	149	200	268	357	476	638	850	1105	1445	1913	2550	3400	4590	6375	8500	11305	15045	19975	26563	35424					
					16	66	92	118	153	206	276	368	490	656	875	1138	1488	1969	2625	3500	4725	6563	8750	11638	15488	20563	27344	36466					
4	3	2	1	½	17	68	95	122	158	212	284	378	504	675	900	1170	1530	2025	2700	3600	4860	6750	9000	11970	15930	21150	28125	37508	⅜	1 ½	3	4 ½	6
					18	69	97	125	162	217	291	389	518	694	925	1203	1573	2081	2775	3700	4995	6938	9250	12303	16373	21738	28906	38549					
					19	71	100	128	166	223	299	399	532	713	950	1235	1615	2138	2850	3800	5130	7125	9500	12635	16815	22325	29688	39591					
					20	73	102	132	171	229	307	410	546	731	975	1268	1658	2194	2925	3900	5265	7313	9750	12968	17258	22913	30469	40633					
6	4 ½	3	1 ½	¾	21	75	105	135	175	235	315	420	560	750	1000	1300	1700	2250	3000	4000	5400	7500	10000	13300	17700	23500	31250	41675	1	2	4	6	8
					21	77	108	138	179	241	323	431	574	769	1025	1333	1743	2306	3075	4100	5535	7688	10250	13633	18143	24088	32031	42717					
					22	79	110	142	184	247	331	441	588	788	1050	1365	1785	2363	3150	4200	5670	7875	10500	13965	18585	24675	32813	43759					
					23	81	113	145	188	253	339	452	602	806	1075	1398	1828	2419	3225	4300	5805	8063	10750	14298	19028	25263	33594	44801					
8	6	4	2	1	24	83	116	149	193	259	347	462	616	825	1100	1430	1870	2475	3300	4400	5940	8250	11000	14630	19470	25850	34375	45843	1 ¼	2 ½	5	7 ½	10
					25	84	118	152	197	264	354	473	630	844	1125	1463	1913	2531	3375	4500	6075	8438	11250	14963	19913	26438	35156	46884					
					26	86	121	155	201	270	362	483	644	863	1150	1495	1955	2588	3450	4600	6210	8625	11500	15295	20355	27025	35938	47926					
					27	88	123	159	206	276	370	494	658	881	1175	1528	1998	2644	3525	4700	6345	8813	11750	15628	20798	27613	36719	48968					
10	7 ½	5	2 ½	1 ¼	28	90	126	162	210	282	378	504	672	900	1200	1560	2040	2700	3600	4800	6480	9000	12000	15960	21240	28200	37500	50010	1 ½	3	6	9	12
					28	92	129	165	214	288	386	515	686	919	1225	1593	2083	2756	3675	4900	6615	9188	12250	16293	21683	28788	38281	51052					
					29	94	131	169	219	294	394	525	700	938	1250	1625	2125	2813	3750	5000	6750	9375	12500	16625	22125	29375	39063	52094					
					30	96	134	172	223	300	402	536	714	956	1275	1658	2168	2869	3825	5100	6885	9563	12750	16958	22563	29963	39844	53136					
					31	98	137	176	228	306	410	546	728	975	1300	1690	2210	2925	3900	5200	7020	9750	13000	17290	23010	30550	40625	54178	1 ¾	3 ½	7	10 ½	14
					000	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22					
						SPRING HANGER SIZE																												
						SPRING RATE - POUNDS / INCH																												
				E82		30	42	54	70	94	126	168	224	300	400	520	680	900	1200	1600	2160	3000	4000	5320	7080	9400	12500	16670	E82				
			E268		7	15	21	27	35	47	63	84	112	150	200	260	340	450	600	800	1080	1500	2000	2660	3540	4700	6250	8335		E268			
		E98			4	7.5	10.5	13.5	17.5	23.5	31.5	42	56	75	100	130	170	225	300	400	540	750	1000	1330	1770	2350	3125	4167			E98		
	E100					5	7	9	11.6	15.6	21	28	37.3	50	66.6	86.6	113.3	150	200	266.6	360	500	667	867	1180	1566.6	2083.3	2778.3				E100	
E110						3.75	5.25	6.75	8.75	11.75	15.75	21	28	37.5	50	65	85	112.5	150	200	270	375	500	665	885	1175	1562.5	2083.75					E110

