

ISO 6336-3:2019-11 (E)

Calculation of load capacity of spur and helical gears - Part 3: Calculation of tooth bending strength

Contents		Page
Foreword		v
Introduction		vi
1	Scope	1
2	Normative references	1
3	Terms, definitions, symbols and abbreviated terms	2
3.1	Terms and definitions	2
3.2	Symbols and abbreviated terms	2
4	Tooth breakage and safety factors	7
5	Basic formulae	7
5.1	General	7
5.2	Safety factor for bending strength (safety against tooth breakage), SF	8
5.3	Tooth root stress, F	8
5.3.1	General	8
5.3.2	Method A	8
5.3.3	Method B	8
5.4	Permissible bending stress, FP	10
5.4.1	General	10
5.4.2	Methods for determination of permissible bending stress, FP -- Principles, assumptions and application	10
5.4.3	Permissible bending stress, FP: Method B	11
5.4.4	Permissible bending stress, FP, for limited and long life: Method B	12
6	Form factor, YF	14
6.1	General	14
6.2	Calculation of the form factor, YF: Method B	15
6.2.1	General	15
6.2.2	Parameters of virtual gears	17
6.2.3	Tooth root normal chord, sFn, radius of root fillet, F, bending moment arm, hFe for external gears generated with a hob	18
6.2.4	Tooth root normal chord, sFn, radius of root fillet, F, bending moment arm, hFe for external gears generated with a shaper cutter²⁾	19
6.2.5	Tooth root normal chord, sFn, radius of root fillet, F, bending moment arm, hFe for internal gears generated with a shaper cutter²⁾	24
7	Stress correction factor, YS	24
7.1	Basic uses	24
7.2	Stress correction factor, YS: Method B	24
7.3	Stress correction factor for gears with notches in fillets	25
7.4	Stress correction factor, YST, relevant to the dimensions of the standard reference test gears	25
8	Helix angle factor, Y	26
8.1	General	26
8.2	Graphical value	26
8.3	Determination by calculation	26

9	Rim thickness factor, YB	27
9.1	General	27
9.2	Graphical values	27
9.3	Determination by calculation	27
9.3.1	External gears	27
9.3.2	Internal gears	28
10	Deep tooth factor, YDT	28
10.1	General	28
10.2	Graphical values	28
10.3	Determination by calculation	29
11	Reference stress for bending	29
11.1	General	29
11.2	Reference stress for Method A	29
11.3	Reference stress, with values F_{lim} and F_E for Method B	29
12	Life factor, YNT	29
12.1	General	29
12.2	Life factor, YNT: Method A	30
12.3	Life factor, YNT: Method B	30
12.3.1	General	30
12.3.2	Graphical values	30
12.3.3	Determination by calculation	31
13	Notch sensitivity factor, Y _T , and relative notch sensitivity factor, Y _{rel T}	32
13.1	Basic uses	32
13.2	Determination of the notch sensitivity factors	32
13.2.1	General	32
13.2.2	Method A	32
13.2.3	Method B	32
13.3	Relative notch sensitivity factor, Y _{rel T} : Method B	32
13.3.1	Graphical values	32
13.3.2	Determination by calculation	33
14	Surface factors, Y _R , Y _{RT} , and relative surface factor, Y _{rel T}	38
14.1	Influence of surface condition	38
14.2	Determination of surface factors and relative surface factors	39
14.2.1	General	39
14.2.2	Method A	39
14.2.3	Method B	39
14.3	Relative surface factor, Y _{rel T} : Method B	39
14.3.1	Graphical values	39
14.3.2	Determination by calculation	40
15	Size factor, Y _X	41
15.1	General	41
15.2	Size factor, Y _X : Method A	41
15.3	Size factor, Y _X : Method B	41
15.3.1	General	41
15.3.2	Graphical values for reference stress and static stress	41
15.3.3	Determination by calculation	42
Annex A (normative) Permissible bending stress, F_P , obtained from notched, flat or plain polished test pieces		44
Annex B (informative) Guide values for mean stress influence factor, Y _M		52
Annex C (informative) Derivations of determinant normal tooth load of spur gears		54
Bibliography		55