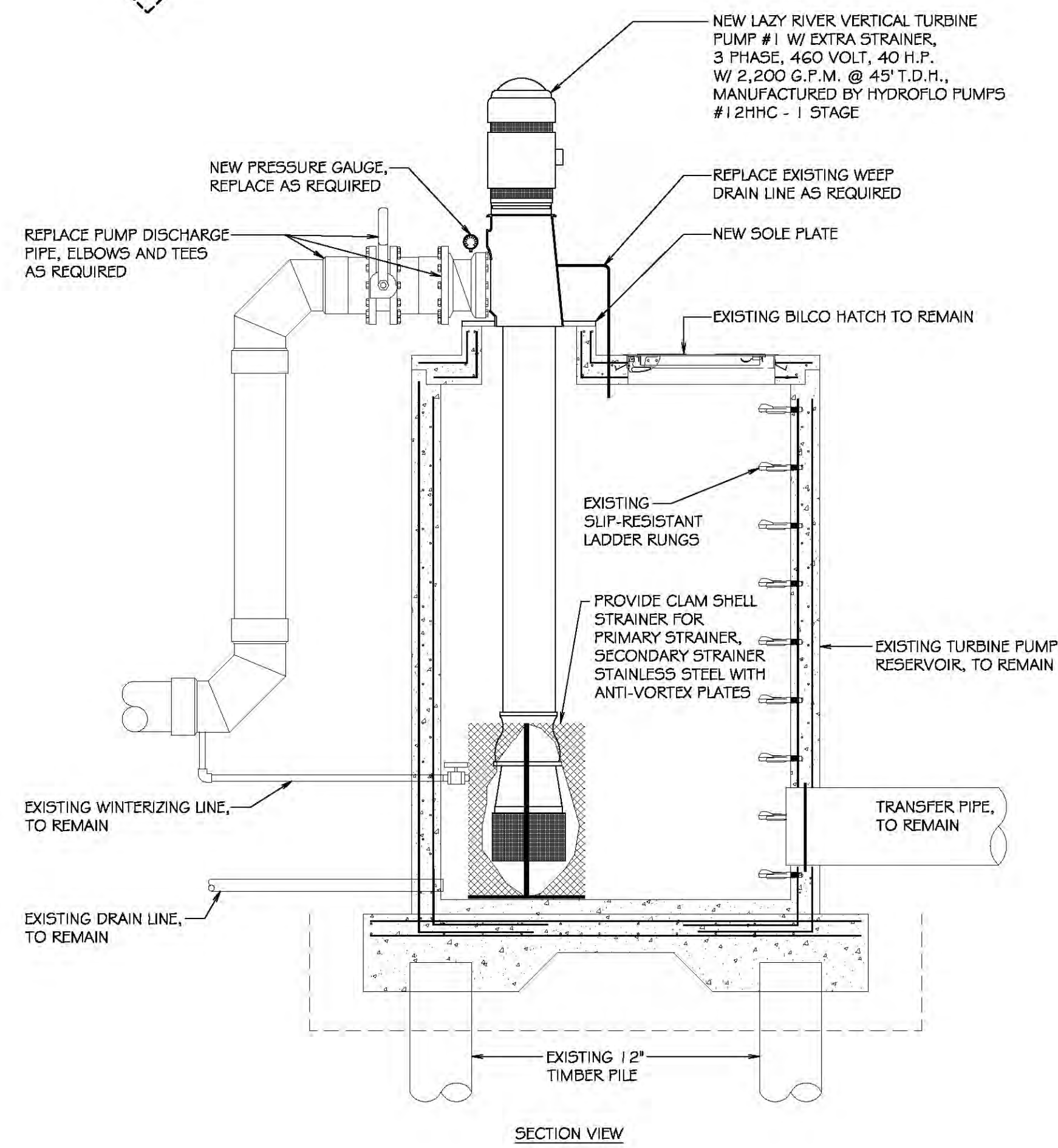


**PIPE REPLACEMENT NOTES**

1. CONTRACTOR TO REPLACE ALL PUMP DISCHARGE PIPES.
2. SAW CUT EXISTING DECK AS REQUIRED TO REPLACE PIPES.
3. ANY SECTIONS OF THE DECK THAT ARE REPLACED SHALL BE SLIP-RESISTANT AND MATCH EXISTING SLOPES.
4. ALL PLUMBING WORK, THROUGHOUT THE ENTIRE SWIMMING POOL PROJECT, SHALL COMPLY AND BE IN ACCORDANCE WITH THE ILLINOIS STATE PLUMBING CODE.
5. ALL POOL RECIRCULATION LINES TO BE SCHEDULE 80 PVC PIPE (ASTM D 1785), UNLESS OTHERWISE SPECIFIED. ALL PIPE FITTINGS TO BE SCHEDULE 80 PVC (ASTM D2466), UNLESS OTHERWISE SPECIFIED. PVC PIPING SHALL BE STAMPED WITH N.S.F. SEAL OF APPROVAL.
