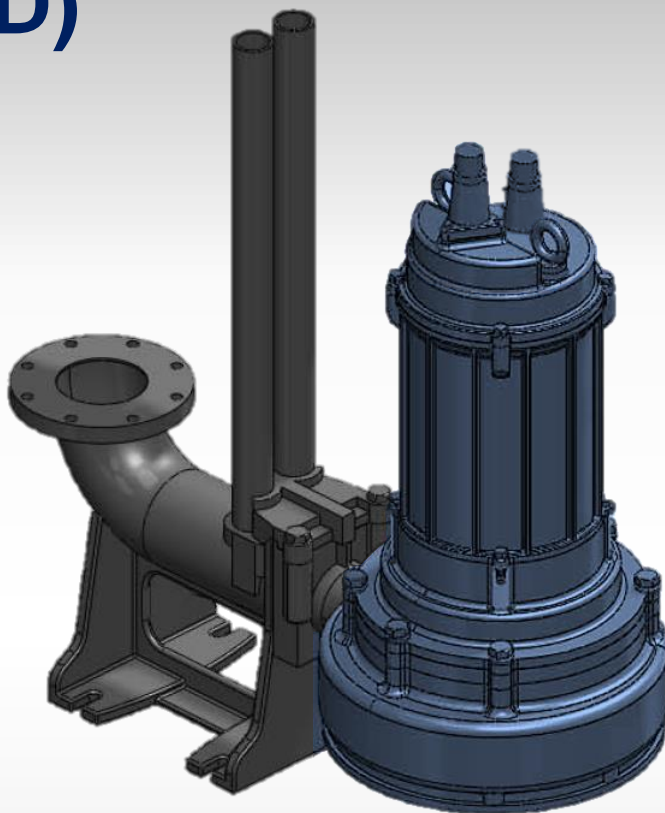


TYPE

.....

MSC(QD)

SUBMERSIBLE CHOPPER PUMP (QUICK DISCONNECT)



**ALSO AVAILABLE IN
FREE STANDING DESIGN**

**PUMP WITH DISCHARGE SIZE
3" THRU 4". CAPACITIES TO
500 GPM, HEADS TO 65', 3450
AND 1750 RPM OPERATION**

**HARDENED TUNGSTEN CARBIDE
EDGED ROTATING IMPELLER
CHOPPING AGAINST STATIONARY
CHROMIUM SUCTION PLATE**

HIGH LIGHT

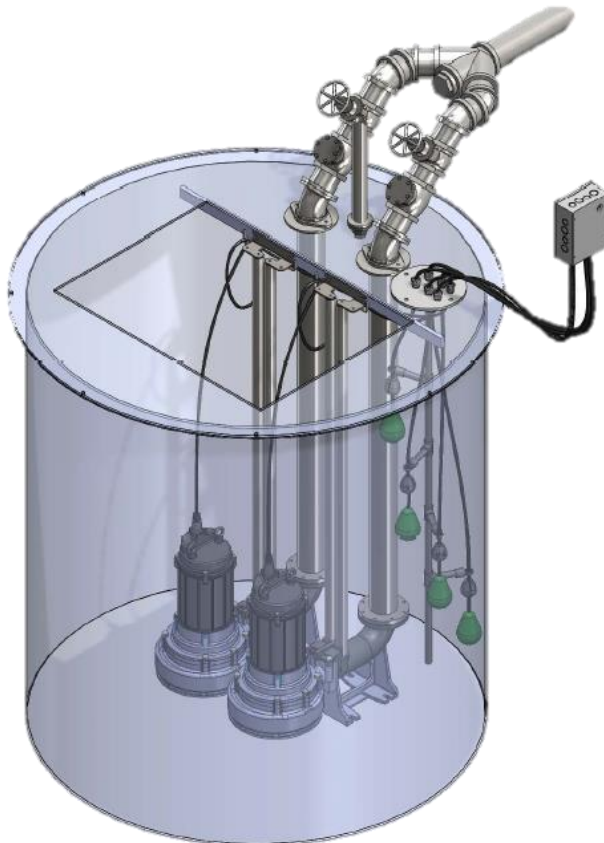
- ⌘ Motors are fully submersible
- ⌘ Pumps are non-clog type
- ⌘ Indoor and outdoor installation
- ⌘ Easy installation and removal
- ⌘ Standard Thermal and Moisture Sensor
- ⌘ Harden impeller edge and suction plate
- ⌘ For sewage, effluent, and industrial waste water
- ⌘ Control system available
- ⌘ Fiberglass and steel basin available

INTRODUCTION

Sewage pumps provide for the lifting and disposal of sewage and sewage related fluids from retaining basins or concrete pits and are pumped to city water disposal lines where these fluids cannot drain under gravity conditions alone. Typically located below grade, sewage pumps provide building owners the ability to design and locate restroom or other facilities below ground that are serviced by these sewage lift stations. In addition to their use in buildings, Federal Pump's MSC chopper pumps are used in municipalities, large residential buildings, below ground parking structures, industrial water facilities, and other areas where these sewage and water particulates are collected and pumped to other locations

Federal Pump's MSC chopper pump differs from industry standard centrifugal sewage pumps that solids through its single-vane impeller design by shredding and grinding these solids within the pump; not allowing for larger solids the opportunity to clog the pump, piping or disposal system. The hardened tungsten carbide edged rotating impeller cutting and chopping against the stationary chromium suction plate reduces solids to particles and prevent any downstream clogging that is commonplace when larger solids are pumped through the impeller and into the piping system

Supported by heavy duty industrial grade shafts, bearings, and increased motor insulation, the MSC pump provide 20 starts per hours and is backed by Federal Pump's one year limited warranty.



Compatible with Federal Pump's FBS, SBS, TCS, NPS, and POS simplex, and duplex control system, MSC chopper pump system supports 24/7 automatic operation for standard sewage pump service.

Available in Free Standing or Quick Disconnect Design(QD), the MSC product offering provides the end user with trouble and maintenance free operation when designed, installed, and maintained properly

PRODUCT DETAILS

CABLE

Neoprene power cable sheath for temperatures to 80°C (170°F)

MOTOR

Submersible air-filled motor copper wound- Class B insulation(available in Class F for higher temperature requirement)

BEARING

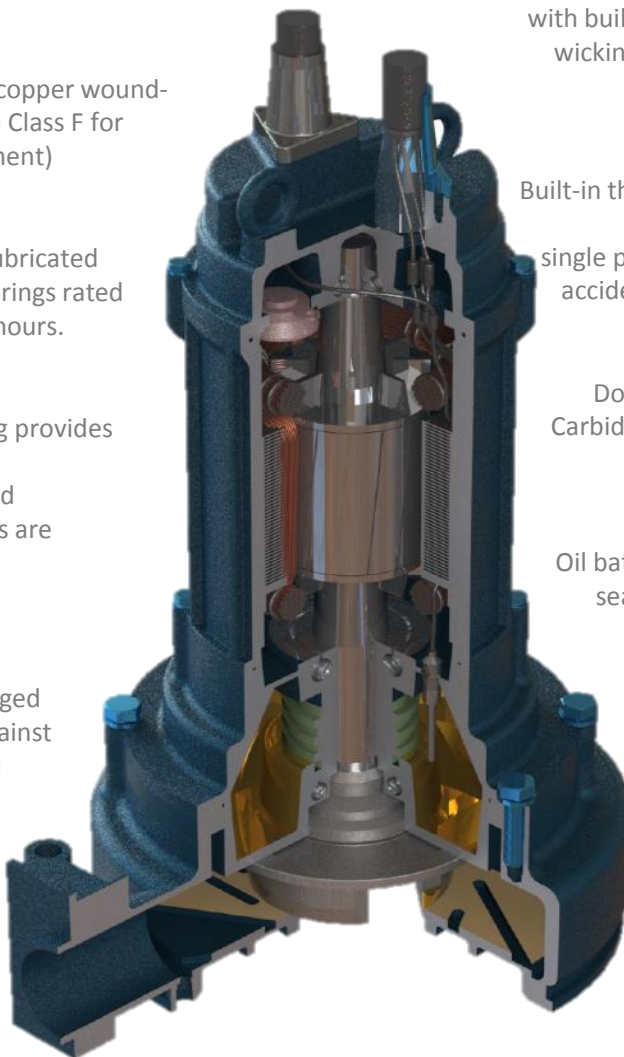
Double shield permanently lubricated high temperature C3 ball bearings rated for B₁₀ bearing life of 60,000 hours.

CASING

Rugged cast iron pump casing provides for metal to metal guide rail connections where pump and discharge mating connections are sealed tight for optimum Performance

IMPELLER

Sintered tungsten carbide edged cast iron impeller rotating against high chromium cast iron field replaceable and adjustable suction plate — with a Brinell Hardness of 550— to reduce incoming solids



CABLE SEALING

Innovative triple protection motor/cable ends sealed with epoxy resin and molded rubber with built-in power cord strain relief. Anti-wicking block is used to eliminate water intrusion into the motor

THERMAL PROTECTION

Built-in thermal motor protection prevents motor failure due to overloading, single phasing (on three phase units) and accidental extended dry-run conditions

SEAL

Double mechanical seals with silicon Carbide faces for extended seal life with nitrile-buna elastomer

SEAL LUBRICATION

Oil bath seal housing provides optimum seal lubrication and extends seal life while keeping mechanical seal from pumped media.

SEAL FAILURE

Seal failure protection senses water intrusion into seal chamber with auto pump shut down and alarm condition provided by the control panel

SELECTION TABLE*

MODEL NO	G.P.M.	DISCH. HEAD [FEET]	MOTOR H.P.	DISCH. SIZE [INCHES]	MODEL NO	G.P.M.	DISCH. HEAD [FEET]	MOTOR H.P.	DISCH. SIZE [INCHES]
MSC(QD)-3A-2*-2-3*	50	33	2	3	MSC(QD)-4C-3-4-3*	225	18	3	4
MSC(QD)-4C-3*-4-3*		33	3	4	MSC(QD)-4C-5-4-3*		34	5	4
MSC(QD)-4C-5*-4-3*		52	5	4	MSC(QD)-4E-7½-4-3*		41	7 1/2	4
MSC(QD)-4E-7½*-4-3*		58	7 1/2	4	MSC(QD)-4E-10-4-3*		53	10	4
MSC(QD)-4E-10*-4-3*		72	10	4	MSC(QD)-4C-3-4-3*	250	15	3	4
MSC(QD)-3A-2*-2-3*	75	28	2	3	MSC(QD)-4C-5-4-3*		32	5	4
MSC(QD)-4C-3*-4-3*		37	3	4	MSC(QD)-4E-7½-4-3*		38	7 1/2	4
MSC(QD)-4C-5*-4-3*		48	5	4	MSC(QD)-4E-10-4-3*		50	10	4
MSC(QD)-4E-7½*-4-3*		53	7 1/2	4	MSC(QD)-4C-5-4-3*	300	27	5	4
MSC(QD)-4E-10*-4-3*		69	10	4	MSC(QD)-4E-7½-4-3*		35	7 1/2	4
MSC(QD)-3A-2*-2-3*	100	24	2	3	MSC(QD)-4E-10-4-3*		44	10	4
MSC(QD)-4C-3*-4-3*		35	3	4	MSC(QD)-4C-5-4-3*	350	22	5	4
MSC(QD)-4C-5*-4-3*		47	5	4	MSC(QD)-4E-7½-4-3*		30	7 1/2	4
MSC(QD)-4E-7½*-4-3*		52	7 1/2	4	MSC(QD)-4E-10-4-3*		38	10	4
MSC(QD)-4E-10*-4-3*		66	10	4	MSC(QD)-4C-5-4-3*	400	15	5	4
MSC(QD)-3A-2*-2-3*	125	19	2	3	MSC(QD)-4E-7½-4-3*		26	7 1/2	4
MSC(QD)-4C-3*-4-3*		32	3	4	MSC(QD)-4E-10-4-3*		33	10	4
MSC(QD)-4C-5*-4-3*		44	5	4	MSC(QD)-4E-7½-4-3*	500	15	7 1/2	4
MSC(QD)-4E-7½*-4-3*		50	7 1/2	4	MSC(QD)-4E-10-4-3*		22	10	4
MSC(QD)-4E-10*-4-3*		62	10	4					
MSC(QD)-3A-2*-2-3*	150	15	2	3					
MSC(QD)-4C-3*-4-3*		28	3	4					
MSC(QD)-4C-5*-4-3*		42	5	4					
MSC(QD)-4E-7½*-4-3*		48	7 1/2	4					
MSC(QD)-4E-10*-4-3*		60	10	4					
MSC(QD)-3A-2*-2-3*	175	10	2	3		500	15	7 1/2	4
MSC(QD)-4C-3*-4-3*		25	3	4			22	10	4
MSC(QD)-4C-5*-4-3*		38	5	4					
MSC(QD)-4E-7½*-4-3*		45	7 1/2	4					
MSC(QD)-4E-10*-4-3*		58	10	4					
MSC(QD)-4C-3*-4-3*	200	22	3	4					
MSC(QD)-4C-5*-4-3*		37	5	4					
MSC(QD)-4E-7½*-4-3*		42	7 1/2	4					
MSC(QD)-4E-10*-4-3*		55	10	4					

MSC(QD)-4C-5H-4-3D

PUMP SERIES

DISCHARGE SIZE & COVER DESIGN

HORSEPOWER (ADD "H" FOR HIGH TEMP)

RPM

ELECTRICAL RATING (PHASE & VOLTAGE)3*

*Refer to pump performance curve for pump operation over its entire range.

