



Flow Solutions Division

Improve Process Equipment Reliability and Performance with Flowserve Tools

Getting the maximum life out of your rotating equipment can sometimes be a frustrating challenge. Frustrating because when pumps break down, it costs you money. Lost production, more labor, and more money spent on replacing parts.

That's why we put together the Flowserve Tool Box. These precision tools were custom designed to help you get the most out of your rotating equipment.



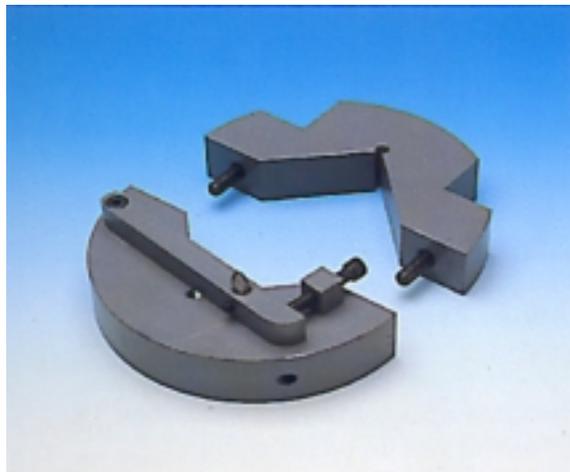
Shaft alignment kit



Pump inspection kit



Static test rigs for mechanical seals



Stuffing box facing tools

Shaft Alignment Kit

If you are still using a straight edge to align your pump and motor, you may be unknowingly sending your seal, coupling, and bearings to an early grave. Even the most eagle-eyed maintenance person can't get two shafts to within 0.020" using a straightedge.

The Reverse Dial Indicator Alignment Kit puts an end to premature equipment failure due to misalignment. This precision alignment kit was developed to fit the special needs of rotating equipment maintenance personnel. It is *not* a hardware store offering. Using this kit, you will be able to compensate for all major types of misalignment in a matter of minutes. This comprehensive tool kit comes complete with everything you need to conduct a precision alignment on small frame ANSI pumps all the way up to equipment with 4⁵/₈" shaft diameter and 12 inch coupling spans: a mag base, four way level, tape measure, an easy to use instruction manual, alignment worksheets and a rugged carrying case.

Also contact Flowserve for information on high quality pre-cut stainless steel shims and a hand held alignment computer for precision coupling alignment.

Measuring Tool Kit

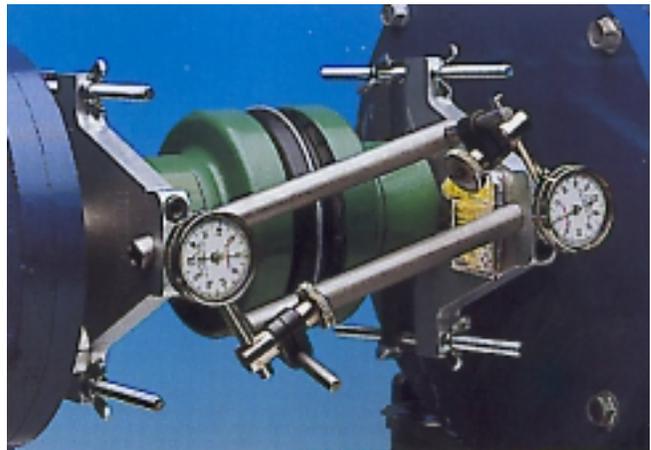
How many times do you need to borrow or locate the precision measuring instrument or tool you require during the overhaul, repair or retrofitting of your equipment? The Flowserve Measuring Tool Kit provides a conveniently packaged combination of instruments and tools in a professional carrying case. This kit contains the following items:

- 6 inch Electronic Vernier Caliper
- 12 inch firm joint Machinists OD and ID Calipers
- Tape Measure
- Thickness (Feeler) Gages
- 6 inch Stainless Steel Scale
- Starrett Tools and Rules Manual

Use of this kit will ensure the accurate measurement of shafts, sleeves, bearings, wear rings, seal chamber dimensions, bolt circles, and the proper setting of impeller clearances as well as other critical tolerance areas of your equipment in order to keep your equipment in the best running condition possible.