6. ALL VALVES TWO (2) INCHES AND SMALLER TO BE TRUE UNION PVC BALL VALVES, UNLESS OTHERWISE SPECIFIED. ALL VALVES THREE (3) INCHES AND LARGER TO BE BUTTERFLY VALVES, UNLESS OTHERWISE SPECIFIED.

**BONDING NOTE:**

1. CONTRACTOR SHALL BOND NEW DECK TO THE EXISTING BONDING GRID IN ACCORDANCE WITH ARTICLE 680.26 OF THE 2008 NATIONAL ELECTRICAL CODE. PROVIDE AN APPROVED BONDING LUG / CLAMP ON ALL EXISTING ITEMS AND CONNECT WITH A #8 SOLID BARE COPPER BONDING WIRE.



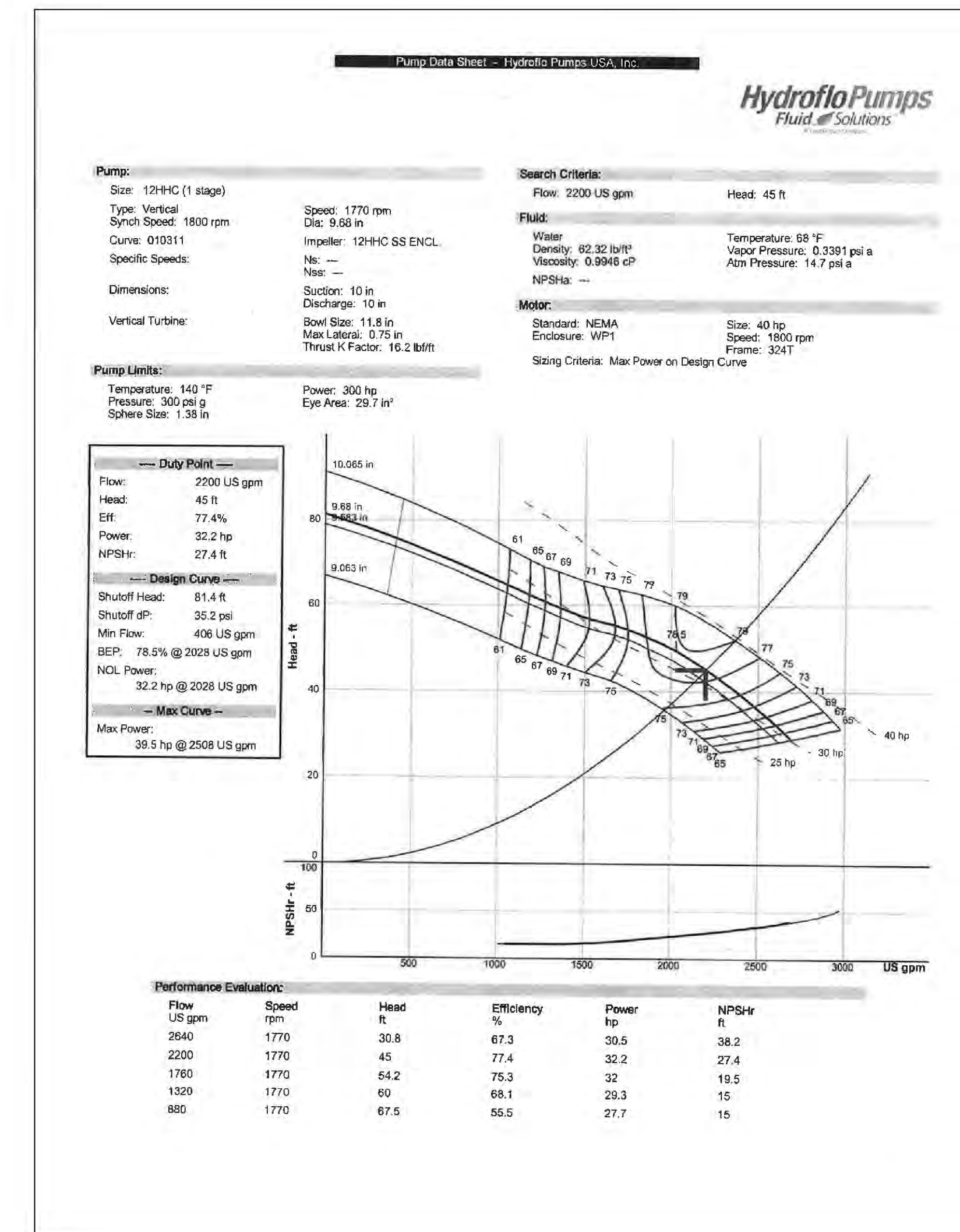
**1 NEW TURBINE PUMP #1 DETAIL**  
(LAZY RIVER TURBINE PUMP #1) SCALE: 1/2" = 1'-0"

