

TOWN OF WALDEN
WATER FACILITY IMPROVEMENTS
SUMMARY REPORT
November 2022

The Town has identified several projects necessary to improve water system performance and resilience. As a result, this summary report describes the key project elements included in this water system improvement package.

Water Meters and Automated Meter Reading. The Town has customer water service meters approaching 50 years old and is losing revenue due to the age, inaccuracy, and condition of the existing meters. Furthermore, the Town has been challenged to maintain adequately qualified Public Works staff to manage and operate the water and wastewater systems as well as roads and other Town facilities. Replacing current water meters with more accurate state-of-the-art meters and enabling automated remote meter reading will reduce operational costs and relieve the strain of manual water reading on the existing staff.

Automated Meter System specifications and product data are provided as Attachment A to this summary report.

Water Treatment Plant (WTP) Finished Water Pumps. Current WTP finished water pumps are approaching the end of their effective life. Finished water pumps with constant speed motors convey treated water from the WTP clear well to the Town's finished water storage tanks. Current operations include manually throttling valves to reduce the flow rates which wastes energy and overworks the pumps. Two (2) new finished water pumps with premium efficiency motors and variable frequency drives (VFDs) would provide better control, flexibility, and reliability to the critical treated water pumping system serving the Town's residents and businesses. Since treated water pumping is one of the primary electrical loads at the WTP, reducing the energy impacts would help to optimize the existing solar photovoltaic system installed at the site.

The intent of the new pump and VFD installation will not be to increase flow rates, but rather to provide a more efficient means for matching pump output to the WTP filtering capacity. As the filters come on line and produce water, the pumps will be able to automatically adjust to the amount of water being produced in the treated water clear well, rather than manually throttling the outflow.

Pump specifications, pump production curves, and product data are provided as Attachment B to this summary report. In addition, disinfection contact calculations are also provided.

Replacement of 8-inch transmission line, associated distribution lines, and valves. Portions of the Town's water transmission and distribution infrastructure is in need of replacement. The Town's 2008 Master Plan identifies the treated water transmission line as a top priority for replacement and upgrade from 8" to 10" diameter piping. The transmission main consists of

approximately 2660 ft. of very old thin wall steel pipe and 1069 ft. of 8" DIP that was installed in 1980 to replace failing portions of the existing steel pipe. The Town has encountered several critical waterline leaks on the steel pipe as well as on other old cast iron lines within the distribution system. Also, there are issues with water main gate valves not working properly due to their age and condition. The Town proposes to upgrade the treated transmission line to 10" DIP and replace other pipelines and valves that are in disrepair and/or undersized for current and future needs.

Attachment C provides a figure depicting the pipelines and related valves and appurtenances to be replaced under this project.

Final Environmental Determination. The Town and its consultants are initiating the State Historic Preservation Office Section 106 Consultation and the U.S. Fish and Wildlife Service Section 7 Consultation. In addition, a public meeting will be advertised and is scheduled for December 12 at Town Hall. Once the public meeting has been advertised, a copy of the meeting advertisement will be forwarded to CDPHE.

Financial Analysis Comments. A 20-year cash flow model is included in Attachment D.

**ATTACHMENT A
METER DATA**



A PRODUCT SHEET OF NEPTUNE TECHNOLOGY GROUP

T-10[®] METER

SIZES: 1 ½" and 2"



Construction

Every Neptune[®] T-10[®] water meter meets or exceeds the latest AWWA C700 Standard. Its nutating disc, positive displacement principle has been time-proven for accuracy and dependability since 1892, ensuring maximum utility revenue.

The T-10 water meter consists of three major assemblies: a register, a lead free, high-copper alloy maincase, and a nutating disc measuring chamber.

The T-10 meter is available with a variety of register types. For reading convenience, the register can be mounted in one of four positions on the meter.

The corrosion-resistant, lead-free, high-copper alloy maincase will withstand most service conditions: internal water pressure, rough handling, and in-line piping stress.

The innovative floating chamber design of the nutating disc measuring element protects the chamber from frost damage while the unique chamber seal extends the low-flow accuracy by sealing the chamber outlet port to the maincase outlet port. The nutating disc measuring element utilizes corrosion-resistant materials throughout and a thrust roller to minimize wear.

Warranty

See Neptune Meter Warranty Statement for warranty details.

When desired, maintenance is easily accomplished either by replacement of major assemblies or individual components.

KEY FEATURES

Register

- Magnetic-driven, low-torque registration ensures accuracy
- Impact-resistant register
- High-resolution, low-flow leak detection
- Bayonet-style register mount allows in-line serviceability
- Tamperproof seal pin deters theft
- Date of manufacture, size, and model stamped on dial face

Lead Free Maincase

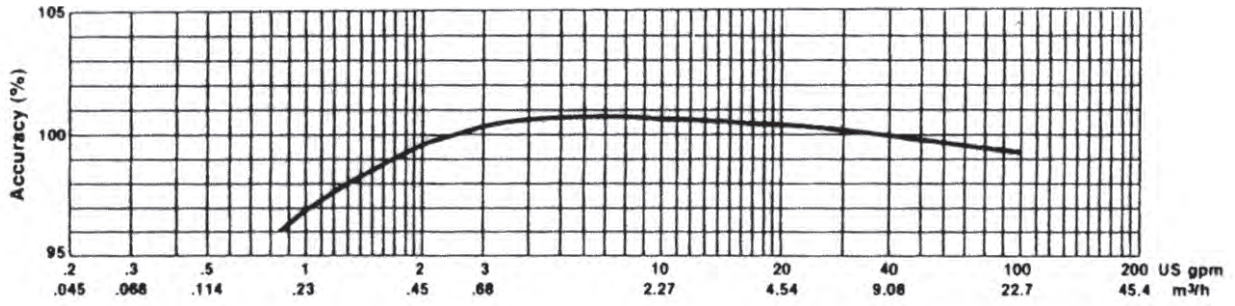
- Made from lead free, high-copper alloy
- NSF/ANSI 61 Certified
- NSF/ANSI 372 Certified
- Lifetime guarantee
- Resists internal pressure stresses and external damage
- Handles in-line piping variations and stresses
- Lead free, high-copper alloy provides residual value vs. plastic

Electrical grounding continuity

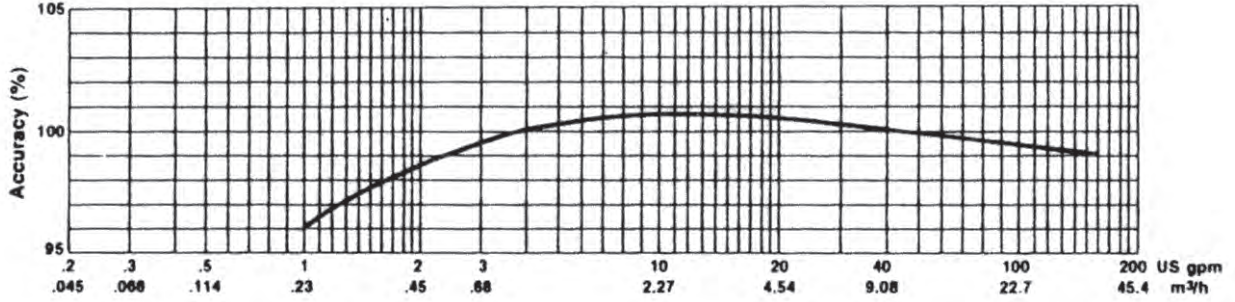
Nutating Disc Measuring Chamber

- Positive displacement
- Widest effective flow range for maximum revenue
- Proprietary polymer materials maximize long-term accuracy
- Floating chamber design is unaffected by meter position or in-line piping stresses

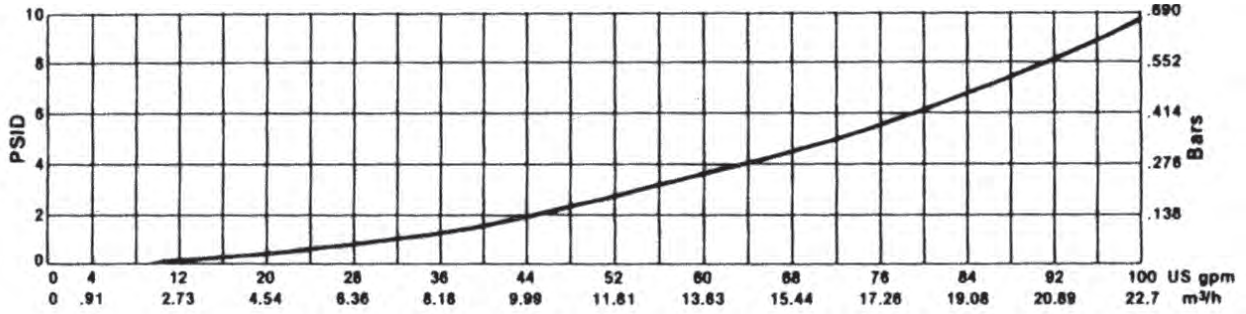
1 1/2" Accuracy



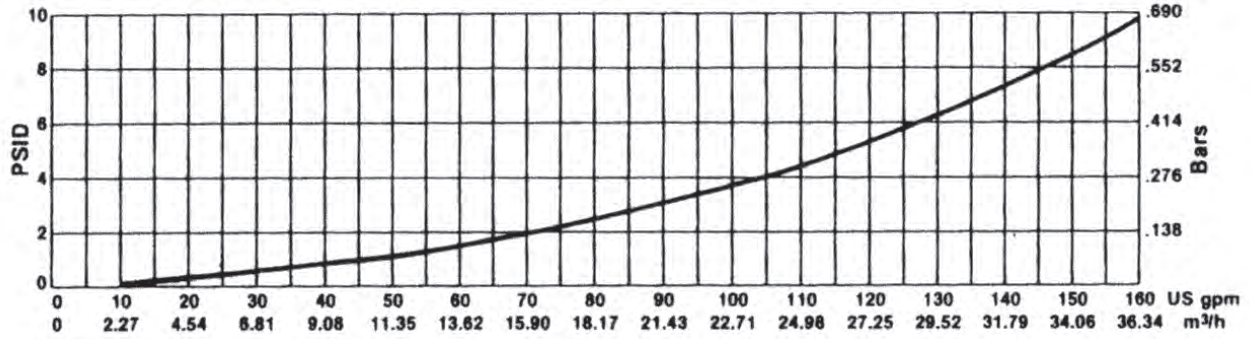
2" Accuracy



1 1/2" Pressure Loss



2" Pressure Loss



These charts show typical meter performance. Individual results may vary.

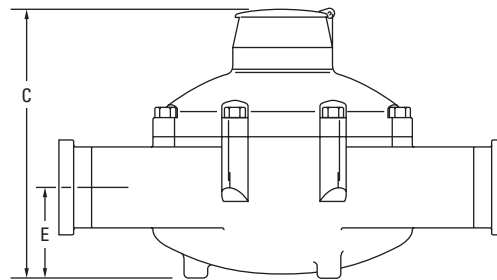
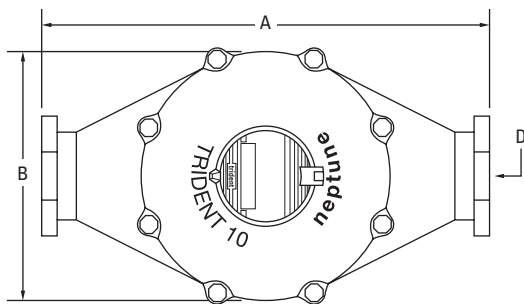
Operating Characteristics

Meter Size	Normal Operating Range @100% Accuracy (±1.5%)	AWWA Standard	Low Flow @ 95% Accuracy
1 1/2"	2 to 100 US gpm 0.46 to 22.73 m ³ /h	5 to 100 US gpm 1.1 to 22.7 m ³ /h	3/4 US gpm 0.17 m ³ /h
2"	2 1/2 to 160 US gpm 0.57 to 36.36 m ³ /h	8 to 160 US gpm 1.8 to 36.3 m ³ /h	1 US gpm 0.23 m ³ /h

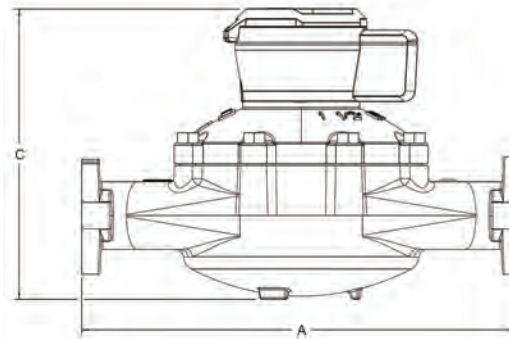
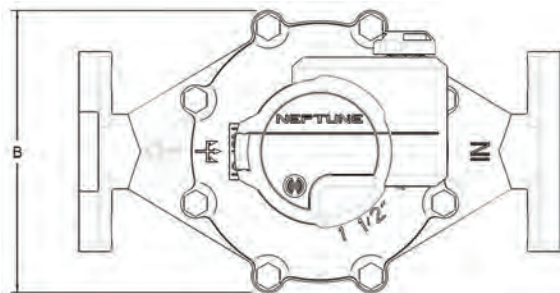
Dimensions

Meter Size	A in/mm	B in/mm	C-Std. in/mm	C-ARB in/mm	C-E-CODER®) R900i™ or ProCoder™) R900i™	D-Threads per inch	D-Thread Type	E in/mm	Weight lbs/kg
1 1/2" Screw End	12 5/8 321	8 1/16 205	8 1/8 206	8 13/16 220.3	8 3/8 213	11 1/2	1 1/2 NPT	2 9/16 65	31 14.1
1 1/2" Flanged End	13 330	8 1/16 205	8 1/8 206	8 13/16 220.3	8 3/8 213	—	—	2 9/16 65	35 15.9
2" Screw End	15 1/4 387	9 7/16 240	9 5/16 237	9 15/16 248.4	9 1/2 241	11 1/2	2" NPT	3 1/8 79	40 18.1
2" Flanged End	17 432	9 7/16 240	9 5/16 237	9 15/16 248.4	9 1/2 241	—	—	3 1/8 79	44 20.0

T-10 With Standard Register



T-10 With E-CODER®)R900i™ or ProCoder™)R900i™ Pit Register



Guaranteed Systems Compatibility

All T-10 meters are guaranteed adaptable to our ARB[®]V, ProRead[™] (ARB VI), ProCoder[™], E-CODER[®] (ARB VII), E-CODER[®]R900i[™], E-CODER[®]R450i[™], E-CODER[®]L900i[™], TRICON[®]/S, TRICON/E[®]3, and Neptune ARB[®] Utility Systems[™] without removing the meter from service.