AAA Technology

Next

Variable Spring Hangers & Supports

WORKING RANGE INCHES								
E110	E100	E98	E268	E82	000	00	0	1
					7	19	45	63
					7	20	47	66
					8	22	49	68
					9	24	51	71
0	0	0	0	0	10	26	53	74
					11	28	54	76
					12	30	56	79
					12	31	58	81
2	1 ½	1	½	¼	14	34	60	84
					14	35	62	87
					15	38	64	89
					16	40	66	92
4	3	2	1	½	17	41	68	95
					18	43	69	97
					19	45	71	100
					20	47	73	102
6	4 ½	3	1 ½	¾	21	49	75	105
					21	50	77	108
					22	53	79	110
					23	55	81	113
8	6	4	2	1	24	56	83	116
					25	58	84	118
					26	60	86	121
					27	62	88	123
10	7 ½	5	2 ½	1 ¼	28	64	90	126
					28	66	92	129
					29	68	94	131
					30	70	96	134
					31	72	98	137
					000	00	0	1

Working Range

- E82 – Short Travel – 1 ¼”
  - Single Short Spring Coil
- E268 – Std. Travel – 2 ½”
  - Single Standard Spring Coil
- E98 – Long Travel – 5”
  - 2 Standard Spring Coils in Series
- E100 – Extra Lg. Travel – 7 ½”
  - 3 Standard Spring Coils in Series
- E110 – Very Long Travel – 10”
  - 4 Standard Spring Coils in Series

AAA Technology

Next

Variable Spring Hangers & Supports

- E82 – Short Travel – 1 ¾”
  Single Short Spring Coil
- E268 – Std. Travel – 3 ½”
  Single Standard Spring Coil
- E98 – Long Travel – 7”
  2 Standard Spring Coils in Series
- E100 – Extra Lg. Travel – 10 ½”
  3 Standard Spring Coils in Series
- E110 – Very Long Travel – 14”
  4 Standard Spring Coils in Series

3"	SPRING DEFLECTION INCHES				
22	E82	E268	E98	E100	E110
25006	0	0	0	0	0
27089					
28131					
29173	¼	½	1	1 ½	2
31256					
32298					
33340	½	1	2	3	4
34382					
35424					
36466					
37508	¾	1 ½	3	4 ½	6
38549					
39591					
40633					
41675	1	2	4	6	8
42717					
43759					
44801					
45843	1 ¼	2 ½	5	7 ½	10
46884					
47926					
50010	1 ½	3	6	9	12
52094					
54178	1 ¾	3 ½	7	10 ½	14

Cushion

Total Range

Cushion

AAA Technology

Next

Variable Spring Hangers & Supports

HANGER SIZE AND SERIES SELECTION C

LOAD TABLE IN POUNDS FOR SPRING HANGER SELECT

WORKING RANGE INCHES					ROD DIAMETER 1/2"								5/8"			3/4"		1"	1 1/4"		1
					SPRING HANGER SIZE																
E110	E100	E98	E268	E82	000	00	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
					7	19	45	63	81	105	141	189	252	336	450	600	780	1020	1350	1800	2400	3240	4
					7	20	47	66	84	109	147	197	263	350	469	625	813	1063	1406	1875	2500	3375	4

NGER SIZE AND SERIES SELECTION CHART

LOAD TABLE IN POUNDS FOR SPRING HANGER SELECTION

ROD DIAMETER 5/8"	3/4"		1"		1 1/4"		1 1/2"	1 3/4"	2"	2 1/4"	2 1/2"	2 3/4"	3"	SPRING DEFLECTION INCHES				
SPRING HANGER SIZE																		
7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	E82	E268	E98	E100	E110
336	450	600	780	1020	1350	1800	2400	3240	4500	6000	7980	10620	14100	18750	25005	0	0	0	0	0
350	469	625	813	1063	1406	1875	2500	3375	4688	6250	8313	11063	14688	19531	26047					

