

Information on Gear Teeth in Drawings

Information on Involute Teeth for Cylindrical Gears

DIN
3966

Part 1

Angaben für Verzahnungen in Zeichnungen; Angaben für Stirnrad- (Zylinderrad-) Evolventenverzahnungen

In this Standard the information contained in the International Standard ISO 1340 — 1976 has been adopted and supplemented by additional data. For provisions relating to the representation of gears in drawings see DIN ISO 2203.

This Standard contains only such information as is necessary and adequate, apart from the usual data on material, heat-treatment and hardness, for clearly denoting the involute teeth on a cylindrical gear in manufacturing drawings. If necessary further details may be added, e. g. if the gearcutting or manufacturing method (e. g. injection moulding in the case of plastics gears) to be applied, or agreements on testing and acceptance, make this necessary.

For information regarding cylindrical gears for light precision engineering see DIN 58 405 Part 3.

The terms, designations and symbols used agree with DIN 3960, DIN 3998 Part 2 and DIN 3999.

Length dimensions in mm

Contents

	Page		Page
0 Other relevant Standards	1	2.2 Gear tooth tolerances and their test dimensions	3
1 Dimensions and symbols in the drawing	2	2.3 Gear pairing	4
1.1 Tip diameter d_a	2	3 Data on preparatory treatment	4
1.2 Root diameter d_f (if required)	2	4 Examples for tables according to Section 2	4
1.3 Facewidth b	2	4.1 Table for an external straight cylindrical gear	5
1.4 Symbols of the reference elements	2		
1.5 Concentricity and camming tolerance			

Anwenderinformation

Die Originalfassung der Norm enthält **Elemente, z.B. farbige Abbildungen oder Tabellen**, die in dieser gescannten Form der Norm nicht originalgetreu darstellbar sind. Dies muß bei der Anwendung berücksichtigt werden. Maßgebend für das Anwenden jeder DIN-Norm ist deren Originalfassung mit dem neuesten Ausgabedatum. Vergewissern Sie sich bitte in den DIN-Mitteilungen, im aktuellen DIN-Katalog mit dem neuesten Ergänzungsheft oder in der aktuellen Ausgabe der PERINORM.

th
ress

nd gear
ical

rm)
tion
osition;
gs

ances,

is 2 to 7

Explanations on page 8

Information on Gear Teeth in Drawings

Information on Involute Teeth for Cylindrical Gears

DIN
3966
Part 1

Angaben für Verzahnungen in Zeichnungen; Angaben für Stirnrad- (Zylinderrad-) Evolventenverzahnungen

In this Standard the information contained in the International Standard ISO 1340 — 1976 has been adopted and supplemented by additional data. For provisions relating to the representation of gears in drawings see DIN ISO 2203.

This Standard contains only such information as is necessary and adequate, apart from the usual data on material, heat-treatment and hardness, for clearly denoting the involute teeth on a cylindrical gear in manufacturing drawings. If necessary further details may be added, e. g. if the gearcutting or manufacturing method (e. g. injection moulding in the case of plastics gears) to be applied, or agreements on testing and acceptance, make this necessary.

For information regarding cylindrical gears for light precision engineering see DIN 58 405 Part 3.

The terms, designations and symbols used agree with DIN 3960, DIN 3998 Part 2 and DIN 3999.

Length dimensions in mm

Contents

	Page		Page
0 Other relevant Standards	1	2.2 Gear tooth tolerances and their test dimensions	3
1 Dimensions and symbols in the drawing	2	2.3 Gear pairing	4
1.1 Tip diameter d_a	2	3 Data on preparatory treatment	4
1.2 Root diameter d_f (if required)	2	4 Examples for tables according to Section 2	4
1.3 Facewidth b	2	4.1 Table for an external straight cylindrical gear	5
1.4 Symbols of the reference elements	2	4.2 Table for an external helical cylindrical gear	5
1.5 Concentricity and camming tolerance as well as parallelism of faces of the gear body	2	4.3 Table for an internal straight cylindrical gear	5
1.6 Symbols of surfaces for the tooth flanks to DIN ISO 1302 or DIN 3141	2	4.4 Abridged table for an external cylindrical gear	7
1.7 Denoting the working flanks (if required)		4.5 Abridged table for an external cylindrical gear	7
2 Data in separate table	2		
2.1 Nominal dimensions of gear teeth	3		