*Refer to page 20 for amp draw on the each pump and model selection

* H = High Temperature

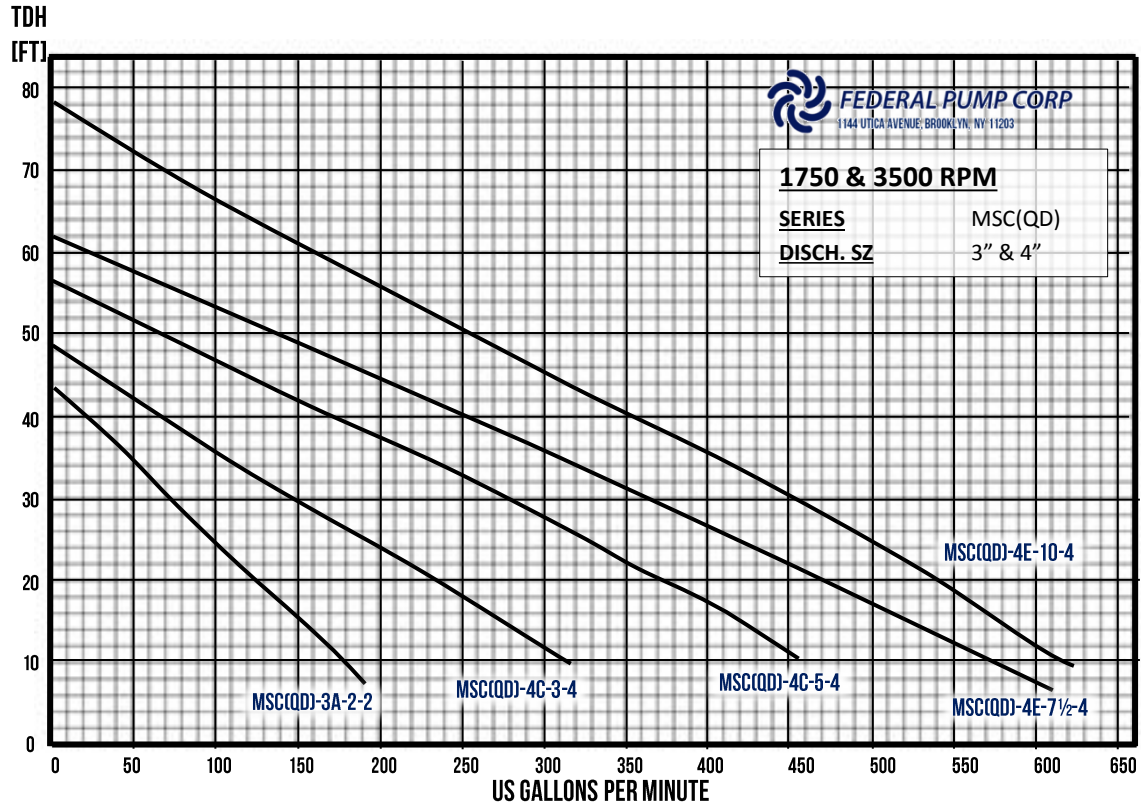
3* 3 = 3PH | B = 208V C = 230V D = 460V

i.e. 3D = WIRED for 3PH/460V

TYPE

MSC(QD)

SERIES PERFORMANCE RANGE

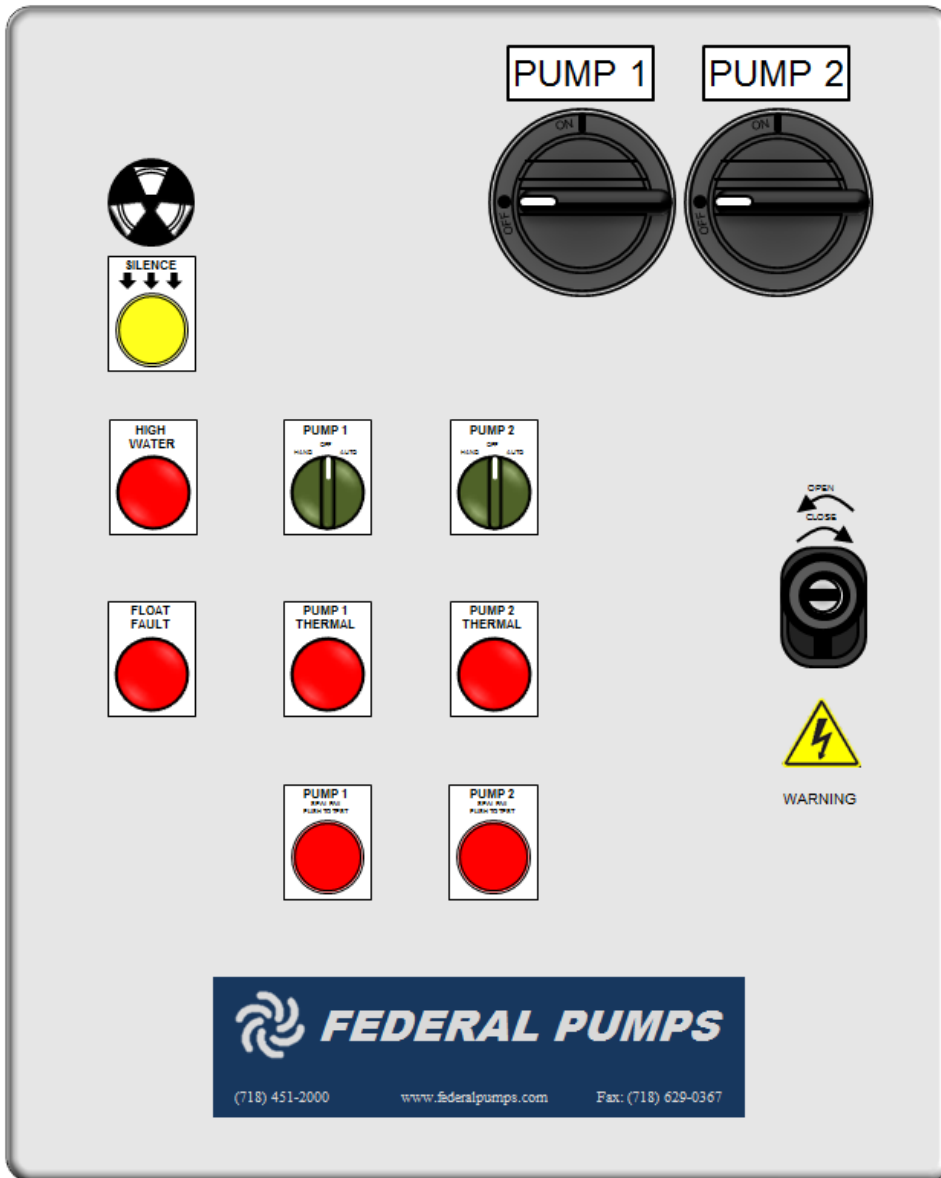


MODEL	MOTOR HP	DISCH. SIZE [INCHES]	RPM	IMPELLER	WEIGHT [lb.]
MSC(QD)-3A-2-2-3*	2	3	3500	CFP-20A	128
MSC(QD)-4C-3-4-3*	3	4	1750	CFP-30A	186
MSC(QD)-4C-5-4-3*	5	4	1750	CFP-50A	222
MSC(QD)-4E-7½-4-3*	7½	4	1750	CFP-75A	326
MSC(QD)-4E-10-4-3*	10	4	1750	CFP-100A	358

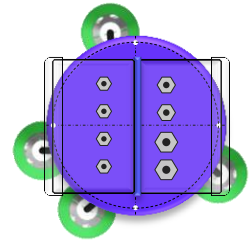
RECOMMENDED MINIMUM PIT & BASIN SIZES

Pump Series	Pump Model	Round		Square	
		Simplex	Duplex	Simplex	Duplex
MSC(QD)	MSC(QD)-3A-2-2	36" dia.	42" dia.	36" X 36"	42" X 42"
	MSC(QD)-4C-3-4	42" dia.	48" dia.	42" X 42"	48" X 48"
	MSC(QD)-4C-5-4	48" dia.	60" dia.	48" X 48"	54" X 54"
	MSC(QD)-4E-7½-4	48" dia.	60" dia.	48" X 48"	54" X 54"
	MSC(QD)-4E-10-4	60" dia.	60" dia.	54" X 54"	60" X 60"

SUGGESTED CONTROLS



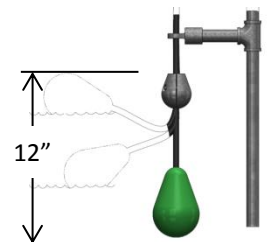
PILOT DEVICE



Top View



Side View



Float Detail

SBS Control Panel & Pilot Device (Standard Items)

- ⌘ NEMA Type 1,4 & 12
- ⌘ Fused Discount Switch/Circuit Breaker
- ⌘ Across-the-line Magnetic Starter
- ⌘ H-O-A Switch with integral Pilot Light
- ⌘ Control Circuit Transformer (24V)
- ⌘ HWA Light & Adjustable Buzzer
- ⌘ HWA Silencing Push Button
- ⌘ Pump Thermal Alarm Light
- ⌘ Pump Moisture Detection Light

SUGGESTED SPECIFICATIONS: (DUPLEX SEWAGE PUMPS)

Pumps

Furnish and install where shown in the plans a Federal Pump Model MSC(QD) quick disconnect submersible chopper Duplex Sewage Pump system with each pump flow (GPM) and TDH (FT) rated as shown on the plans. Casing, Impeller, discharge elbow, and motor frame shall be manufactured from gray cast iron with each pump having a field adjustable and or replaceable, high chrome iron cutter plate. An adjustable stainless steel base with threaded rods will be used to mount the pump to the basin or concrete pit. Internal and external surfaces coming into contact with the fluid shall be protected by a fused polymer coating. All exposed fasteners shall be stainless steel. All units shall be furnished with a base mounted discharge elbow with discharge flange connections and stainless steel base as shown in the plans. Pump to elbow connection shall be metal to metal. Impellers shall be of the single-vane semi-open solids handling design equipped with tungsten carbide edge and shall be slip fit to the shaft and key driven. All units shall be furnished with a dual inside mechanical shaft seal located completely out of the fluid, running in a separate oil filled chamber and further protected by an exclusionary oil seal located between the bottom seal faces and the fluid being pumped. Pumps shall be provided with silicon carbide versus silicon carbide upper and lower mechanical seal faces. Mechanical seal hardware shall be stainless steel.

Motors

Motors will be air-filled and provided with 20 feet of submersible power cable and shall be NEMA MG-1, Design Type B equivalent and rated at full load amps. Motor(s) shall have a 1.15 service factor and shall be rated for 20 starts per hour. Motor(s) shall be air filled, copper wound, class E or F insulated with built in thermal and over current protection for each winding. Motor shaft shall be 420 stainless steel and shall be supported by two permanently lubricated, high temperature ball bearings, with a B-10 life rating at best efficiency point of 60,000 hours. The bottom bearing on pumps rated 7.5 HP and below shall be a single row, double shielded, C3, deep groove type ball bearing. The top bearing on all units shall be a single row, double shielded, C3, deep groove type ball bearing. The pump power cable shall be suitable for submersible pump applications and shall be field replaceable utilizing standard submersible pump cable. The cable entrance shall incorporate built in strain relief and a combination three way mechanical compression sealing with a fatigue reducing/thermal expansion boot. The cable entrance assembly shall contain a anti-wicking block to eliminate water incursion into the motor due to capillary wicking should the power cable be accidentally damaged. Motors will be provided with thermal overload protection and seal failure sensors.

