ASC Engineered Solutions

Double Spring Hangers

☐**Fig. 98** Standard Double Spring Hangers Type: ☐A, ☐B, ☐C, ☐D, ☐E, ☐F, ☐G
☐**Fig. C-98** Corrosion Resistant Double Spring Hangers Type: ☐A, ☐B, ☐C, ☐D, ☐E, ☐F, ☐G

Design Features:

- Precompression.

Precompressing the spring into the hanger casing provides the following advantages:

1. Saves up to 50% in headroom by reducing the length of the hanger.
2. Reduces the installed height of the overall hanger assembly.
3. Prevents the spring supporting force from exceeding the normal safe limits of variations.
4. Saves valuable erection time because spring is precompressed close to ½" of the working range.

Calibration: All ASC Engineered Solutions™ Variable Spring Hangers and supports are calibrated for accurate loading conditions.

- Load indicator is clearly seen in the slot, simplifying reading of the scale plate. Load is read from bottom of indicator.
- Cold set at the factory upon request.
- Spring and casing are fabricated of steel and are rugged and compact.
- Piston cap serves as a centering device or guide maintaining spring alignment.
- Casing protects the spring from damage and weather conditions.

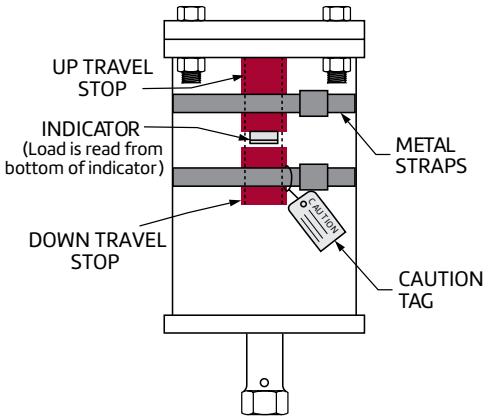
Standard Finish: Painted with semi-gloss primer.

Corrosion Resistant: ASC offers corrosion-resistant and weather-resistant (either galvanized or zinc based primer) Variable Spring Hangers to fill vital needs in the chemical and refinery industries as well as in modern outdoor power plant construction. For protection against severe weather conditions or moderate corrosive conditions, the parts of the hanger are galvanized per ASTM A-153 or painted with zinc based primer, except for the spring which has a protective coating and the load column for Type F which is electro-galvanized.

Advantages of a Protective Coating:

- Protects from a wide range of corrosives.
- Does not affect the flex life of the spring.
- Recommended for ambient temperatures up to 200° F.

Travel Stop: The functional design of the pre-compressed variable spring hanger permits the incorporation of a two-piece travel stop that locks the hanger spring against upward or downward movement for temporary conditions of underload or overload. The complete travel stop, the up travel stop only for cold set purposes or the down travel stop only which may be employed during erection, hydrostatic test (ASC permits a hydrostatic test load of 2 times the normal operating load for the spring hanger) or chemical clean out will be furnished only when specified. The travel stop is painted red and is installed at the factory with a caution tag attached calling attention that the device must be removed before the pipe line is put in service. Permanently attached travel stops available upon request.

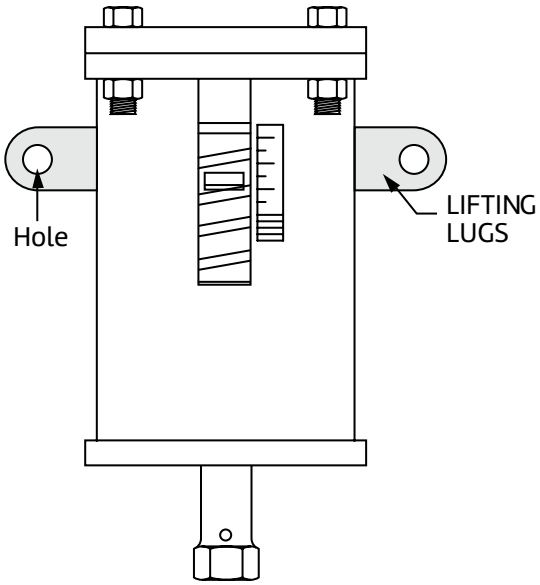


Approvals:
WW-H-171E (Types 51, 56 and 57), ANSI/MSS SP-69 and MSS SP-58 (Types 51, 52 and 53).

