

Application & Reference Data Typical Specifications

Section 914 Vertical Turbine Fire Pump

Typical Specifications
**Vertical Turbine
Fire Pump
Motor Driven**

VERTICAL

Contractor shall furnish and install a quantity of _____ Aurora Pump _____ stage, _____ Model (Underwriters Laboratories Listed) (Underwriters Laboratories of Canada Listed) (Factory Mutual Approved) water lubricated vertical turbine fire pump(s). Each unit shall include a bowl assembly, strainer, column and shaft, surface discharge head, vertical hollow shaft electrical motor, automatic air release valve, discharge pressure gauge, and automatic motor controller.

CONDITIONS OF SERVICE

The pump(s) shall be rated for _____ GPM at _____ PSI at the discharge head centerline. The maximum lift below (distance from the discharge head centerline to the minimum low water level) will not exceed _____ feet. The distance from the top of the pump mounting pad to the bottom of the sump or reservoir shall be _____ feet. The unit(s) will be installed at _____ feet elevation above sea level with a maximum ambient temperature of _____ degrees F.

PUMP CONSTRUCTION

DISCHARGE HEAD

The discharge head shall be Class 30 cast iron with a separate cast iron foundation plate, and shall be furnished with a grease lubricated packing box and ANSI (125 lb.) (250 lb.) standard discharge flange. To prevent damage to the shaft when installing or removing the motor, a separate motor shaft shall be furnished and shall be connected to the headshaft at a point above the packing box with a threaded coupling. The headshaft shall be furnished with a stainless steel sleeve where it passes through the packing box. The discharge head shall be provided with a _____" NPT tap for packing box drainage. The discharge head shall be hydrostatically tested 1-1/2 times the maximum working pressure but in no case less than 250 PSI

COLUMN PIPE

Pump column pipe shall be furnished in sections not exceeding 10 feet in length with straight threads and sleeve type couplings. Pipe weights shall be not less than specified in NFPA #20.

LINESHAFT

Open, water lubricated construction shall be used where the distance from the discharge head to the static water level does not exceed 50 feet. Lineshaft shall be furnished in sections not exceeding 10 feet in length. Lineshaft shall be SAE 1045 steel of adequate size to transmit the horsepower and thrust required and shall have renewable shaft sleeves. The lineshaft shall run in neoprene bearings housed in bronze bearing retainers.

BOWL ASSEMBLY

The pump bowls shall be Class 30 cast iron with bronze bowl wearing rings, bronze enclosed impellers and steel impeller lock collets. The pump shaft shall be 416 stainless steel supported by bronze bowl bearings. The bowl assembly shall be hydrostatically tested to 1-1/2 times the maximum working pressure but in no case less than 250 PSI. The bowl assembly shall be performance tested and certified performance curves supplied.

STRAINER

A bronze basket strainer with a free area of at least 4 times the suction area and with openings to restrict the passage of a 1/2" sphere shall also be supplied.

ELECTRIC MOTOR

Electric motor(s) shall be of the weather protected Type 1, vertical hollow shaft design with non-reverse ratchet and 1.15 service factor, _____ RMP, and wound for _____ phase, _____ hertz, _____ volts. Motor(s) shall be of the (across-the-line) (part-winding) (wye-delta) (primary resistor) (auto-transformer) (soft start) type starting and sizing so as not to exceed the permissible loading limits of NFPA #20 (or Factory Mutual Loss Prevention Data Sheet 3-7N) at any point on the pump performance curve. Motor(s) shall be provided with thrust bearings having an average life of 5 years continuous operation and capable of sustaining the maximum pump downthrust. Maximum motor horsepower shall not exceed _____ HP.

CONTROLLER

The electric motor controller shall be arranged to start the fire pump motor automatically on loss of system pressure with (automatic stop) (manual stop). (For sprinkler or standpipe systems where an automatically controlled pumping unit constitutes the sole supply, the controller shall be wired for manual shutdown. Manual

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shutdown shall also be provided where required by the authority jurisdiction.) It shall be supplied with a circuit breaker rated not less than _____ AIC at _____ phase, _____ hertz, _____ volts.

The magnetic starting contactor shall be of the (choose one):

1. Across-the-line type.
2. Primary resistor reduced voltage type.
3. Primary reactor reduced voltage type.
4. Part winding reduced voltage start type.
5. Wye-Delta open transition reduced voltage type.
6. Wye-Delta closed transition reduced voltage type.
7. Auto transformer reduced voltage type.
8. Solid state soft start reduced voltage type.

ACCESSORIES

Furnish each pump with the following fittings or accessories:

1. 3-1/2" dial discharge pressure gauge.
2. Minimum 1-1/2" automatic air and vacuum release valve.
3. Pressure recorder as required by Factory Mutual and NFPA #20, common to all pumps.
4. Hose valve manifold with a set of 2-1/2" hose valves, caps and chains, or flowmeter common to all pumps.
5. Water level testing device common to all pumps.

STANDARDS

All equipment furnished and the complete installation shall be in accordance with NFPA #20 and/or (UL448) (ULC 448) (Factory Mutual Approved Standard #1312). Pump(s) and controller(s) shall bear the (UL) (ULC) (FM) mark.

Typical Specifications
**Vertical Turbine
Fire Pump
Engine Driven**

GENERAL

Contractor shall furnish and install a quantity of _____ Aurora Pump _____ stage, _____ Model (Underwriters Laboratories Listed) (Underwriters Laboratories of Canada Listed) (Factory Mutual Approved) water lubricated vertical turbine fire pump(s). Each unit shall include a bowl assembly, strainer, column and shaft, surface discharge head, vertical hollow shaft right angle gear, gear to engine flexible shaft with guard, automatic air release valve, discharge pressure gauge, and diesel engine with fuel and starting systems and automatic engine controller.

CONDITIONS OF SERVICE

The pump(s) shall be rated for _____ GPM at _____ PSI at the discharge head centerline. The maximum lift below (distance from the discharge head centerline to the minimum low water level) will not exceed _____ feet. The distance from the top of the pump mounting pad to the bottom of the sump or reservoir shall be _____ feet. The unit(s) will be installed at _____ feet elevation above sea level with a maximum ambient temperature of _____ degrees F.