Controls

Pump manufacturer shall provide a Federal Pump series SBS Duplex Level Control system including Duplex Control Panel (for wall mounting) and accessory alarms as detailed in this specification. Duplex Sewage Pump Controller shall include: individual circuit breakers with thru-the-door disconnect handles, single-feed power input terminal block, across-the line type magnetic starters with overload protection, HOA selector switches with integral pilot run lights, control circuit transformer with fused secondary, automatic lead/lag alternator, high water alarm light, seal failure alarm light and common alarm horn with silence push button, control relays, numbered terminal strip, and N/O circuits for BMS. The controls shall be provided in a NEMA 1-UL 508A approved enclosure (or as shown in the plans). The SBS control package will include a NEMA 4 junction box and mounting mechanism with float switch cable compression fittings to ensure float switches remain aligned along with (4) non-mercury type tilt level switches. The contractor shall set the level switches as shown in the plans and ensure the high water alarm is set at least 6" below the bottom of the invert.

Basin/Pit Accessories

The pumps will be installed as shown in the plans. The pump manufacturer will provide the appropriate sized aluminum gas tight cover assembly with hinged cover to allow the pumps to be lifted out of the pit for service and repair. Pump manufacturer will provide stainless steel base for mounting in basin bottom, base elbow, guide bar brackets for mounting at upper basin position, stainless steel guide rails that connect to lower base mounted elbow and stainless steel lifting cable connected to lifting lugs provided in motor assembly.

Sequence of Operation:

Upon rise in liquid level to a predetermined point the lead float switch will initiate lead pump operation and complete the pumping cycle to a predetermined pumps off set point. If the influent conditions rise above a certain rate where the lead pump alone cannot satisfy demand, the lag pump will start at a predetermined set point and work in parallel with the lead pump to satisfy system conditions and pump down to pumps off level. The lead and lag pumps will alternate cycles every 24 hours for even pump loading. In the event a high water level condition occurs, the high water level alarm float switch will activate an alarm horn and light to signal the condition. In the event the lead or lag pump fails the alternate pump will maintain pump conditions until the level is reduced to pumps off set point. An alarm light will be activated along with the alarm horn should one of the pumps fail notifying the user of a failed pump condition.

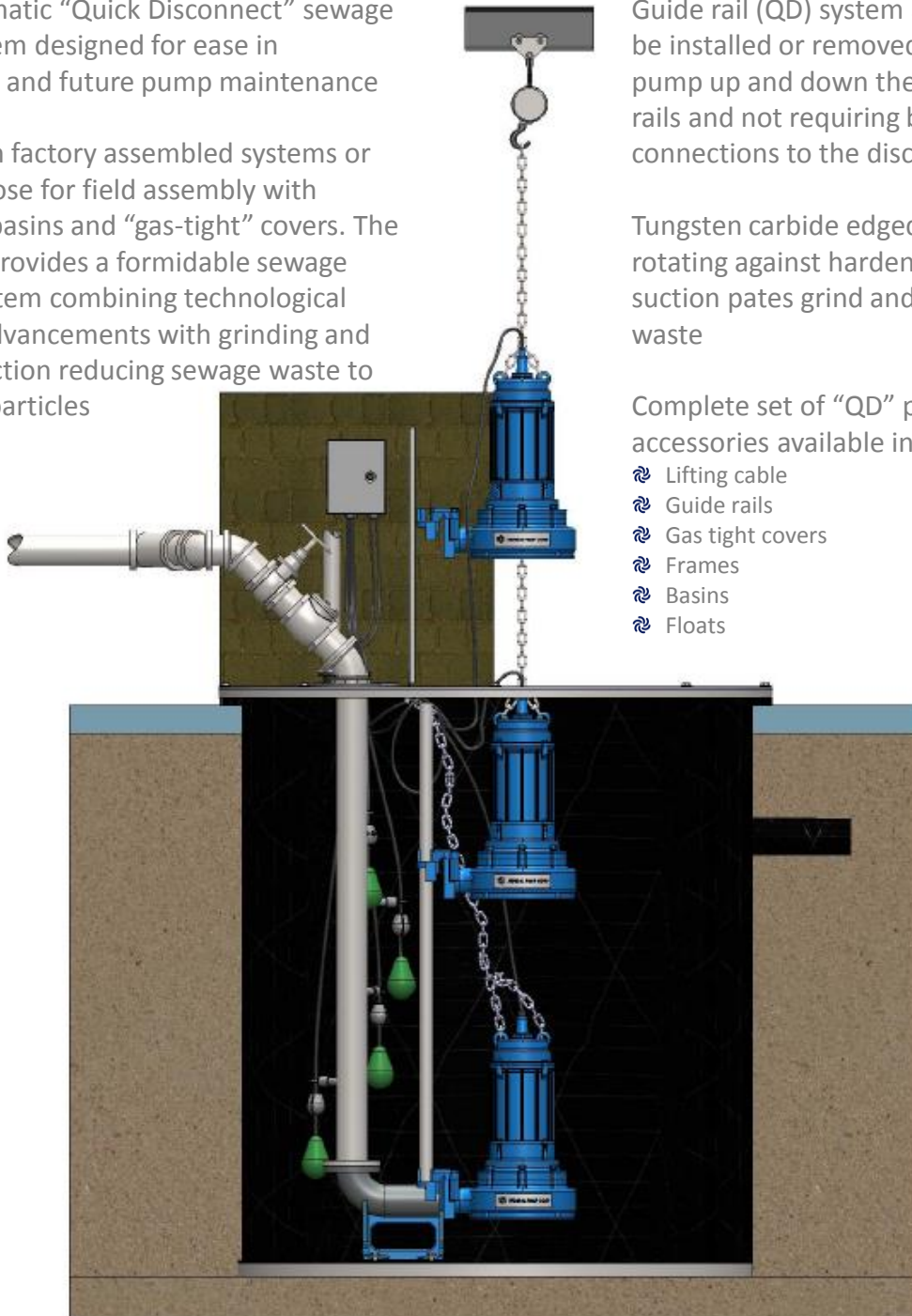
Start-Up

Pump manufacturer representative will review the installation and be available for start-up. Start-up will include a minimum of (4) complete run cycles, and simulated alarm conditions to ensure system operation is complete and to specification.

SYSTEM SCHEMATIC

Fully automatic “Quick Disconnect” sewage pump system designed for ease in installation and future pump maintenance

Available in factory assembled systems or shipped loose for field assembly with fiberglass basins and “gas-tight” covers. The MSC(QD) provides a formidable sewage ejector system combining technological material advancements with grinding and shearing action reducing sewage waste to shredded particles



Guide rail (QD) system allows pumps to be installed or removed by guiding the pump up and down the installed guide rails and not requiring bolted connections to the discharge piping

Tungsten carbide edged impellers rotating against hardened chromium suction pates grind and shear sewage waste

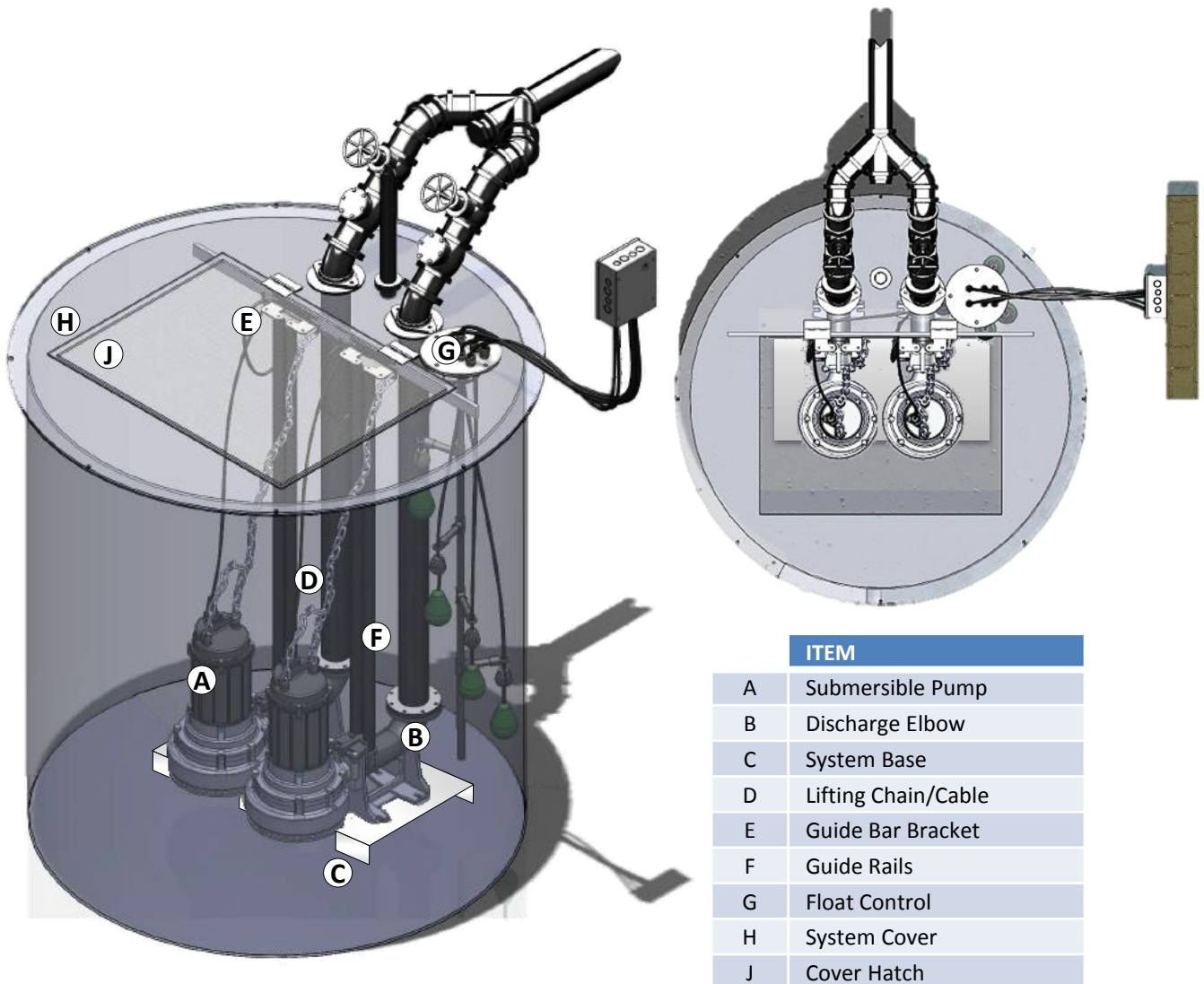
Complete set of “QD” packaged system accessories available includes

- ⌘ Lifting cable
- ⌘ Guide rails
- ⌘ Gas tight covers
- ⌘ Frames
- ⌘ Basins
- ⌘ Floats

SYSTEM SCHEMATIC

Components provided for field installation or factory assembled for ease and speed in installation are available. External piping from pump discharge to system are provided for in the field by the installing contractor

Typical installation is shown with in-ground fiberglass basin (standard sizes from 24" ~ 72" Ø) with steel base elbows to fiberglass basin floor. Installation shows hinged aluminum cover(available in steel diamond plate or other materials).



PUMP & BASIN SIZING

PUMP CAPACITY

Sewage pump are used to handle sewage and other liquids containing solids where gravity drainage is not practical

Single pump units may be used but duplex units are recommended so that, in the event of failure of one pump, the second pump is available to handle the in-flow. Duplex units are required by the National Plumbing Code when more than [6] water closets are handled.

Each pump of a duplex set is sized to handle the full pump capacity. Pump capacity can be determined by the number of water closets to be handled. The capacities shown below apply to single pumps and to each pump of a duplex set.

No. of Water Closets Handled	Pump Capacity (G.P.M)
1	50
2 or 3	75
4 or 5	100
6 or 7	125
8 to 10	150
11 to 15	200
16 to 20	250
21 to 25	300
26 to 30	350
31 to 35	400
36 to 40	450

TABLE 1. Water closet vs pump capacity

Fixtures other than water closets need not be considered when using the above table. However, if outside drainage (see below) is greater than half the pump capacity shown above, add the excess amount of outside drainage to the pump capacity.

