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**Plain bearings — Terms, definitions,  
classification and symbols —**

Part 5:

**Application of symbols**

*Paliers lisses — Termes, définitions, classification et symboles —*

*Partie 5: Application des symboles*

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## Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 4378-5 was prepared by Technical Committee ISO/TC 123, *Plain bearings*, Subcommittee SC 6, *Terms and common items*.

This first edition cancels and replaces ISO 4378-4:1997 as well as ISO 7904-2:1995, which have been technically revised.

ISO 4378 consists of the following parts, under the general title *Plain bearings — Terms, definitions, classification and symbols*:

- *Part 1: Design, bearing materials and their properties*
- *Part 2: Friction and wear*
- *Part 3: Lubrication*
- *Part 4: Basic symbols*
- *Part 5: Application of symbols*

## Introduction

As there is a large number of multiple designations in the domain of plain bearings, there is a considerable risk of error in the interpretation of standards and technical literature. This uncertainty leads to the continuous addition of supplementary designations, which only serves to increase the misunderstanding.

This part of ISO 4378 specifies practical applications of the general symbols used in the field of plain bearings.

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# Plain bearings — Terms, definitions, classification and symbols —

## Part 5: Application of symbols

### 1 Scope

This part of ISO 4378 specifies practical applications of the general symbols defined in ISO 4378-4, with regard to the calculations, design and testing of plain bearings.

ISO 4378-4 distinguishes between basic characters and additional signs. Additional signs are subscripts and superscripts. The symbols necessary for plain bearing calculations, design, manufacture and testing are just basic characters or combinations of basic characters and additional signs.

This part of ISO 4378 lists symbols which have been found necessary for the calculations, design and testing of plain bearings. They have been defined in accordance with the recommendations given in ISO 4378-4.

Angles and directions of rotation are defined positively as rotating in a left-hand (anticlockwise) direction; the same applies to rotational frequencies, and circumferential and angular velocities.

### 2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 4378-4, *Plain bearings — Terms, definitions, classification and symbols — Part 4: Basic symbols*

### 3 Symbols and terms

The following listings are not necessarily complete. They may be enlarged, if necessary.

NOTE Some letters of the Roman and Greek alphabet have not yet been used. Therefore, these letters are not listed below.

#### 3.1 Symbols of the Roman alphabet

$A$	heat-emitting surface area (bearing housing), elongation at fracture
$A^*$	heat-emitting surface area parameter [thrust bearing, $A^* = A/(B \times L \times Z_{ax})$ ]
$A_B$	area of segment or pad
$A_G$	area of groove cross-section
$A_i$	heat-emitting surface area (bearing housing) inside of the machine (flange bearing)

$A_{lan}$	land area
$A_{lan}^*$	relative land area ( $A_{lan}^* = A_{lan}/(\pi \times D \times B)$ for hydrostatic journal bearings)
$A_o$	heat-emitting surface area (bearing housing) outside of the machine (flange bearing)
$A_p$	area of lubricant pocket
$A_s$	area of cross-section
$\bar{A}_T$	specific area of tube
$A_{T,i}$	area of tube cross-section flowed through
$a$	distance, acceleration, thermal diffusivity, inertia factor
$a_F$	distance between leading edge and pivot position of pad (tilting-pad bearing)
$a_F^*$	relative distance between leading edge and pivot position of pad (tilting-pad bearing)
$a_{min}$	minimum distance between two circular thrust pads
$a_T$	distance between temperature measuring point and bearing sliding surface
$B$	width parallel to the sliding surface, normal to the direction of motion; bearing width, nominal bearing width, pad width, nominal pad width
$B^*$	relative width, relative bearing width, relative pad width, width ratio ( $B^* = B/D$ )
$B_{ax}$	width of thrust bearing or thrust pad [ $B_{ax} = (D_o - D_i)/2$ ]
$B_{eff}$	effective bearing width (without grooves, chamfers, etc.), effective pad width
$B_H$	outer width of bearing housing in axial direction
$B_{tot}$	total bearing width
$b$	width parallel to the sliding surface, normal to the direction of motion or flow
$b_c$	width of circumferential discharge (hydrostatic bearing, $b_c = B - b_{lan}$ )
$b_G$	width of lubricant groove, width of lubricant supply groove, width of bleed groove
$b_{lan}$	land width parallel to the sliding surface, normal to the direction of flow
$b_p$	width of lubricant pocket, width of lubricant supply pocket
$b_p^*$	relative width of lubricant pocket, relative width of lubricant supply pocket
$C$	bearing clearance, nominal bearing clearance, chamfer, concentration
$C_{ax}$	axial bearing clearance (thrust bearing)
$C_{ax,m}$	mean value of $C_{ax}$ [ $C_{ax,m} = (C_{ax,min} + C_{ax,max})/2$ ]
$C_{ax,max}$	maximum value of $C_{ax}$
$C_{ax,min}$	minimum value of $C_{ax}$
$C_D$	bearing clearance, bearing diametral clearance (difference between bearing bore and journal diameter of a journal bearing, $C_D = D - D_j$ )
$C_{D,m}$	mean value of $C_D$ [ $C_{D,m} = (C_{D,min} + C_{D,max})/2$ ]