PUMP CONSTRUCTION

DISCHARGE HEAD

The discharge head shall be Class 30 cast iron with a separate cast iron foundation plate, and shall be furnished with a grease lubricated packing box and ANSI (125 lb.) (250 lb.) standard discharge flange. To prevent damage to the shaft when installing or removing the motor, a separate motor shaft shall be furnished and shall be connected to the headshaft at a point above the packing box with a threaded coupling. The headshaft shall be furnished with a stainless steel sleeve where it passes through the packing box. The discharge head shall be provided with a _____" NPT tap for packing box drainage. The discharge head shall be hydrostatically tested 1-1/2 times the maximum working pressure but in no case less than 250 PSI

COLUMN PIPE

Pump column pipe shall be furnished in sections not exceeding 10 feet in length with straight threads and sleeve type couplings. Pipe weights shall be not less than specified in NFPA #20.

LINESHAFT

Open, water lubricated construction shall be used where the distance from the discharge head to the static water level does not exceed 50 feet. Lineshaft shall be furnished in sections not exceeding 10 feet in length. Lineshaft shall be SAE 1045 steel of adequate size to transmit the horsepower and thrust required and shall have renewable shaft sleeves. The lineshaft shall run in neoprene bearings housed in bronze bearing retainers.

BOWL ASSEMBLY

The pump bowls shall be Class 30 cast iron with bronze bowl wearing rings, bronze enclosed impellers and steel impeller lock collets. The pump shaft shall be 416 stainless steel supported by bronze bowl bearings. The bowl assembly shall be hydrostatically tested to 1-1/2 times the maximum working pressure but in no case less than 250 PSI. The bowl assembly shall be performance tested and certified performance curves supplied.

STRAINER

A bronze basket strainer with a free area of at least 4 times the suction area and with openings to restrict the passage of a 1/2" sphere shall also be supplied.

GEAR

A vertical hollow shaft right angle gear with a non-reverse ratchet shall be furnished to match the mounting dimensions of the discharge head. The gear shall have adequate thrust and horsepower ratings to transmit the maximum thrust and horsepower required by the pump.

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ENGINE

Diesel engine(s) shall be equal to _____ Model _____ rated _____ HP at _____ RPM at 300 feet above sea level and 77 degrees F and shall be (Underwriters Laboratories Listed) (Factory Mutual Approved). Each engine shall be provided with electric starting equipment and a charging alternator. The factory supplied heat exchanger piping loop complete with required strainers, a pressure gauge, a pressure reducing valve, and a bypass line shall be installed between the pump discharge head and the engine heat exchanger by the installing contractor. Each engine shall be furnished with lead-acid starting batteries, battery rack and cables, a flexible exhaust connector and industrial type silencer. Furnish each engine with a jacket water heater.

FLEXIBLE SHAFT

A flexible shaft, with engine and gear flanges, shall be furnished to connect the engine to the gear. The shaft shall be adequately sized to transmit the maximum pump brake horsepower at the engine speed with a minimum bearing life of 2500 hours. The shaft shall be protected by a shaft guard.

CONTROLLER

The diesel engine controller shall be arranged to start the fire pump motor automatically on loss of system pressure with (automatic stop) (manual stop). (For sprinkler or standpipe systems where an automatically controlled pumping unit constitutes the sole supply, the controller shall be wired for manual shutdown. Manual shutdown shall also be provided where required by the authority jurisdiction.) An automatic weekly test timer shall also be standard. The controller shall be furnished with a built-in battery charger capable of restoring the batteries from a fully discharged condition to a fully charged condition within twenty-four (24) hours.

FUEL SYSTEM

Furnish an above ground fuel tank with a capacity equal to one gallon per horsepower plus 5% volume for expansion and 5% volume for sump. Furnish the tank with an indicating fuel level gauge. Provide flexible fuel line connectors at the engine and fuel line connections at the fuel tank. (Fuel lines to be provided by the installing contractor.)

ACCESSORIES

Furnish each pump with the following fittings or accessories:

1. 3-1/2" dial discharge pressure gauge.
2. Minimum 1-1/2" automatic air and vacuum release valve.
3. Main relief valve with closed waste cone.
4. Discharge tee with relief valve elbow.
5. Pressure recorder as required by Factory Mutual and NFPA #20, common to all pumps.
6. Hose valve manifold with a set of 2-1/2" hose valves, caps and chains, or flowmeter common to all pumps.
7. Water level testing device common to all pumps.

STANDARDS

All equipment furnished and the complete installation shall be in accordance with NFPA #20 and/or (UL448) (ULC 448) (Factory Mutual Approved Standard #1312). Pump(s) and controller(s) shall bear the (UL) (ULC) (FM) mark.

Technical Data

Vertical Turbine Fire Pump

250 - 300 GPM 10 FEM												
NUMBER OF STAGES	4	5	6	7	8	9	10	11	12	13	14	15
Bowl O.D. (in.)	9.63	9.63	9.63	9.63	9.63	9.63	9.63	9.63	9.63	9.63	9.63	9.63
Bowl Kt/(lbs./Foot)	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8
Bowl Ka/(lbs.)	63.2	79	94.8	110.6	126.4	142.2	158	173.8	189.6	205.4	221.2	237
Bowl Shaft Diameter	1-7/16	1-7/16	1-7/16	1-7/16	1-7/16	1-7/16	1-7/16	1-7/16	1-7/16	1-7/16	1-7/16	1-7/16
Lineshaft Diameter (1)'	1	1	1	1	1	1-1/4	1-1/4	1-1/4	1-1/4	1-1/4	1-1/4	1-1/4
Lineshaft Ks/Foot	2.8	2.8	2.8	2.8	2.8	4.2	4.2	4.2	4.2	4.2	4.2	4.2
"SDC" Discharge Head Size (2)	16-1/2x6	16-1/2x6	16-1/2x6	16-1/2x6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
"LAD" Discharge Head Size (2)	16-1/2x6	16-1/2x6	16-1/2x6	16-1/2x6	16-1/2x6	16-1/2x6	16-1/2x6	16-1/2x6	16-1/2x6	16-1/2x6	16-1/2x6	16-1/2x6
Column O.D. (in.)	6-5/8	6-5/8	6-5/8	6-5/8	6-5/8	6-5/8	6-5/8	6-5/8	6-5/8	6-5/8	6-5/8	6-5/8
Column Weight/Foot (lbs.)	18.97	18.97	18.97	18.97	18.97	18.97	18.97	18.97	18.97	18.97	18.97	18.97
Column Wall Thickness (in.)	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28

