

OILCO

LIQUID HANDLING SYSTEMS

SYSTEMS

SYSTEMS

SYSTEMS

Swivel Joint Catalog

Edition No: 214



Serving the Industry Since 1935

DEDICATION

80 Years of Experience

HISTORY

In 1935, the OILCO Corporation, through one of its divisions, introduced the first completely packaged loading assembly to the petroleum industry. This spirit of innovation, and commitment to quality and leadership which are the hallmarks of our philosophy, keep OILCO brand products at the forefront of the liquid handling industry today.

OILCO Corporation designs, engineers, and manufactures a wide range of standard and specialty equipment. Every component is made of the finest materials and machined to precision tolerances. CNC and advanced milling operations ensure proper dimensional accuracy. Castings are tested three times throughout the manufacturing process to ensure absolute accuracy.

Loading arms and swivel joints are most often associated with the petroleum and petrochemical industries. The fact is, however, that these sturdy and versatile devices are used for liquid handling in a multitude of industries; metal manufacturing, marine loading and unloading, and general contracting. The following is a brief review of the major components of liquid handling systems, and how they have helped industries flourish.

SWIVEL JOINTS

Essential components in the liquid handling systems, swivel joints are a fixture in American industry. These unassuming but precisely engineered devices give loading assemblies – usually rigid – the flexibility needed to meet necessary handling requirements.

OILCO swivel joints are manufactured in eight styles, available in cast, manufactured and jacketed, with flanged, threaded, or welded ends. All are adaptable to piping, tubing, and hoses. And all can be modified to meet requirements for inlets, outlets, counterbalancing, and connections. They are also available in a variety of metal alloys, seal compounds, and finishes.

- Low Torque Type: Recently introduced by OILCO with the only documented research curve, these units reduce torque by up to 65% as compared to conventional swivel joints
- Split Flange Design: Introduced by OILCO in the late 80's, these units allow for packing seal replacement without removal of ball bearings
- Timken® Roller Bearing Type: Guaranteed for life, removable seal design
- Roller Bearing Type: the most traditional swivel joint, long lasting, low cost

QUALITY

Every OILCO product must pass a battery of tests to assure you of the highest reliability and performance and to live up to the OILCO name. This includes all trade standards, domestic and international shipping regulations, and all ISO 9001-2000 compliances. Castings are tested for operational and surface defects. Machined parts are scrutinized for tightness under pressure. Special manufacturing processes such as flame hardening are used to ensure long term product performance. After every OILCO swivel joint is assembled, it is tested again to ensure that swivels perform under maximum pressure or vacuum.

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SWIVEL JOINTS

The Leader in Swivel Joint Technology

O-Ring & V-Ring Design

The standard OILCO O-ring is a single point pressure seal design. Contained within opposing grooves, the compression along the sealing surfaces promotes a positive adherence while maintaining rotation and keeping friction loss to its minimum.

The OILCO V-ring is a triple seal configuration, spring energized, and self-adjusting for normal wear. A Teflon® spring adapter and equally spaced compression springs forces the interlocking three seals to flare and constantly maintain an optimal positive seal.

Buna-N is standard, but Viton, Teflon®, Kalrez®, Chemrez®, EPDM and EPR are available options in either format, depending on the product and customer requirements.



Ball Bearing & Timken® Roller Bearing

OILCO utilizes various ball bearing and dimensional engineering to offer the highest moment load to swivel joint ratio in the industry. OILCO begins the swivel joint line with a graduated ball bearing design in the dual track raceways.

For extreme load carrying, OILCO offers a swivel line incorporating the tapered Timken® roller bearing. Virtually friction free movement, the roller bearings offer superior durability and permanent alignment with simple seal replacement and easy internal maintenance.

Special Project Applications

OILCO offers the industry both the most swivel joint design options and the most extensive level of secondary options. Available on most series, OILCO can manufacture customer specific applications in less time than anyone else. Such options include: High pressure, low torque, heavy duty, stainless steel inserts and cross bearing design.



O-RING & V-RING

Performance Leaders

The 80 Series O-Ring Type Swivel Joint

The 80 Series swivel joint is a leak proof, low maintenance design. It has widely spaced ball races allowing for better alignment and longer packing life. Flow restriction and internal turbulence are held to a minimum with a smooth bore design. The single seal point will operate under both a vacuum and a pressure environment. And the felt dust seal prevents all foreign matter from entering the swivel chamber.

Designed as the basic workhorse of the swivel joint world, the 80 Series is a ball bearing, single point seal design with a felt dust seal backup that allows for an endless number of applications. The 80 Series is available in carbon steel, stainless steel T-316, and aluminum. Sizes range from 2" to 6" in all materials. In addition, an 880 Series cast aluminum variant is available which can help reduce overall cost yet maintain the overall o-ring series characteristics.



The 90 Series V-Ring Type Swivel Joint

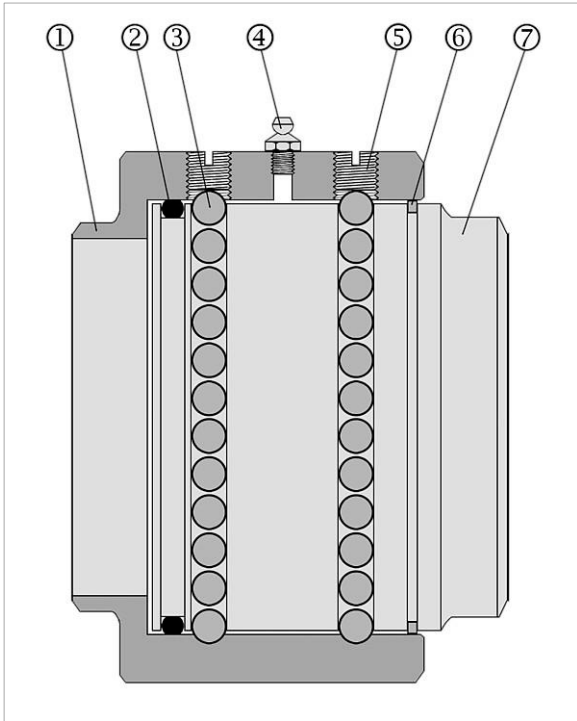
The unquestionable sales and performance leader of the OILCO swivel joint line. The 90 Series swivel joint is designed with a three "V" ring seal configuration that is spring loaded and self-adjusting for normal wear. The incorporation of these "V" rings maintains a constant optimal pressure, securing a reliable seal long after conventional single rings or compression seals may be compromised.



OILCO has also developed a secondary manufacturing process specifically for the 90 Series swivel joints, creating the "low torque" (LT) version. These extensively treated swivels reduce the amount of torque up to 65% as compared with conventional swivels. Friction in the sealing and ball race surfaces are dramatically reduced, therefore providing a swivel joint that can be used in damage critical environment. Most commercial concerns, through over 50 years of field research and testing have been addressed by the OILCO 90 Series. By far, this swivel joint covers the widest range of production and safety considerations in the market today. And with sizing from 1.5" through 18", no project is out of reach for this line of performance swivels.

TECHNICAL

Differential Internal Characteristics



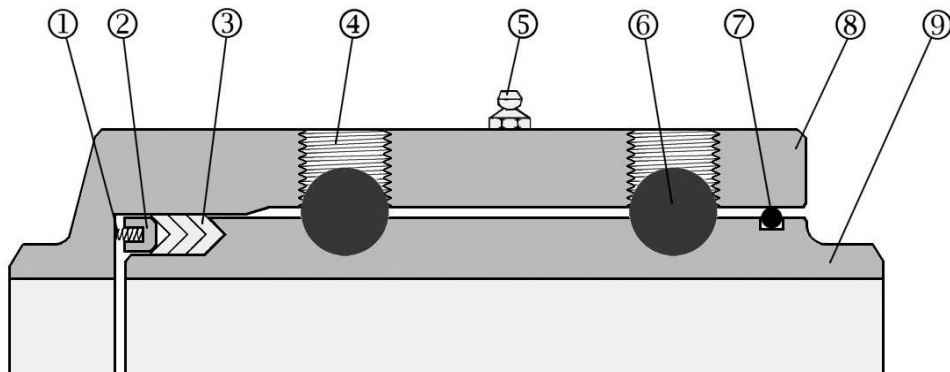
80 SERIES SWIVEL JOINTS

Item	Description
1	Swivel Joint Body
2	Main Pressure Seal
3	Radial Ball Bearings
4	Grease Fitting
5	Bearing Cap Screws
6	Environmental Dust Seal
7	Swivel Joint Sleeve

Note: When unit is modified for submerged service applications, the grease fitting is replaced with a compression washer and screw, the ports are sealed and the environmental dust seal is switched from a low drag felt seal to a rubber mechanical chamber seal to prevent cross contamination.

90 SERIES SWIVEL JOINTS

Item	Description	Item	Description
1	Compression Springs	6	Radial Ball Bearings
2	Teflon Spring Adapter	7	Environmental Dust Seal
3	Chevron Packing Seals	8	Swivel Joint Body
4	Bearing Cap Screws	9	Swivel Joint Sleeve
5	Grease Fitting		



SPLIT FLANGE

Accessible Packing Seals

The 180 and 190 Series Split Flange Models



In critical maintenance areas, access to the packing chamber without mechanical disassembly can serve as equal importance to the actual unit performance. For this reason, both 80 Series and 90 Series swivel joints are offered in a split flange variant. The operation mechanics of the units remain unchanged, with the packing chamber accessed immediately under the collar of the two part body construction.

A modified version of the OILCO 80 Series swivel joint line, the 180 Series Split Flange units adopt all the traditional criteria of the "O" ring swivel and offers it in a removable seal version. It is a ball bearing, single point seal design with a dust seal backup that allows for an

endless number of applications. The split flange series is available in carbon steel, stainless steel T-316, and aluminum, with various seal configurations. Sizes range from 1.5" to 6" in all materials. All styles are available in flanged, threaded, and butt-weld ends.

The 180 Series and 190 Series have widely spaced ball races allowing for better alignment and longer packing life. The single point seal utilized in the 180 Series will operate under both a vacuum and a pressure environment. Packing seal material is Buna-N (standard) but Viton, Nitrile, Teflon®, Kalrez®, Chemrez®, EPDM and EPR are available. And the felt dust seal prevents all foreign matter from entering the swivel chamber. The split design of the body cavity allows for easy in-field service without having to remove the ball bearings. This greatly reduces the risk of operator and maintenance error, while constantly assuring proper alignment as determined by the factory. Further, the pressure seal has been positioned in such a manner that replacement time is considerably reduced.

Like the 180 Series, the 190 Series offers the same maintenance advantage in seal access. By utilizing the identical packing components found in the 90 Series, repair parts and cost are held to a basic average. The 190 Series is available in carbon steel, stainless steel T-316, and aluminum, with various seal configurations. Sizes range from 1.5" to 18" in all materials. All styles are available in flanged and butt-weld ends and up to 6" with NPT threaded connections.

HYBRID - “SSI”

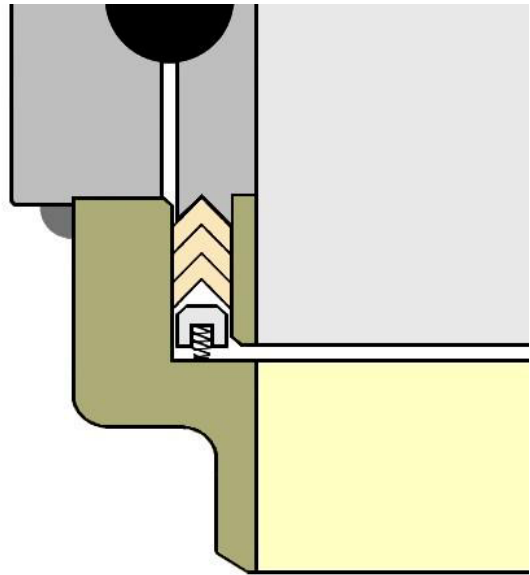
Stainless Steel Insert

90 Series Stainless Steel Insert

Originally inspired by the needs of the iron and steel mills, OILCO sought to understand the complex chemical problems for pumping vast quantities of on-site water through the lids of the melting pots. Due to the intense chemical treatment of the water, standard steel joints were suffering with extensive pitting and corrosion of the sealing surface. While traditional wisdom would warrant the use of stainless steel, the problem still arose, albeit in a slower timeline. However, the use of upgraded stainless steel (especially in the larger 10" through 18" sizes) became a huge cost consideration for the plant engineers.

By isolating the critical areas of the sealing service, OILCO managed to develop a process that mates the benefits of stainless steel, while keeping the cost of the unit down to a more manageable level. The result was the stainless steel insert swivel joint. These swivels are dimensionally identical to their carbon steel and stainless steel counterparts, but utilize the necessary aspects of each material to prolong the seal life and seal area integrity.

This hybrid swivel joint meets several working concerns and cost efficiency issues. The development of the stainless steel inserts for use in the 90 Series swivels has increased the life expectancy of the standard carbon steel units by 30-50%, while not forcing the consumer to rely solely on the markedly higher priced full stainless steel T-316 version.

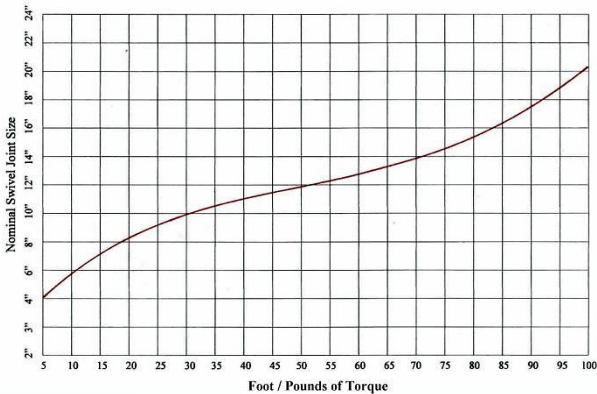


LOW TORQUE

Reduced Friction Tolerances

90 Series – Low Torque Application

The Low Torque ("LT") model swivel joint is a specifically conditioned 90 Series swivel joint that reduces torque up to 65% more than any other conventional joint. The low torque option is a secondary procedure applied during the manufacturing process, prior to welding procedures. The low torque swivel can be broken with a minimal amount of manual pressure, assisting in ease of use for the operator in critical operations areas.



The application of the low torque option for the 90 Series swivel joint is for the entire nominal size range. Following the CNC milling stage, the sleeve is polished and turned to an extra smooth surface. The body receives a specifically tailored honing. This process is also not limited to carbon steel units, but can be applied to both aluminum and stainless steel assemblies as well.

Steam Jacketing

Constructed of a lighter gauge material on the exterior of the unit, a standard jacket will allow steam to circulate evenly in order to preclude binding of the product. The external jacketing includes 100% coverage of the ball race area and attached elbow fittings. These steam jacketed swivel are used for such viscous materials as petroleum products, asphalt, tars, heavy oil, liquid sulphur, chemicals, and food products.



Internal product lines can handle 500 psi while the steam chambers can work up to a range of 150 psi. The swivel joint packing seals are able to withstand temperatures of up to 600° F. All internal elbows are long radius and standard weight, allowing the assembly to be piggable when required. The incorporated joints are adaptable to suction or pressure lines with standard packing seals.

STEAM JACKET

100% Fully Enclosed Core

HIGH PRESSURE

The 90 Series "HP" Design

Schedule 80 & 160 High Pressure Swivels

Since its inception, the 90 Series design has performed flawlessly. As a result, multiple application alternatives have been incorporated into the production line to accommodate changing industry needs. After an accelerated research and development program, OILCO introduced a new option → geared toward prover arm engineers and manufacturers.

The new High Pressure ("HP") line has increased the working pressure capabilities of OILCO swivel joints to allow for incorporation in various prover assemblies, testing facilities, and other critical loading and unloading procedures. Utilizing established engineering techniques and design specifications, the "HP" line affords identical predictability with an improved level of effective range.

With capacity more than doubling standard characteristics, the "HP" Series has operations and testing limits well north of 3000 psi. This ability has placed OILCO swivel joints in the forefront of complex prover arm manufacturing specifications for several U.S. design firms. Enhanced mechanical chambers, increased sealing surfaces, and an inflation of overall wall diameter thickness, have all aided in catapulting the OILCO brand name into markets far outreaching the previous 77 years.

