

UDC 621.833 : 001.4

September 1976

**Denominations on Gears
and Gear Pairs**
General Definitions

DIN
3998
Part 1

Benennungen an Zahnrädern und Zahnradpaaren; Allgemeine Begriffe

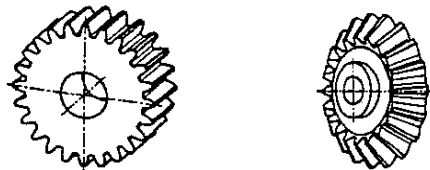
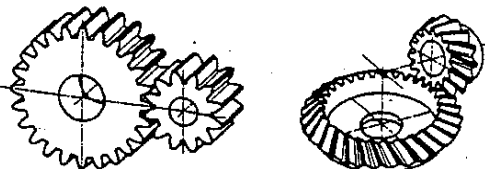
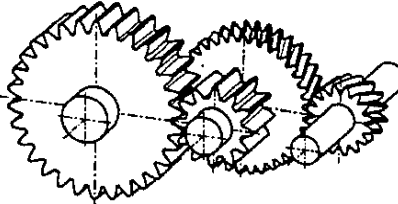
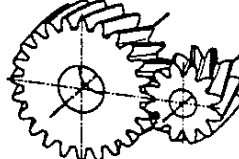
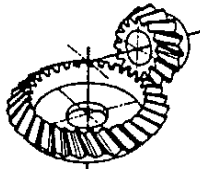
This Standard contains the denominations of the international dictionary of definitions for gear tooth geometry, Part 1 being concerned with general denominations, Part 2 with cylindrical gears and cylindrical gear pairs, Part 3 with bevel gears and bevel gear pairs as well as with hypoid gears and hypoid gear pairs, and Part 4 with worm gear pairs. Supplementary Sheet 1 to DIN 3998 lists the keywords of the terminology in English and French in alphabetical order. For connection with Recommendation ISO/R 1122 — 1969 issued by the International Organization for Standardization (ISO), see Explanations.

The sequence of the denominations and the consecutive numbering in DIN 3998 Part 1 to Part 4 agree with ISO/R 1122. The denominations are stated in English and French.

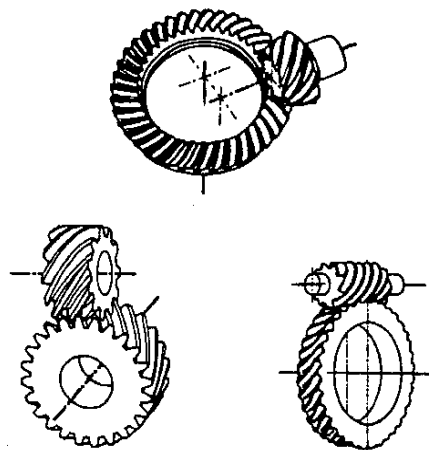
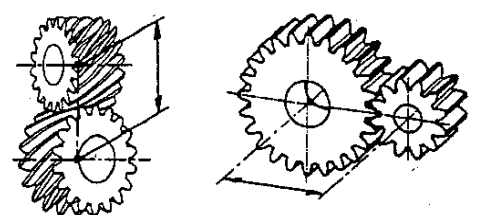
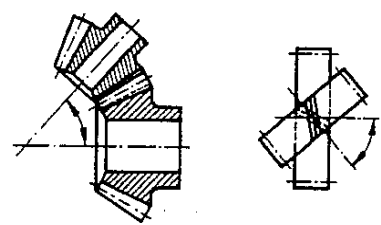
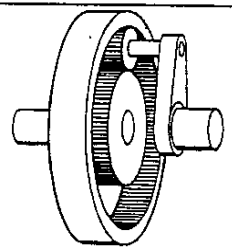
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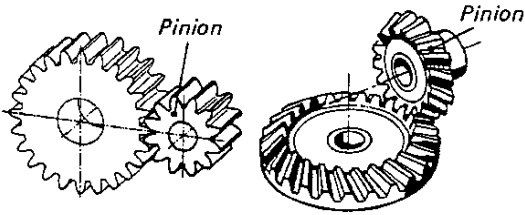
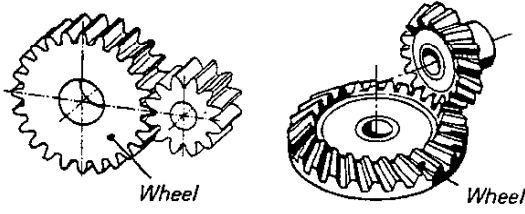
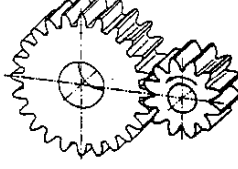
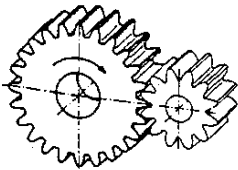
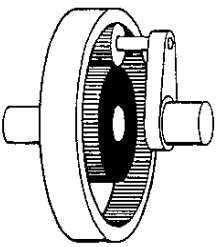
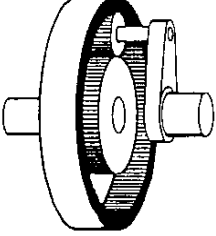
Continued on pages 2 to 17
Explanations on page 17

