

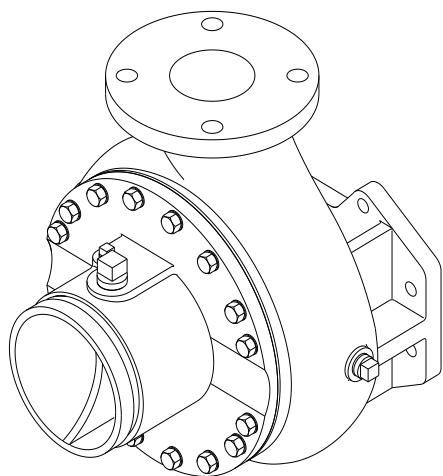
CG Series Centrifugal Fire Pumps

Operation and Maintenance

Form No.	Section	Issue Date	Rev. Date
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Read through the safety information and operating instructions carefully before using your Waterous Fire Pump.

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Mechanical Seal

If a mechanical shaft seal is used, no adjustment is required. When the pump operates, the water being pumped cools and lubricates the shaft seal to prevent it from overheating.

CAUTION

Prolonged dry pump operation or operating a dry pump at high speeds will reduce the life of the mechanical seal.

Packing – Braided Flexible Graphite (BFG) (Not Available After 2/4/05)

Waterous uses a braided graphite fiber, with reinforced flexible graphite yarns and high purity graphite filament yarns that appear on the corners as well as throughout the body of the packing. The graphite reinforcement allows the flexible graphite yarns to provide greater tensile strength.

This type of packing reduces the frictional heat created between the shaft and the I.D. of the packing. By dissipating the heat through the cross section of the packing, the heat is transferred to the packing gland and the pump body.

Packing Removal

⚠ WARNING

**Truck movement hazard.
May cause serious personal injury.**

Stop engine, set the parking brake and chock the wheels before going under truck to remove packing.

1. Remove the unbalanced nuts, flat washers and packing gland halves from one end of the pump.
2. Engage the pump per appropriate operating instructions. Operate the pump, gradually increasing the discharge pressure until the packing is forced out of the stuffing box. Pressure in excess of 300 psi (20.7 bar) may be required.

⚠ WARNING

Packing Gland and Pump Body Temperature Hazard. May result in serious burns.

Heat is dissipated through the cross-section of the packing, transferring the heat to the packing gland and pump body.

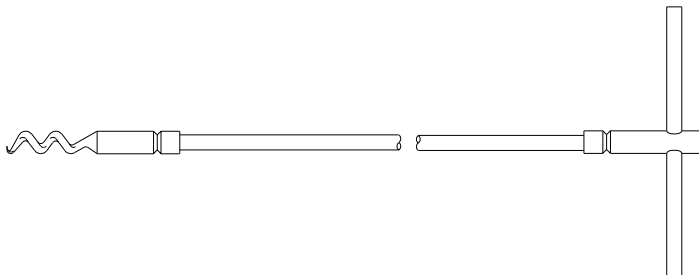
CAUTION

**Pump overheating hazard.
May cause damage to the pump.**

Circulate enough water through the pump to prevent overheating. Do not pressurize the pump over the rated maximum discharge pressure of the pump.

3. If all the packing is not forced out, it may be necessary to remove the remaining packing by hand, using a pick or similar device. Waterous has a packing removal tool (P/N 5782) available for this purpose, see Figure 8.
4. Replace packing per instructions below.

Figure 8. Packing Removal Tool



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Packing Installation

1. Before installing the new packing, be sure that all of the old packing is removed from the stuffing box.
2. Be sure that the stuffing box and the shaft are clean and free of any packing residue.
3. Lightly lubricate the packing ring I.D. and O.D. with mineral oil, automotive grease or engine oil for installation purposes.
4. Make sure the packing is clean.
5. Carefully install one ring of packing. With the aid of packing glands, push the packing into the stuffing box as far as possible. Repeat this operation with each ring, staggering the joints at least 90° apart. Install the packing rings until the top of the last ring is about 1/4 inch from the end of the stuffing box (at least 1/8 inch is required for the packing gland nose entrance into the stuffing box), see Figure 9.