Specifications:
ASC Variable Spring Hangers are welded in strict accordance with ASME Section IX.

PROJECT INFORMATION	APPROVAL STAMP
Project:	☐ Approved
Address:	☐ Approved as noted
Contractor:	☐ Not approved
Engineer:	Remarks:
Submittal Date:	
Notes 1:	
Notes 2:	

Fig. 98 Standard Double Spring Hangers
Fig. C–98 Corrosion Resistant Double Spring Hangers



Size Range:
The ASC Engineered Solutions™ Variable Spring Hanger in five series and seven types is offered in twenty–three sizes (Fig. B–268 only is offered in twenty–five sizes). The hanger can be furnished to take loads 10 lbs. to 50,000 lbs.

Ordering:

1. Size
2. Type
3. Figure number
4. Product name
5. Desired supporting force in operating position
6. Calculated amount and direction of pipe movement from installed to operating position.
7. Customer's identification number (if any)
8. When ordering Type F spring specify if roller or guided load column is to be furnished.
9. When ordering Type G, specify total load and load per spring plus center to center rod dimensions.
10. If required, specify with travel stop
11. When ordering corrosion resistant, specify C–268, C–82, C–98, Triple–CR, or Quadruple–CR, either painted with zinc based primer or completely galvanized, except for coated spring coil.

Note:
To help alleviate the problem of lifting large size spring hangers into position for installation, this product is available with lifting lugs (if required) on sizes weighing one hundred pounds or more.

Fig. 98 Standard Double Spring Hangers
Fig. C–98 Corrosion Resistant Double Spring Hangers