0 Other relevant Standards

DIN ISO 1302	Technical drawings; indication of surface condition in drawings
DIN ISO 2203	Technical drawings; representation of gears
DIN 3141	(Preliminary Standard) Surface symbols in drawings; assignment of peak-to-valley heights
DIN 3960	Definitions and parameters for cylindrical gears and cylindrical gear pairs with involute teeth
DIN 3961	Tolerances for cylindrical gear teeth; bases

DIN 3967	System of gear fits; backlash, tooth thickness allowances, tooth thickness tolerances, bases
DIN 3998	Part 2 Denominations on gears and gear pairs; cylindrical gears and cylindrical gear pairs
DIN 3999	Symbols for gear teeth
DIN 7168	Part 2 (at present still in draft form) General tolerances, form and position
DIN 7184	Part 1 Tolerances of form and position; definitions; indications on drawings
DIN 58 405	Part 2 Spur gear drives for fine mechanics; gear fit selection, tolerances, allowances

Continued on pages 2 to 7
Explanations on page 8

1 Dimensions and symbols in the drawing

1.1 Tip diameter d_a

Tip diameter d_a with deviations (if required).

Note: In the case of undercut or injection moulded gears, which by reason of the manufacturing method are to be treated like undercut gears, the connection between the tooth thickness allowances and the allowances of the tip diameter is to be observed, see DIN 3960.

1.2 Root diameter d_f (if required), if no tooth depth h is stated in the table.

Root diameter d_f with allowances (if required) if a specific dimension is to be observed.

Note: In the case of undercut or injection moulded gears the connection between the tooth thickness allowances and the allowances of the root diameter are to be observed, see DIN 3960.

1.3 Facewidth b

1.4 Symbols of the reference elements

The reference element for the concentricity and camming tolerancing is the gear axis. The method of indicating shall be in accordance with DIN 7184 Part 1.

1.5 Concentricity and camming tolerance as well as parallelism of faces of the gear body

Where the reference to general tolerances according to DIN 7168 Part 2 is not sufficient, concentricity and camming tolerances to DIN 7184 Part 1 are to be specified.

The test locations are to be designated.

In detail the following are to be indicated:

Permissible concentricity deviation of the external cylinder or of separate cylindrical test surfaces relative

to the centre of the bore/centre of the journal or relative to the bore envelope/journal envelope; the plane of measurement is to be stated if necessary.

Permissible camming deviation of the end faces

or of special test surfaces relative to the centre of the bore/centre of the journal or relative to the bore envelope/journal envelope; the measurement circles are to be denoted if necessary. The requirement can be stipulated for either one or both sides of the gear.

If required (e. g. for gear cutting in clusters) the deviations from parallelism of the faces is to be tolerated.

Remark:

If required, individual teeth on one side of a gear, which is declared in this way to be the front side, can be denoted as tooth 1 and tooth 2, the counting direction being specified at the same time (preferably in the clockwise direction). The front side is the criterion for determining the right flank and left flank, see DIN 868.

1.6 Symbols of surfaces for the tooth flanks to DIN ISO 1302 or DIN 3141, if necessary also for the tooth root and root radiusing surfaces.

1.7 Denoting the working flanks (if required) e. g. by the note "working flank" in a transverse section, see DIN 868.

2 Data in separate table

In a table those parameters are to be stated which are necessary, for the particular case concerned, for selecting or manufacturing the tool producing the gear teeth (e. g. pinion type cutter, injection mould), for setting the gear tooth production machine and for testing the gear teeth.

