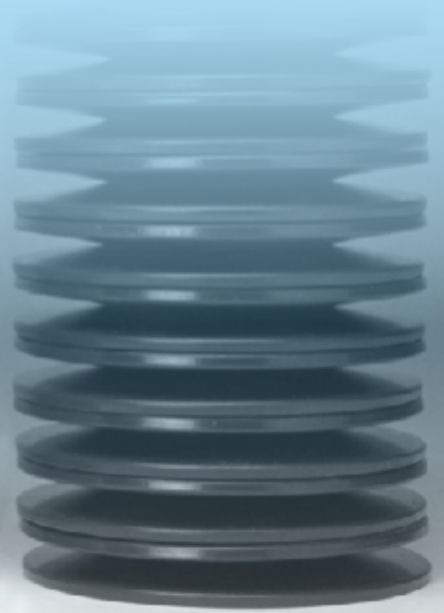
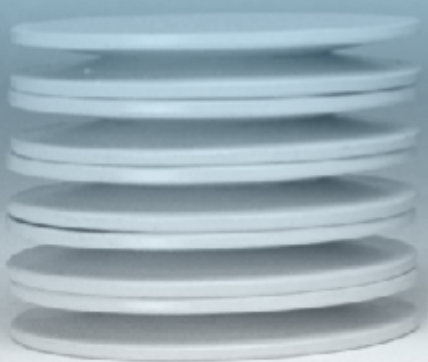


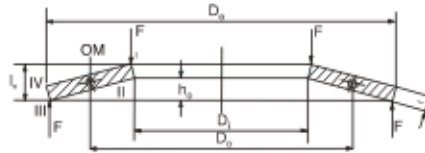
# International DISC SPRINGS & Belleville Washers



**International  
Industrial  
Springs**



Standard sizes available



as per din 2093

**GROUP CLASSIFICATION OF DISC SPRING**

In accordance with DIN 2093 Standard, Disc Springs are classified into 3 groups as given in the table:

Group	Thickness of single disc in mm	Single disc with Ground ends and reduced material thickness(t')
1	Less than 1.25	No
2	From 1.25 to 6	No
3	Over 6 upto14	Yes

**COMPANY PROFILE**

International Industrial Springs, Thane established in the year 1967 has specialized in manufacturing of Coil, Sprial & Flat Wire, Springs, Sheet Metal Components, Disc Springs, Belleville Washers, Valve Plates & Valve Reeds catering to the requirements of Domestic and International customers. IIS continued its steady growth by implementing modern manufacturing methods. Our Engineers have utilized their engineering backgrounds, experience and skills in designing and improving the manufacturing process to enhance the quality of our product. Extensive product development and testing facilities are available for our in house production and also for customer's proprietary development.

Our main goals are individual attention, custom engineering, continuous improvement and managements commitment to product Quality and Customer Satisfaction.

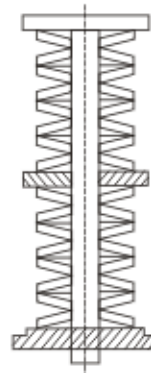
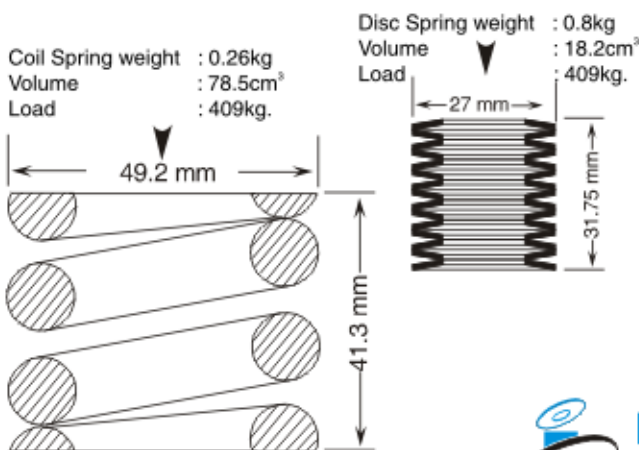
**INTRODUCTION**

Disc Springs are conically formed annular discs, which are loaded in the axial direction. Disc Springs offer a well-developed solution to many engineering problems through a unique combination of high force in a small space. Disc Springs can be used as single disc or arranged in stacks. A spring stack can consists of either single springs or parallel spring sets. Disc Springs are available with or without contact flats. Disc Springs and Belleville Washers are manufactured to DIN 2093 and DIN 6796. Heavy series Disc Springs are manufactured from forgings. We have computerized design program to assist our customers for their specific applications. Disc Springs are mainly manufactured from 50CrV4 material

Our Disc Springs are AUSTEMPERED. This method of heat treatment is particularly effective for springs, as it gives the maximum toughness and therefore considerable durability.

**DISC SPRING STACK COMPARED TO HELICAL SPRING.**

Note that the same load can be achieved at substantial reduction in space, thus disc springs can designed for extremely high loads where coil springs are not feasible at all.



**STACK LENGTH**

When stacking Disc Springs, effort should be made to keep the stacks as short as possible. Friction and other influences make a stack more uneven. It influences more on the side of the loading. This effect usually can be neglected for a "normal" spring stack, but not for long stacks. If it is longer, the stack can be stabilized by dividing it with guide washers, which as a rule of thumb should have a thickness of atleast one and a half times the guide diameter.

**ADVANTAGES OF DISC SPRINGS**

- 1) No Deformation of Fatigue under normal loads.
- 2) High Energy Storage Capacity.
- 3) Long Service Life.
- 4) Stock keeping is minimized as the individual spring sizes can be combined universally.
- 5) Space saving.
- 6) Largely Self-damping, giving good shock absorption and energy dissipation.
- 7) Efficient use of space and high spring force with small deflections.
- 8) Adaptable to stacking in numerous configurations, Thus having modular spring element.
- 9) Low cost & Greater Security.

**DISC SPRINGS IN SERIES & PARALLEL COMBINATIONS.**

**STACKED IN PARALLEL :**

Total Deflection = Deflection 1 disc

Total Load = Load on 1 disc X no. of discs.

**STACKED IN SERIES :**

Total Deflection = Deflection of 1 disc X No. of discs in stack.

Total Load = Load on 1 disc.

**STACKED IN PARALLEL SERIES :**

COMBINATIONS can be designed to accommodates virtually any load or deflection and to obtain progressive or regressive characteristics.



