



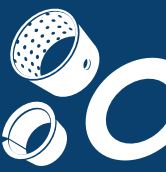
# KS PERMAGLIDE® Plain Bearings Materials and Applications

Material KS PERMAGLIDE® P1 – maintenance-free, up to 280 °C

Material	Structure	Illustration	Characteristics	Applications (examples)
<b>All-rounder P10</b> <i>Reduced PFOA</i>	<ul style="list-style-type: none"> <li>Steel back</li> <li>Porous lead bronze</li> <li>PTFE, Pb</li> </ul>		<ul style="list-style-type: none"> <li>Very good dry running properties</li> <li>Good chemical resistance</li> <li>Can be used in oil</li> </ul>	<ul style="list-style-type: none"> <li>Fire damper</li> <li>Gear pump</li> <li>Wind turbine systems</li> <li>Packaging machines</li> <li>Agricultural machines</li> </ul>
<b>High pv value P11</b> <i>Reduced PFOA</i>	<ul style="list-style-type: none"> <li>Bronze back</li> <li>Porous tin bronze</li> <li>PTFE, Pb</li> </ul>		<ul style="list-style-type: none"> <li>Very good thermal conductivity</li> <li>For high velocities</li> <li>Good corrosion protection</li> </ul>	<ul style="list-style-type: none"> <li>Outdoor applications</li> <li>Construction machines</li> <li>Maritime applications, e.g. pump turbine</li> </ul>
<b>Benefits in oil P14</b> <b>RoHS</b> <i>Unleaded PFOA-free</i>	<ul style="list-style-type: none"> <li>Steel back</li> <li>Porous tin bronze</li> <li>PTFE, ZnS</li> </ul>		<ul style="list-style-type: none"> <li>High performance with mixed friction</li> <li>Physiologically harmless</li> <li>Very low swelling tendency in oil</li> </ul>	<ul style="list-style-type: none"> <li>Oiled shift forks</li> <li>Office machines</li> <li>DC proportional solenoid</li> </ul>
<b>High performance P147*</b> <b>RoHS</b> <i>Unleaded PFOA-free</i>	<ul style="list-style-type: none"> <li>Steel back</li> <li>Porous bismuth-tin bronze</li> <li>PTFE, BaSO<sub>4</sub></li> </ul>		<ul style="list-style-type: none"> <li>Good corrosion protection</li> <li>High chemical resistance</li> <li>Salt spray tested</li> </ul>	<ul style="list-style-type: none"> <li>Applications with swivel motion</li> <li>Windscreen wipers</li> <li>Hinges</li> <li>Maritime applications, e.g. flood gate</li> </ul>



\* On request



**Material KS PERMAGLIDE® P2 – low-maintenance, up to 130 °C**

Material	Structure	Illustration	Characteristics	Applications (examples)
<b>P20</b> <i>Reduced PFOA</i>	<ul style="list-style-type: none"> <li>Steel back</li> <li>Porous tin bronze</li> <li>PVDF, lead, additives</li> </ul>		<ul style="list-style-type: none"> <li>Ready to install with oil distributing pockets</li> <li>Very good damping characteristics</li> </ul>	<ul style="list-style-type: none"> <li>Wind turbine systems</li> <li>Construction machines</li> <li>Agricultural machines</li> <li>Starter motors</li> <li>Yarn unwinders</li> <li>Unbalance adjustment</li> <li>Pneumatic cylinders</li> </ul>
<b>P22, P23*</b> <i>Reduced PFOA</i>	<ul style="list-style-type: none"> <li>Steel back</li> <li>Porous tin bronze</li> <li>PVDF, lead, additives</li> </ul>		<ul style="list-style-type: none"> <li>P22: with machining allowance, smooth surface</li> <li>P23: ready to install, smooth surface</li> </ul>	<ul style="list-style-type: none"> <li>Hydrodynamic applications</li> <li>Construction machines</li> <li>Swivel cradle mounting</li> <li>Dampers</li> <li>Radial piston machines</li> </ul>
<b>P200</b> ✓ RoHS <i>Unleaded PFOA-free</i>	<ul style="list-style-type: none"> <li>Steel back</li> <li>Porous tin bronze</li> <li>PVDF, additives</li> </ul>		<ul style="list-style-type: none"> <li>Ready to install with oil distributing pockets</li> <li>Very good damping characteristics</li> <li>High chemical resistance</li> </ul>	<ul style="list-style-type: none"> <li>Dampers</li> <li>Agitators</li> </ul>
<b>P202, P203*</b> ✓ RoHS <i>Unleaded PFOA-free</i>	<ul style="list-style-type: none"> <li>Steel back</li> <li>Porous tin bronze</li> <li>PVDF, additives</li> </ul>		<ul style="list-style-type: none"> <li>P202: with machining allowance, smooth surface</li> <li>P203: ready to install, smooth surface</li> </ul>	<ul style="list-style-type: none"> <li>Hydrodynamic applications</li> <li>Hydraulic applications</li> <li>Pneumatic applications</li> <li>Radial piston machines</li> </ul>