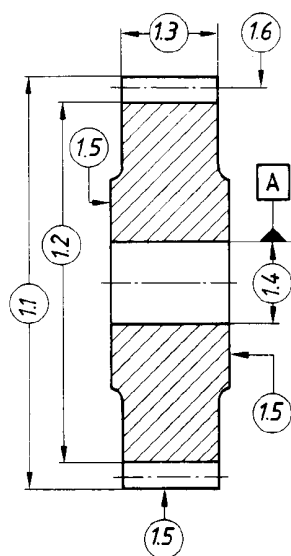


Figure 1. Dimensions and symbols in the drawing, external gear teeth with bearing bore

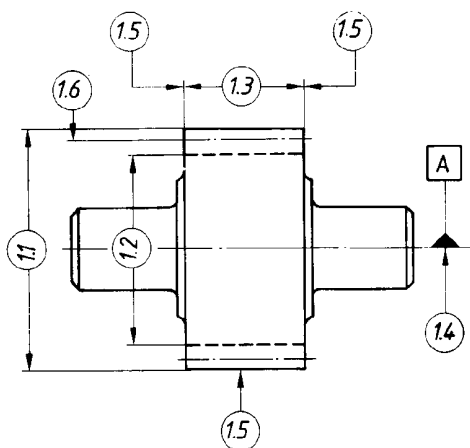


Figure 2. Dimensions and symbols in the drawing, external gear teeth with journal

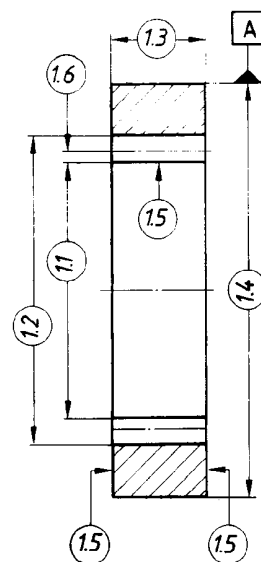


Figure 3. Dimensions and symbols in the drawing, internal teeth

In the heading of the Table it shall be stated whether the data apply to an external or an internal cylindrical gear.

The Table may either be incorporated in the drawing sheet or attached to the drawing as a separate sheet.

The examples in Sections 4.1 to 4.3 show a detailed form of the Table with all the necessary data. It may be appropriate to provide on the drawing abridged tables containing only a few items of data, see examples in Sections 4.4 and 4.5. The data lacking in these tables, but necessary for describing the gear teeth, can then be supplied as a separate sheet accompanying the drawing.

2.1 Nominal dimensions of gear teeth

2.1.1 Module m

The normal module m_n is to be stated.

2.1.2 Number of teeth z

For the purpose of calculations, the number of teeth of an external gear is given a positive sign and the number of teeth of an internal gear a negative sign, see DIN 3960. In drawings the number of teeth is always stated without sign.

If the gear teeth on the workpiece consist only of one or more sectors, the number of teeth of the complete tooth system shall be stated in the table, and additionally in brackets (optionally in the table or drawing) the number of teeth of the sectors.

2.1.3 Standard basic rack tooth profiles

2.1.3.1 Standard basic rack tooth profile of the gear teeth

Remark:

In the case of helical gears the standard basic rack tooth profile applies to the normal section.

Note: The gear tooth tolerances for involute teeth with normal standard basic rack tooth profile (see DIN 3961 to DIN 3967 or DIN 58 405 Part 2) can also be used as appropriate for gear teeth the standard basic rack tooth profile of which deviates in one or more parameters from DIN 867 or DIN 58 400, e. g. in the profile angle α_p , the tooth depth h_p , the bottom clearance etc., or for which certain profile modifications are specified. The parameters subject to deviation are to be specially stated, preferably in a drawing.

2.1.3.2 Standard tool profile

The standard tool profile is stated according to DIN 3972 or DIN 58 412 or in a drawing.

2.1.4 Helix angle β

The helix angle β is stated without sign, see DIN 3960.

If a helix angle to DIN 3978 is used, then "DIN 3978" shall be added to the dimension data.

It may be expedient to state also the number of teeth of the pinion type cutter and the helical guidance lead, see example in Section 4.2.

Note: This applies in particular when a helix angle not contained in DIN 3978 is specified with a non-standard number of teeth on the pinion cutter but with standard helical guidance lead (see Explanations in DIN 3978).