**International Industrial Springs**

Plot No A26, Road No. 10, Wagle Industrial Estate, Thane - 400604, Maharashtra, INDIA  
 TEL. :2582 1941 / 2508 / 6593 / 55986988 / 89 FAX : 91-22-2582 4478  
 Email : sales@internationalsprings.com / discsprings@yahoo.com  
 Website : www.internationalsprings.com

## IIS-Disc Springs

						Characteristic Values												
						Dimensions					0.25h <sub>o</sub>		0.50h <sub>o</sub>		0.75h <sub>o</sub>		1.0h <sub>o</sub>	
						D <sub>e</sub> (mm)	D <sub>i</sub> (mm)	t (mm)	l <sub>o</sub> (mm)	t' (mm)	Group	F (N)	s (mm)	F (N)	s (mm)	F (N)	s (mm)	F (N)
	6.0	3.2	0.30	0.45	-	1	45	0.038	84	0.075	117	0.110	153	0.150				
	8.0	3.2	0.20	0.40	-	1	12	0.050	20	0.100	26	0.150	30	0.200				
	8.0	3.2	0.30	0.55	-	1	46	0.063	79	0.125	105	0.190	126	0.250				
	8.0	3.2	0.40	0.60	-	1	69	0.050	130	0.100	186	0.150	238	0.200				
	8.0	3.2	0.50	0.70	-	1	128	0.050	246	0.100	357	0.150	465	0.200				
<b>C</b>	<b>8.0</b>	<b>4.2</b>	<b>0.20</b>	<b>0.45</b>	-	1	21	0.063	33	0.125	39	0.190	42	0.250				
<b>B</b>	<b>8.0</b>	<b>4.2</b>	<b>0.30</b>	<b>0.55</b>	-	1	52	0.063	89	0.125	119	0.190	142	0.250				
<b>A</b>	<b>8.0</b>	<b>4.2</b>	<b>0.40</b>	<b>0.60</b>	-	1	78	0.050	147	0.100	210	0.150	269	0.200				
	10.0	3.2	0.30	0.65	-	1	51	0.088	82	0.175	98	0.260	108	0.350				
	10.0	3.2	0.40	0.70	-	1	75	0.075	133	0.150	182	0.230	220	0.300				
	10.0	3.2	0.50	0.75	-	1	104	0.063	195	0.125	282	0.190	357	0.250				
	10.0	4.2	0.40	0.70	-	1	79	0.075	140	0.150	192	0.230	232	0.300				
	10.0	4.2	0.50	0.75	-	1	110	0.063	206	0.125	297	0.190	377	0.250				
	10.0	4.2	0.60	0.85	-	1	175	0.060	360	0.125	508	0.190	652	0.250				
<b>C</b>	<b>10.0</b>	<b>5.2</b>	<b>0.25</b>	<b>0.55</b>	-	1	30	0.075	48	0.150	58	0.230	63	0.300				
<b>B</b>	<b>10.0</b>	<b>5.2</b>	<b>0.40</b>	<b>0.70</b>	-	1	88	0.075	155	0.150	213	0.230	257	0.300				
<b>A</b>	<b>10.0</b>	<b>5.2</b>	<b>0.50</b>	<b>0.75</b>	-	1	122	0.063	228	0.125	329	0.190	418	0.250				
	12.0	4.2	0.40	0.80	-	1	85	0.100	141	0.200	178	0.300	206	0.400				
	12.0	4.2	0.50	0.85	-	1	116	0.088	208	0.175	282	0.260	352	0.350				
	12.0	4.2	0.60	1.00	-	1	224	0.100	405	0.200	557	0.300	694	0.400				
	12.0	5.2	0.50	0.90	-	1	150	0.100	263	0.200	350	0.300	424	0.400				
	12.0	5.2	0.60	0.95	-	1	196	0.088	361	0.175	502	0.260	641	0.350				
	12.0	6.2	0.50	0.85	-	1	134	0.088	239	0.175	324	0.260	404	0.350				
	12.0	6.2	0.60	0.95	-	1	214	0.088	394	0.175	547	0.260	699	0.350				
	12.5	5.2	0.50	0.85	-	1	111	0.088	200	0.175	270	0.260	337	0.350				
<b>C</b>	<b>12.5</b>	<b>6.2</b>	<b>0.35</b>	<b>0.80</b>	-	1	84	0.113	130	0.225	152	0.340	160	0.450				
<b>B</b>	<b>12.5</b>	<b>6.2</b>	<b>0.50</b>	<b>0.85</b>	-	1	120	0.088	215	0.175	291	0.260	363	0.350				
<b>A</b>	<b>12.5</b>	<b>6.2</b>	<b>0.70</b>	<b>1.00</b>	-	1	239	0.075	457	0.150	673	0.230	855	0.300				
<b>C</b>	<b>14.0</b>	<b>7.2</b>	<b>0.35</b>	<b>0.80</b>	-	1	68	0.113	106	0.225	123	0.340	131	0.450				
<b>B</b>	<b>14.0</b>	<b>7.2</b>	<b>0.50</b>	<b>0.90</b>	-	1	120	0.100	210	0.200	279	0.300	338	0.400				
<b>A</b>	<b>14.0</b>	<b>7.2</b>	<b>0.80</b>	<b>1.10</b>	-	1	284	0.075	547	0.150	813	0.230	1 040	0.300				
	15.0	5.2	0.40	0.95	-	1	101	0.138	154	0.275	175	0.410	181	0.550				
	15.0	5.2	0.50	1.00	-	1	133	0.125	221	0.250	280	0.380	321	0.500				
	15.0	5.2	0.60	1.05	-	1	171	0.113	302	0.225	409	0.340	499	0.450				
	15.0	5.2	0.70	1.10	-	1	214	0.100	395	0.200	555	0.300	704	0.400				
	15.0	6.2	0.50	1.00	-	1	138	0.125	229	0.250	291	0.380	334	0.500				
	15.0	6.2	0.60	1.05	-	1	178	0.113	314	0.225	426	0.340	519	0.450				
	15.0	6.2	0.70	1.10	-	1	222	0.100	411	0.200	578	0.300	733	0.400				
	15.0	8.2	0.70	1.10	-	1	256	0.100	474	0.200	666	0.300	844	0.400				
	15.0	8.2	0.80	1.20	-	1	367	0.100	689	0.200	982	0.300	1 261	0.400				
<b>C</b>	<b>16.0</b>	<b>8.2</b>	<b>0.40</b>	<b>0.90</b>	-	1	84	0.125	131	0.250	155	0.380	165	0.500				
<b>B</b>	<b>16.0</b>	<b>8.2</b>	<b>0.60</b>	<b>1.05</b>	-	1	172	0.113	304	0.225	412	0.340	503	0.450				
	16.0	8.2	0.70	1.15	-	1	254	0.113	461	0.225	641	0.340	798	0.450				
	16.0	8.2	0.80	1.20	-	1	308	0.100	579	0.200	825	0.300	1 059	0.400				
<b>A</b>	<b>16.0</b>	<b>8.2</b>	<b>0.90</b>	<b>1.25</b>	-	1	363	0.088	697	0.175	1 004	0.260	1 319	0.350				

