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BS EN 16984:2016



BSI Standards Publication

Disc springs — Calculation

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European foreword

This document (EN 16984:2016) has been prepared by Technical Committee CEN/TC 407 “Cylindrical helical springs made from round wire and bar - Calculation and design”, the secretariat of which is held by AFNOR.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by May 2017, and conflicting national standards shall be withdrawn at the latest by May 2017.

This European Standard has been prepared by the initiative of the Association of the European Spring Federation ESF and is based on the German Standard DIN 2092 “Disc springs — Calculation”, which is known and used in many European countries.

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1 Scope

This standard specifies design criteria and features of disc springs, whether as single disc springs or as stacks of disc springs. It includes the definition of relevant concepts as well as design formulae, and covers the fatigue life of such springs.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 16983:2016, *Disc springs - Quality specifications - Dimensions*

EN ISO 26909, *Springs - Vocabulary (ISO 26909)*

3 Terms, definitions, symbols, units and abbreviated terms

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in EN ISO 26909 apply.

NOTE Disc springs are annular coned elements that offer resistance to a compressive load applied axially. They may be designed as single disc springs or as disc springs stacked in parallel or in series, either singly or in multiples. They may be subjected to both static and fatigue loading, and may have flat bearings.

3.2 Symbols, units and abbreviated terms

For the purposes of this document, the following symbols, units and abbreviated terms apply

Table 1 — Symbols, units and abbreviated terms

Symbol	Unit	Description
D_e	mm	Outer diameter of spring
D_i	mm	Inner diameter of spring
D_0	mm	Diameter of centre of rotation
E	MPa	Modulus of elasticity (see EN 16983:2016)
F	N	Spring load
F_1, F_2, F_3 ...	N	Spring loads related to spring deflections s_1, s_2, s_3...
F_c	N	Design spring load when spring is in the flattened position
F_{ges}	N	Spring load of springs stacked in parallel, related to spring deflection s_{ges}
$F_{ges\ R}$	N	Spring load of springs stacked in parallel, allowance being made for friction
F_t	N	Test load for length L_t or l_t
K_1, K_2, K_3, K_4		Constants (see 5.3)
L_0	mm	Length of springs stacked in series or in parallel, in