

MASON-MERCER

SLIP JOINTS



Slip Joint Features

- As safe as the Piping itself
- Lowest Fluid Friction Loss
- 6 inch Standard Movement
- Repackable Under Full Pressure
- Weld Ends or Flanges

Whenever we introduce a new product we try to provide development history as well as description, application and specifications. The advantage slip joints have over stainless steel bellows are higher pressure and temperature ratings, lower thrust forces and most important of all, the complete elimination of cataclysmic failure. That is why we recommend them for high pressure steam service particularly in occupied areas.

It isn't that long ago that all sliding seals were done by "packing" within a packing "gland". A reciprocating or rotating shaft seal would have looked like Figure 1 where a "Stuffing Box" held square shaped graphite and oil impregnated cotton or flax, woven in firm rings. A round flanged pressure ring squeezed the packing to make the seal. The same method was used in a pipeline as slip joints allowed for expansion and contraction too. However, unlike the illustration below, the packing box would be much longer so the pipe could come in from both ends.

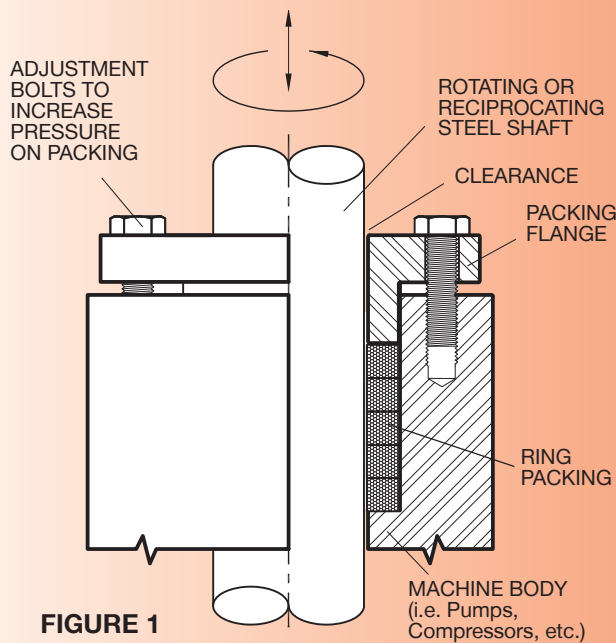


FIGURE 1

This all changed as extremely accurate machining became common and injectable flake graphite packing was developed.

Lubricating oil no longer leaks past automobile engine cylinders, nor does it become contaminated by combustion gases. Both ball and slip joint components can now be machined accurately and ground to close

tolerances to hold the graphite and oil mixtures pumped in at high pressures between seal areas. This replaces the outmoded high maintenance, mechanical packing method.

Both corrosion and wear are all but memories with protective hard **chromium** plated surfaces sliding through the new graphite rich lubricant seals.

We could waste a lot of your time talking about how much better our internal workings are compared to others, but all manufacturers' internal configurations are similar.

We have tried to be more practical by:

1) Standardizing on six inch travel. Demand for a little more than 4" movements come up fairly often, but the jump to 8" is overkill and expensive. Rather than stocking both, our **6"** movement will make drawings and space requirements more uniform and one size helps us maintain a larger inventory to meet today's on-demand requirements.

2) All sliding surfaces are hard, polished chrome to minimize occasional repacking by injection and extend the life of the body so they need never be replaced more often than the piping.

3) All slip joints are injection packed at the factory and tested to three times rated pressure.

Our greatest **redesign effort** went into the Packing Ports.

1) Our "Open" and "Shut" positions are clearly marked with engraved lettering, so there is little chance of a steamfitter turning this simple shut off valve the wrong way and getting burnt when the filling plug is removed. The valve bolt ends have stop pins to prevent absent-minded removal.

2) The ports are both pressed in and seal welded internally for better appearance and uniform facing of the closure valves.

3) The packing ports accept the end fitting of a packing pump or packing pellets forced into the seal area by screwing in the packing bolt. Repacking can be done while the system is under pressure as the packing valve bolt is closed when packing is added beneath the packing bolt and opened when the packing bolt is back in place. However, in the interest of safety, it is better if the system is down.