## IIS-Disc Springs

Dimensions						Group	Characteristic Values							
							0.25h <sub>0</sub>		0.50h <sub>0</sub>		0.75h <sub>0</sub>		1.0h <sub>0</sub>	
							F (N)	s (mm)	F (N)	s (mm)	F (N)	s (mm)	F (N)	s (mm)
18.0	6.2	0.40	1.00	-	1	85	0.150	126	0.300	139	0.450	137	0.600	
18.0	6.2	0.50	1.10	-	1	130	0.150	206	0.300	245	0.450	267	0.600	
18.0	6.2	0.60	1.20	-	1	191	0.150	317	0.300	400	0.450	462	0.600	
18.0	6.2	0.70	1.25	-	1	236	0.138	414	0.275	550	0.410	672	0.550	
18.0	6.2	0.80	1.30	-	1	286	0.125	523	0.250	733	0.380	912	0.500	
18.0	8.2	0.50	1.10	-	1	140	0.150	222	0.300	265	0.450	288	0.600	
18.0	8.2	0.70	1.25	-	1	255	0.138	446	0.275	594	0.410	725	0.550	
18.0	8.2	0.80	1.30	-	1	309	0.125	564	0.250	791	0.380	984	0.500	
18.0	8.2	1.00	1.40	-	1	425	0.100	814	0.200	1 181	0.300	1 537	0.400	
<b>C 18.0</b>	<b>9.2</b>	<b>0.45</b>	<b>1.05</b>	-	1	121	0.150	186	0.300	214	0.450	223	0.600	
<b>B 18.0</b>	<b>9.2</b>	<b>0.70</b>	<b>1.20</b>	-	1	233	0.125	417	0.250	572	0.380	699	0.500	
<b>A 18.0</b>	<b>9.2</b>	<b>1.00</b>	<b>1.40</b>	-	1	451	0.100	865	0.200	1 254	0.300	1 631	0.400	
20.0	8.2	0.50	1.15	-	1	127	0.163	200	0.325	231	0.490	244	0.650	
20.0	8.2	0.60	1.30	-	1	214	0.175	342	0.350	413	0.530	453	0.700	
20.0	8.2	0.70	1.35	-	1	262	0.163	442	0.325	570	0.490	668	0.650	
20.0	8.2	0.80	1.40	-	1	315	0.150	557	0.300	751	0.450	921	0.600	
20.0	8.2	0.90	1.45	-	1	374	0.138	685	0.275	949	0.410	1 201	0.550	
20.0	8.2	1.00	1.55	-	1	494	0.138	917	0.275	1 288	0.410	1 648	0.550	
20.0	10.2	0.40	0.90	-	1	55	0.130	84	0.250	99	0.380	106	0.500	
<b>C 20.0</b>	<b>10.2</b>	<b>0.50</b>	<b>1.15</b>	-	1	141	0.163	219	0.325	254	0.490	268	0.650	
<b>B 20.0</b>	<b>10.2</b>	<b>0.80</b>	<b>1.35</b>	-	1	304	0.138	547	0.275	745	0.410	929	0.550	
20.0	10.2	0.90	1.45	-	1	412	0.138	754	0.275	1 045	0.410	1 323	0.550	
20.0	10.2	1.00	1.55	-	1	544	0.138	1 010	0.275	1 418	0.410	1 815	0.550	
<b>A 20.0</b>	<b>10.2</b>	<b>1.10</b>	<b>1.55</b>	-	1	548	0.113	1 050	0.225	1 531	0.340	1 976	0.450	
20.0	10.2	1.25	1.75	-	1	890	0.125	1 708	0.250	2 507	0.380	3 222	0.500	
20.0	10.2	1.50	1.80	-	2	857	0.075	1 695	0.150	2 576	0.230	3 340	0.300	
<b>C 22.5</b>	<b>11.2</b>	<b>0.60</b>	<b>1.40</b>	-	1	240	0.200	370	0.400	425	0.600	444	0.800	
<b>B 22.5</b>	<b>11.2</b>	<b>0.80</b>	<b>1.45</b>	-	1	306	0.163	533	0.325	710	0.490	855	0.650	
<b>A 22.5</b>	<b>11.2</b>	<b>1.25</b>	<b>1.75</b>	-	2	693	0.125	1 330	0.250	1 952	0.380	2 509	0.500	
23.0	8.2	0.70	1.50	-	1	279	0.200	448	0.400	544	0.600	602	0.800	
23.0	8.2	0.80	1.55	-	1	332	0.188	560	0.375	717	0.560	842	0.750	
23.0	8.2	0.90	1.60	-	1	391	0.175	687	0.350	925	0.530	1 119	0.700	
23.0	8.2	1.00	1.70	-	1	507	0.175	909	0.350	1 249	0.530	1 536	0.700	
23.0	10.2	0.90	1.65	-	1	463	0.188	802	0.375	1 055	0.560	1 273	0.750	
23.0	10.2	1.00	1.70	-	1	538	0.175	964	0.350	1 325	0.530	1 629	0.700	
23.0	10.2	1.25	1.90	-	2	870	0.163	1 627	0.325	2 320	0.490	2 955	0.650	
23.0	12.2	1.00	1.60	-	1	475	0.150	872	0.300	1 217	0.450	1 536	0.600	
23.0	12.2	1.25	1.85	-	2	863	0.150	1 630	0.300	2 331	0.450	3 000	0.600	
23.0	12.2	1.50	2.00	-	2	1 159	0.125	2 250	0.250	3 338	0.380	4 320	0.500	
25.0	10.2	1.00	1.75	-	1	492	0.188	870	0.375	1 168	0.560	1 436	0.750	
<b>C 25.0</b>	<b>12.2</b>	<b>0.70</b>	<b>1.60</b>	-	1	331	0.225	515	0.450	601	0.680	635	0.900	
<b>B 25.0</b>	<b>12.2</b>	<b>0.90</b>	<b>1.60</b>	-	1	367	0.175	644	0.350	868	0.530	1 050	0.700	
25.0	12.2	1.00	1.80	-	1	585	0.200	1 021	0.400	1 359	0.600	1 647	0.800	
25.0	12.2	1.25	1.95	-	2	848	0.175	1 573	0.350	2 232	0.530	2 814	0.700	
<b>A 25.0</b>	<b>12.2</b>	<b>1.50</b>	<b>2.05</b>	-	2	1 040	0.138	2 007	0.275	2 910	0.410	3 821	0.550	
28.0	10.2	0.80	1.75	-	1	348	0.238	553	0.475	661	0.710	723	0.950	
28.0	10.2	1.00	1.90	-	1	512	0.225	872	0.450	1 135	0.680	1 337	0.900	
28.0	10.2	1.25	2.05	-	2	737	0.200	1 339	0.400	1 853	0.600	2 322	0.800	
28.0	10.2	1.50	2.20	-	2	1 003	0.175	1 899	0.350	2 745	0.530	3 511	0.700	

