

DIN EN 13001-3-8:2026-07 (E)

Cranes - General design - Part 3-8: Limit states and proof competence of machinery - Shafts

Contents	Page
European foreword	4
Introduction	5
1 Scope	6
2 Normative references	6
3 Terms and definitions, symbols and abbreviations	7
3.1 Terms and definitions	7
3.2 Symbols and abbreviations	7
4 Safety requirements	11
4.1 General	11
4.2 Materials	11
4.2.1 Grades and qualities for shafts	11
4.2.2 Impact toughness	19
4.3 Mechanism components - Shafts	19
4.3.1 General	19
4.3.2 Shafts for plain bearings	19
5 Proof of competence for shafts	19
6 Proof of static strength	20
6.1 General	20
6.2 Design stresses	20
6.3 Limit design stresses	21
6.4 Execution of the proof	21
7 Proof of fatigue strength	22
7.1 General	22
7.2 Stress life approach: S-N procedure	23
7.2.1 Design stress	23
7.2.2 Limit design fatigue stress $R_{d,f}$	28
7.3 Execution of the proof of fatigue strength	34
7.3.1 Individual proof	34
7.3.2 Simplified proof	34
7.3.3 Proof for multiaxial loading	35
Annex A (informative) Values for the notch factor f_1	36
A.1 General	36
A.2 Examples of notch factors	37
Annex B (informative) -N procedure: the strain life approach	47
B.1 General	47
B.2 Origin of the strain life approach resistance curve	47
B.3 Determination of the strain life approach resistance curve for a steel grade	49
B.4 Determination of the resistance curve for a machinery component	51
B.5 Strain-life approach: -N method	52

B.6	Strain-life approach (-N procedure): proof of fatigue strength of a shaft (example)	59
Annex C (informative) Examples for the determination of predetermined values of $\hat{n}$ and s_k		65
C.1	General	65
C.2	Rope drum shaft	65
C.3	Travel and traverse wheel shaft	68
C.4	Guide roller axles	69
C.5	Sheave axle	70
Annex D (informative) Overview of standards published by CEN/TC 147		71
D.1	General	71
D.2	Selecting a suitable standard	71
Annex E (informative) List of significant hazards		73
Bibliography		74