

CE



CHRISTIE
TOTAL TORQUE SOLUTIONS

WCA4™ FLANGE ALIGNMENT TOOL
OPERATOR INSTRUCTION MANUAL



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1 - INTRODUCTION

The Christie WCA4TM is an aid for use in normal maintenance and installation procedures, and enable the realignment of mis-aligned flanges within their respective working capacities. For example, the tool can be used to assist in the replacement of ring and other types of flange joint. The use of these instructions will promote safe use, and maximize the service life of the tools. It is recommended that the operator read the relevant sections of this instruction manual for the WCA4TM flange alignment tool.

2 – SAFETY INFORMATION

Failure to comply with the following cautions and warnings could cause equipment damage and personal injury; read the manual fully!

Read all the following instructions, warnings and cautions carefully. Follow all safety precautions to avoid personal injury or property damage during system operation.

W. Christie (Industrial) Limited cannot be responsible for damage or injury resulting from unsafe product use, lack of maintenance or incorrect product and/or system operation. Contact W. Christie (Industrial) Limited when in doubt as to the safety precautions and applications. To protect your warranty, use only good quality hydraulic oil of the grade 32cSt.

In all installations the site safety requirements must be adhered to ALSO the safety of the operator, and when present, any assisting personnel, is of paramount importance along with the safety of others including, when present, the general public.

These instructions are only to cover the safe operation of THE CHRISTIE WCA4™ FLANGE ALIGNMENT TOOL, during normal maintenance/installation operations. All other safety aspects must be controlled by the operation supervisor.

Please note the following:-

- 1) The tools must not be attached to a flange joint prior to misalignment

A **CAUTION** is used to indicate correct operating or maintenance procedures and practices to prevent damage to, or destruction of equipment or other property.

A **WARNING** indicates a potential danger that requires correct procedures or practices to avoid personal injury.

A **DANGER** is only used when your action or lack of action may cause serious injury or even death.



IMPORTANT: The operator must have read and understood all instructions, safety issues, cautions and warnings before starting to operate the Christie equipment.



DANGER: To avoid personal injury keep hands and feet way from the tool and workpiece during operation.



WARNING: Do not overload equipment. Overloading causes equipment failure and possible personal injury.



WARNING: Always wear suitable clothing and Personal Protective Equipment (PPE).



CAUTION: Make sure that all system components are protected from external sources of damage, such as excessive heat, flame, moving machine parts, sharp edges and corrosive chemicals.



CAUTION: Do not operate the equipment without lubricating all moving parts as in section 5.4. Use only high pressure molybdenum disulphide grease.



WARNING: Immediately replace worn or damaged parts with genuine Christie parts. Christie parts are designed to fit properly and withstand rated loads. For repair or maintenance service contact W. Christie (Industrial) Limited

3 – TECHNICAL DATA

TOOL	TOOL DESCRIPTION	ALIGNING FORCE
WCA4TM	Mechanical Fixed Flange and Rotational Alignment Tool	4.0 T (40kN) from 50 lbf.ft (67.8 Nm) of torque

4 – FLANGE MISALIGNMENT DETERMINATION PROCEDURE

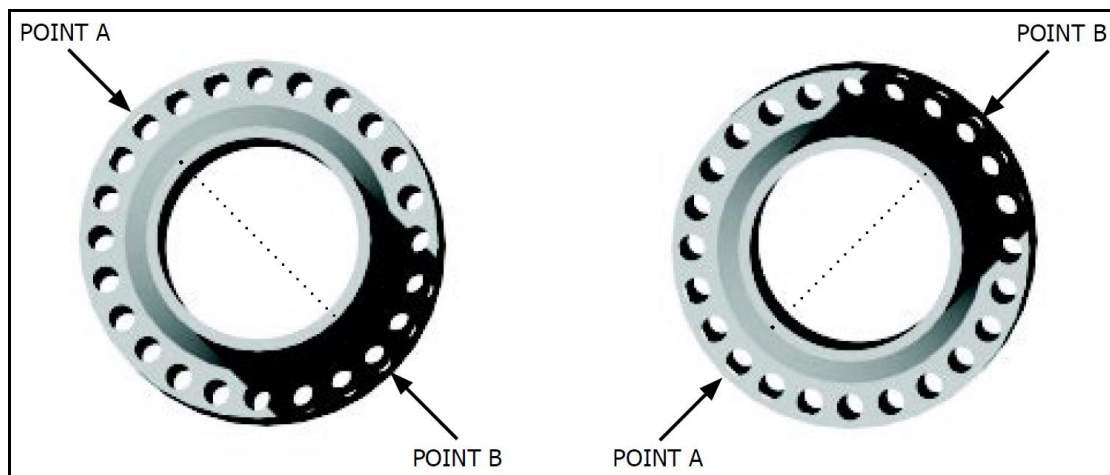
The tool being used must not be attached to a flanged joint prior to the misalignment procedure being carried out.