$C_{D,eff}$	effective bearing diametral clearance
$C_{D,max}$	maximum value of $C_D$
$C_{D,min}$	minimum value of $C_D$
$C_G$	circumference of groove cross-section
$C_R$	bearing radial clearance (difference between bearing bore and journal radius of a journal bearing, $C_R = R - R_J$ )
$\Delta C_{R,el}$	elastic change of $C_R$
$C_{R,eff}$	effective bearing radial clearance
$C_{R,m}$	mean value of $C_R$ [ $C_{R,m} = (C_{R,min} + C_{R,max})/2$ ]
$C_{R,max}$	maximum value of $C_R$
$C_{R,min}$	minimum value of $C_R$
$\Delta C_{R,th}$	thermal change of $C_R$
$\Delta C_{R,tot}$	total change of $C_R$ ( $\Delta C_{R,tot} = \Delta C_{R,el} + \Delta C_{R,th}$ )
$c$	specific heat capacity, lubricant specific heat capacity, stiffness
$c_{ax}$	axial bearing stiffness
$c_{ax,i}$	axial stiffness of the bearing when load is directed into the machine (flange bearing)
$c_{ax,o}$	axial stiffness of the bearing when load is directed out of the machine (flange bearing)
$c_{dw}$	vertical stiffness of the bearing loaded downwards
$c_F$	stiffness of pad pivot support in direction of load (tilting-pad bearing)
$c_h$	horizontal bearing stiffness
$c_{ik}$	lubricant film stiffness coefficient of journal bearing ( $i, k = 1, 2$ )
$c_{ik}^*$	non-dimensional lubricant film stiffness coefficient of journal bearing
	$c_{ik}^* = \frac{\psi^3}{2 \times B \times \eta \times \omega} \times c_{ik}(i, k) = (1, 2)$
$c_{ik,i}$	inner lubricant film stiffness coefficient of journal bearing ( $i, k = 1, 2$ )
$c_{ik,o}$	outer lubricant film stiffness coefficient of journal bearing ( $i, k = 1, 2$ )
$c_{JR}$	flexural stiffness of the Jeffcott Rotor
$c_p$	specific heat capacity of the lubricant (at constant pressure)
$c_{p,cl}$	specific heat capacity of the coolant (at constant pressure)
$c_{sh}$	flexural stiffness of shaft
$c_{sup}$	stiffness of isotropic bearing or bearing shell support
$c_{sup,ik}$	stiffness coefficient of anisotropic bearing or bearing shell support ( $i, k = 1, 2$ )
$c_{up}$	vertical stiffness of the bearing loaded upwards

$c_v$	vertical bearing stiffness
$c_\phi$	angular stiffness of pad pivot support (tilting-pad bearing)
$D$	bearing diameter (inside diameter of journal bearing), nominal bearing diameter
$D_B$	twice the lobe or pad bore radius of a multi-lobed or tilting-pad journal bearing
$D_{B,m}$	mean value of $D_B$ [ $D_{B,m} = (D_{B,\min} + D_{B,\max})/2$ ]
$D_{B,\max}$	maximum value of $D_B$
$D_{B,\min}$	minimum value of $D_B$
$D_{B,o}$	outside diameter of bearing shell or pad of a fixed-pad or tilting-pad journal bearing
$D_{fi}$	(outside) diameter of lubricating ring fixed to the shaft
$D_{H,i}$	inside diameter of bearing housing
$D_{H,o}$	outside diameter of bearing housing
$D_i$	inside diameter of thrust bearing sliding surface
$D_J$	journal diameter (diameter of the shaft section located inside of a journal bearing)
$D_{J,m}$	mean value of $D_J$ [ $D_{J,m} = (D_{J,\min} + D_{J,\max})/2$ ]
$D_{J,\max}$	maximum value of $D_J$
$D_{J,\min}$	minimum value of $D_J$
$D_{lo}$	(outside) diameter of loose lubricating ring
$D_m$	mean diameter of thrust bearing sliding surface [ $D_m = (D_i + D_o)/2$ ]
$D_{\max}$	maximum value of $D$
$D_{\min}$	minimum value of $D$
$D_o$	outside diameter of thrust bearing sliding surface
$D_{T,i}$	inside diameter of tube
$D_{T,o}$	outside diameter of tube
$d$	diameter, distance, depth, damping
$d_B$	diameter of circular thrust pad
$d_{cp}$	diameter of capillary
$d_e$	damping of eigenfrequency, system damping
$d_F$	damping of pad pivot support in direction of load (tilting-pad bearing)
$d_G$	diameter of groove
$d_{G,m}$	mean diameter of groove
$d_{ik}$	lubricant film damping coefficient of journal bearing ( $i, k = 1, 2$ )