**VERTICAL TURBINE PUMP INSTALLATION NOTES**

1. ALL EQUIPMENT AND PIPES ARE TO REMAIN UNLESS OTHERWISE NOTED.
2. REMOVE AND DISPOSE OF EXISTING FILTRATION PUMP AND MOTOR.
3. INSTALL NEW PUMP AND MOTOR WITH ASSOCIATED PIPES PER MANUFACTURERS INSTRUCTIONS.
4. ALL PLUMBING WORK, THROUGHOUT THE ENTIRE SWIMMING POOL PROJECT, SHALL COMPLY AND BE IN ACCORDANCE WITH THE ILLINOIS STATE PLUMBING CODE.
5. ALL POOL RECIRCULATION LINES TO BE SCHEDULE 80 PVC PIPE (ASTM D 1785), UNLESS OTHERWISE SPECIFIED. ALL PIPE FITTINGS TO BE SCHEDULE 80 PVC (ASTM D2466), UNLESS OTHERWISE SPECIFIED. PVC PIPING SHALL BE STAMPED WITH N.S.F. SEAL OF APPROVAL.
6. ALL VALVES TWO (2) INCHES AND SMALLER TO BE TRUE UNION PVC BALL VALVES, UNLESS OTHERWISE SPECIFIED. ALL VALVES THREE (3) INCHES AND LARGER TO BE BUTTERFLY VALVES, UNLESS OTHERWISE SPECIFIED.

**BONDING NOTE:**

1. CONTRACTOR SHALL BOND NEW PUMPS AND MOTORS TO THE EXISTING BONDING GRID IN ACCORDANCE WITH ARTICLE 680.26 OF THE 2008 NATIONAL ELECTRICAL CODE. PROVIDE AN APPROVED BONDING LUG / CLAMP ON ALL EXISTING ITEMS AND CONNECT WITH A #8 SOLID BARE COPPER BONDING WIRE.





## DESIGN CRITERIA

**VERTICAL TURBINE PUMP SPECIFICATION:**

**MOTOR**

1. VERTICAL HOLLOW SHAFT MOTOR, HIGH THRUST DESIGN FOR VERTICAL TURBINE PUMP OPERATION:
  2. ENCLOSURE: WP1 OR TFC
  3. VOLTAGE: 460 (CONTRACTOR TO CONFIRM VOLTAGE PRIOR TO ORDERING PUMPS)
  4. PHASE: 3
  5. SPEED: 1 800 RPM OR 1 200 RPM, 3 600 RPM NOT ACCEPTABLE
  6. MANUFACTURE US, GE, SEMANS OR APPROVED EQUAL
- NOTE: WIRE NUTS ARE NOT ACCEPTABLE ON MOTOR CONNECTIONS