Fig. 98 Type A

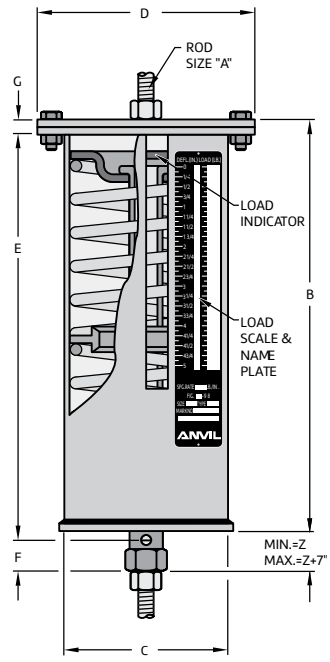


Fig. 98 Type B

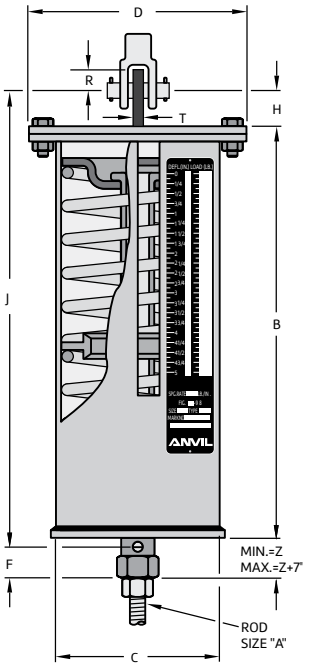


Fig. 98 Type C

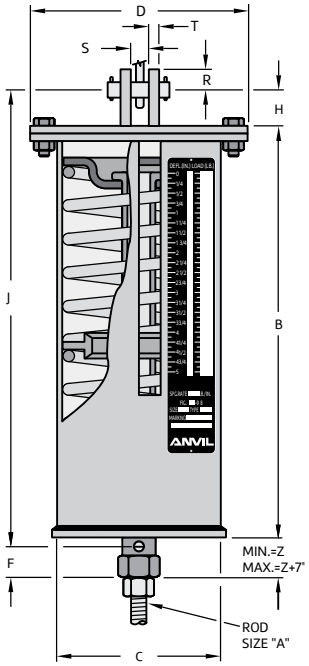


Fig. 98 Type D

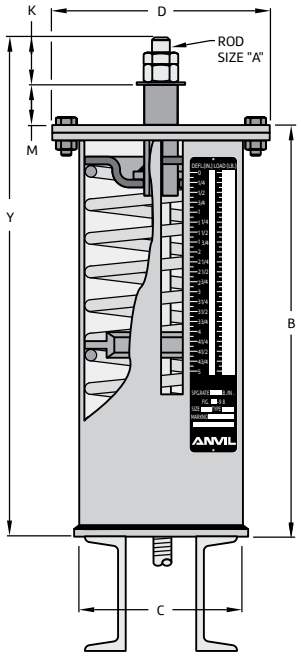


Fig. 98 Type E

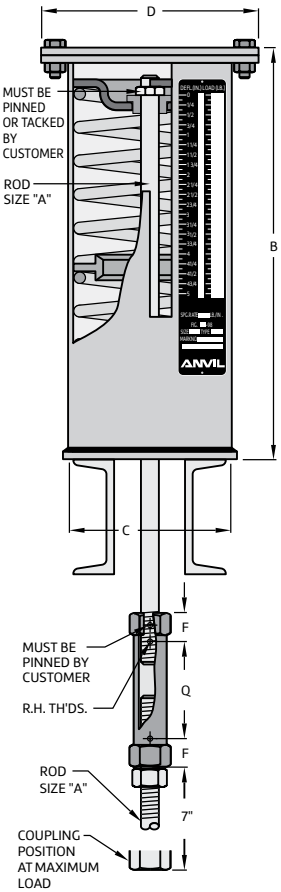


Fig. 98 Type F

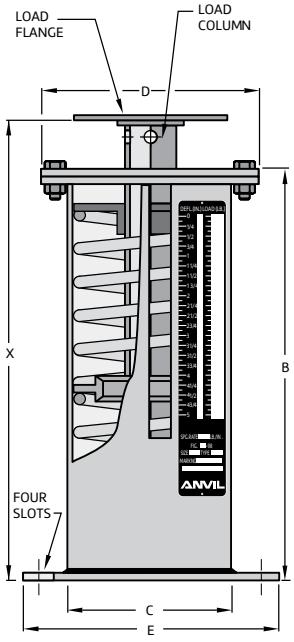
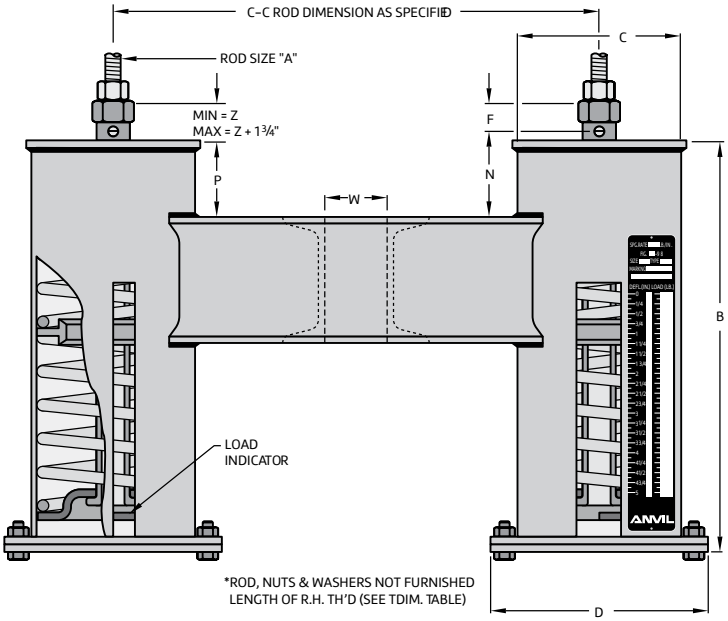


Fig. 98 Type G



The ASC Variable Double Spring Hanger, Fig. 98, embodies all of the Fig. B-268 features and is designed to the same exacting specifications. Each basic unit consists of two springs arranged in series within a single casing. A centering guide is provided to assure the permanent alignment of the spring assembly. This hanger is offered in the seven basic types as shown here.

The load table and instructions for sizing and ordering this hanger may be found on the first submittal page.

