

It shall not include such items as mechanical seal(s), gland(s), lantern ring(s), packing, water shield(s), oil thrower(s) or oil ring(s), bearings, bearing appurtenances, coupling, pulley, or sheave.

1.1.6.5.1.5 Rotating assembly

A rotating assembly shall consist of a bare rotor plus casing wearing rings (where used), casing bushings (where used), bearings, and all other stationary or rotating parts required to be assembled over the shaft.

A rotating assembly shall include the following (where used):

- Packing and gland(s)
- Mechanical seal(s) and gland(s)
- Water shield(s)
- Oil thrower(s)
- Oil ring(s)
- Bearing housing cover(s)

It shall not include coupling, pulley, or sheave, nor shall it include bearing housings except when these are of a design that requires that they be assembled prior to mounting of the bearings.

1.1.6.6 Position of casing

The normal position of the discharge nozzle of an end suction horizontal pump shall be top vertical. Optional positions of the discharge nozzle shall be designated by degrees of rotation, measured from the vertical centerline in the clockwise (CW) [c] direction, facing the drive end of the pump (see Figure 1.1.6.6).

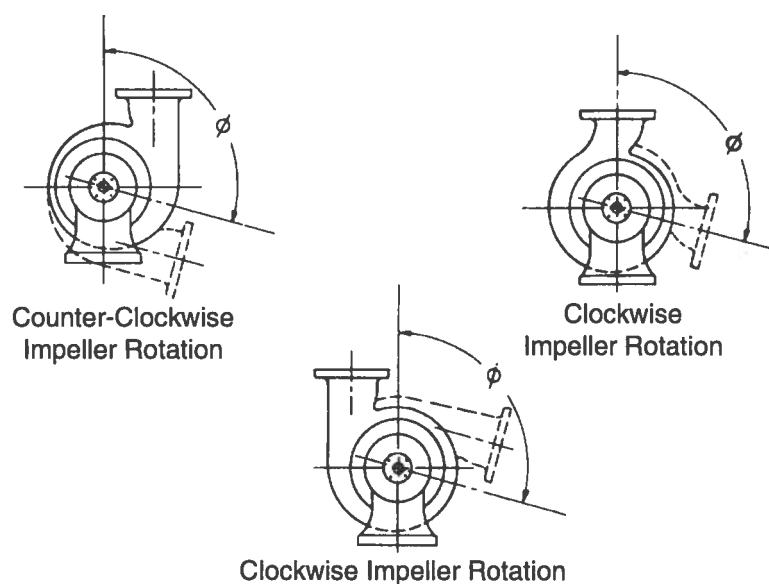


Figure 1.1.6.6 — Position of casing and shaft rotation

1.1.6.7 Rotation of shaft

Pumps are designated as having clockwise (CW) [c] or counterclockwise (CCW) [cc] rotation when facing the drive end of the pump (see Figures 1.1.6.6, 1.1.6.7a, and 1.1.6.7b).

To determine the rotation of a horizontal pump, stand at the driver end facing the pump (Figure 1.1.6.7a). If the top of the shaft revolves from the left to the right, the rotation is clockwise (CW) [c], and if the top of the shaft revolves from right to left, the rotation is counterclockwise (CCW) [cc].

