



Khodiyar Spring
i n d u s t r i e s

your trusted spring partner

DISC SPRINGS DIN 2093

An ISO certified company

www.khodiarspring.com



Since inception khodiyar spring has grown to become industry's superior and self - governing spring industry, which is a testimony to our excellent fabrication, commitment and service to you. We offer a great range of the products to work with your need and budget.

We step ahead under the succesful guidance of Mr.Ravindra D.Bambhroliya and Mr.Govind N.Babariya. The company has earns appreciated recognition as one of the trusted disc spring manufacturer, exporter and supplier in India .

Our involvement with the industry and customers goes back a long way. We believe strongly in supporting the industry and doing everything we can build a study base of consistency.

Since our inception we have been instrumental in the completion of many projects from the conception stage through to detail drawings.We have a well equipped work shop that allows us to fabricate the special purpose springs and prototypes. our focus is placed on the design and manufacture of springs to meet the requirements of diverse industries.Range of highly sophisticated manufacturing equipments ensures minimal down time.

The professional engineers are effectively monitoring every aspects of the manufacturing process. Our team of talented executives remains up-dated with latest market trends.

Best of the organization

- Finely coordinate management
- Well managed infrastructure
- Spacious workshop
- Well equipped warehouse
- Smart and punctual customization
- Efficient product range
- Qualified professional
- Experienced man-power
- Global clientele
- Advance technology
- High - tech machinery
- Computerized designs

Team

We possess the qualified professional team, which works with dedication and cordination. Due to effective execution of our efficient team, we are been able to meet the requirement of our cutomers.



Disc spring washer

Disc spring are conically formed angular disc which are loaded in the axial direction. They can be statically loaded as well subject to continuous dynamic loads. It can be used as single disc or in multiple stack in combination to achieve desired deflections and characteristics.

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 consist of either single spring or parallel spring sets. Disc springs and belleville washers are manufactured to DIN2093 and DIN6796. Disc spring stacks may be designed for extremely high loads where coil springs are not feasible at all. The standard disc springs shown are generally available from stock. We can make many special sizes to customer requirements. Engineering assistance is available upon request.

Characteristics of Disc Spring

- Wide range of load deflection characteristics such as straight line progressive and regressive.
- Flexibility in stack arrangement in order to achieve a desired performance
- Stock is minimized as the individual spring sizes can be combined universally.
- Space saving and self damping (especially when staked in parallel)
- No deformation or fatigue under normal loads, Longer fatigue life.
- Simplified inventory, and individual spring size can be used for a wide range of applications
- High energy storage capacity.
- Largely self - damping, giving good shock absorption and energy dissipation.
- Efficient use of space and high spring force with small deflections.
- Adaptable to stacking in numerous configuration.
- Combination use as a modular spring element
- Low maintenance cost and long service life.

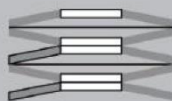
Features of Disc Spring Washer

- Greater security of operation service, as failure of one disc spring element within a stack does not totally lead of failure of entire assembly.
- Spring load achieved by reciprocally alternating disc.
- Axial load achieved by application of guide bolt or sleeve.
- High damping capacity through friction, which can be increased by parallel stacking.
- Load, stack height and travel can be determined and changes as needed.

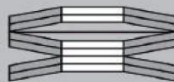
They can be used as single disc or on multiple stack combination to achieve desired deflection and characteristics.



Stacked in Parallel
Total Deflection = Deflection of 1 disc
Total Load = Load on 1 disc x No. of discs

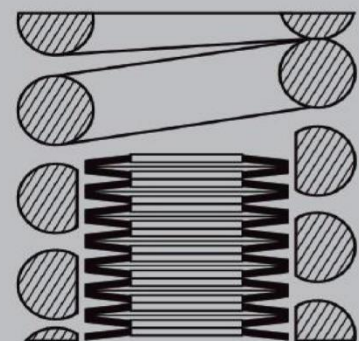


Series
Total Deflection = Deflection of 1 disc x No. disc in stack
Total Load = Load on 1 disc



Parallel Series Combinations can be designed to accommodate virtually any load of deflection and to obtain progressive or regressive characteristics.

