
**Calculation of load capacity of spur
and helical gears —**

**Part 3:
Calculation of tooth bending strength**

*Calcul de la capacité de charge des engrenages cylindriques à
dentures droite et hélicoïdale —*

Partie 3: Calcul de la tenue en fatigue à la flexion en pied de dent





COPYRIGHT PROTECTED DOCUMENT

© ISO 2019

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Fax: +41 22 749 09 47
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

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), S_F	8
5.3 Tooth root stress, σ_F	8
5.3.1 General	8
5.3.2 Method A	8
5.3.3 Method B	8
5.4 Permissible bending stress, σ_{FP}	10
5.4.1 General	10
5.4.2 Methods for determination of permissible bending stress, σ_{FP} — Principles, assumptions and application	10
5.4.3 Permissible bending stress, σ_{FP} : Method B	11
5.4.4 Permissible bending stress, σ_{FP} , for limited and long life: Method B	12
6 Form factor, Y_F	14
6.1 General	14
6.2 Calculation of the form factor, Y_F : Method B	15
6.2.1 General	15
6.2.2 Parameters of virtual gears	17
6.2.3 Tooth root normal chord, s_{Fn} , radius of root fillet, ρ_F , bending moment arm, h_{Fe} for external gears generated with a hob	18
6.2.4 Tooth root normal chord, s_{Fn} , radius of root fillet, ρ_F , bending moment arm, h_{Fe} for external gears generated with a shaper cutter ²⁾	19
6.2.5 Tooth root normal chord, s_{Fn} , radius of root fillet, ρ_F , bending moment arm, h_{Fe} for internal gears generated with a shaper cutter ²⁾	24
7 Stress correction factor, Y_S	24
7.1 Basic uses	24
7.2 Stress correction factor, Y_S : Method B	24
7.3 Stress correction factor for gears with notches in fillets	25
7.4 Stress correction factor, Y_{ST} , relevant to the dimensions of the standard reference test gears	25
8 Helix angle factor, Y_β	26
8.1 General	26
8.2 Graphical value	26
8.3 Determination by calculation	26
9 Rim thickness factor, Y_B	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, Y_{DT}	28
10.1 General	28