$d_{ik}^*$	non-dimensional lubricant film damping coefficient of journal bearing
	$\left[ d_{ik}^* = \frac{\psi^3}{2 \times B \times \eta \times \omega} \times \omega \times d_{ik} \quad (i, k = 1, 2) \right]$
$d_L$	lubrication hole diameter
$d_{\text{orf},i}$	inside diameter of orifice
$d_{\text{orf},o}$	outside diameter of orifice
$d_P$	diameter of lubricating pocket
$d_{\text{sup}}$	damping of isotropic bearing or bearing shell support
$d_{\text{sup},ik}$	damping coefficient of anisotropic bearing or bearing shell support ( $i, k = 1, 2$ )
$d_\vartheta$	angular damping of pad pivot support (tilting-pad bearing)
$E$	Young's modulus (modulus of elasticity)
$E_B$	Young's modulus of bearing material
$E_J$	Young's modulus of journal material
$E_{\text{res}}$	resultant Young's modulus
$E_{\text{sh}}$	Young's modulus of shaft material
$e$	eccentricity (distance between journal and bearing axis)
$e_B$	eccentricity of bearing sliding surfaces (segments or pads) of a multi-lobed or tilting-pad journal bearing
$e_{B,h}$	eccentricity of bearing sliding surfaces (segments) of a multi-lobed journal bearing in the horizontal direction
$e_{B,v}$	eccentricity of bearing sliding surfaces (segments) of a multi-lobed journal bearing in the vertical direction
$e_{\text{CG}}$	eccentricity of centre of gravity (distance between centre of gravity and shaft axis)
$e_x$	component of eccentricity normal to direction of load
$e_y$	component of eccentricity in direction of load
$F$	bearing force, bearing load, nominal bearing load, load-carrying capacity
$F^*$	bearing force parameter
$\Delta F$	additional dynamic force
$\Delta F^*$	additional dynamic force parameter ( $\Delta F^* = \frac{\Delta F \times \psi^2}{B \times D \times \eta \times \omega}$ for journal bearings)
$F_{\text{ax}}$	axial bearing force, axial bearing load, thrust bearing load (nominal load)
$F_{\text{ax,lim}}$	maximum admissible thrust bearing load
$F_{\text{ax,lim},i}$	maximum admissible thrust bearing load directed into the machine (flange bearing)
$F_{\text{ax,lim},o}$	maximum admissible thrust bearing load directed out of the machine (flange bearing)

$F_B$	segment or pad load
$F_d$	damping force
$F_{dyn}$	dynamic bearing force, dynamic bearing load
$F_{dyn,rsn}$	resonance amplitude of dynamic bearing force
$F_{dyn,x}$	component of $F_{dyn}$ in the $x$ -direction
$F_{dyn,y}$	component of $F_{dyn}$ in the $y$ -direction
$F_e$	bearing force considering elasticity
$F_e^*$	bearing force parameter considering elasticity ( $F_e^* = K_{el} \times F^*$ )
$F_{e,tr}$	bearing force considering elasticity at transition to mixed friction
$F_{e,tr}^*$	bearing force parameter considering elasticity at transition to mixed friction
$F_{eff}$	effective load-carrying capacity
$F_{eff}^*$	effective load-carrying capacity parameter [ $F_{eff}^* = F_{hs} / (b_c \times l_{ax} \times Z \times p_{en})$ for hydrostatic journal bearings]
$F_{eff,0}^*$	effective load-carrying capacity parameter at $N = 0$
$F_{exc}$	exciting force
$F_f$	friction force ( $F_f = f \times F$ )
$F_f^*$	friction force parameter ( $F_f^* = \frac{f}{\psi} \times S_o$ for journal bearings)
$F_{f,ax}$	friction force of thrust bearing ( $F_{f,ax} = f_{ax} \times F_{ax}$ )
$F_{f,B}$	friction force of thrust bearing segment or pad
$F_{f,B}^*$	friction force parameter of thrust bearing segment or pad ( $F_{f,B}^* = \frac{F_{f,B} \times h_{ax,min}}{B_{ax} \times R_m^2 \times \eta \times \omega}$ )
$F_{f,G}$	friction force in the area of the lubricant groove
$F_{f,G}^*$	friction force parameter in the area of the lubricant groove
$F_{f,ld}$	friction force in the loaded area of the lubricant film
$F_{f,ld}^*$	friction force parameter in the loaded area of the lubricant film
$F_{f,P}$	friction force in the area of the lubricant pocket
$F_{f,P}^*$	friction force parameter in the area of the lubricant pocket
$F_{f,r}$	friction force of journal bearing ( $F_{f,r} = f_r \times F_r$ )
$F_{f,uld}$	friction force in the unloaded area of the lubricant film
$F_{f,uld}^*$	friction force parameter in the unloaded area of the lubricant film
$F_{lim}$	maximum admissible bearing load
$F_{lim,dw}$	maximum admissible bearing load in vertical direction downwards