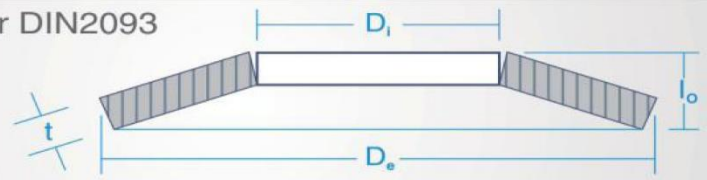
Comparison with Coil Springs



Where same load is achieved in less space

Disc Spring As per DIN2093

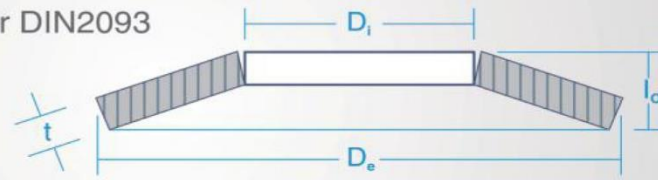
D_e : Outside Diameter
 D_i : Inside Diameter
 t : Thickness
 h : Overall Height
 F : Force (N)
 s : Deflection



ITEM CODE	Metric Dimensions					Defl	Force
	D_e	D_i	t	h	l_o	$S=.75l_o$	N
DS060303	6	3.2	0.3	0.15	0.45	0.11	117
DS080302	8	3.2	0.2	0.2	0.4	0.15	26
DS080303	8	3.2	0.3	0.25	0.55	0.19	105
DS080304	8	3.2	0.4	0.2	0.6	0.15	186
DS080305	8	3.2	0.5	0.2	0.7	0.15	357
DS080402	8	4.2	0.2	0.25	0.45	0.19	39
DS080403	8	4.2	0.3	0.25	0.55	0.19	119
DS080404	8	4.2	0.4	0.2	0.6	0.15	210
DS100303	10	3.2	0.3	0.35	0.65	0.26	98
DS100304	10	3.2	0.4	0.3	0.7	0.23	182
DS100305	10	3.2	0.5	0.25	0.75	0.19	282
DS100404	10	4.2	0.4	0.3	0.7	0.23	192
DS100405	10	4.2	0.5	0.25	0.75	0.19	297
DS100406	10	4.2	0.6	0.25	0.85	0.19	508
DS100502	10	5.2	0.25	0.3	0.55	0.23	58
DS100504	10	5.2	0.4	0.3	0.7	0.23	213
DS100505	10	5.2	0.5	0.25	0.75	0.19	329
DS120404	12	4.2	0.4	0.4	0.8	0.3	178
DS120405	12	4.2	0.5	0.35	0.85	0.26	282
DS120406	12	4.2	0.6	0.4	1	0.3	557
DS120505	12	5.2	0.5	0.4	0.9	0.3	350
DS120506	12	5.2	0.6	0.35	0.95	0.26	502
DS120605	12	6.2	0.5	0.35	0.85	0.26	324
DS120606	12	6.2	0.6	0.35	0.95	0.26	547
DS130505	12.5	5.2	0.5	0.35	0.85	0.26	270
DS130603	12.5	6.2	0.35	0.45	0.80	0.34	152
DS130605	12.5	6.2	0.5	0.35	0.85	0.26	291
DS130607	12.5	6.2	0.7	0.3	1	0.23	673
DS140703	14	7.2	0.35	0.45	0.8	0.34	123
DS140705	14	7.2	0.5	0.4	0.9	0.3	279
DS140708	14	7.2	0.80	0.3	1.1	0.23	813
DS150504	15	5.2	0.4	0.55	0.95	0.41	175
DS150505	15	5.2	0.5	0.5	1	0.38	280
DS150506	15	5.2	0.6	0.45	1.05	0.34	409
DS150507	15	5.2	0.7	0.4	1.1	0.3	555
DS150605	15	6.2	0.5	0.5	1	0.38	291
DS150606	15	6.2	0.6	0.45	1.05	0.34	426
DS150606	15	6.2	0.7	0.4	1.1	0.3	578
DS150607	15	8.2	0.7	0.4	1.1	0.3	666
DS150808	15	8.2	0.8	0.4	1.2	0.3	982
DS160804	16	8.2	0.4	0.5	0.9	38	155

Disc Spring As per DIN2093

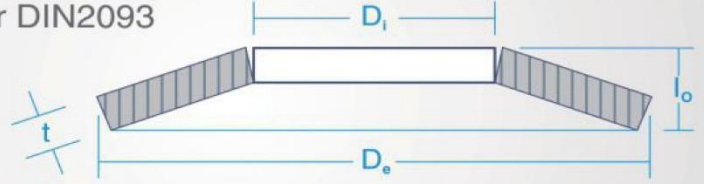
D_o : Outside Diameter
 D_i : Inside Diameter
 t : Thickness
 l_o : Overall Height
 F : Force (N)
 s : Deflection