Registration

ProRead Registration (per sweep hand revolution)		1 ½"	2"
100	US Gallons	✓	✓
100	Imperial Gallons	✓	✓
10	Cubic Feet	✓	✓
1	Cubic Metre		✓
.01	Cubic Metre	✓	
Register Capacity ProRead, ProCoder, and E-CODER		1 ½"	2"
100,000,000	US Gallons	✓	✓
100,000,000	Imperial Gallons	✓	✓
10,000,000	Cubic Feet	✓	✓
100,000	Cubic Metres	✓*	
1,000,000	Cubic Metres	✓**	✓
E-CODER High Resolution (8-digit reading)		1 ½"	2"
1	US Gallons	✓	✓
1	Imperial Gallons	✓	✓
0.1	Cubic Feet	✓	✓
0.01	Cubic Metres		✓
0.001	Cubic Metres	✓	
ProCoder High Resolution (8-digit reading)		1 ½"	2"
1	US Gallons	✓	✓
1	Imperial Gallons	✓	✓
0.1	Cubic Feet	✓	✓
0.01	Cubic Metres	✓	✓

*ProRead and E-CODER only **ProCoder only

Specifications

Certification

- NSF/ANSI 61, NSF/ANSI 372

Application

- Cold water measurement of flow in one direction

Maximum Operating Water Pressure

- 150 psi (1,034 kPa)

Maximum Operating Water Temperature

- 80°F

Measuring Chamber

- Nutating disc technology design made from proprietary synthetic polymer

Options

Sizes

- 1 ½" flanged or threaded end
- 2" flanged or threaded end

Units of Measure

- U.S. gallons, imperial gallons, cubic feet, cubic metres

Register Types

- Direct reading: Bronze box and cover
- Remote reading: ProRead Absolute Encoder, ProCoder, E-CODER, E-CODER)R900i, E-CODER)R450i, E-CODER)L900i, TRICON/S, TRICON/E3

- Reclaim

Measuring Chamber

- Synthetic polymer

Companion Flanges

- Lead free, high-copper alloy

Environmental Conditions

- Operating temperature: +33°F to +49°F (0°C to +65°C)
- Storage temperature: +33°F to +158°F (0°C to +70°C)

Test Ports

- 1" (optional)



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Tallahassee, AL 36078
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A PRODUCT SHEET OF NEPTUNE TECHNOLOGY GROUP

T-10 Meter

SIZES $\frac{5}{8}$ ", $\frac{3}{4}$ ", AND 1"

Every T-10® water meter meets or exceeds the latest AWWA C700 Standard. Its nutating disc, positive displacement principle has been time-proven for accuracy and dependability since 1892, ensuring maximum utility revenue.

Construction

The T-10 water meter consists of three major assemblies: a register, a lead free, high-copper alloy maincase, and a nutating disc measuring chamber.

The T-10 meter is available with a variety of register types. For reading convenience, the register can be mounted in one of four positions on the meter.

The corrosion-resistant, lead-free, high-copper alloy maincase will withstand most service conditions; internal water pressure, rough handling, and in-line piping stress.

The innovative floating chamber design of the nutating disc measuring element is unaffected by meter position or in-line piping stresses while the unique chamber seal extends the low-flow accuracy by sealing the chamber outlet port to the maincase outlet port. The nutating disc measuring element utilizes corrosion-resistant materials throughout and a thrust roller to minimize wear.

Warranty

Neptune® provides a limited warranty with respect to its T-10 water meters for performance, materials, and workmanship.

When desired, maintenance is easily accomplished either by replacement of major assemblies or individual components.

Guaranteed Systems Compatibility

All T-10 water meters are guaranteed adaptable to our ARB®V, ProRead™ (ARB VI) AutoDetect, ProCoder™, E-CODER® (ARB VII), E-CODER®)R900i™, E-CODER®)R450i™, E-CODER®)L900i™, TRICON®/S, TRICON/E®3, and Neptune meter reading systems without removing the meter from service.

Systems Compatibility

Adaptability to all present and future systems for flexibility is available only with Neptune's ARB® Utility Management Systems™.



KEY FEATURES

REGISTER

Magnetic-driven, low-torque registration ensures accuracy

Impact-resistant register

High-resolution, low-flow leak detection

Bayonet-style register mount allows in-line serviceability

Tamperproof seal pin deters theft

Date of manufacture, size, and model stamped on dial face

LEAD FREE MAINCASE

Made from lead free, high-copper alloy

NSF/ANSI 372, NSF/ANSI 61

Lifetime guarantee

Resists internal pressure stresses and external damage

Handles in-line piping variations and stresses

Lead free, high-copper alloy provides residual value vs. plastic or composite

Electrical grounding continuity

NUTATING DISC MEASURING CHAMBER

Positive displacement

Widest effective flow range for maximum revenue

Proprietary polymer materials maximize long-term accuracy

Floating chamber design is unaffected by meter position or in-line piping stresses

Specifications

- NSF/ANSI 372, NSF/ANSI 61
- National Type Evaluation Program (NTEP) certification

Application

- Cold water measurement of flow in one direction in residential service applications

Maximum Operating Water Pressure

- 150 psi (1034 kPa)

Maximum Operating Water Temperature

- 80°F

Measuring Chamber

- Nutating disc technology design made from proprietary synthetic polymer

Options

Sizes

- $\frac{5}{8}$ " , $\frac{5}{8}$ " x $\frac{3}{4}$ "
- $\frac{3}{4}$ " , $\frac{3}{4}$ " SL, $\frac{3}{4}$ " x 1"
- 1" , 1" x 1 $\frac{1}{4}$ "

Units of Measure:

- U.S. gallons, imperial gallons, cubic feet, cubic metres

Register Types

- Direct reading: bronze box and cover (standard)

Remote Reading:

- ProRead, ProCoder, E-CODER, E-CODER)R900i, E-CODER)R450i, E-CODER)L900i, TRICON/S, TRICON/E3

- Reclaim

Bottom Caps

- Synthetic polymer ($\frac{5}{8}$ " only)
- Cast iron
- Lead free, high-copper alloy

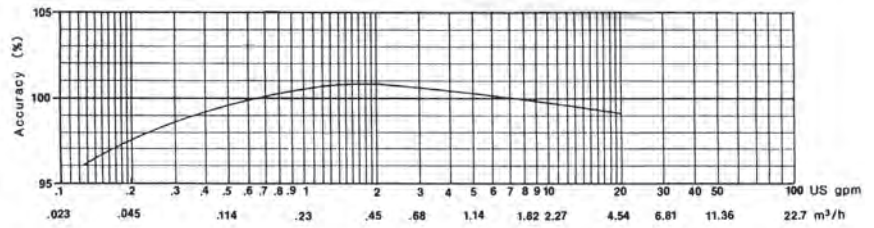
Connections

- Lead free, high-copper alloy, straight or bent

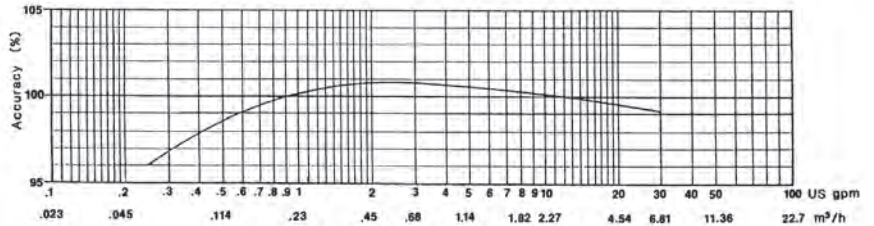
Environmental Conditions

- Operating temperature:
+33° F to +149° F (0° C to +65° C)
- Storage temperature:
+33° F to +158° F (0° C to +70° C)

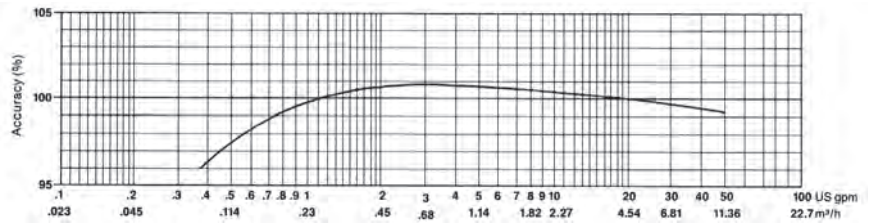
$\frac{5}{8}$ " ACCURACY



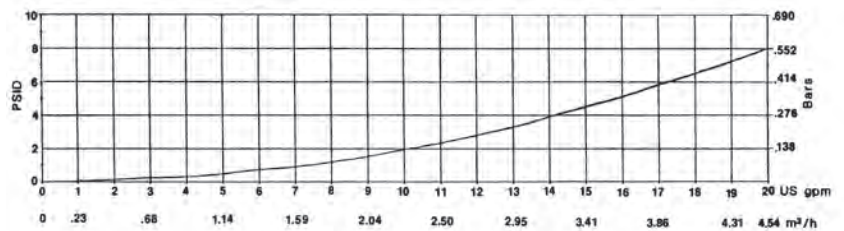
$\frac{3}{4}$ " ACCURACY



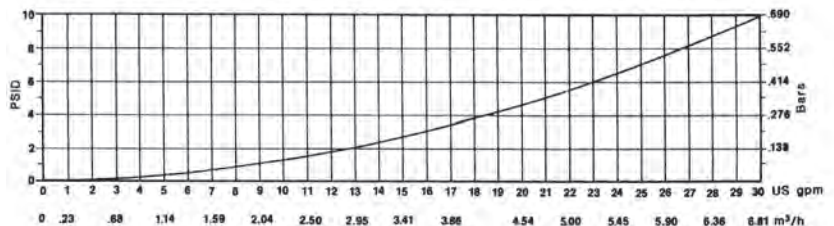
1" ACCURACY



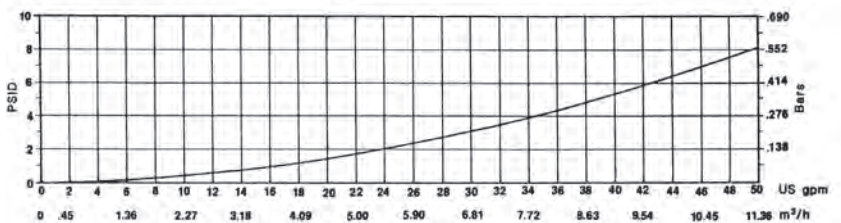
$\frac{5}{8}$ " PRESSURE LOSS



$\frac{3}{4}$ " PRESSURE LOSS

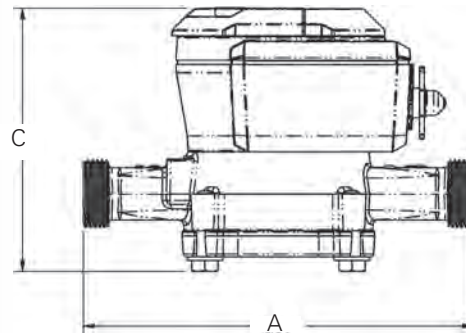
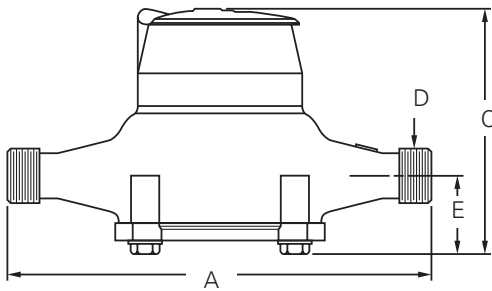
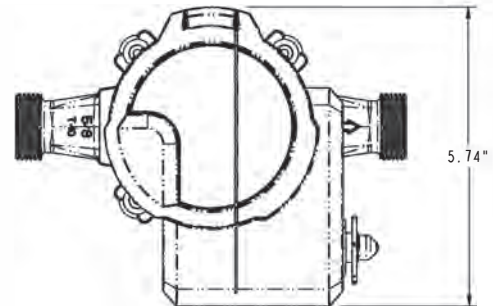
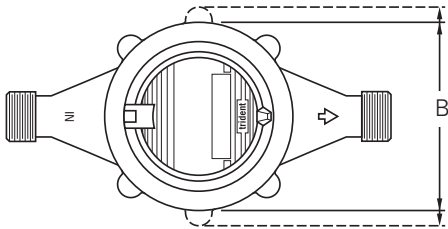


1" PRESSURE LOSS



Dimensions

Meter Size	A	B	C					D-	E-	Weight lbs/kg
	in/mm	in/mm	Std. in/mm	ARB in/mm	ProCoder™ or E-CODER®	ProCoder™) R900i™ or ProCoder™) R450i™	E-CODER®) R900i™ or E-CODER®) R450i™	NPSM Thread	in/mm	
5/8	7½ 191	3⅝ 92	4⅜ 111	5¼ 133	5¼ 133	5¼ 133	5¼ 133	¾" - 14	1½ 38	3¼ 1.4
5/8 x ¾	7½ 191	3⅝ 92	4⅜ 111	5¼ 133	5¼ 133	5¼ 133	5¼ 133	1" - 11½	1½ 38	3⅝ 1.5
Pre 2011 ⅝	7½ 191	3⅝ 92	4⅞ 124	5½ 146	5½ 139	5½ 139	5½ 139	¾" - 14	1⅝ 41	3¾ 1.7
Pre 2011 ⅝ x ¾	7½ 191	3⅝ 92	4⅞ 124	5½ 146	5½ 139	5½ 139	5½ 139	1" - 11½	1⅝ 41	4 1.8
¾	9 229	4⅜ 111	5½ 140	6¼ 159	6¼ 159	6¼ 159	6¼ 159	1" - 11½	1⅞ 48	6 2.7
¾" SL	7½ 911	4⅜ 111	5½ 140	6¼ 159	6¼ 159	6¼ 159	6¼ 159	1" - 11½	1⅞ 48	5½ 2.5
¾ x 1"	9 229	4⅜ 111	5½ 140	6¼ 159	6¼ 159	6¼ 159	6¼ 159	1¼" - 11½	1⅞ 48	6½ 2.9
1"	10¾ 273	6½ 165	6⅝ 162	7 178	7 178	7 178	7 178	1¼" - 11½	2⅝ 54	9¾ 4.4
1" x 1¼"	10¾ 273	6½ 165	6⅝ 162	7 178	7 178	7 178	7 178	1½" - 11½	2⅝ 54	10¼ 4.6



Operating Characteristics

Meter Size	Normal Operating Range @ 100% Accuracy (+/- 1.5%)	AWWA Standard	Low Flow @ 95% Accuracy
5/8"	1/2 to 20 US gpm 0.11 to 4.55 m ³ /h	1 to 20 US gpm 0.23 to 4.5 m ³ /h	1/8 US gpm 0.03 m ³ /h
3/4"	3/4 to 30 US gpm 0.17 to 6.82 m ³ /h	2 to 30 US gpm 0.45 to 6.8 m ³ /h	1/4 US gpm 0.06 m ³ /h
1"	1 to 50 US gpm 0.23 to 11.36 m ³ /h	3 to 50 US gpm 0.68 to 11.4 m ³ /h	3/8 US gpm 0.09 m ³ /h

Registration

ProRead Registration (per sweep hand revolution)		5/8"	3/4" & 1"
10	US Gallons	√	√
10	Imperial Gallons	√	√
1	Cubic Foot	√	√
0.1	Cubic Metre	√	√
Register Capacity ProRead, ProCoder, and E-CODER		5/8"	3/4" & 1"
10,000,000	US Gallons	√	√
10,000,000	Imperial Gallons	√	√
1,000,000	Cubic Feet	√	√
100,000	Cubic Metres	√	√
ProCoder and E-CODER High Resolution (8-digit reading)		5/8"	3/4" & 1"
0.1	US Gallons	√	√
0.1	Imperial Gallons	√	√
0.01	Cubic Feet	√	√
0.001	Cubic Metres	√	√



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A PRODUCT SHEET OF NEPTUNE TECHNOLOGY GROUP

MRX920™ Mobile Data Collector and MX900™ Software

Make Reading Success and Efficiency Automatic

Reliable, accurate, and field-proven, Neptune's MRX920™ mobile data collector – along with its MX900™ meter routes and mapping software – has helped water utilities across North America streamline, automate, and increase operational efficiencies. As part of Neptune's R900® System, the MRX920 helps transform data into actionable information that helps identify hidden causes of loss and optimize operational efficiency.