$F_{\text{lim,h}}$	maximum admissible bearing load in the horizontal direction
$F_{\text{lim,up}}$	maximum admissible bearing load in the vertical direction upwards
$F_{\text{n}}$	normal force (normal to the sliding surface)
$F_{\text{r}}$	radial bearing force, radial bearing load, journal bearing load (nominal load)
$F_{\text{r,lim}}$	maximum admissible journal bearing load
$F_{\text{res}}$	resulting force, resulting load
$F_{\text{rot}}$	bearing force component due to rotation
$F_{\text{sc}}$	static bearing force, static bearing load
$F_{\text{sp}}$	spring force
$F_{\text{sq}}$	bearing force component due to squeezing
$F_{\text{str}}$	bearing force at start ( $N \approx 0$ )
$F_{\text{stp}}$	bearing force at stop ( $N \approx 0$ )
$F_{\text{tr}}$	bearing force at transition to mixed friction
$F_{\text{tr}}^*$	bearing force parameter at transition to mixed friction
$F_{\text{u}}$	unbalance force
$F_0$	bearing force at $N = 0$
$f$	friction factor (coefficient of friction), deflection, function, frequency
$f^*$	friction parameter
$f_{\text{ax}}$	coefficient of friction of thrust bearing
$f_{\text{B}}$	downward deflection of segment or pad
$f_{\text{e}}$	bearing eigenfrequency
$f_{\text{hd}}$	hydrodynamic coefficient of friction
$f_{\text{hd,m}}$	hydrodynamic coefficient of friction in the area of mixed friction
$f_{\text{J}}$	journal deflection
$f_{\text{min}}$	minimum coefficient of friction, coefficient of friction at minimum of Stribeck curve
$f_{\text{r}}$	coefficient of friction of journal bearing
$f_{\text{s}}$	solid coefficient of friction
$f_{\text{s,m}}$	solid coefficient of friction in the area of mixed friction
$f_{\text{tl}}^*$	friction parameter of taper land thrust bearing ( $f_{\text{tl}}^* = f^* \times h_{\text{wed}}/h_{\text{ax,min}}$ )
$f_{\text{tr}}$	coefficient of friction at transition to mixed friction
$G$	shear modulus
$g$	acceleration due to gravity

$H$	height, bearing height, nominal bearing height, hardness
$H_H$	height of bearing housing
$h$	height, depth, thickness, lubricant film thickness, local lubricant film thickness, gap
$h^*$	relative lubricant film thickness, relative local lubricant film thickness ( $h^* = h/C_R$ for journal bearings)
$h_{en}$	lubricant film thickness at the entrance gap
$h_{ex}$	lubricant film thickness at the exit gap
$h_G$	depth of lubricant groove, depth of lubricant supply groove
$h_{lim}$	minimum admissible lubricant film thickness during operation
$h_{lim}^*$	minimum admissible relative lubricant film thickness during operation ( $h_{lim}^* = h_{r,lim}/C_R$ for journal bearings)
$h_{lim,tr}$	minimum admissible lubricant film thickness at transition to mixed friction (minimum value of minimum lubricant film thickness still permitting full separation of bearing and shaft sliding surfaces by a lubricant film)
$h_{lim,tr}^*$	minimum admissible relative lubricant film thickness at transition to mixed friction ( $h_{lim,tr}^* = h_{lim,tr}/C_R$ for journal bearings)
$h_{min}$	minimum lubricant film thickness, minimum gap
$h_{min}^*$	minimum relative lubricant film thickness, minimum relative gap ( $h_{min}^* = h_{r,min}/C_R$ for journal bearings, $h_{min}^* = h_{ax,min}/h_{wed}$ for thrust bearings)
$h_{min,tr}$	minimum lubricant film thickness at transition to mixed friction
$h_{min,tr}^*$	minimum relative lubricant film thickness at transition to mixed friction ( $h_{min,tr}^* = h_{min,tr}/C_R$ for journal bearings)
$h_{min,0}$	reference value of $h_{min}$
$h_P$	depth of lubricant pocket, depth of lubricant supply pocket
$h_{r,lim}$	minimum admissible lubricant film thickness of journal bearing during operation
$h_{r,min}$	minimum lubricant film thickness of journal bearing
$h_{wav}$	waviness of sliding surface
$h_{wav,eff}$	effective waviness of sliding surface
$h_{wav,eff,lim}$	maximum admissible effective waviness of sliding surface
$h_{wav,lim}$	maximum admissible waviness of sliding surface
$h_{wed}$	wedge depth (thrust bearing)
$h_{wed}^*$	relative wedge depth (thrust bearing, $h_{wed}^* = h_{wed}/l_{wed}$ )
$h_{wed,r}$	wedge depth in radial direction (thrust bearing)
$h_0$	local gap at $\varepsilon = 0$ (journal bearing)
$h_0^*$	relative local gap at $\varepsilon = 0$ ( $h_0^* = h_0/C_R$ )

