
Contents

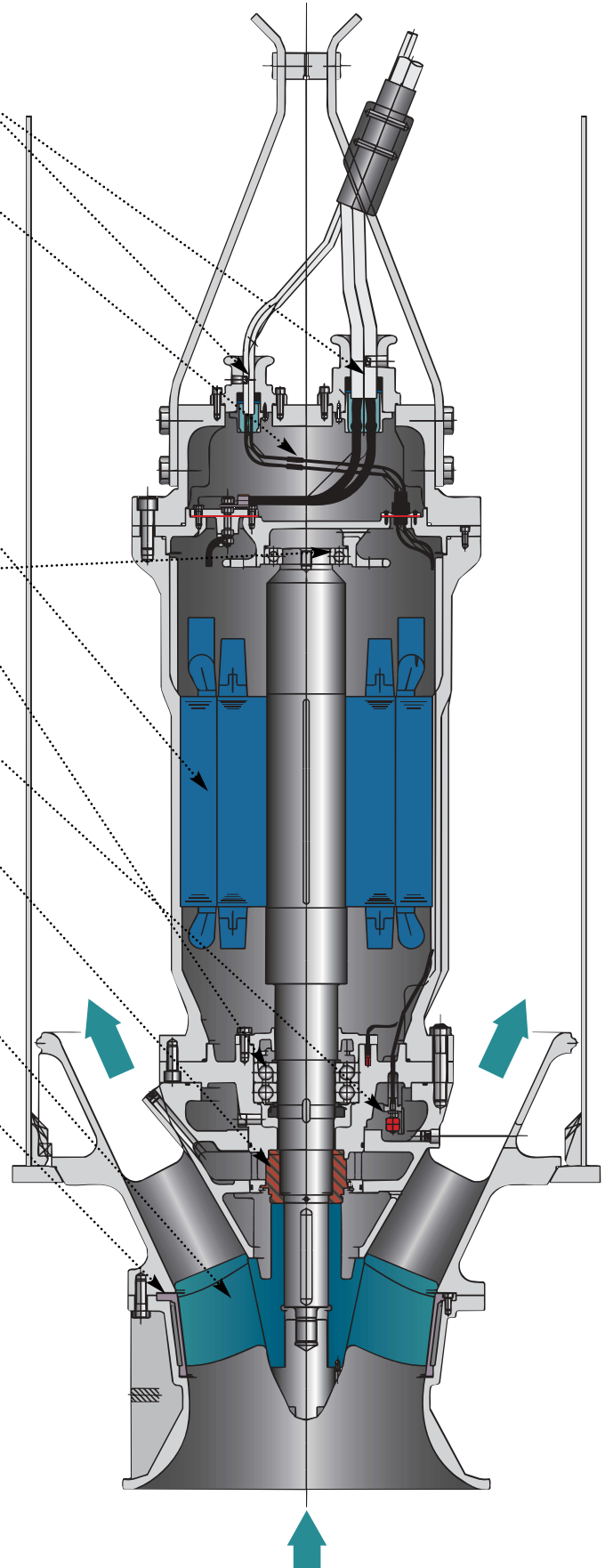
Model

A0553	C1125	V0494
A0713	C1285	V0554
A0843	C1455	V0754
A1003	C1605	V0854
	C1915	V0974
	C2185	V1154
	C2905	

Section	Page
Specifications	3-203
Model Designation	3-206
Impeller Data	3-208
Material Specifications	3-209
Selection Chart	3-210
Performance Curves	3-212
Outline Drawings	3-230
Sectional View	3-235
Technical Information	3-237.1
material specification	
impeller description	
motor protection	
cable entry	
paint specifications	
mechanical seal	
general	
Motor Data	3-267
motor electrical specifications	
cable data	
wiring diagrams	
motor electrical data	

Features

- **Watertight cable entry system** prevents capillary action and protects against moisture; reduces maintenance costs
- **Junction area** includes a terminal board for cable connections allowing for fast efficient replacement; area sealed from the stator housing; prevents leakage into the motor; reduces the possibility of failure
- **Heavy duty, high efficiency, air filled motor, Class F** insulated, rated for 311°F with a 1.10 service factor dissipates heat easily; thermal protection in each phase of windings; operates cooler with higher efficiencies; longer service life with lower operating costs
- **Double and triple row grease bearings** carries thrust loading with L-10 life of up to 100,000 hours; ensures long, dependable operation and lowers maintenance costs
- **Float type leakage detector** provides early warning of mechanical seal failure; avoids costly motor repairs
- **Cartridge type, duplex mechanical seals** assembled in tandem arrangement; easy maintenance and high reliability
- **High efficiency, axial flow impellers** accept large diameter solids; lowers operating costs
- **Replaceable case liner** maintains working clearances while lowering case replacement costs



