Double Mechanical Seal

The uses of double mechanical seal with Bearing assembly in top entry, bottom entry, and side entry equipment require robust sealing solutions to ensure reliable operation and prevent leakage of fluids or gases, and provide long-term durability under high-pressure & high -temperature conditions. It is designed to withstand the demanding requirements of industrial processes, where the prevention of fluid leaks is essential for safety, efficiency, and environmental protection. This configuration ensures enhanced sealing performance and provides support for the rotating equipment within the system. It is commonly used in industries such as oil and gas, petrochemicals, refineries, power generation and Pharmaceutical plants.

Let's explore the description for this type of equipment in different configurations: top entry, bottom entry and side entry.

Top Entry Equipment: The top entry configuration refers to the seal's placement at the top of the equipment, machinery, process vessel or vertical pumps where the primary access point is located at the top. In this configuration, the double mechanical seal is positioned on the top side of the equipment, allowing for easy installation, maintenance, inspection & product changeover. The seal assembly is designed to withstand high pressures, preventing any leakage of fluids or gases.

Bottom Entry Equipment: The bottom entry configuration involves placing the double mechanical seal with bearing assembly at the bottom of the equipment. This design is commonly used in process vessels, pumps, mixers and equipment where the shaft extends downwards. This arrangement is suitable for applications where top access is limited or impractical. The double mechanical seal with bearing assembly for bottom entry Equipments shares similarities with the top entry design but is adapted for the specific requirements of bottom entry applications. The double mechanical seal comprises two sets of sealing faces, with one set located inside the equipment and the other exposed to the external environment. The double mechanical seal provides a robust barrier against pressure and ensures a reliable and tight seal. The bearing assembly supports the rotating shaft and helps maintain its alignment, enabling smooth operation even under high-pressure and high-temperature conditions.

Side Entry Equipment: The side entry equipment refers to process vessels, machinery, or equipment that are accessed from the side. In the side entry configuration, the double mechanical seal with bearing assembly is positioned on the lateral sides of the equipment or both sides, perpendicular to the shaft. The double mechanical seal with bearing

assembly for side entry equipment is designed to accommodate the unique configuration and operating conditions of this type of equipment. This set-up is often employed in large pumps, mixers, dryer, screw conveyor or horizontal Equipments where top or bottom entry may not be feasible or when space restrictions or process requirements dictate the need for a side-mounted seal. This configuration guarantees a high level of sealing integrity even under demanding operating conditions. The double mechanical seal consists of two sets of sealing faces, with one set facing the process fluid and the other facing the external environment. The bearing assembly is integrated into the seal housing providing support to the shaft and ensuring proper alignment.

Regardless of the entry configuration, the double mechanical seal with bearing assembly offers several advantages for high-pressure and high-temperature applications. These include;

1) Enhanced sealing performance: The double seal design provides an additional layer of protection against leaks, making it more reliable than single seals.
2) Increased equipment lifespan: The bearing assembly reduces shaft misalignment and vibration, minimizing wear and tear on the equipment and extending its operational life.
3) Reduced maintenance requirements: The top, bottom, or side entry configurations allow for easier access to the seals, simplifying inspection, replacement, or repair procedures.
4) Improved safety: The double mechanical seal design helps prevent the release of hazardous fluids or gases, ensuring a safer working environment.

Double Mechanical Seal: The double mechanical seal configuration consists of two sets of sealing elements working in tandem to prevent the escape of process fluids and maintain system integrity. Each set of seals consists of a primary seal and a secondary seal. The primary seal is in direct contact with the process fluid, while the secondary seal acts as a backup to provide additional protection against leaks. Each set typically consists of stationary and rotating seal faces, Together, they create a highly effective sealing mechanism, capable of withstanding the high pressures encountered in the application. The seal faces are constructed from high-performance materials capable of withstanding high pressures and temperatures, such as advanced ceramics, carbons, silicon carbide or tungsten carbide which offer excellent resistance to wear, corrosion, and thermal stress. The seal faces are held in place by a metal or elastomeric holder that ensuring proper alignment and support.

Bearing Assembly: To withstand the demanding operating conditions, the entire double mechanical seal is equipped with a robust bearing assembly. The bearing assembly plays a

critical role in supporting the rotating equipment, such as pumps, compressors, mixers or Equipments. It ensures smooth and efficient operation by minimizing friction and wear. The bearing assembly is designed to withstand the high loads and vibrations generated by the equipment while maintaining proper alignment and stability. The bearing assembly incorporates high-temperature and high-pressure resistant bearings, such as specialized roller or ball bearings depending on the specific application requirements, to withstand the harsh operating conditions. By incorporating the bearing assembly within the double mechanical seal arrangement, the system benefits from both reliable sealing and optimized equipment performance. The housing is constructed from materials such as stainless steel, duplex steel, or special alloys that offer exceptional strength and corrosion resistance.

Flush and Cooling Systems: In high-pressure & high-temperature applications, it is common to incorporate a flush and cooling system integrated into the seal design. The flush system provides a continuous flow of a compatible fluid to cool and clean the seal faces, removing any solids or contaminants that may accumulate. This system helps maintain the appropriate temperature and pressure conditions at the sealing faces, reducing the risk of seal failure and prolonging their lifespan.

Pressure and Temperature Control: Agitator double mechanical seals for high-pressure and high-temperature applications may feature pressure and temperature control devices. These devices monitor and regulate the pressure and temperature within the sealing system to maintain optimal operating conditions. They can include pressure sensors, temperature sensors, and control valves.

Overall, the high pressure and high temperature application top entry, bottom entry, and side entry equipment's double mechanical seal with bearing assembly ensures reliable sealing performance and long-term equipment integrity and reliability in challenging industrial environments. Its robust design and advanced materials make it a preferred choice for critical applications where leakage prevention and equipment protection are paramount.