**PUMPS**

1. MANUFACTURE HYDROFLO, JOHNSTON, PACO, OR APPROVED EQUAL. SEE DESIGN CRITERIA FOR SPECIFIC FLOWS, HEADS, ENCLOSURE, HP, PHASE, VOLTAGE, RPM, AND LENGTHS.
2. PUMP MANUFACTURE MUST GET ENGINEER APPROVAL BEFORE BID.
3. ALL PUMP HARDWARE TO BE 300 SERIES STAINLESS STEEL.
4. ALL PUMP PARTS CAST IRON, STEEL AND DUCTIL IRON COATING INSIDE AND OUT TO BE 134 SCOTCHKOTE POWDER COATED EPOXY SUITABLE FOR HEAVY CHLORINATED WATER AT 90°F.

**DUCTILE HEAD**

1. DUCTILE IRON FLANGE DISCHARGE HEAD WITH PACKED STUFFING BOX WITH JOHN CRANE TYPE 1345 GRAPHITE PACKING.
2. SS RECIRC LINE.
3. ALL HARDWARE 316 SS.
4. TWO-PIECE HEAD SHAFT DESIGN. ONE PIECE HEAD SHAFT DESIGN NOT ACCEPTABLE.
5. EPOXY COATED INSIDE AND OUT.

**SHAFT**

1. ALL SHAFTING TO BE PH 17-4 PH STAINLESS STEEL, NO EXCEPTIONS.
2. ALL COUPLINGS TO BE 300 SERIES STAINLESS.

**BEARING**

1. ALL BEARING TO BE COMPOSITE TYPE, VESCONITE OR CARBON GRAPHITE. NO OTHER MATERIAL ACCEPTABLE UNLESS APPROVED BY ENGINEER BEFORE BID.

**COLUMN ASSEMBLY**

NOTE: ALL COLUMNS PIPE TO FLANGE, FIRST SECTION OFF OF DISCHARGE HEAD TO BE 24" FACE TO FACE.

1. MAX BEARING SPANS 5 FEET
2. MIN SHAFT DIAMETERS 1" - 2 1/3 THRU 2 1/5 FRAME MOTORS
3. MIN. SHAFT DIAMETER 1 3/16" - 2 5/4 THRU 3 2/6 FRAME MOTORS
4. MIN. SHAFT DIAMETER 1 1/2" - 3 6/4 THRU 4 0/5 FRAME MOTORS
5. THE COLUMN PIPE SHALL BE SCHEDULE 40. THE COLUMN PIPE SHALL BE COATED INSIDE AND OUT WITH A 134 SCOTCHKOTE POWDER COATED EPOXY SUITABLE FOR HEAVY CHLORINATED WATER AT 90°F.
6. PUMP STRAINER TO BE 5 TO 7 INCHES OFF BOTTOM OF BASIN NO HIGHER. CONTRACTOR TO CONFIRM BOTH BASIN DEPTHS.

**SPIDERS**

1. ALL SPIDERS, 201SS OR 300 SERIES SS CONSTRUCTION.

**BOWL ASSEMBLY**

1. CAST IRON BOWLS EPOXY LINED, STAINLESS STEEL IMPELLER ENCLOSED OR SEMI-OPEN AND SINGLE THROUGH FOUR STAGE ASSEMBLIES ARE ACCEPTABLE.

**PRIMARY STRAINER**

1. 304 SS. CONSTRUCTION CLIP ON STRAINER WITH ANTI-VORTEX RIBS.

**SOLE PLATE**

1. CAST IRON OR BARRICATED STEEL.
2. FUSE COATED EPOXY
3. SS HARDWARE

1. CONTRACTOR TO VERIFY IN FIELD ALL EXISTING CONDITIONS INCLUDING, BUT NOT LIMITED TO, TYPE AND SIZE OF JOINT AND EXISTING JOINT MATERIAL.
2. CLEAN, PREPARE JOINTS AND APPLY PRIMER AS RECOMMENDED BY MANUFACTURER.
3. INSTALL BACKER ROD OR BOND BREAKER AS NECESSARY TO PREVENT 3-SIDED ADHESION OF SEALANT TO ADJACENT SUBSTRATES.