OUTSIDE DRAINAGE

Paved Area: 10 G.P.M per 1,000 sq. ft. of area.

Tile Drainage Bed (Sandy Soil): 15 G.P.M per 1,000 sq. ft. of area.

Tile Drainage Bed (Clay Soil): 8 G.P.M per 1,000 sq. ft. of area.

Roof Drainage: 30 G.P.M. per 1,000 sq. ft. of area

UNUSUAL EXTRA IN-FLOW FACTOR

If drainage is to be handled by the sewage pumps from unusual sources such as boiler blow-down*, air conditioning condensate, pools, display fountains, wash racks, etc., add this additional in-flow to the pump capacity.

*Note that according to the Department of Environment Protection: Bureau of Wastewater Treatment, discharge to Sanitary or Combined Sewer cannot exceed 150°F. Please contact factory for solution on keeping the temperature below 150°F.

PUMP & BASIN SIZING

PUMP DISCHARGE HEAD

The pump discharge head includes the following three elements:

Static Head The difference in elevation between the lowest water level in the basin (generally 1 ft. above the bottom of the basin) and the maximum height of the discharge line.

Friction Loss of head in the discharge line from friction through pipe, valves and other fittings.

Back Pressure In cases where the fun-off sewage is charged, add for the sewage back pressure (generally from 2 ft. to 8 ft.)

Example: Sewage basin is 5 ft. deep and set in ground with top flush with finished floor of basement. Basement floor is 10 ft. below highest point of pump discharge line. Pump capacity is 100 G.P.M. Size of discharge line is 4"

Static head	14 ft.
Friction loss thru discharge pipe	2 ft.
Friction loss thru discharge valves & fittings ...	3 ft.
Back pressure in charged sewer	4 ft.
Total pump discharge head	23 ft.

PIT OR BASIN SIZE

For most installations, pit or basin diameters (or squares) can be the minimums shown in **Table 1**. In some cases, the minimum basin diameters shown can be reduced if space conditions require (consult the factory).

Pit or basin depth should be sufficient to allow 3ft. Below the inlet connection. The pump turn-on level is just below the inlet connection and the pump turn-off lee is 1 ft. above the bottom of the basin. Therefore, each pump cycle will pump at least 2ft. of water.

If job conditions require basins to be shallower than recommended, increase the basin diameter to accommodate for the basin capacity Capacities (in gallons) of round pits and basins per foot of depth are shown in the dimension in **Table 3 (See page 14)**. To determine the capacity (in gallons) of a square or rectangular pits, multiply the cubic feet by 7.5

SECTIONAL BASINS

Standard steel and fiberglass basins are built in one section. Multi-section basins are furnished only when specified.

SQUARE BASINS

Square and rectangular basins are available in steel construction only. Fiberglass basins are not available in these shapes

PUMP & BASIN SIZING

RECOMMENDED MINIMUM PIT & BASIN SIZES					
Pump Series	Pump Model	Round		Square	
		Simplex	Duplex	Simplex	Duplex
VSA	VSA-3F,4F	30" dia.	36" dia.	30" X 30"	36" X 36"
	VSA-3A,4A	30" dia.	42" dia.	30" X 30"	42" X 42"
	VSA-4C,5C	36" dia.	48" dia.	36" X 36"	48" X 48"
	VSA-4E,5E	42" dia.	48" dia.	42" X 42"	48" X 48"
	VSA-6H	48" dia.	60" dia.	48" X 48"	60" X 60"
VSAF	VSAF-4F*	N.A.	60" dia.	N.A.	60" X 60"
	VSAF-4A*	N.A.	60" dia.	N.A.	60" X 60"
	VSAF-4C*	N.A.	72" dia.	N.A.	72" X 72"
	VSAF-4E*	N.A.	72" dia.	N.A.	72" X 72"
VSS	VSS-3A,4A	30" dia.	42" dia.	30" X 30"	42" X 42"
	VSS-4C,5C	36" dia.	48" dia.	36" X 36"	48" X 48"
	VSS-4E,5E	42" dia.	60" dia.	42" X 42"	60" X 60"
	VSS-6H	48" dia.	60" dia.	48" X 48"	60" X 60"
VSS(QD)	VSS-QD-4A	42" dia.	60" dia.	36" X 36"	42" X 42"
	VSS-QD-4C	42" dia.	60" dia.	36" X 42"	42" X 42"
	VSS-QD-4E	42" dia.	60" dia.	36" X 42"	42" X 42"
MSC	MSC-3A-2-2	30" dia.	42" dia.	30" X 30"	42" X 42"
	MSC-4C-3-4	36" dia.	48" dia.	36" X 36"	48" X 48"
	MSC-4C-5-4	42" dia.	48" dia.	42" X 42"	48" X 48"
	MSC-4E-7½-4	48" dia.	60" dia.	48" X 48"	54" X 54"
	MSC-4E-10-4	48" dia.	60" dia.	48" X 48"	54" X 54"
MSC(QD)	MSC-QD-3A-2-2	36" dia.	42" dia.	36" X 36"	42" X 42"
	MSC-QD-4C-3-4	42" dia.	48" dia.	42" X 42"	48" X 48"
	MSC-QD-4C-5-4	48" dia.	60" dia.	48" X 48"	54" X 54"
	MSC-QD-4E-7½-4	48" dia.	60" dia.	48" X 48"	54" X 54"
	MSC-QD-4E-10-4	60" dia.	60" dia.	54" X 54"	60" X 60"

TABLE 2. Minimum basin diameter for different pump series

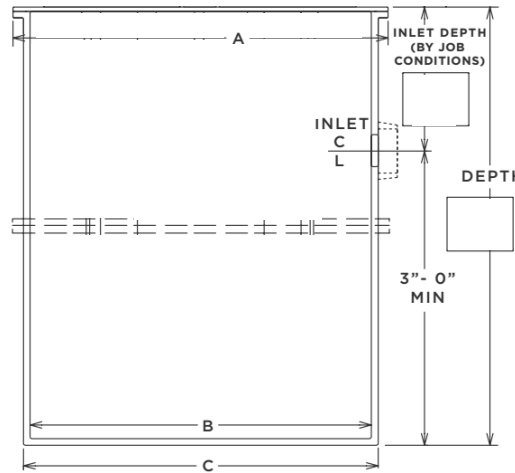
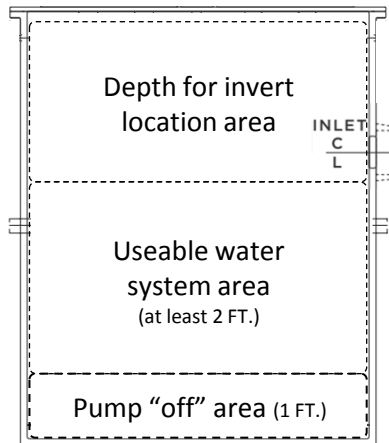
NOTE: Modified 3HP & 5HP MSC Series pumps can be fitted in smaller pit sizes. Contact the factory or its local representative for more information

PUMP & BASIN SIZING

RECOMMENDED MINIMUM PIT & BASIN SIZES					
Pump Series	Pump Model	Round		Square	
		Simplex	Duplex	Simplex	Duplex
BGP	BGP-1¼G	24" dia.	30" dia.	24" X 24"	36" X 36"
	BGP-2G	24" dia.	36" dia.	24" X 24"	36" X 36"
BGP(QD)	BGP-1¼G	24" dia.	30" dia.	24" X 24"	36" X 36"
	BGP-2G	24" dia.	36" dia.	24" X 24"	36" X 36"
JJM	JJM-4A	42" dia.	48" dia.	36" X 36"	42" X 42"
	JJM-4C	42" dia.	48" dia.	36" X 36"	42" X 42"
	JJM-6E	48" dia.	72" dia.	48" X 48"	60" X 60"
	JJM-6H	48" dia.	72" dia.	48" X 48"	60" X 60"
	JJM-6K	48" dia.	72" dia.	48" X 48"	60" X 60"
	JJM-8M	60" dia.	84" dia.	60" X 60"	72" X 72"
	JJM-8P	60" dia.	84" dia.	60" X 60"	72" X 72"
JJM-QD	JJM-QD-4A	42" dia.	48" dia.	42" X 42"	42" X 42"
	JJM-QD-4C	42" dia.	48" dia.	42" X 42"	42" X 42"
	JJM-QD-6E	60" dia.	72" dia.	60" X 60"	60" X 60"
	JJM-QD-6H	60" dia.	72" dia.	60" X 60"	60" X 60"
	JJM-QD-6K	60" dia.	72" dia.	60" X 60"	60" X 60"
	JJM-QD-8M	72" dia.	84" dia.	66" X 66"	84" X 84"
	JJM-QD-8P	72" dia.	84" dia.	66" X 66"	84" X 84"
VSABM					
	Minimum Basin Sizes are Not Applicable for Dry-pit pumps				

TABLE 2. (cont.) Minimum basin diameter for different pump series

PUMP & BASIN SIZING



Instruction:

1. Use TABLE 2 to identify the minimum basin diameter for the pump chosen.
2. Use TABLE 3 to identify the Gallons/ft of depth
3. Decide the pump cycle duration (i.e 3 minutes or 5 minutes)
4. Determine the "Usable Area"[Gal.] by multiplying pump flow capacity[GPM] and pump cycle duration
5. Divide "Usable Area"[Gal.] by the Gal./FT. to find the "Usable Area Height" [FT]. Then divide the height by the number of pumps used in the system.
6. Add the "Pump 'off' area"[FT], "Usable Area Height"[FT], & "Invert Depth Area"[FT] and round up to the next 6" interval for minimum basin depth.

BASIN DIMENSIONS						
B Basin inside dia.	Approx. GAL/FT. of depth*	A Cover dia.	C Approx. basin footprint dia.	No. of tapping	Bolt size	Bolt circle dia.
30	37	34	31	6	$\frac{3}{8}$	$32\frac{1}{2}$
36	55	40	37	6	$\frac{3}{8}$	$38\frac{1}{2}$
42	70	46	43	8	$\frac{1}{2}$	$44\frac{1}{2}$
48	95	53	49	8	$\frac{1}{2}$	51
54	120	60	55	12	$\frac{1}{2}$	57
60	150	66	61	12	$\frac{1}{2}$	63
72	210	78	73	16	$\frac{1}{2}$	75
84	290	90	85	16	$\frac{1}{2}$	87