$h_{0,\max}$	maximum gap at $\varepsilon = 0$
$h_{0,\max}^*$	maximum relative gap at $\varepsilon = 0$ , gap ratio ( $h_{0,\max}^* = h_{0,\max}/C_R$ )
$I$	geometrical moment of inertia
$i$	$\sqrt{-1}$
$J$	mass moment of inertia
$J_X$	bearing mass moment of inertia with reference to the X-axis
$J_Y$	bearing mass moment of inertia with reference to the Y-axis
$J_Z$	bearing mass moment of inertia with reference to the Z-axis
$j$	$\sqrt{-1}$
$K$	coefficient, constant, factor, parameter, auxiliary variable
$K_d$	dissipation parameter [ $K_d = \eta \times \omega / (\rho \times c_p \times T \times \psi^2)$ for journal bearings]
$K_{el}$	elasticity influence parameter
$K_{fil}$	fill factor
$K_I$	correction factor considering the heat transition resistance of bearing insulation
$K_P$	profile factor [relative difference between lobe or pad bore radius and journal radius, $K_P = 1/(1 - m)$ ]
$K_{P,eff}$	effective profile factor
$\Delta K_{P,el}$	elastic change of $K_P$
$K_{P,T}$	profile factor at temperature $T$
$\Delta K_{P,th}$	thermal change of $K_P$
$\Delta K_{P,tot}$	total change of $K_P$ ( $\Delta K_{P,tot} = \Delta K_{P,el} + \Delta K_{P,th}$ )
$K_{rot}$	rotational speed influence parameter
$K_T$	heating parameter ( $K_T = \frac{\eta_0 \times \omega}{\rho \times c_p \times T_0 \times \psi^2}$ for journal bearings)
$K_w$	wear coefficient
$K_\lambda$	heat conduction parameter ( $K_\lambda = \frac{1}{Re \times Pr \times \psi}$ for journal bearings)
$k$	heat transition coefficient
$k_{A^*}$	heat transition coefficient referring to $A^*$
$k^*$	heat transition parameter [ $k^* = 2 \times \psi \times k_A \times A / (\lambda \times D)$ for journal bearings]
$k_A$	heat transition coefficient referring to $A$
$k_B$	heat transition coefficient referring to bearing sliding surface (heat transition coefficient at the interface between lubricant film and bearing sliding surface)

$k_T$	heat transition coefficient of tube
$L$	length parallel to the sliding surface, in direction of motion; nominal length, pad length, nominal pad length
$L_H$	length of bearing housing at right angles to the axis
$L_T$	length of tube
$l$	length in the direction of flow, exponent of Falz's formula for the dependency of $\eta$ on $T \left[ \frac{\eta}{\eta_0} = \left( \frac{T}{T_0} \right)^{-l} \right]$
$l_{cp}$	length of capillary
$l_G$	length of lubricant groove (circumferential direction), length of lubricant supply groove, length of drainage groove, length of bleed groove
$l_{ax}$	length of axial discharge [ $l_{ax} = \pi \times D/Z_{ax} - (l_{lan} + l_G)$ for hydrostatic journal bearings]
$l_{lan}$	land length in the direction of flow (thrust bearing)
$l_P$	length of lubricant pocket, length of lubricant supply pocket
$l_{wed}$	wedge length (thrust bearing)
$M$	moment, mixing factor
$M_F$	moment of bearing load
$M_f$	friction moment ( $M_f = R \times F_{f,r}$ for journal bearings, $M_f = R_m \times F_{f,ax}$ for thrust bearings)
$m$	mass, preload of bearing or pad sliding surface
$m_B$	bearing mass
$m_{JR}$	mass of the Jeffcott Rotor
$N$	rotational speed (rotational frequency) of the rotor (revolutions per time unit)
$N_B$	rotational speed (rotational frequency) of the bearing
$N_{cr}$	critical speed (critical rotational frequency) of the rigidly supported rotor
$N_F$	rotational speed (rotational frequency) of the bearing force
$N_{f,min}$	rotational speed (rotational frequency) at minimum of Stribeck curve
$N_{lim}$	rotational speed (rotational frequency) at the stability speed limit of the rotor supported by plain bearings
$N_{max}$	maximum rotational speed (maximum rotational frequency)
$N_{min}$	minimum rotational speed (minimum rotational frequency)
$N_{rsn}$	resonance speed (resonance rotational frequency) of the rotor supported by plain bearings
$N_{tr}$	rotational speed (rotational frequency) at transition to mixed friction, transition rotational speed, transition rotational frequency

$N_0$	reference value of $N$
$Nu$	Nusselt number
$n$	number
$O$	point of origin, centre, centreline, order of magnitude
$O_B$	centreline of plain bearing
$O_i$	centreline of sliding surface No. $i$
$O_J$	centreline of journal
$P$	power, heat flow
$P^*$	power ratio ( $P^* = P_f/P_{Pu}$ )
$P_{cv,B}$	heat flow discharged from the bearing to the ambient air via convection
$P_{cv,sh}$	heat flow discharged from the shaft to the ambient air via convection
$P_f$	frictional power
$P_{f,ax}$	frictional power of thrust bearing ( $P_{f,ax} = F_{f,ax} \times U_m$ )
$P_{f,P}$	frictional power in the lubricant pocket(s)
$P_{f,r}$	frictional power of journal bearing ( $P_{f,r} = F_{f,r} \times U_J$ )
$P_{Pu}$	pumping power
$P_{pa}$	parasitic power loss
$P_{pa,ax}$	parasitic power loss of thrust bearing
$P_{pa,r}$	parasitic power loss of journal bearing
$P_{th}$	heat flow (quantity of heat transferred by heat or mass transfer per time unit)
$P_{th,amb}$	heat flow to the ambient air
$P_{th,cl}$	heat flow via the cooling system
$P_{th,f}$	heat flow due to frictional power
$P_{th,L}$	heat flow via the lubricant
$P_{th,L,en}$	heat flow supplied to the bearing via the lubricant
$P_{th,L,ex}$	heat flow discharged from the bearing via the lubricant
$P_{th,sf}$	heat flow discharged from the bearing via the lubricant side flow rate
$P_{tot}$	total power
$P_{tot}^*$	total power parameter ( $P_{tot}^* = \frac{P_{tot}}{F_r \times \omega \times C_R}$ for journal bearings)
$P_{\lambda,sh}$	heat flow discharged from the bearing via heat conduction in the shaft