Strapped to the seat of your utility vehicle, the MRX920 reads up to fifty (50) meters simultaneously as your meter reader cruises down the streets. And in conjunction with the routes-integrated/Esri®-powered MX900 mapping, meter reading is automatic, fast, and effortless for your meter readers, accurate with less manpower deployed for your utility.

The MRX920 comes with Bluetooth capability, so your meter readers have the option of wirelessly updating routes and uploading the latest readings to the host system remotely and in near real-time without having to return to the office^{1,2}.

Additionally, Neptune has ported its well-established R900 radio frequency (RF) architecture to the latest release of MRX920 using software-defined radio (SDR) technology. This means all Neptune data collection systems have a common, core code base which translates to faster availability of new features and functionalities for your utility.

Make Migration to Other Technology Simple

The R900 System is designed to easily accommodate and support past generations of meters, encoder registers, and data collectors – while at the same time giving your utility the flexibility to incorporate future innovations as needed. The MRX920 is no exception, providing seamless compatibility with all generations of R900 MIUs. Its industry-leading performance can save days or even weeks for your meter reading routes, and new features within its MX900 software, such as Esri-powered mapping and wireless mobility, make valuable data available in real time as you read your system. Feel free to phase in these new features and equipment at your own pace, secure in the knowledge that Neptune will support your future needs without leaving you with stranded assets.



KEY BENEFITS

Reduced Meter Reading Time

- Reads up to fifty (50) meters simultaneously

Simple Access to Actionable Data

- Esri-powered GIS maps¹ show meter reading and flag status
- Wireless mobility – communicate meter reading data back to N_SIGHT® in real time¹
- User-configurable advanced filtering shows you only the information you need
- Data logging and off-cycle reads without physical access to the meters²

Analyze Data at the Source

- View data logging graphs in the field and share with homeowner to address high bill complaints
- Identify high/low audit status failures
- Receive leak, reverse flow, and days of no flow alerts from E-CODER®-equipped meters

¹ Optional MX900™ Mapping and Mobility module required. Mobile computing device recommended and not included.

² Cellular or Internet connection required.

Save Your Utility – and Your Customers – Time and Money

While the R900 System always allows your utility to migrate forward to implement fixed network data collectors, or backward to use RF technology for individual off-cycle readings or data logging, using the MRX920 and MX900 software as a part of your system makes for fast and simple access to information that can provide effective resolutions to customers' water-related issues. With detailed consumption data in hand while working in the field, along with proactive alerts of leaks and backflow conditions, you can enhance customer service. In the process, you can even preempt high bill complaints, reduce delinquent payments, and eliminate write-offs.

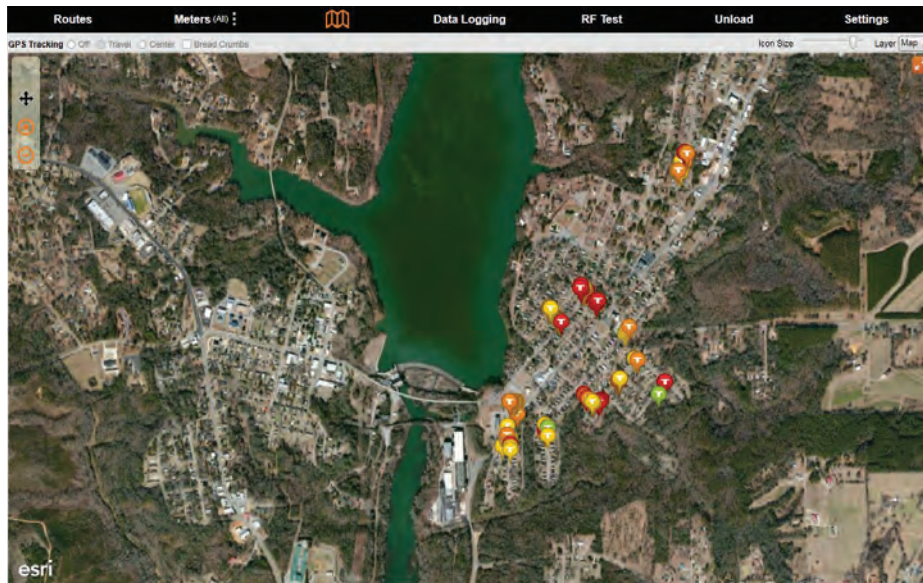
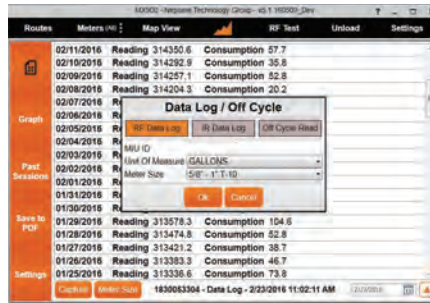
Specifications

Physical Specifications

- Dimensions: 8" (width) x 3.15" (height) x 11" (length excluding connections and handle)
- Weight: ~5 lbs

Electrical Specifications

- Power consumption: < 1A
- Power supply: 12V DC via vehicle power source adapter



Neptune recommends the following mobile computing hardware specifications for optimal performance:

- 12.1" XGA (800 x 600) minimum
- 89-key keyboard
- Operating System:
 - Windows® 7 Professional 32 & 64
 - Windows® 8 Professional 32 & 64
 - Windows® 8.1 Professional 64
 - Windows® 10 Professional 64
- .Net Framework 4.5 or higher
- Processor: Intel Pentium 1.7 Ghz or faster processor
- Memory: 1 GB minimum
- Communication
 - Internal 802.11 b/g wireless LAN
 - Windows Wireless Connection Manager (if Bluetooth connection to the receiver is desired, Bluetooth v2.1 + EDR required)
- USB 2.0
- GPS receiver (required for the mapping and mobility module)
- Minimum of 2 GB of available hard drive space

Environmental Conditions

- Operating temperature: -4°F to +122°F (-20°C to +50°C)
- Storage temperature: -40°F to +185°F (-40°C to +85°C)
- Operating humidity: 5 to 95% non-condensing relative humidity



**ATTACHMENT B
WTP PUMP DATA**

Vertical Turbine Pumps



Models VIT, VIC & VIS

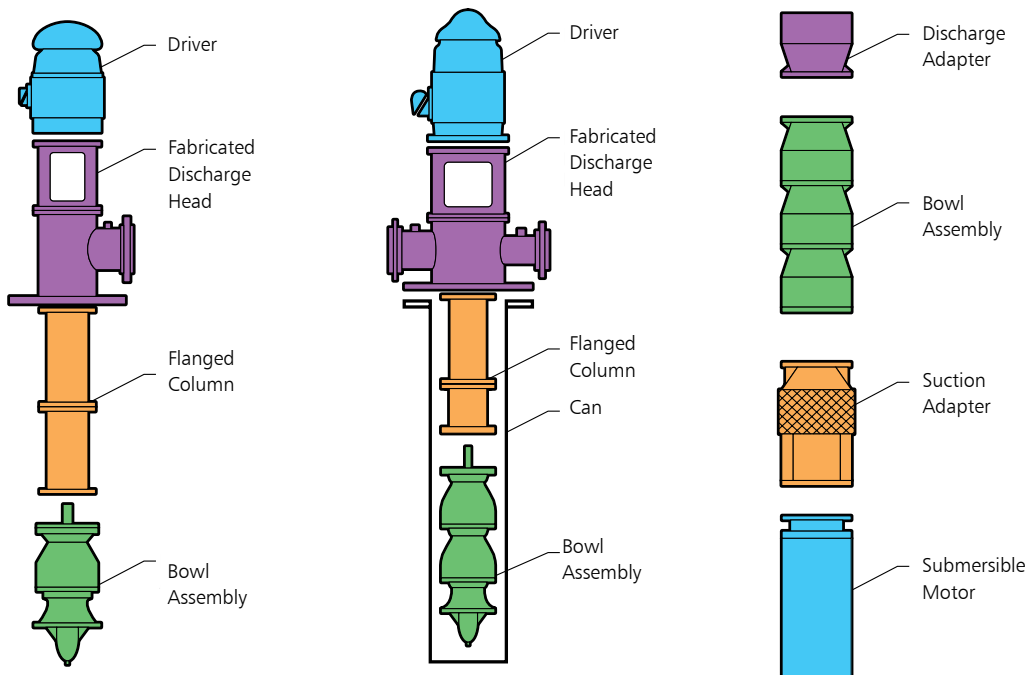
Flexibility by Design:

Three Pump Models, One Common Bowl Assembly

The three different pump models in the vertical turbine line have one thing in common – the hydraulic design of the pump bowl assembly. Using state-of-the-art techniques in turbine pump design, Goulds vertical turbine line covers a wide range of hydraulic conditions to meet virtually every pumping service in the industry with optimum efficiency.

Goulds flexibility of design allows the use of a wide range of materials and design features to meet the custom requirements of the user. No matter what the requirements, Goulds can design and manufacture the pump to best satisfy them, specifically and thoroughly.

This bulletin is designed to assist the user in selecting the best pump for the conditions required; however, any questions will be answered promptly by calling the Goulds sales office or representative in your area.



Goolds Vertical Turbine Pumps

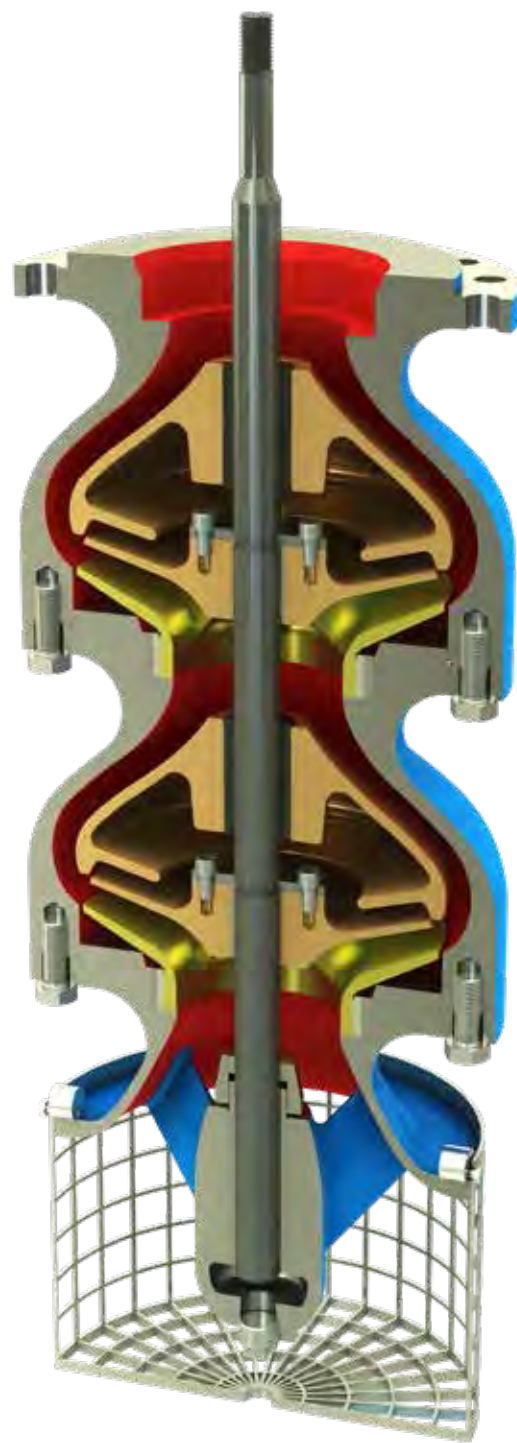
Pump Bowl Assembly

The bowl assembly is the heart of the vertical turbine pump. The impeller and diffuser type casing are designed to deliver the head and capacity that your system requires in the most efficient way possible. The fact that the vertical turbine pump can be multi-staged allows maximum flexibility both in the initial pump selection and in the event that future system modifications require a change in the pump rating.

A variety of material options allows the selection of a pump best suited for even the most severe services. The many bowl assembly options available ensure that the vertical turbine pump satisfies the users' needs for safe, efficient, reliable and maintenance-free operation.

Standard Design Features

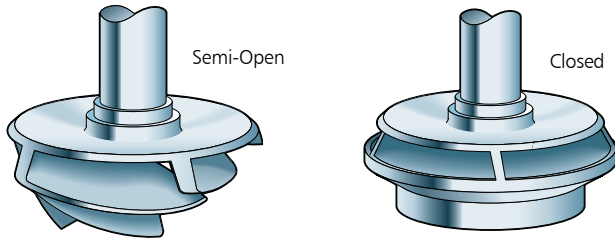
- **Suction Bell** - Allows smooth entry of liquid into first stage impeller eye, minimizes foundation opening.
- **Suction Bell Bearing** - Provided for shaft stability.
- **Sand Collar** - Prevents solids from entering suction bearing.
- **Impeller** - Semi-open or enclosed for appropriate service.
- **Pump Shaft** - Heavy duty 416SS standard, other alloys available for strength and corrosion resistance.
- **Flanged Bowls** - Registered fits ensure positive alignment, ease of maintenance.
- **Diffuser Bowl** - Available in variety of cast materials.
- **Sleeve Type Bearing** - Provided at each stage to assure stable operation.
- **Keyed Impellers** - Standard for API applications, 18" and larger sizes; furnished on all pumps for temperatures above 180° F (82° C) and on cryogenic services. Regardless of size, keyed impellers provide ease of maintenance and positive locking under fluctuating load and temperature conditions.