TABLE 3. Basin's detailed dimension and associated unit capacity

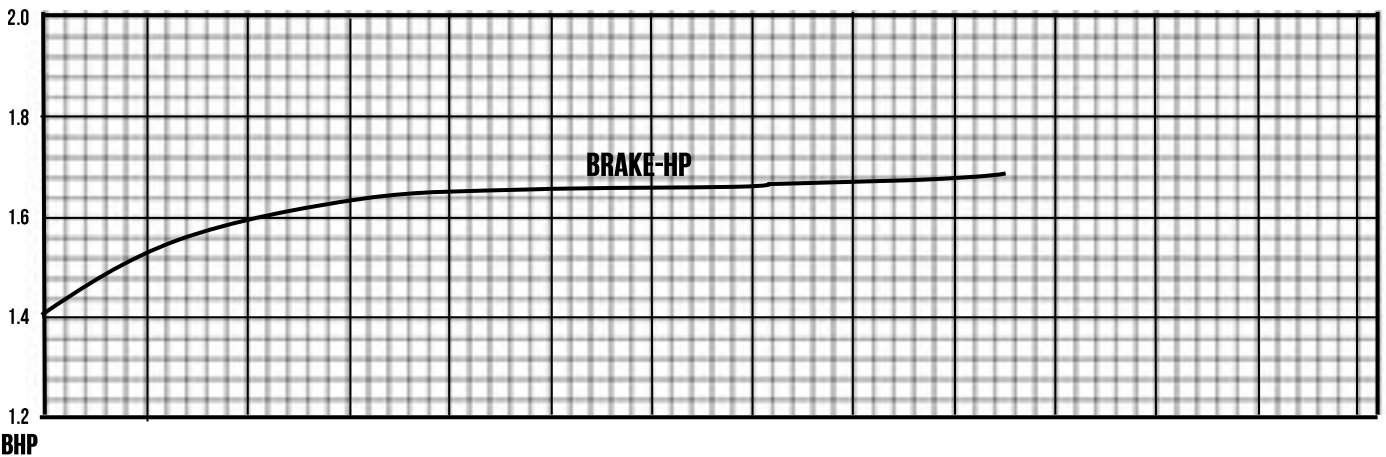
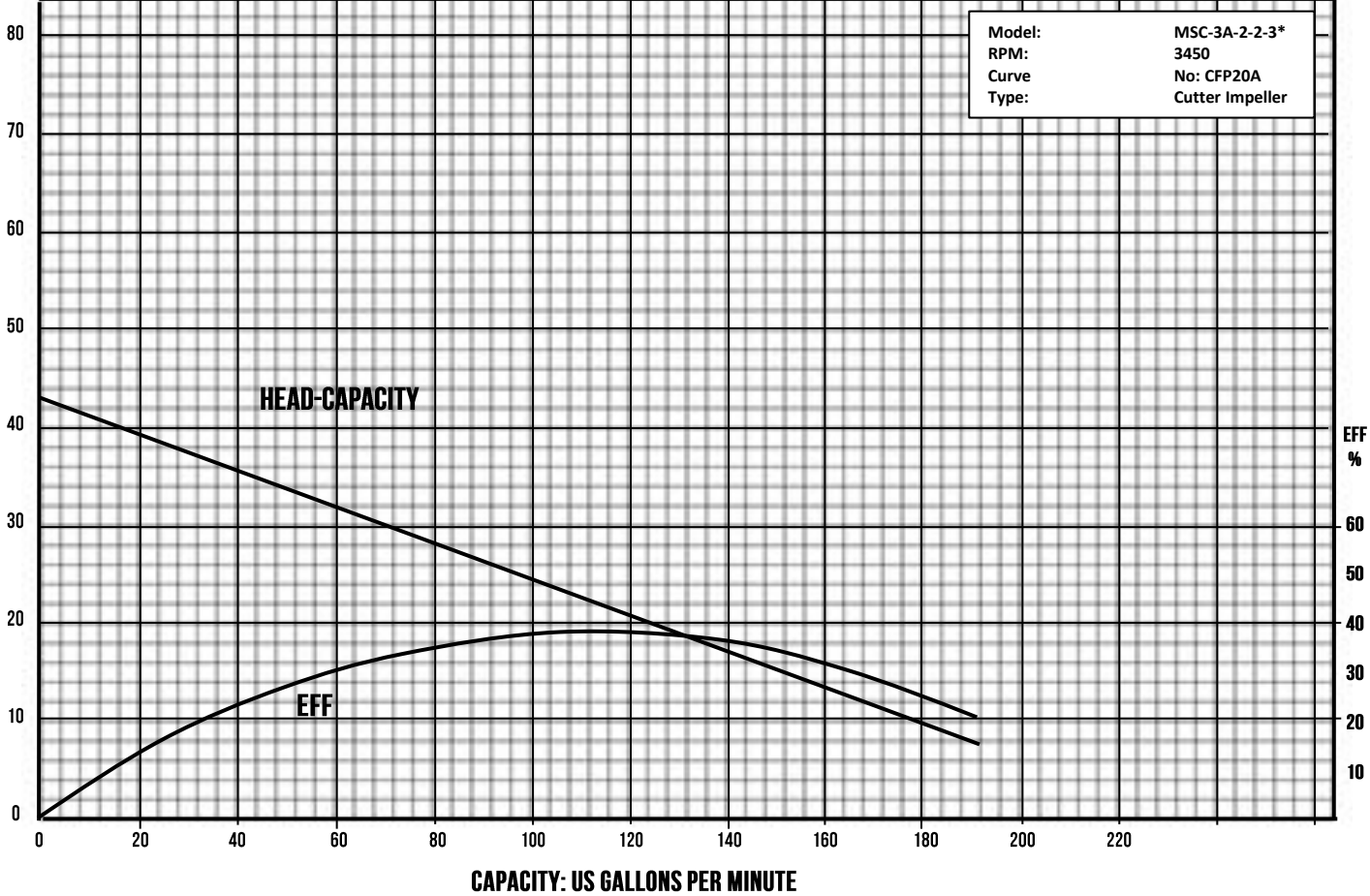
*To determine the capacity (in gallons) of a square or rectangular pits, multiply the cubic feet by 7.5

Note: When specifying fiberglass basins or designing concrete pits, useable water volume needs to be considered to minimize pump Start/Stop cycles. Float swing (12" per float) should also be taken into consideration for proper operation. Ensure basin designs (Depth & Diameter) are adequately sized for system flow requirements and for proper fluid storage to maintain maximize period of system at rest.

PUMP PERFORMANCE

TDH

(FT)



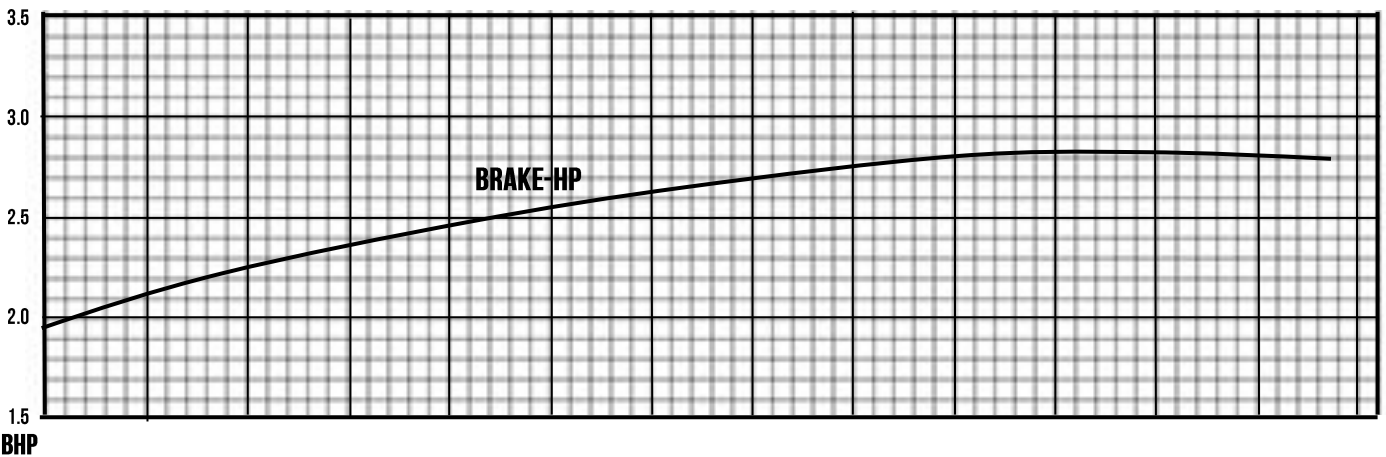
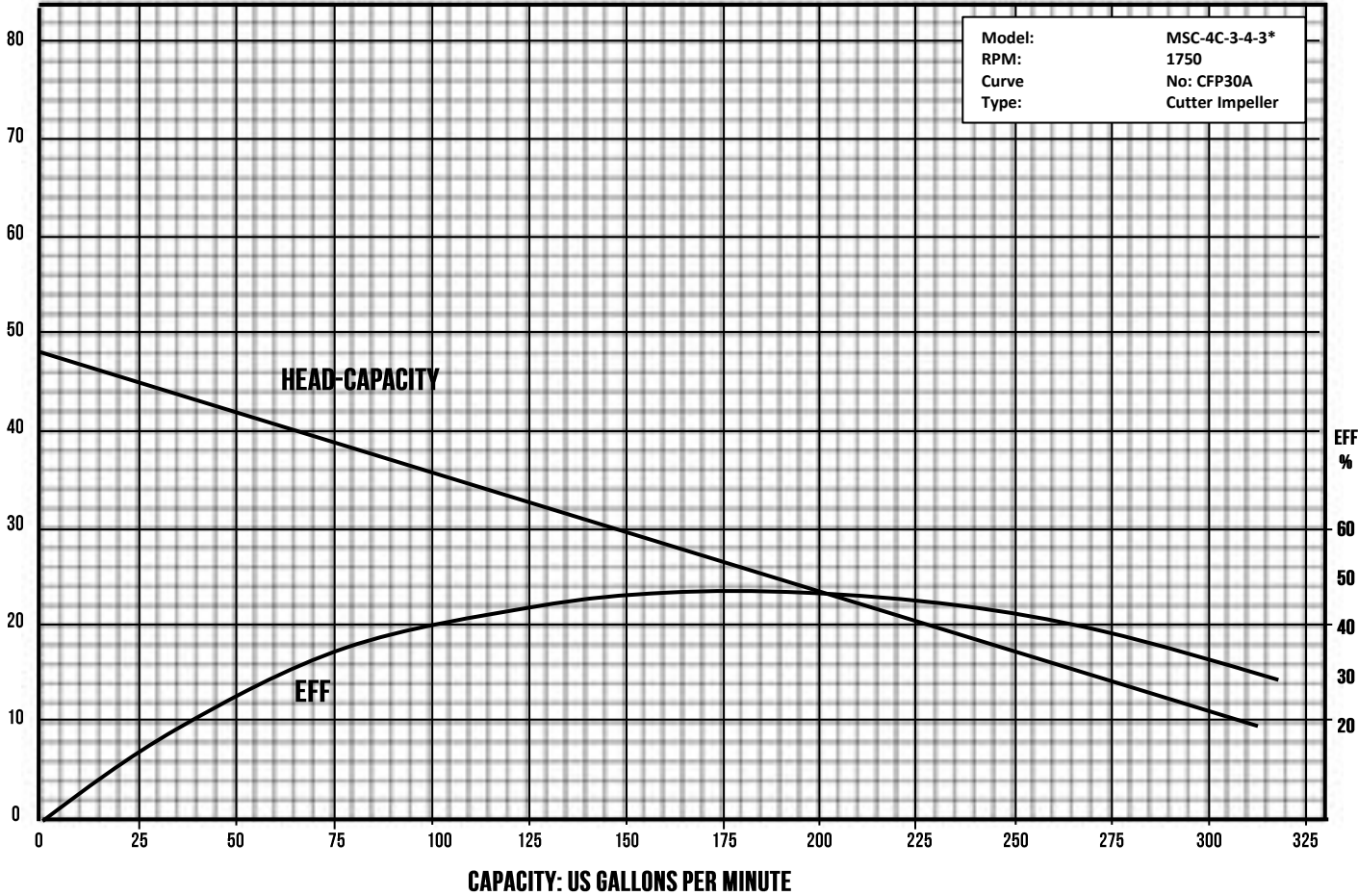
TYPE

MSC(QD)