ITEM CODE	Metric Dimensions					Defl	Force
	De	Di	t	h	lo	S=.75lo	N
DS160806	16	8.2	0.6	0.45	1.05	0.34	412
DS160807	16	8.2	0.7	0.45	1.15	0.34	641
DS160808	16	8.2	0.8	0.4	1.2	0.3	825
DS160809	16	8.2	0.9	0.35	1.25	0.26	1004
DS180604	18	6.2	0.4	0.6	1	0.45	139
DS180605	18	6.2	0.5	0.6	1.1	0.45	245
DS180606	18	6.2	0.6	0.6	1.2	0.45	400
DS180607	18	6.2	0.7	0.55	1.25	0.41	550
DS180608	18	6.2	0.8	0.5	1.3	0.38	733
DS180805	18	8.2	0.5	0.6	1.1	0.45	265
DS180807	18	8.2	0.7	0.55	1.25	0.41	594
DS180808	18	8.2	0.8	0.5	1.3	0.38	791
DS180810	18	8.2	1	0.4	1.4	0.3	1181
DS180904	18	9.2	0.45	0.6	1.05	0.45	214
DS180907	18	9.2	0.7	0.5	1.2	0.38	572
DS180910	18	9.2	1	0.4	1.4	0.3	1254
DS200806	20	8.2	0.6	0.70	1.30	0.53	413
DS200807	20	8.2	0.7	0.65	1.35	0.49	570
DS200808	20	8.2	0.8	0.60	1.40	0.45	751
DS200809	20	8.2	0.9	0.55	1.45	0.41	949
DS200810	20	8.2	1	0.55	1.55	0.41	1288
DS201005	20	10.2	0.5	0.65	1.15	0.49	254
DS201008	20	10.2	0.8	0.55	1.35	0.41	745
DS201009	20	10.2	0.9	0.55	1.45	0.41	1050
DS201010	20	10.2	1	0.55	1.55	0.41	1418
DS201011	20	10.2	1.1	0.45	1.55	0.34	1531
DS201012	20	10.2	1.25	0.50	1.75	0.38	2507
DS201015	20	10.2	1.5	0.3	1.8	0.23	2576
DS221106	22.5	11.2	0.6	0.8	1.4	0.6	425
DS221108	22.5	11.2	0.8	0.65	1.45	0.49	710
DS221112	22.5	11.2	1	0.65	1.65	0.49	1335
DS221112	22.5	11.2	1.25	0.5	1.75	0.38	1952
DS230807	23	8.2	0.7	0.8	1.5	0.6	544
DS230808	23	8.2	0.8	0.75	1.55	0.56	717
DS230809	23	8.2	0.9	0.7	1.6	0.53	925
DS230810	23	8.2	1	0.7	1.7	0.53	1249
DS231009	23	10.2	0.9	0.75	1.65	0.56	1055
DS231010	23	10.2	1	0.7	1.7	0.53	1325
DS231012	23	10.2	1.25	0.65	1.9	0.49	2320
DS231210	23	12.2	1	0.6	1.6	0.45	1217
DS231212	23	12.2	1.25	0.6	1.85	0.45	2331
DS231215	23	12.2	1.5	0.5	2	0.38	3338
DS251207	23	12.2	0.7	0.9	1.6	0.68	600

Disc Spring As per DIN2093

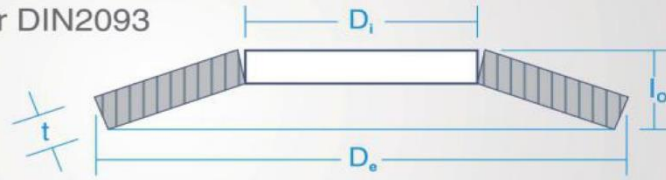
D_o : Outside Diameter
 D_i : Inside Diameter
 t : Thickness
 l_o : Overall Height
 F : Force (N)
 s : Deflection