Pump Bowl Assembly Options

Choice of Semi-Open or Enclosed Impellers

Available in alloy construction for a wide range of corrosive/abrasive services.



Hydraulic Balanced Impeller

Optional dynamic balance to ISO Grade 1.0 (4 w/n)



Dual Wear Rings

Available for enclosed impellers and bowls; permits re-establishing initial running clearances and efficiency at lower cost. Hard facing of wear rings can be flushed when solids are present in pumpage.



Strainers/Vortex Suppressor

Basket strainers are available to provide protection from large solids.



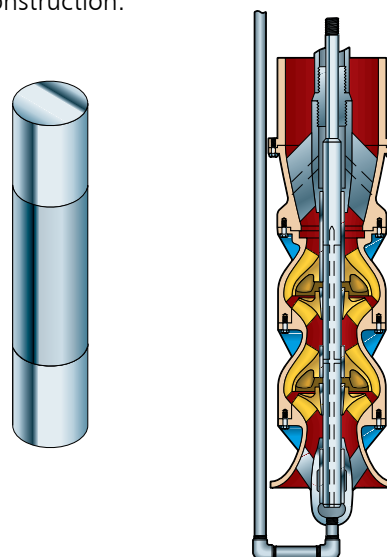
First Stage-Low NPSH X Impeller or Double Suction

For low NPSH_A applications, either large eye or double suction first stage available to minimize pump length.



Hardfacing & Rifle Drilled Shaft

Hardfacing the surface of bearing and/or shaft to protect against wear from abrasives in the bearing area. Rifle drilling of bowl shafts available for bearing protection on abrasive services. Discharge bowl included with enclosed lineshaft construction.

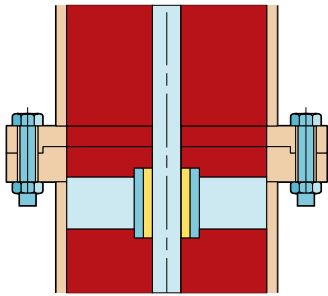


Flanged Column

Column sections are provided with flanged ends incorporating registered fits for ease of alignment during assembly to ensure concentricity. Our standard bearing retainers are welded into the column section.

Open Lineshaft Bearing

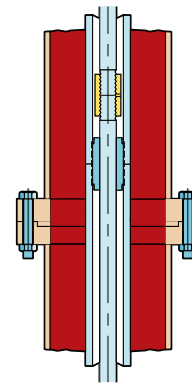
Flanged column / product lubricated lineshaft is recommended for ease of maintenance. Renewable shaft sleeve or hard facing of shaft available for longer life.



Enclosed Lineshaft

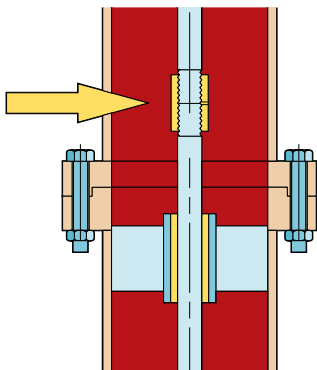
The lineshaft is protected by water flushing the enclosing tube bearing on corrosive / abrasive services. Oil lubricated lineshaft available on long settings.

Alignment is attained by register fit between the flange faces.



Threaded Lineshaft Coupling

Threaded lineshaft coupling is commonly used for lower horsepower pumps. It is more economical.



Keyed Lineshaft

Keyed lineshaft coupling is recommended for motors larger than 700 HP. It provides ease of maintenance.



Discharge Heads

Discharge Heads

The discharge head functions to change the direction of flow from vertical to horizontal and to couple the pump to the system piping in addition to supporting and aligning the driver. Discharge head accommodates all types of driver configurations. Optional sub-base can be supplied. Goulds offers three basic types for maximum flexibility.

VIT DISCHARGE HEAD

Suitable for all service conditions such as high or low temperature or corrosive services. Various materials available. Segmented elbow available for efficiency improvement. Access ports for easy access to seals and couplings. Base flange can be machined to match ANSI tank flange.



VIC DISCHARGE HEAD

VIC can also be supplied with the pump suction in the can.



BELOW GROUND DISCHARGE HEAD

Use whenever VIT pump is required to adapt to an underground discharge system.

- Finite Element Analysis is typically recommended on this configuration to evaluate the pump's dynamic behavior and capability to withstand the loads
- Robust design as a result of the cantilever load distribution applied to the foundation and anchor bolts
- Customized design to minimize the foundation opening



FAN AIR COOLED THRUST POT

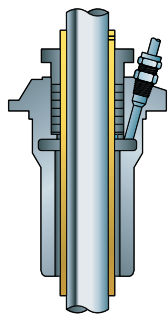
- Cast steel body meeting API standard
- 25,000-hour L10 bearing life
- Two or three bearing configurations
- Momentary up-thrust capability
- Inpro seals - prevent oil contamination
- Vibration and temperature monitoring are standard provisions
- Oil lubricated thrust bearings & permanently-lubricated radial bearings



Seals & Couplings

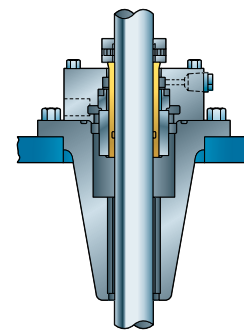
Packed Box With or Without Sleeve Open Lineshaft

Whenever packing lubrication leakage can be tolerated and the discharge pressure does not exceed 150 psi, a packed box may be used. Optional headshaft sleeve or shaft hardfacing available to protect shaft.



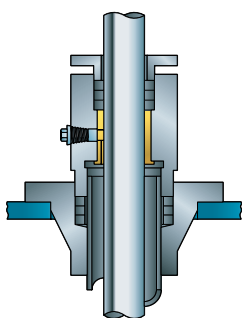
Single Seal

Most popular method — used for low to medium pressures. Cartridge style for ease of installation and maintenance.



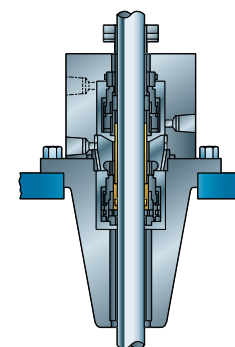
Water Flush or Oil Lubricated Enclosed Lineshaft

Water flush tube connection is supplied when pressurized water is introduced into the enclosing tube for bearing protection on abrasive services.



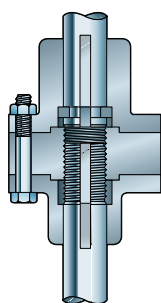
Dual Seals

Two seals mounted in-line. Chamber between seals can be filled with a buffer liquid and may be fitted with a pressure sensitive annunciating device for safety.



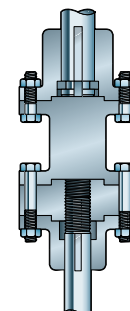
Adjustable Coupling (Type A)

For vertical solid shaft driver, impeller adjustment made by using adjustable plate in the coupling.



Adjustable Spacer Coupling (Type AS)

Same function as Type A coupling with addition of spacer. Spacer may be removed for mechanical seal maintenance without removing the driver.



Model VIT

Vertical Industrial Turbine Pump

For higher flows refer to high capacity section

- Flows to 70,000 GPM (15,900 m³/Hr)
- Heads to 3,500 feet (1,060 m)
- Pressures to 2,500 psi (76kg/cm²)
- Bowl sizes from 6" to 55" (152.4 mm to 1,400 mm)
- Temperatures to 500° F (260° C)
- Horsepower to 5,000 HP (3,730 KW)

Design Advantages

- Fabricated discharge head and flanged column
- Flanged bowl construction
- 416SS shafting
- Alloy construction with external flush of critical wear areas available for corrosive/abrasive services
- Built-in alignment and simple piping for less costly installation and ease of maintenance / reduced downtime

Applications

- Cooling Water
- Seawater and River Water Intake
- Industrial Process Pumps
- Utility Circulating Water
- Condenser Circulating Water Pumps
- Fire Service
- Reclaimed Water

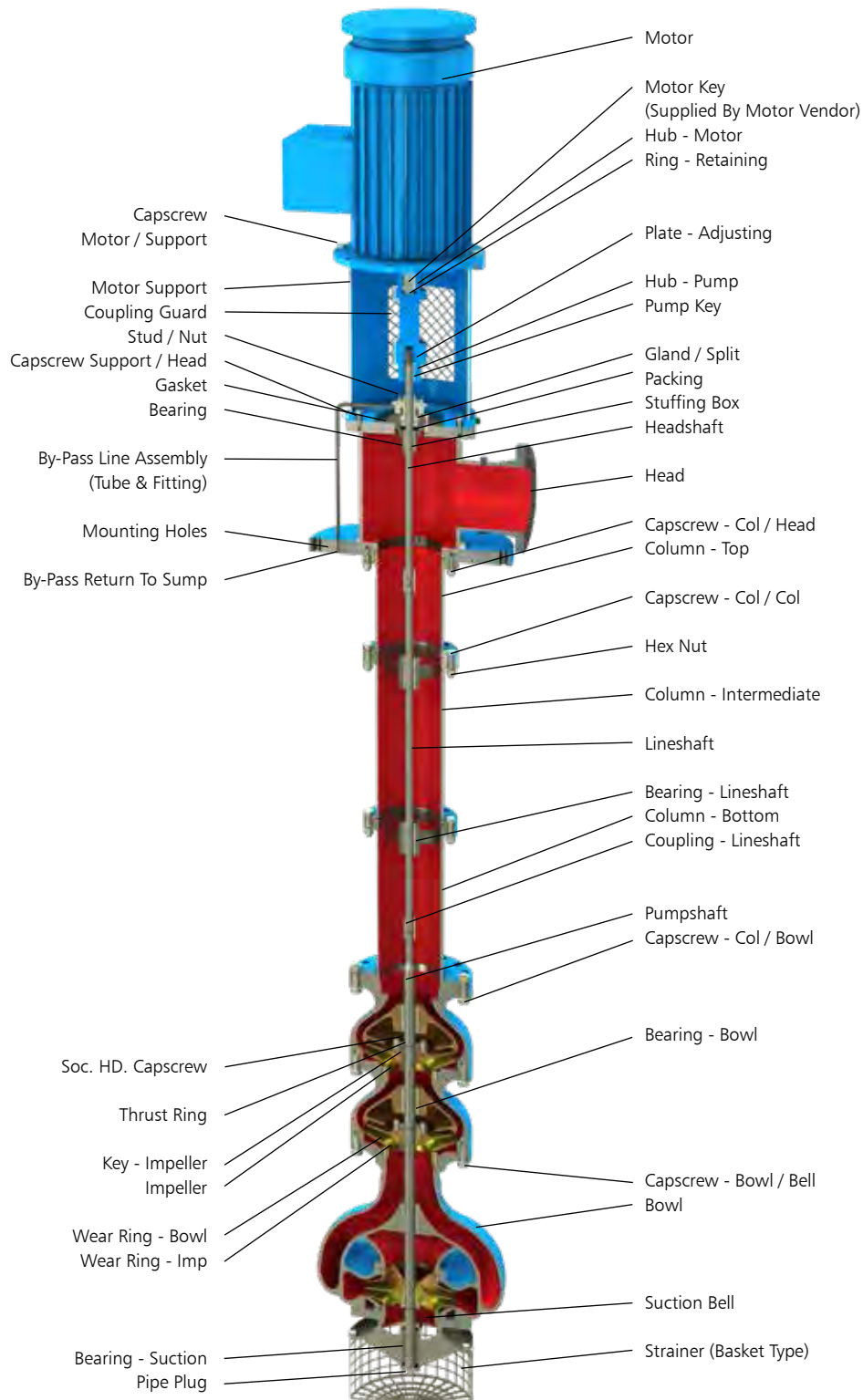


Cross Sectional

VIT (Product Lube)

TYPICAL MARKETS SERVED

- Power Generation
- Oil & Gas
- Mining
- Municipal
- General Industry
- Chemical

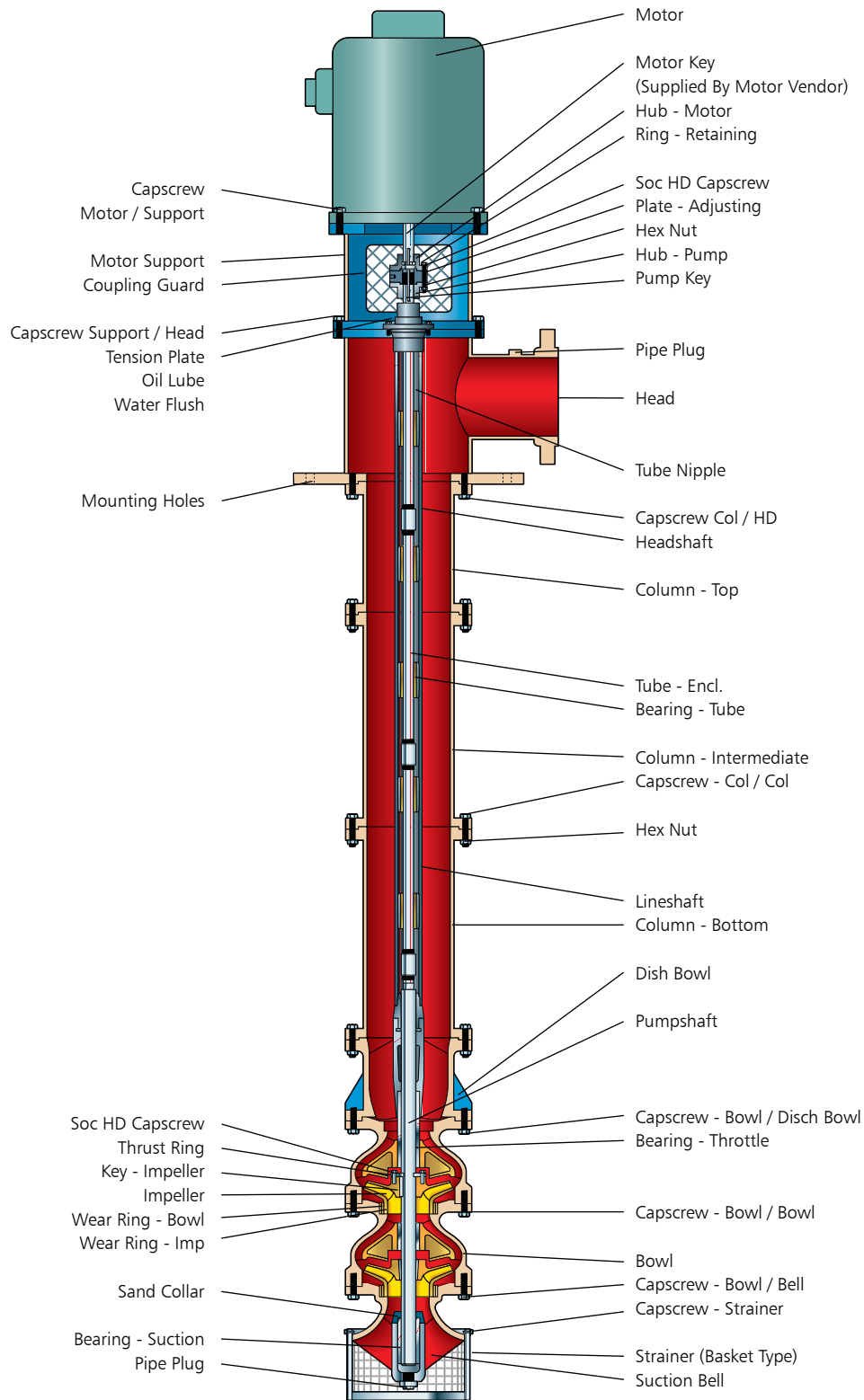


Cross Sectional

VIT (Enclosed Lineshaft)