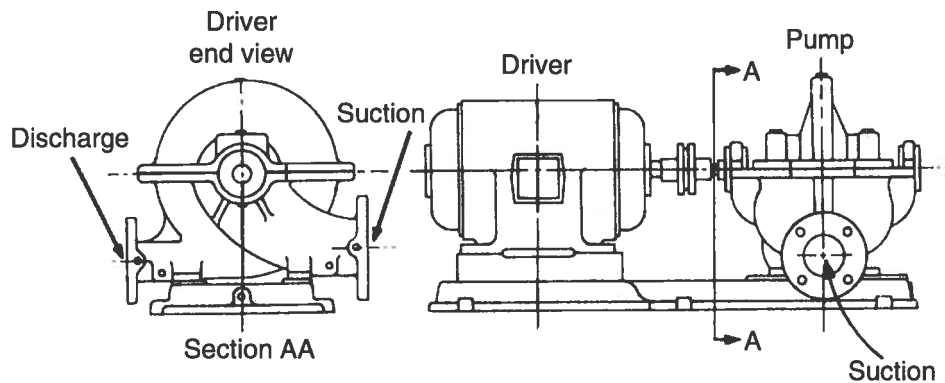


Figure 1.1.6.7a — Horizontal pump – shaft rotation (CW rotation)

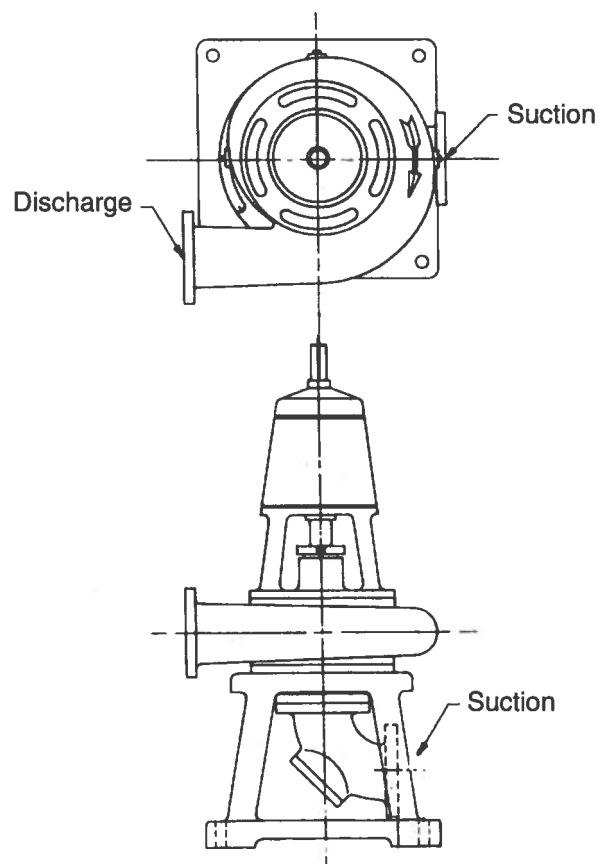


Figure 1.1.6.7b — Vertical pump – shaft rotation (CW rotation)

1.1.6.8 Special case ASME/ANSI B73.1, C-frame adapter

The C-frame adapter is cast or fabricated with rabbet fits on either end. One end is mounted to the rabbet of a C-frame NEMA motor, the other end is mounted to a rabbet fit on the bearing frame of the pump. The rabbet fits preclude the need for realignment of the coupling following normal maintenance on the wet end of the pump. Installation requires control of manufacturing tolerances, proper coupling selection, and in some cases, initial motor alignment. Motor weight may also be limited due to the cantilevered construction.

Tolerances cannot always be controlled to ensure that shaft alignment will meet requirements with all pump components, therefore, special components, such as adjustment features and/or soft couplings, must be used to ensure satisfactory operation. Larger motors may also be supported from the baseplate. They should not, however, be bolted down to the baseplate unless normally used casing bolts are eliminated as this could induce additional misalignment. Designs differ between manufacturers, so manufacturers' instructions for installation and operation must be followed to get satisfactory operation and life. Figure 1.1.6.8 depicts a typical configuration of the C-frame adapter to an overhung pump.

1.1.7 Centrifugal pumps nomenclature

The following nomenclature and definitions provide a means for identifying the various pump components covered by the Hydraulic Institute Standards and to serve as a common language between the purchaser, the manufacturer, and those writing specifications for pumps and pumping equipment.