## IIS-Disc Springs

						Characteristic Values							
Dimensions					Group	0.25h <sub>0</sub>		0.50h <sub>0</sub>		0.75h <sub>0</sub>		1.0h <sub>0</sub>	
D <sub>e</sub> (mm)	D <sub>i</sub> (mm)	t (mm)	l <sub>0</sub> (mm)	t' (mm)		F (N)	s (mm)	F (N)	s (mm)	F (N)	s (mm)	F (N)	s (mm)
28.0	12.2	1.00	1.95	-	1	590	0.238	992	0.475	1 266	0.710	1 482	0.950
28.0	12.2	1.25	2.10	-	2	844	0.213	1 519	0.425	2 089	0.640	2 590	0.850
28.0	12.2	1.50	2.25	-	2	1 149	0.188	2 159	0.375	3 065	0.560	3 949	0.750
<b>C 28.0</b>	<b>14.2</b>	<b>0.80</b>	<b>1.80</b>	-	1	435	0.250	681	0.500	801	0.750	859	1.000
<b>B 28.0</b>	<b>14.2</b>	<b>1.00</b>	<b>1.80</b>	-	1	476	0.200	832	0.400	1 107	0.600	1 342	0.800
28.0	14.2	1.25	2.10	-	2	907	0.213	1 634	0.425	2 246	0.640	2 785	0.850
<b>A 28.0</b>	<b>14.2</b>	<b>1.50</b>	<b>2.15</b>	-	2	1 033	0.163	1 970	0.325	2 854	0.490	3 680	0.650
31.5	12.2	1.00	2.10	-	1	587	0.275	951	0.550	1 170	0.830	1 309	1.100
31.5	12.2	1.25	2.20	-	2	761	0.238	1 343	0.475	1 800	0.710	2 207	0.950
31.5	12.2	1.50	2.35	-	2	1 033	0.213	1 912	0.425	2 697	0.640	3 413	0.850
<b>C 31.5</b>	<b>16.3</b>	<b>0.80</b>	<b>1.85</b>	-	1	384	0.263	594	0.525	687	0.790	722	1.050
<b>B 31.5</b>	<b>16.3</b>	<b>1.25</b>	<b>2.15</b>	-	2	791	0.225	1 409	0.450	1 923	0.680	2 359	0.900
31.5	16.3	1.50	2.40	-	2	1 260	0.225	2 314	0.450	3 249	0.680	4 077	0.900
<b>A 31.5</b>	<b>16.3</b>	<b>1.75</b>	<b>2.45</b>	-	2	1 391	0.175	2 669	0.350	3 905	0.530	5 036	0.700
31.5	16.3	2.00	2.75	-	2	2 199	0.188	4 239	0.375	6 148	0.560	8 054	0.750
34.0	12.3	1.00	2.25	-	1	637	0.313	998	0.625	1 175	0.940	1 258	1.250
34.0	12.3	1.25	2.35	-	2	815	0.275	1 395	0.550	1 825	0.830	2 162	1.100
34.0	12.3	1.50	2.50	-	2	1 097	0.250	1 982	0.500	2 725	0.750	3 397	1.000
34.0	14.3	1.25	2.40	-	2	913	0.288	1 546	0.575	1 990	0.860	2 347	1.150
34.0	14.3	1.50	2.55	-	2	1 224	0.263	2 192	0.525	2 997	0.790	3 704	1.050
34.0	16.3	1.50	2.55	-	2	1 291	0.263	2 313	0.525	3 163	0.790	3 908	1.050
34.0	16.3	2.00	2.85	-	2	2 097	0.213	4 003	0.425	5 803	0.640	7 498	0.850
<b>C 35.5</b>	<b>18.3</b>	<b>0.90</b>	<b>2.05</b>	-	1	458	0.288	712	0.575	831	0.860	884	1.150
<b>B 35.5</b>	<b>18.3</b>	<b>1.25</b>	<b>2.25</b>	-	2	731	0.250	1 277	0.500	1 699	0.750	2 059	1.000
<b>A 35.5</b>	<b>18.3</b>	<b>2.00</b>	<b>2.80</b>	-	2	1 864	0.200	3 576	0.400	5 187	0.600	6 747	0.800
40.0	14.3	1.25	2.65	-	2	904	0.350	1 459	0.700	1 780	1.050	1 984	1.400
40.0	14.3	1.50	2.75	-	2	1 114	0.313	1 929	0.625	2 550	0.940	3 061	1.250
40.0	14.3	2.00	3.05	-	2	1 800	0.263	3 363	0.525	4 781	0.790	6 096	1.050
40.0	16.3	1.50	2.80	-	2	1 224	0.325	2 102	0.650	2 758	0.980	3 281	1.300
40.0	16.3	2.00	3.10	-	2	1 972	0.275	3 663	0.550	5 195	0.830	6 580	1.100
40.0	18.3	2.00	3.15	-	2	2 182	0.288	4 030	0.575	5 642	0.860	7 171	1.150
<b>C 40.0</b>	<b>20.4</b>	<b>1.00</b>	<b>2.30</b>	-	1	565	0.325	876	0.650	1 018	0.980	1 072	1.300
<b>B 40.0</b>	<b>20.4</b>	<b>1.50</b>	<b>2.65</b>	-	2	1 109	0.288	1 953	0.575	2 616	0.860	3 201	1.150
40.0	20.4	2.00	3.10	-	2	2 175	0.275	4 041	0.550	5 730	0.830	7 258	1.100
<b>A 40.0</b>	<b>20.4</b>	<b>2.25</b>	<b>3.15</b>	-	2	2 336	0.225	4 481	0.450	6 544	0.680	8 456	0.900
40.0	20.4	2.50	3.45	-	2	3 351	0.238	6 453	0.475	9 359	0.710	12 243	0.950
<b>C 45.0</b>	<b>22.4</b>	<b>1.25</b>	<b>2.85</b>	-	2	1 041	0.400	1 620	0.800	1 891	1.200	2 007	1.600
<b>B 45.0</b>	<b>22.4</b>	<b>1.75</b>	<b>3.05</b>	-	2	1 524	0.325	2 701	0.650	3 659	0.980	4 475	1.300
<b>A 45.0</b>	<b>22.4</b>	<b>2.50</b>	<b>3.50</b>	-	2	2 773	0.250	5 320	0.500	7 716	0.750	10 037	1.000
50.0	18.4	1.25	2.85	-	2	757	0.400	1 178	0.800	1 375	1.200	1 459	1.600
50.0	18.4	1.50	3.30	-	2	1 379	0.450	2 184	0.900	2 606	1.350	2 837	1.800
50.0	18.4	2.00	3.50	-	2	1 918	0.375	3 392	0.750	4 586	1.130	5 603	1.500
50.0	18.4	2.50	4.10	-	2	3 703	0.400	6 733	0.800	9 315	1.200	11 673	1.600
50.0	18.4	3.00	4.40	-	2	5 043	0.350	9 546	0.700	13 688	1.050	17 650	1.400
50.0	20.4	2.00	3.50	-	2	1 966	0.375	3 478	0.750	4 702	1.130	5 745	1.500
50.0	20.4	2.50	3.85	-	2	3 008	0.338	5 601	0.675	7 902	1.010	10 098	1.350
50.0	22.4	2.00	3.60	-	2	2 247	0.400	3 924	0.800	5 222	1.200	6 329	1.600
50.0	22.4	2.50	3.90	-	2	3 261	0.350	6 044	0.700	8 510	1.050	10 817	1.400