PUMP PERFORMANCE

TDH

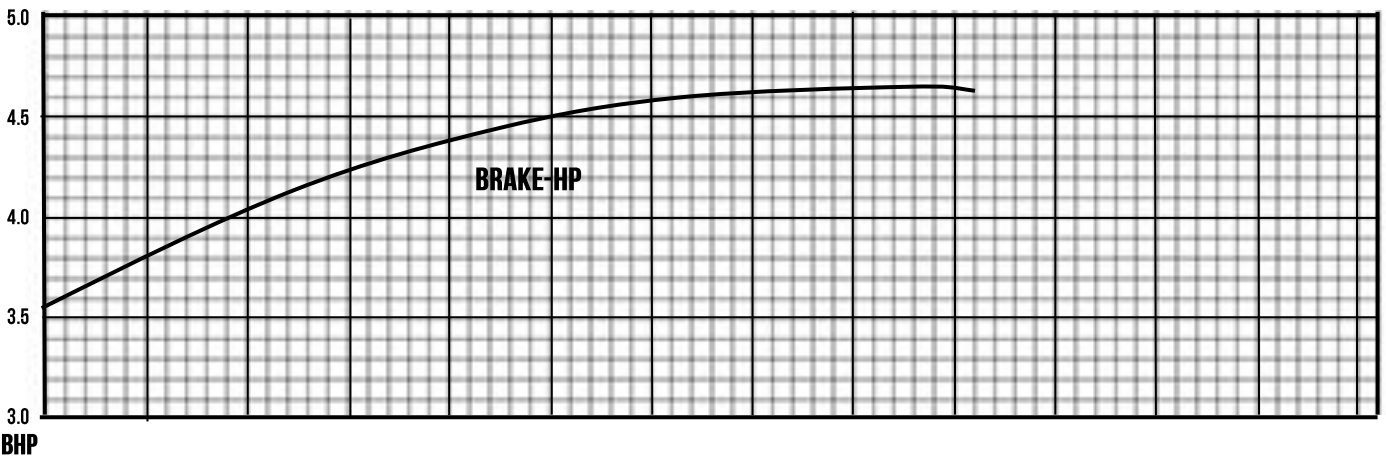
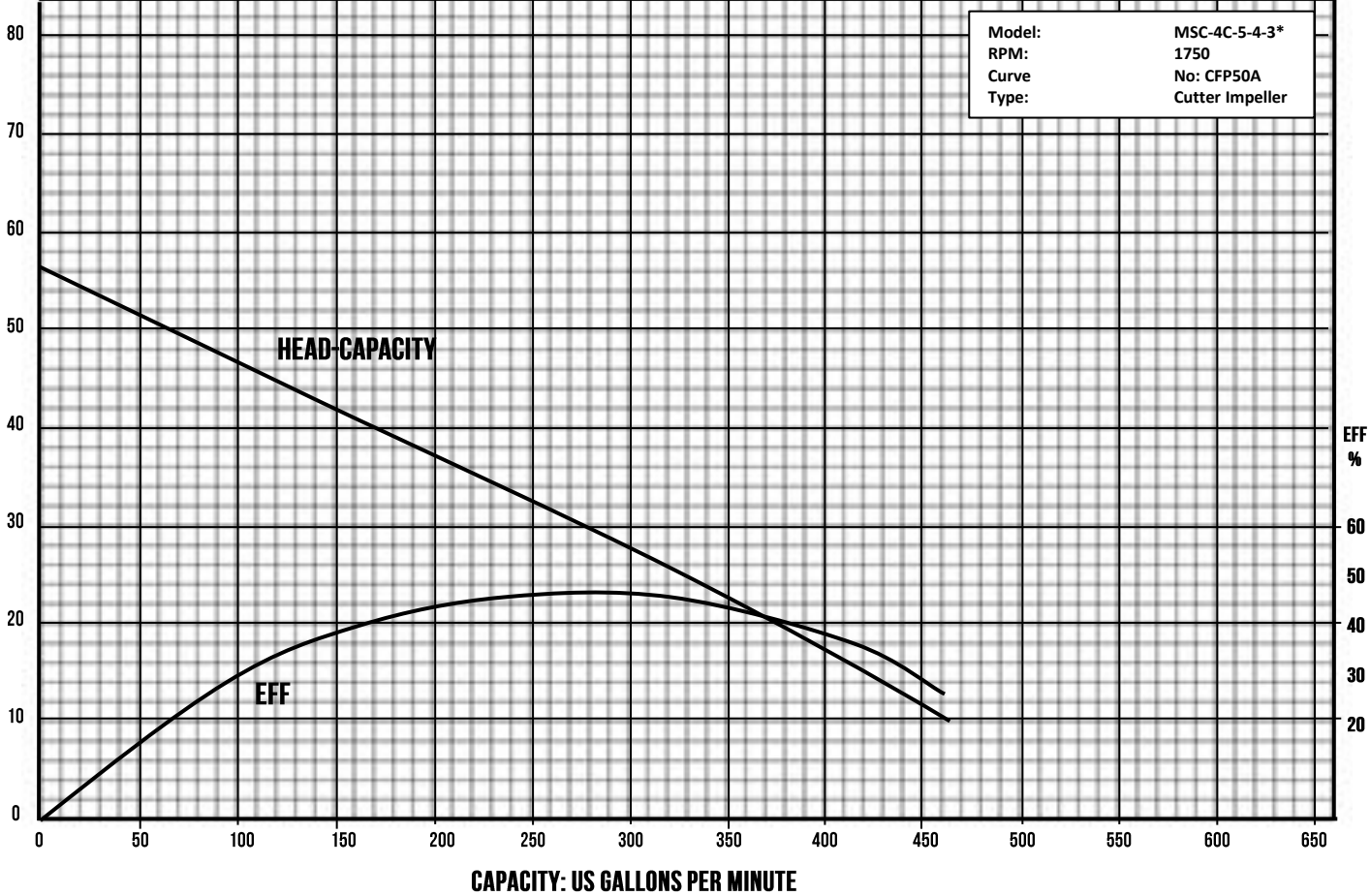
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PUMP PERFORMANCE

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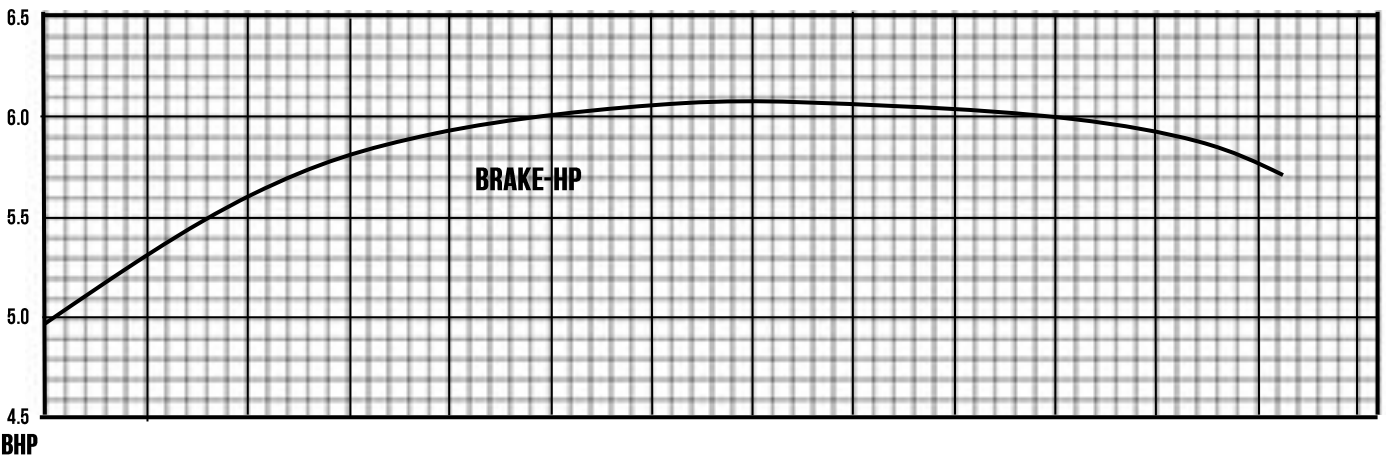
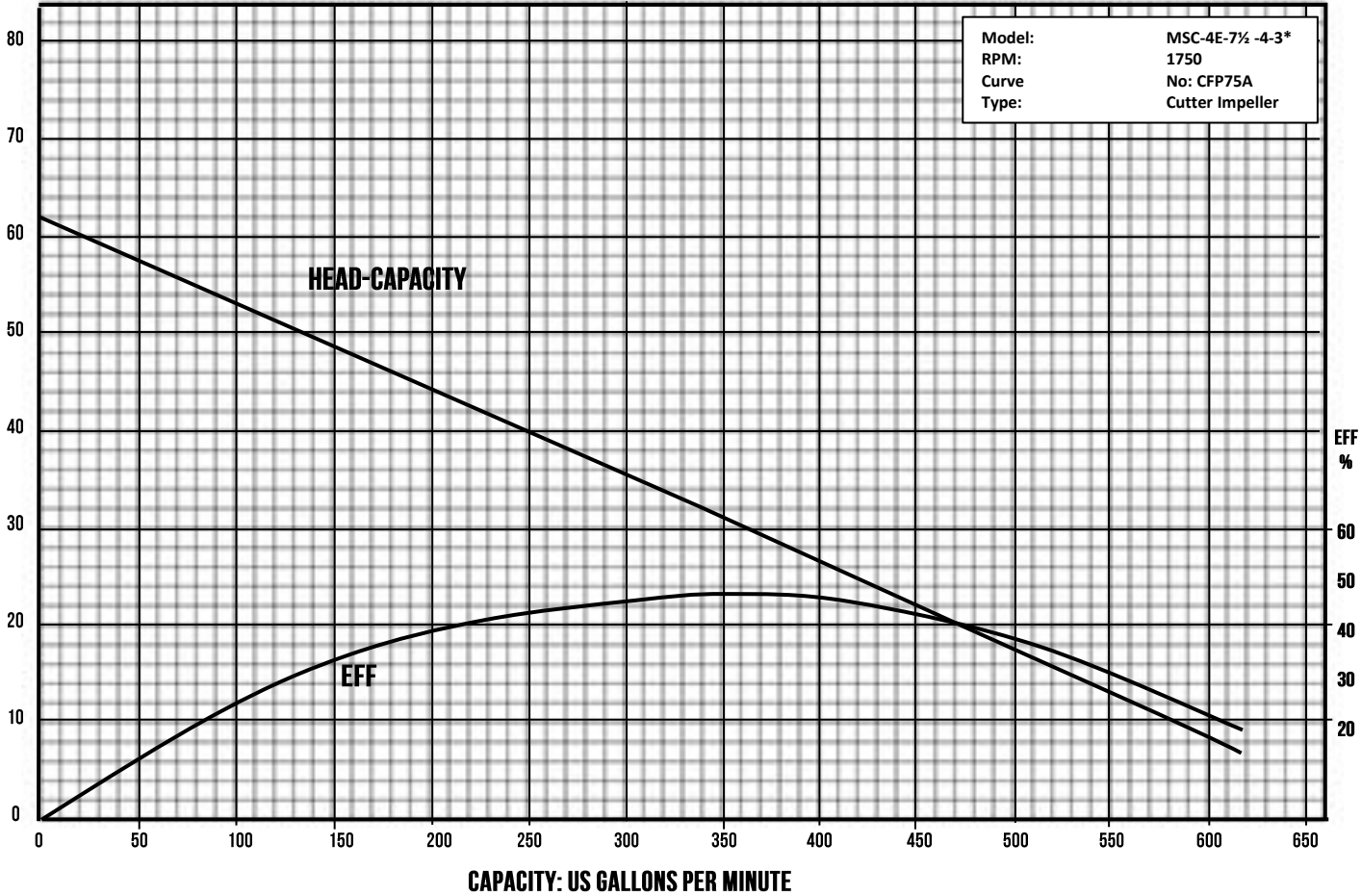
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PUMP PERFORMANCE