Ser. No. 1)	Denomination	Examples of design
1	<i>General definitions</i> <i>Définitions générales</i>	
1.1	<i>Kinematic definitions</i> <i>Définitions cinématiques</i>	
1.1.1	<i>Relative position of axes</i> <i>Position relative des axes</i>	
1.1.1.1	<i>Toothed gear</i> <i>Roue d'engrenage</i>	
1.1.1.2	<i>Gear pair</i> <i>Engrenage</i>	
1.1.1.3	<i>Train of gears</i> <i>Train d'engrenages</i>	
1.1.1.4	<i>Gear pair with parallel axes</i> <i>Engrenage parallèle</i>	
1.1.1.5	<i>Gear pair with intersecting axes</i> <i>Engrenage concourant</i>	

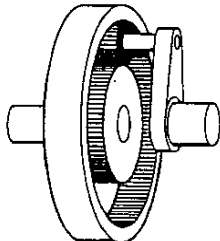
1) Number according to ISO/R 1122

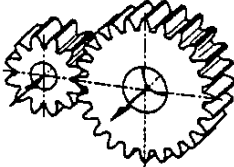
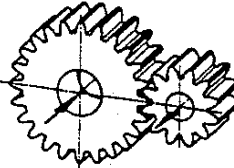
Ser. No. 1)	Denomination	Examples of design
1.1.1.6	<i>Gear pair with non-parallel non-intersecting axes</i> <i>Engrenage gauche</i>	
1.1.1.7	<i>Centre distance</i> <i>Entraxe</i>	
1.1.1.8	<i>Shaft angle</i> <i>Angle des axes</i>	
1.1.1.9	<i>Epicycloidal or planetary gear train</i> <i>Train planétaire ou épicycloidal</i>	

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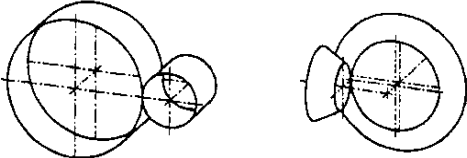


Ser. No. 1)	Denomination	Examples of design
1.1.2	<i>Mating gears</i> <i>Roues conjuguées</i>	
1.1.2.1	<i>Mating gear</i> <i>Roue conjuguée</i>	
1.1.2.2	<i>Pinion</i> <i>Pignon</i>	
1.1.2.3	<i>Wheel or gear</i> <i>Roue</i>	
1.1.2.4	<i>Driving gear</i> <i>Roue menante</i>	
1.1.2.5	<i>Driven gear</i> <i>Roue menée</i>	
1.1.2.6	<i>Sun gear</i> <i>Roue solaire</i>	
1.1.2.7	<i>Ring gear</i> <i>Couronne de train planétaire</i>	

