



Bal Seal® spring-energized low friction seals in gimbals/pods/turrets/pan-tilt systems

Application Bulletin

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19650 Pauling
Foothill Ranch, CA
USA 92610-2610

t +1 949 460 2100
f +1 949 460 2300

Jollemanhof 16, 5th floor
1019 GW Amsterdam
The Netherlands

t +31 20 638 6523
f +31 20 625 6018

Suite 901, Chinachem
Century Tower
178 Gloucester Road,
Wanchai, Hong Kong

t +852 28681860
f +852 22956753

www.balseal.com



Overview

Design engineers employ gimbals, pods, turrets, and pan-tilt systems to protect sensitive electronics used for infrared scanning, radar detection, and weapons targeting. These systems, which are deployed in air, land, and sea-based equipment, are usually controlled by small motors designed to meet strict weight and power specifications. Many of these systems use one or more seals to insulate their contents from environmental conditions including moisture, pressures, high and low temperatures, dust, and debris.

The environmental seal, which is installed between two mating surfaces, must maintain sufficient contact pressure to keep internal components clean and dry. However, if the seal configuration creates too much friction, motor performance, precision, and system life can be compromised.

The Bal Seal® spring-energized low friction seal offers an ideal solution for gimbals, pods, turrets, and pan-tilt systems used on aircraft and other platforms. Its seal jacket is typically constructed of specially formulated polymer-filled polytetrafluoroethylene (PTFE) materials that provide exceptional sealing performance and an extremely low dynamic coefficient of friction. Additionally, its Bal Spring® canted coil spring energizer exerts a customizable, near-constant force that helps compensate for wear and ensures long service life.



Rotating electro-optical turret

Operating Parameters

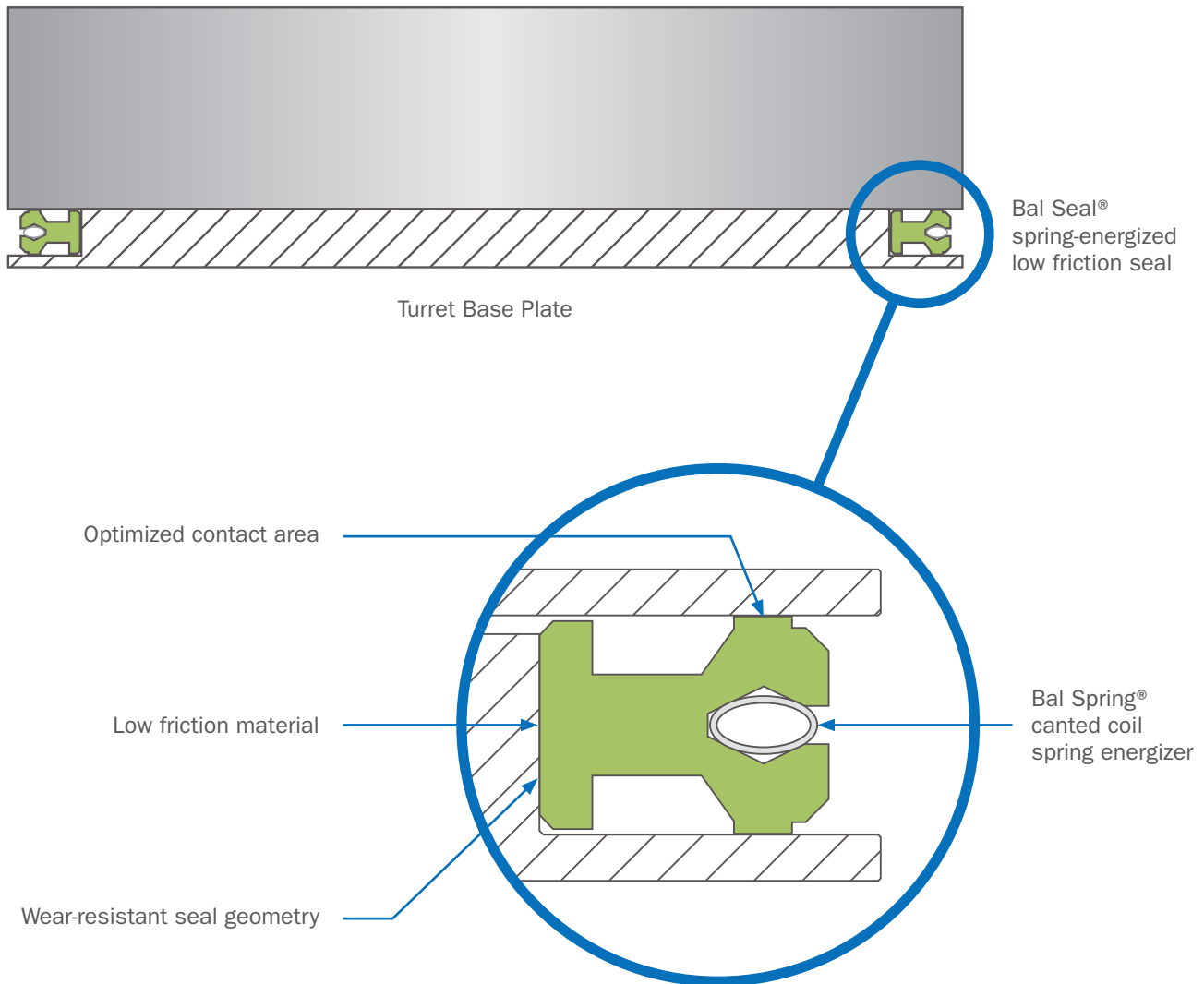
The Bal Seal® low friction seal is designed to deliver effective sealing with minimal friction in oscillating or continuous rotation service. It performs well in temperatures ranging from -60 °C to +80 °C, and in dry or moist environments. Seal materials are compatible with a variety of harsh chemicals (i.e., jet fuels, solvents, Skydrol), and their inherent lubricity eliminates the need for greases and oils.

Bal Seal low friction spring-energized seals are compatible with relatively soft metals, such as uncoated stainless steel. They can be customized to meet specific sealing, frictional and life requirements.

Advantages

- Materials offer extremely low dynamic coefficient of friction
- Seal can be customized to meet specific friction and leak rate requirements at varied temperatures and pressures
- Allows for required sealing without sacrificing low torque
- Can be used against range of materials (hardness/finishes)
- Design minimizes countersurface wear
- Low friction and stiction—ideal for oscillating motion
- Tolerance stackup benefits—can handle relatively large tolerances compared to seal cross-section

For more information about this sealing solution or material, please contact a Bal Seal Engineering technical sales representative.



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