2.1.5 Flank direction (of helical gears)

Instead of the terms "right-handed" or "left-handed" to DIN 3960 it is sufficient to state "right" or "left" or "R" or "L" in the table.

In the case of double helical teeth and continuous double helical teeth the corresponding symbols to DIN ISO 2203 are to be used and supplemented as necessary by any further data needed.

2.1.6 Reference circle diameter d and base diameter d_b

Note: The reference circle diameter d derives from the foregoing gear tooth data. It is not needed for generating and testing the teeth and can therefore be omitted from the table. The base diameter can be omitted if it is not needed for generating or testing the teeth.

2.1.7 Addendum modification coefficient x

The addendum modification coefficient x is to be stated with its sign "+" or "-", see DIN 3960.

Note: In the table the theoretical value of the addendum modification coefficient is to be stated without taking into account the tooth thickness allowances not even if these, as is usually the case, are produced by an additional depth feed of the gearcutting tool. With this theoretical value it is possible to check the nominal dimensions of the tip diameter, base tangent length etc. more quickly than if it were first necessary to determine a proportion assignable to the production of the tooth thickness allowances and deduct this.

Remark:

For internal gears the sign of the addendum modification has been altered in DIN 3960, October 1976 edition, compared with the previous editions. In the case of internal gears it is recommended that a note drawing attention to the new provision should be included in the table, see example in Section 4.3.

Note: In contrast with the provision of this Section, that the addendum modification coefficient is to be stated with its sign, the negative signs of the number of teeth, the diameter, the centre distance and some test dimensions for the tooth thickness requiring to be used, or arising, in connection with the calculation of internal gears are not generally stated in production documents intended for the workshop, see also DIN 3960 and DIN 3993.

2.1.8 Tooth depth h

The parameter stated is the nominal dimension of the tooth depth h , which also contains the addendum alteration $k \cdot m_n$, so that the nominal dimension of the root diameter can be calculated from the tip diameter in the drawing and the tooth depth h .

2.1.9 Addendum alteration $k \cdot m_n$

This information is usually only necessary if it is not certain in advance what tool addendum h_{aP0} will be used for cutting the teeth, or if the tip cylinder will be undercut with a standard cutting tool. This applies also to injection moulded gears.

2.2 Gear tooth tolerances and their test dimensions

Note: The information according to Sections 2.2.1 to 2.2.6 characterizes the quality of the gear teeth and

their acceptance testing. The information is sufficient for finding all the necessary numerical values in the Standards DIN 3962, DIN 3963 and DIN 3967.

It is optional whether the provisions of these Sections are supplemented in the Table by additional data according to Section 2.2.7, see examples in Sections 4.1 to 4.3.

2.2.1 Gear tooth quality, tolerance zone

Data according to DIN 3961 and DIN 3967 or according to DIN 58 405 Part 2.

2.2.2 Quality testing and test groups

Note: When determining the gear tooth quality by stating function groups it is not absolutely necessary for all the parameters and working deviations belonging to this group to be tested; it is sufficient to test only those parameters or working deviations which are critical for the case concerned. For a certain function group and gear tooth quality, therefore, test groups are feasible and expedient in which various combinations of tests are combined. The test groups are designated by the letter symbols A, B and C; DIN 3961 explains which test procedures belong to a given function group and gear tooth quality and which parameters or working deviations must lie within given values for this purpose. In the Table the code letter of the selected test group is indicated together with the gear tooth quality designation, see example in Section 4.3.

If the test group is not stated in the Table the manufacturer of the gear is allowed to select the test group.

2.2.3 Tooth thickness and tooth thickness allowances

In the Table the nominal dimension of the tooth thickness (normal tooth thickness on the reference cylinder) and the tooth thickness allowances are stated. This information is necessary for calculation purposes and for checking test dimensions. The tooth thickness allowances are specified according to DIN 3967 or DIN 58 405 Part 2.

