PERFORMANCE THROUGH REVOLUTION

Dynamatic® has a complete range of gear pumps for both mobile and industrial market segments. Dynamatic® developed these pumps in technical collaboration with DOWTY Hydraulic units Limited, U.K.

Complete Range

Dynamatic® gear pumps are available in four frame sizes giving displacements from 1.23 cc / rev. to 151.0 cc/ rev. Pumps are also available in Tandem Configurations and the company specializes in supplying units to special order instructions (subject to quantity) including multiple section pumps.

High Efficiency

High volumetric efficiency produced by Dynamatic® pumps are achieved in part by careful attention to the control of gear tip leakage. The body to gear geometry is arranged such that during the running-in test cycle, to which every unit is subjected, the gears cut perceptible tracks in the body. These results in virtually zero clearance between the gear tips and body producing a near perfect tip seal under running conditions.

Floating composite bushes are used in Dynamatic® pumps, which house the bearing liners and provide a face seal to the gears. This efficient seal is achieved by pressure loading precise areas of the bush rear face with fluid at working pressure. Special features are incorporated in the bush sealing face to compensate for operating variables such as pressure, speed and temperature. The Dynamatic® pressure balancing system ensures a minimum net load on the bush bearings for high mechanical efficiency, while at the same time varying the pressure distribution across the bush faces with the change in system pressure, thus contributing to high volumetric performance.

Performance

DU lined / bimetal bearings are used to sustain high journal loads when operating at 210 Kg/cm^2 and speed upto 3500 RPM. Dynamatic® has developed special journal surface finishes and treatment, to obtain maximum benefits from these bearing configurations.

Low pressure bearing lubrication is a feature of all Dynamatic® Pumps. This is achieved by utilising the expression generated when the gear teeth separate to draw lubricating fluid from the inlet port and along each bearing journal by way of passage in the composite bush. This proven system ensures efficient cooling and lubrication of the bearings with a constant supply of fluid, independent of operating conditions.

Durability

High tensile aluminum alloy bodies are used throughout the range to ensure uniformity in material properties and maximum fatigue strength. Through – body bores enable precise alignment of the bearings and hence maximum bearing load capacity. Careful attention to machining details and surface finishes, holds wear rates to a minimum and promotes an extended operating life.

Dynamatic® Pumps have been designed to perform with a wide range of fluids and can be supplied with either Nitrile or Viton seals as standard.

APPLICATION DATA

DRIVES

Use of flexible coupling is recommended to accommodate any slight misalignment of shaft and to dampen vibration.

The user should work closely with the coupling manufacturer in selecting and applying a suitable coupling. Drives should be arranged so that the shaft is protected from all axial and radial loads. The coupling should allow a minimum of 0.25mm radial movement and should impose little or no end load. Splines must allow sufficient radial movement.

A large angle between the drive and connecting shafts should be avoided (10^0 max.). Splined shaft units may be plugged directly into a rigidly supported mating part, only if the concentricity between the female spline and pilot diameter is better than 0.12 mm T.I.R. In case where manufacturing tolerances exceed this figure, the application should be referred to our Technical Sales Department. When flexible couplings, gears, Vee or toothed timing belts are to be used, the coupling half, gear or pulley, should be secured to the drive shaft.

If this is not possible, continuous lubrication to the shaft must be provided to maintain maximum life. This can be done by flooded lubrication, oil mist lubrication or by applying a molybdenum disulfide based grease during initial assembly.

Side loads by indirect drives can be accommodated, but allowances must be made for the extra side load that these drives impose on the pump bearings. In general larger the gear, sprocket, or pulley diameter and the closer this is to the pump-mounting flange, lesser the load on the bearings. However, the loading must be carefully calculated and should be referred to our Technical sales Department.

Both parallel and taper shaft units are supplied with a shaft key. The parallel shaft keys must be hand-fitted when the coupling is assembled. On no account must the key or coupling be fitted, or removed by hammering or levering. This will damage the pump intemally.

Mounting

The pump may be mounted in any position. The units are supplied with a wide variety of mounting flanges, having a spigot for location. The fixture that receives the mounting flange spigot should have 1mm x 45^0 chamfer to ensure proper installation. To minimize vibration, which can be transmitted to the pump by rigid pipe runs, it is good practice to use flexible hose immediately connected to the unit ports.