$Pr$	Prandtl number ( $Pr = \frac{\eta \times c_p}{\lambda}$ )
$p$	lubricant film pressure, local lubricant film pressure (pressure built up in the lubricant film of a plain bearing by hydrodynamic or hydrostatic effects)
$\bar{p}$	specific bearing load (bearing load per unit of projected bearing area)
$p_{amb}$	ambient pressure (pressure in the immediate vicinity of bearing shell or pad)
$p_{amb,i}$	ambient pressure at $D_i$ (thrust bearing)
$p_{amb,o}$	ambient pressure at $D_o$ (thrust bearing)
$\bar{p}_{ax}$	specific load of thrust bearing [ $\bar{p}_{ax} = F_{ax}/(B \times L \times Z_{ax})$ ]
$p_B$	profile of bearing or pad sliding surface
$\bar{p}_{dyn}$	dynamic specific bearing force, dynamic specific bearing load ( $\bar{p}_{dyn} = F_{dyn}/(B \times D)$ for journal bearings, $\bar{p}_{dyn} = F_{dyn}/(B \times L \times Z_{ax})$ for thrust bearings)
$p_{en}$	lubricant supply pressure (pressure by which the lubricant is supplied to the bearing)
$p_{en}^*$	lubricant supply pressure parameter ( $p_{en}^* = \frac{p_{en} \times \psi^2}{\eta \times \omega}$ for journal bearings)
$p_{lim}$	maximum admissible lubricant film pressure
$\bar{p}_{lim}$	maximum admissible specific bearing load (limiting value of specific bearing load; exceeding this value may lead to bearing failure)
$\bar{p}_{lim,tr}$	maximum admissible specific bearing load at transition to mixed friction
$p_{max}$	maximum lubricant film pressure
$p_{max}^*$	maximum lubricant film pressure parameter ( $p_{max}^* = p_{max} \bar{p}$ )
$p_P$	lubricant pressure in the lubricant pocket
$p_{P,i}$	lubricant pressure in the lubricant pocket No. $i$
$p_{P,i,0}$	lubricant pressure in the lubricant pocket No. $i$ at $\varepsilon = 0$ (journal bearing)
$\bar{p}_r$	specific load of journal bearing [ $\bar{p}_r = F_r/(B \times D)$ ]
$\bar{p}_{sc}$	static specific bearing force, static specific bearing load [ $\bar{p}_{sc} = F_{sc}/(B \times D)$ for journal bearings, $\bar{p}_{sc} = F_{sc}/(B \times L \times Z_{ax})$ for thrust bearings]
$\bar{p}_{str}$	specific bearing load at start ( $N \approx 0$ )
$\bar{p}_{stp}$	specific bearing load at stop ( $N \approx 0$ )
$\bar{p}_{tr}$	specific bearing load at transition to mixed friction [ $\bar{p}_{tr} = F_{tr}/(B \times D)$ for journal bearings]
$Q$	lubricant flow rate (volume of lubricant passing through the bearing per time unit, $Q = Q_3 + Q_p$ )
$Q^*$	lubricant flow rate parameter, relative lubricant flow rate ( $Q^* = Q/Q_0$ )
$Q_{ax}$	lubricant flow rate of thrust bearing
$Q_{ax,en}$	lubricant flow rate supplied to the thrust bearing

