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NATIONAL STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

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Plain bearings - Terms, definitions, classification and symbols - Part 5: Application of symbols

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1 Scope

This part of GB/T 2889 specifies the actual practice of commonly used symbols related to calculation, design, and testing of sliding bearings in ISO 4378-4.

application.

ISO 4378-4 distinguishes between basic symbols and additional symbols. Additional symbols are used as superscripts or subscripts. Sliding shaft The symbols required for calculation, design, manufacturing and testing are basic symbols or a combination of basic symbols and additional symbols.

This section gives the symbols that need to be used in the calculation, design, and inspection of sliding bearings. These symbols are in accordance with ISO 4378-4 The recommended way to define.

The positive direction of the rotation angle and direction is defined as the left-hand (counterclockwise) rotation direction. This definition also applies to rotation frequency, peripheral speed, and Angular velocity.

2 Normative references

The following documents are indispensable for the application of this document. For dated reference documents, only the dated version applies to this article Pieces. For undated reference documents, the latest version (including all amendments) is applicable to this document.

ISO 4378-4 Plain bearing terms, definitions, classifications and symbols Part 4.Basic symbols (Plainbearings-Terms, definitions,classificationandsymbols-Part 4.Basicsymbols)

3 Symbols and definitions

Not all related symbols are listed in the following symbols. If necessary, it may be expanded.

Note. Some Roman letters and Greek letters are not currently used, so they are not listed in the following symbols.

3.1 Roman alphabet symbols

A (bearing seat) heat dissipation area, elongation after fracture A* Characteristic value of heat dissipation area [A* of thrust bearing=A/(BxLxZax)] AB sector or tile area AG oil groove cross-sectional area Ai Flanged bearing housing inner surface heat dissipation area Alan oil sealing surface (slot bank) area A*lan Relative area of oil sealing surface (groove) [A*lan of hydrostatic radial bearing=Alan/(pixDxB)] AO Flanged bearing housing outer surface heat dissipation area AP Lubricant cavity area AS cross-sectional area Specific surface area of AT tube AT, i tube cross section flow area a distance, acceleration, thermal diffusion coefficient, inertia factor aF The distance between the front edge of the pad and the pivot position in a tilting pad bearing a*F The relative distance between the position of the front edge of the pad and the position of the pivot in a tilting pad bearing amin The minimum distance between two circular thrust pads aT The distance between the temperature measuring point and the bearing surface B Width parallel to the sliding surface and perpendicular to the direction of movement, bearing width, bearing nominal width, tile width, tile Said width B* relative width, relative width of bearing, relative width of pad, aspect ratio (B*=B/D)

The width of Bax thrust bearing or thrust pad [Bax=(Do-Di)/2] Beff bearing effective width (not including grooves, chamfers, etc.), effective width of pads BH bearing seat axial width Total width of Btot bearing b Width parallel to the sliding surface, perpendicular to the direction of movement or direction of flow bc Circumferential width of oil outlet (hydrostatic bearing bc=B-blan)

bG lubricating oil groove width, oil supply groove width, exhaust groove width blan The width of the oil sealing surface (groove) parallel to the sliding surface and perpendicular to the flow direction bP oil chamber width, oil supply chamber width b*P Relative width of oil cavity, relative width of oil supply cavity C bearing clearance, bearing nominal clearance, chamfer, concentration Cax bearing axial clearance (thrust bearing)

Cax,m Average value of Cax [Cax,m=(Cax,min Cax,max)/2] Cax,max Maximum value of Cax Cax,min The minimum value of Cax CD bearing clearance, bearing diameter clearance (in radial bearings, the difference between the diameter of the bearing hole and the journal diameter, CD=D-DJ)

CD,m CD average [CD,m=(CD,min CD,max)/2] CD,eff effective bearing diameter clearance CD,max The maximum value of CD CD,min The minimum value of CD CG oil groove cross-section circumference CR bearing radius clearance (the difference between the radius of the bearing hole of the radial bearing and the radius of the journal CR=R-RJ)

delta CR, el The amount of change in CR caused by elastic deformation CR, eff bearing effective radius clearance CR,m The average value of CR [CR,m=(CR,min CR,max)/2] CR,max The maximum value of CR CR,min The minimum value of CR delta CR,th The amount of change in CR caused by thermal change delta CR,tot Total change in CR (delta CR,tot=delta CR,el delta RR,th)

c Specific heat capacity, specific heat capacity of lubricant, stiffness cax bearing axial stiffness The axial stiffness of the bearing when the cax,i load is directly applied to the inside of the flanged bearing cax,o The axial stiffness of the bearing when the load is directly applied to the outside of the flanged bearing cdw Vertical stiffness of bearing under downward load cF Rigidity of pad pivot along the load direction (tilting pad bearing)

ch Horizontal stiffness of bearing cik Lubricating film stiffness coefficient of radial bearing (i,k=1,2)

c*ik Dimensionless lubricating film stiffness coefficient of radial bearing c*ik= Psi3 2xBxetaxomega xcik(i,k=1,2)

cik,i The stiffness coefficient of the internal lubricating film of the radial bearing cik,o Rigidity coefficient of external lubricating film of radial bearing cJR Jeffcott rotor bending stiffness cP Lubricant specific heat capacity (under constant pressure)

cp,cl specific heat capacity of coolant (under constant pressure)