- High moment load capacity
- Increased Pressure rating
- NACE compliant material
- Multiple seal packages
- Schedule 80 & 160 sizes
- 2" through 18" available



REMOVABLE SEAL

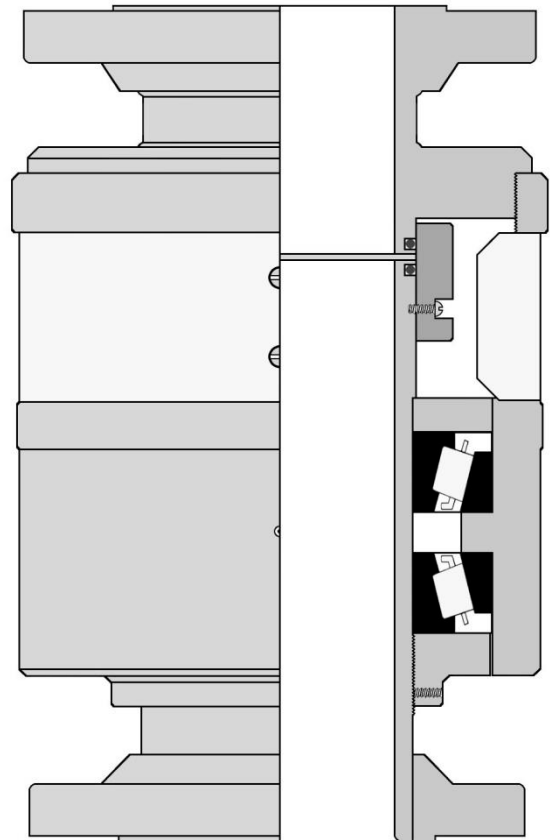
Riser Swivel Joint

Model 857-F

Designed nearly five decades ago, the Model 857-F was engineered and manufactured to support the multitude of counterweighted hose loaders outfitting the west coast terminals throughout California. Due to the high moment loads on larger loading assemblies, the 857-F incorporated Timken® tapered roller bearings in the mechanical chamber. This allowed for the intense bending moment at the riser and resolved all associated fatiguing issues at the base.

Consideration was also given to the maintenance need of the arms in service at the terminal facilities. Due to the high unit weight of these counterweighted systems, removing them from service offered a lengthy disassembly operation along with the necessity of a maintenance team. To resolve this issue, the 857-F was constructed with a shielded removable seal. The dual o-ring compartment is enclosed with a heavy wall locking collar and successfully allows for the various flow rates required by the customers. With only standard tools, the main pressures seals can be removed and new o-rings installed in a matter of minutes. This innovation resulted in a maintenance plan that did not require any disassembly and only a single technician.

The Model 857-F has a reported minimal performance lifespan of 20 years and in cases where the unit was not taxed to its operation limits, more than 30 years. The Model 857-F was, and continues to be, a consistent, reliable, and efficient riser swivel joint design.



-
- Higher Moment Load Carrying
 - Extended Service Life
 - Dual O-Ring Design
 - Tapered Roller Bearings
 - Removable Main Seals
 - On-Site Replacement

LOW PROFILE MODULAR DESIGN

1000 Series

Minimal Weight & Profile • Split Flange Design • Removable Mechanical Cartridge

The 1000 Series line is a short profile, split flange, modular design unit. Engineered for optimal field performance and simple maintenance, the 1000 Series employs proven OILCO technology upgraded to include a separation of mechanics.



Within the mechanics of the 1000 Series is a dual track raceway design which will allow for true carrying capacity and bending moment load ratings. Upper and lower flange housings surround a dual track mechanical cartridge. This allows for metal variation dependent upon product transfer and specific carrying capacity. The main pressure seal is a U-cup that will allow for a multitude of compounds, but a number of rigid O-ring inner seals are available to increase positive seal flaring.

The removable cartridge at the heart of the swivel joint has been engineered to provide predictable performance characteristics, similar to those of the OILCO 80 and 90 Series production lines. In the event of contamination due to corrosive service, the modular cartridge can be serviced or replaced in the field with ease. In extreme conditions, the housing material can vary from the operational portion of the unit (e.g. low temperature operations).



GUARANTEED

DUAL TAPERED ROLLER BEARING

2000 Series

The OILCO 2000 Series offers the best load carrying capacity in the industry. Unequaled in durability and overall moment ratings, combined with virtually friction free movement and minimal seal wear, there is simply no other swivel joint that measures up to its performance level.



Timken® roller bearings are proven stronger than any other conventional bearings. And put inside the precision CNC milled 2000 Series swivel joint spool, permanent alignment is assured. Such is the confidence in the manufacturing of the 2000 Series, the bearings are guaranteed by OILCO for the life of the joint. *Restrictions apply.*

The OILCO 2000 Series is offered in carbon steel, stainless steel T-316 and aluminum. Packing seal material is Buna-N (standard) but Viton, Teflon®, Nitrile, Kalrez®, Chemrez®, EPDM and EPR are available. The 2000 Series has a wide range of availability – 2" through 12". And all styles are available in threaded, flanged, and butt weld connections.

- GUARANTEED FOR LIFE
- UNPARALLELED RANGE
- EFFORTLESS TORQUE



CROSS-TECH

TIMKEN® & RADIAL BEARING SWIVELS

Nuvex Series I



The OILCO Nuvex Series I is an advanced mechanical swivel joint designed for confined spaces of operation and extreme performance parameters. The incorporation of the hardened tapered roller bearings allows for increased moment load capacity and the oversized radial ball bearings assures proper unit alignment. This dual design has allowed for an increased mechanical ratio which supports more aggressive operations and trusted rotational geometry.



The Nuvex Series I can be offered with a multitude of packing seal compounds in either a chevron v-ring style or H-block design. As an

integrated cartridge type swivel joint, most maintenance, including seal replacement can be accomplished in the field with minimal down time.

Nuvex Series II

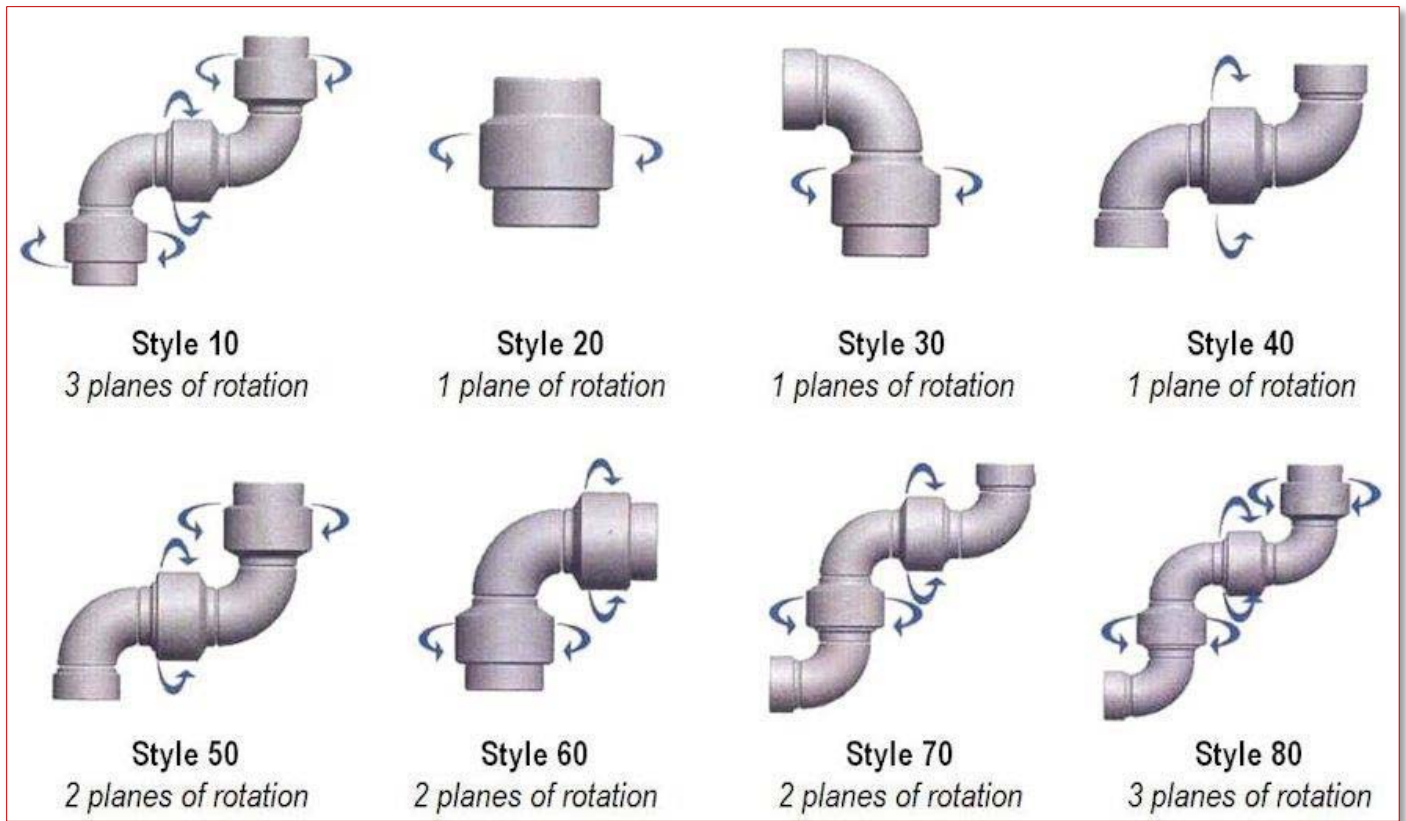
The Nuvex Series II was designed as a companion unit to the Series I. It offers similar load carrying characteristics in a thinner and lighter weight version. By reducing the overall profile, the Nuvex Series II functions as an ideal intermediate and apex swivel joint to allow its incorporation into LPG and critical application assemblies.

The Nuvex Series II maintains the mechanical ideal incorporating a tapered roller bearing and radial ball bearing arrangement, only on a reduced thrust alignment angle (*tapered bearing and ball are in horizontal instead of vertical plane*). And similar to the Series I, the packing seals can be provided in a v-ring chevron stack or in an H-block for the inclusion of specialty materials.



IDENTIFICATION

CONFIGURATION & NUMBERING



Indicates unit size → **12" MODEL 92-FSS-V** ← Seal compound

Series and overall configuration style (e.g. 90 Series, style 20) → **92-FSS-V** ← Identifies the connection type and the material of construction

Connection end & material descriptions

F – 150# RF ANSI Flanges
 NF – TTMA Tank Truck Flanges
 O – NPT Female Threads
 M – NPT Male Threads
 S – Carbon Steel
 SS – Stainless Steel
 A – Aluminum

Seal Compounds

V – Viton
 T – Teflon
 EPR – EPR
 EPDM – EPDM
 K – Kalrez
 C – Chemraz
 No indicator is Buna-N (STD)

Special Extension Notes & Extras

LT – Low Torque
 P – Submerged Service
 H – Straight Handle
 SH – Shovel Handle
 OXY – Oxygen Service
 EPXY – Epoxy Paint Exterior
 FG – Food Grade Lubricant

SAFETY OVERVIEW

SWIVEL JOINT GUIDELINES

For 80 years, OILCO has manufactured the largest selection of top quality swivel joints in the industry. With such a diverse array of models and styles, it is critical the customer fit the appropriate unit with the intended application. Size, material of construction, connection type and seal to product compatibility are vital in selected the ideal equipment with the proper application. After installation, periodic safety checks and programmed maintenance schedule should be followed in order to maintain unit integrity and performance. If there are any questions or concerns with an OILCO swivel joint or an intended project, please call the main office at 1-800-99-OILCO.



CAUTION



- Only approved OILCO parts should be used for installation and repair.
 - Maintenance should never be performed on a unit in service and under pressure.
 - Operational pressure should never exceed the working pressure of the swivel joint spool or the affixed end connections.
 - Whenever a leak is detected, remove the swivel joint from service immediately a replace packing with OILCO seal replacement kits. If the unit has experienced wear and no longer suitable for service, contact factory.
 - Adhere to all factory recommendations and MSDS instructions for proper chemical compatibility and safe fluid handling.
 - Safe handling practices should be observed when manipulating swivel joints. Personnel should always wear proper PPE (Personal Protective Equipment).
 - Never bolt on, wrap or weld additional pieces to OILCO swivel joints without first consulting with the factory.
 - An approved scheduled preventative maintenance program should include routine examination and care of all swivel joints in and out of service.
 - Consult OILCO's *Swivel Joint General Maintenance & Safety Notes* for detailed reference to the above care and caution associated with everyday operations.
 - Failure to observe all safety warnings can result in property damage or personal injury.
- ❖ *OILCO swivel joints are designed to be included in engineered systems under controlled industrial conditions. All safety procedures, guidelines and policies established by OILCO, the customer, the destination facility and any supervising government agency must be observed at all times.*

Worldwide Innovation Since 1935

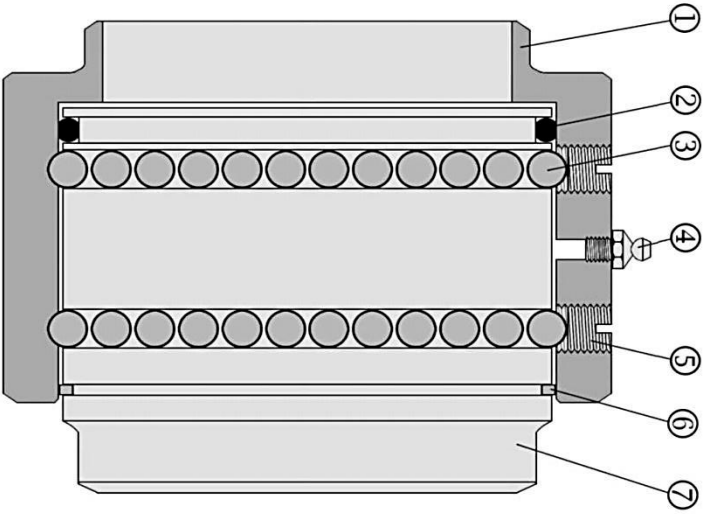


- Advanced Swivel Joint Technology
- Top & Bottom Loading Arm Design



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APPENDIX "A" – 80 SERIES ILLUSTRATION



Swivel Joint Component List:

- | | | | |
|---|---------------------------|---|---------------------------|
| 1 | Swivel Joint Body Housing | 5 | Ball Retainer Screws |
| 2 | O-Ring Main Pressure Seal | 6 | Environmental Dust Seal |
| 3 | Radial Ball Bearings | 7 | Swivel Joint Inner Sleeve |
| 4 | Grease Fitting | | |



Information:
Consult factory for all post-manufacturing recommendations, lubrication data and scheduling and all general maintenance and safety.



Caution:
Weld end swivel joints should be completely disassembled prior to welding so as to not damage the seals. Care should be taken to avoid distortion of seal and ball race diameters

Product Overview:

- o Single point main pressure packing seal
- o Dual radial ball bearing mechanical chamber
- o Available sizes: 2" through 6"
- o Available end connections include NPT, TTMA and ANSI flanges

Design Notes:

- (1) All surfaces are to be machine finished before final testing and assembly
- (2) Operational and testing pressures determined by ASTM pipe ratings
- (3) Swivel joint body and sleeve material are one-piece construction
- (4) Swivel joints are offered with Buna-N packing seals standard

Manufacturer Specifications:

Seal Packing: O-ring, single point main pressure seal
Teflon encapsulated available with modified sleeve option

End Connection: Schedule 40 standard
37 1/2° bevel for weld (swivel spool)

Material of Construction:

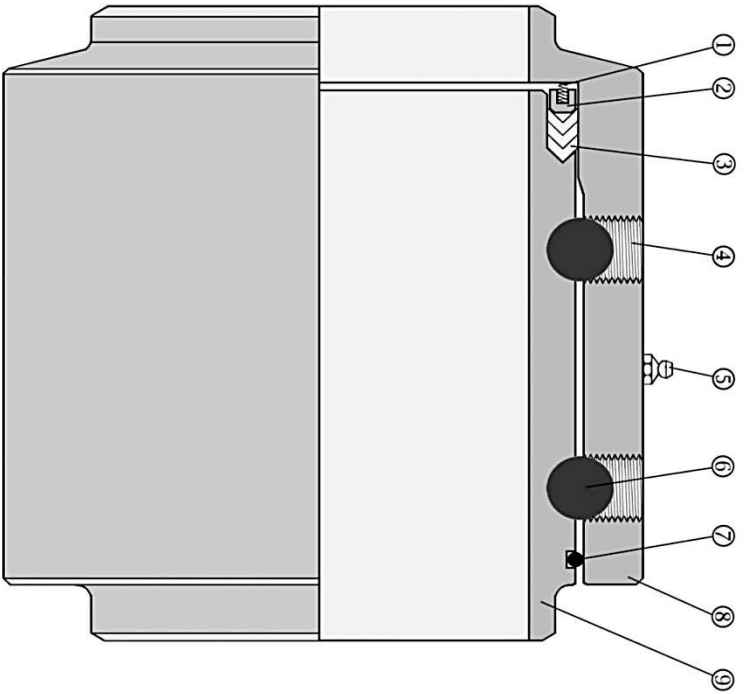
Carbon Steel, ASTM A-106 Grade B
Stainless Steel, T-316
Aluminum



80 Series
O-Ring Swivel Joints
General Data Illustration

Date:	Drawing #:
9-11-2013	SK-80BW

APPENDIX "A" – 90 SERIES ILLUSTRATION



Swivel Joint Component List:

- | | | | |
|---|------------------------------------|---|------------------------------------|
| 1 | Spring Adapter Compression Springs | 6 | Radial Ball Bearings |
| 2 | Teflon Spring Adapter | 7 | Environmental Dust Seal |
| 3 | Chevron Packing Seals | 8 | Swivel Joint Body Housing |
| 4 | Ball Retainer Cap Screws | 9 | (1 piece 2", 4", 2 piece 6" – 16") |
| 5 | Grease Fitting | | Swivel Joint Inner Sleeve |



Information:
Consult factory for all post-manufacturing recommendations, lubrication data and scheduling and all general maintenance and safety.