2.2.4 Test dimension of tooth thickness

In the normal section the tooth thickness is a theoretical value which is not directly measurable on the gear. In the Table, therefore, it is necessary to quote one of the test dimensions to DIN 3960. Usually it is sufficient to quote the maximum and minimum values of the test dimension, see examples in Sections 4.1 to 4.3.

It may be expedient to quote the nominal dimension of the test dimension with the allowances (e. g. when the nominal dimension of the tooth thickness is not quoted according to Section 2.2.3).

From the quoting of a test dimension it is possible to find the measuring method according to which the tooth thicknesses and tooth thickness fluctuation are to be determined.

If a test dimension is missing from the Table, or if several test dimensions are stated, the measuring method to be applied is left to the manufacturer of the gear. The special features of the measuring methods — see DIN 3967 Appendix B — must be taken into account.

2.2.5 Profile test range (if required)

For testing the profile form deviations it may be necessary to state the test range of the involutes.

The profile test range is conveniently specified by stating the working lengths L_f for the tooth root and L_a for the tooth crest, see DIN 3960.

The profile test range can also be specified by stating the length of path of contact g_α , see DIN 3960, also example in Section 4.2.

2.2.6 Effective root diameter d_{Nf} (if required)

For the manufacture of a gear cutting tool the effective root diameter d_{Nf} is often needed, see DIN 3960, also example in Section 4.3.

2.2.7 Supplementary data

When required, supplementary data can be indicated, e. g. regarding the standard basic rack tooth profile (possibly differing from DIN 867 or DIN 58 400), see example in Section 4.3.

It may also be necessary to fix provisions regarding non-geometrical parameters. In the case of plastic gears it may be necessary, for example, to provide data regarding storage at certain temperatures.

2.3 Gear pairing

The pairing of gears in gear transmissions can be indicated in the Table by the following data.

2.3.1 Reference number of the mating gear or mating gears

2.3.2 Number of teeth z of the mating gear or mating gears

If the mating gear is an internal gear, the term “internally-toothed” should be added to its number of teeth.

In the case of gears with two or more mating gears, the detailing of all the mating gears may obscure the position. In such cases it is advantageous to indicate the largest length of path of action arising or the corresponding working lengths, see Section 2.2.5. The data according to Sections 2.3.1 to 2.3.3 can then be dispensed with, see example in Section 4.2.

2.3.3 Centre distance a in transmission housing and centre distance allowances A_a

The centre distance a is reckoned as positive for external gear pairs and negative for internal gear pairs, see DIN 3960. In drawings a centre distance is always indicated without sign.

3 Data on preparatory treatment

If necessary, data regarding preparatory treatment (machining allowances, measured quantities) may be inserted in a special panel.

4 Examples for tables according to Section 2

In the examples the allowances for the test dimensions of tooth thickness are calculated from the tooth thickness allowances according to geometrically ideal preconditions. The corrections necessary on the basis of practical experience and depending on the factors associated with the measuring methods (see DIN 3967) are not considered here.

4.1 Table for an external straight cylindrical gear

In addition to the minimum data, the base tangent length and tolerances for the individual parameters are stated here.

4.2 Table for an external helical cylindrical gear

In addition to the minimum data, the information given here includes provisions on quality testing to DIN 3961, the two-flank working distance with the working deviation and working error, the effective root diameter and (instead of several mating gears) the largest length of path of contact arising.

4.3 Table for an internal straight cylindrical gear

In addition to the minimum data, the information stated here includes provisions on quality testing to DIN 3961, the diametral two-ball measurement with measuring ball diameter and the effective root diameter.