ITEM CODE	Metric Dimensions					Defl	Force
	D_e	D_i	t	h	l_o	$S=0.75l_o$	N
DS251209	25	12.2	0.9	0.7	1.6	0.53	868
DS251210	25	12.2	1	0.8	1.8	0.6	1359
DS251212	25	12.2	1.25	0.7	1.95	0.53	2232
DS251215	25	12.2	1.5	0.55	2.05	0.41	2910
DS281008	28	10.2	0.8	0.95	1.75	0.71	661
DS281010	28	10.2	1	0.9	1.9	0.68	1135
DS281012	28	10.2	1.25	0.8	2.05	0.6	1853
DS281015	28	10.2	1.5	0.7	2.2	0.53	2745
DS281210	28	12.2	1	0.95	1.95	0.71	1266
DS281212	28	12.2	1.25	0.85	2.1	0.64	2089
DS281215	28	12.2	1.5	0.75	2.25	0.56	3065
DS281408	28	14.2	0.8	1	1.8	0.75	801
DS281410	28	14.2	1	0.8	1.8	0.6	1107
DS281412	28	14.2	1.25	0.85	2.1	0.64	2246
DS281415	28	14.2	1.5	0.65	2.15	0.49	2854
DS311608	31.5	16.3	0.8	1.05	1.85	0.79	687
DS311612	31.5	16.3	1.25	0.9	2.15	0.68	1923
DS311615	31.5	16.3	1.5	0.9	2.4	0.68	3249
DS311617	31.5	16.3	1.75	0.7	2.45	0.53	3905
DS311620	31.5	16.3	2	0.75	2.75	0.56	6148
DS341412	34	14.3	1.25	1.150	2.4	0.86	1990
DS341415	34	14.3	1.5	1.05	2.55	0.79	2997
DS341615	34	16.3	1.5	1.05	2.55	0.79	3163
DS341620	34	16.3	2	0.85	2.85	0.64	5803
DS351809	35.5	18.3	0.9	1.15	2.05	0.86	831
DS351812	35.5	18.3	1.25	1	2.25	0.75	1699
DS351820	35.5	18.3	2	0.8	2.8	0.6	5187
DS401412	40	14.3	1.25	1.4	2.65	1.05	1780
DS401415	40	14.3	1.5	1.25	2.75	0.94	2550
DS401420	40	14.3	2	1.05	3.05	0.79	4781
DS401615	40	16.3	1.5	1.3	2.8	0.98	2758
DS401620	40	16.3	2	1.1	3.1	0.83	5195
DS401820	40	18.3	2	1.15	3.15	0.86	5642
DS402010	40	20.4	1	1.3	2.3	0.98	1018
DS402015	40	20.4	1.5	1.15	2.65	0.86	2616
DS402020	40	20.4	2	1.1	3.1	0.83	5730
DS402022	40	20.4	2.25	0.9	3.15	0.68	6544
DS402025	40	20.4	2.5	0.95	3.45	0.71	9359
DS452212	45	22.4	1.25	1.6	2.85	1.2	1891
DS452217	45	22.4	1.75	1.3	3.05	0.98	3659
DS452225	45	22.4	2.5	1	3.5	0.75	7716

Disc Spring As per DIN2093

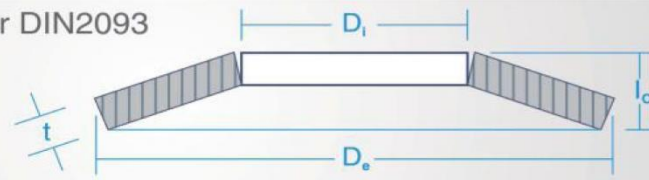
D_o : Outside Diameter
 D_i : Inside Diameter
 t : Thickness
 l_o : Overall Height
 F : Force (N)
 s : Deflection