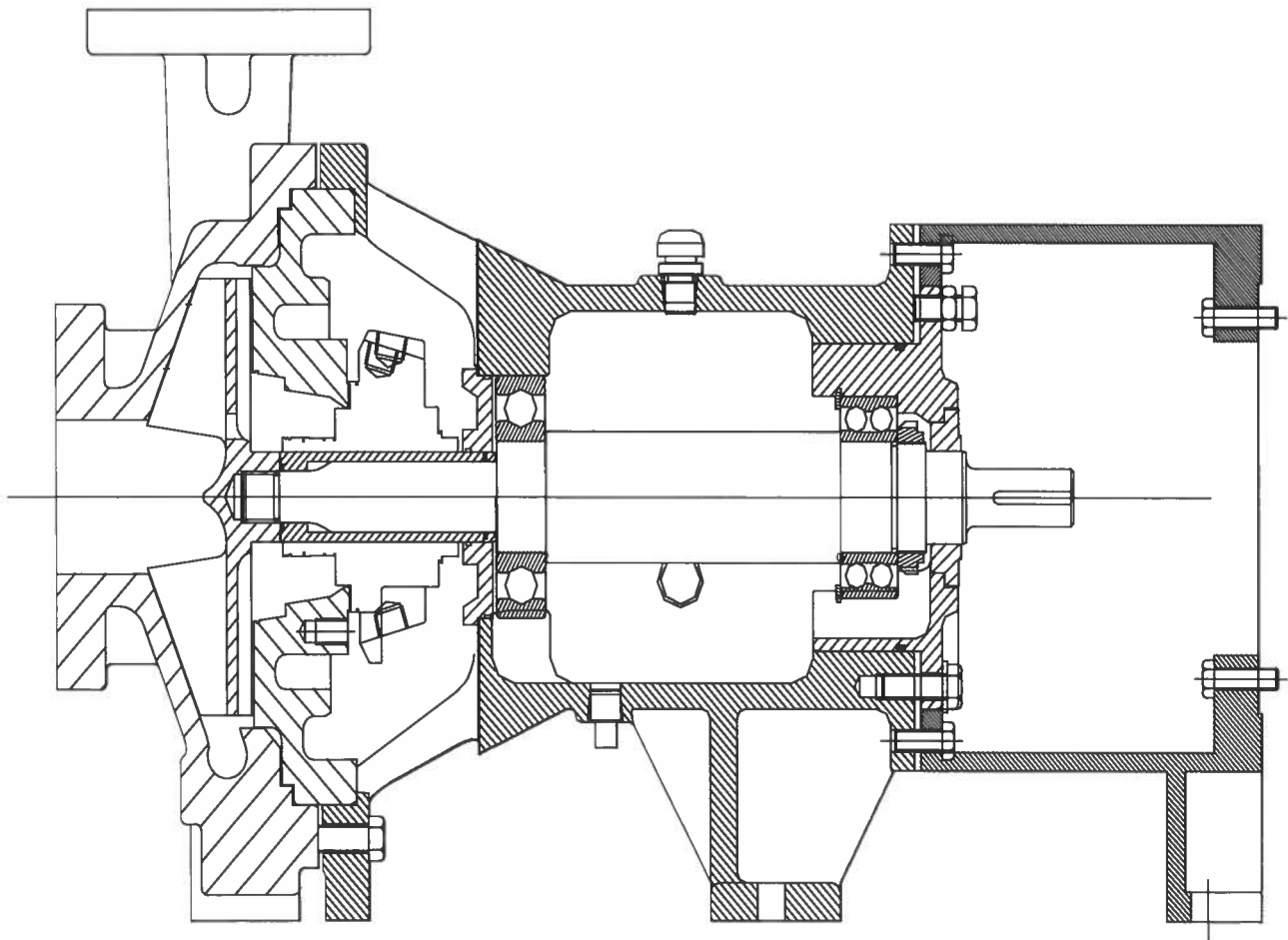


Figure 1.1.6.8 — Pump with C-frame motor adapter, short coupled

1.1.7.1 Definitions — part names

Table 1.1.7.1a is arranged in four columns as follows: part names in alphabetical order, item numbers used to identify part names on sectional drawings, abbreviations, and definitions of pump part names.

