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NATIONAL STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

GB/T 10085-2018

Replacing GB/T 10085-1988

Basic paramaters of cylindrical worm gears

圆柱蜗杆传动基本参数

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Foreword

This standard was drafted in accordance with the rules given in GB/T 1.1-2009. This standard replaces GB/T 10085-1988 "Basic parameters of cylindrical worm drive". Compared with GB/T 10085-1988, the main changes of this standard are as follows:

--- Added standard "preface";

--- The manner in which the scope of application is expressed has been adjusted (see Chapter 1, Chapter 1 of the 1988 edition);

--- Increased the requirements for ZC worms (see Chapter 3, Chapter 3 of the 1988 edition). Please note that some of the contents of this document may involve patents. The issuing organization of this document is not responsible for identifying these patents. This standard is proposed and managed by the National Gear Standardization Technical Committee (SAC/TC52). This standard was drafted. Chongqing Machine Tool (Group) Co., Ltd., Zhengzhou Machinery Research Institute Co., Ltd., Beijing University of Technology. The main drafters of this standard. Li Xianguang, Yu Kebin, Li Yi, Zhang Yuanguo, Shi Zhaoyao, Long Lin, Zhang Liang, Li Mingyu, Xie Xiaoqing, Li Wu, Huang Guangrong, Wang Zhigang, Guan Hongjie. The previous versions of the standards replaced by this standard are.

---GB/T 10085-1988. Basic parameters of cylindrical worm drive

1 Scope

GB/T 10085-2018 is the Chinese national standard on basic paramaters of cylindrical worm gears, in the field of mechanical systems and components. The /T suffix marks it as a

recommended standard: it is not compulsory by itself, but it becomes binding as soon as a contract, a tender or a customer specification calls it up - which in practice is how most foreign buyers meet it. It was issued on 14 May 2018 by the State Administration for Market Regulation; Standardization Administration of China, and has been in force since 1 December 2018. Classification: ICS 21.200, CCS J17. This page is published from the official record of the standard held by the Chinese standards administration: the identification, the dates, the classification and the issuing body are taken from there. The clause text, the tables and the numeric limits are in the document itself, which is delivered complete in English translation.

This standard specifies the basic parameters of cylindrical worm gear transmission. This standard is applicable to cylindrical worm drive with modulus m>=1mm and shaft angle Sigma=90°.

2 Description 53 6.3 63 1 53 0.246 62 5 90 1 62

0.000 Self-locking 70 5 50 1 70 0.000 82a 4 71 1 82

0.125 Self-locking 7.25 12.5 90 4 29 -0.100 9.5a 10 71 4 38 -0.050 11.75 8 80 4 47 -0.375 15.25 6.3 63 4 61 0.2143 19.5a 10 71 2 38 -0.050 23.5 8 80 2 47 -0.375 30.5 6.3 63 2 61 0.2143 38a 10 71 1 38 -0.050 47 8 80 1 47 -0.375 61 6.3 63 1 61 0.2143 71 5 90 1 71 0.500 80a 5 50 1 80

0.000 Self-locking 7.75 12.5 112 4 31 0.020 10.25a 10 90 4 41 0.000 13 8 80 4 52 0.250 15.5 12.5 112 2 31 0.020 20.5a 10 90 2 41 0.000 26 8 80 2 52 0.250 31 12.5 112 1 31 0.020 41a 10 90 1 41 0.000 52 8 80 1 52 0.250 61 6.3 112 1 61 0.2937 70 6.3 63 1 70 -0.3175 81a 5 90 1 81

0.500 Self-locking 7.25 16 112 4 29 -0.500 9.5a 12.5 90 4 38 -0.200 12 10 90 4 48 -0.500 15.25 8 80 4 61 -0.500 19a 12.5 90 2 38 -0.200 24 10 90 2 48 -0.500 30.5 8 80 2 61 -0.500 38a 12.5 90 1 38 -0.200 48 10 90 1 48 -

0.500 Table A.1 (continued) Center distance a/mm Transmission ratio Modulus m/mm Worm indexing circle Diameter d1/mm Number of worm heads Z

3 Basic dimensions and parameters of the worm

The basic dimensions and parameters of the cylindrical worm shall be as specified in Table 1 (where the modulus and diameter are selected in GB/T 10088); At the same time, the corresponding ZA, ZI, ZN, ZK and ZC worms can be obtained by different methods (see GB/T 10087 for the type of worm). ZI and ZK worms are recommended. In addition to special requirements, right-handed worms should be used.