**PUMP ASSEMBLY**

1. ALL PUMPS MUST BE ASSEMBLED AT FACTORY OR APPROVED FACTORY SERVICE CENTER.

**DESIGN: 2200 USGPM @ 45' TDH, 1770 RPM, \***

77.4% Efficient, 32.2 BHP, 9.51 Feet TPL (+/- 1.5")  
1 12HHIC-45064-w\_B2 12HHIC - 1 Stage W/L VERTICAL TURBINE PUMP ASSEMBLY  
\*\*\* Fully Assembled Vertical Turbine \*\*\*  
**DRIVER ASSEMBLY SECTION**  
• US 40HP, 1800RPM, 3PH/60Hz/230-460V, Premium Efficient, 324TP Frame VHS-WP1 w/ NRR and 1.1875" Drive Coupling  
– Motor Type: RUS  
– Motor CD = 28.219"  
**DISCHARGE HEAD ASSEMBLY SECTION**  
• 1.1875" x 34.219" x 416SS Head Shaft Assembly w/ 12TPI-LH Bronze Adjusting Nut and Key  
• HF10 Ductile Iron Head with 10" 125# Discharge Flange  
– Head Coating: Coating Inside and Outside-Scotchkote 134 of Discharge Head  
– Shaft Guard: Universal 304SS  
– 1.1875" Cast Iron Packing Box Assembly w/ Hydroflo FEP Bearing, John Crane #1345 Packing, Bronze Lantern Ring and SS Packing Gland  
• Base Plate: Standard Steel HF10 24" W x 24" L x 1" Thick  
– 6-8 mils Scotchkote 134 Coating of Base Plate  
• Machine Head for Flange  
**COLUMN ASSEMBLY SECTION**  
• 2 Piece Fabricated Steel Column Assembly: ~ 6.93' of 10" x 365" Wall Steel Water Lubricated Column with Flanged Ends  
– Bottom 5' Column  
– Column Coating: Coating ID and OD-Scotchkote 134 of Column Assembly  
• 1 Pct(3): 5" x 2" x .75" 304SS Spiders w/ Rubber Inserts  
• 2 Piece Lineshaft Assembly: 1.1875" -12TPI x 120" x 17-4PH w/ 316SS Couplings  
– Top Shaft: 1.1875" -12TPI x 17-4PH w/ 316SS Coupling  
– Lineshaft: 1.1875" -12TPI x 17-4PH w/ 316SS Couplings

**BOWL ASSEMBLY SECTION**  
• 12HHIC - 1 Stage Product Lubricated Bowl Assembly w/ 18-8 SS Fasteners including:  
– \* No Discharge Case - Column to be Flanged Directly to Bowl  
– Ductile Iron Bowls  
– Hydroflo FEP Bowl Bearings  
– 201SS Impellers with 316SS Collars  
– 17-4PH Bowl Shaft: 8.00" Water Lube Projection x 1.1875" DIA - 12 TPI  
– 10" NPT, Ductile Iron Suction Case with Hydroflo FEP Bearing  
– Pump End Coating: Coating Outside Only-Scotchkote 134 of Pump End  
• 304SS Bolt-On Basket Strainer with Vortex Suppression  
• Crating and Painting  
• Min. Submergence from Bottom of Suction for Vortex Suppression = 37" (In.).  
\*\*This does not include NPSHr requirements. NPSHr at Duty Point = 27.4' (Ft.).  
• Estimated Total Assembly Weight As Above: 2107 Lbs.