Table 1.1.7.1a — Centrifugal pump nomenclature – alphabetical listing

Part name	Item No.	Abbreviation	Definition
Adapter	71	Adpt	A machined piece used to permit assembly of two other parts or for a spacer.
Assembly, motor rotor core	222	Assy rtr core	The rotating assembly of an electrical machine containing laminations and conductors, which, when interacting with stator core assembly, produces torque.
Assembly, motor stator core	223	Assy str core	The fixed assembly of an electrical machine containing laminations and windings that creates magnetic fields.
Base	53	Base	A structure to support a pump.
Baseplate	23	Base pl	A member on which the pump and its driver are mounted.
Bearing, inboard	16	Brg inbd	The bearing nearest the coupling of a between-bearing pump but farthest from the coupling of an end suction pump.
Bearing, outboard	18	Brg outbd	The bearing most distant from the coupling of a between-bearing pump but nearest to the coupling of an end suction pump.
Bell, end	271	Bell end	The end bell performs two functions. First, it acts as a cover for the rotating assembly. Second, it provides a support for the manifold.
Bracket, bearing	125	Bkt brg	Detachable bracket that contains a bearing.
Bushing, bearing	39	Bush brg	The removable portion of a sleeve bearing in contact with the journal.
Bushing, interstage diaphragm	113	Bush instg diaph	A tubular-shaped replaceable piece mounted in the interstage diaphragm.
Bushing, pressure reducing	117	Bush press red	A replaceable piece used to reduce the liquid pressure at the stuffing box or seal chamber by throttling the flow.
Bushing, stuffing box	63	Bush stfg box	A replaceable sleeve or ring placed in the end of the stuffing box opposite the gland.

Table 1.1.7.1a — Centrifugal pump nomenclature – alphabetical listing (*continued*)

Part name	Item No.	Abbreviation	Definition
Bushing, throttle, auxiliary	171	Bush throt aux	A stationary ring or sleeve placed in the gland of a mechanical seal subassembly to restrict leakage in the event of seal failure.
Cap, bearing, inboard	41	Cap brg inbd	The removable upper portion of the inboard bearing housing.
Cap, bearing, outboard	43	Cap brg outbd	The removable upper portion of the outboard bearing housing.
Casing	1	Csg	The portion of the pump that includes the impeller chamber and volute or diffuser.
Casing, gland half	1C	Csg gld half	The gland (drive) half of a radially split casing.
Casing, lower half	1A	Csg lwr half	The lower or supporting half of the casing of an axially split pump.
Casing, suction half	1D	Csg suc half	The suction half of a radially split casing.
Casing, upper half	1B	Csg upr half	The upper or removable half of the casing of an axially split pump.
Collar, release	36	Clr rel	Split ring device to ease movement of screwed-on impellers.
Collar, shaft	68	Clr sft	A ring used on a shaft to establish a shoulder.
Collar, thrust	72	Clr thr	A circular collar mounted on a shaft to retain a split ring and transmit axial thrust.
Coupling half, driver	42	Cplg half drvr	The coupling half mounted on driver shaft.
Coupling half, pump	44	Cplg half pump	The coupling half mounted on pump shaft.
Coupling, oil pump	120	Cplg oil pump	A means of connecting the driver shaft to the oil pump shaft.
Coupling, shaft	70	Cplg sft	A mechanism used to transmit power from the drive shaft to the pump shaft, or to connect two shafts.
Cover, bearing end	123	Cov brg end	A plate closing the outboard bearing housing.
Cover, bearing, inboard	35	Cov brg inbd	An enclosing plate for either end of an inboard bearing of between-bearing or multistage pumps, or for the impeller end of the bearing of end suction pumps.

