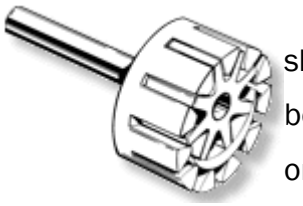
Internal Gear Pump

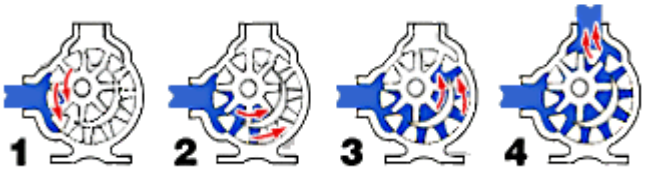
Internal gear pumps are exceptionally versatile. While they are often used on thin liquids such as solvents and fuel oil, they excel at efficiently pumping thick liquids such as asphalt, chocolate, and adhesives. The useful viscosity range of an internal gear pump is from 1cPs to over 1,000,000cP.

In addition to their wide viscosity range, the pump has a wide temperature range as well, handling liquids up to 750°F / 400°C. This is due to the single point of end clearance (the distance between the ends of the rotor gear teeth and the head of the pump). This clearance is adjustable to accommodate high temperature, maximize efficiency for handling high viscosity liquids, and to accommodate for wear.



The internal gear pump is non-pulsing, self-priming, and can run dry for short periods. They're also bi-rotational, meaning that the same pump can be used to load and unload vessels. Because internal gear pumps have only two moving parts, they are reliable, simple to operate, and easy to maintain.

How Internal Gear Pumps Work



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1. Liquid enters the suction port between the rotor (large exterior gear) and idler (small interior gear) teeth. The arrows indicate the direction of the pump and liquid.
2. Liquid travels through the pump between the teeth of the "gear-within-a-gear" principle. The crescent shape divides the liquid and acts as a seal between the suction and discharge ports.
3. The pump head is now nearly flooded, just prior to forcing the liquid out of the discharge port. Intermeshing gears of the idler and rotor form locked pockets for the liquid which assures volume control.
4. Rotor and idler teeth mesh completely to form a seal equidistant from the discharge and suction ports. This seal forces the liquid out of the discharge port.

Advantages

- Only two moving parts

Disadvantages

- Usually requires moderate speeds

- Only one stuffing box
- Non-pulsating discharge
- Excellent for high-viscosity liquids
- Constant and even discharge regardless of pressure conditions
- Operates well in either direction
- Can be made to operate with one direction of flow with either rotation
- Low NPSH required
- Single adjustable end clearance
- Easy to maintain
- Flexible design offers application customization
- Medium pressure limitations
- One bearing runs in the product pumped
- Overhung load on shaft bearing

Applications

Common internal gear pump applications include, but are not limited to:

- All varieties of fuel oil and lube oil
- Resins and Polymers
- Alcohols and solvents
- Asphalt, Bitumen, and Tar
- Polyurethane foam (Isocyanate and polyol)
- Food products such as corn syrup, chocolate, and peanut butter
- Paint, inks, and pigments
- Soaps and surfactants
- Glycol

Materials of Construction / Configuration Options

- **Externals (head, casing, bracket)** - Cast iron, ductile iron, steel, stainless steel, Alloy 20, and higher alloys.

- **Internals (rotor, idler)** - Cast iron, ductile iron, steel, stainless steel, Alloy 20, and higher alloys.
- **Bushing** - Carbon graphite, bronze, silicon carbide, tungsten carbide, ceramic, colomony, and other specials materials as needed.
- **Shaft Seal** - Lip seals, component mechanical seals, industry-standard cartridge mechanical seals, gas barrier seals, magnetically-driven pumps.
- **Packing** - Impregnated packing, if seal not required.

Source : http://nprcet.org/e%20content/mech/FMM.pdf