**New KS PERMAGLIDE® materials**

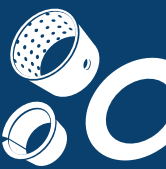
**Material KS PERMAGLIDE® P1 – maintenance-free, up to 250 °C**

Material	Structure	Characteristics	Applications (examples)
<b>P141*</b> ✓ RoHS <i>Unleaded PFOA-free</i>	<ul style="list-style-type: none"> <li>Steel back</li> <li>Porous tin bronze</li> <li>PTFE, ZnS, CF, additives</li> </ul>	<ul style="list-style-type: none"> <li>High-performance material</li> <li>Suitable for heavy loads in oil</li> <li>Good wear protection</li> </ul>	<ul style="list-style-type: none"> <li>Hydrodynamic systems</li> <li>Dampers</li> <li>Pumps</li> <li>Compressors</li> </ul>
<b>P170*</b> ✓ RoHS <i>Unleaded PFOA-free</i>	<ul style="list-style-type: none"> <li>Steel back</li> <li>Porous tin bronze</li> <li>PTFE, additives</li> </ul>	<ul style="list-style-type: none"> <li>High-performance material</li> <li>Particularly suitable for oscillatory motion</li> <li>High wear resistance with micro-movement</li> </ul>	<ul style="list-style-type: none"> <li>Dual mass flywheel</li> <li>Belt tensioner</li> <li>Vibration damper</li> </ul>