Table 1.1.7.1a — Centrifugal pump nomenclature – alphabetical listing (*continued*)

Part name	Item No.	Abbreviation	Definition
Cover, bearing, outboard	37	Cov brg outbd	An enclosing plate for either end of the outboard bearing of double suction or multistage pumps, or for the coupling end of the bearing of end suction pumps.
Cover, casing	239	Cov csg	A removable piece that provides access to the internal flow passages. This piece is bolted to the case to seal the access point.
Cover, motor end	207	Cov mot end	A removable piece that encloses the end(s) of a motor stator housing.
Cover, oil bearing cap	45	Cov oil brg cap	A lid or plate over an oil filler hole or inspection hole in a bearing cap.
Cover, rotor	272	Cov rot	The rotor cover bolts to the rotor and acts as an impeller to conduct the liquid into the rotor assembly. Together with the rotor, the rotor cover forms the rotor assembly. The purpose of the rotor assembly in a pitot tube pump is to increase the rotational velocity of the fluid and allow it to be conducted into the pitot tube opening.
Cover, stuffing box and seal chamber	11	Cov stfg box Cov seal cham	A removable piece, with stuffing box or seal chamber integral, used to enclose the outboard side of the impeller in the casing of end suction pumps.
Cover, suction	9	Cov suct	A removable piece, with which the inlet nozzle may be integral, used to enclose the suction side of the casing of an end suction pump.
Crossover, interstage	111	Xover instg	A specifically designed piece that carries the flow from one stage to another in a multistage pump.
Deflector	40	Defl	A flange or collar mounted on a shaft and rotating with it to prevent passage of liquid, grease, oil, or heat along the shaft.
Diaphragm, interstage	109	Diaph instg	A removable stationary partition between stages of a multistage pump.
Diffuser	5	Diff	A piece, adjacent to the impeller exit, which has multiple passages of increasing area for converting velocity to pressure.
Disc or drum, balancing	56	Disc/drum bal	The rotary member of a hydraulic balancing device.

Table 1.1.7.1a — Centrifugal pump nomenclature – alphabetical listing (*continued*)

Part name	Item No.	Abbreviation	Definition
Elbow, discharge	105	Ell disch	An elbow in an axial flow or mixed flow pump by which the liquid leaves the pump.
Elbow, suction	57	Ell suct	A curved water passage, usually 90 degrees, attached to the pump inlet.
Frame	19	Fr	A member of an end suction pump to which is assembled the liquid end and rotating element.
Gasket	73	Gskt	Resilient material used to seal joints between nonrotating parts to prevent leakage.
Gasket, impeller screw	28	Gskt imp scr	Resilient material used to seal joint between hub of impeller and the impeller screw.
Gasket, shaft sleeve	38	Gskt sft slv	Resilient material used to provide a seal between the shaft sleeve and the impeller.
Gauge, sight, oil	143	Ga sight oil	A device for the visual determination of the oil level.
Gland	17	Gld	A retainer that compresses packing in a stuffing box or retains the stationary element of a mechanical seal.
Gland, stuffing box, auxiliary	133	Gld stfg box aux	A follower provided for compression of packing in an auxiliary stuffing box.
Guard, coupling	131	Grd cplg	A protective shield over a shaft coupling.
Gearbox assembly	291	Gbx assy	A device to mechanically increase or decrease the driver speed via a specified gear ratio.
Handle	227	Hdl	A piece that can be used to hand-carry a pump.
Housing, bearing	99	Hsg brg	A body in which the bearing(s) is mounted.
Housing, bearing, inboard	31	Hsg brg inbd	See bearing (inboard) and bearing housing.
Housing, bearing, outboard	33	Hsg brg outbd	See bearing (outboard) and bearing housing.
Housing, manifold	273	Hsg man	A body containing the passageway for liquid into and out of the pump.
Housing, stator	201	Hsg str	A body in which a stator core assembly is mounted.