**\* DESIGN: 1601 USGPM @ 45.1' TDH, 1770 RPM, \***

73.9% Efficient, 24.6 BHP, 9.51 Feet TPL (+/- 1.5")  
1 12HHIC-45066-w\_B0 12HHIC - 1 Stage W/L VERTICAL TURBINE PUMP ASSEMBLY  
\*\*\* Fully Assembled Vertical Turbine \*\*\*  
**DRIVER ASSEMBLY SECTION**  
• US 25HP, 1800RPM, 3PH/60Hz/230-460V, Premium Efficient, 284TPA Frame VHS-WP1 w/ NRR and 1.1875" Drive Coupling  
– Motor Type: AUS  
– Motor CD = 24.78"  
**DISCHARGE HEAD ASSEMBLY SECTION**  
• 1.1875" x 30.75" x 316SS Head Shaft Assembly w/ 12TPI-LH Bronze Adjusting Nut and Key  
• HF8 Ductile Iron Head with 8" 125# Discharge Flange  
– Head Coating: Coating Inside and Outside-Scotchkote 134 of Discharge Head  
– Shaft Guard: Universal 304SS  
– 1.1875" Cast Iron Packing Box Assembly w/ Hydroflo FEP Bearing, John Crane #1345 Packing, Bronze Lantern Ring and SS Packing Gland  
• Base Plate: Standard Steel HF8 24" W x 24" L x 1" Thick  
– 6-8 mils Scotchkote 134 Coating of Base Plate  
• Machine Head for Flange  
**COLUMN ASSEMBLY SECTION**  
• 2 Piece Fabricated Steel Column Assembly: ~ 6.93' of 8" x 322" Wall Steel Water Lubricated Column with Flanged Ends  
– Bottom 5' Column  
– Column Coating: Coating ID Only-Scotchkote 134 of Column Assembly  
• 1 Pct(3): 5" x 2" x .75" 304SS Spiders w/ Rubber Inserts  
• 2 Piece Lineshaft Assembly: 1.1875" -12TPI x 120" x 17-4PH w/ 316SS Couplings  
– Top Shaft: 1.1875" -12TPI x 17-4PH w/ 316SS Coupling  
– Lineshaft: 1.1875" -12TPI x 17-4PH w/ 316SS Couplings

**BOWL ASSEMBLY SECTION**  
• 12HHIC - 1 Stage Product Lubricated Bowl Assembly w/ 18-8 SS Fasteners including:  
– \* No Discharge Case - Column to be Flanged Directly to Bowl  
– Ductile Iron Bowls  
– Hydroflo FEP Bowl Bearings  
– 201SS Impellers with 316SS Collars  
– 17-4PH Bowl Shaft: 8.00" Water Lube Projection x 1.1875" DIA - 12 TPI  
– 10" NPT, Ductile Iron Suction Case with Hydroflo FEP Bearing  
– Pump End Coating: Coating Outside Only-Scotchkote 134 of Pump End  
• 304SS Bolt-On Basket Strainer with Vortex Suppression  
• Crating and Painting  
• Min. Submergence from Bottom of Suction for Vortex Suppression = 37" (In.).  
\*\*This does not include NPSHr requirements. NPSHr at Duty Point = 17.3' (Ft.).  
• Estimated Total Assembly Weight As Above: 1641 Lbs.

### 3M™ Scotchkote™ Fusion-Bonded Epoxy Coating 134

**Product Description**  
3M™ Scotchkote™ Fusion-Bonded Epoxy Coating 134 is a one-part, heat curable, thermosetting epoxy coating designed for corrosion protection of metal. The epoxy is applied to preheated steel as a dry powder which melts and cures to a uniform coating thickness. This bonding process provides excellent adhesion and coverage on applications such as valves, pumps, pipe drains, hydrants and porous castings. Scotchkote 134 coating is resistant to wastewater, corrosive soils, hydrocarbons, harsh chemicals, and sea water. Powder properties allow easy manual or automatic application by electrocoat or air-spray equipment.

**Temperature Operating Range**  
Scotchkote 134 coating, when properly applied to a nominal thickness of 15 mils, should perform in a satisfactory manner on pipelines operating between -100°F/-73°C to 205°F/90°C. For temperatures reaching 200°F/93°C thicker coatings, greater than 30 mils, may improve the service capability. However, it is difficult to accurately predict field performance from the laboratory data due to the wide variations in actual field conditions. Soil types, moisture content, temperatures, coating thickness, and other factors specific to the area all influence the coating performance and upper temperature operating limits.

