

ISO 10300-1:2023-08 (E)

Calculation of load capacity of bevel gears - Part 1: Introduction and general influence factors

| Contents | | Page |
|--------------------|---|-------------|
| Foreword | | v |
| Introduction | | vii |
| 1 | Scope | 1 |
| 2 | Normative references | 1 |
| 3 | Terms and definitions | 2 |
| 4 | Symbols and general subscripts | 2 |
| 5 | Application | 6 |
| 5.1 | Calculation methods | 6 |
| 5.1.1 | General | 6 |
| 5.1.2 | Method A | 6 |
| 5.1.3 | Method B | 6 |
| 5.1.4 | Method C | 6 |
| 5.2 | Safety factors | 7 |
| 5.3 | Rating factors | 7 |
| 5.3.1 | Testing | 7 |
| 5.3.2 | Manufacturing tolerances | 7 |
| 5.3.3 | Implied accuracy | 8 |
| 5.4 | Further factors to be considered | 8 |
| 5.4.1 | General | 8 |
| 5.4.2 | Lubrication | 8 |
| 5.4.3 | Misalignment | 8 |
| 5.4.4 | Deflection | 8 |
| 5.4.5 | Materials and metallurgy | 8 |
| 5.4.6 | Residual stress | 8 |
| 5.4.7 | System dynamics | 9 |
| 5.4.8 | Contact pattern | 9 |
| 5.4.9 | Corrosion | 9 |
| 5.5 | Further influence factors in the basic formulae | 9 |
| 6 | External force and application factor, K_A | 10 |
| 6.1 | Nominal tangential force, torque, power | 10 |
| 6.2 | Variable load conditions | 10 |
| 6.3 | Application factor, K_A | 10 |
| 6.3.1 | Application factor – General | 10 |
| 6.3.2 | Influences affecting external dynamic loads | 11 |
| 6.3.3 | Establishment of application factors | 11 |
| 7 | Dynamic factor, K_v | 11 |
| 7.1 | General | 11 |
| 7.2 | Design | 11 |
| 7.3 | Manufacturing | 12 |
| 7.4 | Transmission error | 12 |
| 7.5 | Dynamic response | 12 |
| 7.6 | Resonance | 13 |
| 7.6.1 | General | 13 |

| | | |
|---|---|----|
| 7.6.2 | Gear blank resonance | 13 |
| 7.7 | Calculation methods for Kv | 13 |
| 7.7.1 | General comments | 13 |
| 7.7.2 | Method A, Kv-A | 14 |
| 7.7.3 | Method B, Kv-B | 14 |
| 7.7.4 | Method C, Kv-C | 18 |
| 8 | Face load factors, KH, KF | 20 |
| 8.1 | General comments | 20 |
| 8.2 | Method A | 20 |
| 8.3 | Method B | 21 |
| 8.4 | Method C | 21 |
| 8.4.1 | Face load factor, KH-C | 21 |
| 8.4.2 | Local face load factor, KH,Y | 21 |
| 8.4.3 | Face load factor, KF-C | 22 |
| 8.4.4 | Lengthwise curvature factor for bending strength, KF0 | 22 |
| 9 | Transverse load factors, KH, KF | 23 |
| 9.1 | General comments | 23 |
| 9.2 | Method A | 24 |
| 9.3 | Method B | 24 |
| 9.3.1 | Bevel gears having virtual cylindrical gears with contact ratio $v < 2$ | 24 |
| 9.3.2 | Bevel gears having virtual cylindrical gears with contact ratio $v > 2$ | 24 |
| 9.4 | Method C | 25 |
| 9.4.1 | General comments | 25 |
| 9.4.2 | Assumptions | 25 |
| 9.4.3 | Determination of the factors | 25 |
| 9.5 | Running-in allowance, y | 25 |
| Annex A (normative) Calculation of virtual cylindrical gears -- Method B1 | | 27 |
| Annex B (normative) Calculation of virtual cylindrical gears -- Method B2 | | 43 |
| Annex C (informative) Values for application factor, KA | | 49 |
| Annex D (informative) Contact patterns | | 50 |
| Bibliography | | 54 |