$Q_{le}$	lubricant flow rate at leading edge of segment or pad
$Q_{sf}$	lubricant side flow rate of segment or pad
$Q_{te}$	lubricant flow rate at trailing edge of segment or pad
$Q_{cl}$	coolant flow rate
$Q_P$	lubricant flow rate per lubricant pocket
$Q_{Pu}$	lubricant flow rate at pump
$Q_{Pu,lim}$	maximum admissible lubricant flow rate at pump
$Q_p$	lubricant flow rate due to supply pressure
$Q_p^*$	lubricant flow rate parameter due to supply pressure [ $Q_p^* = Q_p / (p_{en}^* \times Q_0)$ ]
$Q_{P,sf}$	lubricant side flow rate of lubricant pocket
$Q_r$	lubricant flow rate of journal bearing
$Q_{r,en}$	lubricant flow rate supplied to the journal bearing
$Q_0$	reference value of $Q$ ( $Q_0 = R^3 \times \omega \times \psi$ for hydrodynamic journal bearings, $Q_0 = C_R^3 \times p_{en} / \eta$ for hydrostatic journal bearings, $Q_0 = B_{ax} \times h_{ax,min} \times U_m \times Z_{ax}$ or $Q_0 = h_{ax,min} \times \omega \times R_m^2$ for thrust bearings)
$Q_1$	lubricant flow rate at the entrance into the gap (circumferential direction)
$Q_1^*$	lubricant flow rate parameter at the entrance into the gap (circumferential direction, $Q_1^* = Q_1 / Q_0$ )
$Q_2$	lubricant flow rate at the exit of the gap (circumferential direction, $Q_2 = Q_1 - Q_3$ )
$Q_2^*$	lubricant flow rate parameter at the exit of the gap (circumferential direction, $Q_2^* = Q_2 / Q_0$ )
$Q_3$	lubricant flow rate due to hydrodynamic pressure build-up (side flow rate)
$Q_3^*$	lubricant flow rate parameter due to hydrodynamic pressure build-up (side flow rate parameter, $Q_3^* = Q_3 / Q_0$ )
$q$	lubricant flow rate (lubricant volume flow)
$R$	journal bearing inside radius ( $R = D/2$ )
$R_a$	surface finish Centre Line Average (CLA)
$R_{a,B}$	surface finish Centre Line Average (CLA) of bearing sliding surface
$R_{a,J}$	surface finish Centre Line Average (CLA) of journal or thrust collar sliding surface
$R_B$	lobe or pad bore radius of a multi-lobed or tilting-pad journal bearing ( $R_B = D_B/2$ )
$\Delta R_B$	difference between lobe or pad bore radius and journal radius ( $\Delta R_B = R_B - R_J$ )
$R_{cp}$	flow resistance of capillary
$R_J$	journal radius (radius of the shaft section located inside of a journal bearing, $R_J = D_J/2$ )
$R_{lan,ax}$	flow resistance of land parallel to the sliding surface, normal to the direction of flow

$R_{lan,c}$	flow resistance of land in the direction of flow
$R_m$	mean radius of thrust bearing sliding surface ( $R_m = D_m/2$ )
$R_P$	flow resistance of lubricant pocket (hydrostatic bearing)
$R_{P,0}$	flow resistance of lubricant pocket at $\varepsilon = 0$ (hydrostatic journal bearing)
$R_z$	surface finish ten-point average
$R_{z,B}$	surface finish ten-point average of bearing sliding surface
$R_{z,J}$	surface finish ten-point average of journal or thrust collar sliding surface
$Re$	Reynolds number [ $Re = (\rho \times \omega \times R \times C_R)/\eta$ for journal bearings, $Re = \rho \times \omega \times R_m \times h_{min}/\eta$ for thrust bearings]
$Re_{cp}$	Reynolds number in the capillary ( $Re_{cp} = \rho \times \bar{v}_{cp} \times d_{cp}/\eta_{cp}$ )
$Re_{cr}$	critical Reynolds number
$Re_P$	Reynolds number in the lubricant pocket ( $Re_P = \rho \times U \times h_P/\eta$ )
$r$	radius, coordinate in the radial direction
$r_F$	coordinate of pivot position of pad in the radial direction (tilting-pad bearing)
$r_T$	coordinate of temperature measuring point in the radial direction
$S$	safety factor, displacement amplitude of rotor (mechanical oscillation), $S$ number (special form of reciprocal Sommerfeld number $So$ , $S = \frac{1}{2 \times \pi \times So} = \frac{B \times D \times \eta \times \omega}{2 \times \pi \times F_r \times \psi^2}$ )
$S_F$	safety factor against mixed friction due to overload
$S_N$	safety factor against mixed friction due to rotational underspeed
$S_{rsn}$	displacement amplitude of rotor at resonance
$So$	Sommerfeld number (special form of bearing force parameter $F^*$ ; $So = \frac{F_r \times \psi^2}{B \times D \times \eta \times \omega}$ for journal bearings, $So = \frac{F_{ax} \times h_{ax,min}^2}{Z_{ax} \times B_{ax} \times R_m^3 \times \eta \times \omega}$ for thrust bearings)
$So_{cr}$	Sommerfeld number formed with $\omega_{cr}$ (journal bearing, $So_{cr} = \frac{F_r \times \psi^2}{B \times D \times \eta \times \omega_{cr}}$ )
$So_m$	Sommerfeld number formed with $\eta_m$ ( $So_m = \frac{F_r \times \psi^2}{B \times D \times \eta_m \times \omega}$ for journal bearings)
$So_{rot}$	Sommerfeld number of bearing force component due to rotation ( $So_{rot} = \frac{F_{rot} \times \psi^2}{B \times D \times \eta \times \omega}$ for journal bearings)
$So_{sq}$	Sommerfeld number of bearing force component due to squeezing ( $So_{sq} = \frac{F_{sq} \times \psi^2}{B \times D \times \eta \times \dot{\varepsilon}}$ for journal bearings)
$So_{tr}$	Sommerfeld number at transition to mixed friction
$So_0$	Sommerfeld number formed with $\eta_0$ ( $So_0 = \frac{F_r \times \psi^2}{B \times D \times \eta_0 \times \omega}$ for journal bearings)