Shaft alignment kit



Measuring tool kit



Pump Inspection Kit

Proper shaft alignment and seal installation alone won't ensure optimum performance from your rotating equipment. There are many other factors that can greatly reduce mean time between pump maintenance. Skilled rotating equipment specialists should know how to detect these important equipment performance characteristics. See illustrations at right.

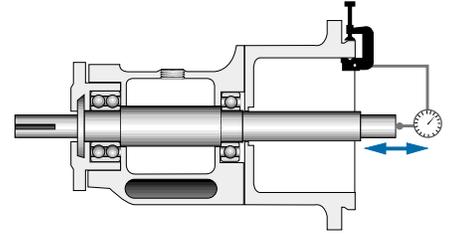
Any of these conditions can lead to poor performance including bearing or seal failure. They're usually caused by wear, improper fits or corrosion. However, the proper tools can detect these problems and let you take corrective action before major problems occur.

The Flowserve Pump Inspection Kit contains everything you need to test for all five harmful conditions with speed and accuracy. The tools were custom designed to fit shaft sizes up to 3 1/2". A professional carrying case has a precut insert for all components and includes complete inspection and instruction materials.



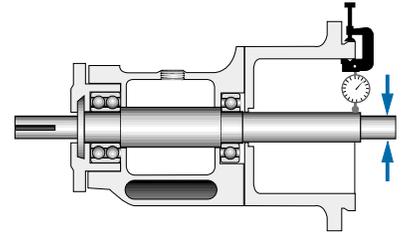
Shaft End Play

What to watch for: worn or loose thrust bearings allow axial movement of the shaft which will, in turn, over or under compress the seal. Also, it can cause pin wear and fretting damage to the sleeve.



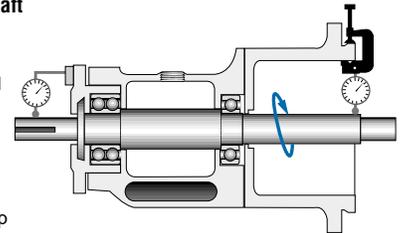
Shaft Whip or Radial Deflection

What to watch for: worn or loose radial bearings cause deflection and misalignment of the seal. This shortens seal life by overworking the drive and spring members.



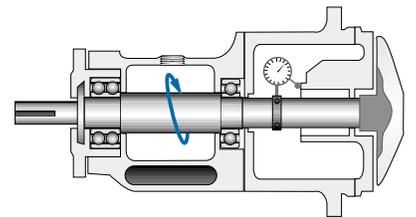
Shaft Run-Out or Bent Shaft

What to watch for: run-out causes face wipe. Excessive wipe, affected by seal size and shaft speed, causes leakage which in an emission sensitive liquid is not acceptable. With the shaft drive end bent, you can expect pump and motor bearing problems as well as coupling wear.



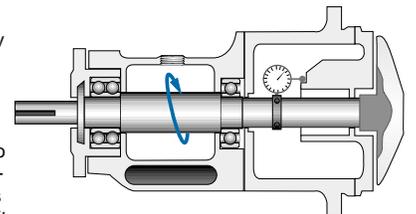
Stuffing Box to Shaft Perpendicularity

What to watch for: a lack of perpendicularity will overwork a seal to the point of premature failure. The drive, secondary seal (fretting) and spring mechanism can all be points of wear.