4.1 LATERAL MISALIGNMENT

- 1) Loosen and remove every second bolt around the flange, continue with this until misalignment occurs.

A flanged joint, once broken down, may spring out of alignment at any point, or in any direction around its circumference. Misalignment may not occur until only a few bolts remain.

- 2) At this point the direction of any misalignment should become obvious. The alignment tool being used should be attached at the maximum point of misalignment (point A or B in the examples shown below) as shown in section 5.3.



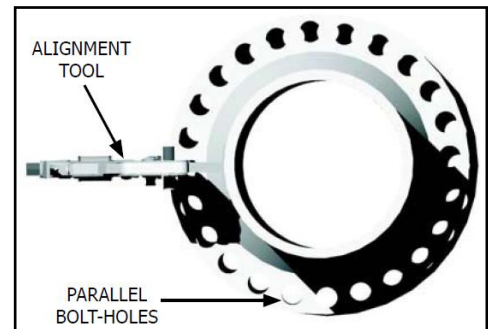
4.2 – ROTATIONAL (TWIST) MISALIGNMENT

If the outer circumference of the flanges are in alignment but the operator is unable to fit the bolt into any two corresponding bolt-holes then rotational misalignment may have occurred.

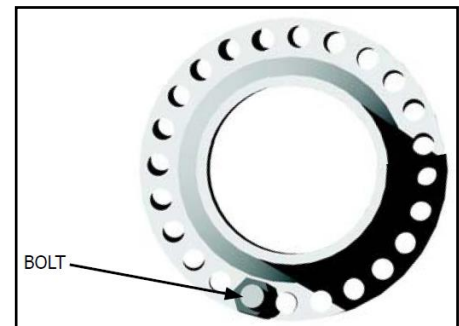
In this case the alignment tool can be attached to the most accessible point as misalignment occurs at all bolt-holes to the same degree.



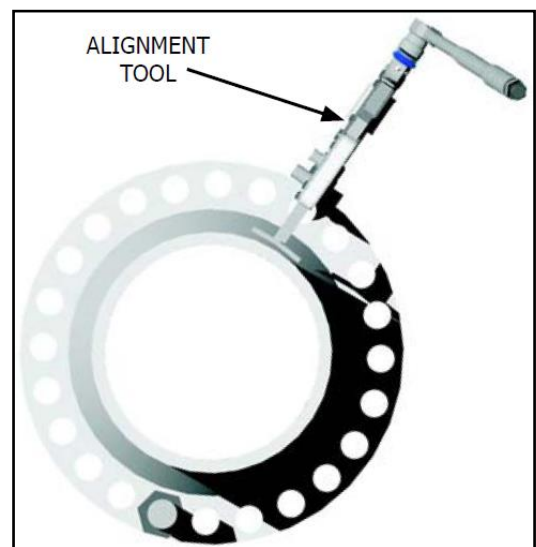
- 1) Attach the alignment tool at the most accessible/convenient point (as shown in section 5.3) and use it to push the flanges out of alignment until one pair of bolt-holes becomes parallel.



- 2) Insert the bolt into the aligned bolt-hole and release the alignment tool. The load will transfer onto the bolt.



- 3) Repeat steps 1 and 2 at other points around the flange until all of the remaining bolt-holes are parallel and the rest of the bolts can be inserted.