Bending stiffness of csh shaft csup isotropic bearing or bearing seat stiffness csup,ik stiffness coefficient of anisotropic bearing or bearing seat cup Vertical stiffness of the bearing subjected to upward load cv bearing vertical stiffness ctheta Angular stiffness of pad pivot (tilting pad bearing)

D Bearing diameter (radial bearing inner diameter), bearing nominal diameter DB Double oil wedge or tilting pad radial bearing 2 times the oil wedge radius or pad hole radius DB,m DB average [DB,m=(DB,min DB,max)/2] DB,max The maximum value of DB DB,min The minimum value of DB DB, O outer diameter of bearing pad back, outer diameter of pad of fixed or tilting pad radial bearing Dfi The outer diameter of the lubricating ring fixed on the shaft DH,i bearing seat inner diameter DH, o Bearing seat outer diameter Di Inner diameter of the sliding surface of the thrust bearing DJ journal diameter (the diameter of the shaft located inside the radial bearing)

DJ,m The average value of DJ[DJ,m=(DJ,min DJ,max)/2] DJ,max The maximum value of DJ DJ,min The minimum value of DJ Outer diameter of Dlo open oil ring Dm The average diameter of the sliding surface of the thrust bearing [Dm=(Di Do)/2] Dmax The maximum value of D The minimum value of Dmin D Do outer diameter of the sliding surface of the thrust bearing DT, i tube inner diameter DT, o Tube outer diameter d diameter, distance, depth, damping dB diameter of the circular thrust pad dcp capillary diameter de Natural damping frequency, system damping dF Damping of the pad pivot along the load direction (tilting pad bearing) dG oil groove diameter dG,m Average diameter of oil groove dik Lubricating film damping coefficient of radial bearing (i,k=1,2)

d*ik Dimensionless lubricating film damping coefficient of radial bearing d*ik= 2xBxetaxomega xomegaxdik(i,k=1,2)

dL oil hole diameter dorf,i orifice inner diameter dorf,o Outer diameter of orifice dP lubricating oil cavity diameter dsup damping of isotropic bearing (homogeneous bearing) or bearing seat dsup,ik damping coefficient of anisotropic bearing (non-homogeneous bearing) or bearing seat dtheta Angular damping of the pad pivot (tilting pad bearing)

E modulus of elasticity EB bearing material elastic modulus EJ journal material elastic modulus Eres total elastic modulus Esh shaft material elastic modulus e Eccentricity (the distance between the journal and the center line of the bearing)

eB The eccentricity of the bearing sliding surface (sector or pad) of the multi-oil wedge radial bearing or tilting pad radial bearing eB,h The eccentricity of the sliding surface (sector) of the multi-oil wedge radial bearing in the horizontal direction eB,v The vertical eccentricity of the sliding surface (sector) of the multi-oil wedge radial bearing ECG center of gravity eccentricity (the distance between the center of gravity and the centerline of the shaft)

ex eccentricity component perpendicular to the load direction ey eccentricity component parallel to the load direction F supporting force, bearing load, bearing rated load, carrying capacity F* characteristic value of supporting force delta F additional dynamic load delta F* Additional dynamic load characteristic value (delta F* of radial bearing= delta FxPsi2 BxDxetaxomega Fax Axial bearing force, bearing axial load, thrust bearing load (rated load)

Fax,lim Maximum allowable load of thrust bearing Fax,lim,i point to the maximum allowable load of the thrust bearing inside the machine (with flange bearing)

Fax, lim, o Maximum allowable load of thrust bearing pointing to the outside of the machine (with flange bearing)

FB sector or tile load Fd damping force Fdyn dynamic support force, dynamic bearing load Fdyn,rsn Resonance amplitude of dynamic support force Fdyn,x Fdyn component along the x direction Fdyn,y Fdyn component along the y direction Support force in the Fe elastic range F*e Supporting force characteristic value in the elastic range (F*e =KelxF*)

The supporting force in the elastic range during the transition from Fe,tr to mixed friction The characteristic value of the supporting force in the elastic range during the transition from F*e,tr to mixed friction Feff effective carrying capacity F*eff effective load carrying capacity characteristic value [F*eff of hydrostatic bearing=Fhs/(bcxlaxxZxpen)] F*eff,0 The characteristic value of effective carrying capacity when N=0 Fexc motivation Ff friction (Ff=fxF)