SP	switching period
$s$	displacement
$s_y$	journal displacement against the direction of load
$T$	temperature, lubricant temperature
$\Delta T$	difference between lubricant temperature at the bearing exit and lubricant temperature at the bearing entrance ( $\Delta T = T_{ex} - T_{en}$ )
$T_{amb}$	ambient temperature (temperature in the immediate vicinity of the bearing)
$T_{amb,B}$	bearing shell or pad ambient temperature
$T_{amb,C}$	thrust collar ambient temperature (thrust bearing)
$T_{amb,sh}$	shaft ambient temperature
$T_B$	bearing temperature
$T_{B,max}$	maximum bearing or pad sliding surface temperature
$T_{B,lim}$	maximum admissible bearing sliding surface temperature (maximum temperature of bearing sliding surface material; exceeding this value leads to deterioration of the material)
$T_C$	thrust collar temperature (thrust bearing)
$\Delta T_{cl}$	difference between coolant temperature at the heat exchanger exit and coolant temperature at the heat exchanger entrance ( $\Delta T_{cl} = T_{cl,ex} - T_{cl,en}$ )
$T_{cl,en}$	coolant temperature at the heat exchanger entrance
$T_{cl,ex}$	coolant temperature at the heat exchanger exit
$T_{cp}$	lubricant temperature in the capillary (hydrostatic bearing)
$T_{eff}$	effective temperature of lubricant film (temperature defined on the basis of heat balance)
$T_{eff,ax}$	effective temperature of lubricant film of thrust bearing
$T_{eff,lim}$	maximum admissible effective temperature of lubricant film
$T_{eff,r}$	effective temperature of lubricant film of journal bearing
$T_{eff,tr}$	effective temperature of lubricant film at transition to mixed friction
$T_{en}$	lubricant temperature at the bearing entrance (temperature at which the lubricant is supplied to the bearing, measured immediately before entering the bearing)
$T_{ex}$	lubricant temperature at the bearing exit
$T_{gl}$	glass transition temperature (testing of plastics)
$T_J$	journal temperature
$T_{le,m}$	mean lubricant temperature at leading edge of segment or pad
$T_{lim}$	maximum admissible bearing temperature
$T_{max}$	maximum temperature of lubricant film

$\Delta T_{\max}$	difference between maximum temperature of lubricant film and lubricant temperature in the lubricant pocket ( $\Delta T_{\max} = T_{\max} - T_1$ )
$\Delta T_{\max}^*$	non-dimensional difference between maximum temperature of lubricant film and lubricant temperature in the lubricant pocket ( $\Delta T_{\max}^* = \frac{\rho \times c_p \times \psi}{\bar{p}_r \times f_r} \times \Delta T_{\max}$ for journal bearings)
$T_{\text{ms}}$	measured temperature
$T_{\text{P,m}}$	mean temperature in the lubricant pocket(s)
$T_{\text{P,sf,m}}$	mean temperature of the lubricant side flow rate of lubricant pocket
$T_{\text{sf,m}}$	mean temperature of the lubricant side flow rate of segment or pad
$T_{\text{sh}}$	shaft temperature
$T_{\text{te,m}}$	mean lubricant temperature at trailing edge of segment or pad
$T_0$	lower reference temperature
$T_1$	lubricant temperature at the entrance into the gap (circumferential direction), upper reference temperature
$\Delta T_1$	difference between lubricant temperature at the entrance into the gap and lubricant temperature at the bearing entrance ( $\Delta T_1 = T_1 - T_{\text{en}}$ )
$T_2$	lubricant temperature at pressure trailing edge (circumferential direction)
$\Delta T_2$	difference between lubricant temperature at pressure trailing edge and lubricant temperature at the entrance into the gap ( $\Delta T_2 = T_2 - T_1$ )
$Ta$	Taylor number ( $Ta = Re \times \sqrt{\psi}$ for journal bearings)
$Ta_{\text{cr}}$	critical Taylor number ( $Ta_{\text{cr}} = 41,3$ for journal bearings)
$t$	time, thickness, wall thickness, lining thickness
$t_{\text{B}}$	thickness of bearing shell or segment or pad
$t_{\text{C}}$	thickness of thrust collar (thrust bearing)
$U$	surface velocity in the $x$ - or $\varphi$ -direction, sliding velocity, circumferential speed
$U_{\text{B}}$	circumferential speed of the bearing
$U_{\text{J}}$	circumferential speed of the journal, sliding velocity ( $U_{\text{J}} = \omega \times R_{\text{J}}$ )
$U_{\text{lim,tr}}$	minimum admissible circumferential speed at transition to mixed friction
$U_{\text{m}}$	mean circumferential speed of the thrust collar sliding surface, sliding velocity ( $U_{\text{m}} = \omega \times R_{\text{m}}$ )
$U_{\text{tr}}$	circumferential speed at transition to mixed friction
$u$	velocity component in the $x$ - or $\varphi$ -direction, deformation in $x$ -direction
$\bar{u}$	average velocity component in the $x$ - or $\varphi$ -direction
$V$	volume, surface velocity in the $y$ -direction
$V_{\text{L}}$	lubricant volume of the bearing