Specifications

	Standard	Optional
Design Discharge Size Range of input HP Range of Performance Liquid Temperature Maximum (allowed) Submergence Speed	24 to 64 inch 10 to 422 HP Capacity 2500 to 55000 GPM Head 5 to 50 feet 32 to 104° F 82 feet 1800, 1200, 900, 700, 600 RPM	
Materials Casing Impeller Shaft Motor Frame Fastener	Cast Iron Ductile Cast Iron 403 Stainless Steel Cast Iron 304 Stainless Steel	Bronze, Stainless Steel
Construction Impeller Type Shaft Seal Material – Upper Side Material – Lower Side Bearing Mounting Method	Axial Flow or Mixed Flow Cartridge Type Duplex Mechanical Seal in Tandem Arrangement Carbon/Ceramic Silicon Carbide/Silicon Carbide Grease Lubricated Ball Bearing Sole Plate with Rotation Stopper	Impeller Wearing Ring Carbon/Tungsten Carbide Tungsten Carbide/Tungsten Carbide
Motor Type Starting Method Hz, Voltage Protection	Air-filled Direct online 60Hz, 460V Built-in winding temperature detector Built-in float type leakage detector	FM Explosion Proof, Class 1, Division 1, Group C, D Thrust bearing temperature detector
Accessories	Submersible cable 33 ft. Cable Glands for each cable Sole Plate with Rotation Stopper	Column Pipe
Codes & Standards	ISO 9000 ISO 9001	

Specifications

A. General:

Provide FM explosion proof submersible axial flow pumps suitable for continuous duty operation underwater without loss of watertight integrity to a depth of 65 feet. Pump system design shall include a fabricated steel discharge tube in which the pump/motor unit is mounted, (see drawings for details). The pump shall be easily removable for inspection or service, requiring no bolts, nuts, or other fasteners to be disconnected, or the need for personnel to enter the wet well. Pumps shall be designed to allow for reverse rotation when the pump shuts off and the column drains. The motor and pump shall be designed, manufactured, and assembled by the same manufacturer.

B. Manufacturer:

EBARA International Corporation

C. Pump Characteristics:

Pumps shall conform to the following requirements:

Number of units

Design flow (gpm)

Design TDH (ft)

Minimum shut off head (ft)

RPM

Maximum HP

Minimum hydraulic efficiency at design (%)

Minimum power factor at design (%)

Voltage/HZ

460V / 60

Phase

3

D. Pump Construction:

All major parts of the pumping unit(s) including casing, suction bell, intermediate casing, discharge bowl, and motor frame shall be manufactured from gray cast iron, ASTM A-48 Class 35. Propeller shall be manufactured in ductile cast iron, ASTM A536 60-40 material. Castings shall have smooth surfaces devoid of blow holes or other casting irregularities. A replaceable casing wear liner shall be provided, manufactured of stainless steel, ASTM A743 CF8 material, to maintain working clearances and hydraulic efficiencies. All exposed bolts and nuts shall be 304 stainless steel. All mating surfaces of major components shall be machined and fitted with NBR O-rings where watertight sealing is required. Machining and fitting shall be such that sealing is accomplished by automatic compression of O-rings in two planes and O-ring contact is made on four surfaces without the requirement of specific torque limits. Surfaces in contact with the pumpage shall be surface prepared to SSPC-SP-10 and coated with three (3) coats of coal tar epoxy paint. The internal surface of the motor shall be surface prepared to SSPC-SP-3 and coated with one (1) coat of zinc rich primer paint. Surfaces in air shall be surface prepared to SSPC-SP-10 and coated with one (1) coat of zinc chromate primer and one (1) coat of alkyd resin enamel paint.

The propeller shall be an axial flow type available in 1° increments for efficient operation. The blades shall be fixed pitch, dynamically balanced and backward curved to reduce clogging. Impellers shall be direct connected to the motor shaft with a slip fit, key driven, and secured with an locking nut.