Caution:
Weld end swivel joints should be completely disassembled prior to welding so as to not damage the seals. Care should be taken to avoid distortion of seal and ball race diameters

Product Overview:

- o Chevron packing seals: spring energized and self-adjusting for normal wear
- o Dual radial ball bearing mechanical chamber
- o Available sizes: 2" through 18"
- o Available end connections include NPT, TTMA and ANSI flanges

Design Notes:

- (1) All surfaces are to be machine finished before final testing and assembly
- (2) Operational and testing pressures determined by ASTM pipe ratings
- (3) Swivel joint body and sleeve material are one or two-piece construction
- (4) Swivel joints are offered with Buna-N packing seals standard

Manufacturer Specifications:

Seal Packing: Triple V-Ring Packing Seals
End Connection: Schedule 40 standard
37 1/2° bevel for weld (swivel spool)

Material of Construction:

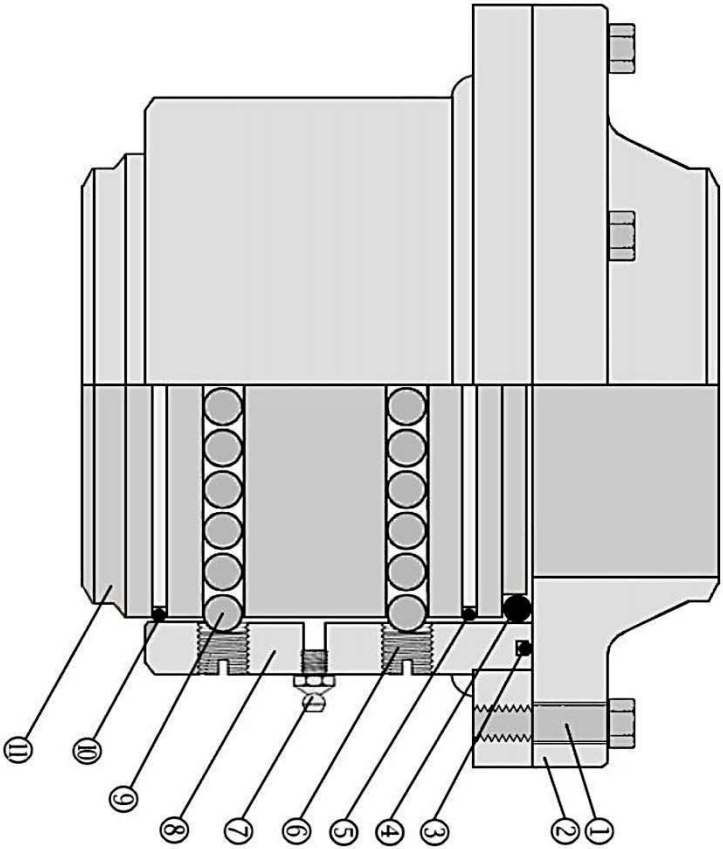
Carbon Steel, ASTM A-106 Grade B
Stainless Steel, T-316
Aluminum



90 Series
V-Ring Swivel Joints
General Data Illustration

Date:	Drawing #:
9-11-2013	SK-90BW

APPENDIX "A" – 180 SERIES ILLUSTRATION



Swivel Joint Component List:

- | | | | |
|---|-------------------------------|----|---------------------------|
| 1 | Split Flange Collar Bolt | 7 | Grease Fitting |
| 2 | Split Flange Head | 8 | Swivel Main Body Housing |
| 3 | Split Flange Face Seal | 9 | Radial Ball Bearings |
| 4 | Main Pressure Seal | 10 | Lower Environmental Seal |
| 5 | Upper Environmental Dust Seal | 11 | Swivel Joint Inner Sleeve |
| 6 | Ball Bearing Cap Screws | | |



Information:

Consult factory for all post-manufacturing recommendations, lubrication data and scheduling and all general maintenance and safety.



Caution:

Weld end swivel joints should be completely disassembled prior to welding so as to not damage the seals. Care should be taken to avoid distortion of seal and ball race diameters

Product Overview:

- o Split flange design for access to main pressure seal chamber
- o Single point o-ring main pressure packing seal
- o Dual radial ball bearing mechanical chamber
- o Available sizes: 2" through 6"
- o Available end connections include NPT, TMA and ANSI flanges

Design Notes:

- (1) All surfaces are to be machine finished before final testing and assembly
- (2) Operational and testing pressures determined by ASTM pipe ratings
- (3) Swivel joint body material is a two-piece construction and swivel joint sleeve is a standard one piece construction
- (4) Swivel joints are offered with Buna-N packing seals standard

Manufacturer Specifications:

Seal Packing: O-ring, single point main pressure seal
Teflon encapsulated available with modified sleeve option

End Connection: Schedule 40 standard
37 1/2° bevel for weld (swivel spool)

Material of Construction:

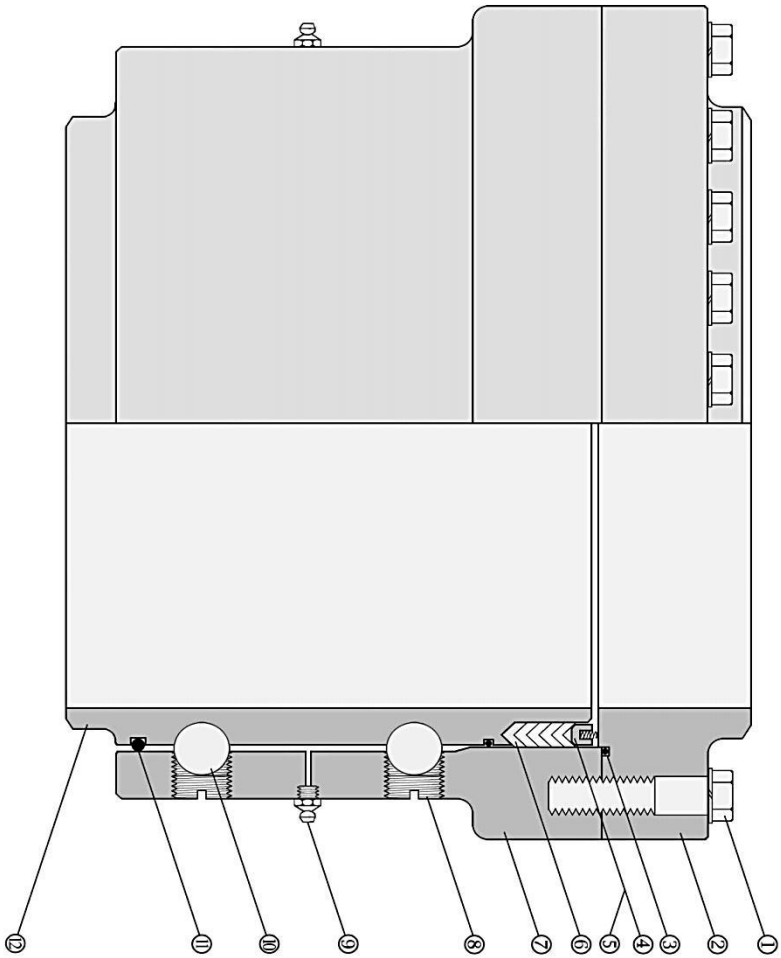
Carbon Steel, ASTM A-106 Grade B
Stainless Steel, T-316
Aluminum



180 Series
O-Ring Swivel Joints
General Data Illustration

Date:	9-11-2013	Drawing #:	SK-180BW
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APPENDIX "A" – 190 SERIES ILLUSTRATION



Swivel Joint Component List:

- | | | | |
|---|------------------------------------|----|--|
| 1 | Split Flange Head bolts | 7 | Lower Swivel Joint Body Housing |
| 2 | Split Flange Head | 8 | Ball Bearing Retainer Screws |
| 3 | Split Flange Face Seal | 9 | Grease Fittings |
| 4 | Spring Adapter Compression Springs | 10 | Radial Ball Bearings |
| 5 | Teflon Spring Adapter | 11 | Mechanical Chamber Environmental Seals |
| 6 | Chevron Packing Seals | 12 | Swivel Joint Inner Sleeve |

Information:
Consult factory for all post-manufacturing recommendations, lubrication data and scheduling and all general maintenance and safety.



Caution:
Weld end swivel joints should be completely disassembled prior to welding so as to not damage the seals. Care should be taken to avoid distortion of seal and ball race diameters

Product Overview:

- o Split flange design for access to main pressure seal chamber
- o Chevron packing seals; spring energized and self-adjusting for normal wear
- o Dual radial ball bearing mechanical chamber
- o Available sizes: 2" through 18"
- o Available end connections include NPT, TMA and ANSI flanges

Design Notes:

- (1) All surfaces are to be machine finished before final testing and assembly
- (2) Operational and testing pressures determined by ASTM pipe ratings
- (3) Swivel joint body material is a two-piece construction and swivel joint sleeve is a standard one piece construction
- (4) Swivel joints are offered with Buna-N packing seals standard

Manufacturer Specifications:

Seal Packing: Triple V-ring Packing Seals

End Connection: Schedule 40 standard
37 1/2° bevel for weld (swivel spool)

Material of Construction:

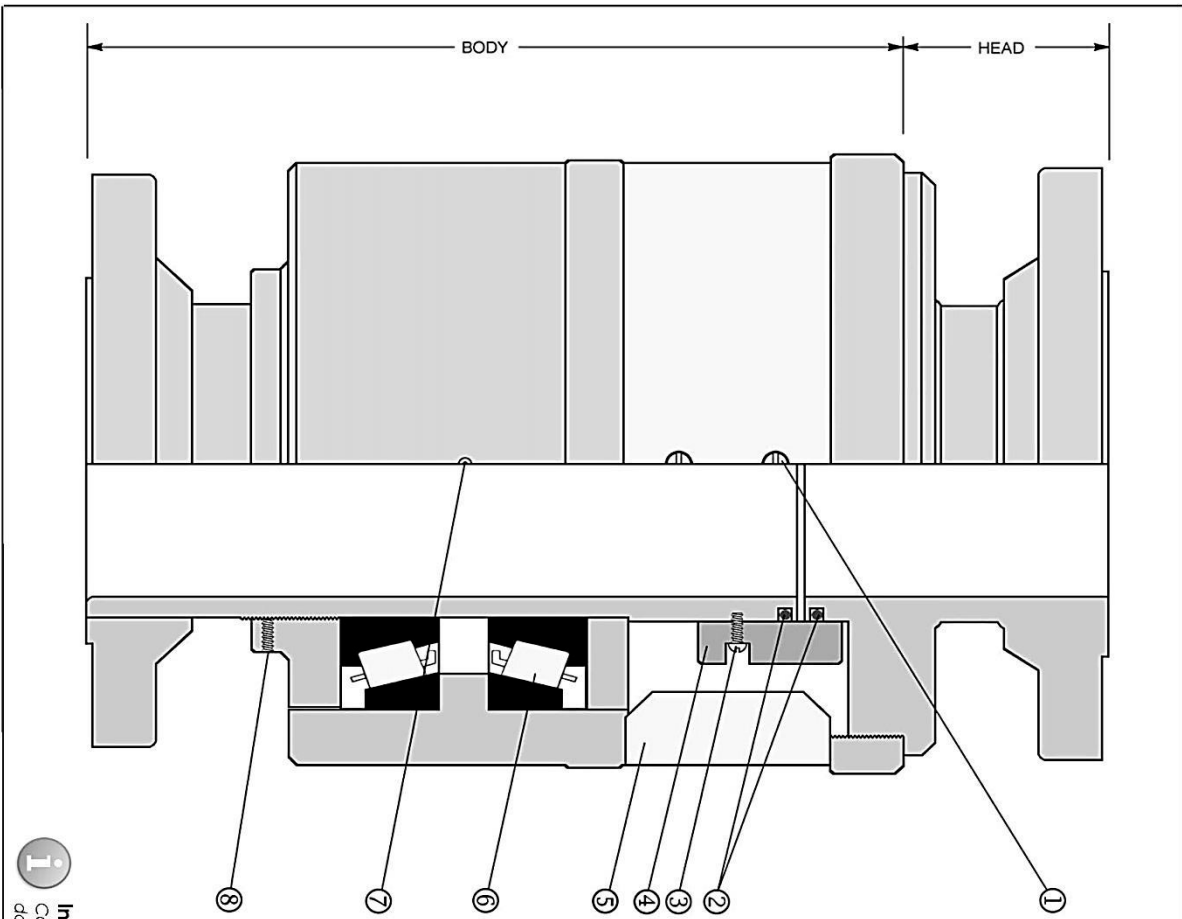
Carbon Steel, ASTM A-106 Grade B
Stainless Steel, T-316
Aluminum



190 Series
V-Ring Swivel Joints
General Data Illustration

Date:	Drawing #:
9-11-2013	SK-190BW

APPENDIX "A" – 857 SERIES ILLUSTRATION



Product Overview:

- o Dedicated heavy load capacity riser swivel joint
- o Removable main pressure seal o-rings
- o Dual Tinken tapered roller bearings
- o Available size: 4"

Design Notes:

- (1) All surfaces are to be machine finished before final testing and assembly
- (2) Operational and testing pressures determined by ASTM pipe ratings
- (3) Swivel joints are offered with Buna-N packing seals standard

Swivel Joint Component List:

- 1 Removable cover shield screws
- 2 Dual main o-ring pressure seal
- 3 Internal sealing chamber collar locking screw
- 4 Internal sealing chamber sliding collar
- 5 Removable cover shield (sealing chamber access)
- 6 Dual row, Tinken® tapered roller bearings
- 7 Mechanical chamber grease fitting
- 8 Locking set pin for mechanical chamber lower collar

Manufacturer Specifications:

Seal Packing: Dual O-ring Packing Seals
 End Connection: 150# RF ANSI Flanges (std.)

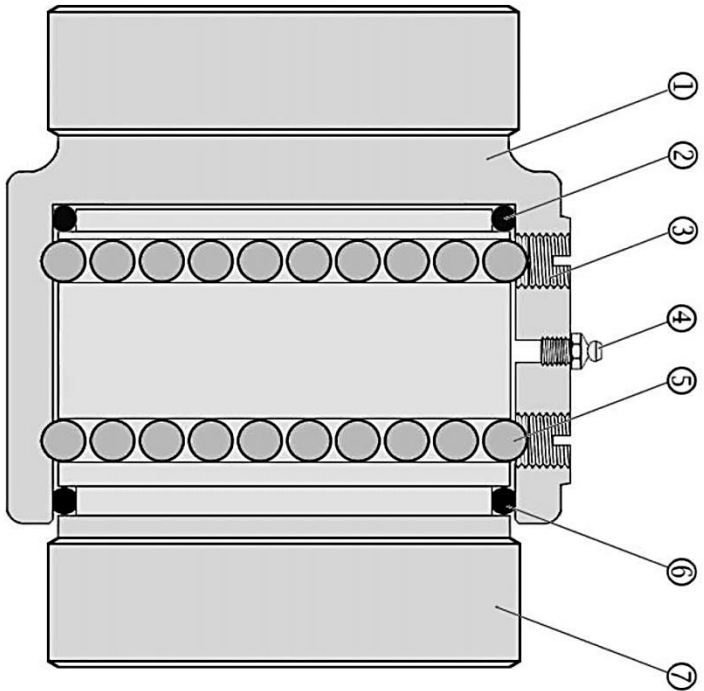
Material of Construction:

Carbon Steel, ASTM A-106 Grade B

Information:
 Consult factory for all post-manufacturing recommendations, lubrication data and scheduling and all general maintenance and safety.