Table 1.1.7.1a — Centrifugal pump nomenclature – alphabetical listing (*continued*)

Part name	Item No.	Abbreviation	Definition
Impeller	2	Imp	The bladed member of a rotating assembly of the pump, which imparts the principal force to the liquid pumped.
Inducer	246	Ind	A single stage axial flow helix installed in the suction eye of an impeller to lower the NPSHR.
Journal, thrust bearing	74	Jnl thr brg	A removable cylindrical piece mounted on the shaft and which turns in the bushing. It may have an integral thrust collar.
Key, bearing journal	76	Key brg jnl	A parallel-sided piece used for preventing the bearing journal from rotating relative to the shaft.
Key, coupling	46	Key cplg	A parallel-sided piece used to prevent the shaft from turning in a coupling half.
Key, impeller (propeller)	32	Key imp	A parallel-sided piece used to prevent the impeller from rotating relative to the shaft.
Liner, casing	219	Lnr csg	A replaceable metal, rubber, or phenolic insert to protect the casing from abrasive wear or damage.
Liner, gland half	21D	Lnr, gld half	A part within the casing, gland half.
Liner, stuffing-box cover or seal chamber	21B	Lnr, stfg box cov Lnr, seal cham cov	A part within the stuffing-box or seal chamber cover.
Liner, suction cover	21A	Lnr, suct cov	A part within the suction cover.
Liner, suction half	21C	Lnr, suct half	A part within the casing, suction half.
Locknut, bearing	22	Lknut brg	A fastener that positions an anti-friction bearing on the shaft.
Locknut, coupling	50	Lknut cplg	A fastener holding a coupling half in position on a tapered shaft.
Lockwasher	69	Lkwash	A device to prevent loosening of a nut.
Nut, impeller	24	Nut imp	A threaded piece used to fasten the impeller on the shaft.
Nut, shaft adjusting	66	Nut sft adj	A threaded piece for altering the axial position of the rotating assembly.

Table 1.1.7.1a — Centrifugal pump nomenclature – alphabetical listing (*continued*)

Part name	Item No.	Abbreviation	Definition
Nut, shaft sleeve	20	Nut sft slv	A threaded piece used to locate the shaft sleeve on the shaft.
O-ring	119	O-ring	A radial or axial type seal.
Packing	13	Pkg	A lubricated material used to control leakage around the portion of the shaft located in the stuffing box.
Pedestal, driver	81	Ped drvr	A support for the driver of a vertical pump.
Pipe, column	101	Pipe col	A vertical pipe by which the pumping element is suspended.
Plate, side	61	Pl side	A replaceable piece in the casing or cover of an open impeller pump to maintain a close clearance along the impeller face.
Plate, stack	278	St pl	The stacking plate fixes the position of the bearings in the frame, thus locating the rotor in the correct relationship to the stationary parts.
Plate, wear	225	Wp pl	A replaceable, axial clearance part used to protect the casing, stuffing box, or suction cover from wear.
Pump, oil	121	Pump oil	A device for supplying lubricating oil under pressure.
Retainer, bearing	193	Ret brg	A device used to support the lineshaft bearing.
Retainer, grease	51	Ret grs	A contact seal or cover to retain grease.
Ring, balancing	115	Ring bal	The stationary member of a hydraulic balancing device.
Ring, casing	7	Ring csg	A stationary replaceable ring to protect the casing at the running fit with the impeller ring or the impeller.
Ring, impeller	8	Ring imp	A replaceable ring mounted on one or both sides of the impeller.
Ring, lantern	29	Ring ltrn	An annular piece used to establish a liquid seal around the shaft and to lubricate the stuffing-box packing.