5 – WCA4TM MECHANICAL FIXED FLANGE AND ROTATIONAL ALIGNMENT TOOL

5.1 – KIT COMPONENTS

1 x WCA4TM Tool

1 x 50 lbf.ft (67.8 Nm) Torque Wrench with 22mm Socket

1 x Ratchet and Strap

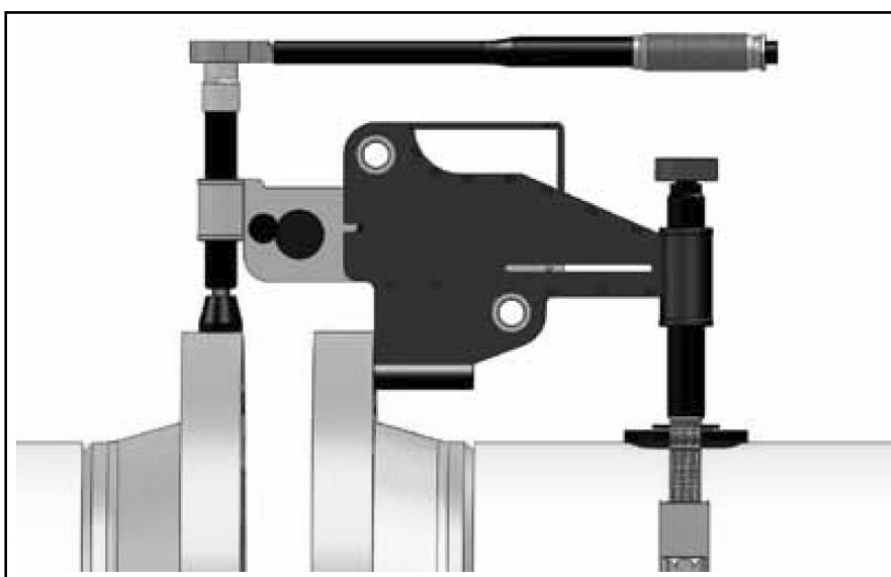
1 x Instruction Manual

1 x Carry Case



5.2 – HOW THE WCA4TM WORKS

- 1) The WCA4TM is secured to the lower of the two flanges by fully inserting the lift hook into the bolt-hole at the point of greatest misalignment.
- 2) The drop leg is adjusted down to the pipe while the tool is held level in the bolt-hole.
- 3) The wing retaining screw is loosened to allow the wing to be extended out.
- 4) The screw bolt is turned clockwise until the friction pad comes into contact with the circumference of the opposite flange.
- 5) The torque wrench is set to 50 lbf.ft (67.8 Nm) (max), attached to the screw bolt and turned to screw down on the flange, bringing the joint into alignment.



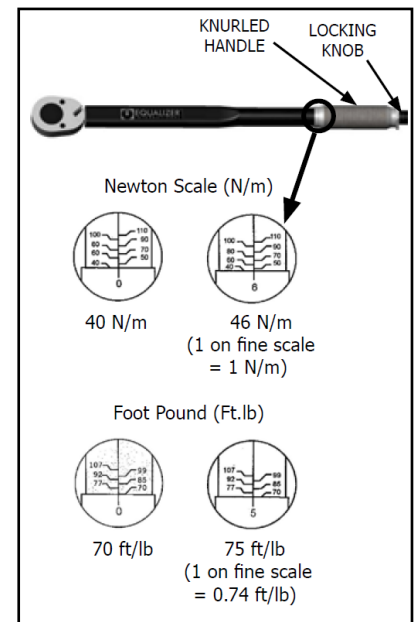
5.3 – INSTALLATION AND OPERATION

HOW TO USE THE TORQUE WRENCH

Balance the wrench in your left hand and unlock the knurled handle by turning the locking knob anti-clockwise. Set the torque amount by turning the knurled handle - see example 40-46 N/m

- 1) Turn the handle till 0 on fine scale reach 40 N/m on base scale
- 2) To set 46 turn handle till fine scale reach 6
- 3) Lock handle by turning the locking knob clockwise

Install the proper socket and attach to the tool. Pull handle till you feel and/or hear the wrench click. Setting of ft/lb scale is done in the same way as above.