	
857 Series Removable Seal Riser Swivel Joints General Data Illustration	
Date: 9-11-2013	Drawing #: SK-857F

APPENDIX "A" – MODEL 880 SERIES ILLUSTRATION



Swivel Joint Component List:

- | | | | |
|---|---------------------------|---|---------------------------|
| 1 | Swivel Joint Body Housing | 5 | Radial Ball Bearings |
| 2 | O-Ring Main Pressure Seal | 6 | Environmental Dust Seal |
| 3 | Ball Bearing Cap Screws | 7 | Swivel Joint Inner Sleeve |
| 4 | Grease Fitting | | |



Information:
Consult factory for all post-manufacturing recommendations, lubrication data and scheduling and all general maintenance and safety.



Caution:
Weld end swivel joints should be completely disassembled prior to welding so as to not damage the seals. Care should be taken to avoid distortion of seal and ball race diameters

Product Overview:

- o Single point main pressure packing seal
- o Dual radial ball bearing mechanical chamber
- o Available sizes: 2" through 4"
- o Available end connections include TEMA and ANSI flanges. Units are cast with female NPT in the molding process.

Design Notes:

- (1) Internal surfaces are to be machine finished before final testing and assembly
- (2) Operational and testing pressures determined by ASTM pipe ratings
- (3) Swivel joint body and sleeve material are one-piece construction
- (4) Swivel joints are offered with Buna-N packing seals standard

Manufacturer Specifications:

Seal Packing: O-ring, single point main pressure seal
End Connection: Schedule 40 Female NPT standard

Material of Construction:

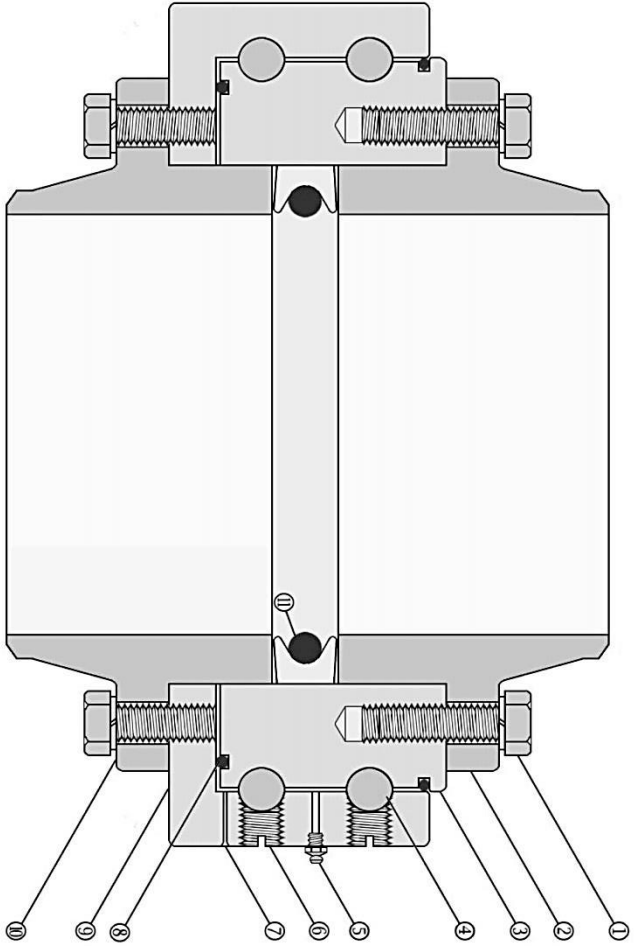
Cast Aluminum



880 Series
O-Ring Swivel Joints
General Data Illustration

Date:	9-11-2013	Drawing #:	SK-880BW
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APPENDIX "A" – 1000 SERIES ILLUSTRATION



Swivel Joint Component List:

- | | | | |
|---|-----------------------------------|----|-----------------------------------|
| 1 | Flange Bolt and Locking Washers | 7 | Optional Leak Detection Port |
| 2 | Upper Split Flange Housing | 8 | Environmental Dust Seals |
| 3 | Inner Mechanical Cartridge Module | 9 | Outer Mechanical Cartridge Module |
| 4 | Radial Ball Bearings | 10 | Lower Split Flange Housing |
| 5 | Grease Fitting | 11 | Main Pressure Seal Arrangement |
| 6 | Ball Bearing Cap Screws | | |



Information:
Consult factory for all post-manufacturing recommendations, lubrication data and scheduling and all general maintenance and safety.



Caution:
Weld end swivel joints should be completely disassembled prior to welding so as to not damage the seals. Care should be taken to avoid distortion of seal and ball race diameters

Product Overview:

- o Chevron type main pressure seal ("H" block option for complex compounds)
- o Dual radial ball bearing mechanical chamber
- o Module mechanical cartridge alloys for interchangeable metal composition
- o Dual sided split flange design allows for seal replacement without disassembly
- o Available sizes: 4"
- o Available end connections include NPT, TMA and ANSI flanges

Design Notes:

- (1) All surfaces are to be machine finished before final testing and assembly
- (2) Operational and testing pressures determined by ASTM pipe ratings
Maximum operational pressure: 590 PSI
Maximum testing pressure: 895 PSI
- (3) Operation temperature range: -50°F to +480°F
- (4) Swivel joints are offered with Buna-N packing seals standard

Manufacturer Specifications:

Seal Packing: Chevron style (W609) main pressure seal with rigid o-ring insert

End Connection: Schedule 40 standard
37 1/2° bevel for weld (swivel spool)

Material of Construction:

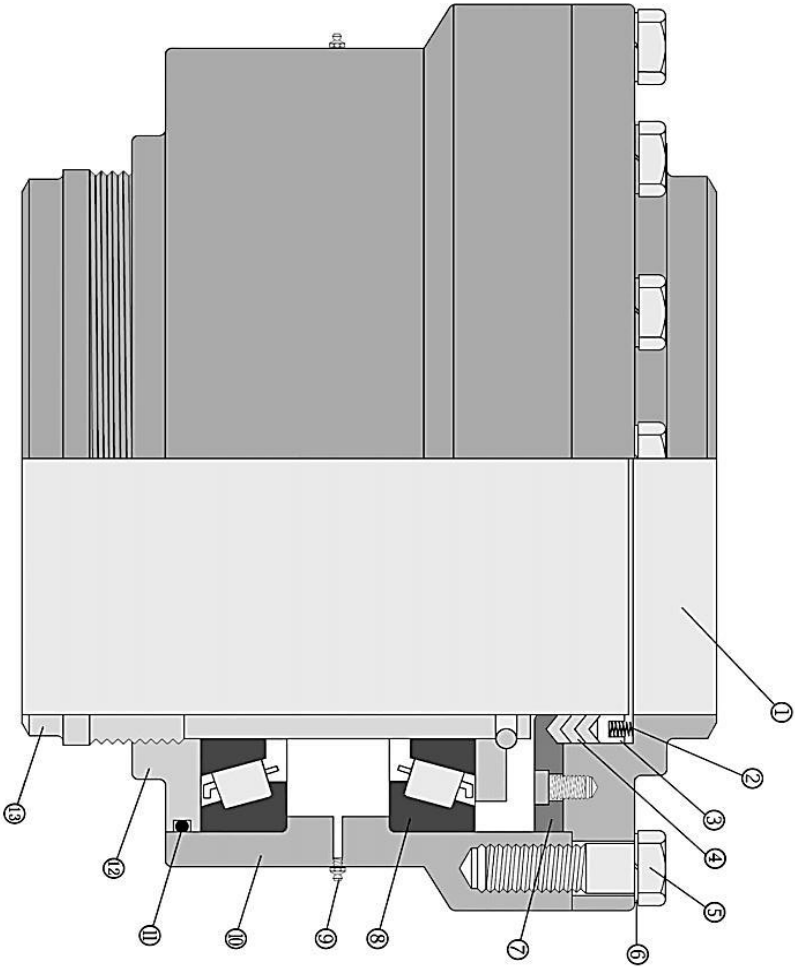
Carbon Steel, ASTM A-106 Grade B
Stainless Steel, T-316
Low Temperature Carbon Steel



1000 Series
Module Swivel Joints
General Data Illustration

Date:	Drawing #:
9-11-2013	SK-1000BW

APPENDIX "A" – 2000 SERIES ILLUSTRATION



Swivel Joint Component List:

- | | | | |
|---|---------------------------------------|----|--|
| 1 | Upper Swivel Joint Body Flange Collar | 8 | Timken® Tapered Roller Bearings (Two Sets) |
| 2 | SS Compression Springs | 9 | Standard Grease Fitting |
| 3 | Teflon Spring Adapter | 10 | Main Outer Swivel Joint Body Housing |
| 4 | Triple chevron v-ring packing seals | 11 | Environmental Dust Seal |
| 5 | Flange Head Cap Screws | 12 | Lower Housing Locking Collar |
| 6 | Lock Washer | 13 | Swivel Joint Inner Sleeve |
| 7 | Sealing Flange Adapter | | |

Product Overview:

- o Spill flange design for access to main pressure seal chamber
- o Chevron packing seals; spring energized and self-adjusting for normal wear
- o Dual Timken tapered roller bearing for high load carrying capacity
- o Available sizes: 2" through 18"
- o Available end connections include NPT, TTMA and ANSI flanges

Design Notes:

- (1) All surfaces are to be machine finished before final testing and assembly
- (2) Operational and testing pressures determined by ASTM pipe ratings
- (3) Swivel joint body material is a two-piece construction and swivel joint sleeve is a standard one piece construction
- (4) Swivel joints are offered with Buna-N packing seals standard

Manufacturer Specifications:

Seal Packing: Triple V-ring Packing Seals

End Connection: Schedule 40 standard
37 1/2° bevel for weld (swivel spool)

Material of Construction:

Carbon Steel, ASTM A-106 Grade B
Stainless Steel, T-316



Information:

Consult factory for all post-manufacturing recommendations, lubrication data and scheduling and all general maintenance and safety.

Caution:

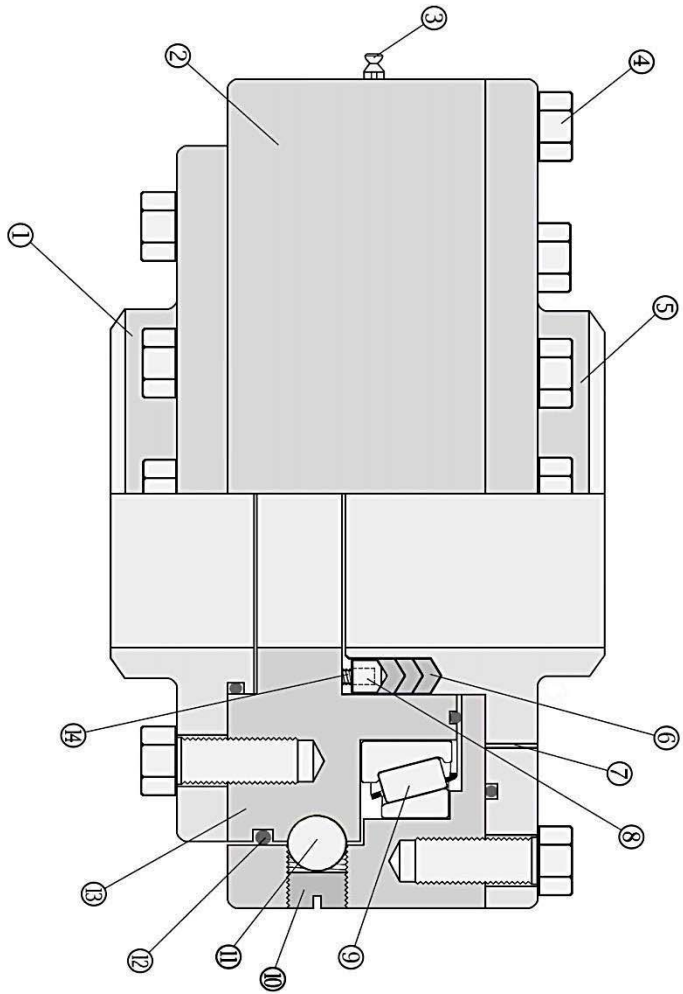
Weld end swivel joints should be completely disassembled prior to welding so as to not damage the seals. Care should be taken to avoid distortion of seal and ball race diameters



**2000 Series
Timken Roller Bearing
Swivel Joints**
General Data Illustration

Date:	Drawing #:
9-11-2013	SK-2000BW

APPENDIX "A" – NUVEX SERIES I ILLUSTRATION



Swivel Joint Component List:

- | | | | |
|---|---------------------------------|----|------------------------------------|
| 1 | Lower Swivel Joint Body/Housing | 8 | Teflon Spring Adaptor |
| 2 | Outer Mechanical Cartridge | 9 | Tinkern@ Tapered Roller Bearing |
| 3 | Grease Filling Port | 10 | Ball Bearing Cap Screws |
| 4 | Housing Flange Cap Screw | 11 | Radial Ball Bearings |
| 5 | Upper Swivel Joint Body/Housing | 12 | Environmental Dust Seals |
| 6 | Chevron Main Packing Seals | 13 | Inner Mechanical Chamber Cartridge |
| 7 | Inspection Port (Optional) | | |

Product Overview:

- o Split flange design for access to main pressure seal chamber
- o Chevron packing seals: spring energized and self-adjusting for normal wear
- o Combination Tinkern Tapered roller bearing for high load carrying capacity and radial ball bearings for component alignment
- o Removable mechanical chamber for cross material insertion or repair
- o Available sizes: 2" through 4"
- o Available end connections include NPT, TMA and ANSI flanges

Design Notes:

- (1) All surfaces are to be machine finished before final testing and assembly
- (2) Operational and testing pressures determined by ASTM pipe ratings
- (3) Swivel joint body material is mated to a mechanical cartridge. Housing material and mechanical cartridge options available.
- (4) Swivel joints are offered with Buna-N packing seals standard

Manufacturer Specifications:

Seal Packing: Triple V-ring Packing Seals
 End Connection: Schedule 40 standard
 37 1/2° bevel for weld (swivel spool)

Material of Construction:

Carbon Steel, ASTM A-106 Grade B
 Stainless Steel, T-316



Information:
 Consult factory for all post-manufacturing recommendations, lubrication data and scheduling and all general maintenance and safety.