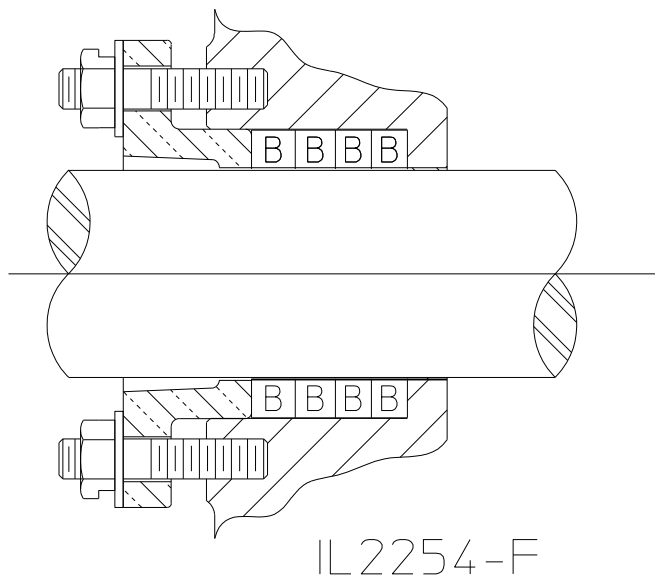
NOTE: Be sure that the packing joints are staggered at least 90° apart.

6. Install packing glands, nuts and washers. Tighten gland nuts one flat beyond finger tight, see Figure 9.

NOTE: The milled slot on the nut should face the gland.

7. Adjust packing as required per instructions below.

Figure 9. Packing and Gland Installation



Packing Adjustment

The pump packing is designed and adjusted to drip slightly during operation. This is to cool and lubricate the packing. It is desirable to adjust the stuffing box to maintain a leakage rate of 10 to 120 drops per minute when operating at a discharge pressure of 150 psi (10.3 bar).

Leakage through the braided flexible graphite (BFG) packing may be at zero or diminish to zero leakage and may not respond to loosening of the packing nuts to restore leakage, see Adjustment Step 3. While the packing gland and stuffing box and pump body may reach high temperatures during this time, the impeller shaft will be protected from heat damage.

CAUTION

**Pump overheating hazard.
May cause damage to the pump.**

Circulate enough water through the pump to prevent overheating.

⚠ WARNING

**Truck movement hazard.
May cause serious personal injury.**

Stop engine, set the parking brake and chock the wheels before going under truck to adjust packing.

1. Engage pump per appropriate operating instructions. Operate the pump at the capacity pressure shown on the serial plate for ten (10) minutes.

CAUTION

Observe the stuffing box drip rate from the side of the truck.

2. Observe leakage. Normal leakage is 10–120 drops per minute.
3. If drip rate is considered high, stop the engine and tighten the packing gland nuts 1/2 to 1 flat (maximum of 1/6 of a revolution). Make appropriate adjustments starting with 1 flat, when approaching the final adjustment reduce to 1/2 flat. This reduces the possibility of over tightening. **Tighten the gland nuts equally to ensure that the packing gland goes on straight.** Gradually reducing leakage during the first hour of operation will result in a better seal over a longer period of time.

CAUTION

Stopping the leakage entirely at this point will cause the packing to overheat.

4. Operate the pump at the capacity pressure shown on the serial plate for two (2) minutes to let packing run in, then observe the drip rate.

 **WARNING**

Packing Gland and Pump Body Temperature Hazard. May result in serious burns.

Heat is dissipated through the cross-section of the packing, transferring the heat to the packing gland and pump body.

5. Repeat steps 3 and 4 until the drop rate is acceptable.

NOTE: After adjusting the packing, the pump must pass the following vacuum test described on the next page.

Vacuum Test

1. Remove all caps except openings without valves. Close all discharge, intake and drain valves and other similar openings. Operate priming device to create a vacuum of about 22 in. Hg/.735 atmosphere in pump, then stop primer and engine.
2. Watch the pressure gauge; if vacuum drops more than 10 in. Hg/.334 atmospheres in five (5) minutes, listen for air leaks around the packing gland, gaskets, valves, etc.
3. Replace gaskets, re-adjust packing, repack or otherwise repair source of trouble.
4. Repeat test.

Overheat Protection Manager

Check the electrical circuit by pressing the test button located on the panel plate every 100 hours of pump operation or every six months, whichever comes first. If the light

does not flash, the light bulb or flasher may need replacement (provided all wire connections are solid).

Butterfly Valve (BFV)

Operate valve once a week for optimal performance.