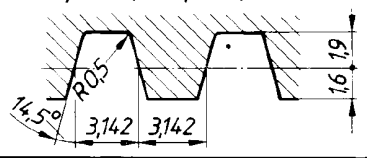
Table for Section 4.1

Cylindrical gear		external internal
Module	m_n	3,5
Number of teeth	z	17
Standard basic rack tooth profile	gear teeth	DIN 867
	tool	DIN 3972-1 $\times 3,5$
Helix angle	β	0°
Flank direction		—
Reference diameter	d	59,5
Base diameter	d_b	55,9120
Addendum modification coefficient ²⁾	x	+ 0,5180
Tooth depth	h	7,88
Addendum alteration	$k \cdot m_n$	
Gear tooth quality, tolerance zone Test group to DIN 3961 1)		6 e 26
Tooth thickness with allowances s_n		6,818 $\begin{smallmatrix} -0,040 \\ -0,100 \end{smallmatrix}$
Test dimensions of tooth thickness 1)	Normal chordal tooth thickness and height above chord	$\bar{s}$ $\bar{h}$
	Base tangent length over k teeth	W_k $k = 3$
	Radial or diametral test dimension	M_r or M_d
	and diameter of measuring ball or measuring roller	D_M
	Two-flank working distance	a''
	Further gear tooth tolerances and test data:	
per. individual pitch deviation f_p		$\pm 0,007$
per. total pitch deviation F_p		0,028
Mating gear	Reference number	R 712
	Number of teeth z	33
Centre distance in housing with allowances		a
Working lengths or length of path of contact		L_a, L_f g_a
Supplementary data (if required):		
1) These tests are left to the manufacturer's discretion if no data are provided. 2) Sign according to DIN 3960, October 1976 edition.		

Table for Section 4.2

Cylindrical gear		external internal
Module	m_n	3
Number of teeth	z	28
Standard basic rack tooth profile	gear teeth	DIN 867
	tool	DIN 3972-I x 3
Helix angle	β	DIN 3978-17,4576 (17°27'27")
Flank direction		left
Reference diameter	d	88,056
Base diameter	d_b	82,2710
Addendum modification coefficient ²⁾	x	+ 0,2050
Tooth depth	h	6,5
Addendum alteration	$k \cdot m_n$	
Gear tooth quality tolerance zone Test group to DIN 3961 ¹⁾		8 e 26 N 8 B
Tooth thickness with allowances s_n		5,160 $\begin{smallmatrix} -0,040 \\ -0,100 \end{smallmatrix}$
Test dimensions of tooth thickness ¹⁾	Normal chordal tooth thickness and height above chord	$\bar{s}$ $\bar{h}$
	Base tangent length over k teeth	W_k $k =$
	Radial or diametral test dimension	M_r or M_d
	and diameter of measuring ball or measuring roller	D_M
	Two-flank working distance	a''
		Maximum 101,185 Minimum 101,105
Further gear tooth tolerances and test data:		
Number of master gear per. two-flank working deviation F_i''		L 322/0
per. two-flank working error f_i''		0,045
Effective root diameter d_{ne}		0,018 84,53
Mating gear	Reference number	
	Number of teeth	z
Centre distance in housing with allowances		a
Working lengths or length of path of contact		L_a, L_f $g\alpha$
		14,32
Supplementary data (if required):		
Number of teeth of pinion-type cutter		32
Helical guidance lead		320 π
1) These tests are left to the manufacturer's discretion if no data are provided.		
2) Sign according to DIN 3960, October 1976 edition.		

Table for Section 4.3

Cylindrical gear		external internal
Module	m_n	2
Number of teeth	z	143
Standard basic rack tooth profile	gear teeth	see below
	tool	
Helix angle	β	0°
Flank direction		—
Reference diameter	d	286
Base diameter	d_b	
Addendum modification coefficient ²⁾	x	- 0,2000
Tooth depth	h	3,5
Addendum alteration	$k \cdot m_n$	
Gear tooth quality tolerance zone Test group to DIN 3961 ¹⁾		9 d 28 T 9 C
Tooth thickness with allowances s_n		2,935 $\begin{smallmatrix} -0,110 \\ -0,360 \end{smallmatrix}$
Test dimensions of tooth thickness ¹⁾	Normal chordal tooth thickness and height above chord	$\bar{s}$ $\bar{h}$
	Base tangent length over k teeth	W_k $k =$
	Radial or diametral test dimension	M_r or M_d
	and diameter of measuring ball or measuring roller	D_M
	Two-flank working distance	a''
		Max. 282,84 Min. 281,87
Further gear tooth tolerances and test data:		
per. individual pitch deviation f_p		$\pm 0,022$
Effective root diameter d_{nf}		289,12
Mating gear	Reference number	12/672 a
	Number of teeth	z
Centre distance in housing with allowances		a
		116 $\pm 0,070$
Working lengths or length of path of contact		L_a, L_f $g\alpha$
Supplementary data (if required):		
		
1) These tests are left to the manufacturer's discretion if no data are provided.		
2) Sign according to DIN 3960, October 1976 edition.		