Rotation

Shaft rotation is denoted in the unit coding. Inlet and Rotation arrows are stamped on the unit body. Direction of rotation is as viewed from the drive shaft end (see coding chart).

Pump Suction Line

The suction line must be as large as possible and should be free from sharp bends to prevent excessive suction head, which should in no case exceed 190 mm of mercury (0.24 bar) below atmospheric pressures. The system should be designed to prevent entry of air and a positive head of oil should be maintained wherever possible. Lower pressures during cold start – up conditions are permissible for short periods.

As a general guide, fluid velocity in the pump suction line should not exceed 1 m/sec for pipe lengths upto 1.5 meters. If longer suction runs or higher velocities are contemplated, contact Dynamatic®before use.

Oil Reservoir

As a general rule of thumb, the reservoir capacity for industrial applications should be three to five times the pump flow per minute being drawn from the reservoir for mobile applications, the reservoir should be sized for not less than 1.5 times the pump flow

flow (of course, the volume for rams and actuators must be allowed for by providing adequate air space and breathing).

The pump suction line should draw oil from a point not less than 100 mm above the tank bottom to avoid sludge deposits from entering the pump. The return line should be submerged to limit frothing of oil. The suction and return connections should be positioned as far apart as possible and separated by baffles, so that oil circulation is promoted within the tank to assist convection cooling and allow air entrained in the oil to dissipate.

Filtration

The fluid should be filtered during top-up and continuously during operation, to achieve and maintain a cleanliness level of ISO 17/14.

This recommendation should be considered a minimum. Better cleanliness levels will significantly increase component life.

Fluids

Most premium grade mineral oil based hydraulic fluids are suitable for use with Dynamatic®Gear Pumps. A primary consideration in the selection of Hydraulic Fluid is expected oil temperature extremes that will be experienced in service. When choosing the hydraulic fluid, these temperature extremes must be considered to obtain the most suitable temperature-viscosity characteristics. For optimum performance, the viscosity should be maintained in the 97 – 456 SUS (20 – 100 CST) range.

Operating Temperature Range

The pumps are designed to operate between 0 deg and 90 deg C. intermittent temperatures may vary between –20 deg to 100 deg C if the fluid being pumped is suitable for such operations. For higher temperature applications, contact Dynamatic® for more details, before use.

Pump Drives

1. Direct Drives

Drive to the pump shaft must be arranged so that the shaft is relieved of all side and end loads.

A flexible coupling should be selected to allow a minimum of 0.010" (0.25 mm) radial displacement and should impose little or no end load on the pump shaft. (Not all ' flexible ' couplings, especially of the bonded rubber types, allow complete radial or axial freedom and should only be used if alignment is good). The table below gives the approved types of drive.

Approved Drives (basic pumps):

- UCC coupling (Crowned tooth gear couplings)
- Renold Chain Coupling
- Quill shaft (The spline must allow sufficient radial movement)
- Turboflex & Hardy Spicer (Must use two couplings to provide radial alignments)

Note: Both Hardy Spicer joints must be fitted such that the pump shaft rotates uniformly and large angles should be avoided on the connecting shaft.

Hardy Spicer type drives often incorporates splined connections to accommodate plunge motions. Under torque these splines tend to lock up and many transmit intermittent end loads on the pump shaft if the prime mover can move relative to the pump.

Pumps equipped with splined or serrated shafts and occasionally parallel-keyed shafts, invite mis-application by plugging the pump shaft directly into the rigidly supported mating shaft of a prime mover.

This practice should be avoided as far as possible since very high side loads can be imposed on the pump by the mating splines acting as an internal/external gear unless the concentricity of the driving and driven shafts, when under load, is of a very high order.

As a general recommendation provided the concentricity of the female drive spline or serration is within 0.005 ins (0.13 mm) T.I.R. of the female location spigot, the plug in drive arrangement will be acceptable. Where plug in drives are to be used detail drawings of the components in the drive train should be submitted to our Technical Sales Department for approval, before use.