TDH

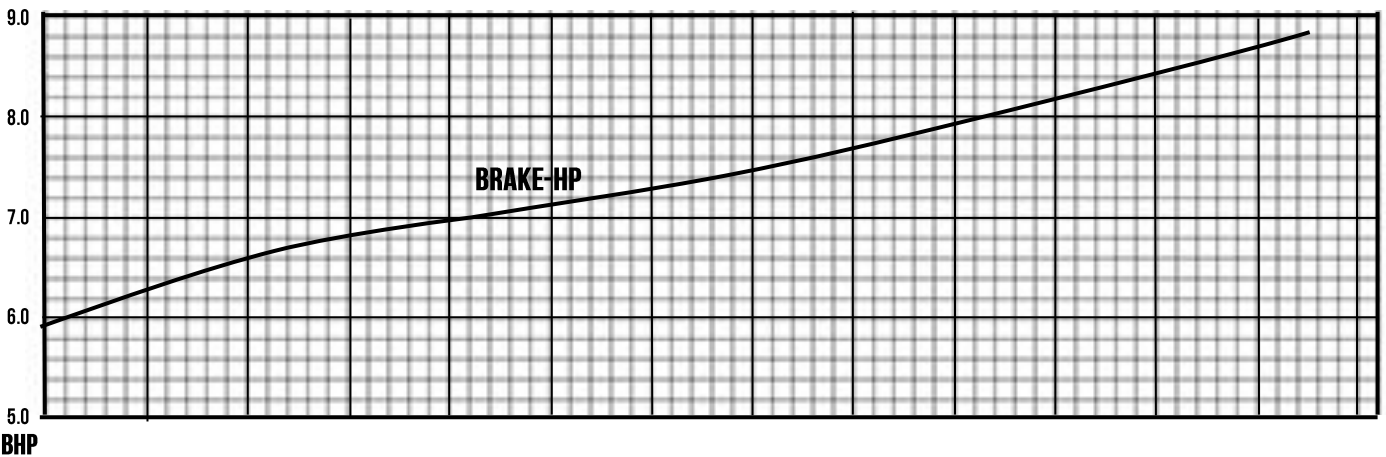
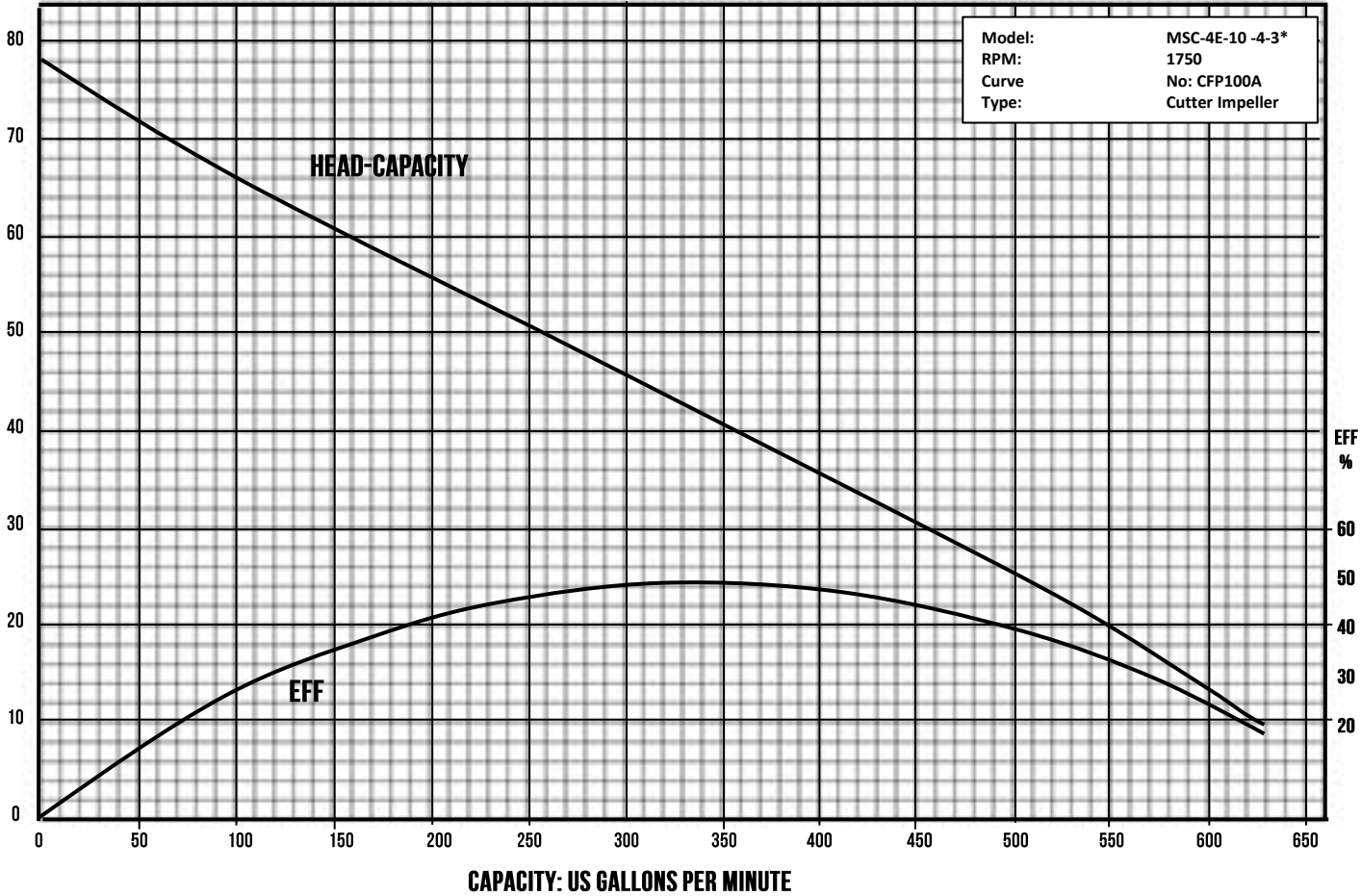
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PUMP PERFORMANCE

TDH

(FT)



PERFORMANCE DATA

ITEM	DESCRIPTION
DISCHARGE SIZE	3" & 4"
HORSEPOWER RANGE	2 ~ 10 hp
PERFORMANCE RANGE	50 ~ 450 GPM
MAX. WATER TEMPERATURE	104°F (OPTIONAL 170°F)
CASING	ASTM A48 CLASS 35 CAST IRON
IMPELLER	ASTM A48 CLASS 35 CAST IRON WITH TUNGSTEN CARBIDE EDGE
SUCTION PLACE	ASTM A532 CLASS III TYPE A
SHAFT	400 SERIES STAINLESS STEEL
MOTOR HOUSING	ASTM A48 CLASS 35 CAST IRON
FASTENERS	304 STAINLESS STEEL (OPTIONAL 316 SS)
MECHANICAL SEALS	SILICON CARBIDE/ NITRIL BUNA ELASTOMER (OPTIONAL VITON (CE-14) ELASTOMER)
BEARINGS	PRE-LUBRICATED DOUBLE SHIELDED
MOTOR TYPE	AIR FILLED CLASS B INSULATION (OPTIONAL CLASS F FOR HIGHER TEMPERATURE)

MOTOR OPERATING PERFORMANCE [AMPS AVG.]

HP	RPM	208V	230V	460V
2	3500	6.7	6.1	3.1
3	1750	9.5	8.6	4.3
5	1750	15.6	14.1	7.1
7.5	1750	21.2	19.2	9.6
10	1750	31.0	28.0	14

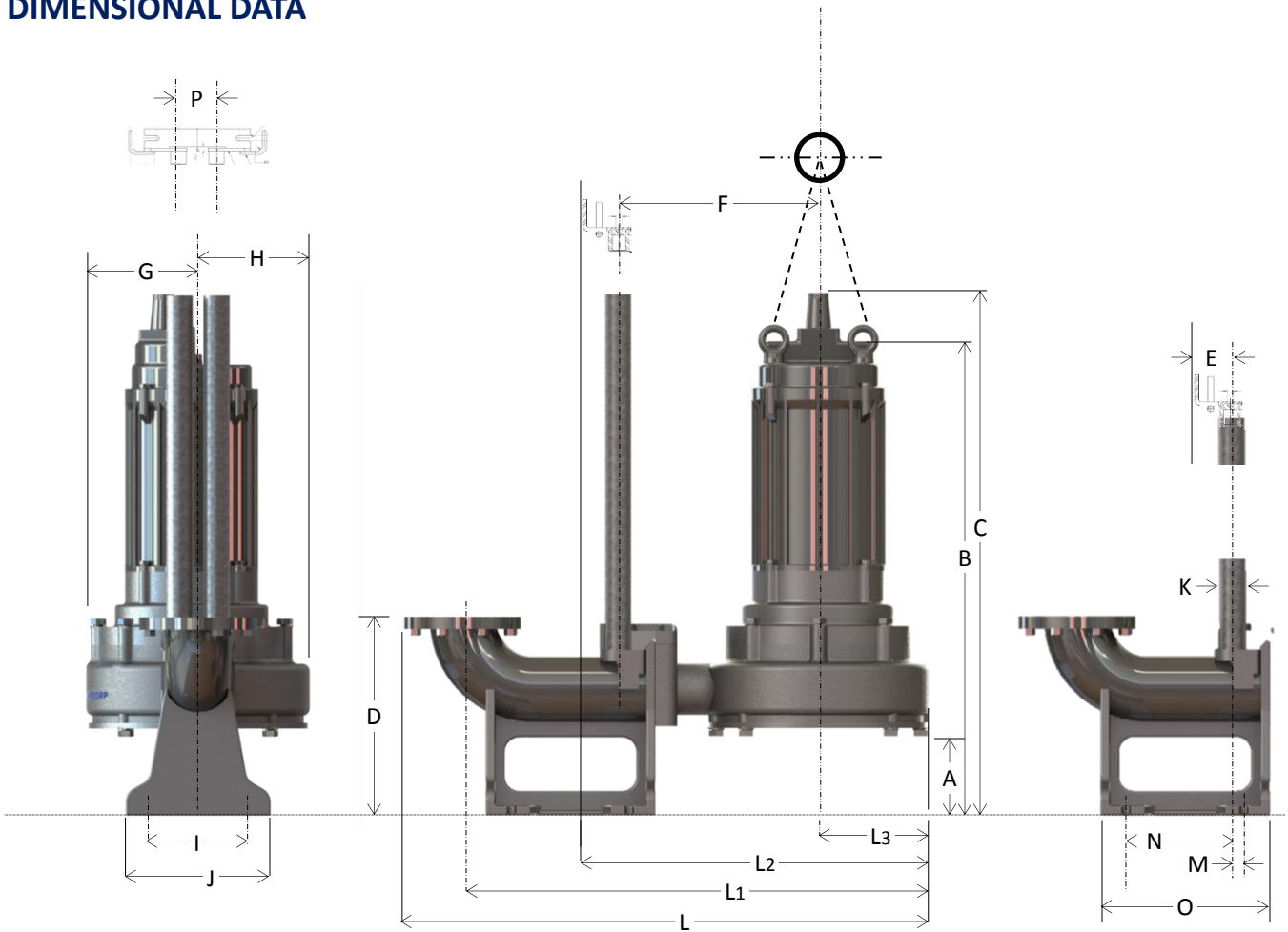
SUBMERSIBLE MSC(QD) CHOPPER PUMPS CAN BE PROVIDED WITH OPTIONAL ACCESSORY EQUIPMENT INCLUDING:

- 🌀 Sewage/Sump pit cover, & frame
- 🌀 Steel or fiberglass multi-sectioned basin and valve boxes
- 🌀 Basin mounting accessories
- 🌀 Float switches for automatic operation
- 🌀 Submersible level transducer for automatic operation & level diagnostics
- 🌀 Control panel with automatic system controls and programmable logic controller
- 🌀 High level alarms or other alarm conditions
- 🌀 Factory assemble and tested unit with basin, pumps, valves, & controls-preassembled and wired

NOTES:

1. Motors are designed for 20 starts per hour. Level devices and pit depths should be designed to maintain 10~12 starts per hours at maximum 104°F for typical sewage pump applications
2. Float devices require 8~12" of water level differential from low float(OFF) to high float(ON) position. Basins should be designed to accommodate float level differential
3. High water alarm float(ON level) should be designed to activate at 6" below the bottom of invert to prevent any fluids backing into the supply lines. Float switch tilt travel of 12" should be considered
4. For higher temperature applications (above 104°F) contact factory for special motor insulation, special float materials and accessories that may be required to sustain operation in higher temperature settings
5. Most fiberglass basins limit temperature to less than 120°F. For temperature in excess of 120°F where fiberglass basins are required, contact the factory for special assistance