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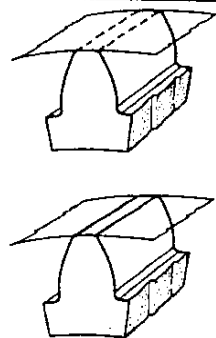
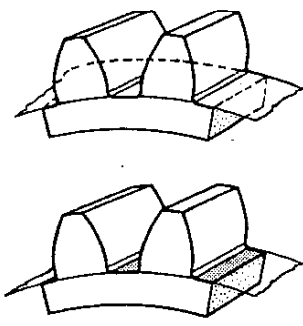
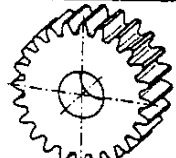
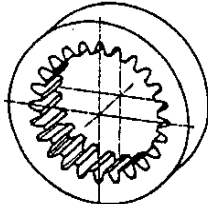
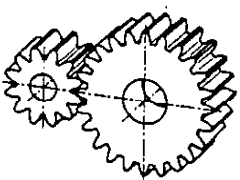
Ser. No. 1)	Denomination	Examples of design
1.1.2.8	<i>Planet gear</i> <i>Roue planétaire</i>	

1.1.3	<i>Relative speeds</i> <i>Vitesses relatives</i>	
1.1.3.1	<i>Gear ratio</i> <i>Rapport d'engrenage</i>	
1.1.3.2	<i>Transmission ratio</i> <i>Rapport de transmission</i>	
1.1.3.3	<i>Speed reducing gear pair (or train)</i> <i>Engrenage (ou train) réducteur</i>	
1.1.3.4	<i>Speed increasing gear pair (or train)</i> <i>Engrenage (ou train) multiplicateur</i>	
1.1.3.5	<i>Speed reducing ratio</i> <i>Rapport de réduction</i>	
1.1.3.6	<i>Speed increasing ratio</i> <i>Rapport de multiplication</i>	

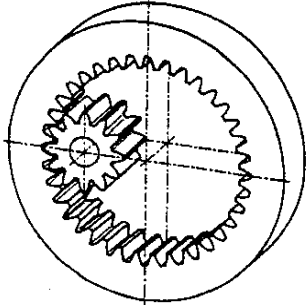
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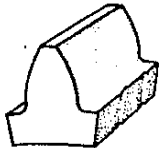
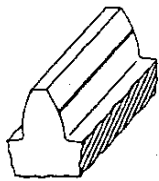
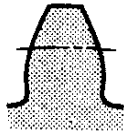
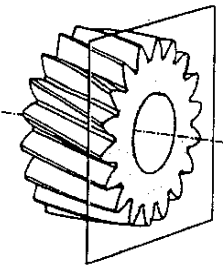
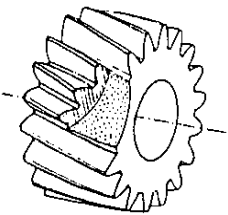
Ser. No. 1)	Denomination	Examples of design
1.1.4	<i>Pitch and reference surfaces</i> <i>Surfaces primitives</i>	
1.1.4.1	<i>Pitch surface</i> <i>Surface primitive de fonctionnement</i>	
1.1.4.2	<i>Reference surface</i> <i>Surface primitive de référence</i>	
1.1.4.3	<i>Reference ...</i> <i>... de référence</i>	
1.1.4.4	<i>Working ...</i> <i>... de fonctionnement</i>	
1.2	<i>Teeth characteristics</i> <i>Caractéristiques de denture</i>	
1.2.1	<i>Dimensions and coefficients</i> <i>Dimensions et coefficients</i>	
1.2.1.1	<i>Gear tooth</i> <i>Dent</i>	
1.2.1.2	<i>Tooth space</i> <i>Entredent</i>	
1.2.1.3	<i>Dimensions</i> <i>Dimensions</i>	
1.2.1.4	<i>Module</i> <i>Module</i> <i>Diametral pitch</i> <i>Diametral pitch</i>	
1.2.1.5	<i>Reduced value of a dimension</i> <i>Valeur réduite d'une dimension</i>	