The pump/motor shall be mounted in a heavy duty fabricated A-36 steel discharge column with a minimum thickness of 1/2". The column diameter shall be sized so as to limit the velocity of the flow across the pump/motor unit to maximum 10.8 ft/sec. The design shall be such that the pump is lowered into the discharge column and comes to rest on the mounting plate. The suction bell extends below the mounting plate and a metal to metal contact seal is made between the discharge bowl and the mounting plate. No gaskets or O-rings shall be permitted. A rotation stopper welded to the interior of the column at the support plate shall come in contact with a cast extension of the discharge bowl to prevent rotation. The weight of the pump and the downward thrust when in operation shall hold the pump firmly in place. The column shall have a removable cover, easily removed or opened for inspection or service. The cover shall remain watertight during normal operation and shall include watertight cable entry provisions for both the power and control cables. It shall also include a cable support system to secure the cables within the column. The pump shall not require any nuts or bolts for fastening and shall be easily removable without the need for service personnel to enter the wetwell. Lifting chain, either galvanized or stainless steel, is suitable for removing and installing the pump unit.

Contents

The mechanical seal system shall be a cartridge mounted double mechanical seal in a tandem arrangement. Each seal shall be positively driven and act independently with its own spring system. The upper seal operates in an oil bath, while the lower seal is lubricated by the oil from between the shaft and the seal faces, and in contact with the pumpage. The oil filled seal chamber shall be designed to prevent over-filling and include an anti-vortexing vane to insure proper lubrication of both seal faces. Lower face materials shall be silicon carbide, upper faces carbon vs. Ceramic. NBR elastomers shall be provided in the oil chamber and viton elastomers where in contact with the pumpage. The mechanical seal hardware shall be 304SS. Seal system shall not rely on pumping medium for lubrication.

E. Motor Construction:

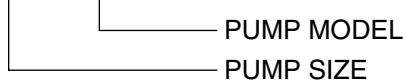
The pump motor shall be FM Explosion Proof, Class 1, Division 1, Groups C, D. The design shall be an air filled induction type with a squirrel cage rotor, shell type design, built to NEMA MG-1, Design B specifications. Stator windings shall be copper, insulated with moisture resistant Class F insulation, rated for 311°F. The stator shall be dipped and baked three times in Class F varnish and heat shrunk fitted into the stator housing. Rotor bars and short circuit rings shall be manufactured of cast aluminum. The motor junction area shall include a terminal strip for wire connections and shall be sealed with gaskets and O-rings from the motor stator housing. The motor shaft shall be one piece AISI403SS material, rotating on two permanently lubricated ball bearings designed for a minimum L-10 life of up to 100,000 hours. Motor service factor shall be 1.10 and capable of up to 10 starts per hour. The motor shall be designed for continuous duty pumping at a maximum sump temperature of 104°F. Voltage and frequency tolerances shall be a maximum 10 / 5% respectively. A thrust bearing RTD temperature monitor shall be provided. Motor over temperature protection shall be provided by miniature thermal protectors embedded in the windings. Mechanical seal failure protection shall be provided by a mechanical float switch located in a chamber above the seal. This switch shall be comprised of a magnetic float that actuates a dry reed switch encapsulated within the stem. Should the mechanical seal fail, liquid shall be directed into the float chamber, in which the rising liquid activates the switch opening the normally closed circuit. The float switch components shall be 304SS material. The motor shall be non overloading over the entire specified range of operation. The motor shall be cooled by the pumped water flowing along the stator housing during operation. A water jacket or any other external cooling systems are not acceptable.

The power and control cable jackets shall be manufactured of an oil resistant chloroprene rubber material, designed for submerged applications. Cable shall be watertight to a depth of at least 82'. The cable entry system shall comprise of primary, secondary, and tertiary sealing methods. The primary seal shall be achieved by an cylindrical elastomeric grommet compressed between the cable housing and cable gland. Secondary sealing is accomplished with a compressed O-rings made of NBR material. Compression and subsequent sealing shall preclude specific torque requirements. The system shall also include tertiary sealing to prevent leakage into the motor housing due to capillary action through the insulation if the cable is damaged or cut. The cable wires shall be cut, stripped, re-connected with a copper butt end connector, and embedded in epoxy within the cable gland. This provides a dead end for leakage through the cable insulation into the motor junction area. The cable entry system shall be the same for both the power and control cables.