Do not pull after the wrench clicks. Use special care at low torque settings. If the wrench has not been used for some time: operate it several times at low torque to allow internal lubricant to recoat. When not in use set to lowest torque setting. Don't turn handle below lowest torque setting. Your torque wrench is a precision measuring instrument and should be treated as such. Clean only by wiping, do not use any type of cleaner which may affect the special internal lubricant with which this wrench is packed at the factory.

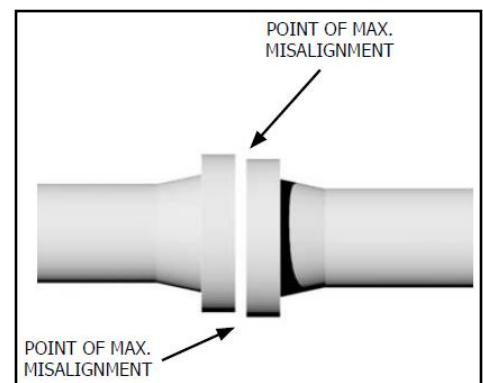


1. Do not attempt to turn the grip while it is locked.
2. Do not turn the grip more than one turn below the lowest scale reading or above the highest scale reading.

INSTALLATION AND OPERATION

- 1) Carry out the Flange Misalignment Determination Procedure (see section 4) to determine the points of maximum misalignment.

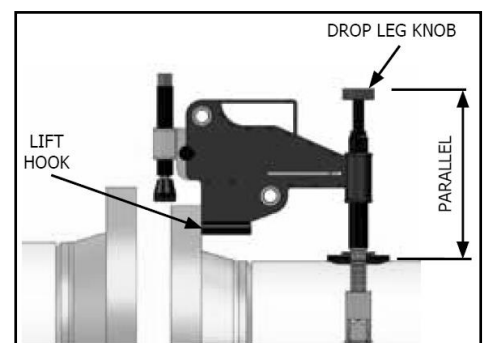
In this example the points of maximum misalignment are at the top and bottom of the joint.



- 2) Guide the lift hook into the bolt-hole at the maximum point of misalignment.

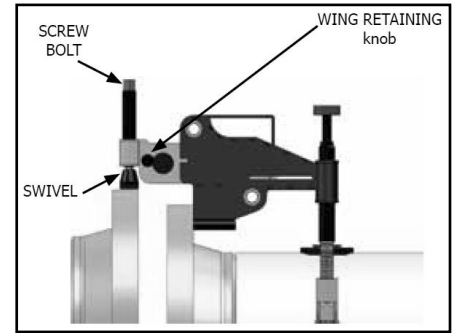
Adjust the drop leg down onto the pipe by turning the adjusting knob in a clockwise direction. The tool should be held up level within the bolt-hole during adjustment.

N.B. The tool must be parallel to the pipe at all times

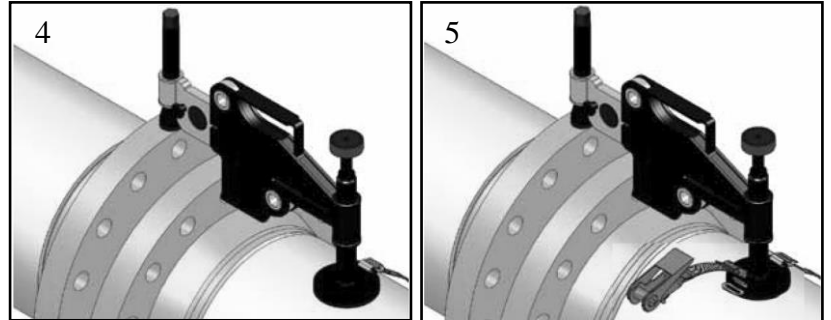


- 3) Loosen the wing retaining knob and extend the wing over to the opposite flange.