400 GPM 10FEM							
NUMBER OF STAGES	4	5	6	7	8	9	10
Bowl O.D. (in.)	9.63	9.63	9.63	9.63	9.63	9.63	9.63
Bowl Kt/(lbs./Foot)	3.8	3.8	3.8	3.8	3.8	3.8	3.8
Bowl Ka/(lbs.)	63.2	79	94.8	110.6	126.4	142.2	158
Bowl Shaft Diameter	1-7/16	1-7/16	1-7/16	1-7/16	1-7/16	1-7/16	1-7/16
Lineshaft Diameter (1)'	1	1	1	1	1	1-1/4	1-1/4
Lineshaft Ks/Foot	2.8	2.8	2.8	2.8	2.8	4.2	4.2
"SDC" Discharge Head Size (2)	16-1/2 x6	16-1/2 x6	16-1/2 x6	16-1/2 x6	N/A	N/A	N/A
"LAD" Discharge Head Size (2)	16-1/2 x6	16-1/2 x6	16-1/2 x6	16-1/2 x6	16-1/2 x6	16-1/2 x6	16-1/2 x6
Column O.D. (in.)	6-5/8	6-5/8	6-5/8	6-5/8	6-5/8	6-5/8	6-5/8
Column Weight/Foot (lbs.)	18.97	18.97	18.97	18.97	18.97	18.97	18.97
Column Wall Thickness (in.)	0.28	0.28	0.28	0.28	0.28	0.28	0.28

500 GPM 11FGM									
NUMBER OF STAGES	4	5	6	7	8	9	10	11	12
Bowl O.D. (in.)	10.86	10.86	10.86	10.86	10.86	10.86	10.86	10.86	10.86
Bowl Kt/(lbs./Foot)	5.02	5.02	5.02	5.02	5.02	5.02	5.02	5.02	5.02
Bowl Ka/(lbs.)	88	110	132	154	176	198	220	242	264
Bowl Shaft Diameter	1-7/16	1-7/16	1-7/16	1-7/16	1-7/16	1-7/16	1-7/16	1-7/16	1-7/16
Lineshaft Diameter (1)'	1-1/4	1-1/4	1-1/4	1-1/4	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2
Lineshaft Ks/Foot	4.2	4.2	4.2	4.2	6.0	6.0	6.0	6.0	6.0
"SDC" Discharge Head Size (2) (3)	16-1/2 x6	16-1/2 x6	16-1/2 x6	16-1/2 x6	16-1/2 x6	N/A	N/A	N/A	N/A
"LAD" Discharge Head Size (2)	16-1/2 x6	16-1/2 x6	16-1/2 x6	16-1/2 x6	16-1/2 x6	16-1/2 x6	16-1/2 x6	16-1/2 x6	16-1/2 x6
Column O.D. (in.)	6-5/8	6-5/8	6-5/8	6-5/8	6-5/8	6-5/8	6-5/8	6-5/8	6-5/8
Column Weight/Foot (lbs.)	18.97	18.97	18.97	18.97	18.97	18.97	18.97	18.97	18.97
Column Wall Thickness (in.)	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28

1. For setting using more than 50 feet of column and lineshafting, consult the Factory to ensure adequate lineshaft size.
2. Discharge heads are equipped with dual registers to accommodate drivers from 10" through 24" BD.
3. U.L. Listed Only.

Technical Data
**Vertical Turbine
 Fire Pump**

750 GPM 12FCM								
NUMBER OF STAGES	3	4	5	6	7	8	9	10
Bowl O.D. (in.)	12.26	12.26	12.26	12.26	12.26	12.26	12.26	12.26
Bowl Kt/(lbs./Foot)	6.33	6.33	6.33	6.33	6.33	6.33	6.33	6.33
Bowl Ka/(lbs.)	88.5	118	147.5	177	206.5	236	265.5	295
Bowl Shaft Diameter	1-11/16	1-11/16	1-11/16	1-11/16	1-11/16	1-11/16	1-11/16	1-11/16
Lineshaft Diameter (1)'	1-1/4	1-1/4	1-1/2	1-1/2	1-1/2	1-11/16	1-11/16	1-11/16
Lineshaft Ks/Foot	4.2	4.2	6.0	6.0	6.0	8.1	8.1	8.1
"LAD" Discharge Head Size (2)	16-1/2 x6	16-1/2 x6	16-1/2 x6	16-1/2 x6	16-1/2 x6	16-1/2 x6	16-1/2 x6	16-1/2 x6
Column O.D. (in.)	8-5/8	8-5/8	8-5/8	8-5/8	8-5/8	8-5/8	8-5/8	8-5/8
Column Weight/Foot (lbs.)	24.7	24.7	24.7	24.7	24.7	24.7	24.7	24.7
Column Wall Thickness (in.)	.277	.277	.277	.277	.277	.277	.277	.277

750 GPM 14FGM							
NUMBER OF STAGES	3	4	5	6	7	8	9
Bowl O.D. (in.)	14	14	14	14	14	14	14
Bowl Kt/(lbs./Foot)	8.41	8.41	8.41	8.41	8.41	8.41	8.41
Bowl Ka/(lbs.)	112.5	150	187.5	225	262.5	300	337.5
Bowl Shaft Diameter	1-15/16	1-15/16	1-15/16	1-15/16	1-15/16	1-15/16	1-15/16
Lineshaft Diameter (1)'	1-1/4	1-1/2	1-1/2	1-11/16	1-11/16	1-11/16	1-15/16
Lineshaft Ks/Foot	4.2	6.0	6.0	8.1	8.1	8.1	10.6
"SDC" Discharge Head Size (2)	16-1/2 x8	16-1/2 x8	16-1/2 x8	16-1/2 x8	N/A	N/A	N/A
"LAD" Discharge Head Size (2)	16-1/2 x8	16-1/2 x8	16-1/2 x8	16-1/2 x8	16-1/2 x8	16-1/2 x8	16-1/2 x8
Column O.D. (in.)	8-5/8	8-5/8	8-5/8	8-5/8	8-5/8	8-5/8	8-5/8
Column Weight/Foot (lbs.)	24.7	24.7	24.7	24.7	24.7	24.7	24.7
Column Wall Thickness (in.)	.277	.277	.277	.277	.277	.277	.277

1. For setting using more than 50 feet of column and lineshafting, consult the Factory to ensure adequate lineshaft size.
2. Discharge heads are equipped with dual registers to accommodate drivers from 10" through 24" BD.
3. U.L. Listed Only. (750 12 FCM)