ITEM CODE	Metric Dimensions					Defl	Force
	De	Di	t	h	lo	S=.75lo	N
DS501812	50	18.3	1.25	1.6	2.85	1.2	1373
DS501815	50	18.3	1.5	1.8	3.3	1.35	2603
DS501820	50	18.3	2	1.5	3.5	1.13	4567
DS501825	50	18.3	2.5	1.35	3.85	1.2	9305
DS501830	50	18.3	3	1	4	1.05	13763
DS502020	50	20.4	2	1.5	3.5	1.13	4702
DS502025	50	20.4	2.5	1.35	3.85	1.01	7902
DS502220	50	22.4	2	1.6	3.6	1.2	5222
DS502225	50	22.4	2.5	1.4	3.9	1.05	8510
DS502512	50	25.4	1.25	1.6	2.85	1.2	1550
DS502515	50	25.4	1.5	1.6	3.1	1.2	2512
DS502520	50	25.4	2	1.4	3.4	1.05	4762
DS502522	50	25.4	2.25	1.5	3.75	1.13	7241
DS502525	50	25.4	2.5	1.4	3.9	1.05	9063
DS502530	50	25.4	3	1.1	4.1	0.83	12044
DS562815	56	28.5	1.5	1.95	3.45	1.46	2621
DS562820	56	28.5	2	1.6	3.6	1.2	4438
DS562825	56	28.5	2.5	1.7	4.2	1.28	9004
DS562830	56	28.5	3	1.3	4.3	0.98	11441
DS602020	60	20.4	2	2.1	4.1	1.58	4727
DS602025	60	20.4	2.5	1.8	4.3	1.35	7297
DS602030	60	20.4	3	1.7	4.7	1.26	11569
DS602525	60	25.5	2.5	1.9	4.4	1.43	8195
DS602530	60	25.5	3	1.65	4.65	1.24	11803
DS603025	60	30.5	2.5	1.8	4.3	1.35	8342
DS603027	60	30.5	2.75	2	4.75	1.5	12360
DS603030	60	30.5	3	1.7	4.7	1.28	13269
DS603035	60	30.5	3.5	1.5	5	1.13	18225
DS633118	63	31	1.8	2.35	4.15	1.76	4237
DS633125	63	31	2.5	1.75	4.25	1.31	7179
DS633130	63	31	3	1.8	4.8	1.35	12536
DS633135	63	31	3.5	1.4	4.9	1.05	15025
DS702520	70	25.5	2	2.5	4.5	1.88	4441
DS703025	70	30.5	2.5	2.4	4.9	1.8	8031
DS703030	70	30.5	3	2.1	5.1	1.58	11453
DS703530	70	35.5	3	2.1	5.1	1.58	12316
DS703540	70	35.5	4	1.8	5.8	1.35	23923
DS704040	70	40.5	4	1.6	5.6	1.2	23351
DS704050	70	40.5	5	1.2	6.2	0.9	33672
DS713620	71	36	2	2.6	4.6	1.95	5144
DS713625	71	36	2.5	2	4.5	1.5	6725

Disc Spring As per DIN2093

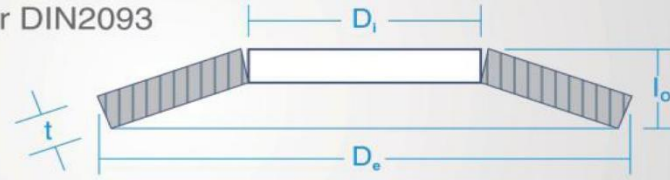
D_o : Outside Diameter
 D_i : Inside Diameter
 t : Thickness
 l_o : Overall Height
 F : Force (N)
 s : Deflection



ITEM CODE	Metric Dimensions					Defl	Force
	De	Di	t	h	lo	S=.75lo	N
DS713640	71	36	4	1.6	5.6	1.2	20535
DS803125	80	31	2.5	2.8	5.3	2.1	7239
DS803130	80	31	3	2.5	5.5	1.88	10369
DS803140	80	31	4	2.1	6.1	1.58	19447
DS803630	80	36	3	2.7	5.7	2.03	11936
DS806340	80	36	4	2.2	6.2	1.65	21400
DS804122	80	41	2.25	2.95	5.2	2.21	6611
DS804130	80	41	3	2.3	5.3	1.73	10539
DS804140	80	41	4	2.2	6.2	1.65	22874
DS804150	80	41	5	1.7	6.7	2.4	7684
DS904625	90	46	2.5	3.2	5.7	2.4	7684
DS904635	90	46	3.5	2.5	6	1.88	14189
DS904650	90	46	5	2	7	1.5	31354
DS1004140	100	41	4	3.2	7.2	2.4	20251
DS10042150	100	41	5	2.75	7.75	2.06	32328
DS1005127	100	51	2.7	3.5	6.2	2.63	8613
DS1005135	100	51	3.5	2.8	6.3	2.1	13070
DS1005140	100	51	4	3	7	2.25	20674
DS1005150	100	51	5	2.8	7.8	2.1	36339
DS1005160	100	51	6	2.2	8.2	1.65	48022
DS1125730	112	57	3	3.9	6.9	2.93	10493
DS1125740	112	57	4	3.2	7.2	2.4	17752
DS1125760	112	57	6	2.5	8.5	1.88	43812
DS1254140	125	41	4	4.2	8.2	3.15	17346
DS1255140	125	51	4	4.5	8.5	3.38	19829
DS1255150	125	51	5	3.9	8.9	2.93	30705
DS1255160	125	51	6	3.4	9.4	2.55	44307
DS1256150	125	61	5	4	9	3	33965
DS1256160	125	61	6	3.6	9.6	2.7	50722
DS1256180	125	61	8	2.9	10.9	2.18	93765
DS1256435	125	64	3.5	4.5	8	3.38	15422
DS1256450	125	64	5	3.5	8.5	2.63	29950
DS1256460	125	64	6	3.6	9.6	2.7	52150
DS1256470	125	64	7	3	10	2.25	67220
DS1256480	125	64	8	2.6	10.6	1.95	85926
DS1257160	125	71	6	3.3	9.3	2.48	51304
DS1257180	125	71	8	2.4	10.4	1.80	85494
DS1257110	125	71	10	1.8	11.8	1.35	124124
DS1407238	140	72	3.8	4.9	8.7	3.68	17201
DS1407250	140	72	5	4	9	3	27920
DS1407280	140	72	8	3.2	11.2	2.4	85251