## IIS-Disc Springs

	Dimensions					Group	Characteristic Values							
	D <sub>e</sub> (mm)	D <sub>i</sub> (mm)	t (mm)	l <sub>o</sub> (mm)	t' (mm)		0.25h <sub>o</sub>		0.50h <sub>o</sub>		0.75h <sub>o</sub>		1.0h <sub>o</sub>	
							F (N)	s (mm)	F (N)	s (mm)	F (N)	s (mm)	F (N)	s (mm)
<b>C 50.0</b>	<b>25.4</b>	<b>1.25</b>	<b>2.85</b>	-	-	2	854	0.400	1 328	0.800	1 550	1.200	1 646	1.600
50.0	25.4	1.50	3.10	-	-	2	1 242	0.400	2 028	0.800	2 512	1.200	2 844	1.600
<b>B 50.0</b>	<b>25.4</b>	<b>2.00</b>	<b>3.40</b>	-	-	2	1 949	0.350	3 491	0.700	4 762	1.050	5 898	1.400
50.0	25.4	2.25	3.75	-	-	2	2 940	0.380	5 249	0.750	7 241	1.130	8 997	1.500
50.0	25.4	2.50	3.90	-	-	2	3 473	0.350	6 437	0.700	9 063	1.050	11 519	1.400
<b>A 50.0</b>	<b>25.4</b>	<b>3.00</b>	<b>4.10</b>	-	-	2	4 255	0.275	8 214	0.550	12 044	0.830	15 640	1.100
<b>C 56.0</b>	<b>28.5</b>	<b>1.50</b>	<b>3.45</b>	-	-	2	1 458	0.488	2 259	0.975	2 621	1.460	2 766	1.950
<b>B 56.0</b>	<b>28.5</b>	<b>2.00</b>	<b>3.60</b>	-	-	2	1 910	0.400	3 335	0.800	4 438	1.200	5 379	1.600
56.0	28.5	2.50	4.20	-	-	2	3 676	0.430	6 550	0.850	9 004	1.280	11 160	1.700
<b>A 56.0</b>	<b>28.5</b>	<b>3.00</b>	<b>4.30</b>	-	-	2	4 142	0.325	7 895	0.650	11 441	0.980	14 752	1.300
60.0	20.5	2.00	4.10	-	-	2	2 318	0.525	3 802	1.050	4 737	1.580	5 380	2.100
60.0	20.5	2.50	4.30	-	-	2	3 018	0.450	5 379	0.900	7 302	1.350	9 006	1.800
60.0	20.5	3.00	4.70	-	-	2	4 449	0.425	8 234	0.850	11 615	1.280	14 698	1.700
60.0	25.5	2.50	4.40	-	-	2	3 447	0.475	6 081	0.950	8 195	1.430	9 997	1.900
60.0	25.5	3.00	4.65	-	-	2	4 495	0.413	8 352	0.825	11 803	1.240	15 002	1.650
60.0	30.5	2.50	4.30	-	-	2	3 447	0.450	6145	0.900	8 342	1.350	10 289	1.800
60.0	30.5	2.75	4.75	-	-	2	5 125	0.500	9 117	1.000	12 360	1.500	11 430	2.000
60.0	30.5	3.00	4.70	-	-	2	5 083	0.425	9 407	0.850	13 269	1.280	16 792	1.700
60.0	30.5	3.50	5.00	-	-	2	6 591	0.375	12 574	0.750	18 225	1.130	23 528	1.500
<b>C 63.0</b>	<b>31.0</b>	<b>1.80</b>	<b>4.15</b>	-	-	2	2 364	0.588	3 658	1.175	4 237	1.760	4 463	2.350
<b>B 63.0</b>	<b>31.0</b>	<b>2.50</b>	<b>4.25</b>	-	-	2	2 942	0.438	5 270	0.875	7 179	1.310	8 904	1.750
63.0	31.0	3.00	4.80	-	-	2	4 891	0.450	8 981	0.900	12 536	1.350	15 825	1.800
<b>A 63.0</b>	<b>31.0</b>	<b>3.50</b>	<b>4.90</b>	-	-	2	5 399	0.350	10 359	0.700	15 025	1.050	19 545	1.400
70.0	25.5	2.00	4.50	-	-	2	2 408	0.625	3 771	1.250	4 441	1.880	4 755	2.500
70.0	30.5	2.50	4.90	-	-	2	3 755	0.600	6 297	1.200	8 031	1.800	9 360	2.400
70.0	30.5	3.00	5.10	-	-	2	4 676	0.525	8 376	1.050	11 453	1.580	14 152	2.100
70.0	35.5	3.00	5.10	-	-	2	5 028	0.525	9 007	1.050	12 316	1.580	15 218	2.100
70.0	35.5	3.50	5.30	-	-	2	6 077	0.450	11 380	0.900	16 180	1.350	20 710	1.800
70.0	35.5	4.00	5.80	-	-	2	8 757	0.450	16 634	0.900	23 923	1.350	30 919	1.800
* 70.0	35.5	4.00	5.80	3.75	-	3	9 167	0.450	17 020	0.900	23 920	1.350	30 250	1.800
70.0	40.5	4.00	5.60	-	-	2	8 391	0.400	16 099	0.800	23 351	1.200	30 376	1.600
* 70.0	40.5	4.00	5.60	3.75	-	3	8 739	0.400	16 430	0.800	23 350	1.200	29 810	1.600
70.0	40.5	5.00	6.20	-	-	2	11 544	0.300	22 728	0.600	33 672	0.900	44 495	1.200
* 70.0	40.5	5.00	6.20	4.60	-	3	11 900	0.300	23 070	0.600	33 672	0.900	43 880	1.200
<b>C 71.0</b>	<b>36.0</b>	<b>2.00</b>	<b>4.60</b>	-	-	2	2 861	0.650	4 432	1.300	5 144	1.950	5 426	2.600
<b>B 71.0</b>	<b>36.0</b>	<b>2.50</b>	<b>4.50</b>	-	-	2	2 894	0.500	5 054	1.000	6 725	1.500	8 152	2.000
<b>A 71.0</b>	<b>36.0</b>	<b>4.00</b>	<b>5.60</b>	-	-	2	7 379	0.400	14 157	0.800	20 535	1.200	26 712	1.600
* 71.0	36.0	4.00	5.60	3.75	-	3	7 685	0.400	14 440	0.800	20 530	1.200	26 210	1.600
80.0	31.0	2.50	5.30	-	-	2	3 678	0.700	5 933	1.400	7 239	2.100	8 070	2.800
80.0	31.0	3.00	5.50	-	-	2	4 531	0.625	7 847	1.250	10 369	1.880	12 451	2.500
80.0	31.0	4.00	6.10	-	-	2	7 319	0.525	13 677	1.050	19 447	1.580	24 791	2.100
* 80.0	31.0	4.00	6.10	3.75	-	3	7 783	0.525	14 050	1.050	19 440	1.580	24 150	2.100
80.0	36.0	3.00	5.70	-	-	2	5 401	0.675	9 196	1.350	11 936	2.030	14 106	2.700
80.0	36.0	4.00	6.20	-	-	2	8 163	0.550	15 168	1.100	21 400	1.650	27 245	2.200
* 80.0	36.0	4.00	6.20	3.75	-	3	8 626	0.550	15 600	1.100	21 400	1.650	26 500	2.200
<b>C 80.0</b>	<b>41.0</b>	<b>2.25</b>	<b>5.20</b>	-	-	2	3 698	0.738	5 715	1.475	6 611	2.210	6 950	2.950
<b>B 80.0</b>	<b>41.0</b>	<b>3.00</b>	<b>5.30</b>	-	-	2	4 450	0.575	7 838	1.150	10 539	1.730	12 844	2.300
80.0	41.0	4.00	6.20	-	-	2	8 726	0.550	16 213	1.100	22 874	1.650	29 122	2.200
* 80.0	41.0	4.00	6.20	3.75	-	3	9 220	0.550	16 670	1.100	22 874	1.650	28 330	2.200
<b>A 80.0</b>	<b>41.0</b>	<b>5.00</b>	<b>6.70</b>	-	-	2	11 821	0.425	22 928	0.850	33 682	1.280	43 952	1.700
* 80.0	41.0	5.00	6.70	4.70	-	3	12 350	0.425	23 300	0.850	33 682	1.280	43 300	1.700