Technical Data
**Vertical Turbine
 Fire Pump**

1000 GPM 12FCM							
NUMBER OF STAGES	3	4	5	6	7	8	9
Bowl O.D. (in.)	12.26	12.26	12.26	12.26	12.26	12.26	12.26
Bowl Kt/(lbs./Foot)	6.33	6.33	6.33	6.33	6.33	6.33	6.33
Bowl Ka/(lbs.)	88.5	118	147.5	177	206.5	236	265.5
Bowl Shaft Diameter	1-11/16	1-11/16	1-11/16	1-11/16	1-11/16	1-11/16	1-11/16
Lineshaft Diameter (1)	1-1/4	1-1/2	1-1/2	1-1/2	1-11/16	1-11/16	1-11/16
Lineshaft Ks/Foot	4.2	6.0	6.0	6.0	8.1	8.1	8.1
"LAD" Discharge Head Size (2)	16-1/2 x6	16-1/2 x6	16-1/2 x6	16-1/2 x6	16-1/2 x6	16-1/2 x6	16-1/2 x6
Column O.D. (in.)	8-5/8	8-5/8	8-5/8	8-5/8	8-5/8	8-5/8	8-5/8
Column Weight/Foot (lbs.)	24.7	24.7	24.7	24.7	24.7	24.7	24.7
Column Wall Thickness (in.)	.277	.277	.277	.277	.277	.277	.277

1000 GPM 14FGM							
Number of Stages	3	4	5	6	7	8	9
Bowl O.D. (in.)	14	14	14	14	14	14	14
Bowl Kt/(lbs./Foot)	8.41	8.41	8.41	8.41	8.41	8.41	8.41
Bowl Ka/(lbs.)	112.5	150	187.5	225	262.5	300	337.5
Bowl Shaft Diameter	1-15/16	1-15/16	1-15/16	1-15/16	1-15/16	1-15/16	1-15/16
Lineshaft Diameter (1)	1-1/4	1-1/2	1-1/2	1-11/16	1-11/16	1-11/16	1-15/16
Lineshaft Ks/Foot	4.2	6.0	6.0	8.1	8.1	8.1	10.6
"SDC" Discharge Head Size (2)	16-1/2 x8	16-1/2 x8	16-1/2 x8	16-1/2 x8	N/A	N/A	N/A
"LAD" Discharge Head Size (2)	16-1/2 x8	16-1/2 x8	16-1/2 x8	16-1/2 x8	16-1/2 x8	16-1/2 x8	16-1/2 x8
Column O.D. (in.)	8-5/8	8-5/8	8-5/8	8-5/8	8-5/8	8-5/8	8-5/8
Column Weight/Foot (lbs.)	24.7	24.7	24.7	24.7	24.7	24.7	24.7
Column Wall Thickness (in.)	.277	.277	.277	.277	.277	.277	.277

1. For setting using more than 50 feet of column and lineshafting, consult the Factory to ensure adequate lineshaft size.
2. Discharge heads are equipped with dual registers to accommodate drivers from 10" through 24" BD.
3. U.L. Listed Only. (1000 GPM 12 FCM)

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Technical Data
**Vertical Turbine
Fire Pump**

1250 GPM 13FGH							
NUMBER OF STAGES	4	5	6	7	8	9	10
Bowl O.D. (in.)	12.9	12.9	12.9	12.9	12.9	12.9	12.9
Bowl Kt/(lbs./Foot)	12.02	12.02	12.02	12.02	12.02	12.02	12.02
Bowl Ka/(lbs.)	173.2	216.5	259.8	303.1	346.4	389.7	433
Bowl Shaft Diameter	1-11/16	1-11/16	1-11/16	1-11/16	1-11/16	1-11/16	1-11/16
Lineshaft Diameter (1) ¹	1-1/2	1-1/2	1-11/16	1-11/16	1-11/16	1-15/16	1-15/16
Lineshaft Ks/Foot	6	6	8.1	8.1	8.1	10.6	10.6
"SDC" Discharge Head Size (2)	16-1/2x8	16-1/2x8	16-1/2x8	N/A	N/A	N/A	N/A
"LAD" Discharge Head Size (2)	16-1/2x8	16-1/2x8	16-1/2x8	16-1/2x8	16-1/2x8	16-1/2x8	16-1/2x8
Column O.D. (in.)	8-5/8	8-5/8	8-5/8	8-5/8	8-5/8	8-5/8	8-5/8
Column Weight/Foot (lbs.)	24.7	24.7	24.7	24.7	24.7	24.7	24.7
Column Wall Thickness (in.)	0.277	0.277	0.277	0.277	0.277	0.277	0.277

1500 GPM 13FGH							
NUMBER OF STAGES	4	5	6	7	8	9	10
Bowl O.D. (in.)	12.9	12.9	12.9	12.9	12.9	12.9	12.9
Bowl Kt/(lbs./Foot)	12.02	12.02	12.02	12.02	12.02	12.02	12.02
Bowl Ka/(lbs.)	173.2	216.5	259.8	303.1	346.4	389.7	433
Bowl Shaft Diameter	1-11/16	1-11/16	1-11/16	1-11/16	1-11/16	1-11/16	1-11/16
Lineshaft Diameter (1) ¹	1-1/2	1-1/2	1-11/16	1-11/16	1-11/16	1-15/16	1-15/16
Lineshaft Ks/Foot	6.0	6.0	8.1	8.1	8.1	10.6	10.6
"SDC" Discharge Head Size (2)	16-1/2 x8	16-1/2 x8	16-1/2 x8	N/A	N/A	N/A	N/A
"LAD" Discharge Head Size (2)	16-1/2 x8	16-1/2 x8	16-1/2 x8	16-1/2 x8	16-1/2 x8	16-1/2 x8	16-1/2 x8
Column O.D. (in.)	8-5/8	8-5/8	8-5/8	8-5/8	8-5/8	8-5/8	8-5/8
Column Weight/Foot (lbs.)	24.7	24.7	24.7	24.7	24.7	24.7	24.7
Column Wall Thickness (in.)	0.277	0.277	0.277	0.277	0.277	0.277	0.277

1. For setting using more than 50 feet of column and lineshafting, consult the Factory to ensure adequate lineshaft size.
2. Discharge heads are equipped with dual registers to accommodate drivers from 10" through 24" BD.