Disc Spring As per DIN2093

D_o : Outside Diameter
 D_i : Inside Diameter
 t : Thickness
 l_o : Overall Height
 F : Force (N)
 s : Deflection



ITEM CODE	Metric Dimensions					Defl	Force
	De	Di	t	h	lo	S=.75lo	N
DS1506150	150	61	5	5.3	10.3	3.98	31059
DS1506160	150	61	6	4.8	10.8	3.6	45456
DS1507160	150	71	6	4.8	10.8	3.6	48155
DS1507180	150	71	8	4	12	3	89851
DS1508180	150	81	8	3.7	11.7	2.78	89663
DS1508110	150	81	10	3	13	2.25	139128
DS1608243	160	82	4.3	5.6	9.9	4.2	21843
DS1608260	160	82	6	4.5	10.5	3.38	41051
DS1608210	160	82	10	3.5	13.5	2.63	138564
DS1809248	180	92	4.8	6.2	11	4.65	26442
DS1809260	180	92	6	5.1	11.1	3.83	37533
DS1809210	180	92	10	4	14	3	125417
DS1809213	180	92	13	3.5	16.5	2.63	238300
DS2008280	200	82	8	6.2	14.2	4.65	78034
DS2008210	200	82	10	5.5	15.5	4.13	129569
DS2008212	200	82	12	4.6	16.6	3.45	182737
DS2009210	200	92	10	5.6	15.6	4.2	137688
DS2009212	200	92	12	4.8	16.8	3.6	199269
DS2009214	200	92	14	4.1	18.1	3.08	26623
DS20010255	200	102	5.5	7	12.5	5.25	36111
DS20010280	200	102	8	5.6	13.6	4.2	76378
DS20010210	200	102	10	5.6	15.6	4.2	145357
DS20010212	200	102	12	4.2	16.2	3.15	183020
DS20010214	200	102	14	4.2	18.2	3.15	289181
DS20011212	200	112	12	4.2	16.2	3.15	195830
DS20011214	200	112	14	3.5	17.5	2.63	257208
DS20011216	200	112	16	2.8	18.8	2.1	305100
DS22511265	225	112	6.5	7.1	13.6	5.33	44594
DS22511280	225	112	8	6.5	14.5	4.88	70788
DS22511212	225	112	12	11.25	17	3.75	171016
DS22511216	225	112	16	15	20.5		
DS25010210	250	102	10	9.6	18	6	126387
DS25010212	250	102	12	11.5	19	5.25	182962
DS25012770	250	127	7	6.7	14.8	5.85	50466
DS25012710	250	127	10	9.4	17	5.25	119053
DS25012712	250	127	12	11.25	19.3	5.48	210942
DS25012714	250	127	14	13.1	19.6	4.2	248828
DS25012716	250	127	16	15	21.8	4.35	383017

DISC SPRINGS TOLERANCES

THICKNESS TOLERANCES		
	t or t' [MM]	Tolerance for t [MM]
Group 1	0.2 to 0.6	+ 0.02 /- 0.06
	> 0.6 to < 1.25	+ 0.03 /- 0.09
Group 2	1.25 to 3.8	+ 0.04 /- 0.12
	> 0.6 to < 1.25	+ 0.05 /- 0.15
Group 3	> 6.0 to 14.0	+ 0.10 /- 0.10

For Springs in group 3 the tolerance is applied to the reduced thickness.

We use the thickness to ensure that springs loads are within tolerance and therefore will in some cases deviate from the above figures.