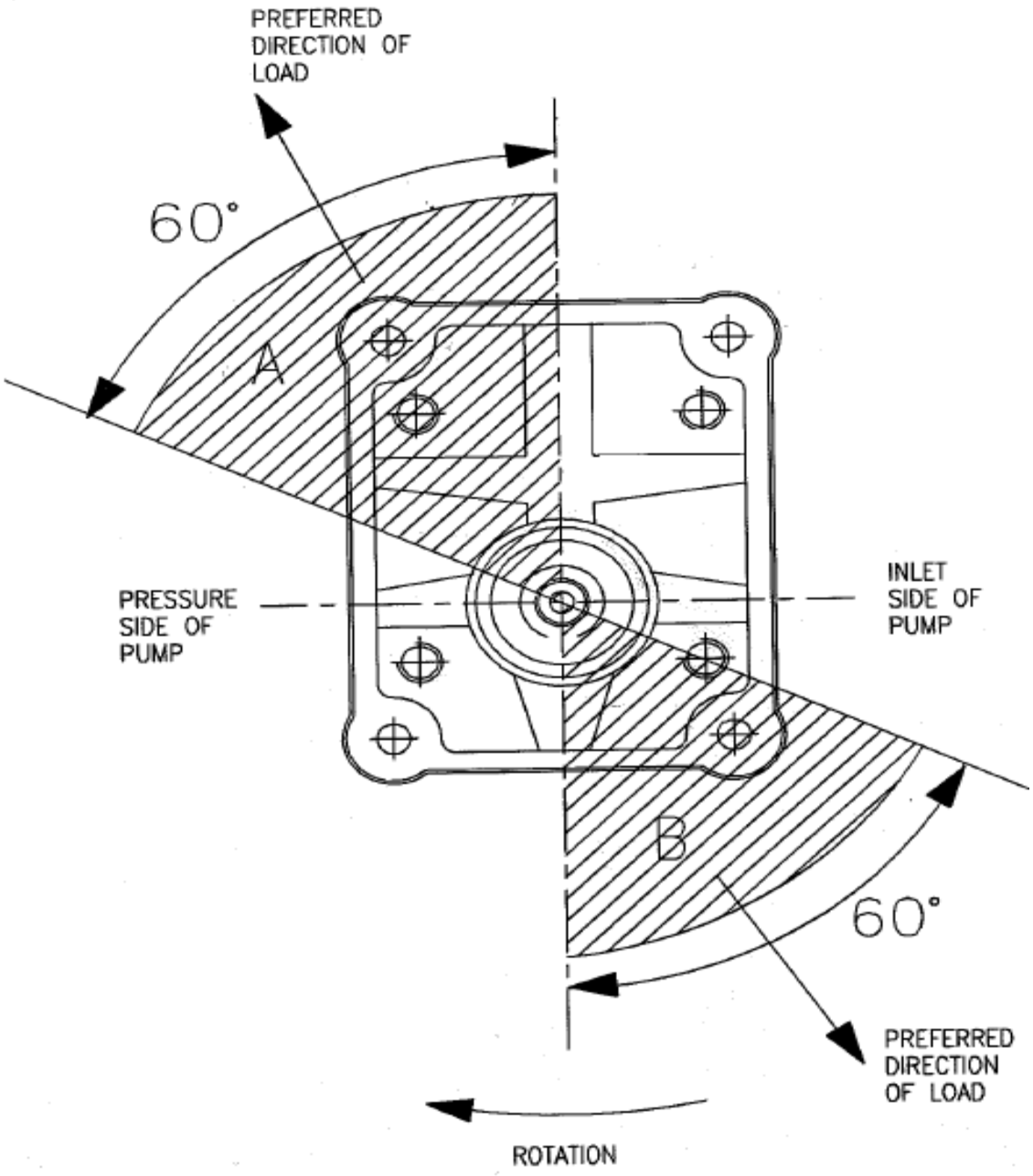
2. Indirect Drives

Generally, with any indirect side drive, the gear, sprocket or pulley diameter should be as large as possible and installed as close as possible to the pump mounting flange to minimize the side loads imposed on the pump shaft and bearings.

Chain, toothed, belt, V Belt or gear drives can be accommodated but allowance must be made for the extra load these drives apply to the pump bearings.