## IIS-Disc Springs

	Dimensions					Group	Characteristic Values							
	D <sub>e</sub> (mm)	D <sub>i</sub> (mm)	t (mm)	l <sub>0</sub> (mm)	t' (mm)		0.25h <sub>0</sub>		0.50h <sub>0</sub>		0.75h <sub>0</sub>		1.0h <sub>0</sub>	
							F (N)	s (mm)	F (N)	s (mm)	F (N)	s (mm)	F (N)	s (mm)
<b>C</b>	<b>90.0</b>	<b>46.0</b>	<b>2.50</b>	<b>5.70</b>	-	2	4 232	0.800	6 585	1.600	7 684	2.400	8 157	3.200
<b>B</b>	<b>90.0</b>	<b>46.0</b>	<b>3.50</b>	<b>6.00</b>	-	2	5 836	0.625	10 416	1.250	14 189	1.880	17 487	2.500
<b>A</b>	<b>90.0</b>	<b>46.0</b>	<b>5.00</b>	<b>7.00</b>	-	2	11 267	0.500	21 617	1.000	31 354	1.500	40 786	2.000
*	90.0	46.0	5.00	7.00	4.70	3	11 710	0.500	22 040	1.000	31 354	1.500	40 060	2.000
	100.0	41.0	4.00	7.20	-	2	8 714	0.800	15 219	1.600	20 251	2.400	24 547	3.200
*	100.0	41.0	4.00	7.20	3.75	3	9 345	0.800	15 800	1.600	20 251	2.400	23 550	3.200
	100.0	41.0	5.00	7.75	-	2	12 345	0.688	22 937	1.375	32 328	2.060	41 201	2.750
*	100.0	41.0	5.00	7.75	4.75	3	12 940	0.688	23 520	1.375	32 328	2.060	40 330	2.750
<b>C</b>	<b>100.0</b>	<b>51.0</b>	<b>2.70</b>	<b>6.20</b>	-	2	4 779	0.875	7 410	1.750	8 613	2.630	9 091	3.500
<b>B</b>	<b>100.0</b>	<b>51.0</b>	<b>3.50</b>	<b>6.30</b>	-	2	5 624	0.700	9 823	1.400	13 070	2.100	15 843	2.800
	100.0	51.0	4.00	7.00	-	2	8 673	0.750	15 341	1.500	20 674	2.250	25 338	3.000
*	100.0	51.0	4.00	7.00	3.75	3	9 282	0.750	15 910	1.500	20 674	2.250	24 380	3.000
	100.0	51.0	5.00	7.80	-	2	13 924	0.700	25 810	1.400	36 339	2.100	46 189	2.800
*	100.0	51.0	5.00	7.80	4.75	3	14 550	0.700	26 400	1.400	36 340	2.100	45 190	2.800
<b>A</b>	<b>100.0</b>	<b>51.0</b>	<b>6.00</b>	<b>8.20</b>	-	2	17 061	0.550	32 937	1.100	48 022	1.650	62 711	2.200
*	100.0	51.0	6.00	8.20	5.60	3	17 750	0.550	33 590	1.100	48 020	1.650	61 570	2.200
<b>C</b>	<b>112.0</b>	<b>57.0</b>	<b>3.00</b>	<b>6.90</b>	-	2	5 834	0.975	9 038	1.950	10 493	2.930	11 064	3.900
<b>B</b>	<b>112.0</b>	<b>57.0</b>	<b>4.00</b>	<b>7.20</b>	-	2	7 639	0.800	13 341	1.600	17 752	2.400	21 518	3.200
*	112.0	57.0	4.00	7.20	3.75	3	8 192	0.800	13 850	1.600	17 752	2.400	20 650	3.200
<b>A</b>	<b>112.0</b>	<b>57.0</b>	<b>6.00</b>	<b>8.50</b>	-	2	15 800	0.625	30 215	1.250	43 812	1.880	56 737	2.500
*	112.0	57.0	6.00	8.50	5.60	3	16 660	0.625	30 910	1.250	43 800	1.880	55 530	2.500
	125.0	41.0	4.00	8.20	-	2	8 501	1.050	13 943	2.100	17 346	3.150	19 729	4.200
*	125.0	41.0	4.00	8.20	3.75	3	9 146	1.050	14 540	2.100	17 350	3.150	18 720	4.200