**Material KS PERMAGLIDE® P2 – low-maintenance, up to 200 °C**

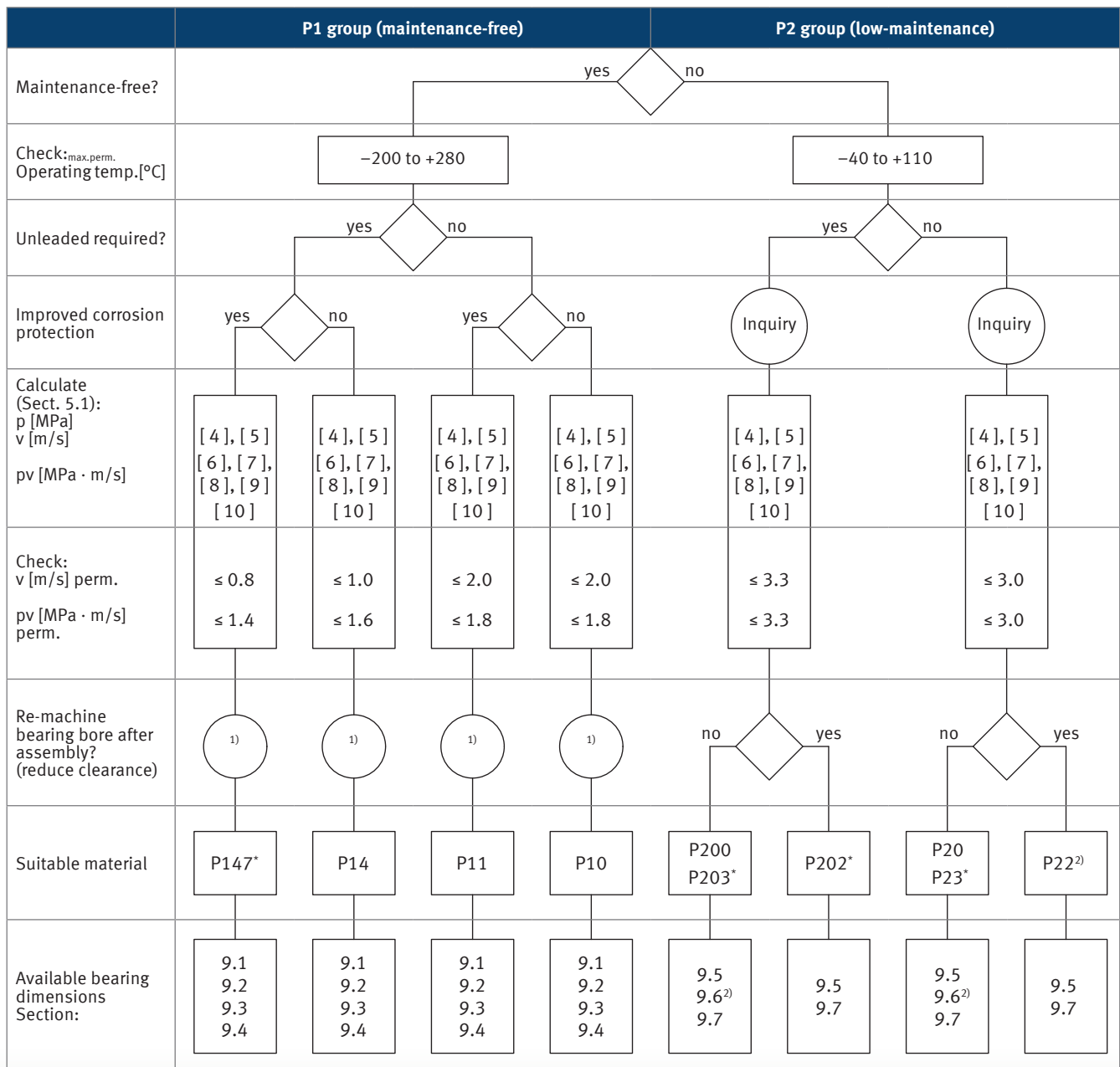
Material	Structure	Characteristics	Applications (examples)
<b>P213*</b> ✓ RoHS <i>Unleaded PFOA-free</i>	<ul style="list-style-type: none"> <li>Steel back</li> <li>Porous tin bronze</li> <li>PEEK, CF, additives</li> </ul>	<ul style="list-style-type: none"> <li>Ready to install, without oil distributing pockets</li> <li>High thermal stability</li> <li>Extremely high wear resistance</li> </ul>	<ul style="list-style-type: none"> <li>Hydrodynamic applications in low-viscosity carbon-hydrogen, e.g. fuels</li> <li>Fuel injection pumps</li> </ul>

\* On request



**Material selection plan. Applies to dry-running and grease-lubricated plain bearings.**  
**For hydrodynamic operation, Motorservice offers calculation and material selection as a service.**

Input variables	
The adjacent input variables are normally set out in the specification or are calculated (shaft). As an initial approximation, the overall length must be provisionally determined as a function of the shaft in this plan.	<ul style="list-style-type: none"> <li>• Bearing load [MPa]</li> <li>• Shaft diameter [mm]</li> <li>• Speed [rpm]</li> <li>• Swivel angle [°]</li> <li>• Oscillating frequency [rpm]</li> <li>• Overall length [mm]</li> </ul>



<sup>1)</sup> P1 group bushes cannot be re-machined. Non-cutting calibration is possible, but this reduces durability (KS PERMAGLIDE® catalogue, item no. 50003863, Tab. 37)

<sup>2)</sup> Applies to P20/P200 material only

\* On request