Note. Since the tooth profile of the ZC worm is inconsistent with other types of worms, the tip diameter da1 and the root circle diameter df1 of the worm in Table 1 are not applicable.

ZC worm, its size needs to be calculated separately.

4 Center distance a

Generally, the center distance a of the reduction gear of the cylindrical worm drive should be selected according to the following values, in millimeters (mm). 40; 50; 63; 80; 100; 125; 160; (180);.200; (225); 250; (280); 315; (355); 400; (450); The center distance greater than 500 mm can be selected according to the priority number of the priority number R20.

Note. The numbers in parentheses are not used as much as possible.

5 Transmission ratio i

Generally, the nominal value of the transmission ratio i of the reduction gear of the cylindrical worm drive should be selected according to the following values. 5;7.5;10;12.5;15;20;25;30;40;50;60;70;80. Among them, 10; 20; 40 and 80 are basic transmission ratios, which should be used preferentially.

6 Transmission ratio ii=n1/n

2 The worm is actively selected according to regulations 7 tooth ratio uu=z2/z

1 When the worm is active, i=u 8 worm gear displacement coefficient x2 x2=a/m-(d1 d2)/(2m) 9 worm diameter coefficient qq=d1/m 10 worm axial pitch px px=pim 11 worm lead pz pz=pimz1 12 worm index circle diameter d1 d1=mq 13 worm tooth tip diameter da1 da1=d1 2ha1=d1 2h*am 14 worm tooth root circle diameter df1 df1=d1-2hf1=d1-2(h*am

c) 15 head clearance cc=c*m according to regulations Table B.1 (continued) Serial number name code relationship description

16 Involute worm base circle diameter db1 db1=d1·tggamma/tggammab=mz1/tggammab 17 worm tooth tip height ha1 ha1=h*a·m=(da1-d1)/2 18 worm tooth root height hf1 hf1=(h*ac*)m=(d1-df1)/2 19 worm tooth height h1 h1=ha1 hf1=(da1-df1)/2 20 worm lead angle gamma tggamma=mz1/d1=z1/q

21 Involute worm base circle lead angle gammab cosgammab=cosgammacosalphan

22 Worm tooth width b1 is determined by design 23 worm wheel index circle diameter d2 d2=mz2=2a-d1-2x2m 24 worm wheel throat diameter da2 da2=d2 2ha2 25 worm gear root diameter df2 df2=d2-2hf2 26 worm gear tip height ha2 ha2=(da2-d2)/2=m(h*a x2) 27 worm gear root height hf2 hf2=(d2-df2)/2=m(h*a-x2 c*) 28 worm gear height h2 h2=ha2 hf2=(da2-df2)/2 29 worm wheel throat diameter rg2 rg2=a-da2/2 30 worm gear width b2 is determined by design 31 worm gear width angle theta theta=2arcsin(b2/d1) 32 worm axial tooth thickness sx sx=pim/2 33 worm normal tooth thickness sn sn=sxcosgamma 34 worm gear tooth thickness st is determined by the axial cogging width ex' at the worm pitch circle 35 worm pitch circle diameter d'1 d'1=d1 2x2m=m(q 2x2) 36 worm wheel pitch diameter d'2

d'2=d2

7 The relationship between the basic geometry of cylindrical worm drive

See Appendix B for the relationship between the basic geometry of a cylindrical worm drive. Table

1 Basic dimensions and parameters of the worm Modulus m/mm Axial pitch Px/mm Indexing straight Diameter d1/mm Number of worm heads Z