Caution:

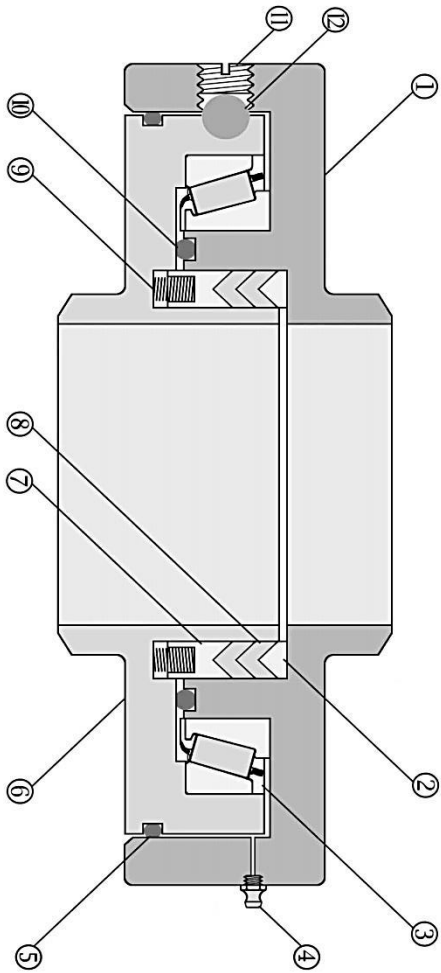
Weld end swivel joints should be completely disassembled prior to welding so as to not damage the seals. Care should be taken to avoid distortion of seal and ball race diameters



Nuvex Series I
 Swivel Joints
 General Data Illustration

Date:	Drawing #:
9-11-2013	SK-NU1BW

APPENDIX "A" – NUVEX SERIES II ILLUSTRATION



- Swivel Joint Component List:**
- | | | | |
|---|---------------------------------|----|----------------------------|
| 1 | Upper Swivel Joint Body Housing | 7 | Teflon Spring Adapter |
| 2 | Chevron Seat Adapter | 8 | Chevron Main Packing Seals |
| 3 | Tinker® Tapered Roller Bearing | 9 | Compression Springs |
| 4 | Grease Filling Port | 10 | Mechanical Chamber Seal |
| 5 | Environmental Dust Seal | 11 | Ball Bearing Cap Screws |
| 6 | Lower Swivel Joint Body Housing | 12 | Radial Ball Bearings |

Product Overview:

- o Chevron packing seals; spring energized and self-adjusting for normal wear
- o Combination Tinker tapered roller bearing for high load carrying capacity and radial ball bearings for component alignment
- o Available sizes: 2" through 4"
- o Available end connections include NPT, TMA and ANSI flanges

Design Notes:

- (1) All surfaces are to be machine finished before final testing and assembly
- (2) Operational and testing pressures determined by ASTM pipe ratings
- (3) Swivel joints are offered with Buna-N packing seals standard

Manufacturer Specifications:

Seal Packing: Triple V-ring Packing Seals
 End Connection: Schedule 40 standard
 37 1/2° bevel for weld (swivel spool)

Material of Construction:

Carbon Steel, ASTM A-106 Grade B
 Stainless Steel, T-316



Information:
 Consult factory for all post-manufacturing recommendations, lubrication data and scheduling and all general maintenance and safety.

Caution:

Weld end swivel joints should be completely disassembled prior to welding so as to not damage the seals. Care should be taken to avoid distortion of seal and ball race diameters



Nuvex Series II
 Swivel Joints
 General Data Illustration

Date: 9-11-2013
 Drawing #: SK-NU2BW

APPENDIX "B" – CHEMICAL RESISTANCE CHARTS

Fluid	Metal			Seal Material				
	Aluminum	Carbon Steel	Stainless Steel	Buna-N	Viton	EPR Rubber	Butyl	Teflon
Key: A = Excellent B = Good C = Fair / Poor D = Not Recommended Blank = Insufficient Data								
Acetate Solvents	A	A	A	D	D	D	D	A
Acetic Acid, aerated	B	D	A	C	C	B		A
Acetic Acid, Air Free	B	D	B	C	D	B		A
Acetic Acid, crude	C	C	B	D	D	B	B	A
Acetic Acid, glacial	A	D	A	B	D	B	B	A
Acetic Acid, pure	B	D	B	D	D	B	B	A
Acetic Acid, 10%	B	C	B	D	D	B	B	A
Acetic Acid, 80%	B	C	B	D	D	C		A
Acetic Acid Vapors	B		D	D	D	C	D	A
Acetone	A	A	A	D	D	A	A	A
Acetylene	A	A	A	B	A	A	A	A
Acrylonite	B	B	A	D	C	D	D	A
Alcohol, Amyl	A	B	A	B	B	A	A	A
Alcohol, Butyl	A	B	A	A	A	B	B	A
Alcohol, Ethyl	B	B	A	B	B	A	A	A
Alcohol, Isopropyl	B	B	B	B	A	A	A	A
Alcohol, Methyl	B	C	A	B	D	B	B	A
Alcohol, Propyl	A	B	A	B	A	A	A	A
Aluminum Chloride	C	C	B	A	A	A	A	A
Aluminum Flouride	C	D	C	A	A	A	A	A
Aluminum Potassium Sulfate	D		B	B	B			A
Aluminum Sulfate	C	D	B	A	A	A		A
Ammonia, Anhydrous Liquid	B	A	A	B	D	A	A	A
Ammonia, Aqueous	B	A	A	B	B	B	B	A
Ammonia, Gas, hot	B		A	C	D	B	B	A
Ammonia Solutions	B	B	A	B	D	A	A	A
Ammonium Chloride	C	C	B	B	A	A	A	A
Ammonium Hydroxide 28%	C	B	B	B	C	B	B	A
Ammonium Hydroxide, concentrate	C	C	B	D	C	B	B	A
Ammonium Nitrate	B	D	A	A	B	A	A	A
Ammonium Phosphate	C	D	B	A	A	A	A	A
Ammonium Phosphate, Di-basic	B	D	B	A	D	A	A	A
Ammonium Sulfate	C	C	B	A	D	A	A	A
Aniline	C	C	B	D	C	B	B	A
Asphalt Liquid	C	B	A	C	A	D	D	A
Barium Chloride	D	C	B	A	A	A	A	A
Barium Hydroxide	D	C	B	A	A	A	A	A
Barium Sulfide	D	C	B	A	A	A	A	A
Benzene (Benzol)	B	B	B	D	B	D	D	A
Benzine	<i>See Petroleum Ether</i>							
Borax (Sodium Borate)	C	C	A	B	A	A	A	A
Boric Acid	B	D	B	B	A	B		A
Butadiene	B	B	A	C	B	D	D	A
Butane	A	B	B	B	B	D	D	D
Butyl Acetate	B	B	B	D	D	B	B	A
Butyl Stearate	B		B	B	A	D	D	A
Butylcellosolve	A	A	A	D	D	B	B	A
Butylene	A	A	A	C	B	D	D	A
Calcium Acetate	C		A	B	D	A	A	A
Calcium Bisulfite	C	D	B	A	A	D	D	A
Calcium Chloride	C	C	B	A	A	A	B	A
Calcium Hydroxide	D	C	B	A	A	A	A	A
Calcium Nitrate	C	B	A	B	B	B	B	A
Carbonic Acid	A	D	A	D	B	B	B	A
Carbonic Acid (Phenol)	A	D	B	D	B	C	C	A
Carbon Dioxide Dry	A	A	A	A	B	B	B	A
Carbon Disulphide	A	B	A	A	A	D	D	A
Carbon Tetrachloride, dry	B	B	A	B	A	D	D	A
Carbon Tetrachloride, Wet	D	D	B	C	B	D	D	A
Caustic Potash	D	D	B	B		B	B	A
Caustic Soda	D	B	A	C	B	B	B	A
Cellosolve	B	B	B	D	D	B	B	A
Cellulose Acetate	B		B	D	D	B	B	A
Chlorine Gas, dry	C	B	B	D	B	B	C	A
Chlorobromomethane		B	A	D	A	C	C	A

Fluid	Metal			Seal Material				
	Aluminum	Carbon Steel	Stainless Steel	Buna-N	Viton	EPR Rubber	Butyl	Teflon
Key: A = Excellent B = Good C = Fair / Poor D = Not Recommended Blank = Insufficient Data								
Chloroform, dry	D	B	A	D	B	D	D	A
Chromic Acid 50%	D	C	C	C	B	D	D	A
Citric Acid	B	D	A	B	A	A	A	A
Copper Acetate	D	C	A	B	D	A	A	A
Copper Cyanide	D		A	A	B	B		A
Copper Nitrite	D	D	B	A	A	B	B	A
Copper Sulfate	C	D	B	A	A	A	C	A
Cresote	B	B	A	A	A	D	D	A
Cresote Oil	B	B	B	C	A	D	D	A
Cresylic Acid	C	C	B	D	B	D	D	A
Cyclohexane	A	A	A	B	A	D	D	A
DDT	B	D	B	B	A	D	D	A
Detergents, synthetic	B		B	B	A	C		A
Dichloroethyl Ether (Chlorex)	B	B	B	D	C	C	C	A
Dowtherm	A	B	A	D	A	D		A
Ethane	A	C	B	A	A	D	D	A
Ethanol Amine	A	B	A	B	D	B	B	A
Ethers	A	A	A	D	C	C	C	A
Ethyl Acetate	A	B	B	D	D	B	B	A
Ethyl Cellulose	A	C	A	B	D	B	B	A
Ethyl Chloride, dry	B	B	A	B	B	B	B	B
Ethyl Chloride, wet	D	D	B	B	B	B	B	A
Ethylene Chloride	C		A	D	B	D	D	A
Ethylene Diamine	C	B	A	A	D	A	A	A
Ethylene Dichloride	D	B	A	D	B	C	C	A
Ethylene Glycol	A	B	B	A	A	A	A	A
Ethylene Oxide	B	B	B	D	C	C	C	A
Fatty Acids	B	D	A	B	A	C	C	A
Ferric Chloride	D	D	D	C	B	C	C	A
Ferric Sulfate	D	D	B	A	A	C	B	A
Formaldehyde, cold (Formalin)	A	A	A	B	D	B	B	A
Formaldehyde, hot (Formalin)	B	D	C	B	D	B	B	A
Formic Acid, cold	B	D	B	C	C	B	B	A
Formic Acid, hot	D	D	B	C	C	B	B	A
Freon Gas, dry	B	B	A	B	B	D	D	A
Freon 11, MF, 112, BF, 12, 13	B		A	B	B	D	D	A
Freon 21	B		A	D	D	D	D	A
Freon 22	A		A	D	D	B	B	A
Freon 113, TF	B		A	B	C	D	D	A
Fuel Oil	A	B	A	A	A	D	D	A
Furfural	A	A	A	D	D	B	B	A
Gas, Manufactured	B	B	B	A	A	C		A
Gas, Natural	B	B	A	A	A	C		A
Gas, Odorizers	A	B	B	A	A			A
Gasoline, Aviation	A	A	A	C	A	D	D	A
Gasoline, Leaded	A	A	A	B	A	D	D	A
Gasoline, Sour	A	B	A	B	A	D	D	A
Gasoline, Unleaded	A	A	A	B	A	D	D	A
Gelatin	A	D	A	A	A			A
Glucose	A	B	A	A	A	A	A	A
Glue	A	A	B	A	A	B		A
Glycerine (Glycerol)	A	C	A	A	A	A	A	A
Herbicides	<i>See specific chemical listing</i>							
Hexane	A	B	B	A	A	D		A
Hydraulic Oil, Petroleum Base	A	A	A	A	A	D	D	A
Hydrocyanic Acid	A	D	A	B	A	A	A	A
Hydrogen Gas, cold	A	B	A	B	A	A	A	A
Hydrogen Gas, hot	C	B	B	B		A	A	A
Hydrogen Peroxide, Concentrate	A	D	B	D	A	C	C	A
Hydrogen Peroxide, Dilute	A	D	B	B	A	B		A
Hydrogen Sulfide, Dry	A	B	A	C	D	A	A	A
Hydrogen Sulfide, Wet	B	C	B	D	D	A	A	A
Hypo (Sodium Thiosulfate)	B	D	A	A	A	B		A
Isobutyl Acetate	B	B	A	B	D	B	B	A
Isobutyl Alcohol	B	B	A	D	B	A	A	A

APPENDIX "B" – CHEMICAL RESISTANCE CHARTS

Fluid	Metal			Seal Material				
	Aluminum	Carbon Steel	Stainless Steel	Buna-N	Viton	EPR Rubber	Butyl	Teflon
Key: A = Excellent B = Good C = Fair / Poor D = Not Recommended Blank = Insufficient Data								
Iso-Butane	A	A	A	A	D	D	D	A
Iso-Butanol	A	B	A	A	B	B	B	A
Iso-Propanol	B	B	B	B	A	A	A	A
Iso-Propylamine	A	B	A	A	A	A	A	A
Iso-propyl Acetate	A	B	B	D	B	B	B	A
Jet Fuels, P-4, P-5 and P-6	A	A	A	B	A	D	D	A
Kerosene	A	B	A	A	A	D	D	A
Lacquer (and solvent)	A	C	A	D	D	D	D	A
Lactic Acid, concentrated hot	C	D	B	D	B	D	D	A
Lactic Acid Dilute, cold	A	D	A	B	A	B	B	A
Lactic Acid Dilute, hot	B	D	A	C	D	C	C	A
Lime Sulphur Solutions	C	B	A	D	A	A	A	A
LPG	A	B	A	A	A	D	D	A
Magnesium Chloride	D	C	B	A	A	A	A	A
Magnesium Hydroxide	D	B	A	B	A	B	A	A
Magnesium Sulfate	D	B	A	A	A	B	B	A
Mercury	B	A	A	A	A	A	A	A
Methane	A	B	A	A	A	D	D	A
Methanol	B	C	A	B	D	B	B	A
Methyl Cellosolve	A	B	A	C	D	B	A	A
Methyl Chloride	D	B	A	D	B	D	D	A
Methyl Ethyl Keytone	A	A	A	D	D	A	A	A
Methyl Isobutyle Ketone	A	A	A	D	D	A	A	A
Mineral Oils	A	B	A	A	A	D	D	A
Naptha	A	B	B	B	A	D	D	A
Napthalene	B	B	B	D	A	D	A	A
Napthenic Acid	B	B	A	C	A	D	D	A
Natural Gas, Sour	B	B	A	A	A	D	A	A
Nickel Chloride	D	D	B	A	A	B	B	A
Nickel Sulfate	D	D	B	A	A	A	A	A
Nitric Acid 30%	D	D	A	C	B	B	B	A
Nitric Acid 80%	B	D	B	D	C	D	D	A
Nitric Acid 100%	B	D	A	D	C	D	D	A
Nitrobenzene	B	B	A	D	C	D	C	A
Nitrogen	A	A	A	A	A	A	A	A
Nitrogen Fertilizer Solutions	B	A	A	B	A	B	B	A
N. Octane	A	A	A	B	A	D	D	A
Octyl Alcohol	B	B	A	B	B	B	B	A
Oils, Petroleum Refined	A	A	A	A	A	D	D	A
Oils, Petroleum Sour	A	B	A	B	A	D	D	A
Oils, Water Mixture	A	B	A	A	A	D	D	A
Oleic Acid	B	C	B	C	B	D	D	A
Oleum	B	B	B	D	B	D	D	A
Oxalic Acid	C	D	B	C	A	B	B	A
Palmitric Acid	B	C	B	B	A	D	D	A
Perchlorethylene, dry	B	B	A	C	A	D	D	A
Pesticides	<i>See specific chemical listing</i>							
Petroleum Ether (Naptha)	A	A	A	A	A	D	D	A
Phenol	A	D	A	D	B	D	A	A
Phosphoric Acid 10%	D	D	B	B	B	B	B	A
Phosphoric Acid 50%	D	D	B	C	B	B	B	A
Phosphoric Acid 80%	D	B	A	C	B	B	B	A
Phosphoric Acid 85%	D	C	B	D	B	B	B	A
Phthalic Anhydride	B	C	B	C	A	C	C	A
Picric Acid	C	D	B	C	B	B	B	A
Potassium Acetate Solutions	D	B	A	B	D	A	B	A
Potassium Carbonate	D	B	B	A	A	B	A	A
Potassium Chloride	D	C	B	A	A	A	A	A
Potassium Cynate Solutions	B	D	A	A	B	B	A	A
Potassium Cyanide	D	B	B	A	A	A	A	A
Potassium Hydroxide, Dilute Cold	D	A	A	B	D	A	A	A
Potassium Hydroxide, Dilute Hot	D	B	A	B	D	A	A	A
Potassium Nitrite	A	B	A	A	A	A	A	A
Potassium Sulfate	A	B	A	A	A	A	A	A
Producer Gas	B	B	B	A	A	D	D	A