Technical Data
**Vertical Turbine
 Fire Pump**

2000 GPM 15FGH				
NUMBER OF STAGES	3	4	5	6
Bowl O.D. (in.)	15.0	15.0	15.0	15.0
Bowl Kt/(lbs./Foot)	14.47	14.47	14.47	14.47
Bowl Ka/(lbs.)	160.2	213.6	267	320.4
Bowl Shaft Diameter	1-15/16	1-15/16	1-15/16	1-15/16
Lineshaft Diameter (1)	1-1/2	1-11/16	1-15/16	1-15/16
Lineshaft Ks/Foot	6.0	8.1	10.6	10.6
"SDC" Discharge Head Size (2) (3)	16-1/2 x10	16-1/2 x10	16-1/2 x10	N/A
"LAD" Discharge Head Size (2)	20x10	20x10	20x10	20x10
Column O.D. (in.)	10-3/4	10-3/4	10-3/4	10-3/4
Column Weight/Foot (lbs.)	31.2	31.2	31.2	31.2
Column Wall Thickness (in.)	0.279	0.279	0.279	0.279

2000 GPM 17FGM				
NUMBER OF STAGES	3	4	5	6
Bowl O.D. (in.)	16.92	16.92	16.92	16.92
Bowl Kt/(lbs./Foot)	21.08	21.08	21.08	21.08
Bowl Ka/(lbs.)	195	260	325	390
Bowl Shaft Diameter	2-3/16	2-3/16	2-3/16	2-3/16
Lineshaft Diameter (1)	1-11/16	1-15/16	1-15/16	2-3/16
Lineshaft Ks/Foot	8.1	10.6	10.6	13.6
"LAD" Discharge Head Size (2)	20x10	20x10	20x10	20x10
Column O.D. (in.)	12-3/4	12-3/4	12-3/4	12-3/4
Column Weight/Foot (lbs.)	43.77	43.77	43.77	43.77
Column Wall Thickness (in.)	0.330	0.330	0.330	0.330

2500 GPM 15FGH			
NUMBER OF STAGES	3	4	5
Bowl O.D. (in.)	15.0	15.0	15.00
Bowl Kt/(lbs./Foot)	14.47	14.47	14.47
Bowl Ka/(lbs.)	160.2	213.6	267
Bowl Shaft Diameter	1-15/16	1-15/16	1-15/16
Lineshaft Diameter (1)	1-11/16	1-15/16	1-15/16
Lineshaft Ks/Foot	8.1	10.6	10.6
"SDC" Discharge Head Size (2) (3)	16-1/2 x10	16-1/2 x10	16-1/2 x10
"LAD" Discharge Head Size (2)	20x10	20x10	20x10
Column O.D. (in.)	10-3/4	10-3/4	10-3/4
Column Weight/Foot (lbs.)	31.2	31.2	31.2
Column Wall Thickness (in.)	0.279	0.279	0.279

1. For setting using more than 50 feet of column and lineshafting, consult the Factory to ensure adequate lineshaft size.
2. Discharge heads are equipped with dual registers to accommodate drivers from 10" through 24" BD.
3. U.L. Listed Only. (2000 GPM 15 FGH, 2500 GPM 15 FGH)

Technical Data
**Vertical Turbine
Fire Pump**

3000 GPM 19FGM		
NUMBER OF STAGES	2	3
Bowl O.D. (in.)	18-3/4	18-3/4
Bowl Kt/(lbs./Foot)	30	30
Bowl Ka/(lbs.)	180	260
Bowl Shaft Diameter	2-3/16	2-3/16
Lineshaft Diameter (1)'	1-15/16	2-3/16
Lineshaft Ks/Foot	10.6	13.6
"SDH" Discharge Head Size	24-1/2x12	24-1/2x12
Column O.D. (in.)	12-3/4	12-3/4
Column Weight/Foot (lbs.)	43.77	43.77
Column Wall Thickness (in.)	0.33	0.33

3500 GPM 19FGM		
NUMBER OF STAGES	2	3
Bowl O.D. (in.)	18-3/4	18-3/4
Bowl Kt/(lbs./Foot)	30	30
Bowl Ka/(lbs.)	180	260
Bowl Shaft Diameter	2-3/16	2-3/16
Lineshaft Diameter (1)'	1-15/16	2-3/16
Lineshaft Ks/Foot	10.6	13.6
"SDH" Discharge Head Size	24-1/2x12	24-1/2x12
Column O.D. (in.)	12-3/4	12-3/4
Column Weight/Foot (lbs.)	43.77	43.77
Column Wall Thickness (in.)	0.33	0.33

4000 GPM 19FGH		
NUMBER OF STAGES	2	3
Bowl O.D. (in.)	18-3/4	18-3/4
Bowl Kt/(lbs./Foot)	30	30
Bowl Ka/(lbs.)	180	260
Bowl Shaft Diameter	2-3/16	2-3/16
Lineshaft Diameter (1)'	1-15/16	2-3/16
Lineshaft Ks/Foot	10.6	13.6
"SDH" Discharge Head Size (2) (3)	24-1/2x12	24-1/2x12
Column O.D. (in.)	12-3/4	12-3/4
Column Weight/Foot (lbs.)	43.77	43.77
Column Wall Thickness (in.)	0.33	0.33

4500 GPM 19FGH		
NUMBER OF STAGES	2	3
Bowl O.D. (in.)	18-3/4	18-3/4
Bowl Kt/(lbs./Foot)	30	30
Bowl Ka/(lbs.)	180	260
Bowl Shaft Diameter	2-3/16	2-3/16
Lineshaft Diameter (1)'	1-15/16	2-3/16
Lineshaft Ks/Foot	10.6	13.6
"SDH" Discharge Head Size (2) (3)	24-1/2x12	24-1/2x12
Column O.D. (in.)	12-3/4	12-3/4
Column Weight/Foot (lbs.)	43.77	43.77
Column Wall Thickness (in.)	0.33	0.33

1. For setting using more than 50 feet of column and lineshafting, consult the Factory to ensure adequate lineshaft size.
2. Discharge heads are equipped with dual registers to accommodate drivers from 16-1/2" through 24" BD.
3. U.L. Listed Only.

