Application Note to the Field	Lubrication of Bearings
Application Note Number: 0006-1	**Date:** June 1, 2000; Revised Sept. 2022

The gear pump's sleeve bearings are lubricated by the process fluid. The pumps should be operated with a minimum differential pressure of 15-20 PSI to ensure that the bearings are completely flooded with fluid. During pump operation, the bearings impart some heat to the fluid. This heat is removed by natural convection, as it rises and exits towards the top and is replaced by cooler fluid at the bottom. The circulation through the containment can works in a similar manner.

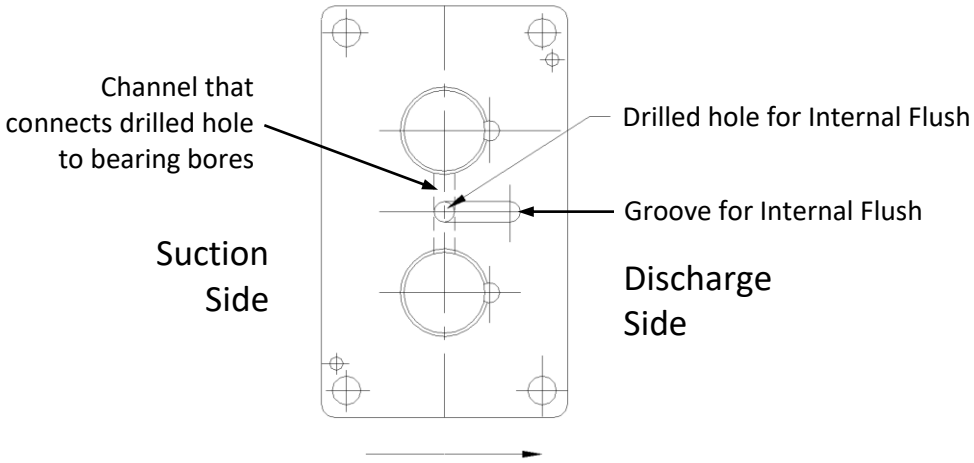
In most cases, the above is sufficient, but for others, it can be advantageous to have a positive flow across the bearings via a "bearing flush." A bearing flush has the following purposes, all of which can increase pump performance and extend the operating time before maintenance is required:

1. To increase lubrication for very thin fluids when hydrodynamic film lubrication is non-existent
2. To increase lubrication for extremely thick fluids where flow across the bearings is insufficient
3. To prevent "churning" of latex-based compounds
4. To flush glue or hard to clean materials from the pump

There are two bearing flush options available for the H-Series and 3-Series gear pumps: Internal and External.

Internal Bearing Flush Option: This is where the front and rear housings are specially machined (see diagram below) to establish a pressure differential across the bearings and containment can (in the case of a mag-drive pump). This is done by exposing them to the high pressure discharge side of the pump. Each bearing and the containment can is then seeing a differential pressure across it of about half that across the pump. There is no additional piping required to utilize this feature.

This option is useful when a bearing flush is needed and the system will be line-flushed. Be careful to select a pump made with materials that are compatible with the flushing agent.



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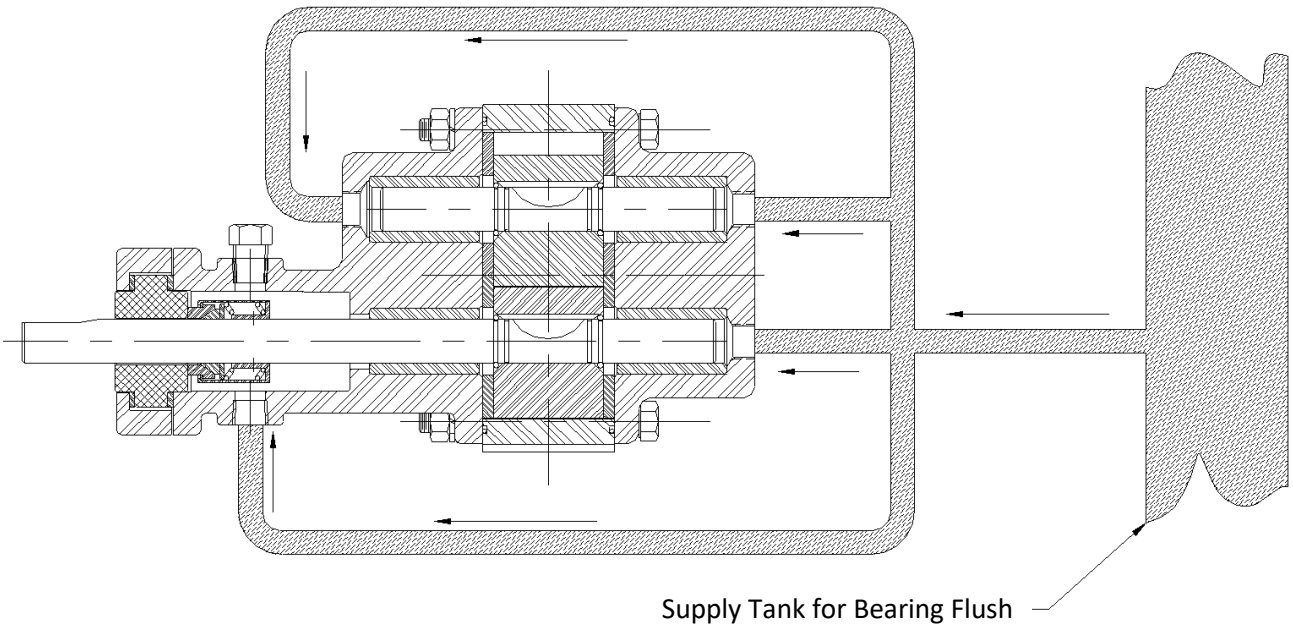
Liquiflo Application Note to the Field: Lubrication of Bearings

External Bearing Flush Option: This can be done when "bearing flush plugs" are ordered with a pump (flush plugs are standard for the larger models, H12/312 and H14/314). Tubing can then be routed from the discharge pipe to the tapped plug holes. This has about the same effect as the internal bearing flush, with an important distinction: it can be removed, and can even be controlled with the use of small valves. There is, however, more potential for leakage and more piping is required.

This option is useful when clean, filtered fluid is required to keep particles out of the bearing-shaft interfaces or when no line flush is available, but the pump needs to be cleaned at the end of the day. This is accomplished with an external reservoir, as shown below.



A bearing flush can be used to provide better lubrication and heat dissipation at lower viscosities, or to allow the bearings and containment can to flood more quickly at higher viscosities.

It is important to note that the flush is using some of the pump's output to achieve this internal lubrication (adding to slip). For this reason, at lower viscosities and/or higher pressures, it is important to be sure that the slip is not too high a portion of the total displacement. In the larger pumps this is seldom a problem, but in the smaller ones (primarily the H1/31/41 thru H5F/35F/45), it can be. This is because the internal flush passages pass basically the same amount of fluid across all the sizes (dependent upon differential pressure and viscosity) and so the percentage of bypass flow gets larger the smaller the pump is.

A bearing flush can be especially helpful in the H12/312 or H14/314 using the MCJ magnetic coupling and running above about 700 RPM.

Please contact the factory for advice on whether this feature should be used for specific applications. Required information to determine this is the following: the pumped fluid, flow rate or pump and operating speed, viscosity, temperature and differential pressure.