1 Diameter coefficient Tip circle diameter Da1/mm Root diameter Df1/mm Indexing cylinder Lead angle gamma Description 1 3.142 18 1 18.000 20 15.6 3°10'47" Self-locking 1.25 3.927 20 1 16.000 22.5 17 3°34'35" 22.4 1 17.920 24.9 19.4 3°11'38" self-locking 1.6 5.027 12.500 23.2 16.16 17.500 31.2 24.16 4°34'26" 9°05'25" 17°44'41" 3°16'14" self-locking 2 6.283 (18) 22.4 (28) 35.5 9.000 22 13.2 11.200 26.4 17.6 14.000 32 23.2 17.750 39.5 30.7 6°20'25" 12°31'44" 23°57'45" 5°06'08" 10°07'29" 19°39'14" 28°10'43" 4°05'08" 8°07'48" 15°56'43" 3°13'28" self-locking 2.5 7.854 (22.4) (35.5) 8.960 27.4 16.4 11.200 33 22 14.200 40.5 29.5 18.000 50 39 6°22'06" 12°34'59" 24°03'26" 5°06'08" 10°07'29" 19°39'14" 28°10'43" 4°01'42" 8°01'02" 15°43'55" 3°10'47" self-locking Table 1 (continued) Modulus m/mm Axial pitch Px/mm Indexing straight Diameter d1/mm Number of worm heads Z

1 Diameter coefficient Tip circle diameter Da1/mm Root diameter Df1/mm Indexing cylinder Lead angle gamma Description 3.15 9.896 (28) 35.5 (45) 8.889 34.3 20.4 11.270 41.8 27.9 14.286 51.3 37.4 17.778 62.3 48.4 6°25'08" 12°40'49" 24°13'40" 5°04'15" 10°03'48" 19°32'29" 28°01'50" 4°00'15" 7°58'11" 15°38'32" 3°13'10" self-locking 4 12.566 (31.5) (50) 7.875 39.5 21.9 10.000 48 30.4 12.5000 58 40.4 17.75 79 61.4 7°14'13" 14°15'00" 26°55'40" 5°42'38" 11°18'36" 21°48'05" 30°57'50" 4°34'26" 9°05'25" 17°44'41" 3°13'28" self-locking 5 15.708 (40) (63) 8.000 50 28 10.000 60 38 12.600 73 51 18.000 100 78 7°07'30" 14°02'10" 26°33'54" 5°42'38" 11°18'36" 21°48'05" 30°57'50" 4°32'16" 9°01'10" 17°36'45" 3°10'47" self-locking Table 1 (continued) Modulus m/mm Axial pitch Px/mm Indexing straight Diameter d1/mm Number of worm heads Z

1 Diameter coefficient Tip circle diameter Da1/mm Root diameter Df1/mm Indexing cylinder Lead angle gamma Description 6.3 19.792 (50) (80) 7.936 62.6 34.9 10.000 75.6 47.9 12.698 92.6 64.8 17.778 124.6 96.9 7°10'53" 14°08'39" 26°44'53" 5°42'38" 11°18'36" 21°48'05" 30°57'50" 4°30'10" 8°57'02" 17°29'04" 3°13'10" self-locking 8 25.133 (63) (100) 7.875 79 43.8 10.000 96 60.8 12.500 116 80.8 17.500 156 120.8 7°14'13" 14°15'00" 26°53'40" 5°42'38" 11°18'36" 21°48'05" 30°57'50" 4°34'26" 9°05'25" 17°44'41" 3°16'14" self-locking 10 31.416 (71) (112) 7.100 91 47 9.000 110 66 11.200 132 88 16.000 180 136 8°01'02" 15°43'55" 29°23'46" 6°20'25" 12°31'44" 23°57'45" 33°41'24" 5°06'08" 10°07'29" 19°39'14" 3°34'35" Table 1 (continued) Modulus m/mm Axial pitch Px/mm Indexing straight Diameter d1/mm Number of worm heads Z