Pump Model Name

Pump Description

450 DSZ3

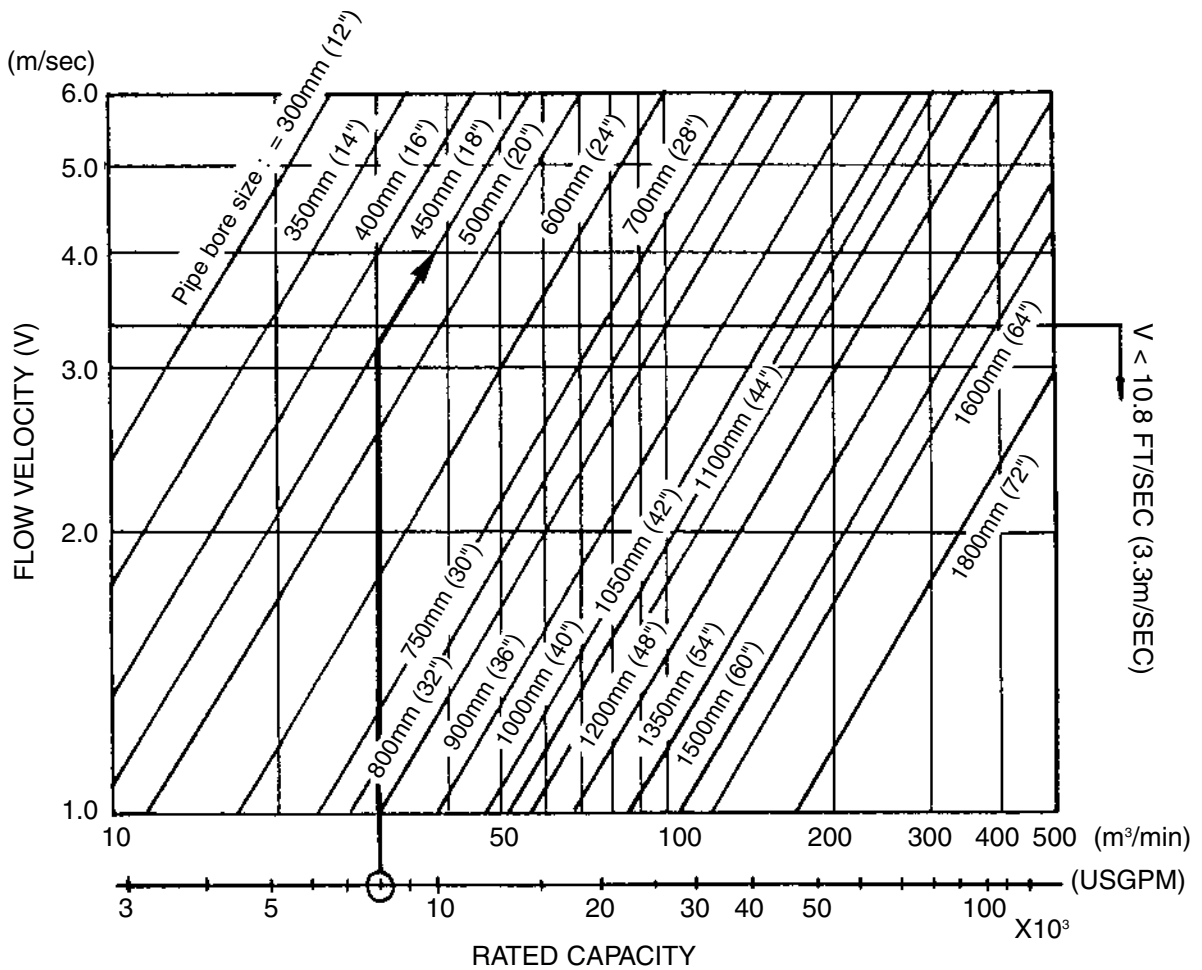


***PUMP SIZE**

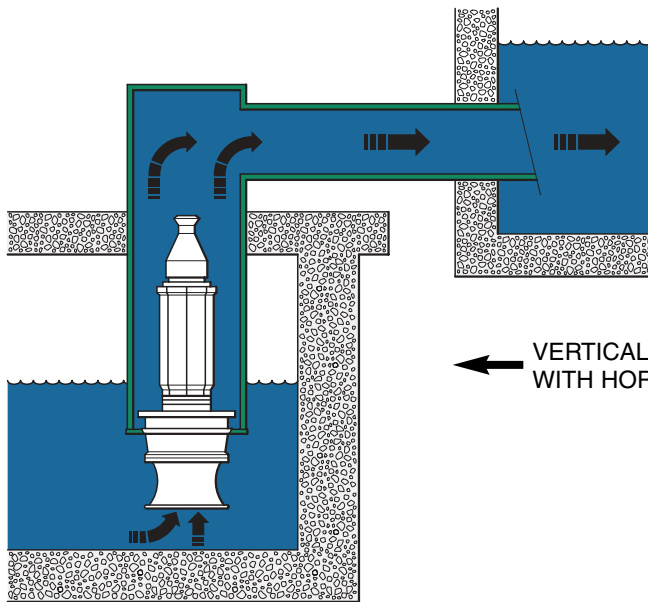
Pump size of DSZ3 pump is defined by minimum pipe bore size in which flow velocity at pump rated capacity does not exceed 10.8 ft./sec. (3.3 m/sec).