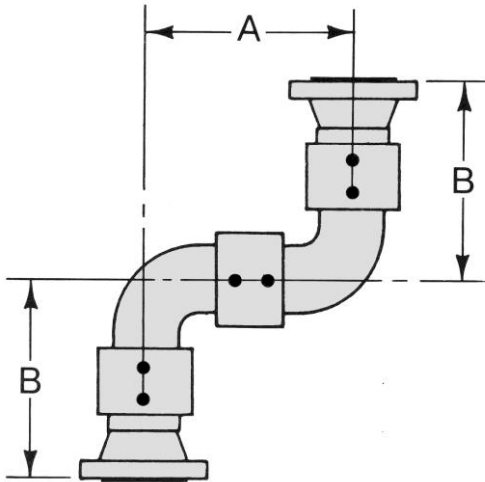
Fluid	Metal			Seal Material				
	Aluminum	Carbon Steel	Stainless Steel	Buna-N	Viton	EPR Rubber	Butyl	Teflon
Key: A = Excellent B = Good C = Fair / Poor D = Not Recommended Blank = Insufficient Data								
Propionic Acid 20%	B	D	B			A	A	A
Propylene	A	A	A	D	A	D	D	A
Propylene Diamine	B	B	A	D	D	D	D	A
Propylene Dichloride	C	B	B	D	B	D	D	A
Propylene Glycol	A	B	B	A	A	B	B	A
Propylene Oxide	B	B	B	D	D	B	B	A
Resins & Rosins	A	C	A	C	A	A	A	A
Rubber or Latex Emulsions	A	B	A	A	A	A	A	A
Shellac – bleached & orange	A	A	A	A	C	B	A	A
Silicone Fluids	B	B	B	B	B	B	B	A
Soap Solutions (Stearates)	C	A	A	A	A	A	A	A
Sodium Aluminate	D	C	B	A	A	A	A	A
Sodium Bicarbonate	C	C	B	A	A	A	A	A
Sodium Bisulfate 10%	D	D	A	A	A	A	A	A
Sodium Borate	B	C	B	A	A	A	A	A
Sodium Carbonate (Soda Ash)	D	B	A	A	A	A	A	A
Sodium Chloride	D	C	B	A	A	B	B	A
Sodium Chronate	D	B	A	A	A	A	A	A
Sodium Cyanide	D	C	B	A	D	A	A	A
Sodium Hydroxide 20% Cold	D	A	A	B	B	A	A	A
Sodium Hydroxide 20% Hot	D	B	A	B	C	B	B	A
Sodium Hydroxide 50% Cold	D	A	A	B	C	A	A	A
Sodium Hydroxide 50% Hot	D	B	A	B	C	B	B	A
Sodium Hydroxide 70% Cold	D	C	A	B	C	A	A	A
Sodium Hydroxide 70% Hot	D	C	B	C	C	B	B	A
Sodium Metaphosphate	D	D	A	A	B	B	B	A
Sodium Nitrate	A	B	A	B	D	A	A	A
Sodium Peroxide	C	C	A	B	A	A	A	A
Sodium Phosphate	D	C	A	B	A	A	A	A
Sodium Phosphate Di-basic	D	C	B	A	A	A	A	A
Sodium Phosphate Tri-basic	B	B	A	A	A	A	A	A
Sodium Silicate	D	B	B	A	A	A	A	A
Sodium Sulfate	B	B	A	A	A	A	A	A
Sodium Sulfide	C	C	B	A	A	A	A	A
Sodium Thiosulfate	B	C	A	B	A	A	A	A
Stearic Acid	A	C	B	A	A	A	B	A
Stoddard's Solvent	A	A	A	A	A	D	D	A
Styrene	A	A	A	D	B	D	D	A
Sulfate, Liquors	C	C	B	C	B	B	B	A
Sulfuric Acid 0 to 77%	D	D	B	D	A	C	C	A
Sulfuric Acid 100%	D	C	A	D	B	D	D	A
Sulfurous Acid	C	D	B	C	A	C	C	A
Tall Oil	C	B	B	B	A	D	D	A
Tar & Tar Oils	B	B	A	B	A	D	D	A
Tartaric Acid	B	D	A	B	A	C	C	A
Toluol (Toluene) (Methyl Benzene)	A	A	A	D	B	D	D	A
Trichlorethylene	A	B	B	C	B	D	D	A
Varnish	A	C	A	C	B	D	D	A
Vinyl Chloride	D	A	D	B	C	C	A	A
Water, Distilled	A	D	A	A	C	A	A	A
Water, Fresh	A	C	A	A	C	A	A	A
Water, Sea	C	D	A	A	C	A	A	A
Xylene (Zylo), Dry	A	B	A	D	B	D	D	A

All ratings are based on media at room temperature unless otherwise specified. This chart is a guide. Please be advised that in any given case many factors such as solution, concentration, temperature, degree of agitation and presence of impurities influence the rate of corrosion. The information contained herein is general in nature and while drawn from sources deemed to be reliable and presumed accurate, is not guaranteed in any way by OILCO. Any application requires the use of qualified experts and subject to limitations normally present.

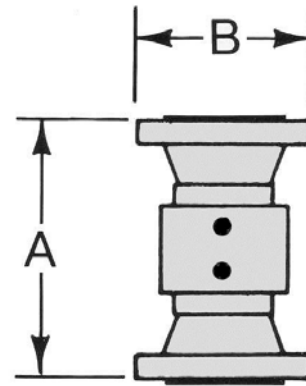
APPENDIX "C" – SWIVEL JOINT DIMENSIONS

80 SERIES O-RING, 150# FLANGE

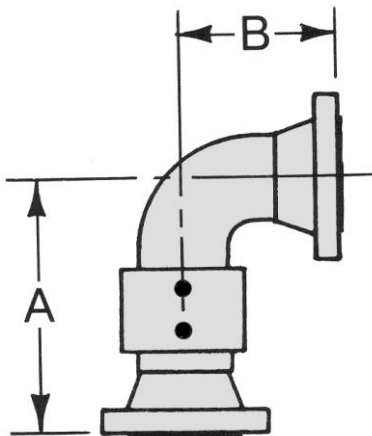
Style 10-F				
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B	9 1/8	10 3/8	11 5/8	16 7/8



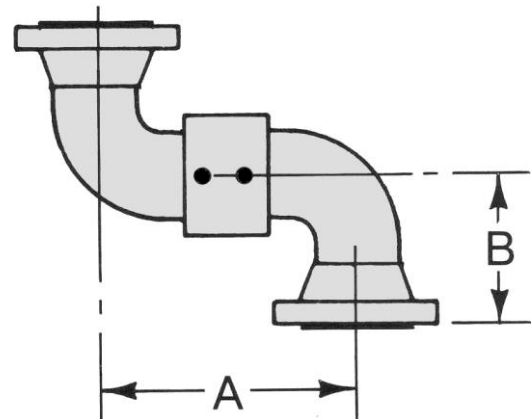
Style 20-F				
Size	2"	3"	4"	6"
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B	6	7 1/2	9	11



Style 30-F				
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A	9 1/8	10 3/8	11 5/8	16 7/8
B	4 1/2	5 3/4	7	9 1/2



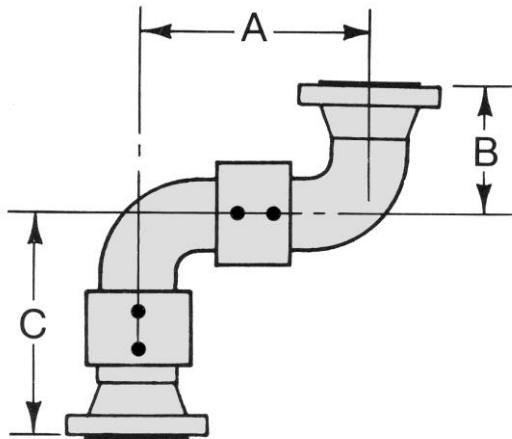
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B	4 1/2	5 3/4	7	9 1/2



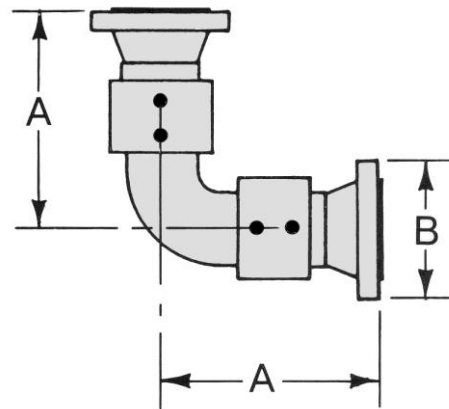
APPENDIX "C" – SWIVEL JOINT DIMENSIONS

80 SERIES O-RING, 150# FLANGE

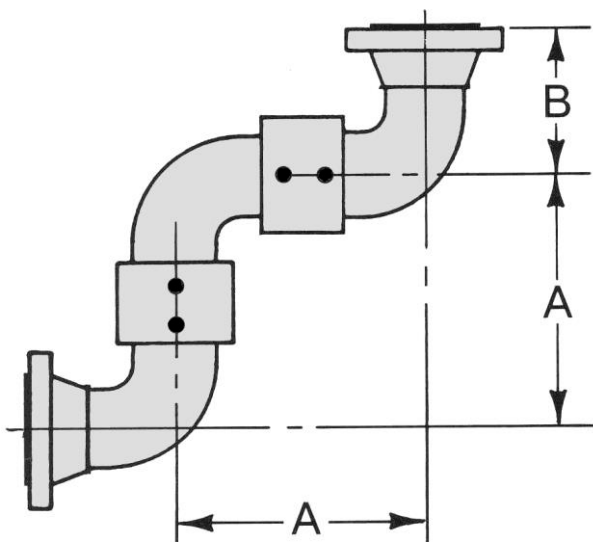
Style 50-F				
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B	4 1/2	5 3/4	7	9 1/2
C	9 1/8	10 3/8	11 5/8	16 7/8



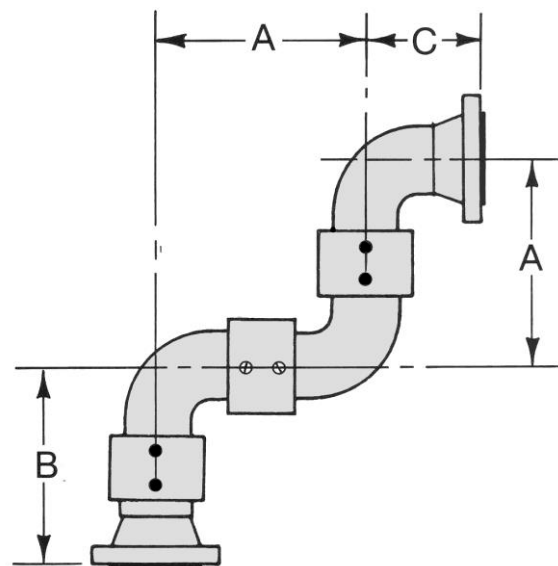
Style 60-F				
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A	9 1/8	10 3/8	4	16 7/8
B	6	7 1/2	9	11



Style 70-F				
Size	2"	3"	4"	6"
A	8 5/8	10 5/8	12 5/8	19 3/8
B	4 1/2	5 3/4	7	9 1/2



Style 80-F				
Size	2"	3"	4"	6"
A	8 5/8	10 5/8	12 5/8	19 3/8
B	9 1/8	10 3/8	11 5/8	16 7/8
C	4 1/2	5 3/4	7	9 1/2

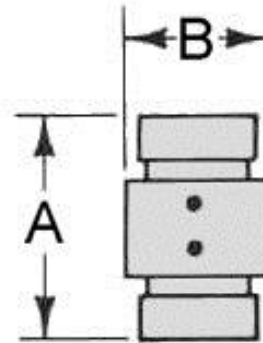
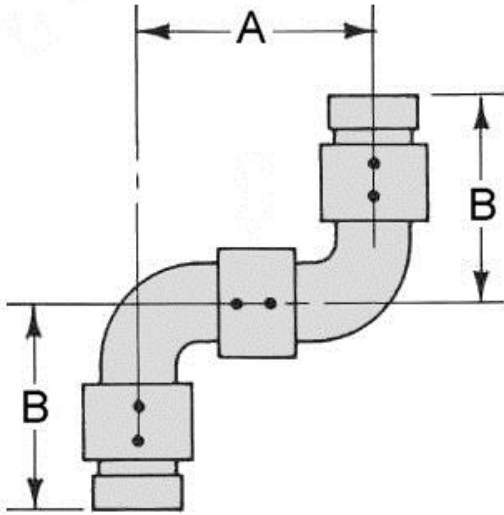


APPENDIX "C" – SWIVEL JOINT DIMENSIONS

80 SERIES O-RING, NPT THREAD

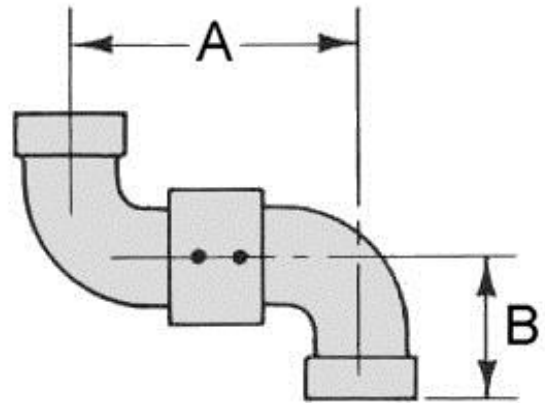
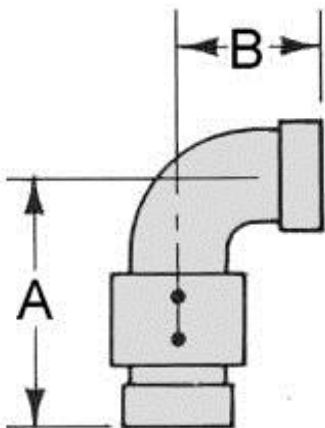
Style 10				
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A	8 5/8	10 5/8	12 5/8	19 3/8
B	7 5/8	9 1/8	10 5/16	15 1/4

Style 20				
Size	2"	3"	4"	6"
A	6 5/8	7 5/8	8	11 1/8
B	4	5	6	8 3/4



Style 30				
Size	2"	3"	4"	6"
A	7 5/8	10 5/8	10 5/16	15 1/4
B	3	4 1/2	5 11/16	7 7/8

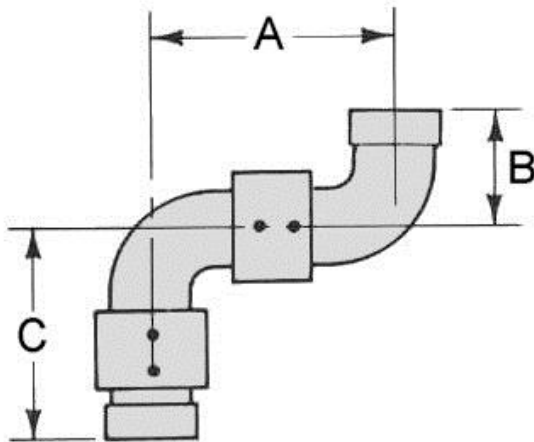
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B	3	4 1/2	5 11/16	7 7/8



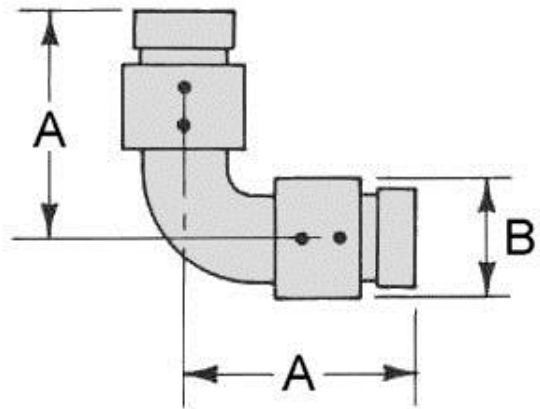
APPENDIX "C" – SWIVEL JOINT DIMENSIONS

80 SERIES O-RING, NPT THREAD

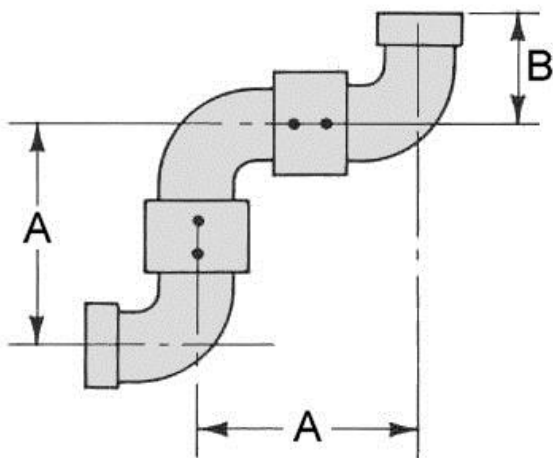
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B	3	4 1/2	5 11/16	7 7/8
C	7 5/8	9 1/8	10 5/16	15 1/4