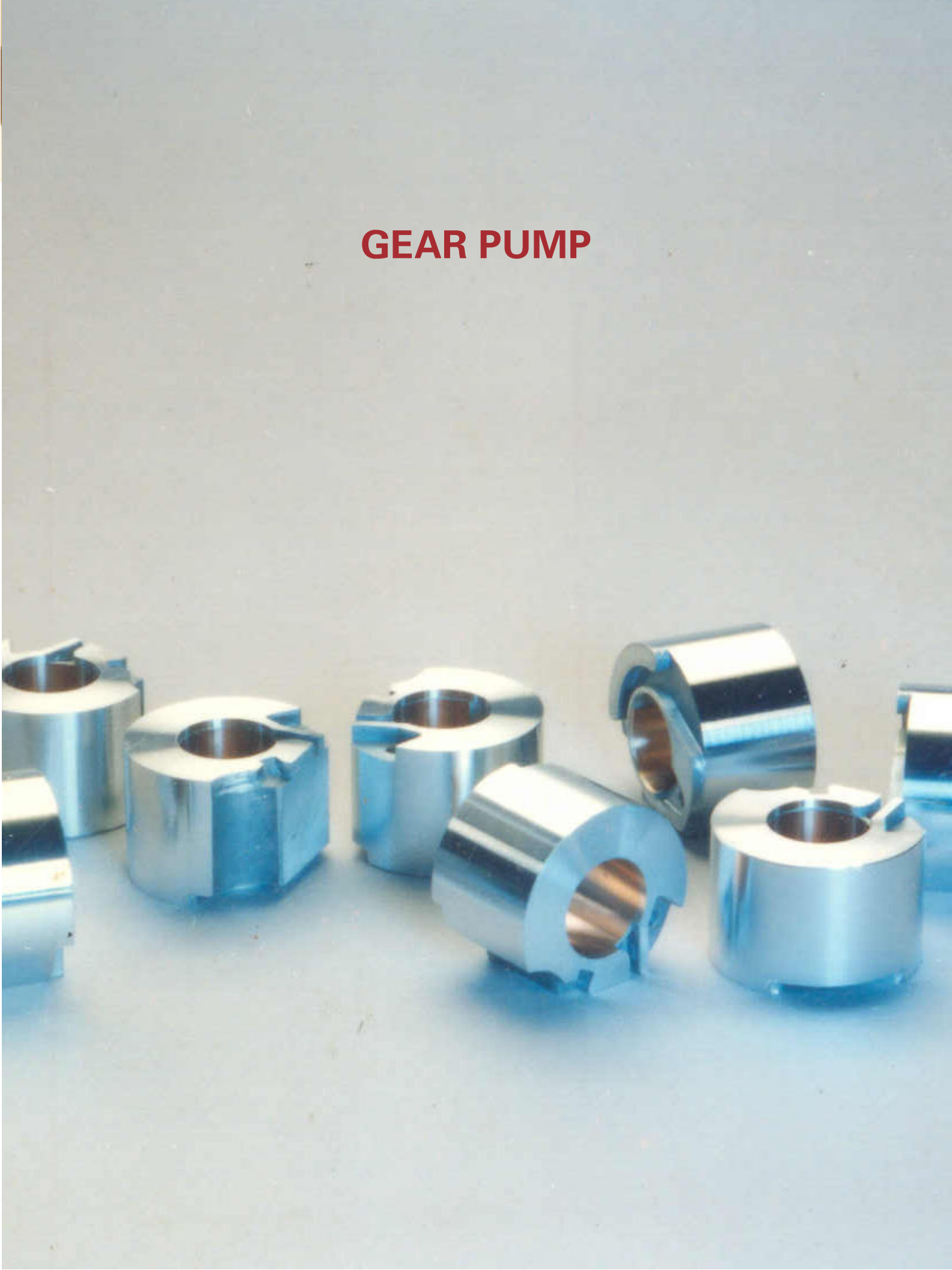
'V' belt drives require static belt tension, which produces poor bearing alignment. The static tension which is dependent upon maximum pump pressure and speed, and can generally only be set approximately, cause the drive shaft to be tilted across the running clearance of the front and rear bearings when operating at low pressures. The shaft will only run with correct alignment when the moments due to the hydraulic loads are greater than those due to the belt tension.

With all indirect drives, whether gear, chain or belt, their suitability can be established by calculation of the loads imposed on the drive shaft. Other variables such as pump size, operating pressure and drive attitude have an influence on bearing loads therefore in all cases where these types of drives are contemplated please consult our Technical Sales Department giving full application details, before use.



PREFERRED DIRECTION OF LOADING AT PUMP DRIVE SHAFT

GEAR PUMP



SINGLE PUMP