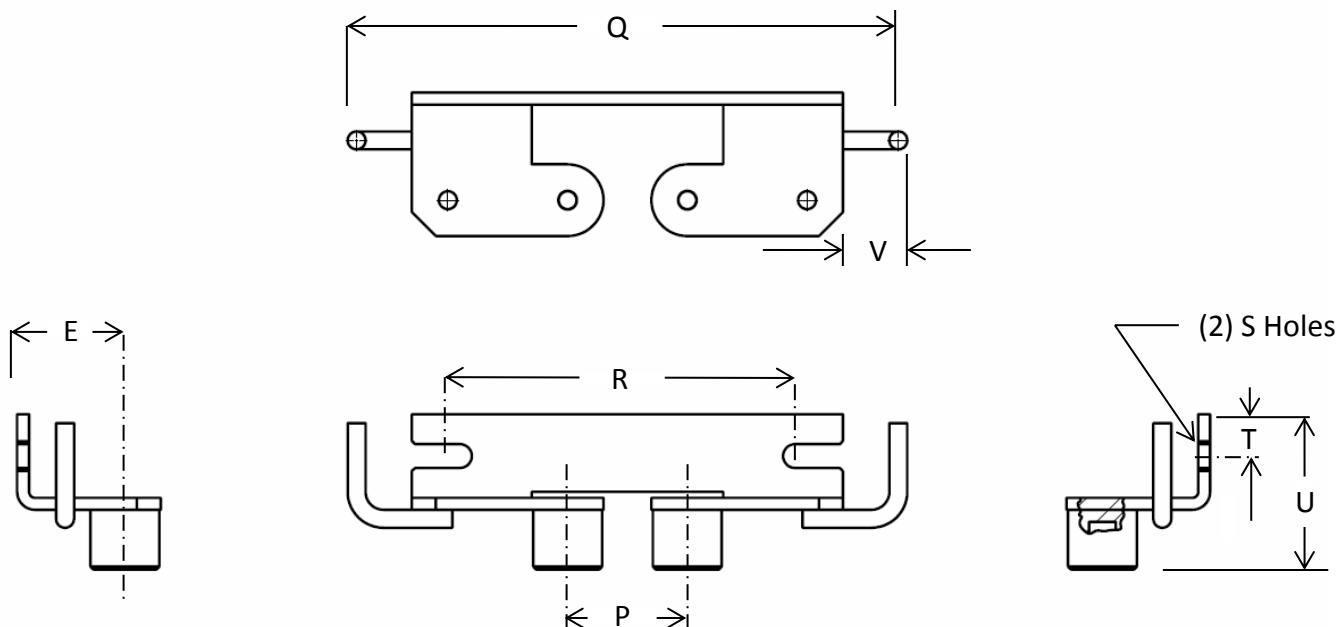
DIMENSIONAL DATA



Disch.	Model	HP	RPM	L	L ₁	L ₂	L ₃	A	B	C	D	E	F	G	H	I	J	K	M	N	O	P	Lb.
3 FLANGE	MSC(QD)-3A-2-2	2	3450	27½	23	15½	4½	5¼	20½	22	12½	2½	9	4	4½	6¾	8½	1¼	¾	6¾	9¾	3¾	128
4 FLANGE	MSC(QD)-4C-3-4	3	1750	31	26½	19	6	4¼	23¾	24¾	12½	2½	10¾	6¾	6¾	6¾	8½	1¼	¾	6¾	9¾	3¾	186
4 FLANGE	MSC(QD)-4C-5-4	5	1750	31¼	26¾	19¾	6¼	4¼	27	29	12½	2½	10¾	6¾	6¾	6¾	8½	1¼	¾	6¾	9¾	3¾	222
4 FLANGE	MSC(QD)-4E-7.5-4	7.5	1750	36	31¼	24¾	7¼	6	33¾	35¾	14¾	3¾	13¾	7¾	8	8	10	2	¾	7¾	11¾	4	326
4 FLANGE	MSC(QD)-4E-10-4	10	1750	36	31¼	24¾	7¼	6	33¾	35¾	14¾	3¾	13¾	7¾	8	8	10	2	¾	7¾	11¾	4	358

Dimensions in inches

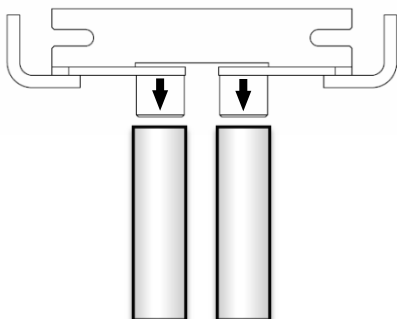
DIMENSIONAL DATA



Disch.	Model	HP	RPM	Q	E	R	P	S	T	U	V
3 FLANGE	MSC(QD)-3A-2-2	2	3450	11¼	2½	7¾	¾	3/8	1	2¼	1
4 FLANGE	MSC(QD)-4C-3-4	3	1750	11¼	2½	7¾	¾	3/8	1	2¼	1
4 FLANGE	MSC(QD)-4C-5-4	5	1750	11¼	3¾	7¾	¾	3/8	1	2¼	1
4 FLANGE	MSC(QD)-4E-7.5-4	7.5	1750	14¾	3¾	9½	4	1/2	1¼	2½	2¼
4 FLANGE	MSC(QD)-4E-10-4	10	1750	14¾	3¾	9½	4	1/2	1¼	2½	2¼

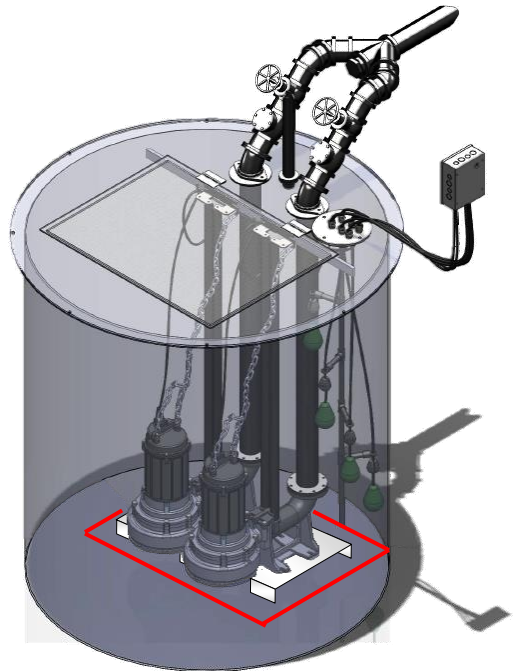
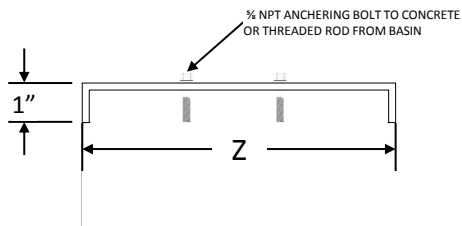
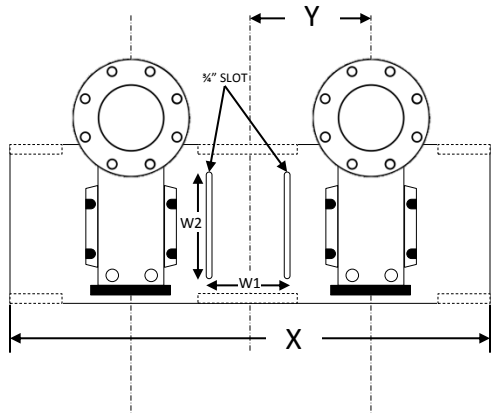
Dimensions in inches

Upper Guide Bar Bracket



1. Locate guide bars into lower guide bar bracket (integral to cast iron elbow mounted in basin floor.)
2. Insert guide bars into lower base elbow extending to top of basin.
3. Insert Upper Guide Bar Bracket into guide bars and then bolt upper guide bar bracket in place.
4. Pump mounted guide bracket slides up and down guide rails to install pump to base elbow and to lift pump from pit using guide bar brackets as positioning devices.

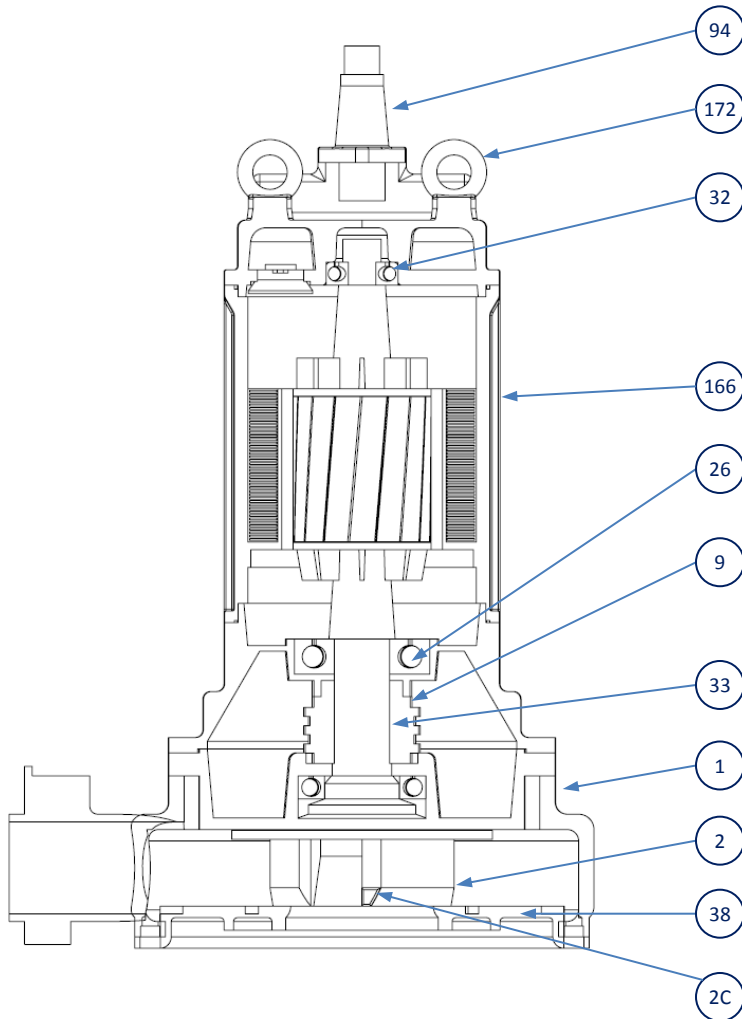
DIMENSIONAL DATA



Disch.	Model	HP	RPM	W1	W2	X	Y	Z
3 FLANGE	MSC(QD)-3A-2-2	2	3450	7	9	30	9	12
4 FLANGE	MSC(QD)-4C-3-4	3	1750	7	9	30	9	12
4 FLANGE	MSC(QD)-4C-5-4	5	1750	7	9	30	9	12
4 FLANGE	MSC(QD)-4E-7.5-4	7.5	1750	8	10	34	12	14
4 FLANGE	MSC(QD)-4E-10-4	10	1750	8	10	34	12	14

Dimensions in inches

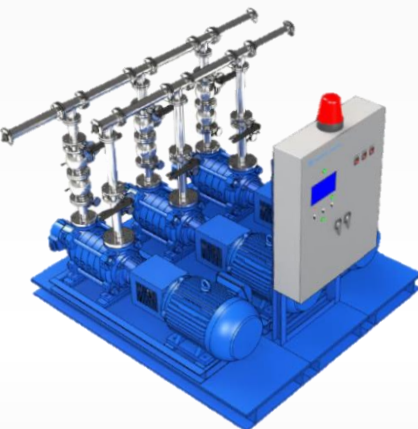
SECTIONAL VIEW



PART NO.	DESCRIPTION	MATERIAL OF CONSTRUCTION	MATERIAL DESIGNATION
1	PUMP CASING	CAST IRON	A48 CLASS 35
2	IMPELLER	CAST IRON	A48 CLASS 35
2C	IMPELLER EDGE	TUNGSTEN CARBIDE	
9	MECHANICAL SHAFT SEAL	VARIOUS	
26	RADIAL BEARING	STEEL	VARIOUS
32	THRUST BEARING	STEEL	VARIOUS
33	PUMP SHAFT	STAINLESS STEEL	AISI 403
38	SUCTION PLATE	CHROMIUM CAST IRON	A532 CLASS III TYPE A
94	CORD GRIP	VARIOUS	
166	MOTOR HOUSING	CAST IRON	A48 CLASS 35
172	LIFTING RING	STEEL	AISI 304



**Variable Speed Booster
Model VSPV(up to 300PSI)**



**Variable Speed Booster
Model VSPM(up to 600PSI)**



**Oil Shield Elevator Sump System
Model SOSP(up to 125GPM)**

Since 1927 Federal Pump has been a leading provider of reliable and innovative fluid handling solutions for supply water management and dewatering pump services.

Its recent introduction of the VSPV & VSPM variable speed domestic water supply system combines innovative technological advancements in premium efficient motors and variable speed drive support programs that reduce energy demand, lower operating costs, and provide more finely tuned supply controls.

Its VSA/VSP vertical pump rated to 210F provides solutions in dewatering applications where condensate or boiler feed water are collected and then cooled and pumped to city sewer connections providing continuous service where submersible pumps do not provide a sustainable solution.

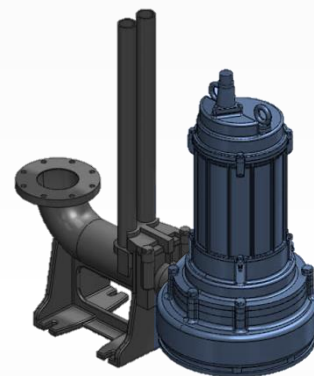
The SOSP Oil Shield sump pumps alerting building management to potential oil leaks in the elevator areas provide additional building support.

High rise roof fill applications, water make-up systems for mechanical equipment utilizing rain water systems and energy efficient condensate, boiler feed, and vacuum condensate units continue in the focus of energy efficiency and building support.

In the tradition of leadership through product innovation, quality designs, and reliable customer service, Federal Pump continues to be a supplier to those water management and dewatering markets where it first started that tradition of leadership in Brooklyn, N.Y.



**Vertical Sewage/Sump Pump
Model VSA/VSP(up to 1400GPM)**



**Submersible Sewage/Sump Pump
Model MSC(QD)/VSS(QD) (up to 500GPM)**



**Condensate/Boiler Feed System
Model CCV/BFC(up to 100,000EDR)**