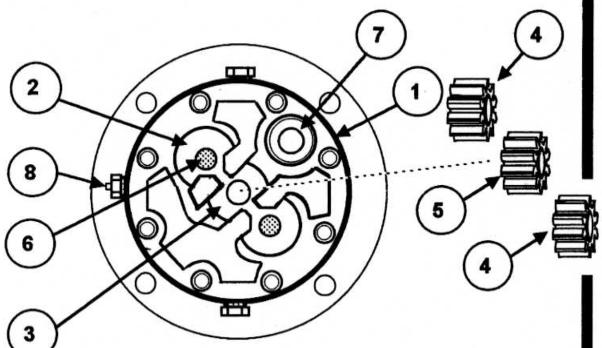
HOW DOES THE SMITH PUMP WORK?

MODEL "GC-1LZ"



(1) MAIN HOUSING
(2) IDLER GEAR POCKET
(3) DRIVE GEAR POCKET
(4) IDLER GEAR WITH BUSHING
(5) DRIVE GEAR
(6) IDLER GEAR SHAFT
(7) INTERNAL BYPASS VALVE (TO 150 PSID)
(8) LEAK DETECTION PORT WITH RELIEF FITTING INSTALLED

These drawings of this fractional HP motor-mounted Smith pump, model "GC-1LZ" (13 USGPM), show how supplied liquid is simultaneously directed into four pumping chambers. Each chamber is strategically positioned to maintain axial and radial forces at equilibrium, and also to reduce internal flow resistance. The flow path, illustrated to the right, proceeds as follows:

(1) The liquid enters the main housing through the inlet on the left-hand side.

(2) The flow is divided between two supply channels (white cavities) which also correspond with matching channels inside the gear end cover.

(3) Each channel feeds liquid into two series of rotating pumping chambers, formed between the diameter of the gear bore and the gear teeth: one around each driven gear, and one on each side of the drive gear. These are incorporated within the three circular white areas as shown in the drawing to the right.

(4) The flow passes through four exit chambers, in the direction of the four small arrows as illustrated to the right. These chambers direct liquid into two exit channels (dark areas), which also correspond with matching channels inside the gear end cover.

(5) These channels discharge into the exit cavity within the main housing. From this point, the liquid exits through the 3/4" left-hand outlet port as illustrated, directly opposite the 3/4" inlet port.

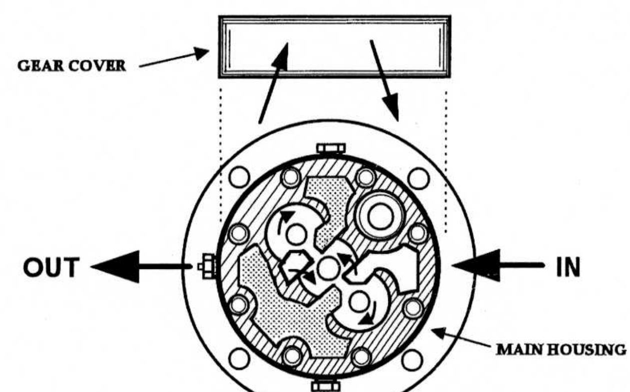
The Smith model "GC-1LZ", utilizes one drive gear and two idler gears. These are its three, simple working parts, two of which are identical. In a sense, this model is "two-pumps-in-one", eliminating excessive weight, size, and wasted energy. The application of turning force, or torque, is applied to each gear so the pressures match on diametrically opposite meshing teeth, causing negligible bearing loads, even while building substantial pressure. This allows for the construction of a continuous-duty rotary gear pump of exceptional capacity and efficiency for its size, equipped with a few simple, rugged working parts which have very little wear potential.

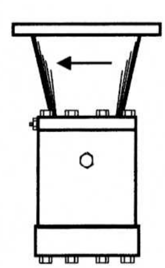
Theoretically, such a design is capable of handling fluids at any pressure without increases in shaft bearing loads, and therefore, there is no need for special efficiency-robbing internal lubrication flow channels, special external lube devices, thrust plates, balancing holes, etc..

During cold weather, the amount of vapor in the pump naturally increases as frictional heat is absorbed by the handled fluid. It is important to note that the internal functioning of the Smith pump does not produce frictional heat in the intake areas, or in the pumping chambers, as do other positive-displacement makes. The minor contact friction produced by gear meshing occurs *after* the liquid leaves the pumping chambers, and has no ill effects on their capabilities. Taking into account the thermodynamic properties of liquefied gases, such as L.P. Gas, as long as there is sufficient NPSHA provided by the installation, low pressure and temperature do not adversely affect the handling efficiency of Smith pumps.

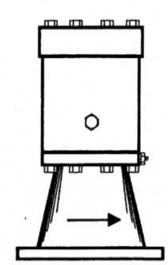
Should abrasive particles be present in the fluid, the pumping action forces most of them to flow harmlessly around, not through, the gears. Proper choice of very tough materials keeps abrasive wear to a tolerable level. Smith pumps are known for low particulate generation under all conditions, even with liquefied gases. They not only have been used successfully in continuous automotive fueling, but also in ultra-critical cleaning operations with alcohols and other industrial solvents.

GEAR COVER END VIEW





FACING GEAR COVER END, ROTATION IS COUNTERCLOCKWISE.



FACING DRIVE SHAFT END, ROTATION IS CLOCKWISE.