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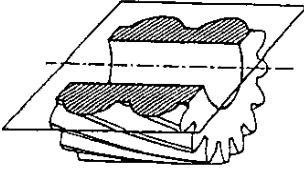
Ser. No. 1)	Denomination	Examples of design
1.2.2	<i>Tip and root surfaces</i> <i>Surfaces de tête et de pied</i>	
1.2.2.1	<i>Tip surface</i> <i>Surface de tête</i> <i>Crest</i> <i>Sommet</i>	
1.2.2.2	<i>Root surface</i> <i>Surface de pied</i> <i>Bottom of the tooth spaces</i> <i>Fond des entredents</i>	
1.2.2.3	<i>External gear</i> <i>Roue extérieure</i>	
1.2.2.4	<i>Internal gear</i> <i>Roue intérieure</i>	
1.2.2.5	<i>External gear pair</i> <i>Engrenage extérieur</i>	


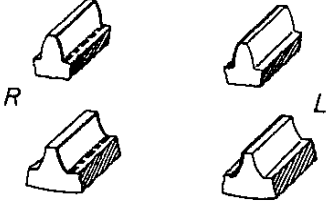



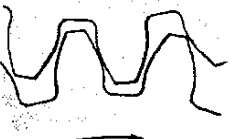
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Ser. No. 1)	Denomination	Examples of design
1.2.2.6	<i>Internal gear pair</i> <i>Engrenage intérieur</i>	

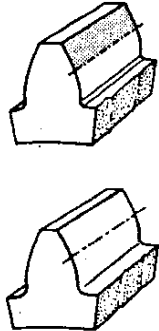
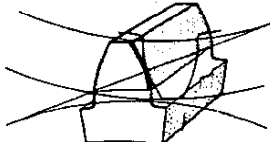
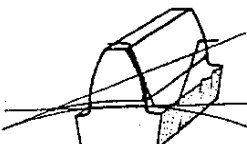
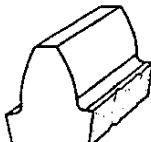
1.2.3	<i>Flanks and profiles</i> <i>Flancs et profils</i>	
1.2.3.1	<i>Tooth flank</i> <i>Flanc</i>	
1.2.3.2	<i>Tooth trace</i> <i>Ligne de flanc</i>	
1.2.3.3	<i>Tooth profile</i> <i>Profil</i>	
1.2.3.4	<i>Transverse profile</i> <i>Profil apparent</i>	
1.2.3.5	<i>Normal profile</i> <i>Profil réel</i>	

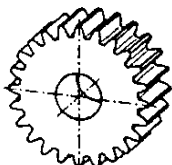
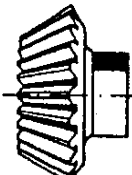
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Ser. No. 1)	Denomination	Examples of design
1.2.3.6	<i>Axial profile</i> <i>Profil axial</i>	

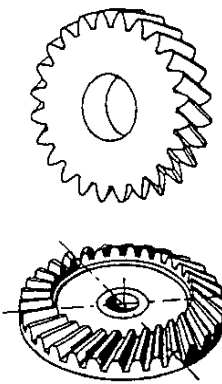
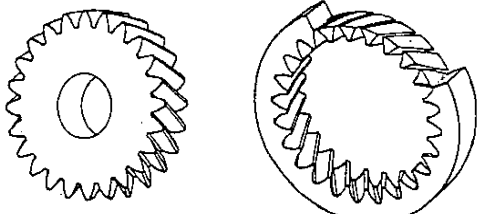
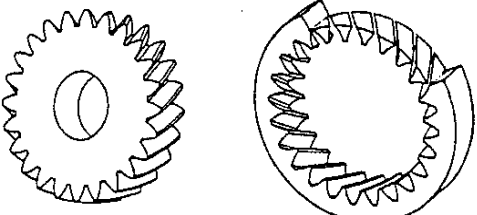
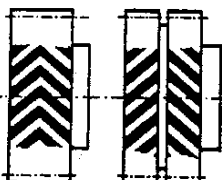

1.2.4	<i>Flanks-qualifications</i> <i>Qualificatifs de flancs</i>	
1.2.4.1	<i>Mating flank</i> <i>Flanc conjugué</i>	
1.2.4.2	<i>Right (or left) flank</i> <i>Flanc de droite (ou de gauche)</i>	
1.2.4.3	<i>Corresponding flanks</i> <i>Flancs homologues</i>	
1.2.4.4	<i>Opposite flanks</i> <i>Flancs anti-homologues</i>	
1.2.4.5	<i>Working flank</i> <i>Flanc avant</i>	
1.2.4.6	<i>Non-working flank</i> <i>Flanc arrière</i>	