Gland Register or Stuffing Box Concentricity

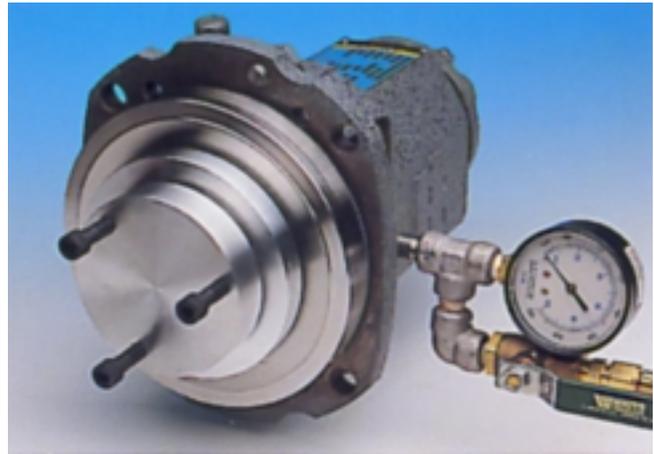
What to watch for: in many cases a lack of concentricity is not a major problem but, it can be. Particularly if a pumping device is incorporated in to the seal. Because it sometimes is a critical area, it is good practice to consider it always critical.



Static Test Rig for mechanical seals

How many times have you seen a mechanical seal leak at pump start-up? In addition to costly and dangerous spills, a lot of time can be wasted repeating the pump and piping disassembly and reassembly procedure.

Now there's a fast and easy way to test the reliability of your mechanical seal installation on the bench, without the pump case. The Flowserve Static Test Rig. Simply replace the impeller with the test rig. The double O-ring design will ensure a flush and airtight fit. Then all you do is pressurize your sealed pump with shop air, dry nitrogen, water, etc. You'll know instantly if your single or tandem seal has been installed correctly if it maintains pressure.

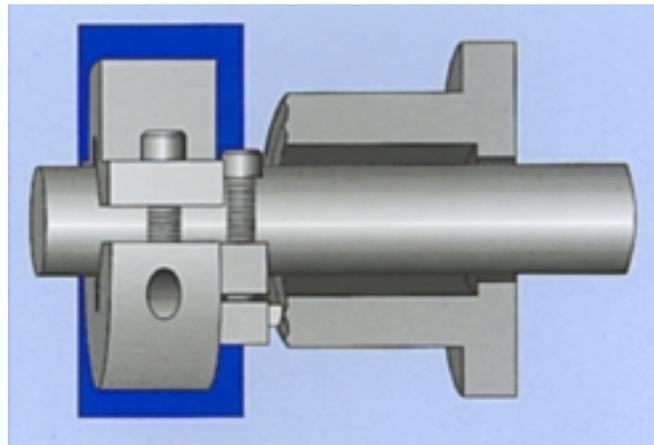


Stuffing Box Facing Tool

Nothing cuts seal life faster than a stuffing box face that isn't perpendicular to the shaft. It's a tolerance that's rarely checked by craftsmen when reassembling pumps. For maximum seal life, most seal manufacturers recommend that this tolerance not exceed .003" Full Indicator Movement (FIM).

Do you have horizontal split case pumps or vertical shaft pumps that were purchased with mechanical packing and the stuffing box face was never machined? Or how about a stuffing box face that is rough, uneven or corroded?

The Flowserve Stuffing Box Facing Tool will help you eliminate this problem. The convenient split design fits neatly around the shaft and allows you to square-up the stuffing box face without disassembling the pump. This easy-to-use tool is available in four sizes to fit shaft diameters from .875" to 6.375".



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Primary Worldwide Flow Solutions Division Locations

Licensees, authorized agents, and affiliated companies located worldwide.

United States	Canada	Netherlands	Argentina	Australia
Kalamazoo, MI Phone 616-381-2650 Fax 616-381-8368	Edmonton, Alberta Phone 780-463-7958 Fax 780-450-1241	Scarborough, Ontario Phone 416-292-2877 Fax 416-292-5190	Roosendaal Phone 31-165-581400 Fax 31-165-552622	Villa Martelli Phone 54-11-4790-6800 Fax 54-11-4709-7072
Singapore	Mexico	Brazil	Japan	Germany
Phone 65-746-4318 Fax 65-747-1963	Tlaxcala Phone 52-2-461-6791 Fax 52-2-461-6847	Sao Paulo Phone 55-11-4066-8600 Fax 55-11-4066-7014	Osaka Phone 81-720-85-5571 Fax 81-720-85-5575	Dortmund Phone 49-231-6964-0 Fax 49-231-6964-248