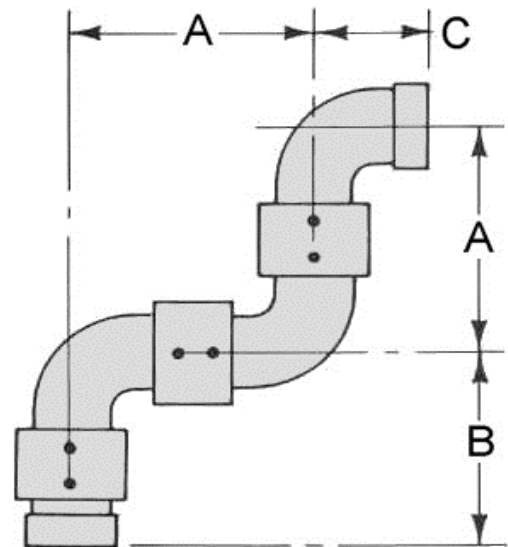
Style 60				
Size	2"	3"	4"	6"
A	7 5/8	9 1/8	10 5/16	15 1/4
B	4	5	6	15 1/4



Style 70				
Size	2"	3"	4"	6"
A	8 5/8	10 5/8	12 5/8	19 3/8
B	3	4 1/2	5 11/16	7 7/8



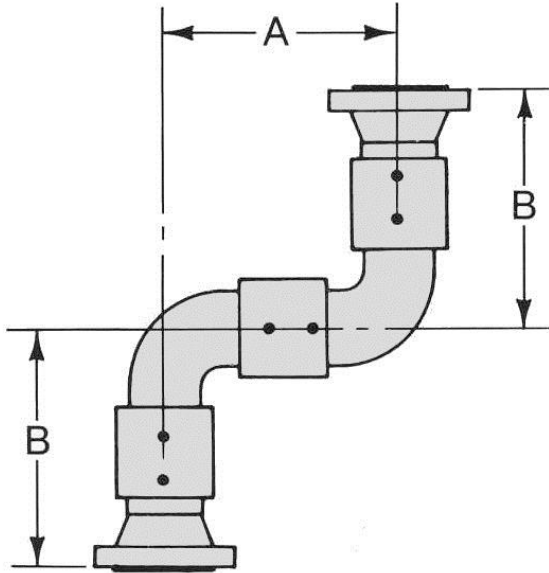
Style 80				
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B	7 5/8	9 1/8	10 5/16	15 1/4
C	3	4 1/2	5 11/16	7 7/8



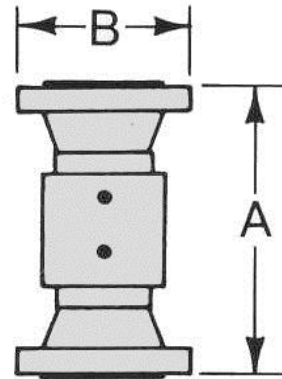
APPENDIX "C" – SWIVEL JOINT DIMENSIONS

90 SERIES V-RING, 150# FLANGE

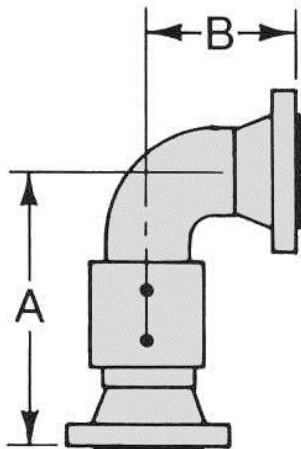
Style 10-F							
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A	8	11 1/8	14 3/4	20 3/8	24 3/4	31 1/16	37 1/2
B	9 3/8	10 7/8	13 3/4	17 7/8	20 3/4	25 1/16	30



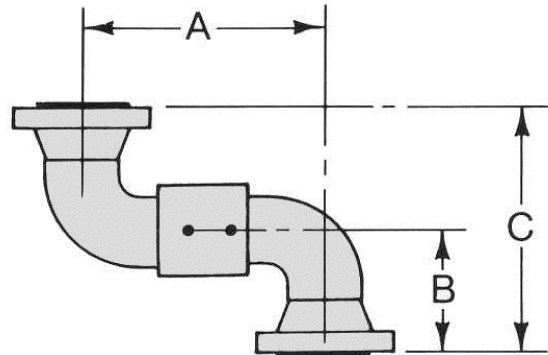
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Size	2"	3"	4"	6"	8"	10"	12"
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B	6	7 1/2	9	11	13 1/2	16	19



Style 30-F							
Size	2"	3"	4"	6"	8"	10"	12"
A	9 3/8	10 7/8	13 3/4	17 7/8	20 3/4	25 1/16	30
B	4 1/2	5 3/4	7	9 1/2	12	14	16 1/2



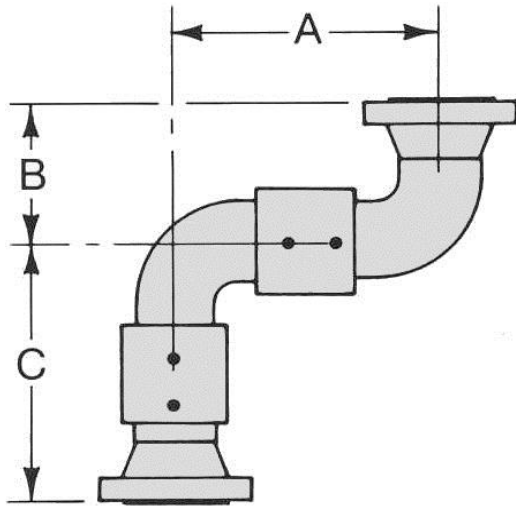
Style 40-F							
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B	4 1/2	5 3/4	7	9 1/2	12	14	16 1/2
C	9	11 1/2	14	19	24	28	33



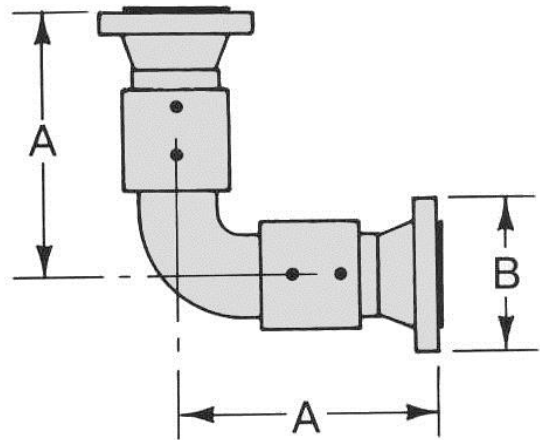
APPENDIX "C" – SWIVEL JOINT DIMENSIONS

90 SERIES V-RING, 150# FLANGE

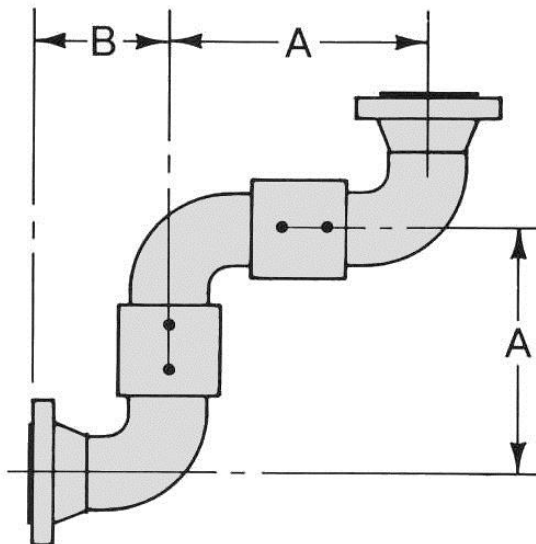
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B	4 1/2	5 3/4	7	9 1/2	12	14	16 1/2
C	9 3/8	10 7/8	13 3/4	17 7/8	20 3/4	25 1/16	30



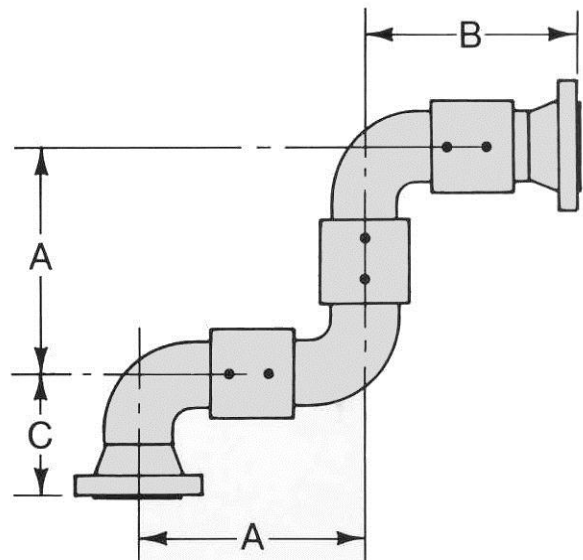
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B	6	7 1/2	9	11	13 1/2	16	19



Style 70-F							
Size	2"	3"	4"	6"	8"	10"	12"
A	8 7/8	11 1/8	14 3/4	20 3/8	24 3/4	31 1/16	37 1/2
B	4 1/2	5 3/4	7	9 1/2	12	14	16 1/2



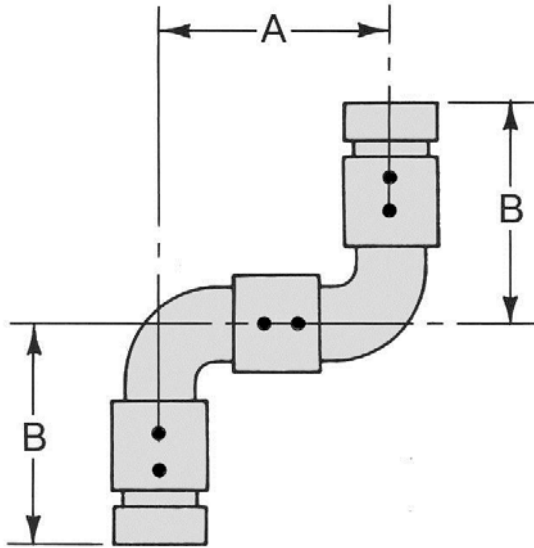
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B	9 3/8	10 7/8	13 3/4	17 7/8	20 3/4	25 1/16	30
C	4 1/2	5 3/4	7	9 1/2	12	14	16 1/2



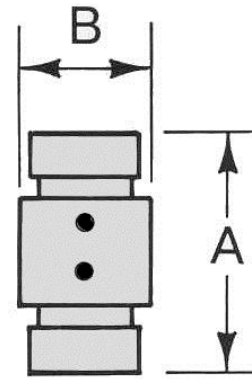
APPENDIX "C" – SWIVEL JOINT DIMENSIONS

90 SERIES V-RING, NPT THREAD

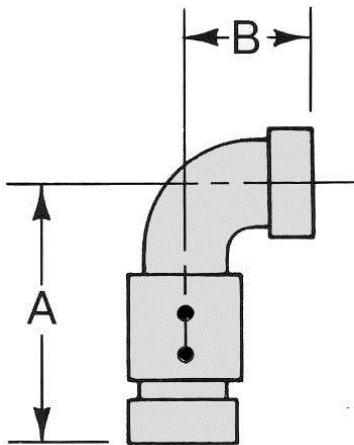
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B	7 7/8	9 5/8	12 7/16	16 1/4	18 7/8



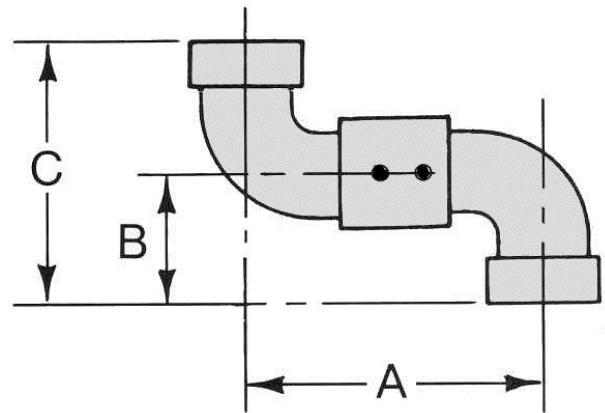
Style 20					
Size	2"	3"	4"	6"	8"
A	6 7/8	8 1/8	9 3/8	12 1/8	13
B	4	5	6	9 1/4	11



Style 30					
Size	2"	3"	4"	6"	8"
A	7 1/8	9 5/8	12 7/16	16 1/4	18 7/8
B	3	4 1/2	5 11/16	7 7/8	10 1/8



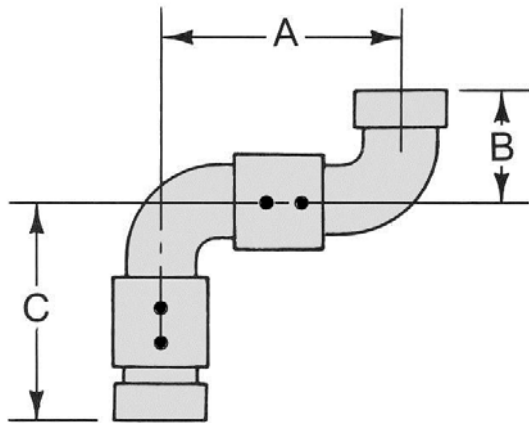
Style 40					
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C	6	9	11 3/8	15 3/4	20 1/4



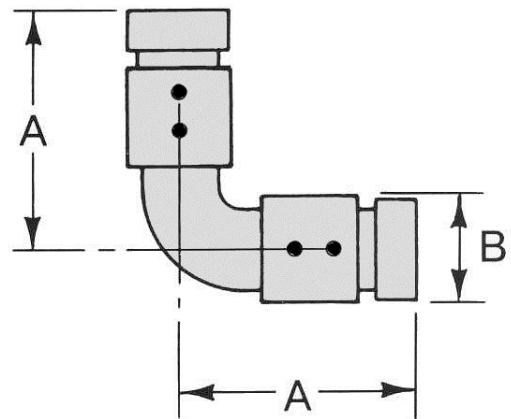
APPENDIX "C" – SWIVEL JOINT DIMENSIONS

90 SERIES V-RING, NPT THREAD

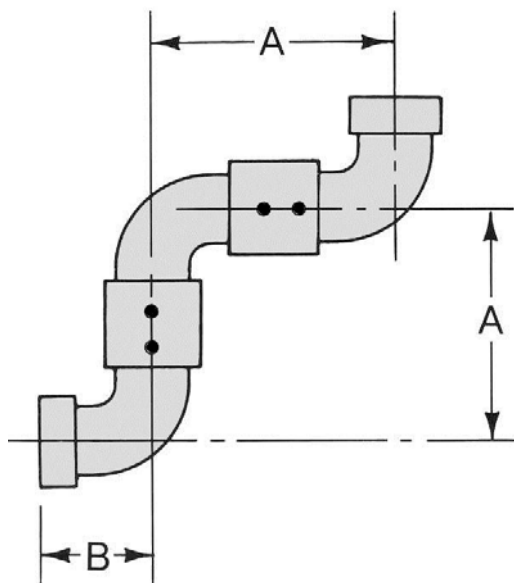
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B	3	4 1/2	5 11/16	7 7/8	10 1/8
C	7 7/8	9 5/8	12 7/16	16 1/4	18 7/8



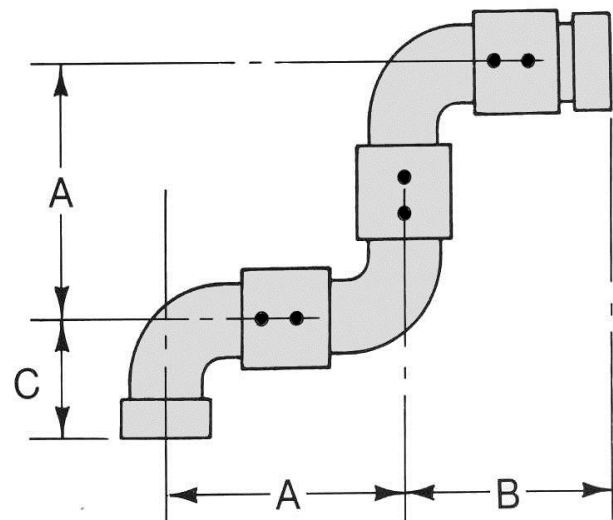
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B	4	5	6	9 1/4	11



Style 70					
Size	2"	3"	4"	6"	8"
A	8 7/8	11 1/8	14 3/4	20 3/8	24 3/4
B	3	4 1/2	5 11/16	7 7/8	10 1/8



Style 80					
Size	2"	3"	4"	6"	8"
A	8 7/8	11 1/8	14 3/4	20 3/8	24 3/4
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C	3	4 1/2	5 11/16	7 7/8	10 1/8