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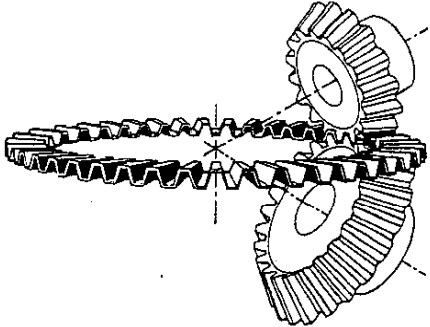
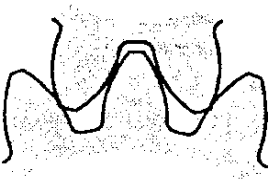
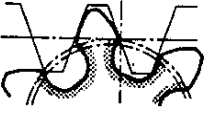
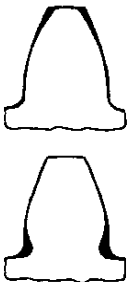

Ser. No. 1)	Denomination	Examples of design
1.2.5	<i>Parts of flanks</i> <i>Parties des flancs</i>	
1.2.5.1	<i>Addendum flank</i> <i>Flanc de saillie</i> <i>Dedendum flank</i> <i>Flanc de creux</i>	
1.2.5.2	<i>Active flank</i> <i>Flanc actif</i>	
1.2.5.3	<i>Usable flank</i> <i>Flanc utilisable</i>	
1.2.5.4	<i>Fillet</i> <i>Flanc de raccord</i>	

1.2.6	<i>Definitions in terms of tooth traces</i> <i>Définitions en fonction des lignes des flanc</i>	
1.2.6.1	<i>Spur gear (or gear pair)</i> <i>Roue droite (ou engrenage droit) cylindrique</i>	
1.2.6.2	<i>Straight bevel gear (or gear pair)</i> <i>Roue droite (ou engrenage droit) conique</i>	

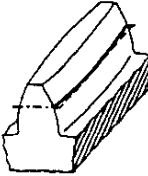
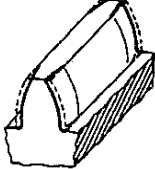
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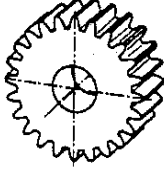
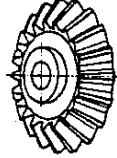
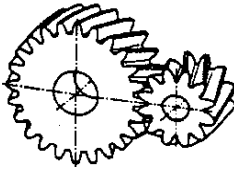
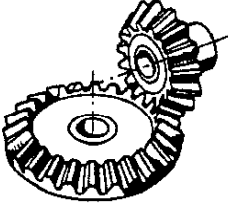
Ser. No. 1)	Denomination	Examples of design
1.2.6.3	<p><i>Helical gear (or gear pair)</i> <i>Roue hélicoïdale (ou engrenage hélicoïdal)</i></p> <p><i>Helical bevel gear (or gear pair)</i> <i>Roue hélicoïdale (ou engrenage hélicoïdal) conique</i></p>	
1.2.6.4	<p><i>Right-hand teeth</i> <i>Denture à droite</i></p>	
1.2.6.5	<p><i>Left-hand teeth</i> <i>Denture à gauche</i></p>	
1.2.6.6	<p><i>Double helical gear (or gear pair)</i> <i>Roue (ou engrenage) en chevron</i></p>	
1.2.6.7	<p><i>Spiral gear (or gear pair)</i> <i>Roue (ou engrenage) spirale</i></p>	