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Fig. 98 Standard Double Spring Hangers
Fig. C–98 Corrosion Resistant Double Spring Hangers

Fig. 98, C–98 Double Spring • Weight (Lbs) • Dimensions (in)

Hanger Size	Rod Size A	R.H. Thread Length	Casing Length B	Casing Dia. C	Flange Dia. D	Min Thread Engage F	Z	Rod Take Out For Types A	Rod Take Out For Types B & C	Rod Take Out For Types E	Rod Take Out For Types G	Type A Depth Thread G	Type A Lug Hole Size	Types B & C Pin Height H	Types B & C R	Types B & C Clevis Opening S	Types B & C Thk. T	Type D Rod Length Y	Type D Nut Allow. K	Type D Height Spacer M
								E	J	Q	N									
0	½	9	12⅝	4	5⅛	15/16	15/16	12 3/16	14⅛	9	1½	7/16	11/16	1½	1¼	⅞	¼	19⅜	1¼	5½
1			14⅜				15/16	13 15/16	15⅞		1½							21⅛		
2			15⅞				11/16	15 3/16	17⅛		1¼							22½		
3	½	9	14	5 9/16	6 15/16	15/16	13/16	13 7/16	15⅜	9	1⅞	7/16	11/16	1½	1¼	⅞	¼	20¾	1¼	5½
4			15¼				13/16	15 3/16	17⅛		2⅜							22		
5			16⅝				11/16	15 15/16	17⅞		1¾							23⅜		
6	⅝	9	16 11/16	6⅝	8⅜	15/16	13/16	15 15/16	18 1/16	9	1⅞	5/8	13/16	1½	1¼	1 1/16	¼	23 11/16	1½	5½
7			18⅝				1⅛	18 3/16	20 5/16		2 3/16							25⅝		
8			19 9/16				11/16	18 11/16	20 13/16		1¾							26 9/16		
9	¾	9	20 3/16	8⅝	10¾	1¼	15/16	18⅞	21⅜	9	2 11/16	1	15/16	1½	1¼	1¼	⅜	27 7/16	1¾	5½
10			22⅝				1	21⅜	23⅞		2¾							29⅞		
11		10	18¼				⅞	16⅞	19⅜	12	2⅝							25½		
12	1	10	19½	8⅝	10¾	1¼	5/8	17⅞	20⅞	12	3⅜	1	1¼	2	1½	1⅝	½	27¼	2¼	5½
13			24¾				¾	23¼	26¼		3½							32⅜		
14	1¼		24⅞				½	23⅛	27⅛		3¼		1½	3	2	2	⅝	33⅜	3	
15	1¼	10	24⅞	8⅝	10¾	1 15/16	½	23⅛	27⅛	12	3¼	1	1½	3	2	2	⅝	33¾	3	5½
16	1½	11	29⅞		11⅜		2	28 9/16	32 15/16	7	4 1/16	1⅜	1¾		2½	2⅜		38⅞	3½	
17	1¾	12	34				2⅛	32 13/16	37 9/16		4 3/16		2			2⅝	¾	43½	4	
18	2	12	33¼	12¾	15⅞	2¾	2 11/16	31⅛	37 9/16	7	4⅛	2¼	2⅜	4	3	2⅞	¾	43 3/16	4 9/16	5½
19	2¼	13	37¾				2 9/16	35½	42⅛		4		2⅝	4½		3⅛		48⅛	5	
20	2½	14	44¼				2 11/16	42⅛	48¾		4⅛		2⅞		4	3⅜	1	55 3/16	5 9/16	
21	2¾	14	49⅞	12¾	16⅞	3⅝	2 11/16	45 7/16	52 11/16	7	3 5/16	2¾	3⅛	4½	4	3⅝	1	60⅝	6¼	5½
22	3	15	62				3½	58⅛	66⅛		4⅛	3	3⅜	5		3⅞		73⅛	6⅝	