Construction Features
**Vertical Turbine
 Fire Pump**

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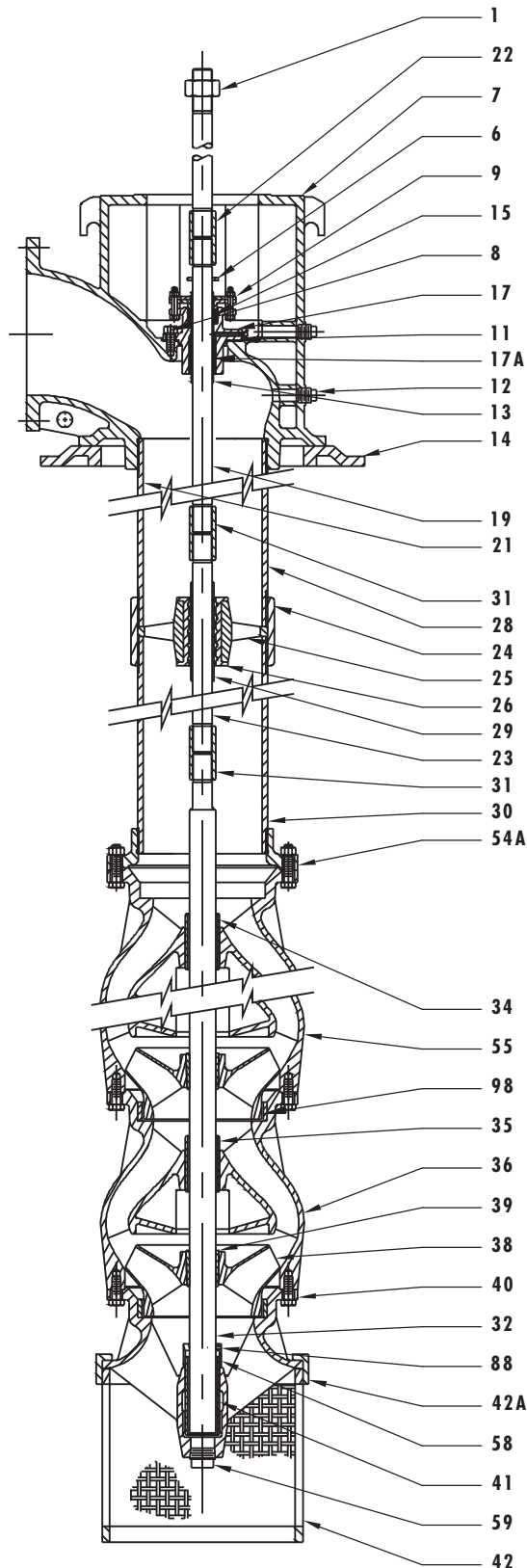
Date **June 1, 2001**

Supersedes Section 913 Page 111
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Type	Vertical Multi-Stage Turbine
Rotation	Counter-clockwise, Viewed from Driven End
Bowls	Diffuser Type, Suction Case and Intermediate Bowls with Wearing Rings, Suction Threaded, for Strainer or Flared for Clip On Strainer
Impellers	Enclosed Type, Single Suction
Bearings, Bowl	Sleeve Type, Water Lubricated
Shaft, Bowl	Water Lubricated
Column Pipe	Threaded
Coupling, Column Pipe	Threaded, Sleeve Type
Shaft, Line	Open, Water Lubricated (1)
Coupling, Lineshaft	Thread or Flanged connection, Surface Type (Refer to Factory)
Sleeve, Lineshaft	Straight
Bearing, Lineshaft	Straight, Water Lubricated (1)
Retainer, Bearing	One Piece Cast, Inter-Locked by Column Joints (For open water-lubricated) (1)
Foundation Plate	Suitable for Grouting, with Discharge Head Mounting Surface
Discharge Head	Flanged Connection, Surface Type
Stuffing Box	Packed, with Bushing and Seal Tap
Gland	One Piece
Auxiliary Connections, Discharge Head	Heat Exchanger and Packing Box Drain
Coupling, Driver	Gib Key with Locknut
Strainer	Threaded, Basket or Cornucopia; Clip-On Basket

(1) Oil lubricated when static water level is 50 to 200 feet below datum. Water level datum greater than 200 feet is not approved for fire pump service.