1) See page 2

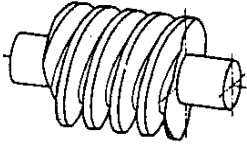
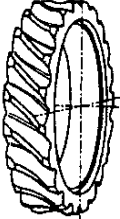
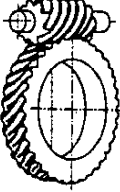
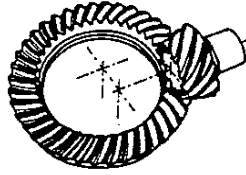
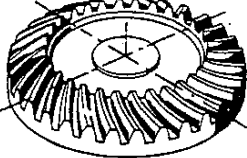
Ser. No. 1)	Denomination	Examples of design
1.3	<i>Tooth generation</i> <i>Génération de la denture</i>	
1.3.1	<i>Generating gear, interference and modification of the flank shape</i> <i>Roue génératrice, interférence et modification de la forme du flanc</i>	
1.3.1.1	<i>Generating gear of a gear</i> <i>Roue génératrice d'une roue</i>	
1.3.1.2	<i>Meshing interference</i> <i>Interférence d'engrènement</i>	
1.3.1.3	<i>Cutter interference</i> <i>Interférence de taillage</i>	
1.3.1.4	<i>Tip relief</i> <i>Dépouille de tête</i> <i>Root relief</i> <i>Dépouille de pied</i>	
1.3.1.5	<i>Undercut</i> <i>Dégagement de pied</i>	

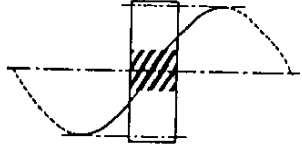
1) See page 2

Ser. No. 1)	Denomination	Examples of design
1.3.1.6	<i>Crowning</i> <i>Bombé</i>	
1.3.1.7	<i>End relief</i> <i>Dépouille d'extrémité</i>	

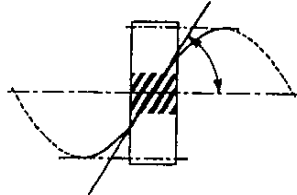
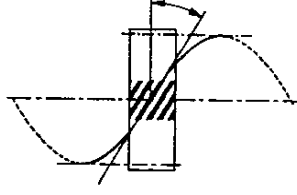
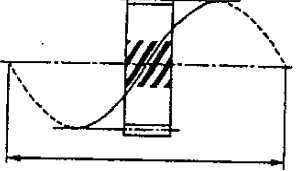

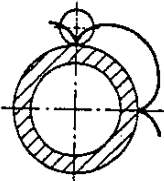
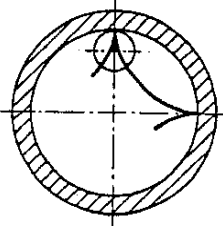
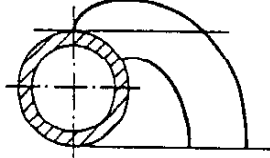
1.3.2	<i>Definitions in terms of tooth generation</i> <i>Définitions en fonction de la génération de la denture</i>	
1.3.2.1	<i>Cylindrical gear</i> <i>Roue cylindrique</i>	
1.3.2.2	<i>Bevel gear</i> <i>Roue conique</i>	
1.3.2.3	<i>Cylindrical gear pair</i> <i>Engrenage cylindrique</i>	
1.3.2.4	<i>Bevel gear pair</i> <i>Engrenage conique</i>	

1) See page 2

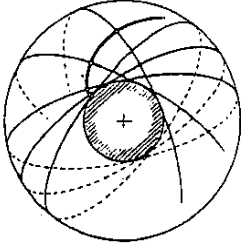
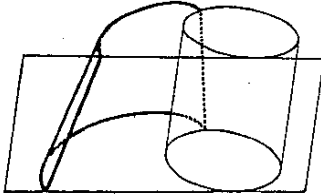
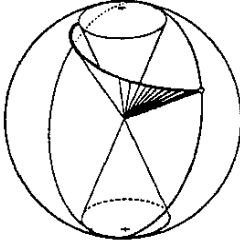
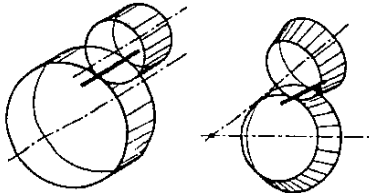
Ser. No. 1)	Denomination	Examples of design
1.3.2.5	<i>Worm</i> <i>Vis</i>	
1.3.2.6	<i>Worm wheel</i> <i>Roue à vis</i>	
1.3.2.7	<i>Worm gear pair</i> <i>Engrenage à vis</i>	
1.3.2.8	<i>Hypoid gear pair</i> <i>Engrenage hypoïde</i>	
1.3.2.9	<i>Hypoid gear</i> <i>Roue hypoïde</i>	