	125.0	51.0	4.00	8.50	-	2	10 096	1.125	16 265	2.250	19 829	3.380	22 060	4.500
*	125.0	51.0	4.00	8.50	3.75	3	10 890	1.125	16 970	2.250	19 820	3.380	20 870	4.500
	125.0	51.0	5.00	8.90	-	2	13 063	0.975	22 931	1.950	30 705	2.930	37 342	3.900
*	125.0	51.0	5.00	8.90	4.70	3	14 020	0.975	23 760	1.950	30 700	2.930	35 930	3.900
	125.0	51.0	6.00	9.40	-	2	17 027	0.850	31 514	1.700	44 307	2.550	56 254	3.400
*	125.0	51.0	6.00	9.40	5.60	3	18 090	0.850	32 500	1.700	44 310	2.550	54 550	3.400
	125.0	61.0	5.00	9.00	-	2	14 615	1.000	25 526	2.000	33 965	3.000	41 170	4.000
*	125.0	61.0	5.00	9.00	4.70	3	15 630	1.000	26 470	2.000	33 965	3.000	39 580	4.000
	125.0	61.0	6.00	9.60	-	2	19 789	0.900	36 336	1.800	50 722	2.700	64 028	3.600
*	125.0	61.0	6.00	9.60	5.60	3	21 080	0.900	37 540	1.800	50 720	2.700	61 970	3.600
	125.0	61.0	8.00	10.90	7.50	3	34 434	0.725	65 305	1.450	93 765	2.180	120 218	2.900
<b>C</b>	<b>125.0</b>	<b>64.0</b>	<b>3.50</b>	<b>8.00</b>	-	2	8 514	1.125	13 231	2.250	15 422	3.380	16 335	4.500
<b>B</b>	<b>125.0</b>	<b>64.0</b>	<b>5.00</b>	<b>8.50</b>	-	2	12 238	0.875	21 924	1.750	29 950	2.630	37 041	3.500
*	125.0	64.0	5.00	8.50	4.70	3	13 090	0.875	22 660	1.750	29 940	2.630	35 790	3.500
	125.0	64.0	6.00	9.60	-	2	20 350	0.900	37 360	1.800	52 150	2.700	65 840	3.600
*	125.0	64.0	6.00	9.60	5.60	3	21 670	0.900	38 600	1.800	52 150	2.700	63 720	3.600
	125.0	64.0	7.00	10.00	6.55	3	25 530	0.750	47 610	1.500	67 220	2.250	85 290	3.000
<b>A</b>	<b>125.0</b>	<b>64.0</b>	<b>8.00</b>	<b>10.60</b>	7.50	3	31 118	0.650	59 520	1.300	85 926	1.950	111 056	2.600
	125.0	71.0	6.00	9.30	-	2	19 538	0.825	36 302	1.650	51 304	2.480	65 207	3.300
*	125.0	71.0	6.00	9.30	5.60	3	20 840	0.830	37 410	1.650	51 290	2.480	63 300	3.300
	125.0	71.0	8.00	10.40	7.40	3	30 867	0.600	59 149	1.200	85 494	1.800	110 547	2.400
	125.0	71.0	10.00	11.80	9.20	3	42 963	0.450	84 219	0.900	124 124	1.350	163 035	1.800
<b>C</b>	<b>140.0</b>	<b>72.0</b>	<b>3.80</b>	<b>8.70</b>	-	2	9 514	1.225	14 773	2.450	17 201	3.680	18 199	4.900
**	140.0	72.0	3.80	8.70	3.80	3	11 390	1.225	17 350	2.450	19 780	3.680	20 420	4.900
<b>B</b>	<b>140.0</b>	<b>72.0</b>	<b>5.00</b>	<b>9.00</b>	-	2	12 014	1.000	20 982	2.000	27 920	3.000	33 843	4.000
*	140.0	72.0	5.00	9.00	4.70	3	12 850	1.000	21 760	2.000	27 920	3.000	32 530	4.000
<b>A</b>	<b>140.0</b>	<b>72.0</b>	<b>8.00</b>	<b>11.20</b>	7.50	3	31 903	0.800	59 967	1.600	85 251	2.400	108 813	3.200