SLIP JOINT and GUIDE SPECIFICATION:

SLIP JOINTS shall be welded or flanged into the piping wherever shown on the drawings to accept 6" total piping movement, all expansion, contraction or combined. Sliding seal surfaces shall be ground smooth before plating with a minimum 2 mil polished hard chrome finish. Packing shall be injected graphite, factory tested to 3 times pressure ratings. Circumference between packing ports shall not exceed 5 inches. All packing ports shall have a shut-off valve allowing repacking by means of a pump or the self-contained packing port bolts without shutting the system down.

Minimum 250 psi @ 450° F. (17 Bar @ 250°C.) temperature and pressure rating.

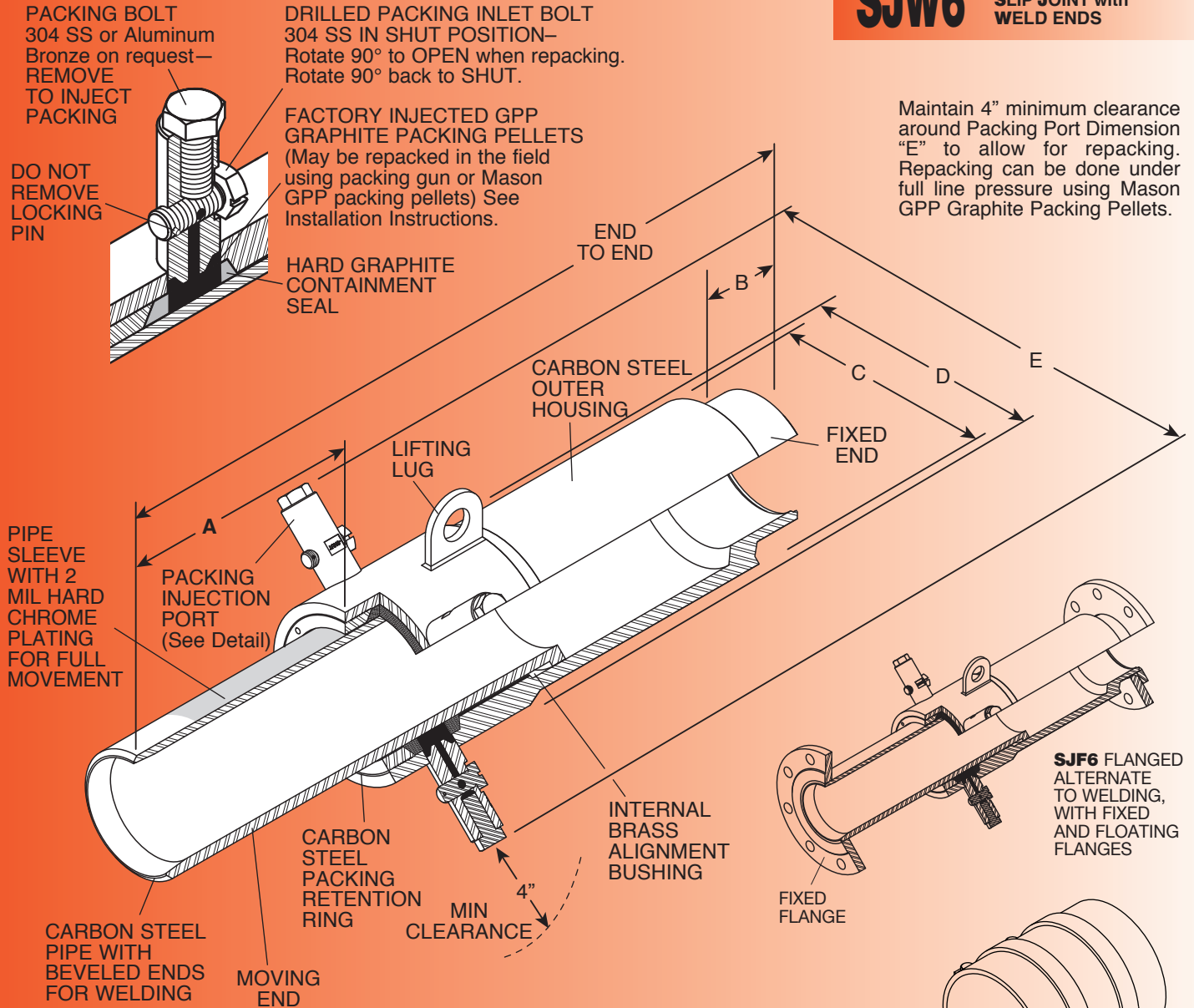
Slip Joints shall be Mason Industries, Inc. SJW6 or SJF6 and Sliding Guides Mason Type ASG.