**Product Features**

- No primer required for most applications.
- Particularly suitable for electrocoat or air-spray application on preheated metal articles.
- Can be electrostatically applied to unheated metal parts and subsequently cured by baking.
- Long gel time allows application on large or complex articles, minimum layer of runs, sags, laminations, or unevenly overspray.
- Especially useful for coating the inside of pipe or other fabrications where a smooth, corrosion resistant coating is required.
- Can be machined by grinding or cutting to meet close tolerance requirements.
- Allows easy visual inspection of coated articles.
- Can be painted with alkyl paint, acrylic lacquer, polyurethane, or acrylic enamel for color coding.
- Will not sag, cold flow, or become soft in storage. Long term storage under most climatic conditions.
- Lightweight for lower shipping costs.
- Protects over wide temperature range.
- Resists direct burial soil stress.

**High adhesion and toughness.**

- Resists cavitation and cathodic disbondment.
- Excellent chemical resistance.
- Suitable for elevated temperature service in presence of H<sub>2</sub>, CO<sub>2</sub>, CH<sub>4</sub>, crude oil and brine when applied over phenolic primer such as Scotchkote 345.
- Long-term performance history in water, sewage, and other service environments.
- Scotchkote 134 FBC meets the requirements of AWWA Standard C213 and C550.
- Operating temperature dry is 230°F/110°C.

**General Application Information**

1. Remove oil, grease and loosely adhering deposits.
2. Abrasive blast clean the surface to SA2. No. 2 SSPC-SP10 90-100%.
3. Apply mechanical masks or mats with materials such as Scotch Glass Cloth Tape 361 or Scotch Aluminum Foil Tape 425 as required.
4. Preheat article to the desired application temperature per cure specifications.
5. Deposit Scotchkote 134 coating by powder spray to the specified thickness.
6. Cure according to cure specifications.
7. Visually and electrically inspect for coating flaws after the coating has cooled.
8. Repair all defects.

**Cure Specifications**  
Scotchkote 134 coating may be applied to metal articles which have been preheated to a temperature of 300°F/149°C to 470°F/240°C. After application, Scotchkote 134 coating must be cured according to the cure guide to achieve maximum performance properties.

If Scotchkote 134 coating is electrostatically applied to unheated parts, the cure time should be measured from the time the coated part reaches the cure temperature. After cure, the coating may be force cooled using air or water to facilitate inspection and handling.

### 3M™ Scotchkote™ Fusion-Bonded Epoxy Coating 134 Test Data

Property	Test Description	Results
Adhesion	Epoxy on 1022	> 5000 psi (gives failure) 210 kg/cm <sup>2</sup>
Adhesion to Steel (Shear)	ASTM D 1002	4000 psi (302 kg/cm <sup>2</sup> ) cohesive failure
Impact	Gardner 508 on 3/8 in diameter top 150" x 1" x 0.32 in x 7.8 mm x 7.8 mm steel panel	100 ft-lbs 1.3 kg-m
Hardness	Based on ASTM D 2583	23
Abrasion Resistance	ASTM D 4060 CS-17 1000g weight / 5000 cycles	0.07 g loss
Thermal Shock	310°F/154°C to -320°F/-190°C cooled 90%	10 cycles, no effect
Penetration	ASTM D 17 -20°F/-4°C	0
Tensile Strength	ASTM D 2370	7300 psi (513 kg/cm <sup>2</sup> )
Elongation	ASTM D 2370	4.2%
Compressive Strength	ASTM D 695	12000 psi (900 kg/cm <sup>2</sup> )
Coefficient of Friction	40 MPa/2 - 1000 App B	2.0"
Electric Strength	ASTM D 148	1000 volts/mil (28.4 kV/mm)
Hot Water Resistance	160°F/71°C immersion / 120 days	Good adhesion, no blistering
Electrical Resistivity	ASTM D 257	1.2 x 10 <sup>11</sup> ohm-cm
Thermal Conductivity	ML-1 90228	7 x 10 <sup>-6</sup> cal/cm-cm <sup>2</sup> /°C-min
Water Absorption	3M-10 mil/254 µm thick film; 30 days	8.8 g/g
Fungus Resistance	ML-STD 810-B Method 008	Fungus-free
Salt Fog	ML-E-5272C	No effect
Weatherwater	ASTM D 21 5000 hours	No effect
Salt Stress - burial	Burials of Scotchkote 134 cycles	Surface chalk
Salt Crack	30 day, 5 wet, 5% NaCl sand crack 230°F/110°C	Disbondment diameter 24 mm average
Embedability	3/8" (9.5 mm) coupon mended bend at 72°F/22°C	1.5" / diameter length

**Handling and Safety Precautions**  
Read all Health Hazard, Precautionary and First Aid, Material Safety Data Sheet, and/or product label prior to handling or use.

