**SPIROL**

# DISC SPRINGS

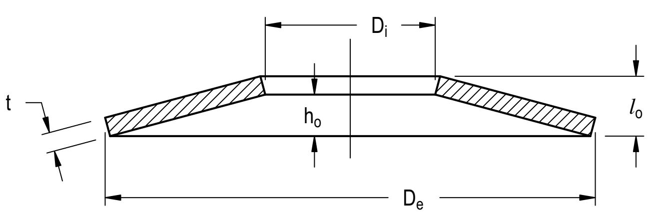
Disc Springs are conically-shaped, washer-type components designed to be axially loaded. What makes Disc Springs unique is that based on the standardized calculations of DIN 2092, the deflection for a given load is predictable and the minimum life cycle can be determined. Disc Springs can be statically loaded either continuously or intermittently, or dynamically subjected to continuous load cycling. They can be used singly or in multiples, stacked parallel, in series or in a combination thereof.

**The advantages of Disc Springs compared to other types of springs include the following:**

- **A wide range of load/deflection characteristics**
- **High load capacity with small deflection**
- **Space savings – high load to size ratio**
- **Consistent performance under design loads**
- **Longer fatigue life**
- **Inherent dampening especially with parallel stacking**
- **Flexibility in stack arrangement to meet your application requirements**

## DIMENSIONAL DESIGNATIONS

$D_e$ = External Diameter of Disc
$D_i$ = Internal Diameter of Disc
$l_o$ = Free Height of Disc
$t$ = Material Thickness of Disc
$h_o$ = Free Cone Height of Disc




## SYMBOLS AND UNITS USED IN THE APPLICATION OF DISC SPRINGS

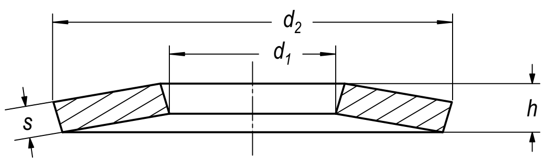
| | | |
|---|---|---|
| $F$ | = Force or Load Applied | N |
| $s$ | = Deflection of Disc Resulting from an Applied Force | mm |
| $\sigma$ | = Stress | $N/mm^2$ |
| $E$ | = Modulus of Elasticity | $N/mm^2$ |
| $\mu$ | = Poisson's Ratio | — |

# SPIROL®

## CONICAL SPRING WASHERS

### Designed in accordance with DIN 6796 for use with high tensile bolts in Classes 8.8 and higher.

Since the spring force exerted is predictable, Spring Washers provide a simple effective means of determining bolt tension required to achieve a properly torqued assembly. In addition, tension, which would otherwise be lost to expansion, wear, or compression set, is maintained.




| Nominal Size | $d_1$ H14 | $d_2$ h14 | s | h max[1)] | h min[2)] | Force N Test[3)] | Force N[4)] |
|---|---|---|---|---|---|---|---|
| 2 | 2.2 | 5 | 0.4 | 0.6 | 0.5 | 920 | 628 |
| 2.5 | 2.7 | 6 | 0.5 | 0.72 | 0.61 | 1540 | 946 |
| 3 | 3.2 | 7 | 0.6 | 0.85 | 0.72 | 2350 | 1320 |
| 3.5 | 3.7 | 8 | 0.8 | 1.06 | 0.92 | 3160 | 2410 |
| 4 | 4.3 | 9 | 1 | 1.3 | 1.12 | 4050 | 3770 |
| 5 | 5.3 | 11 | 1.2 | 1.55 | 1.35 | 6700 | 5480 |
| 6 | 6.4 | 14 | 1.5 | 2 | 1.7 | 9400 | 8590 |
| 7 | 7.4 | 17 | 1.75 | 2.3 | 2 | 13700 | 11300 |
| 8 | 8.4 | 18 | 2 | 2.6 | 2.24 | 17200 | 14900 |
| 10 | 10.5 | 23 | 2.5 | 3.2 | 2.8 | 27500 | 22100 |
| 12 | 13 | 29 | 3 | 3.95 | 3.43 | 40000 | 34100 |
| 14 | 15 | 35 | 3.5 | 4.65 | 4.04 | 55000 | 46000 |
| 16 | 17 | 39 | 4 | 5.25 | 4.58 | 75000 | 59700 |
| 18 | 19 | 42 | 4.5 | 5.8 | 5.08 | 95000 | 74400 |
| 20 | 21 | 45 | 5 | 6.4 | 5.6 | 122000 | 93200 |
| 22 | 23 | 49 | 5.5 | 7.05 | 6.15 | 152000 | 113700 |
| 24 | 25 | 56 | 6 | 7.75 | 6.77 | 175000 | 131000 |
| 27 | 28 | 60 | 6.5 | 8.35 | 7.3 | 230000 | 154000 |
| 30 | 31 | 70 | 7 | 9.2 | 8 | 280000 | 172000 |

1) Maximum height at delivery
2) Minimum height after test for permanent set as specified in DIN 267 Part 26
3) Compression test load
4) Calculated spring force at deflection equals $h_{min}$ - $s$

| | | |
|---|---|---|
| **MATERIAL** | **B** | Spring steel heat treated to HV 420-510 (HRC 43-50) |
| **FINISH** | **K** | Plain (natural), oiled |

TO ORDER: Product / $d_2$ x $d_1$ x t / material code / finish code
EXAMPLE: LWR 9 x 4.3 x 1 B K

**Produced to order only.**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ISO/TS 16949:2009 Certified
ISO 9001:2008 Certified

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