PIPE GUIDES shall be manufactured with stainless steel wrapping the carbon steel foot where it passes through horizontal U guides similarly lined to prevent corrosion. When Teflon® guides are available, it is preferable. The baseplate shall have multiple holes for bolting to beam flanges or flat surfaces. Bases may be welded in position in lieu of bolting. Height must be adjustable to accept different thicknesses of insulation. Guides shall be professionally load rated for bottom, overhead, side mounted or riser positioning to provide both load bearing and guiding capabilities. Submittals shall include load ratings in all modes.

SEAL AND PACKING DETAIL

SJW6

6" (150mm) Movement
SLIP JOINT with
WELD ENDS



Full Vacuum Rating—
30" (762mm) Hg

Slip Joints should be guided
with MASON ASG Adjustable
Sliding Guides.

Refer to page 4 for
Guide Spacing and
Installation Instructions.

For more information,
see ASG Bulletin ASG-35.

SJW6 DIMENSIONS AND PRESSURE RATINGS (American & Metric Units) 6" (150mm) COMPRESSION, 1" (25mm) EXTENSION

Type & Size	Pipe Size (in) (mm)	End to End (in) (mm)	A (in) (mm)	B (in) (mm)	C (in) (mm)	D (in) (mm)	E (in) (mm)	Friction Force (lbs) (kgs)	*Thrust @ 250 psi 17 bar (lbs) (kgs)	Rated Pressure @ 480°F 250°C (psi) (kg/cm ²)	Number of Ports
SJW6-2	2 50	253/8 645	91/4 235	11/2 40	3 76	33/4 95	101/4 261	1102 500	725 329	250 17	2
SJW6-2 1/2	2 1/2 65	253/4 655	91/4 235	11/2 40	33/4 95	41/2 114	11 279	1281 581	1220 553	250 17	2
SJW6-3	3 80	261/4 667	91/4 235	11/2 40	41/2 114	51/4 133	113/4 298	1596 724	1970 893	250 17	2
SJW6-4	4 100	261/2 673	91/4 235	13/4 45	53/4 146	61/4 159	123/4 324	1956 887	2910 1320	250 17	4
SJW6-5	5 125	273/4 706	93/8 238	2 50	65/8 168	75/8 194	141/8 359	2743 1244	4750 2155	250 17	4
SJW6-6	6 150	281/2 722	93/8 238	21/8 55	8 203	85/8 219	151/8 384	3754 1703	6850 3107	250 17	6
SJW6-8	8 200	283/4 728	93/8 238	21/4 57	101/4 260	107/8 273	173/8 441	4811 2182	12160 5156	250 17	6
SJW6-10	10 250	291/4 745	93/8 238	23/8 60	121/4 310	127/8 325	193/8 492	6879 3120	19780 8972	250 17	8
SJW6-12	12 300	301/2 778	93/8 238	25/8 65	143/8 365	147/8 377	213/8 542	8093 3671	28720 13027	250 17	8
SJW6-14	14 350	32 813	93/8 238	25/8 65	155/8 395	161/8 410	225/8 575	9015 4089	34350 15581	250 17	10

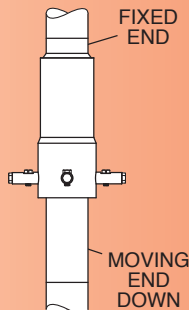
*Lower Thrust Forces in proportion to lower pressures, i.e. 100 psi Force = 100/250 x published Thrust. Forces on Pipe Anchors must include Thrust Force and Friction Force. Friction Force is constant regardless of travel.