TYPICAL MARKETS SERVED

- Mining
- Oil & Gas
- Municipal
- Power Generation
- General Industry
- Chemical



Model VIC

Vertical Industrial Can-Type Pump

- Flows to 70,000 GPM (15,900 m³/Hr)
- Heads to 3,500 feet (1,060 m)
- Pressures to 2,500 psi (76kg/cm²)
- Bowl sizes from 6" to 55" (152.4 mm to 1,400 mm)
- Temperatures to 500° F (260° C)
- Horsepower to 5,000 HP (3,730 KW)

Design Advantages

- Fabricated discharge head and flanged column
- Flanged bowl construction
- 416SS shafting
- In-Line suction and discharge simplifies installation
- Optional suction in can for site piping flexibility
- Inherent design features on Model VIC allow efficient operation at any NPSH available
- Alloy construction for corrosive / abrasive services

Applications

- Pipeline Booster
- Product Transfer, Refinery Blending
- Injection Secondary Recovery
- Chemical Transfer
- Boiler Feed
- Condensate
- Cryogenics
- LNG Transfer
- Light Hydrocarbons
- Water Services

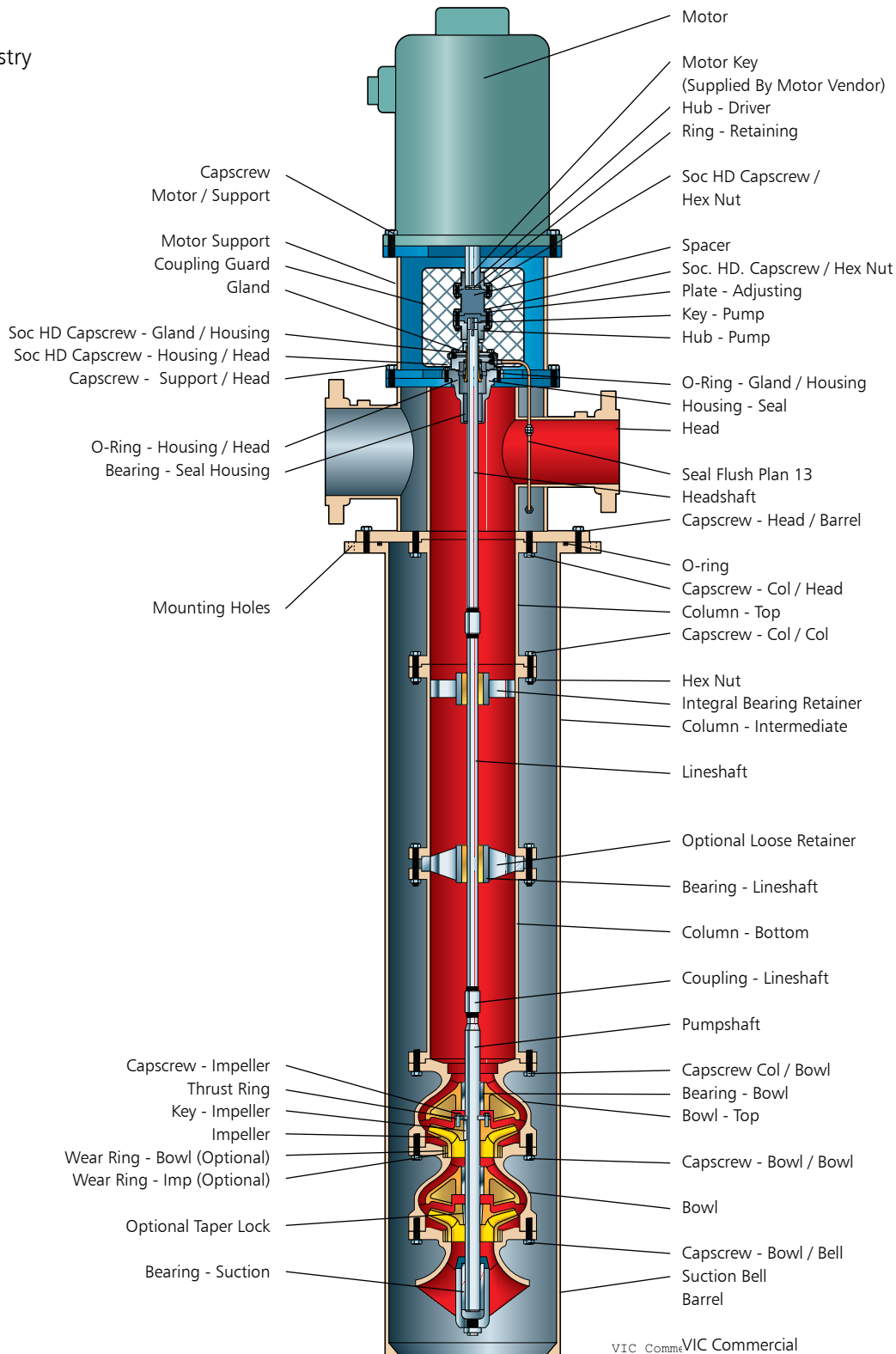


Cross Sectional

VIC

TYPICAL MARKETS SERVED

- Power Generation
- Chemical
- Mining
- General Industry



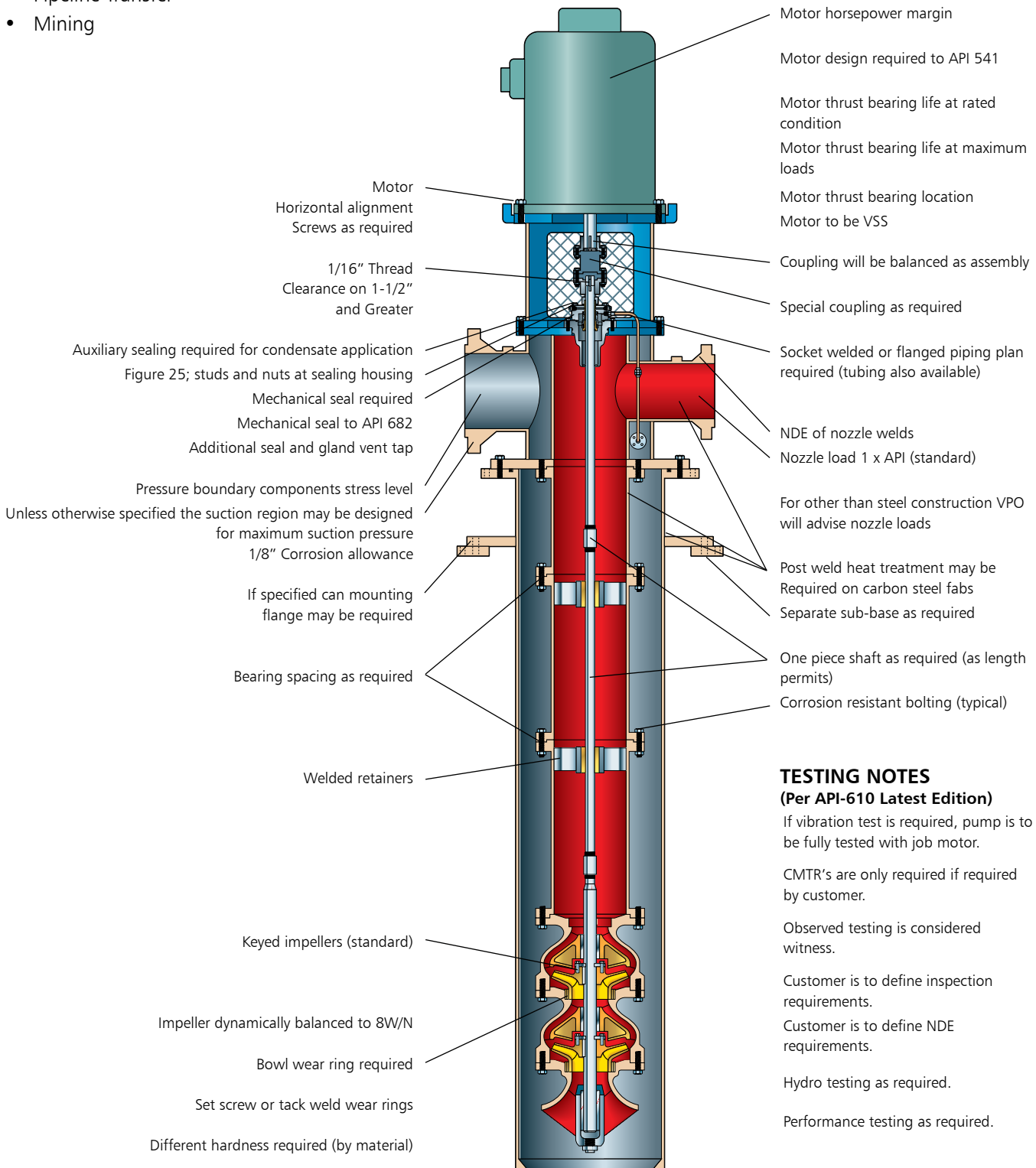
VIC Commercial

Cross Sectional

VIT (Per API-610)

TYPICAL MARKETS SERVED

- Oil & Gas
- Chemicals
- Pipeline Transfer
- Mining



TESTING NOTES

(Per API-610 Latest Edition)

If vibration test is required, pump is to be fully tested with job motor.

CMTR's are only required if required by customer.

Observed testing is considered witness.

Customer is to define inspection requirements.

Customer is to define NDE requirements.

Hydro testing as required.

Performance testing as required.

Model VIS

Vertical Industrial Turbine Pump

- Flows to 70,000 GPM (15,900 m³/Hr)
- Heads to 3,500 feet (1,060 m)
- Pressures to 2500 psi (76kg/cm²)
- Bowl sizes from 6" to 55" (152.4 mm to 1,400 mm)

Design Advantages

- Ideal for deep set applications where use of lineshaft pumps is impractical
- Complete unit is installed underground, resulting in quiet operation and space saving
- Long life / low maintenance – no lubrication, alignment