## IIS-Disc Springs

	Dimensions					Group	Characteristic Values							
	D <sub>e</sub> (mm)	D <sub>i</sub> (mm)	t (mm)	l <sub>o</sub> (mm)	t' (mm)		0.25h <sub>o</sub>		0.50h <sub>o</sub>		0.75h <sub>o</sub>		1.0h <sub>o</sub>	
							F (N)	s (mm)	F (N)	s (mm)	F (N)	s (mm)	F (N)	s (mm)
*	150.0	61.0	5.00	10.30	-	2	15 292	1.325	25 021	2.650	31 059	3.980	35 207	5.300
*	150.0	61.0	5.00	10.30	4.80	3	16 080	1.325	25 710	2.650	31 059	3.980	34 050	5.300
*	150.0	61.0	6.00	10.80	-	2	19 560	1.200	34 161	2.400	45 456	3.600	55 098	4.800
*	150.0	61.0	6.00	10.80	5.80	3	20 300	1.200	34 850	2.400	45 456	3.600	53 950	4.800
*	150.0	71.0	6.00	10.80	-	2	20 721	1.200	36 189	2.400	48 155	3.600	58 370	4.800
*	150.0	71.0	6.00	10.80	5.65	3	22 120	1.200	37 490	2.400	48 155	3.600	56 180	4.800
*	150.0	71.0	8.00	12.00	7.50	3	35 296	1.000	64 684	2.000	89 851	3.000	112 487	4.000
	150.0	81.0	8.00	11.70	7.50	3	34 518	0.925	63 876	1.850	89 663	2.780	112 942	3.700
	150.0	81.0	10.00	13.00	9.30	3	50 088	0.750	96 120	1.500	139 128	2.250	180 141	3.000
<b>C</b>	<b>160.0</b>	<b>82.0</b>	<b>4.30</b>	<b>9.90</b>	-	2	12 162	1.400	18 832	2.800	21 843	4.200	23 022	5.600
**	160.0	82.0	4.30	9.90	4.30	3	14 510	1.400	22 120	2.800	25 120	4.200	25 820	5.600
<b>B</b>	<b>160.0</b>	<b>82.0</b>	<b>6.00</b>	<b>10.50</b>	-	2	17 203	1.125	30 431	2.250	41 051	3.380	50 260	4.500
*	160.0	82.0	6.00	10.50	5.60	3	18 570	1.125	31 630	2.250	41 040	3.380	48 220	4.500
<b>A</b>	<b>160.0</b>	<b>82.0</b>	<b>10.00</b>	<b>13.50</b>	<b>9.40</b>	3	50 547	0.875	96 216	1.750	138 564	2.630	178 214	3.500
<b>C</b>	<b>180.0</b>	<b>92.0</b>	<b>4.80</b>	<b>11.00</b>	-	2	14 646	1.550	22 731	3.100	26 442	4.650	27 966	6.200
**	180.0	92.0	4.80	11.00	4.80	3	17 480	1.550	26 690	3.100	30 410	4.650	31 370	6.200
<b>B</b>	<b>180.0</b>	<b>92.0</b>	<b>6.00</b>	<b>11.10</b>	-	2	16 558	1.275	28 552	2.550	37 533	3.830	44 930	5.100
*	180.0	92.0	6.00	11.10	5.60	3	17 920	1.275	29 770	2.550	37 530	3.830	42 870	5.100
<b>A</b>	<b>180.0</b>	<b>92.0</b>	<b>10.00</b>	<b>14.00</b>	<b>9.40</b>	3	46 850	1.000	88 141	2.000	125 417	3.000	160 223	4.000
	180.0	92.0	13.00	16.50	12.10	3	85 040	0.880	163 400	1.750	238 300	2.630	309 500	3.500
	200.0	82.0	8.00	14.20	7.60	3	35 029	1.550	60 013	3.100	78 034	4.650	92 176	6.200
	200.0	82.0	10.00	15.50	9.60	3	51 105	1.375	93 357	2.750	129 569	4.130	162 061	5.500
	200.0	82.0	12.00	16.60	11.50	3	66 924	1.150	127 191	2.300	182 737	3.450	235 503	4.600
	200.0	92.0	10.00	15.60	9.50	3	55 136	1.400	100 014	2.800	137 688	4.200	171 214	5.600
	200.0	92.0	12.00	16.80	11.40	3	73 913	1.200	139 548	2.400	199 269	3.600	255 443	4.800
	200.0	92.0	14.00	18.10	13.10	3	95 633	1.025	184 092	2.050	267 623	3.080	346 888	4.100
<b>C</b>	<b>200.0</b>	<b>102.0</b>	<b>5.50</b>	<b>12.50</b>	-	2	19 817	1.750	30 882	3.500	36 111	5.250	38 423	7.000
**	200.0	102.0	5.50	12.50	5.50	3	23 640	1.750	36 260	3.500	41 530	5.250	43 120	7.000
<b>B</b>	<b>200.0</b>	<b>102.0</b>	<b>8.00</b>	<b>13.60</b>	<b>7.50</b>	3	33 367	1.400	57 955	2.800	76 378	4.200	91 252	5.600
	200.0	102.0	10.00	15.60	9.40	3	58 757	1.400	106 099	2.800	145 357	4.200	179 858	5.600
<b>A</b>	<b>200.0</b>	<b>102.0</b>	<b>12.00</b>	<b>16.20</b>	<b>11.25</b>	3	66 983	1.050	127 401	2.100	183 020	3.150	235 610	4.200
	200.0	102.0	14.00	18.20	13.10	3	103 781	1.050	199 476	2.100	289 181	3.150	374 993	4.200
	200.0	112.0	12.00	16.20	11.10	3	72 257	1.050	136 873	2.100	195 830	3.150	251 108	4.200
	200.0	112.0	14.00	17.50	12.90	3	91 033	0.875	176 156	1.750	257 208	2.630	334 227	3.500
	200.0	112.0	16.00	18.80	14.80	3	105 268	0.700	206 697	1.400	305 100	2.100	401 294	2.800
**	225.0	112.0	6.00	13.60	6.00	3	25 820	1.900	39 660	3.800	45 500	5.700	47 340	7.600
<b>C</b>	<b>225.0</b>	<b>112.0</b>	<b>6.50</b>	<b>13.60</b>	<b>6.20</b>	3	23 582	1.775	37 417	3.550	44 594	5.330	48 147	7.100
<b>B</b>	<b>225.0</b>	<b>112.0</b>	<b>8.00</b>	<b>14.50</b>	<b>7.50</b>	3	32 870	1.625	55 412	3.250	70 788	4.880	82 002	6.500
<b>A</b>	<b>225.0</b>	<b>112.0</b>	<b>12.00</b>	<b>17.00</b>	<b>11.25</b>	3	64 497	1.250	120 738	2.500	171 016	3.750	217 625	5.000
	225.0	112.0	16.00	20.50	15.00	3	128 500	1.130	247 100	2.250	360 100	3.380	467 800	4.500
	250.0	102.0	10.00	18.00	9.60	3	56 867	2.000	97 282	4.000	126 387	6.000	149 323	8.000
	250.0	102.0	12.00	19.00	11.50	3	73 563	1.750	133 130	3.500	182 962	5.250	227 317	7.000
**	250.0	127.0	6.50	14.80	6.50	3	29 700	2.080	45 420	4.150	51 970	6.230	53 880	8.300
<b>C</b>	<b>250.0</b>	<b>127.0</b>	<b>7.00</b>	<b>14.80</b>	<b>6.70</b>	3	26 895	1.950	42 527	3.900	50 466	5.850	54 284	7.800
<b>B</b>	<b>250.0</b>	<b>127.0</b>	<b>10.00</b>	<b>17.00</b>	<b>9.40</b>	3	51 871	1.750	90 206	3.500	119 053	5.250	142 462	7.000
	250.0	127.0	12.00	19.30	11.25	3	87 633	1.825	156 021	3.650	210 942	5.480	257 630	7.300
<b>A</b>	<b>250.0</b>	<b>127.0</b>	<b>14.00</b>	<b>19.60</b>	<b>13.10</b>	3	93 239	1.400	175 145	2.800	248 828	4.200	317 399	5.600
	250.0	127.0	16.00	21.80	15.00	3	140 941	1.450	267 295	2.900	383 017	4.350	492 058	5.800