Assembly Drawing Vertical Turbine Fire Pump

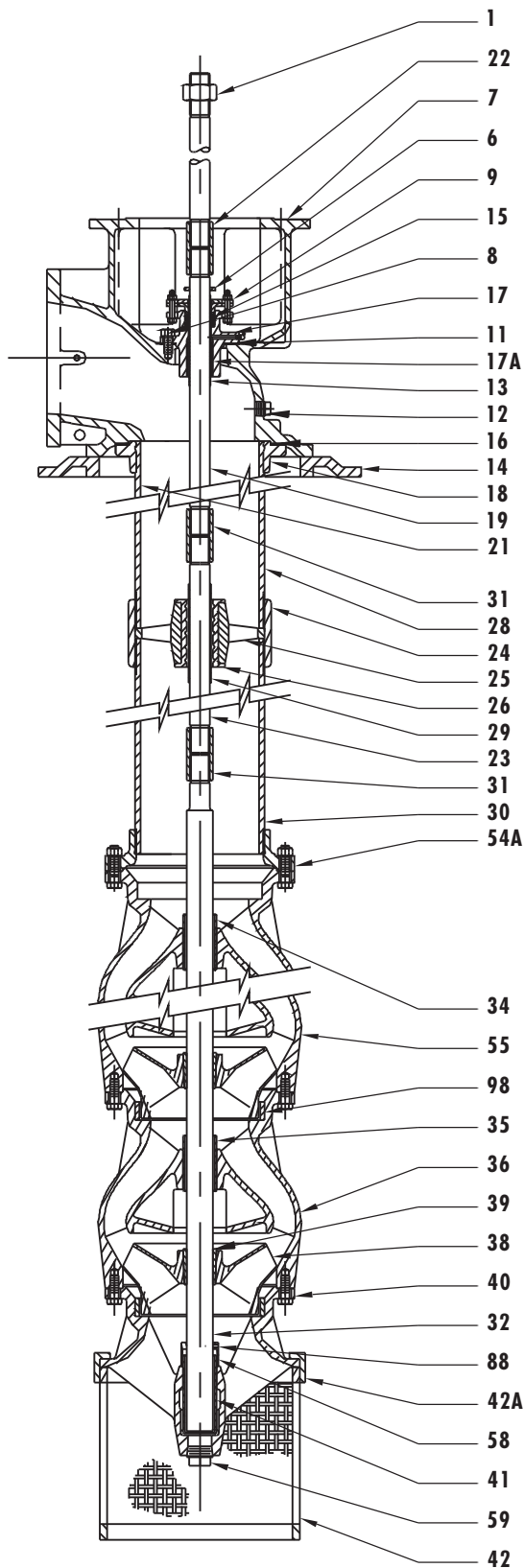


**10FEM, 11FGM, 12FCM, 13FGH, & 15FGH
SDC Discharge Head – Water Lubrication Only**

ITEM	DESCRIPTION	MATERIAL
1	Adjusting Nut	Steel
6	Water Slinger	Neoprene
7	Discharge Head	Cast Iron
8	Capscrew, Packing Box	Steel Gr. 2
9	Gland Half	Bronze
11	Gasket, Packing Box	Tag Board
12	Pre Lube Plug (2)	Cast Iron
13	Sleeve, Top Shaft	Stainless Steel
14	Foundation Plate	Cast Iron
15	Packing	Syn. Graphite Impreg.
17	Packing Box	Cast Iron
17A	Bushing, Packing Box	Bronze
19	Top Shaft	Steel
21	Column Pipe, Top	Steel
22	Coupling, Lineshaft	Steel
23	Lineshaft	Steel
24	Coupling, Column	Steel
25	Bearing Retainer	Bronze
26	Bearing	Neoprene
28	Column Pipe, Intermediate	Steel
29	Sleeve, Intermediate Shaft	Stainless Steel
30	Column Pipe, Bottom	Steel
31	Coupling, Pump Shaft	Steel
32	Pump Shaft	Stainless Steel
34	Bearing, Top Bowl	Bronze
35	Bearing, Intermediate Bowl	Bronze
36	Bowl, Intermediate	Cast Iron
38	Impeller	Bronze
39	Lock Collet, Impeller	Steel
40	Bell, Suction	Cast Iron
41	Bearing, Suction Bell	Bronze
42	Strainer	Bronze
42A	Clip, Strainer	Bronze
54A	Flange, Adapter	Cast Iron
55	Bowl, Top	Cast Iron
58	Sand Collar	Steel
59	Plug, Suction Bell	Cast Iron
88	Set Screw, Sand Collar	Steel
98	Bowl, Wear Ring	Bronze

Sectional Drawing
**Vertical Turbine
 Fire Pump**

**10FEM, 11FGM, 12FCM, 13FGH, & 15FGH
 LAD Discharge Head – Water Lubrication Only**



ITEM	DESCRIPTION	MATERIAL
1	Adjusting Nut	Steel
6	Water Slinger	Neoprene
7	Discharge Head	Cast Iron
8	Capscrew, Packing Box	Steel Gr. 2
9	Gland Half	Bronze
11	Gasket, Packing Box	Tag Board
12	Pre Lube Plug (2)	Cast Iron
13	Sleeve, Top Shaft	Stainless Steel
14	Foundation Plate	Cast Iron
15	Packing	Syn. Graphite Impreg.
16	Gasket, Top Flange	Tag Board
17	Packing Box	Cast Iron
17A	Bushing, Packing Box	Bronze
18	Flange, Top Column	Cast Iron
19	Top Shaft	Steel
21	Column Pipe, Top	Steel
22	Coupling, Lineshaft	Steel
23	Lineshaft	Steel
24	Coupling, Column	Steel
25	Bearing Retainer	Bronze
26	Bearing	Neoprene
28	Column Pipe, Intermediate	Steel
29	Sleeve, Intermediate Shaft	Stainless Steel
30	Column Pipe, Bottom	Steel
31	Coupling, Pump Shaft	Steel
32	Pump Shaft	Stainless Steel
34	Bearing, Top Bowl	Bronze
35	Bearing, Intermediate Bowl	Bronze
36	Bowl, Intermediate	Cast Iron
38	Impeller	Bronze
39	Lock Collet, Impeller	Steel
40	Bell, Suction	Cast Iron
41	Bearing, Suction Bell	Bronze
42	Strainer	Bronze
42A	Clip, Strainer	Bronze
54A	Flange, Adapter	Cast Iron
55	Bowl, Top	Cast Iron
58	Sand Collar	Steel
59	Plug, Suction Bell	Cast Iron
88	Set Screw, Sand Collar	Steel
98	Bowl, Wear Ring	Bronze

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Date **April 1, 2006**

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Dated June 1, 2001

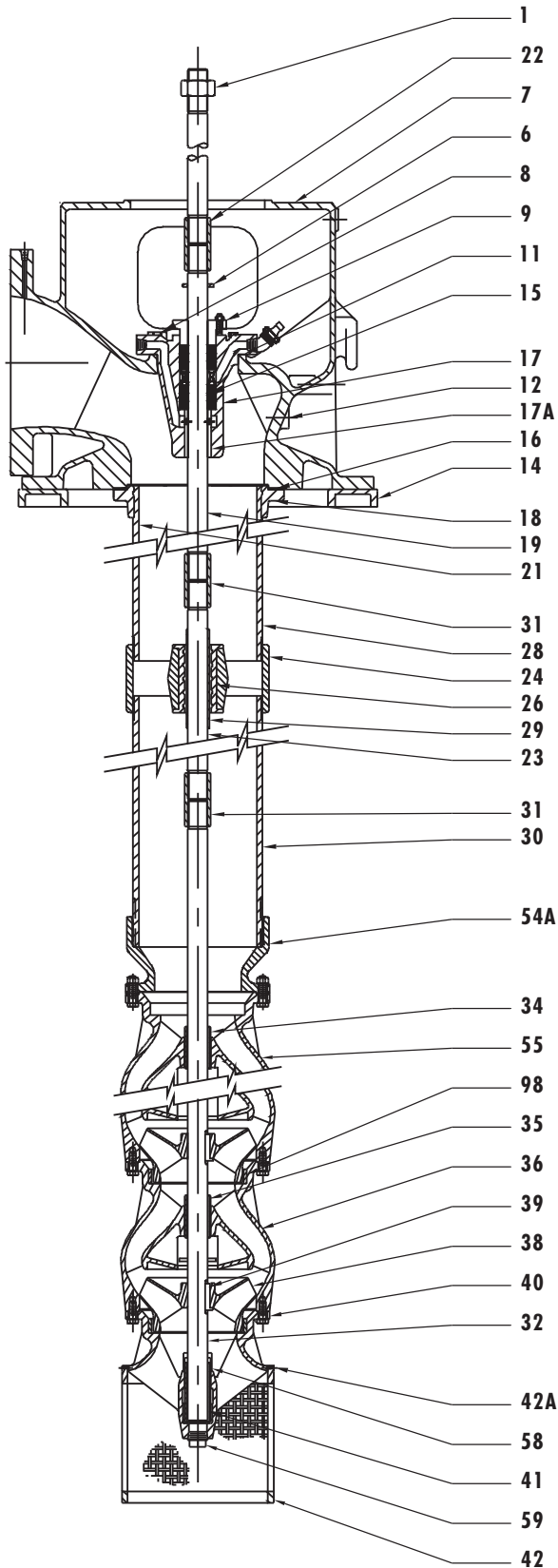
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Assembly Drawing Vertical Turbine Fire Pump