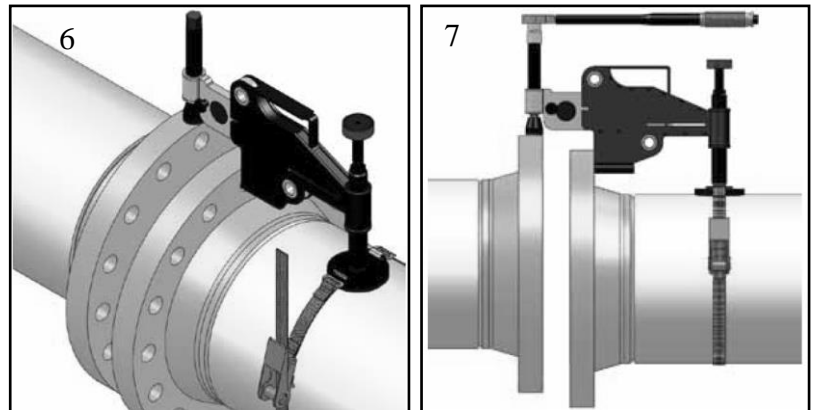
Rotate the screw bolt onto the surface of the opposite flange. Ensure that the tool is sitting level and that the friction pad on the base of the swivel is in full and even contact with the surface of the opposite flange.



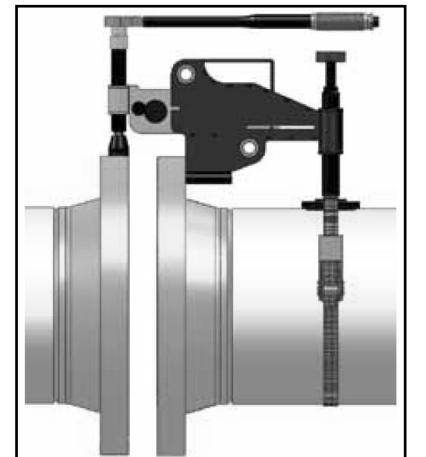
- 4) Attach the hook of the strap through the buckle on top of the base plate as shown.
- 5) Now place the hook of the ratchet mechanism through the opposite side of the buckle as shown.



- 6) Feed the open end of the strap through the ratchet mechanism as shown. Tighten the strap using the ratchet mechanism.
- 7) The torque wrench should be set at 14 ft/lbs (19Nm) then attached to the screw bolt.



- 8) Tighten the screw bolt in a clockwise direction until the flanges come into alignment; or the torque wrench “clicks” If the torque wrench has clicked and the flanges are still mis-aligned adjust the torque wrench up to 24.2 lbf.ft (33 Nm) and continue until a maximum torque wrench setting of 50t/lbs (67.8N/m) is reached or the flanges are aligned.



The maximum safe working load is 50 lbf.ft (67.8 Nm) Exceeding 50 lbf.ft will result in damage to the tool.

- 9) Once in alignment the bolts may be inserted and tightened.

After replacing all of the bolts (apart from the bolt which will go into the bolt-hole in which the WCA4TM is located), remove the tool by reversing steps 2 – 8. Insert the last bolt and tighten.



Care should be taken not to drop any of the component parts when removing them from the flange joint. This action will prevent injuries to either the operator’s lower limbs, or to passers-by.