SLIP JOINT INSTALLATION PROCEDURES

1. All pipe lines should be properly guided and supported with Mason ASG guides on the moving end and anchored on the fixed end, to avoid piping weight on the slip joints.
2. a. Anchors are to be provided upstream and downstream at both ends of the thermally expanding or contracting pipe. Slip joints will not function and may over extend and fail unless these full thrust anchors are in place.
b. Install anchors and guides as shown below under "Slip Joint Guide Spacing".
3. All pipes are to be lined up accurately before installing anchors, guides or slip joints. Do not force slip joints into position before they are welded to pipe. Proper alignment is extremely important.
4. Continue support of slip joint until it is fully welded in place.
5. Never operate slip joints above rated pressures or temperatures.
6. Lift the slip joints by the welded lifting lug only.
7. Slip joints cannot be installed in unanchored piping systems.
8. Slip joints must be installed in steel piping only.
9. For riser applications, install with Moving End facing down to avoid trapping debris.

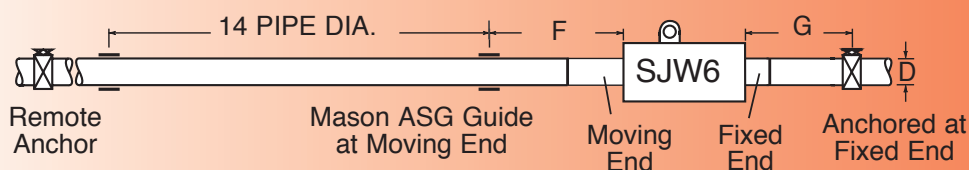
PIPE RISER INSTALLATION

Install SJW6 with moving end down to prevent buildup of debris.



SLIP JOINT GUIDE SPACING

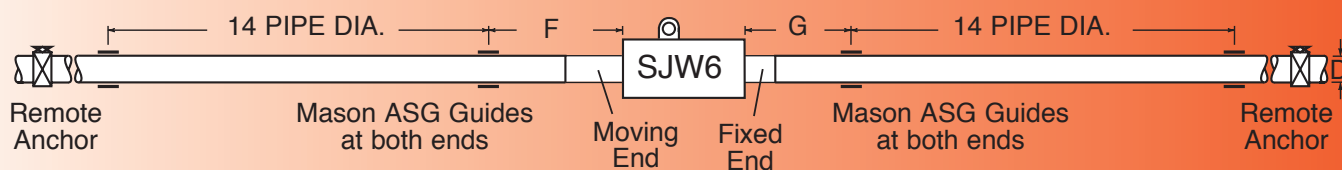
Guides and Anchors for SJW6 located near Anchor



GUIDE SPACE DIMENSIONS

Pipe Size		F		G	
(in)	(mm)	(in)	(mm)	(in)	(mm)
2	50	16	406	8	203
2 1/2	65	16	406	10	254
3	80	16	406	10	254
4	100	16	406	12	305
5	125	16	406	14	356
6	150	16	406	16	406
8	200	18	457	18	457
10	250	22	559	22	559
12	300	24	610	24	610
14	350	28	711	28	711

Guides and Anchors for SJW6 located between Remote Anchors



SLIP JOINT INSPECTION CRITERIA

Store SJW6's slip joints for protection against humidity, solvents, corrosive liquids and fumes.

SJW6 slip joints may require periodic maintenance. Early detection of leakage indicates time for re-packing. It is important to check movements after installation, watch for joints that appear to be overly compressed, elongated or distorted, and then measure actual elongation and compression. Compare them with the original rated movements from your certified Mason drawings. Joints

exceeding their rated movements should be replaced or anchor spacing reduced to limit movements to certified allowable. If re-packing is required, refer to A-35986-1.

DURING MAINTENANCE SHUTDOWN

Remove joint for complete examination or if there is access, crawl up to large diameter joints.



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