PANDA
CARBIDE
TECHNOLOGY CO.,LTD.

Tungsten Carbide Bushing & Sleeve Wear Troubleshooting Checklist

This checklist is designed to help maintenance engineers and procurement managers identify the root causes of component failure and optimize equipment uptime.

1. Surface Scoring & Deep Grooving

Observations: Visible longitudinal scratches or deep grooves on the Internal Diameter (ID) or Outer Diameter (OD).

Root Causes: Contamination in the fluid medium (hard particles/sand); Failure of the upstream filtration system; Improper lubrication.

Panda Carbide Solution: Upgrade to **Sub-micron Grade Carbide** with hardness levels of HRA **91.5 - 93**. Our high-density matrix resists "micro-cutting" from abrasive particles.

2. Edge Chipping & Micro-Fractures

Observations: Irregular chips or small cracks at the leading edges or chamfers of the bushing.

Root Causes: Excessive mechanical impact during installation; Radial shock loads due to shaft misalignment; Handling damage.

Panda Carbide Solution: Utilize **High-Cobalt** (12%-15% Co) **Grades** to improve Transverse Rupture Strength (TRS). Check alignment tolerances and ensure a smooth lead-in chamfer during assembly.

3. Chemical Pitting & Leaching

Observations: "Sponge-like" appearance, dull surface color, or localized pitting (small holes).

Root Causes: Cobalt Leaching caused by acidic or alkaline fluids; Galvanic corrosion in saltwater environments.

Panda Carbide Solution: Switch to **Nickel-Binder Carbide Grades** (WC-Ni). Nickel provides superior chemical passivity and corrosion resistance in H_2S and brine-rich environments.

4. Heat Checking & Thermal Cracking

Observations: Fine, web-like cracks on the polished surface, often accompanied by blue/black thermal discoloration.

Root Causes: Dry Running (lack of lubrication/coolant); Rapid thermal cycling (sudden quenching after high-friction heat).

Panda Carbide Solution: Verify the cooling system flow. We provide specialized grades with **higher thermal conductivity** to dissipate heat faster and prevent thermal stress.

5. Component Migration (Loosening)

Observations: The carbide sleeve has rotated or shifted axially within its steel housing.

Root Causes: Incorrect **Interference Fit** calculation; Failure to account for the difference in **Coefficient of Thermal Expansion (CTE)** between carbide and steel.

Panda Carbide Solution: Refer to the **Panda Carbide Fitment Guide**. We provide precision-ground ODs with h6 or js6 tolerances to ensure a secure shrink-fit even at high operating temperatures.

Summary of Panda Carbide Technical Advantages:

- **HIP-Sintered Quality:** 100% density with zero porosity.
- **Mirror Finishing:** Surface roughness up to Ra 0.1 to minimize friction.
- **Grade Customization:** WC-Co, WC-Ni, and WC-Cr-Ni grades available based on your specific application.

For a professional wear analysis of your failed components, contact our engineering team at:

www.pandacarbide.com
info@pandacarbide.com