Table 1.1.7.1a — Centrifugal pump nomenclature – alphabetical listing (*continued*)

Part name	Item No.	Abbreviation	Definition
Ring, oil	60	Ring oil	A rotating ring used to carry oil from the reservoir to the bearing.
Ring, stuffing-box cover	27	Ring stfg box cov	A stationary ring to protect the stuffing-box cover at the running fit with the impeller ring or impeller.
Ring, suction cover	25	Ring suct cov	A stationary ring to protect the suction cover at the running fit with the impeller ring or impeller.
Ring, thrust, split	86	Ring thr split	A split ring mounted on a shaft to absorb the unbalanced axial thrust of the impeller in the pump.
Rotor	276	Rot	The rotor is connected directly to the drive shaft of the pump. Together with the rotor cover, the rotor forms the rotor assembly. The purpose of the rotor assembly in a pitot tube pump is to increase the rotational velocity of the fluid and allow it to be conducted into the pitot tube opening.
Screw, impeller	26	Scr imp	A screw to fasten the impeller to the shaft.
Screw, impeller, adjusting	149	Scr imp adj	A special screw to adjust the axial movement of shaft/impeller to control clearance between the rotating impeller and the raceway.
Seal, bearing cover, inboard	47	Seal brg cov inbd	A contact seal for the bearing cover (inboard).
Seal, bearing cover, outboard	49	Seal brg cov outbd	A contact seal for the bearing cover (outboard).
Seal, bearing housing	169	Seal brg hsg	A contact seal for a bearing housing.
Seal, mechanical	89	Seal mech	A device that prevents the leakage of fluids along rotating shafts.
Seal, mechanical, rotating element	80	Seal mech rot elem	A device flexibly mounted on a shaft in or on the stuffing box and having a smooth, flat seal face held against the stationary sealing face.
Seal, mechanical, stationary element	65	Seal mech sta elem	A subassembly consisting of one or more parts mounted in or on a stuffing box and having a smooth flat sealing face.
Shaft	6	Sft	The cylindrical member on which the impeller is mounted and through which power is transmitted to the impeller.

Table 1.1.7.1a — Centrifugal pump nomenclature – alphabetical listing (*continued*)

Part name	Item No.	Abbreviation	Definition
Shaft, head	10	Sft hd	The upper cylindrical member in a vertical pump, which transmits power from the driver to the drive shaft.
Shell, lower half, bearing inboard	135	Shl lwr half brg inbd	A semi-cylindrical piece supporting the bearing bushing located in the lower half of the inboard bearing housing.
Shell, lower half, bearing outboard	139	Shl lwr half brg outbd	A piece supporting the bearing bushing located in the lower half of the outboard housing.
Shell, upper half, bearing inboard	137	Shl upr half brg inbd	A piece supporting the bearing bushing located in the upper half of the inboard bearing housing.
Shell, upper half, bearing outboard	141	Shl upr half brg outbd	A piece supporting the bearing bushing located in the upper half of the outboard bearing housing.
Shim	67	Shim	A piece of material placed between two members to adjust their position or fill in a gap.
Sleeve, impeller hub	34	Slv imp hub	A replaceable, cylindrical wearing part mounted on the extended pump impeller hub.
Sleeve, interstage	58	Slv instg	A cylindrical piece mounted on the pump shaft between impellers.
Sleeve, shaft	14	Slv sft	A cylindrical piece fitted over the shaft to protect the shaft through the stuffing box or seal chamber, and which may also serve to locate the impeller axially on the shaft.
Spacer, bearing	78	Spcr brg	A cylindrical piece that fits over the shaft to space or locate rolling element bearings.
Spacer, coupling	88	Spcr cplg	A cylindrical piece used to provide axial space for the removal of the rotating assembly without removing the driver.
Strainer	209	Str	A device used to prevent large objects from entering the pump.
Stuffing box	83	Stfg box	A portion of the casing or casing cover, through which packing and a gland or a mechanical seal is placed to prevent leakage.
Stuffing box, auxiliary	75	Stfg box aux	A recessed portion of the gland and cover of a mechanical seal subassembly designed to accommodate one or more rings of packing.