Hanger Size	Type F E Bottom Flange Size Sq.	Type F E Bottom Flange Bolt Circle Min	Type F E Bottom Flange Bolt Circle Max	Type F Bottom Flange Bolts	Type F Bottom Flange Thick	Type F Load Col. Dia.	Type F Load Flange Diam.	Type F Load Flange Thick	Type F Length X ■ Min	Type F Length X ■ Max	Type G Channel Size (lbs/ft)	Type G Max C–C	Type G Space Between Channels – W	Type G P	Weight Type A,B,C	Weight Type D,E	Weight Type F	Weight Type G*
0	7½	7	8¾	¾	¼	1.90	3⅞	3/16	14 3/16	16 3/16	C3 x 4.1	24	5/8	1½	12	12	20	37
1									15 15/16	17 15/16					14	14	21	41
2									17 7/16	19 7/16					16	16	23	45
3	7½	7	8¾	¾	¼	2.88	5¾	3/16	15⅝	17⅝	C3 x 4.1	30	¾	2	22	21	35	55
4									16⅞	18⅞					25	24	39	61
5									18¼	20¼					27	26	41	65
6	9	8	10⅞	¾	⅜	3.50	6⅜	¼	18⅜	20⅜	C3 x 4.1	36	1		41	40	62	93
7									20 5/16	22 5/16					49	48	72	109
8									21¼	23¼					61	52	75	133
9	13¼	10 9/16	16½	¾	½	4.50	8⅜	½	21⅞	23⅞	C4 x 5.4	36	1¼	3	97	94	136	207
10									24 5/16	26 5/16					114	108	150	241
11									19 15/16	21 15/16					96	95	134	209
12	13¼	10 9/16	16½	¾	½	4.50	8⅜	½	21 3/16	23 3/16	C5 x 6.7	36	1½		108	104	144	223
13									26 7/16	28 7/16					144	139	181	305
14									26 9/16	28 9/16		33			153	147	188	323
15	13¼	10 9/16	16½	¾	½	4.50	8⅜	½	26 9/16	28 9/16	C6 x 10.5	36	1½		172	163	201	368
16						2.00			31⅞	33⅞	C8 x 11.5		2⅛		218	202	241	462
17									36	38					273	247	287	572
18	17¼	15¾	22	¾	⅝	2.50	12½	½	35 5/16	37 5/16	C12 x 20.7	42	2⅜		512	477	550	1,056
19									39 13/16	41 13/16					600	548	624	1,231
20									46 5/16	48 5/16		40			802	723	807	1,633
21	17¼	15¾	22	¾	⅝	3.00	12½	½	51⅞	53⅞	C15 x 33.9	48	3⅛		940	845	872	1,965
22									64	66			3⅜		1,240	1,140	1,184	2,566

■ Hanger take-out or installed height. With pipe movement up, cold to hot, installed height should be the mid point between the minimum and maximum "X" dimension, plus thickness of load flange. With pipe movement down, cold to hot installed height should be mid-point between the minimum and maximum "X" dimension, plus the amount of vertical movement and load flange thickness. (Type F only).
* Weight based on 24" center-to-center dimension. See page 172 for Type F roller and guided load column information.
Attachment rods and nuts not furnished.

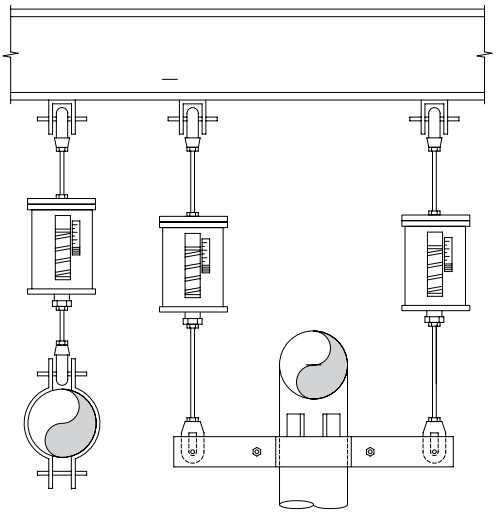
Fig. 82, Fig. B–268, Fig. 98, Triple Spring, and Quadruple Spring (cont.)
Fig. C–82, Fig. C–268, Fig. C–98, Triple–CR, and Quadruple–CR Spring (Corrosion Resistant)

How to Determine Type: The type of variable spring hanger to be used depends upon the physical characteristics required by the suspension problem (e.g., amount of head room, whether pipe is to be supported above or below the spring, etc.).

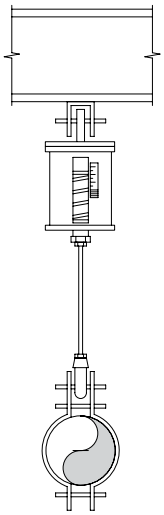
Consideration should be given to the seven standard types offered (see illustration below). Special variable spring hangers can be fabricated for unusual conditions.