**Important Notice**  
All statements, technical information, and recommendations made in 3M's products are based on information believed to be reliable and the accuracy or completeness is not guaranteed. Before using this product, you should read and understand the full and complete instructions for use. 3M makes no representation or warranty, expressed or implied, regarding the use of this product. 3M is not responsible for any injury, damage, or loss resulting from the use of this product. 3M is not responsible for any injury, damage, or loss resulting from the use of this product. 3M is not responsible for any injury, damage, or loss resulting from the use of this product. 3M is not responsible for any injury, damage, or loss resulting from the use of this product.

**Ordering Information/Customer Service**  
For ordering technical or product information, or a copy of the Material Safety Data Sheet, call:  
Phone: 800/722-6721  
Fax: 877/801-1305

**Warranty/Limited Remedy/Limited Liability.**  
3M warrants that Product will conform to the published specifications when applied as directed. Product is provided as is and the specifications (your exclusive remedy) and 3M's sole obligation will be, at 3M's option, to replace or refund the purchase price of the Product. 3M makes no representation or warranty, expressed or implied, regarding the use of this product. 3M is not responsible for any injury, damage, or loss resulting from the use of this product. 3M is not responsible for any injury, damage, or loss resulting from the use of this product. 3M is not responsible for any injury, damage, or loss resulting from the use of this product.

### 3M™ Scotchkote™ Fusion-Bonded Epoxy Coating 134 Cure Guide

Temperature of Article at Time of Powder Application	Typical Gel Time	Cure Time
475°F/241°C	40 seconds	7 minutes
450°F/232°C	60 seconds	15 minutes
400°F/204°C	120 seconds	15 minutes
320°F/171°C	330 seconds	25 minutes
425°F/219°C	90 seconds	25 minutes for NSF/ANSI #1 approved applications

**Typical Properties**

Property	Value
Color	Forest Green
Specific Gravity - Powder (40°/4°C)	1.51
Coverage	127 in <sup>2</sup> /lb (3.66 m <sup>2</sup> /kg)
Fluid Bed Density	33 lb/ft <sup>3</sup> (530 kg/m <sup>3</sup> )
Shelf Life at 60°F/22°C	18 months
Average Gel Time 400°F/204°C	120 seconds
Edge Coverage	12% to 18%
Minimum Epoxidation Concentration	0.03 wt% (26.6 g/m <sup>3</sup> )
Ignition Temperature	660°F/320°C
V.O.C. (As Supplied)	0 g/L, as calculated

**Chemical/Pressure/Temperature Resistance**  
All tests performed on Scotchkote - Fusion-Bonded Epoxy Coating 134 applied over a 1 mil/25.4 µm phenolic primer. Listed below for test conditions: 2% benzene, 20% benzene, 50% benzene, 100% benzene, 100% water, 100% oil, 100% acid, 100% alkali, 100% salt, 100% sugar, 100% alcohol, 100% glycerol, 100% acetone, 100% methanol, 100% ethanol, 100% isopropanol, 100% n-butanol, 100% hexane, 100% heptane, 100% octane, 100% decane, 100% dodecane, 100% tetradecane, 100% hexadecane, 100% octadecane, 100% eicosane, 100% docosane, 100% tetracosane, 100% hexacosane, 100% octacosane, 100% triacontane, 100% hentriacontane, 100% tetratriacontane, 100% pentatriacontane, 100% hexatriacontane, 100% heptatriacontane, 100% octatriacontane, 100% nonatriacontane, 100% decatriacontane, 100% undecatriacontane, 100% dodecatriacontane, 100% tridecatriacontane, 100% tetradecatriacontane, 100% pentadecatriacontane, 100% hexadecatriacontane, 100% heptadecatriacontane, 100% octadecatriacontane, 100% nonadecatriacontane, 100% eicosacontane, 100% heneicosacontane, 100% dotriacontane, 100% tetratriacontane, 100% pentatriacontane, 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