4.4 Abridged Table for an external cylindrical gear

The only information stated are the geometrical parameters of the gear teeth plus the gear tooth quality with the symbols for the tooth thickness allowances to DIN 3967 and the test dimension to be determined for the tooth thickness.

Cylindrical gear	external internal
Module m_n	4,5
Number of teeth z	81
Standard basic rack tooth profile	DIN 867
Helix angle β	11°
Flank direction	left
Addendum modification coefficient x	0
Gear tooth quality, tolerance zone	8 d 25
Base tangent length over k teeth W_k $k = 10$	131,586 $\pm$ $\begin{smallmatrix} 0,100 \\ 0,160 \end{smallmatrix}$
Centre distance in housing with allowances a	200 $\pm$ 0,050

4.5 Abridged Table for an external cylindrical gear

The only information stated are the geometrical basic parameters of the gear teeth and a note concerning the other setting data.

Cylindrical gear		external internal
Module	m_n	3
Number of teeth	z	28
Standard basic rack tooth profile		DIN 867
Helix angle	β	DIN 3978 - 17,4576 (17°27'27")
Flank direction		left
Centre distance in housing with allowances		a 100 ± 0,050
Mating gear	Reference number	Z 3028
	Number of teeth	z 53
Setting data according to No.		Z 789/3

Further Standards

- DIN 867 Basic rack of cylindrical gears with involute teeth for general and heavy engineering
- DIN 868 General definitions and parameters for gears, gear pairs and gear trains
- DIN 3966 Part 2 Information on gear teeth in drawings; information on straight bevel gear teeth
- DIN 3972 Reference profiles of gear-cutting tools for involute tooth systems according to DIN 867
- DIN 3978 Helix angles for cylindrical gear teeth
- DIN 58 400 Basic rack profile for spur gears with involute teeth for fine mechanics
- DIN 58 405 Part 3 Spur gear drives for fine mechanics; indication in drawings, examples for calculation
- DIN 58 412 Standard basic rack tooth profiles for gearcutting tools for light precision engineering to DIN 58 400 and DIN 867

Explanations

This Standard contains data from the International Standard ISO 1340 — 1976 plus further information. These particulars apply to the finished cylindrical gear. In the case of the data in the Table, the reference diameter is quoted as in the International Standard; the standard tool profile, the addendum alteration and the working lengths or the length of path of contact have been added. Information on the maximum speed of the gear and on the circumferential backlash has been deleted.

The definitions and parameters in this Standard relate to DIN 3960 "Definitions and parameters for cylindrical gears and cylindrical gear pairs with involute teeth", October 1976 edition. The designations have been coordinated with DIN 3998 Part 2 "Designations of gears and gear pairs; cylindrical gears and cylindrical gear pairs", and the symbols with DIN 3999 "Symbols for gear teeth".

Only one basic type has been used for the examples of data in the Table; this is intended to be used as far as possible as an example for all cases.

For the angle dimensions occurring in the Table data the units stated should be the degree with decimal subdivision and, in brackets, the units degree, minutes and seconds. For angle dimensions in calculation sheets it may be found in systems with a limited stock of symbols (teleprinters, data processing) that the unit symbols for degree, minute and second cannot be represented by the superscript symbols $^{\circ}$ ' ". For such cases DIN 66 030 "Representation of unit names in systems with a limited stock of characters" (subsequent edition at present still in draft form) provides for the following representations of the unit names:

deg or DEG	for degree (angle)
mnt or MNT	for minute (angle)
sec or SEC	for second (angle).

For further abbreviations of the unit names, d, m and s are recommended, e. g. 17d27m27s.