AAA Technology

Next

Variable Spring Hangers & Supports

					31	72	98	137	176	228	306	410	546	728	975	1300	1690	2210	2925	3900	5200
					000	00	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
							SPRING HANGER SIZE														
							SPRING RATE - POUNDS / INC														
				E82			30	42	54	70	94	126	168	224	300	400	520	680	900	1200	1600
			E268		7	15	15	21	27	35	47	63	84	112	150	200	260	340	450	600	800
		E98			4	7	7.5	11	14	17.5	23.5	31.5	42	56	75	100	130	170	225	300	400
	E100						5	7	9	11.6	15.6	21	28	37.3	50	66.6	86.6	113	150	200	266.6
E110							3.8	5.3	6.8	8.75	11.8	15.8	21	28	37.5	50	65	85	112.5	150	200

1690	2210	2925	3900	5200	7020	9750	13000	17290	23010	30550	40625	54178	1 ¾	3 ½	7	10 ½	14
10	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**					
SPRING HANGER SIZE																	
SPRING RATE - POUNDS / INCH																	
520	680	900	1200	1600	2160	3000	4000	5320	7080	9400	12500	16670	E82				
260	340	450	600	800	1080	1500	2000	2660	3540	4700	6250	8335		E268			
130	170	225	300	400	540	750	1000	1330	1770	2350	3125	4167			E98		
66.6	113	150	200	266.6	360	500	667	867	1180	1566.6	2083.3	2778.3				E100	
65	85	112.5	150	200	270	375	500	665	885	1175	1562.5	2083.8					E110

AAA Technology

Next

Variable Spring Hangers & Supports

Key Load for a Spring Hanger

Hot or Operating Position Load

AAA Technology

Next

Variable Spring Hangers & Supports

Cold or Installed Position Load

Will vary based upon Spring Hanger Series – E82, E268, E98, E100 or E110 because the spring constant varies

Variable Spring Hangers & Supports

Given:

1. Operating Load and
2. Installed to Operating Movement, Load

AAA Technology

Next

Variable Spring Hangers & Supports

Designer should:

1. Find Operating Load on the Chart
2. Move up or down the chart by the amount of the movement but in the opposite direction of the movement
3. The result ⇒ the Installed Load

WORKING RANGE INCHES					1/2"							
E110	E100	E98	E268	E82	000	00	0	1	2	3	4	5
					7	19	45	63	81	105	141	189
					7	20	47	66	84	109	147	197
					8	22	49	68	88	114	153	205
					9	24	51	71	91	118	159	213
0	0	0	0	0	10	26	53	74	95	123	165	221
					11	28	54	76	98	127	170	228
					12	30	56	79	101	131	176	236
					12	31	58	81	105	136	182	244
2	1½	1	½	¼	14	34	60	84	108	140	188	252
					14	35	62	87	111	144	194	260
					15	38	64	89	115	149	200	268
					16	40	66	92	118	153	206	276
4	3	2	1	½	17	41	68	95	122	158	212	284
					18	43	69	97	125	162	217	291
					19	45	71	100	128	166	223	299
					20	47	73	102	132	171	229	307
6	4½	3	1½	¾	21	49	75	105	135	175	235	315
					21	50	77	108	138	179	241	323
					22	53	79	110	142	184	247	331
					23	55	81	113	145	188	253	339
8	6	4	2	1	24	56	83	116	149	193	259	347
					25	58	84	118	152	197	264	354
					26	60	86	121	155	201	270	362
					27	62	88	123	159	206	276	370
10	7½	5	2½	1¼	28	64	90	126	162	210	282	378
					28	66	92	129	165	214	288	386
					29	68	94	131	169	219	294	394
					30	70	96	134	172	223	300	402
					31	72	98	137	176	228	306	410
					000	00	0	1	2	3	4	5
				E82			30	42	54	70	94	126
			E268		7	15	15	21	27	35	47	63
		E98			4	7	7.5	11	14	18	23.5	32
	E100						5	7	9	12	15.6	21
E110							3.8	5	7	8.8	11.8	16

Variable Spring Hangers & Supports

- Operating Load = 241 Lbs
- Installed to Operating Movement = -.55”
- Install Ld =
  - 189 lbs – E82
  - 215 lbs – E268
  - 228 lbs – E98

AAA Technology

Next

Variable Spring Hangers & Supports

Alternative

TRI*HANGER™

AAA Technology

Next

That's the

tall

and

the

short

of

it.

THANK YOU!

AAA Technology

End