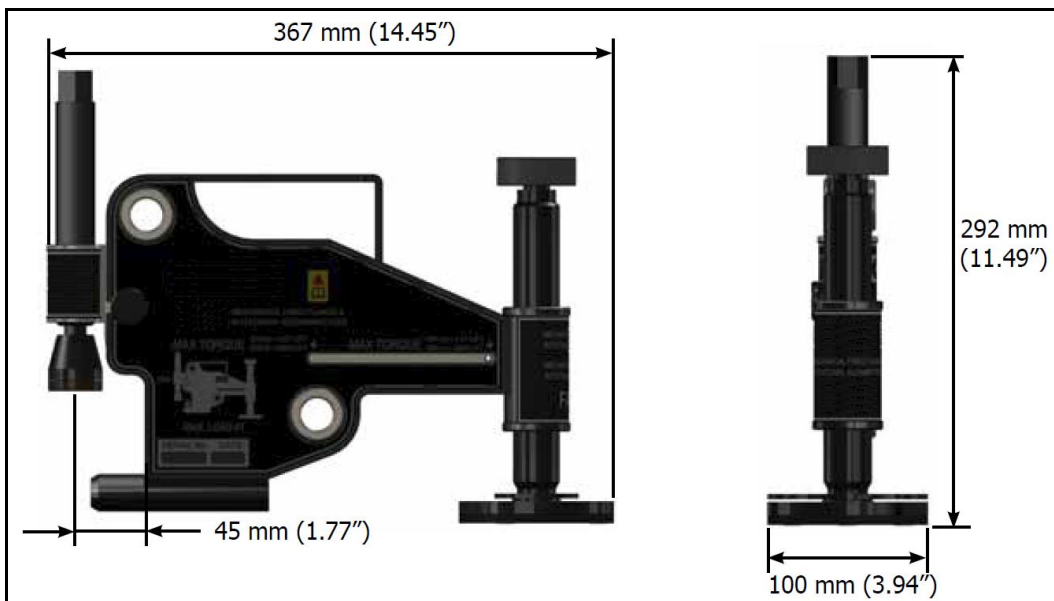
5.4 – WEIGHTS AND DIMENSIONS

WEIGHTS

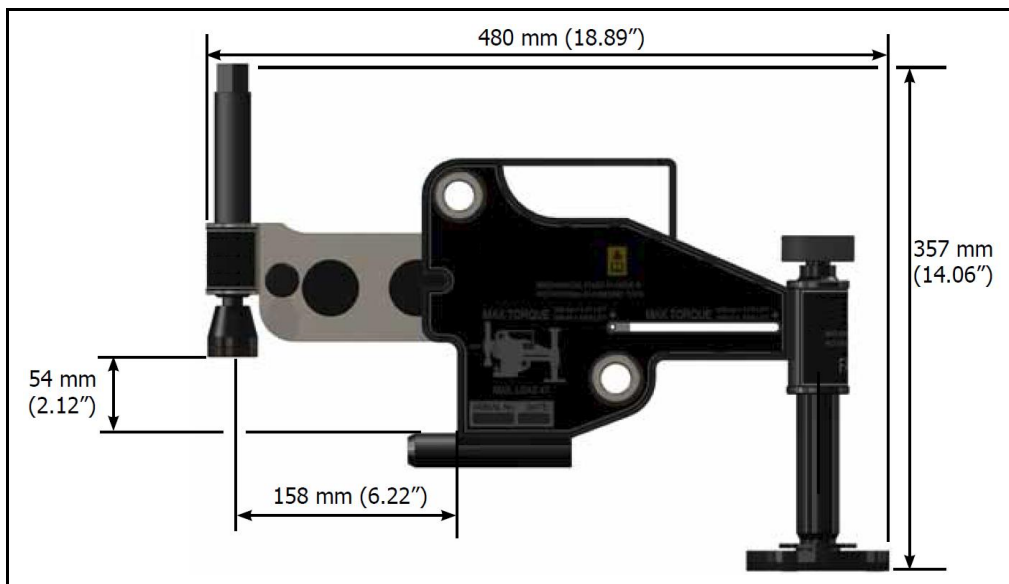
Tool only	= 8.6 kg (18.96 lbs)
Torque Wrench with Socket	= 0.9 kg (1.98 lbs)
Plastic Carry Case	= 2.52 kg (5.55 lbs)
GROSS KIT WEIGHT	= 11.7 kg (25.80 lbs)

OVERALL DIMENSIONS

MINIMUM EXTENSION



MAXIMUM EXTENSION



5.5 – TROUBLESHOOTING

Problem: The thrust plate is sliding in the circumference of the opposite flange as the tool is aligning the joint

- Grit or dirt on wing, rollers or bearings
- Wing is at full extension
- Ensure the rollers are rotating freely and that there is no restriction to the rollers on the wing surfaces such as dirt or grit
- Ensure the wing has sufficient travel left in order to allow the joint to align.