Applications

- Irrigation
- Service Water
- Deep Well
- Sea Water Lift

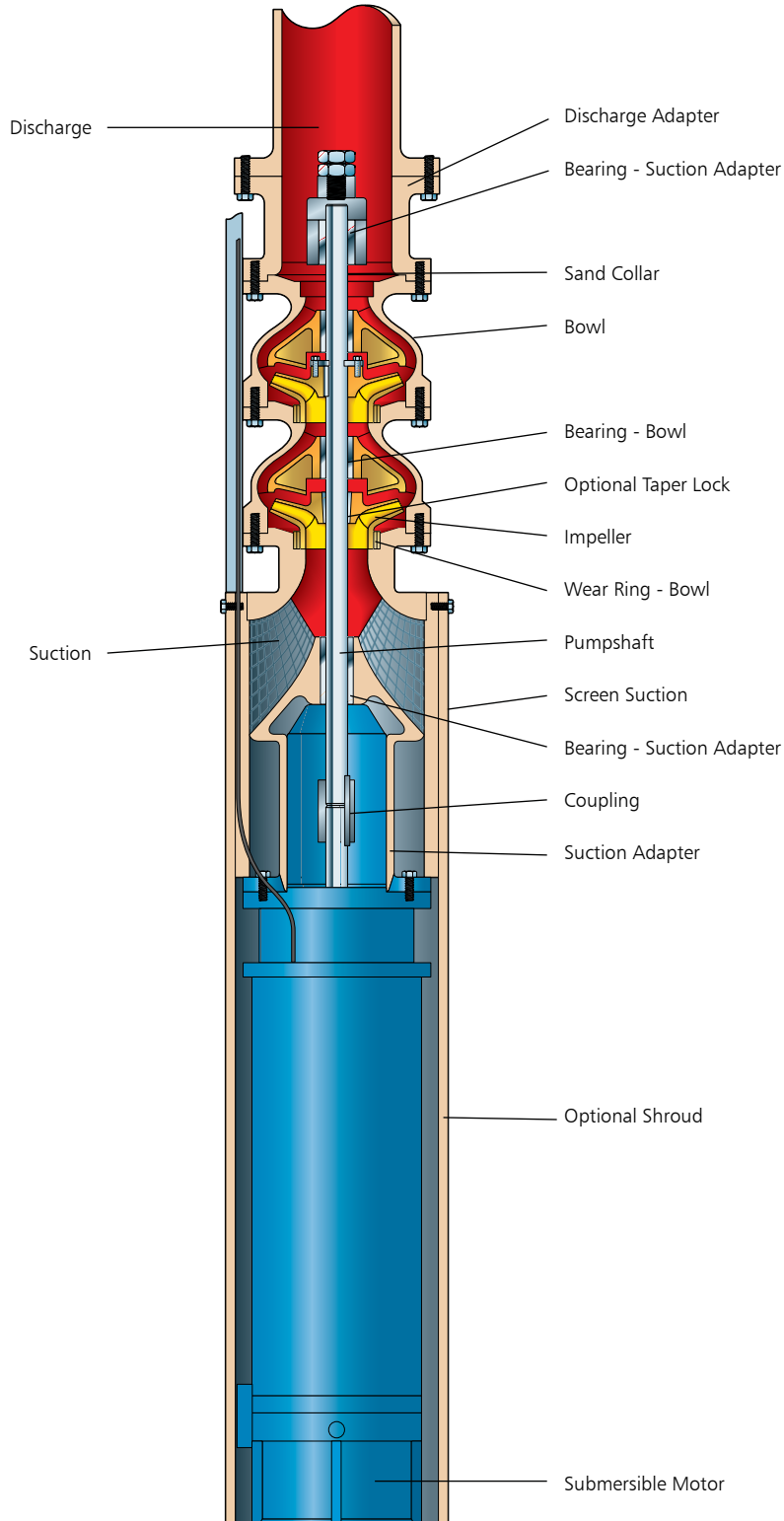


Cross Sectional

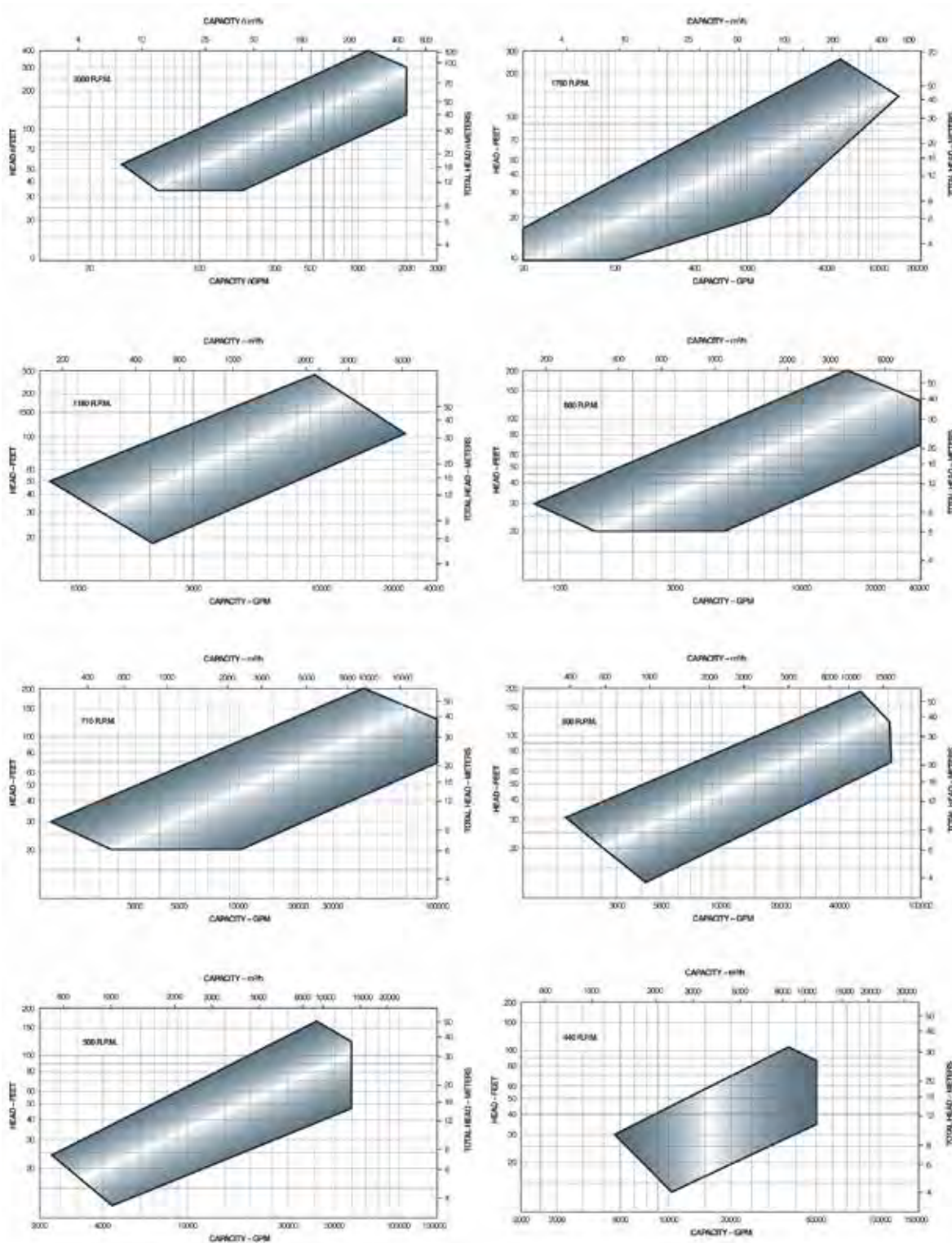
VIS

TYPICAL MARKETS SERVED

- General Industry
- Oil & Gas



Hydraulic Coverage



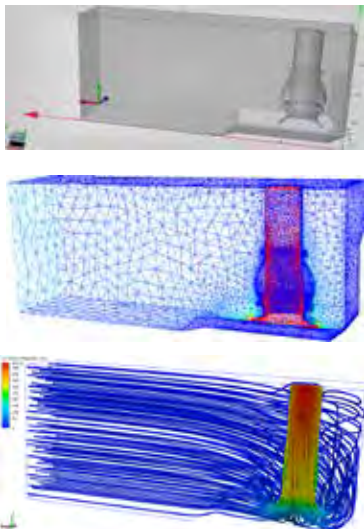
* Head is per stage.

High Capacity Pumps

Model WC-GP

DESIGN FEATURES FOR OPTIMUM EFFICIENCY, RELIABILITY AND COST SAVINGS

- Hydraulic selection at best efficiency point using advanced 3-D tools with parametric design. Each pump is designed for optimum hydraulic and mechanical conditions for the required application. The suction bell provides flared inlet controls to accelerate the fluid to the desired inlet velocity. Outer wall on the bowls provides structural integrity and the flanges with precise rabbet fits are located at each end for positive alignment. The contour of the diffuser/bowl provides accurate fit to the impeller for optimum operating efficiency.
- Cantilever rotor design with no tail bearings. Extra long length bearing or double bearing for added stability in the upper bearing above the first stage impeller. No auxiliary lubrication system needed. The process fluid ensures proper lubrication at all times for increased life expectancy. Elimination of the tail bearing provides lower NPSHR values and improved fluid inlet conditions for hydraulic performance.
- Computational fluid dynamic analysis is available to determine the sump flow conditions at the pump inlet for superior performance.
- Using a thermal casting solidification simulation program, Goulds Pumps is able to design optimum castings to meet specific customer conditions, providing better design standards in the market.
- Shaft sleeves optional. Provides renewable bushings. Prevents wear of shaft itself. Materials can be provided to resist abrasion which are not available in shafting in some cases. Recommended on large shafts due to the shaft replacement cost and lead times.
- Pull-out design is optional. This option provides an effective way to maintain the equipment and replace wear components without the need to remove the complete pump and disconnect the flanges from the main pipe. The removable component is only the rotor for optimum reliability and to reduce costs during maintenance.



High Capacity Pumps

Model WC-GP

DESIGN FEATURES FOR OPTIMUM EFFICIENCY, RELIABILITY AND COST SAVINGS

- Innovative O-Head design using finite element analysis provides maximum equipment reliability throughout its operating hydraulic range without high vibrations from structural resonance frequency. In addition, lateral and torsional rotor analysis addresses unstable rotor dynamics.
- Thrust pot design is optional. It is designed to carry the pump down thrust generated by the rotor weight and the hydraulic action of the pump during operation. Thrust pots are ideally on units equipped with IEC motors where their thrust capacity is basically zero beyond the motor weight. Thrust pots are designed for easy dismantling without the need to remove the unit driver. Additional advantages include capacity of the thrust pot to withstand a large range of thrust forces, meeting international standards for bearing temperature and extended life, in addition to being air cooled for most of the applications.
- The hydraulic balance achieved on the rotor does not have balance holes in the impeller like other brands on the market. Reducing the down thrust of the pump will reduce the cost of the driver by reducing the size of the thrust bearing in the motor, which makes the Goulds Pumps design more competitive.
- Below-grade discharge elbow is optional, and the structural analysis design considers the overturning forces with respect to the anchor bolt location and pump centerline. This results in robust components to prevent equipment deformation. Discharge heads are designed to withhold certain discharge hydraulic and mechanical forces. It is always recommended to minimize these external forces by supporting the system independently. Do not use the rotating equipment as a piping anchor.



High Capacity & Higher Head Pumps

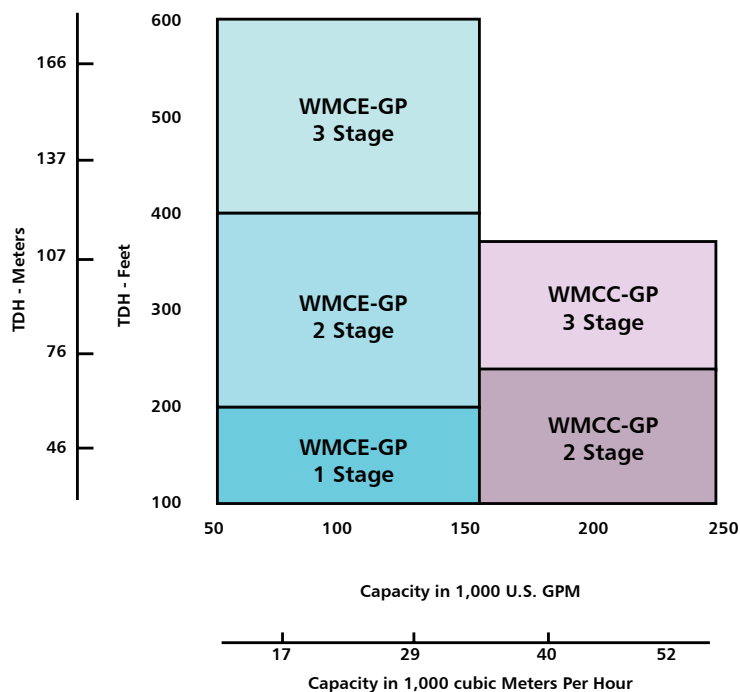
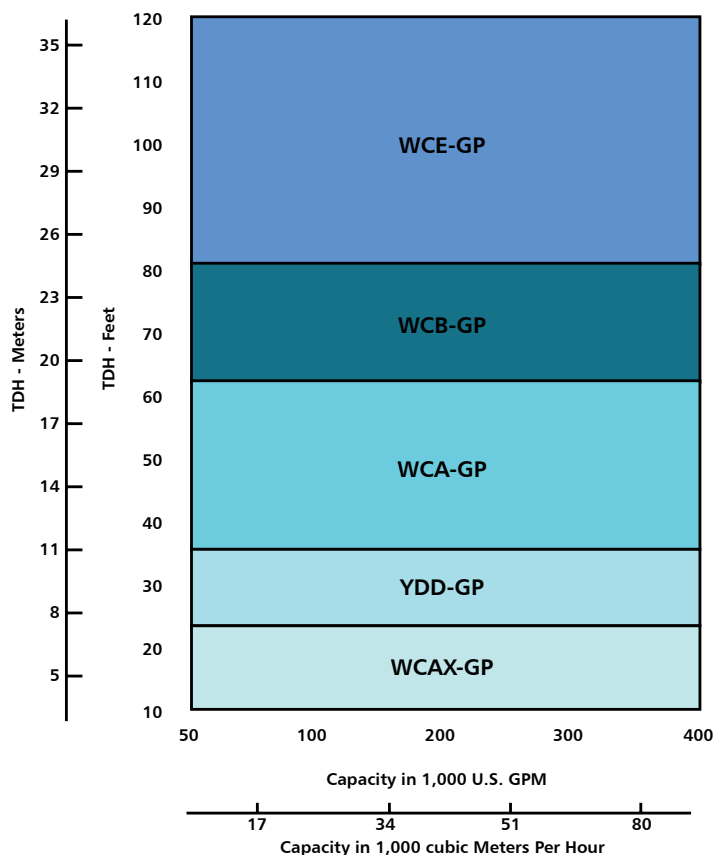
Model WC-GP

Vertical circulating water pumps or wet pit column pumps are classified as VS1 pumps for power generation condenser cooling, recirculation and desalination sea water intake, and as VS3 pumps for flood protection, storm water disposal, waste treatment plants, industrial services, and sump drainage.

High capacity pumps having a CCW (counter clockwise) rotation when viewing the equipment from the top meet Hydraulic Industry Standards and are in full compliance.

These high capacity pumps can be designed in multistage with a HEAVY DUTY configuration for a wide range of heads and extended service life, and are ideal when the installation requires minimum floor space.

Pumps ship completely assembled to the job site as long as they fit within freight dimension limitations. Pumps are shipped in sub-assemblies when the complete assembly exceeds the capacity of the transportation.



Patented O-Head and OC-Head Eliminates Excessive Vibration

Converting to an O-Head or OC-Head results in smoother-running pumps with greatly increased mean time between failure (MTBF), thus avoiding costly repairs and downtime. The O-Head is ideal for high flow, low pressure applications with discharge sizes of 18-32" where vibration is an issue. The vibration is most often caused by excessive or variable loads applied to the discharge flange. The O-Head is available both in new pumps and as retrofits. The OC-Head, which includes an additional isolation element between the head and upper bearing area, is recommended for discharge sizes above 32".

With a traditional head design, any deflection at the discharge flange creates an even larger deflection at the seal housing and motor mounting flange. The O-Head, on the other hand, uses four separate legs to support the motor, which allows the discharge flange to move without affecting bearing alignment.

In the OC-Head, the flexible element isolates the discharge nozzle movement from the bearing and seal.



By mounting the motor on four legs, the O-Head effectively decouples the turning elbow from the motor.

Case Study

Circulating Water pumps at a US based electric company with aging infrastructure began to experience vibration issues. There were cracks in the pumps' concrete foundations. Over time seawater corrosion had reduced the wall thickness of the turning elbows, causing their resonance frequency to move closer to the running speed of the pumps. These two factors combined to create excessive vibration, which caused repeated premature mechanical seal failures and bearing wear. The issues were completely rectified by fitting the pumps with the O-Head, which improved isolation between the discharge flange and the motor mounting. Twelve pumps at the company have been fitted with the O-Head and a dramatic reduction in vibration has resulted in each of them.