Spring Hanger Types – Typical Applications

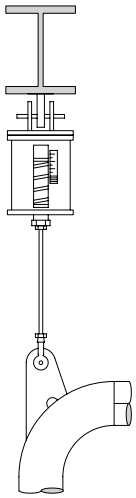
Type A



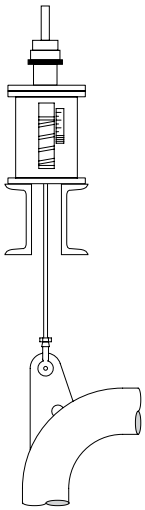
Type B



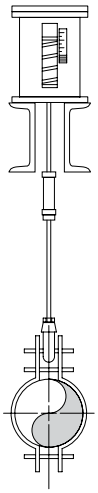
Type C



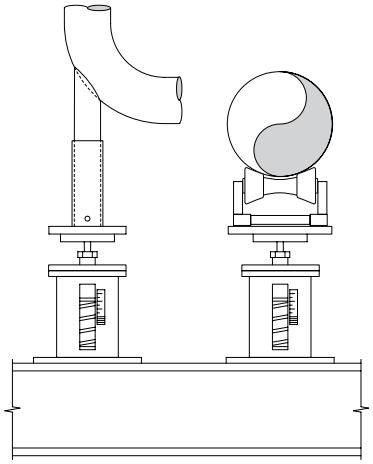
Type D



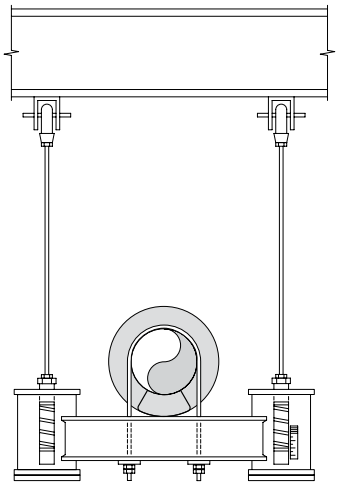
Type E



Type F



Type G



Recommended Service: Pipe hangers located at points that are subject to vertical thermal movement and for which a constant support hanger is not required (see "recommended service" for constant supports in the pipe hanger catalog). Type D & E spring hangers may accommodate less than 4° of rod swing depending onsize, figure number, and application.

Installation: Securely attach hanger to the building. Attach lower hanger rod and turn the load coupling until the load indicator is positioned at the desired setting indicated on the load scale plate.

Adjustment of Hanger: Once installed in the line; the hanger should be adjusted until the load indicator moves to the white button marked "C" (cold position). On inspection of the system, after a reasonable period of operation, the load indicator should be at the red button marked "H" (hot position). If it is not, the hanger should be readjusted to the hot position. No other adjustment is necessary.

How to Determine Series: Complete sizing information is given in the hanger selection chart on the following pages. The sizing information is applicable to hangers of all series. As noted on the hanger selection charts that the total spring deflection in the casing leaves a reserve (overtravel) above and below the recommended working load range.

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Spring Hanger Size and Series Selection

How to Use Hanger Selection Table:
In order to choose a proper size hanger, it is necessary to know the actual load which the spring is to support and the amount and direction of the pipe line movement from the cold to the hot position.

Find the actual load of the pipe in the load table. As it is desirable to support the actual weight of the pipe when the line is hot, the actual load is the hot load. To determine the cold load, read the spring scale, up or down, for the amount of expected movement.

The chart must be read opposite from the direction of the pipe's movement. The load arrived at is the cold load. If the cold load falls outside of the working load range of the hanger selected, relocate the actual or hot load in the adjacent column and find the cold load. When the hot and cold loads are both within the working range of a hanger, the size number of that hanger will be found at the top of the column.

