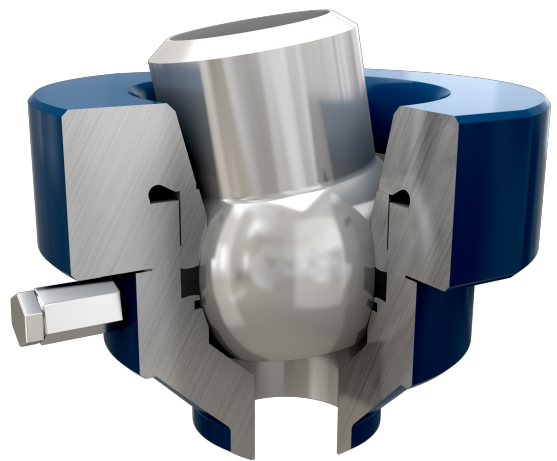


# Grayloc® Universal Ball Joints

## Flexible Pipe Connectors

Our high integrity connectors add flexibility to piping spools in static and dynamic applications.



### FEATURES

**360° continuous rotation and up to 30° axial pivot**

**Engineered contact surfaces for superior wear and reduced friction**

**Simple, tool free, in-line maintenance**

# Universal Ball Joint

## Flexible Pipe Connector

Our universal ball joint\* is a high-integrity, flexible pipe connection suitable for both dynamic and static applications. A reliable high-temperature, high-pressure Graphoil® seal is incorporated in the design and is easily serviced with the field injection port. All ball joints are shipped assembled, tested, and ready for installation.

### Applications

- » Angular Misalignment
- » Marine Loading Piping Systems
- » Pipe Movement
- » Solar Energy Piping Systems
- » Storage Tank Settlement
- » Subsea
- » Thermal Expansion in Piping Systems
- » Thermal Oil Extraction Processes
  - » SAGD (Steam Assisted Gravity Drainage)
  - » CSS (Cyclic Steam Stimulation)
  - » SAP (Solvent-aided Process)
  - » THAI (Toe-to-heel Air Injection)



### Design Parameters

Nominal pipe size (NPS)	1 to 24 in
Design pressure rating	Suitable for ANSI Class 150 up to 10,000 psig
Hydrostatic test pressure (minimum)	1.5 times design pressure rating rounded up to nearest 25 psig
Design temperature range	Up to 1000°F / 556°C
Configurations	Flexi-ball (30° flex and 360° continuous rotation) Uni-ball (360° continuous rotation)

### Material Specifications

Body	Nickel alloy, carbon, low-alloy, stainless, and duplex stainless steels
Ball	Nickel alloy, carbon, low-alloy, stainless, and duplex stainless steels
Ball coating	Contact Grayloc® Products
Packing	Graphoil®
Injection port	Type 316 stainless, AISI 4140, or Inconel 718
External coating	Per customer specifications

### Applicable Design Codes, Standards, and Specifications (latest editions)

ASME B31.1, Power Piping
ASME B31.3, Process Piping
ASTM F1298, Standard Specification for Flexible, Expansion-Type Ball Joints for Marine Applications
API 6FA, Specification for Fire Test for Valves

\*Formerly the SMX universal ball joint

■ For more information, visit [oceanengineering.com/grayloc](https://oceanengineering.com/grayloc) or contact us at [graylocproducts@oceanengineering.com](mailto:graylocproducts@oceanengineering.com)

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