— An ITT Brand

240 Fall Street

Seneca Falls, NY 13148

Phone: 315.568.2811

Fax: 315.568.2418

www.gouldspumps.com

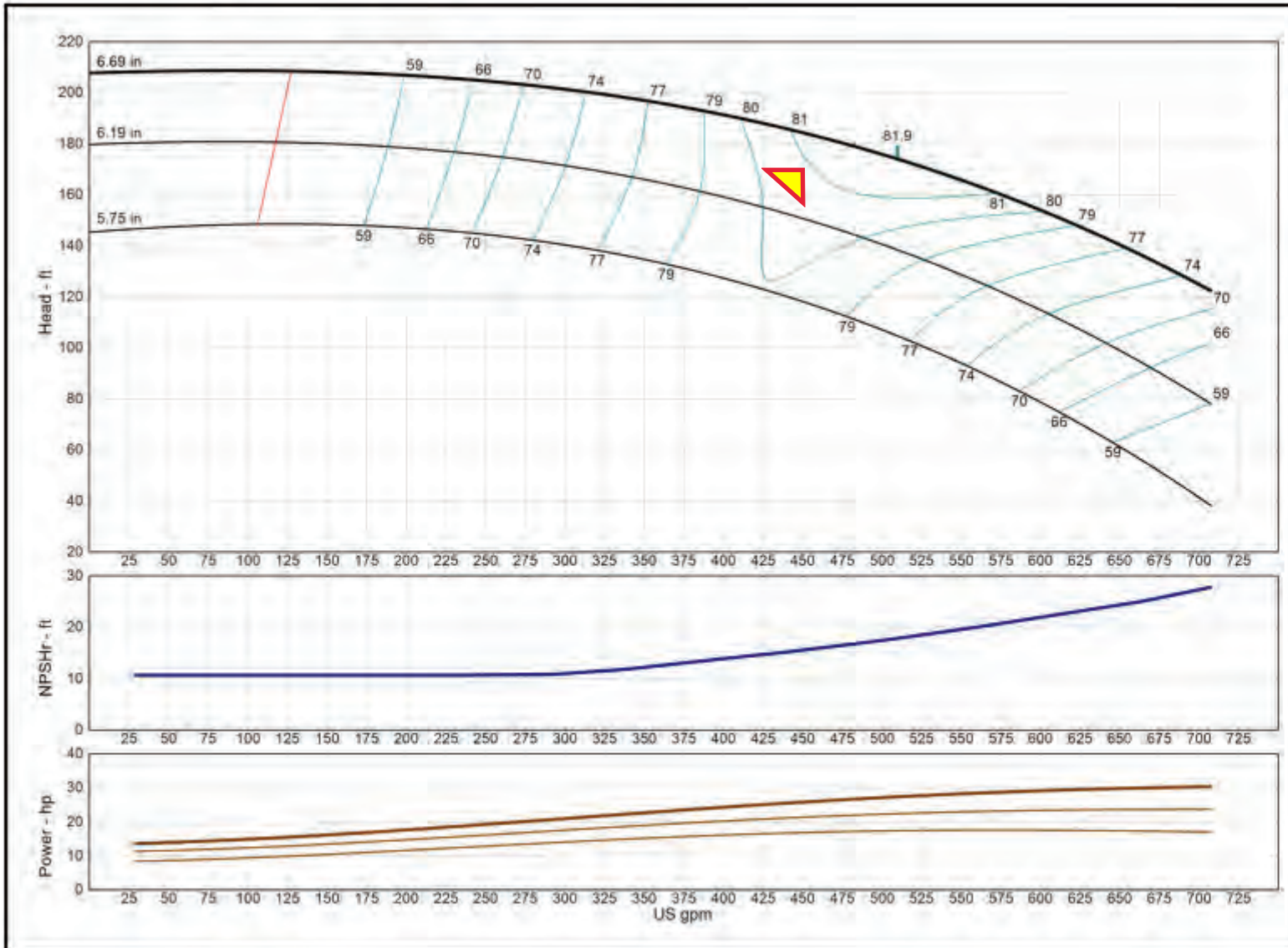
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MODEL 9WAHC

(Effective July 17, 2019)

Vertical Turbine Pump



Model	9WAHC
RPM	3540
Freq Poles	60 Hz 2-pole
Pump Type	Lineshaft
EFFICIENCY CORRECTION	
1-STAGE	-2.0
2-STAGE	-1.0
3-STAGE	0.0
4-STAGE	0.0
Impeller Type	Enclosed
Ns	1670
Thrust K-Factor	3.75 lb/ft
Bowl OD	9.25 in
Bowl Lateral	0.56 in
Max PSI	470 psi
Thd Disch Size	4", 5", 6", 8"

TURBINE OPERATIONS
Lubbock, Texas

NOMINAL BOWL PERFORMANCE CURVE AND DATA BASED ON PUMPING CLEAR, NON-AERATED WATER AND USING STANDARD MATERIALS OF CONSTRUCTION. RATED POINT ONLY CAN BE GUARANTEED BY THE FACTORY. CURVES REPRESENT SINGLE STAGE AVERAGE PERFORMANCE BASED ON TEST OF MULTI-STAGE BOWL ASSEMBLY. EFFICIENCY CORRECTION APPLIES DIRECTLY TO EFFICIENCY (-) AND HEAD (x) FOR LESSER STAGES. ACTUAL DRIVER OPERATING SPEED SHOULD BE VERIFIED.





Aquavar[®]

INTELLIGENT PUMP CONTROLLER

BRAQIPC R2

 **CentriPro**
a xylem brand

Intelligent Variable Speed Control - Aquavar®

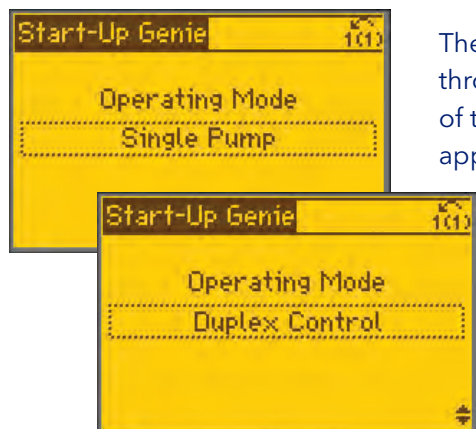
Introduction

The **Aquavar®** Intelligent Pump Controller from CentriPro utilizes an all new Aquavar platform, and combines it with over 20 years of variable speed pumping experience. The Aquavar is designed to provide variable frequency pumping control of speed, pressure, flow and level over a wide range of submersible and above ground applications. Here are just a few of the features and benefits of this versatile product:



- Removable, graphical control panel with display
- Fully backlit display with large text makes the control pad easy to read
- *My Personal Menu* allows user to focus on specific user selected and saved parameters
- Alarm Log key for quick access to last 5 alarms and maintenance events
- Hand on, Auto on, and Off buttons for easy pump operation at the keypad - No toggling between local and remote operation
- Modbus® RTU, included in standard drive - Other communications available with option cards
- Capable of controlling up to 2 fixed speed pumps, with one standard drive
- Duplex variable speed pumping control with auto lead/lag and alternate
- USB Connectivity - Remotely commission and monitor through PC software
- Standard dual DC-link reactors - Reduces the level of harmonics similar to a 5% AC line reactor without the voltage drop across the full load range
- EMC/RFI filters designed to reduce drive noise emissions and interference to strict standards

Your wish is Aquavar's command!



The proprietary CentriPro Start-Up Genie guides you through quick and easy commissioning. Take advantage of the complete Genie with 10 sections to configure applications with pump protections, I/O options, and Duplex operation, or for the more straightforward applications just set your motor information, operation mode and "Autoset" the rest of the parameters. With support for the most common control configurations, the Genie reduces set-up and configuration time to about 15 minutes!



MORE Enclosures!

With native enclosures for IP20, TYPE 1, 12, 3R, and 4X, Aquavar can provide the right protection for your indoor or outdoor application. Choose TYPE 1 and TYPE 12 for indoor applications where you need protection from dust. Choose the rugged TYPE 3R to protect from rain and snow, or TYPE 4X for corrosion protection. Xylem can also provide an IP20 Aquavar for mounting into a separate enclosure with other equipment.



MORE Communications!

Modbus® RTU is the standard communication protocol on the Aquavar via the RS485 serial port. Using the communication option cards you can expand the Aquavar capabilities to include: Modbus® TCP, Profibus, Profinet, DeviceNet, Lon Works, and Ethernet IP.

MORE Pumping!

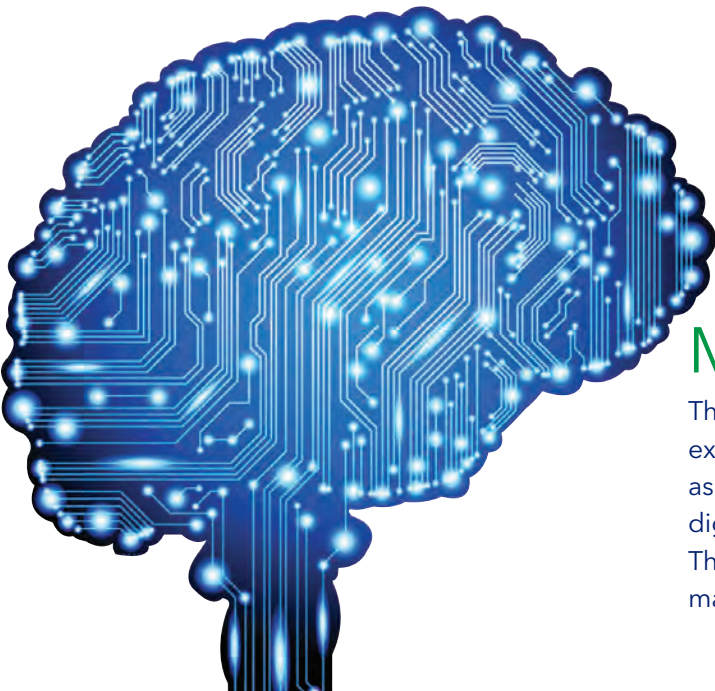
For applications with large ranges of flow, or if you just want an inline spare the Aquavar has you covered. Aquavar has the ability to run two additional constant speed pumps to increase your flow to maintain a constant pressure. The Duplex configuration gives you two variable speed pumps working synchronously to provide more efficient operation. Program Aquavar for Duty Standby and you can run one pump at a time, and have your spare pump ready for action!



Duplex



Aquaforce XL



MORE Intelligence!

The capabilities of Aquavar can be extended with the use of I/O expansion cards available to ship with the drive as a factory option, or as repair parts that can be installed in the field. Additional analog and digital inputs/outputs allow for customized control of your system. The addition of temperature monitoring can help with preventative maintenance and reduce downtime!



Specifications

Ratings and Enclosures

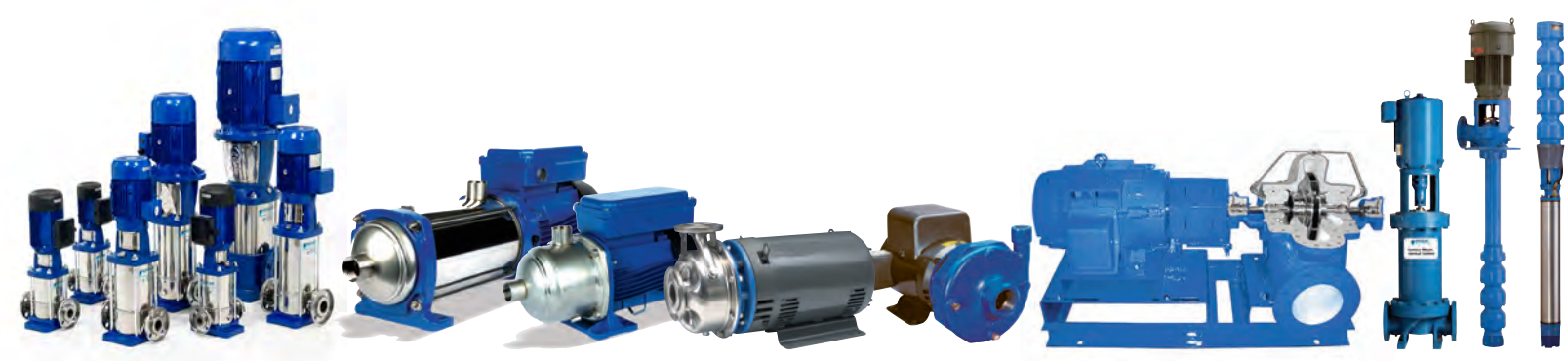
- IP20 Open, TYPE 1, TYPE 12, TYPE 3R (Outdoor), and TYPE 4X (Outdoor)
- 1.5 - 125 HP (frame A - C) wall or motor mounted
- Ambient temperature 14° F - 113° F (-10°C - 45°C). Higher temperatures can be achieved by derating the output amperage of the drive 10% for up to 122° F (50°C).
- At altitudes from 0 to 1000 meters (0 to 3300 feet) nameplate rated current is available. Derate for altitudes above 1000 (3300 feet) with a maximum operating altitude of 3000 meters (9900 feet). (Consult factory for applications above 3000 meters (9900 feet)).
- Relative humidity lower than 95% without condensation

Electrical Characteristics

INPUT POWER

- 3 phase 380 V to 480 V $\pm 10\%$
- 1 phase 200 V to 240 V $\pm 10\%$
- 3 phase 200 V to 240 V $\pm 10\%$
- 3 phase 525 V to 600 V $\pm 10\%$
- Frequency 50 or 60 Hz, $\pm 2\text{Hz}$

OUTPUT POWER - 3 phase from 0 to V_{supply}



Xylem Inc.
2881 East Bayard Street Ext., Suite A
Seneca Falls, NY 13148
Phone: (800) 453-6777
Fax: (888) 322-5877
www.centripro.com

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ATTACHMENT C
TRANSMISSION LINE DATA