Problem: The tool is attached and appears to be functioning properly, but the joint will not align

- There may be something restricting the joint from aligning.
- The joint may require more than 4 T (40 kN) force to align.
- Check the area around the joint to establish if there is an obstruction to the joint
- If the joint requires more force than that of the 4 T (40 kN) tool, then another method of aligning the joint should be adopted

Problem: The thrust plate is twisting on the circumference of the flange when the screw bolt is tightened

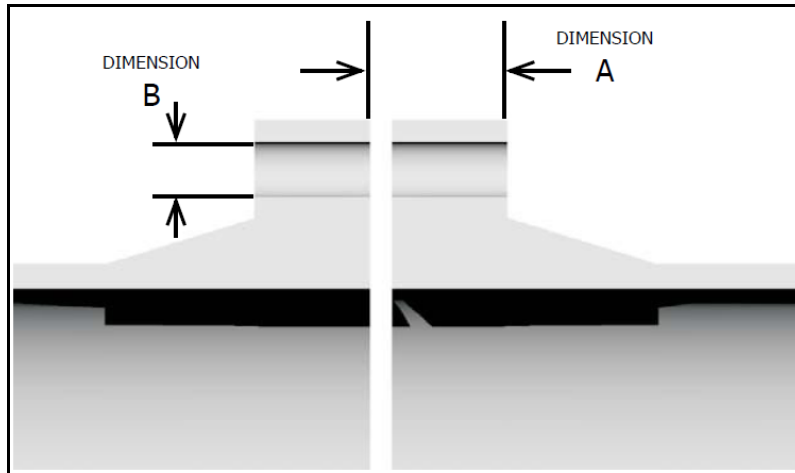
- There may be grit or dirt within the swivel / thrust plate.
- Check that the thrust plate rotates freely. If the thrust plate is not rotating then spray some penetrating liquid into the gap between the swivel and thrust plate in order to loosen it.

5.6 – RANGE OF APPLICATION

MINIMUM AND MAXIMUM FLANGE SIZES

Dimension A: must be between 30 and 133 mm (1.18” and 5.23”)

Dimension B: bolt-hole diameter must be 24 mm (0.95”) or greater



BY FLANGE TYPE, CLASS AND DIAMETER

API	
API STANDARD 605WELD NECK FLANGES	API TYPE 6BXWELD NECK FLANGES
150# 34" THRU 60"	10,000# 2 9/16" THRU 5 1/8"
300# 26" THRU 36"	15,000# 1 13/16" THRU 4 1/16"
	20,000# 1 13/16" THRU 3 1/16"
API TYPE 6BINTEGRAL FLANGES	API TYPE 6BXINTEGRAL FLANGES
10,000# 2 9/16" THRU 21 1/4"	2000# 3 1/2" THRU 21 1/4"
15,000# 1 13/16" THRU 13 5/8"	3000# 2 1/16" THRU 16 3/4"
20,000# 1 13/16" THRU 9"	5000# 2" THRU 9"

BS 3293	
SLIP-ON FLANGES	WELD NECK FLANGES
150# 26" THRU 48"	150# 26" THRU 48"
300# 26" THRU 36"	300# 26" THRU 36"
400# 26" THRU 32"	400# 26" THRU 32"
600# 26" ONLY	600# 26" ONLY
SLIP-ONFLANGES RTJ	WELD NECKFLANGES RTJ
300# 26" THRU 36"	300# 26" THRU 28"
400# 26" ONLY	400# 26" ONLY

ANSI B 16.5		
LAP JOINT FLANGES	THREADED FLANGES	WELD NECK FLANGES
150# NULL	150# 8" THRU 24"	150# 10" THRU 24"
300# 12" THRU 24"	300# 8" THRU 24"	300# 8" THRU 24"
400# 10" THRU 24"	400# 3 1/2" THRU 24"	400# 3" THRU 24"
600# 8" THRU 24"	600# 3 1/2" THRU 24"	600# 3 1/2" THRU 24"
900# 5" THRU 24"	900# 1" THRU 20"	900# 1" THRU 20"
1500# 4" THRU 16"	1500# 1" THRU 10"	1500# 1" THRU 10"
2500# 2" THRU 10"	2500# 1" THRU 6"	2500# 1" THRU 6"
SLIP-ON FLANGES	SOCKET WELD FLANGES	
150# 10" THRU 24"	600# 3 1/2" THRU 24"	1500# 1" THRU 2 1/2"
300# 8" THRU 24"	900# 1" THRU 20"	
400# 3" THRU 24"	1500# 1" THRU 2 1/2"	

If the flange to be aligned is not listed please use the Minimum and Maximum Flange Sizes guide above



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