Example:

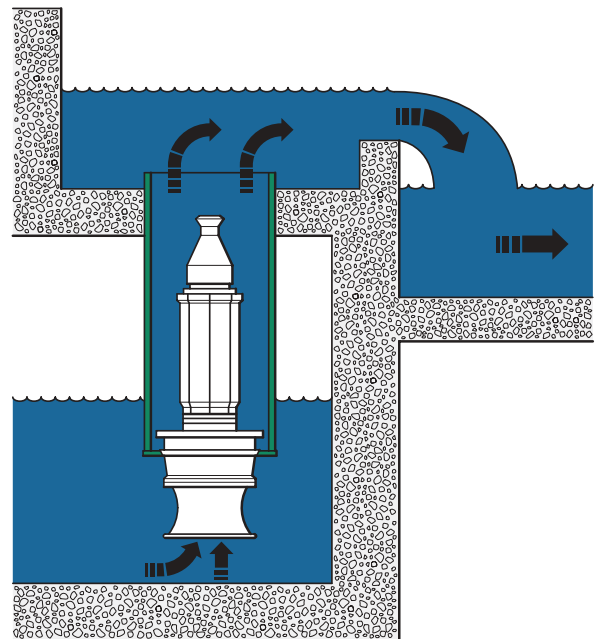
Rated Capacity 8000 GPM



Installation



← VERTICAL SUSPENDED COLUMN WITH HORIZONTAL DISCHARGE



VERTICAL SUSPENDED COLUMN WITH VERTICAL DISCHARGE →

Specifications

Impeller Design

Curve No.	Type of Impeller	Nos. of Blades	Max. Solid Dia.
A0553	Axial Flow	3	3 ⁹ / ₁₆ inch (90 mm)
A0713			4 ⁹ / ₁₆ inch (116 mm)
A0843			5 ⁷ / ₁₆ inch (138 mm)
A1003			6 ⁷ / ₁₆ inch (164 mm)
C1125	Axial Flow	5	1 ³ / ₈ inch (35 mm)
C1285			1 ⁹ / ₁₆ inch (40 mm)
C1455			1 ³ / ₄ inch (45 mm)
C1605			2 inch (50 mm)
C1915			2 ³ / ₈ inch (60 mm)
C2185			2 ¹¹ / ₁₆ inch (68 mm)
C2905			3 ⁹ / ₁₆ inch (91 mm)
V0494			Axial Flow
V0554	2 ¹ / ₂ inch (63 mm)		
V0754	3 ⁷ / ₁₆ inch (87 mm)		
V0854	3 ⁷ / ₈ inch (98 mm)		
V0974	4 ⁷ / ₁₆ inch (112 mm)		
V1154	5 ¹ / ₄ inch (133 mm)		