Load Table (Lbs) **For Selection of Hanger Size** (sizes 10 through 22 on next page)

Working Range (in) unshaded Shaded Rows Show Overtravel					Hanger Size											
Figure No.					B-268 Only Z	Fig. 82, Fig. B-268, Fig. 98, Triple & Quadruple Spring										
Quad.	Triple	98	B-268	82	000	00	0	1	2	3	4	5	6	7	8	9
2	1½	1	½	¼	7	19	43	63	81	105	141	189	252	336	450	600
					7	20	44	66	84	109	147	197	263	350	469	625
					8	22	46	68	88	114	153	206	273	364	488	650
					9	24	48	71	91	118	159	213	284	378	506	675
0	0	0	0	0	10	26	50	74	95	123	165	221	294	392	525	700
					11	28	52	76	98	127	170	228	305	406	544	725
					12	30	54	79	101	131	176	236	315	420	563	750
					12	31	56	81	105	136	182	244	326	434	581	775
2	1½	1	½	¼	14	34	58	84	108	140	188	252	336	448	600	800
					14	35	59	87	111	144	194	260	347	462	619	825
					15	38	61	89	115	149	200	268	357	476	638	850
					16	40	63	92	118	153	206	276	368	490	656	875
4	3	2	1	½	17	41	65	95	122	158	212	284	378	504	675	900
					18	43	67	97	125	162	217	291	389	518	694	925
					19	45	69	100	128	166	223	299	399	532	713	950
					20	47	71	102	132	171	229	307	410	546	731	975
6	4½	3	1 ½	¾	21	49	73	105	135	175	235	315	420	560	750	1,000
					21	50	74	108	138	179	241	323	431	574	769	1,025
					22	53	76	110	142	184	247	331	441	588	788	1,050
					23	55	78	113	145	188	253	339	452	602	806	1,075
8	6	4	2	1	24	56	80	116	149	193	258	347	462	616	825	1,100
					25	58	82	118	152	197	264	354	473	630	844	1,125
					26	60	84	121	155	201	270	362	483	644	863	1,150
					27	62	86	123	159	206	276	370	494	658	881	1,175
10	7½	5	2½	1¼	28	64	88	126	162	210	282	378	504	672	900	1,200
2	1½	1	½	¼	28	66	89	129	165	214	288	386	515	686	919	1,225
					29	68	91	131	169	219	294	394	525	700	938	1,250
					30	70	93	134	172	223	300	402	536	714	956	1,275
					31	72	95	137	176	228	306	410	546	728	975	1,300
					Spring Rate (lbs/In)											
				82	–	–	30	42	54	70	94	126	168	224	300	400
			B-268		7	15	15	21	27	35	47	63	84	112	150	200
		98			–	–	7	10	13	17	23	31	42	56	75	100
	Triple				–	–	5	7	9	12	16	21	28	37	50	67
Quadruple					–	–	4	5	7	9	12	16	21	28	38	50

Note: General rule for series selection use Fig. 82 for up to ½" of movement up to 1" use Fig. B-268, up to 2" use Fig. 98, up to 3" use a Triple, up to 4" use a Quadruple. Double check to assure desired variability is achieved.

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Spring Hanger Size and Series Selection

How to Use Hanger Selection Table (cont.): Should it be impossible to select a hanger in a particular series such that both loads occur within the working range, consideration should be given to a variable spring hanger with a wider working range or a constant support hanger. The cold load is calculated by adding (for up movement) or subtracting (for down movement) the product of spring rate times movement to or from the hot load.

Cold load = (hot load) ± (movement) x (spring rate)
A key criteria in selecting the size and series of a variable spring is a factor known as variability. This is a measurement of the percentage change in supporting force between the hot and cold positions of a spring and is calculated from the formula:

Variability = (Movement) x (Spring Rate) / (Hot Load)
If an allowable variability is not specified, good practice would be to use 25% as recommended by MSS-SP-58.

Load Table (Lbs) **For Selection of Hanger Size** (Continued from previous page)