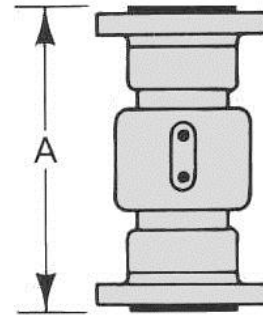
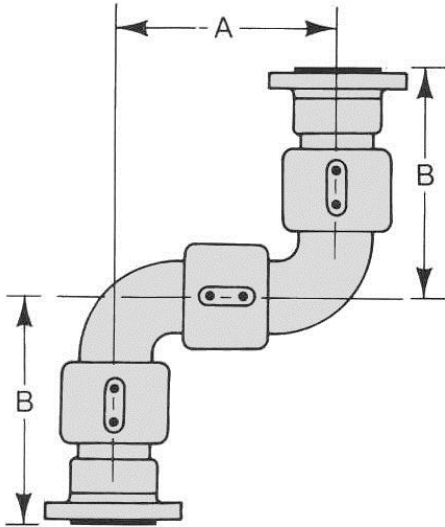


APPENDIX "C" – SWIVEL JOINT DIMENSIONS

880 SERIES O-RING, TTMA FLANGE

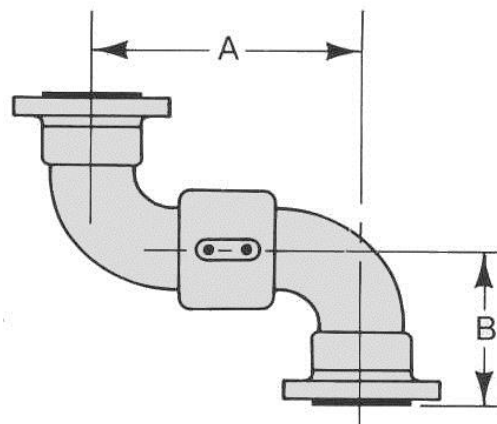
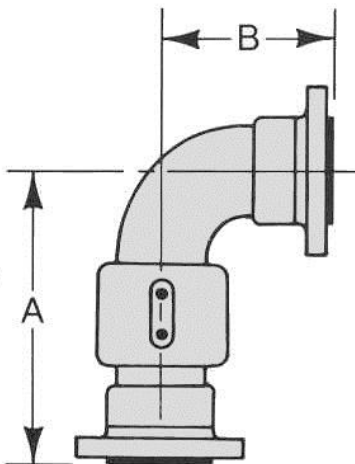
Style 10-ANF			
Size	2"	3"	4"
A	n/a	8 1/4	10 5/8
B	n/a	8 1/16	10 1/8

Style 20-ANF			
Size	2"	3"	4"
A	n/a	6 5/16	8 5/8



Style 30-ANF			
Size	2"	3"	4"
A	n/a	8 1/16	10 1/8
B	n/a	4 7/8	5 3/4

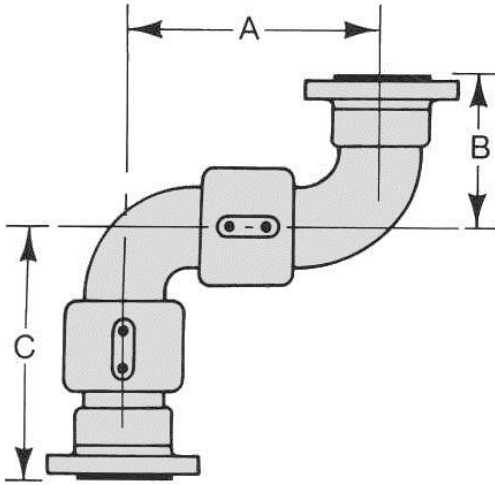
Style 40-ANF			
Size	2"	3"	4"
A	n/a	8 1/4	10 5/8
B	n/a	4 7/8	5 3/4



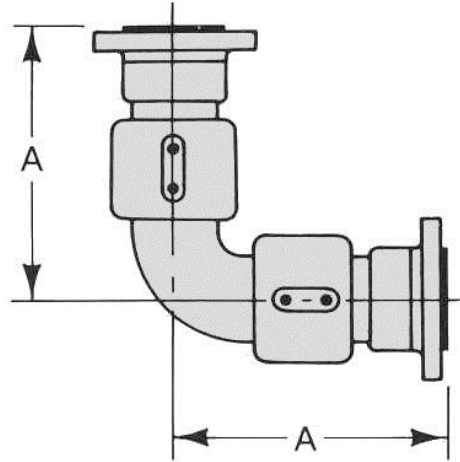
APPENDIX "C" – SWIVEL JOINT DIMENSIONS

880 SERIES O-RING, TTMA FLANGE

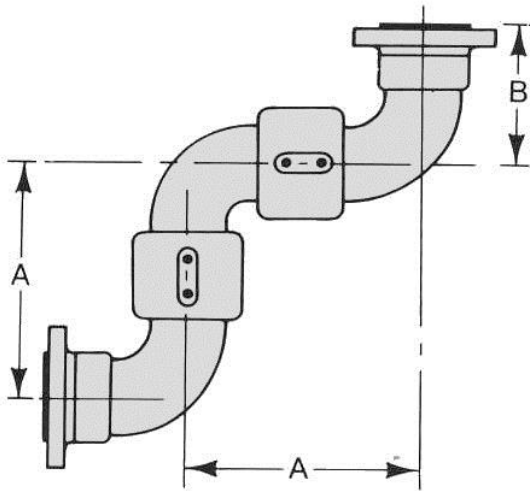
Style 50-ANF			
Size	2"	3"	4"
A	n/a	8 1/4	10 5/8
B	n/a	4 7/8	5 3/4
C	n/a	11 15/16	14 7/8



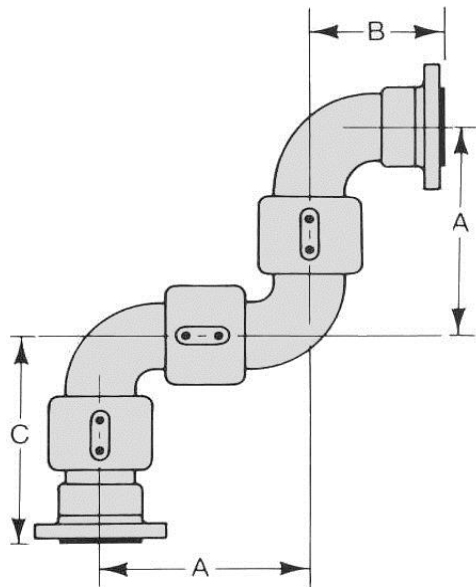
Style 60-ANF			
Size	2"	3"	4"
A	n/a	8 1/16	10 1/8



Style 70-ANF			
Size	2"	3"	4"
A	n/a	8 1/4	10 5/8
B	n/a	4 7/8	5 3/4



Style 80-ANF			
Size	2"	3"	4"
A	n/a	8 1/4	10 5/8
B	n/a	4 7/8	5 3/4
C	n/a	8 1/16	10 1/8

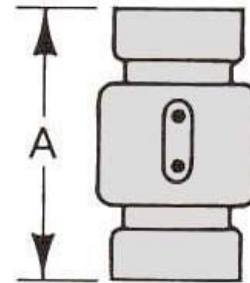
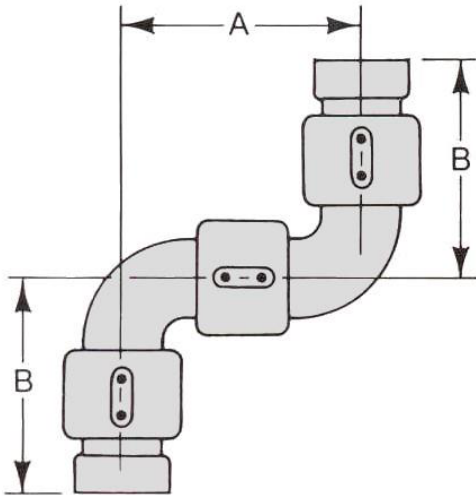


APPENDIX "C" – SWIVEL JOINT DIMENSIONS

880 SERIES O-RING, NPT THREAD

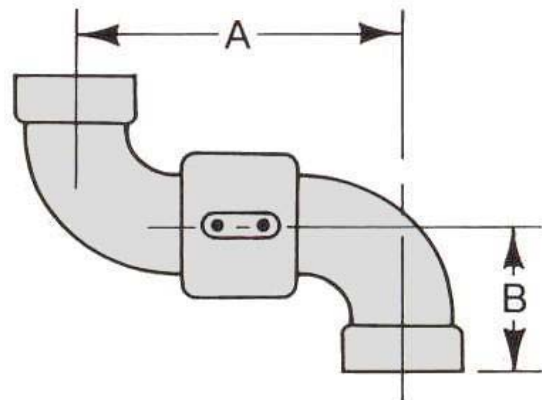
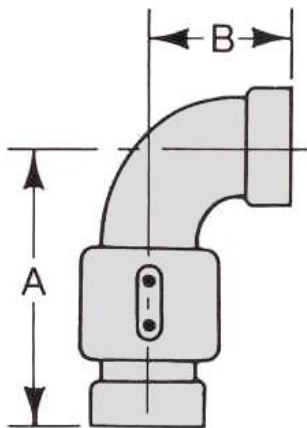
Style 10-A			
Size	2"	3"	4"
A	6 11/16	8 1/4	10 5/8
B	6 3/16	7 1/16	9 1/8

Style 20-A			
Size	2"	3"	4"
A	5 9/16	5 15/16	7 5/8



Style 30-A			
Size	2"	3"	4"
A	6 3/16	7 1/16	9 1/8
B	2 7/8	3 7/8	3 3/4

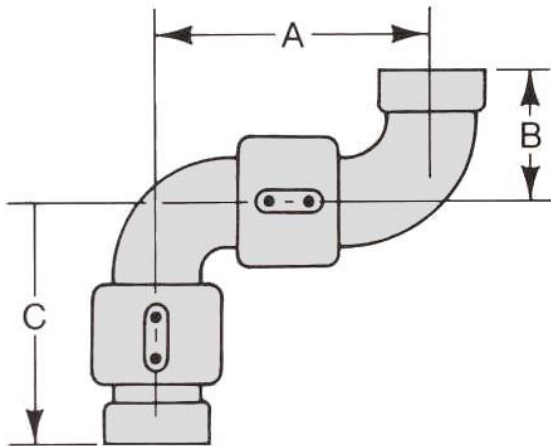
Style 40-A			
Size	2"	3"	4"
A	6 11/16	8 1/4	10 5/8
B	2 7/8	3 7/8	9 1/8



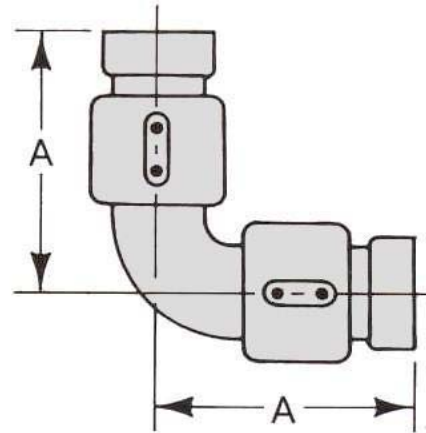
APPENDIX "C" – SWIVEL JOINT DIMENSIONS

880 SERIES O-RING, NPT THREAD

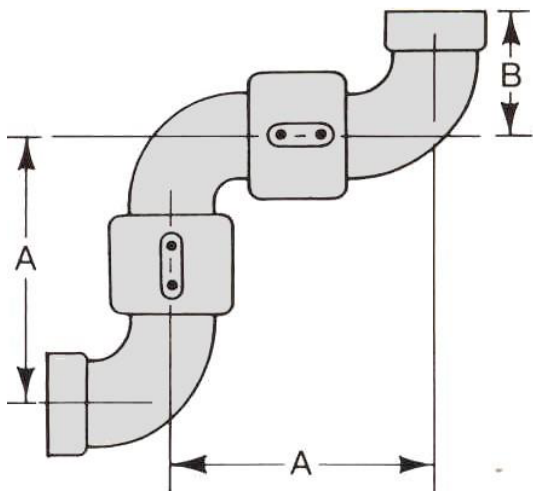
Style 50-A			
Size	2"	3"	4"
A	6 11/16	8 1/4	10 5/8
B	2 7/8	3 7/8	7 1/16
C	6 3/16	7 1/16	9 1/8



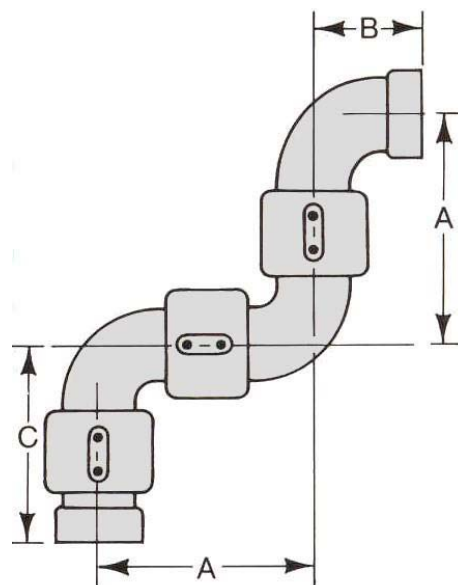
Style 60-A			
Size	2"	3"	4"
A	6 3/16	7 1/16	9 1/8



Style 70-A			
Size	2"	3"	4"
A	6 11/16	8 1/4	10 5/8
B	2 7/8	3 7/8	4 3/4



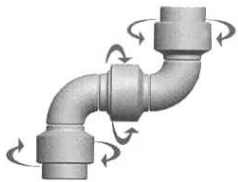
Style 80-A			
Size	2"	3"	4"
A	6 11/16	8 1/4	10 5/8
B	2 7/8	3 7/8	4 3/4
C	6 3/16	7 1/16	9 1/8



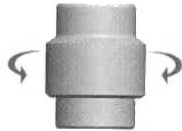
APPENDIX "D" – ORDERING INFORMATION

SWIVEL JOINT DATA SHEET

1. What is the product used for ? _____
2. What size line (inches) ? _____
3. Material of construction required ? _____
4. Preferred seal material ? _____
5. Minimum operating temperature ? _____
6. Maximum operating temperature ? _____
7. Minimum operating pressure ? _____
8. Maximum operating pressure ? _____
9. Configuration Style ? _____



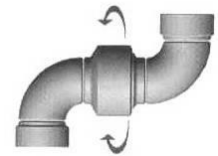
Style 10



Style 20



Style 30



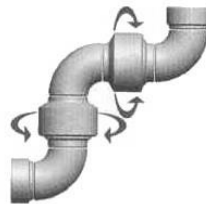
Style 40



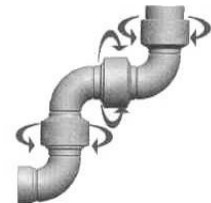
Style 50



Style 60



Style 70



Style 80

10. Connection type (flange, NPT, etc.) ? _____
11. Submerged service unit ? _____
12. Is steam jacketing required ? _____
13. Specialized testing required ? _____
14. Documentation required ? _____
15. Other requirements ? _____

APPENDIX “D” – ORDERING INFORMATION

General Warranty

- All OILCO products are warranted free from defects in material and workmanship under normal use and service for a period of twelve months from the date of manufacture.
- The warranty set forth herein shall be the exclusive warranty made by OILCO and in lieu of all other warranties, expressed or implied, (whether written or oral), including but not limited to any implied warranty of merchantability or fitness for any particular purpose.
- OILCO's liability under this warranty is limited to, at OILCO's option, the repair or replacement of that part which proves to be defective within twelve months of date of manufacture. OILCO Corp. is not responsible for claims of damage due to improper installation or maintenance, corrosive fluids, or use of a product for a purpose other than it was specifically designed for.
- OILCO Corp. shall have no liability or be required to fulfill any obligation under this warranty unless the original purchaser permits OILCO to inspect the item to determine whether the claimed defect is covered by this warranty and returns the claimed defective item to OILCO's factory with all shipping charges prepaid.
- Under no circumstances shall OILCO Corp. be liable for any consequential, special, or contingent damages or expenses, or any other charges beyond the invoice value of the defective items. The remedies set forth herein shall be the exclusive remedies available to the user and are in lieu of all other remedies.

Notes



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*Designed and Manufactured
in the United States of America*