Material Specifications

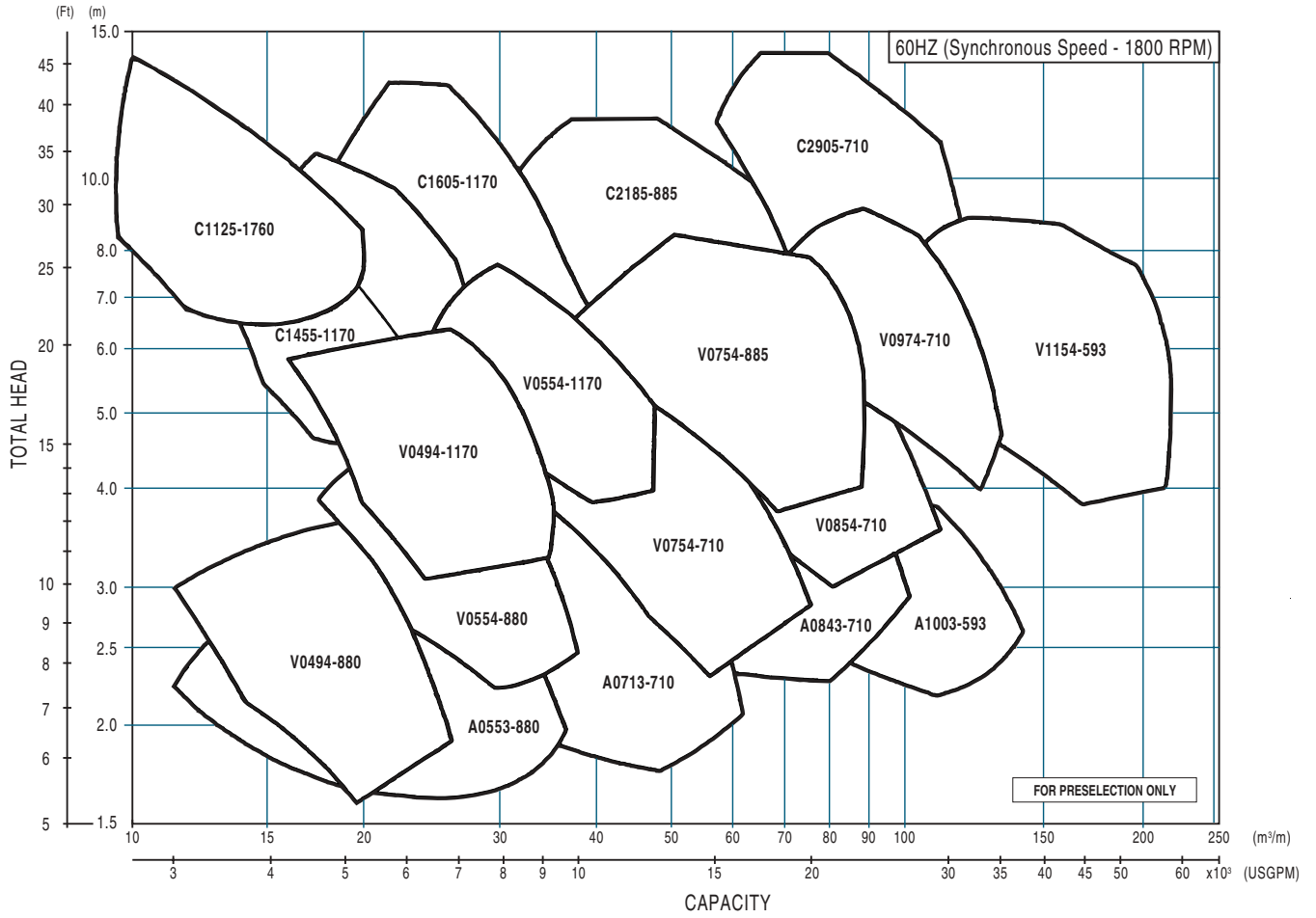
Parts	Standard		
	Type I	Type II	Type III
Discharge Bowl	Cast Iron ASTM A48 CL35	→	→
Suction Bell Mouth	Cast Iron ASTM A48 CL35	→	→
Casing Liner	Stainless Steel ASTM A743 CF8	→	→
Impeller	Ductile Cast Iron ASTM A536 60-40-18	Bronze ASTM B584 C90300	Stainless Steel ASTM A743 CF8
Shaft	Stainless Steel AISI 403	→	→
Motor Frame	Cast Iron ASTM A48 CL35	→	→
Mechanical Seal	Upper: Carbon/Ceramic Lower: Silicon Carbide/Silicon Carbide		

Option	
Mechanical Seal	Upper: Carbon/Tungsten Carbide Lower: Tungsten Carbide/Tungsten Carbide

Note:

1. Other materials may be used if requested.

Selection Chart



Project:

Model:

Chk'd:

Date:

In an effort to maintain a manageable, smaller file size:

- *To access or to download single pump model curves, please follow the “performance curves” link on the Model DSZ page from the pumpsebara.com website;*
- *To access or to download each pump model dimensions, please follow the “dimensions” link on the Model DSZ page from the pumpsebara.com website;*
- *To access or to download each pump model sectional view/parts reference, please follow the “parts reference” link on the Model DSZ page from the pumpsebara.com website.*

Page numbering will follow that within this section and consistent with the existing print version of the EBARA Submersible Water and Waster Pump Product catalog.