Hanger Size														Working Range (in) unshaded Shaded Rows Show Overtravel				
Fig. 82, Fig. B-268, Fig. 98, Triple & Quadruple Spring														Figure No.				
10	11	12	13	14	15	16	17	18	19	20	21	22		82	B-268	98	Triple	Quad.
780	1,020	1,350	1,800	2,400	3,240	4,500	6,000	7,990	10,610	14,100	18,750	25,005		¼	½	1	1½	2
813	1,063	1,406	1,875	2,500	3,375	4,688	6,250	8,322	11,053	14,588	19,531	26,047						
845	1,105	1,463	1,950	2,600	3,510	4,875	6,500	8,655	11,495	15,275	20,313	27,089						
878	1,148	1,519	2,025	2,700	3,645	5,063	6,750	8,987	11,938	15,863	21,094	28,131						
910	1,190	1,575	2,100	2,800	3,780	5,250	7,000	9,320	12,380	16,450	21,875	29,173		0	0	0	0	0
943	1,233	1,631	2,175	2,900	3,915	5,438	7,250	9,652	12,823	17,038	22,656	30,215						
975	1,275	1,688	2,250	3,000	4,050	5,625	7,500	9,985	13,265	17,625	23,438	31,256						
1,008	1,318	1,744	2,325	3,100	4,185	5,813	7,750	10,317	13,708	18,213	24,219	32,298						
1,040	1,360	1,800	2,400	3,200	4,320	6,000	8,000	10,650	14,150	18,800	25,000	33,340		¼	½	1	1½	2
1,073	1,403	1,856	2,475	3,300	4,455	6,188	8,250	10,982	14,592	19,388	25,781	34,382						
1,105	1,445	1,913	2,550	3,400	4,590	6,375	8,500	11,315	15,035	19,975	26,563	35,424						
1,138	1,488	1,969	2,625	3,500	4,725	6,563	8,750	11,647	15,477	20,563	27,344	36,466						
1,170	1,530	2,025	2,700	3,600	4,860	6,750	9,000	11,980	15,920	21,150	28,125	37,508		½	1	2	3	4
1,203	1,573	2,081	2,775	3,700	4,995	6,938	9,250	12,312	16,362	21,738	28,906	38,549						
1,235	1,615	2,138	2,850	3,800	5,130	7,125	9,500	12,645	16,805	22,325	29,688	39,591						
1,268	1,658	2,194	2,925	3,900	5,265	7,313	9,750	12,977	17,247	22,913	30,469	40,633						
1,300	1,700	2,250	3,000	4,000	5,400	7,500	10,000	13,310	17,690	23,500	31,250	41,675		¾	1½	3	4½	6
1,333	1,743	2,306	3,075	4,100	5,535	7,688	10,250	13,642	18,132	24,088	32,031	42,717						
1,365	1,785	2,363	3,150	4,200	5,670	7,875	10,500	13,975	18,575	24,675	32,813	43,759						
1,398	1,828	2,419	3,225	4,300	5,805	8,063	10,750	14,307	19,017	25,263	33,594	44,801						
1,430	1,870	2,475	3,300	4,400	5,940	8,250	11,000	14,640	19,460	25,850	34,375	45,843		1	2	4	6	8
1,463	1,913	2,531	3,375	4,500	6,075	8,438	11,250	14,972	19,902	26,438	35,156	46,885						
1,495	1,955	2,588	3,450	4,600	6,210	8,625	11,500	15,305	20,345	27,025	35,938	47,926						
1,528	1,998	2,644	3,525	4,700	6,345	8,813	11,750	15,637	20,787	27,613	36,719	48,968						
1,560	2,040	2,700	3,600	4,800	6,480	9,000	12,000	15,970	21,230	28,200	37,500	50,010		1¼	2½	5	7½	10
1,593	2,083	2,756	3,675	4,900	6,615	9,188	12,250	16,302	21,672	28,788	38,281	51,052		¼	½	1	1½	2
1,625	2,125	2,813	3,750	5,000	6,750	9,375	12,500	16,635	22,115	29,375	39,063	52,094						
1,658	2,168	2,869	3,825	5,100	6,885	9,563	12,750	16,967	22,557	29,963	39,844	53,136						
1,690	2,210	2,925	3,900	5,200	7,020	9,750	13,000	17,300	23,000	30,550	40,625	54,178						
Spring Rate (lbs/In)																		
520	680	900	1,200	1,600	2,160	3,000	4,000	5,320	7,080	9,400	12,500	16,670	**82**					
260	340	450	600	800	1,080	1,500	2,000	2,660	3,540	4,700	6,250	8,335	**B-268**					
130	170	225	300	400	540	750	1,000	1,330	1,770	2,350	3,125	4,167	**98**					
87	113	150	200	267	360	500	667	887	1,180	1,567	2,083	2,778	**Triple**					
65	85	113	150	200	270	375	500	665	885	1,175	1,563	2,084	**Quadruple**					

Note: General rule for series selection use Fig. 82 for up to ½" of movement up to 1" use Fig. B-268, up to 2" use Fig. 98, up to 3" use a Triple, up to 4" use a Quadruple. Double check to assure desired variability is achieved.