1.4	<i>Geometrical and kinematical notions used in gears</i> <i>Notions géométriques et cinématiques utilisées dans les engrenages</i>	
1.4.1	<i>Geometrical lines</i> <i>Lignes géométriques</i>	
1.4.1.1	<i>Helix</i> <i>Hélice</i>	

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Ser. No. 1)	Denomination	Examples of design
1.4.1.2	<i>Helix angle</i> <i>Angle d'hélice</i>	
1.4.1.3	<i>Lead angle</i> <i>Inclinaison</i>	
1.4.1.4	<i>Lead</i> <i>Pas hélicoïdal</i>	
1.4.1.5	<i>Cycloid</i> <i>Cycloïde</i>	
1.4.1.6	<i>Epicycloid</i> <i>Epicycloïde</i>	
1.4.1.7	<i>Hypocycloid</i> <i>Hypocycloïde</i>	
1.4.1.8	<i>Involute to a circle</i> <i>Développante de cercle</i>	

1) See page 2

Ser. No. 1)	Denomination	Examples of design
1.4.1.9	<i>Spherical involute</i> <i>Développante sphérique</i>	
1.4.2	<i>Geometrical surfaces</i> <i>Surfaces géométriques</i>	
1.4.2.1	<i>Involute helicoid</i> <i>Hélicoïde développable</i>	
1.4.2.2	<i>Spherical involute helicoid</i> <i>Hélicoïde en développante sphérique</i>	
1.4.3	<i>Instantaneous axis</i> <i>Axe instantané</i>	

1) See page 2

Other relevant standards

DIN 868	General definitions and specification factors for gears, gear pairs and gear trains
DIN 3998 Part 2	Denominations on gears and gear pairs; cylindrical gears and gear pairs
DIN 3998 Part 3	Denominations on gears and gear pairs; bevel and hypoid gears and gear pairs
DIN 3998 Part 4	Denominations on gears and gear pairs; worm gear pairs
DIN 3998 Supplementary Sheet 1	Denominations on gears and gear pairs; alphabetical index of equivalent terms
DIN 3999	Symbols for gear teeth

Explanations

This Standard lays down the English technical terminology relating to gear teeth in order to facilitate understanding and orderly arrangement of terms. The sequence of technical terms and their consecutive numbering in Part 1 to Part 4 as well as the additional French denominations agree with the Recommendation issued by the International Organization for Standardization (ISO)

ISO/R 1122 – 1969 *)

Glossary of gears; geometrical definitions

Vocabulaire des engrenages; définitions géométriques

In this Standard certain technical denominations additional to those stated in ISO/R 1122-1969 have been included where this appeared necessary for the sake of complete coverage. Moreover, in some cases existing expressions have been added in brackets. In all cases the non-bracketed terms are the ruling ones.

DIN 3998 is subdivided into Part 1 for general definitions, Part 2 for cylindrical gears and cylindrical gear pairs, Part 3 for bevel gears and bevel gear pairs as well as hypoid gears and hypoid gear pairs, and Part 4 for worm gear pairs. In addition, in Supplementary Sheet 1 to DIN 3998 the keywords of the denominations in English and French are listed in alphabetical order and with the serial number under which the denominations appear in Part 1 to Part 4.

Recommendation ISO/R 1122-1969 contains — like, for example, the Swiss Standard VSM 15 522 also — not only the denominations but also the definitions for geometrical specification factors for gears and gear pairs. The definitions have not been included in DIN 3998 because the definitions and specification factors are laid down in DIN 868, DIN 3960, DIN 3971 and DIN 3975.

Standardization of the denominations in all DIN standards dealing with gear teeth is envisaged on the basis of the present survey DIN 3998.

Some of the illustrations have been taken from the standards VSM 15 522 and NEN 5276 with the approval of the Swiss Standards Association and the Netherlands Standards Institution respectively.

*) Obtainable through DIN Deutsches Institut für Normung e.V., Berlin