DIAMETER TOLERANCES			
	De or Di [mm]	Permissible deviation in mm	
Over	3 to 6	0 /- 0.12	+ 0.12 / 0
Over	6 to 10	0 /- 0.15	+ 0.15 / 0
Over	10 to 18	0 /- 0.18	+ 0.18 / 0
Over	18 to 30	0 /- 0.21	+ 0.21 / 0
Over	30 to 50	0 /- 0.25	+ 0.25 / 0
Over	50 to 80	0 /- 0.30	+ 0.30 / 0
Over	80 to 120	0 /- 0.35	+ 0.35 / 0
Over	120 to 180	0 /- 0.40	+ 0.40 / 0
Over	180 to 250	0 /- 0.46	+ 0.46 / 0
Over	250 to 315	0 /- 0.52	+ 0.52 / 0
Over	315 to 400	0 /- 0.57	+ 0.57 / 0
Over	400 to 500	0 /- 0.63	+ 0.63 / 0

OVERALL HEIGHT TOLERANCES		
	t [MM]	Tolerance for ol [MM]
Group 1	< 1.25	+ 0.10 /- 0.05
	1.25 to 2.0	+ 0.15 /- 0.08
Group 2	> 2.0 to 3.0	+ 0.20 /- 0.10
	> 3.0 to 6.0	+ 0.30 /- 0.15
Group 3	> 6.0 to 14.0	+ 0.30 /- 0.30

To ensure the specified springs forces, DIN 2093 allows the overall height tolerances to be slightly exceeded.

LOAD TOLERANCES		
	t [MM]	Tolerance for F at the test length p = l - 0.75 h0
Group 1	< 1.25	+ 0.10 /- 0.05
Group 2	1.25 to 3.0	+ 15 % /- 7.5 %
	> 3.0 to 6.0	+ 10 % /- 5 %
Group 3	> 6.0 to 16.0	+ 5 % /- 5 %

with a single spring the spring force must be checked at the height (to - l) This should be carried out with the spring pressed between two lubricated, hardened, ground and polished plates. Measurements are always taken in loading direction

Material	Magnetic Permeability	Thermal Conductivity	Field of use	Availability
Carbon steel C80 / CK 75	Very good	Low	C 80 is the most inexpensive spring steel for low stress applications.	Regular
Chrome Vanadium steel 50CrV4	Very good	Low	50 CrV4 is the most regularly used disc spring material 50 CrV4 offers the spring characteristics in the temperature range of -150c, due to high alloy content	Always in Stock
X10 Cr Ni 18-8 stainless steels (AISI 301/1.4310)	Low due to work hardening	Low	Ss301 Disc spring is used non water proof housing & subject to even lightly corrosive substances	Always in Stock
X5 Cr Ni 18 - 10 stainless steels (AISI 304/1.4301)	Low due to work hardening	Low	Disc Spring Washers requiring low elasticity and good corrosion resistance	Always in Stock
X6 Cr Ni MOTI 17-12-2 stainless steels (AISI 316/1.4401)	Low due to work hardening	Low	Disc Spring Washers in used in highly corrosive environments	Always in Stock
HEAT RESISTANT STEEL X7 Cr Ni Al 17-7 (17 - 7 PH)	Good	Low	Disc Spring washers in corrosive environments but for high temperatures	Always in Stock
Inconel X - 750	Zero	Low	Disc Spring washers used in high temperature parts.	Always in Stock
Inconel X - 718	Zero	Low	Disc Spring Washers used in nuclear, aeronautical, space, very high temperature	Always in Stock
Beryllium copper CuBe 2	Zero	Very high	This alloys low modulus of elasticity enables the Disc Spring material to generate a significantly lower spring force when compared to other various materials	Very difficult
X22CrMOV12-1	Zero	Low	Highly heat resisting material	Moderate

Heavy Duty Safety Washers (HDS) - DIN6796



Heavy Duty safety or load washers are manufactured as per DIN 6796 and are designed specifically for heavy duty bolted sections.

Conical spring Washers are spring elements whose role is to counteract the loss of force in screwed or bolted connections due to stress relaxation taking place in the components or to counteract heat expansion. These spring elements are compressed in assembly

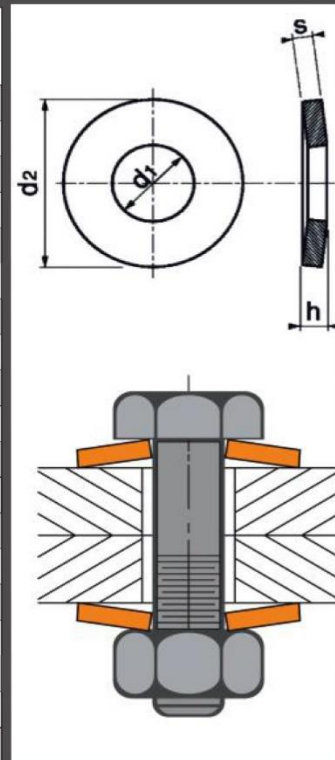
They are configured in accordance with bolts of the property class 8.8 to 10.9 particularly when used in conjunction with short bolts, their function is to increase the elasticity of the overall assembly. In the case of relaxation of the connection, these elements maintain a creation minimum clamping force. However conical spring washers are not able to prevent parts unscrewing as a result of alternating transverse loads.

