

ISO 23509:2006-09 (E)

Bevel and hypoid gear geometry

Contents		Page
Foreword		v
Introduction		vi
1	Scope	1
2	Normative references	1
3	Terms, definitions and symbols	1
3.1	Terms and definitions	6
3.2	Symbols	8
4	Design considerations	10
4.1	General	10
4.2	Types of bevel gears	11
4.2.1	Straight bevels	11
4.2.2	Spiral bevels	11
4.2.3	Zerol bevels	11
4.2.4	Hypoids	12
4.3	Ratios	12
4.4	Hand of spiral	12
4.5	Preliminary gear size	13
5	Tooth geometry and cutting considerations	13
5.1	Manufacturing considerations	13
5.2	Tooth taper	13
5.3	Tooth depth configurations	15
5.3.1	Taper depth	15
5.3.2	Uniform depth	16
5.4	Dedendum angle modifications	18
5.5	Cutter radius	18
5.6	Mean radius of curvature	18
5.7	Hypoid design	19
5.8	Most general type of gearing	19
5.9	Hypoid geometry	20
5.9.1	Basics	20
5.9.2	Crossing point	22
6	Pitch cone parameters	22
6.1	Initial data	22
6.2	Determination of pitch cone parameters for bevel and hypoid gears	23
6.2.1	Method 0	23
6.2.2	Method 1	23
6.2.3	Method 2	27
6.2.4	Method 3	32
7	Gear dimensions	35
7.1	Additional data	35
7.2	Determination of basic data	37
7.3	Determination of tooth depth at calculation point	39
7.4	Determination of root angles and face angles	39
7.5	Determination of pinion face width, b₁	41

7.6	Determination of inner and the outer spiral angles	43
7.6.1	Pinion	43
7.6.2	Wheel	44
7.7	Determination of tooth depth	45
7.8	Determination of tooth thickness	46
7.9	Determination of remaining dimensions	47
8	Undercut check	48
8.1	Pinion	48
8.2	Wheel	50
Annex A (informative) Structure of ISO formula set for calculation of geometry data of bevel and hypoid gears		52
Annex B (informative) Pitch cone parameters		58
Annex C (informative) Gear dimensions		68
Annex D (informative) Analysis of forces		75
Annex E (informative) Machine tool data		78
Annex F (informative) Sample calculations		79