Section **914** Page **115**

Date **June 1, 2001**

Supersedes Section 913 Page 115
Dated November 1, 1999



19FGM & 19FGH SDH Discharge Head – Water Lubrication Only

ITEM	DESCRIPTION	MATERIAL
1	Adjusting Nut	Bronze
6	Water Slinger	Neoprene
7	Discharge Head	Cast Iron
8	Capscrew, Packing Box	Steel Gr. 2
9	Gland Half	Bronze
11	Gasket, Packing Box	Tag Board
12	Pre Lube Plug	Cast Iron
14	Foundation Plate	Cast Iron
15	Packing	Acrylic
16	Gasket, Top Flange	Tag Board
17	Packing Box	Cast Iron
17A	Bushing, Packing Box	Bronze
18	Flange, Top Column	Cast Iron
19	Top Shaft	Stainless Steel
21	Column Pipe, Top	Steel
22	Coupling, Lineshaft	Steel
23	Lineshaft	Steel
24	Coupling, Combination	Cast Iron
26	Bearing	Neoprene
28	Column Pipe, Intermediate	Steel
29	Sleeve, Intermediate Shaft	Stainless Steel
30	Column Pipe, Bottom	Steel
31	Coupling, Pump Shaft	Steel
32	Pump Shaft	Stainless Steel
34	Bearing, Top Bowl	Bronze
35	Bearing, Intermediate Bowl	Bronze
36	Bowl, Intermediate	Cast Iron
38	Impeller	Bronze
39	Gib Key, Impeller	Stainless Steel
40	Bell, Suction	Cast Iron
41	Bearing, Suction Bell	Bronze
42	Strainer	Bronze
42A	Machine Screw, Strainer	Stainless Steel
54A	Flange, Adapter	Cast Iron
55	Bowl, Top	Cast Iron
58	Sand Collar	Rubber
59	Plug, Suction Bell	Cast Iron
98	Bowl, Wear Ring	Bronze

Material Specifications

Vertical Turbine Fire Pump

ITEM	DESCRIPTION	MATERIAL	SPECIFICATION
1	Adjusting Nut	Steel	A108GR12L14
6	Water Slinger	Neoprene	Commercial
7	Discharge Head	Cast Iron	A48-CL30
8	Packing Capscrew	Steel Grade 2	Commercial
9	Gland Half	Bronze	B584 AL836
11	Gasket Packing Box	Tag Board	Commercial
12	Pre-Lube Plug (2)	Cast Iron	Commercial
13	Sleeve Top Shaft	Stainless Steel	AISI 304
14	Floor Plate	Cast Iron	A48-CL30
15	Packing	Syn. Graphite Impreg.	Commercial
16	Gasket Top Flange	Tag Board	Commercial
17	Packing Box	Cast Iron	A48-CL30
17A	Bushing Packing Box	Bronze	B505 AL932
18	Flange Top Column	Cast Iron	A48-CL30
19	Top Shaft	Steel	AISI 1045
21	Top Column Pipe	Steel	A53 or A120
22	Coupling Lineshaft	Steel	A108 GR12L14
23	Lineshaft	Steel	AISI 1045
24	Coupling Column	Steel	A53 or A120
25	Bearing Retainer	Bronze	B584 AL836
26	Bearing	Neoprene	Commercial
28	Column Pipe, Intermediate	Steel	A53 or A120
29	Sleeve Intermediate Shaft	Stainless Steel	AISI 304
30	Column Pipe, Bottom	Steel	A53 or A120
31	Coupling Pump Shaft	Steel	A108 GR12L14
32	Pump Shaft	Stainless Steel	AISI 416
34	Bearing Top Bowl	Bronze	B505 AL932
35	Bearing Intermediate Bowl	Bronze	B505 AL932
36	Bowl Intermediate	Cast Iron	A48-CL30
38	Impeller	Bronze (3)	B584 AL836
39	Lock Collet Impeller	Steel	A108 GR12L14
40	Bell Suction	Cast Iron	A48-CL30
41	Bearing Suction Bell	Bronze	B505 AL932
42	Strainer	Brass	Commercial
42A	Clip, Strainer	Brass	Commercial
54A	Flange Adapter	Cast Iron	A48-CL30
55	Top Bowl	Cast Iron	A48-CL30
58	Sand Collar	Steel	A108 GR12L14
59	Plug Suction Bell	Cast Iron	Commercial
88	Set Screw, Sand Collar	Steel	SAE Bolt Steel
98	Bowl Wear Ring	Bronze	B505 AL932

NOTE:

1. All material specifications are ASTM except where specified and are for description of chemistry only.
 2. When applied with diesel engine driver, remove plug and connect to engine heat exchanger for cooling water.
 3. Manufacturer's option to furnish bronze, per B548-AL875.
- Subject to change without notice.

Typical Specifications
**Vertical Turbine
 Fire Pump**
 Motor Driven

A standard length (type SL) flexible drive shaft is required to connect the fire pump engine to the right angle gear when applied with a vertical turbine pump.

To select the correct shaft size:

1. Select the engine speed in the left hand column.
2. Follow the row to the right to a horsepower value which meets or exceeds the requirements of your application. (Note: These values include a 2.0 service factor, angle not to exceed 3 degrees, and a B-10 bearing life expectation of 2500 hours.
3. Follow the column up to select the correct shaft size.

		SHAFT SIZE SERIES						
		48	55	61	71	81	88	91
Engine Speeds	1750	103	132	201	274	382	527	744
	1900	108	138	211	286	401	553	
	2100	116	149	227	309	430	594	838
	2200	120	154					
	2300	124	158	242	330	459	633	
	2400	127	163					
	2600	135	173					
	2800	142	182					
	3000	149	191					
Standard Shaft Length		24"	24"	24"	24"	36"	36"	36"

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