It should be noted that conical spring washers are extremely high stressed components and are there fore only recommended for static application

STANDARD APPLICATIONS INCLUDE

- Bus Bars in Transofrmers
- Abutomobile & Heavy Construction
- Agriculture & Heavy machineries
- Mining & Turbine construction

Part No.			Thickness (t)	Overall Height (Max((io)	Approximate Force to Flat	Bolt Size
HDSW52204	5.0	2.2	0.40	0.60	628	2.0
HDSW62705	6.0	2.7	0.50	0.72	946	2.5
HDSW73206	7.0	3.2	0.60	0.85	1,320	3.0
HDSW83708	8.0	3.7	0.80	1.06	2,410	3.5
HDSW9431	9.0	4.3	1.00	1.30	3,770	4.0
HDSW115312	11.0	5.3	1.20	1.55	5,480	5.0
HDSW146415	14.0	6.4	1.50	2.00	8,590	6.0
HDSW1774175	17.0	7.4	1.75	2.30	11,300	7.0
HDSW18842	18.0	8.4	2.00	2.60	14,900	8.0
HDSW2310525	23.0	10.5	2.50	3.20	22,100	10.0
HDSW29133	29.0	13.0	3.00	3.95	34,100	12.0
HDSW3511536	35.0	15.0	3.50	4.65	46,000	14.0
HDSW39174	39.0	17.0	4.00	5.25	59,700	16.0
HDSW421945	42.0	19.0	4.50	5.8	74,400	18.0
HDSW45215	45.0	21.0	5.00	6.4	93,200	20.0
HDSW492355	49.0	23.0	5.50	7.05	113,700	22.0
HDSW56256	56.0	25.0	6.00	7.75	131,000	24.0
HDSW602865	60.0	28.0	6.50	8.35	154,000	27.0
HDSW70317	70.0	31.0	7.00	9.2	172,000	30.0



PLATING

- Standard finish in self finish
- Alternative : Phosphate and oil, Mechanical Zinc plate, Deltatone

Other Products

Safelock Washer

Safelock washers are used in pairs. Both Washers have Radial Teeth and are assembled opposite to each other. Safelock washers eliminate the use of adhesive for locking as it automatically secures the joints.

Safelock Washers can be used with Bolts and threaded holes. When using Bolts and Nuts 1 pair should be used on either side

Safe lock Washers are widely used in various industries such as construction, Automotive, Mining, Oil & Natural Gas, Powerplants.

1. When maximum safety is desired while tightening Nut / Bolt.
2. Avoids loosening due to vibration and heavy loads.
3. Perfect locking is achieved at any preload levels.
4. Easy to assemble and dismantle.

RANGE : M3 to M130

MATERIAL:- High Quality Spring Steel (50CrV4) & Stainless steel 304 & 316

PLATING :- Delta Protekat



Contact Washer

RANGE :- M3 to M20

High Quality Spring Steel
(50CrV4) & Stainless Steel 304 & 316



Ball Bearing disc spring

TYPE :- PLAIN & SLOTTED

High Quality Spring Steel
(50CrV4)



Wave Washer

RANGE: As per DIN137A & DIN 137B & also as per customer's specification

High Quality Spring Steel
(50CrV4) & Stainless Steel 304 & 316



Safety Serrated Washer

RANGE: M3 to M40

High Quality Spring Steel
(50CrV4) & Stainless Steel 304 & 316



Sheet Metal Component

TYPE, RANGE & MATERIAL

AS PER CUSTOMER SPECIFICATION

KHODIYAR SPRING INDUSTRIES

L-47, GIDC Estate, Nr. Old Water Tank, Odhav, Ahmedabad, Gujarat, India

Phone:-079 - 22870355; 22875755; Mob - 9998850229

E-Mail:- contact@khodiyarspring.com Web:- www.khodiyarsprings.com, www.khodiyarspring.com