Transmission Line Alignment Town of Walden

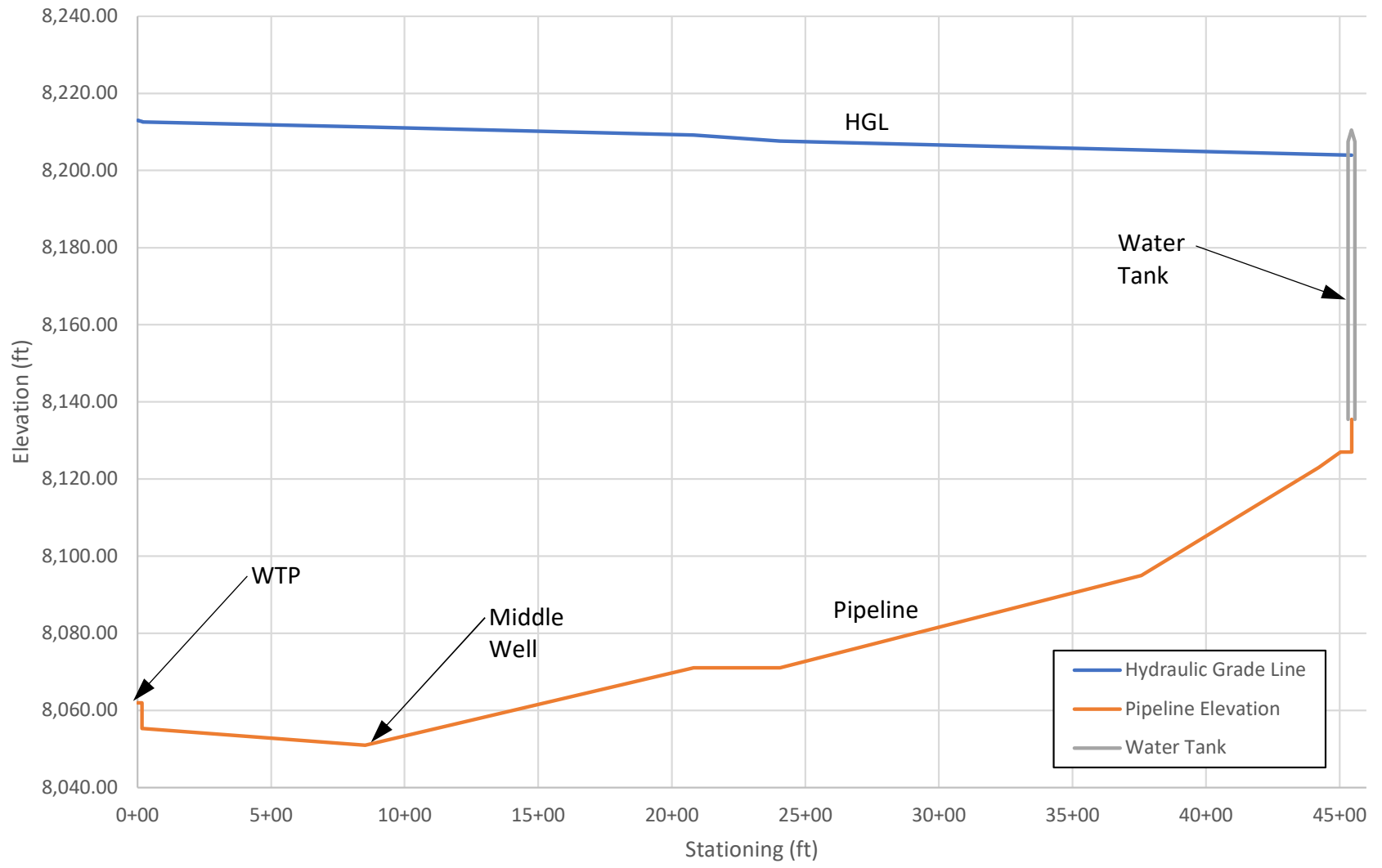


HGL Calculations - Operating One Pump at Maximum Capacity

	1 Pump	2 Pumps
Pipe Material	DI	
Pressure Class	250	PSI
Friction Coeff.	120	
Design Flow	1.00	CFS 2.01
Design Flow	450.00	GPM 900.00
Design Flow	0.65	MGD 1.30

Item	Begin Station	End Station	Start Elev. (ft)	End Elev. (ft)	Length (ft)	Pipe Length (ft)	Diameter (in)	Diameter (ft)	Area (sf)	Pipe Slope (FT/FT)	Hydraulic Radius (ft)	Flow (CFS)	Flow (GPM)	Velocity (FPS)	k Value	Friction Loss (FT)	HGL Start (FT)	HGL End (FT)	Working Pressure (psi)	Comments	
Hydraulic Conditions																					
Wet Well Water Surface	0+00		8052	ft																	
Connection to Water Tank	45+45		8131	ft																	
																Total Head at Water Tank	8204.00				
Total Dynamic Head (TDH)-1 pump			161	ft																	
Total Dynamic Head (TDH)-2 pump			180	ft																	
Losses from WTP to Middle Well (Existing Pipe)																					
1 Pump	0+00	0+00	8062.0	8062.0	0.00	0.00	8.00	0.67	0.35		0.17	1.00	450.00	2.87		0.0000	8052.00	8213.00	65.43		
2 Piping	0+00	0+05	8062.0	8062.0	5.00	5.00	8.00	0.67	0.35	0.0000	0.17	1.00	450.00	2.87		0.0244	8213.00	8212.98	65.42		
3 BFV	0+05		8062.0				8.00	0.67	0.35			1.00	450.00	2.87	1.20	0.1539	8212.98	8212.82			
4 Piping	0+05	0+07	8062.0	8062.0	2.00	2.00	8.00	0.67	0.35	0.0000	0.17	1.00	450.00	2.87		0.0098	8212.82	8212.81	65.35		
5 Wye	0+07		8062.0				8.00	0.67	0.35			1.00	450.00	2.87	0.30	0.0385	8212.81	8212.77		Connect 2nd Pump	
6 Piping	0+07	0+17	8062.0	8062.0	10.00	10.00	8.00	0.67	0.35	0.0000	0.17	1.00	450.00	2.87		0.0488	8212.77	8212.72	65.31		
7 90-Fitting	0+17		8062.0				8.00	0.67	0.35			1.00	450.00	2.87	0.30	0.0385	8212.72	8212.69		Vert. Fitting	
8 Piping	0+17	0+17	8062.0	8055.3	0.00	6.70	8.00	0.67	0.35	0.0000	0.17	1.00	450.00	2.87		0.0000	8212.69	8212.69	68.20		
9 90-Fitting	0+17		8055.3				8.00	0.67	0.35			1.00	450.00	2.87	0.30	0.0385	8212.69	8212.65		Vert. Fitting	
10 Piping	0+17	0+18	8055.3	8055.3	1.00	1.00	8.00	0.67	0.35	0.0000	0.17	1.00	450.00	2.87		0.0049	8212.65	8212.64	68.18		
12 Piping	0+18	8+53	8055.3	8051.0	835.00	835.01	10.00	0.83	0.55	0.0051	0.21	1.00	450.00	1.84		1.3757	8212.64	8211.27	69.45		
13 45-Fitting	8+53		8051.0				10.00	0.83	0.55			1.00	450.00	1.84	0.22	0.0116	8211.27	8211.26		Middle Well	
14 Piping	8+53	20+82	8051.0	8071.0	1229.00	1229.16	10.00	0.83	0.55	0.0163	0.21	1.00	450.00	1.84		2.0249	8211.26	8209.23	59.90		
15 45-Fitting	20+82		8071.0				8.00	0.67	0.35			1.00	450.00	2.87	0.22	0.0282	8209.23	8209.20		Connect to Existing 8"	
16 Piping	20+82	24+05	8071.0	8071.0	323.00	323.00	8.00	0.67	0.35	0.0000	0.17	1.00	450.00	2.87		1.5761	8209.20	8207.63	59.20		
17 90-Fitting	24+05		8071.0				8.00	0.67	0.35			1.00	450.00	2.87	0.30	0.0385	8207.63	8207.59			
18 Piping	24+05	37+58	8071.0	8095.0	1353.00	1353.21	10.00	0.83	0.55	0.0177	0.21	1.00	450.00	1.84		2.2292	8207.59	8205.36	47.82	Begin New 10" DI	
19 BFV	37+58		8095.0				10.00	0.83	0.55			1.00	450.00	1.84	1.20	0.0630	8205.36	8205.30			
20 Piping	37+58	44+22	8095.0	8123.0	664.00	664.59	10.00	0.83	0.55	0.0422	0.21	1.00	450.00	1.84		1.0940	8205.30	8204.20	35.19		
21 90-Fitting	44+22		8123.0				10.00	0.83	0.55			1.00	450.00	1.84	0.30	0.0158	8204.20	8204.19			
22 Piping	44+22	45+04	8123.0	8127.0	82.00	82.10	10.00	0.83	0.55	0.0488	0.21	1.00	450.00	1.84		0.1351	8204.19	8204.05	33.39		
23 90-Fitting	45+04		8127.0				10.00	0.83	0.55			1.00	450.00	1.84	0.30	0.0158	8204.05	8204.04			
24 Piping	45+04	45+45	8127.0	8127.0	41.00	41.00	10.00	0.83	0.55	0.0000	0.21	1.00	450.00	1.84		0.0676	8204.04	8203.97	33.35		
25 90-Fitting	45+45		8127.0				10.00	0.83	0.55			1.00	450.00	1.84	0.30	0.0158	8203.97	8203.95			
26 Piping	45+45	45+45	8127.0	8135.5	0.00	8.50	10.00	0.83	0.55	0.0000	0.21	1.00	450.00	1.84		0.0000	8203.95	8203.95	29.66	Connect to Water Tank	
	45+45		8135.5																		
					Total L	4545.00	4552.77														
HGL at Water Tank					Pipe Slope	1.34%														8203.95	

Hydraulic Grade Line, WTP to Tank



ATTACHMENT D
20-YEAR CASH FLOW

Town of Walden
Water & Sewer Fund
Cash Flow Projection

	Jan-23	Jan-24	Jan-25	Jan-26	Jan-27	Jan-28	Jan-29	Jan-30	Jan-31	Jan-32	Jan-33	Jan-34	Jan-35	Jan-36	Jan-37	Jan-38	Jan-39	Jan-40	Jan-41
Beginning Cash (Operating)	\$131,061	\$122,108	\$181,778	\$199,359	\$229,621	\$273,512	\$320,389	\$370,314	\$423,350	\$479,561	\$583,618	\$690,984	\$801,728	\$915,920	\$1,033,632	\$1,154,937	\$1,279,909	\$1,408,625	\$1,541,162
Water Revenue	\$308,000	\$379,200	\$386,784	\$394,520	\$402,410	\$410,458	\$418,667	\$427,041	\$435,582	\$444,293	\$453,179	\$462,243	\$471,488	\$480,917	\$490,536	\$500,346	\$510,353	\$520,560	\$530,972
Sewer Revenue	\$145,000	\$146,450	\$149,379	\$152,367	\$155,414	\$158,522	\$161,693	\$164,926	\$168,225	\$171,590	\$175,021	\$178,522	\$182,092	\$185,734	\$189,449	\$193,238	\$197,102	\$201,044	\$205,065
Other Revenue	\$13,650	\$13,923	\$14,201	\$14,485	\$14,775	\$15,071	\$15,372	\$15,680	\$15,993	\$16,313	\$16,639	\$16,972	\$17,312	\$17,658	\$18,011	\$18,371	\$18,739	\$19,113	\$19,496
Total Revenue	\$466,650	\$539,573	\$550,364	\$561,372	\$572,599	\$584,051	\$595,732	\$607,647	\$619,800	\$632,196	\$644,840	\$657,736	\$670,891	\$684,309	\$697,995	\$711,955	\$726,194	\$740,718	\$755,532
Water																			
Telephone	\$7,000	\$7,140	\$7,283	\$7,428	\$7,577	\$7,729	\$7,883	\$8,041	\$8,202	\$8,366	\$8,533	\$8,704	\$8,878	\$9,055	\$9,236	\$9,421	\$9,609	\$9,802	\$9,998
Repairs & Maintenance	\$10,000	\$10,200	\$10,404	\$10,612	\$10,824	\$11,041	\$11,262	\$11,487	\$11,717	\$11,951	\$12,190	\$12,434	\$12,682	\$12,936	\$13,195	\$13,459	\$13,728	\$14,002	\$14,282
Solar Array	\$3,500	\$3,570	\$3,641	\$3,714	\$3,789	\$3,864	\$3,942	\$4,020	\$4,101	\$4,183	\$4,266	\$4,352	\$4,439	\$4,528	\$4,618	\$4,711	\$4,805	\$4,901	\$4,999
Water Plant Dist System	\$10,200	\$10,404	\$10,612	\$10,718	\$10,825	\$10,934	\$11,043	\$11,153	\$11,265	\$11,378	\$11,491	\$11,606	\$11,722	\$11,840	\$11,958	\$12,078	\$12,198	\$12,320	\$12,443
Water Assessment	\$3,500	\$3,570	\$3,606	\$3,642	\$3,678	\$3,715	\$3,752	\$3,790	\$3,828	\$3,866	\$3,904	\$3,944	\$3,983	\$4,023	\$4,063	\$4,104	\$4,145	\$4,186	\$4,228
Engineering & Planning	\$20,000	\$20,200	\$20,402	\$20,606	\$10,000	\$10,100	\$10,201	\$10,303	\$10,406	\$10,510	\$10,615	\$10,721	\$10,829	\$10,937	\$11,046	\$11,157	\$11,268	\$11,381	\$11,495
Gas & Oil	\$2,500	\$2,550	\$2,601	\$2,653	\$2,706	\$2,760	\$2,815	\$2,872	\$2,929	\$2,988	\$3,047	\$3,108	\$3,171	\$3,234	\$3,299	\$3,365	\$3,432	\$3,501	\$3,571
Plant Supplies	\$25,000	\$25,500	\$26,010	\$26,530	\$27,061	\$27,602	\$28,154	\$28,717	\$29,291	\$29,877	\$30,475	\$31,084	\$31,706	\$32,340	\$32,987	\$33,647	\$34,320	\$35,006	\$35,706
Gas	\$8,000	\$8,160	\$8,323	\$8,490	\$8,659	\$8,833	\$9,009	\$9,189	\$9,373	\$9,561	\$9,752	\$9,947	\$10,146	\$10,349	\$10,556	\$10,767	\$10,982	\$11,202	\$11,426
Electricity	\$10,000	\$10,200	\$10,404	\$10,612	\$10,824	\$11,041	\$11,262	\$11,487	\$11,717	\$11,951	\$12,190	\$12,434	\$12,682	\$12,936	\$13,195	\$13,459	\$13,728	\$14,002	\$14,282
Capital Outlay	\$10,000	\$10,200	\$10,404	\$10,612	\$10,824	\$11,041	\$11,262	\$11,487	\$11,717	\$11,951	\$12,190	\$12,434	\$12,682	\$12,936	\$13,195	\$13,459	\$13,728	\$14,002	\$14,282
Sewer																			
Repairs & Maintenance	\$10,000	\$10,200	\$10,404	\$10,612	\$10,824	\$11,041	\$11,262	\$11,487	\$11,717	\$11,951	\$12,190	\$12,434	\$12,682	\$12,936	\$13,195	\$13,459	\$13,728	\$14,002	\$14,282
Sewer Plant/Collection System	\$10,000	\$10,200	\$10,404	\$10,612	\$10,824	\$11,041	\$11,262	\$11,487	\$11,717	\$11,951	\$12,190	\$12,434	\$12,682	\$12,936	\$13,195	\$13,459	\$13,728	\$14,002	\$14,282
Wastewater Assessment	\$5,200	\$5,304	\$5,410	\$5,518	\$5,629	\$5,741	\$5,856	\$5,973	\$6,093	\$6,214	\$6,339	\$6,466	\$6,595	\$6,727	\$6,861	\$6,999	\$7,138	\$7,281	\$7,427
Engineering & Planning	\$10,000	\$10,200	\$10,404	\$10,612	\$10,824	\$11,041	\$11,262	\$11,487	\$11,717	\$11,951	\$12,190	\$12,434	\$12,682	\$12,936	\$13,195	\$13,459	\$13,728	\$14,002	\$14,282
Gas & Oil	\$3,000	\$3,060	\$3,121	\$3,184	\$3,247	\$3,312	\$3,378	\$3,446	\$3,515	\$3,585	\$3,657	\$3,730	\$3,805	\$3,881	\$3,958	\$4,038	\$4,118	\$4,201	\$4,285
Plant Supplies	\$10,000	\$10,200	\$10,404	\$10,612	\$10,824	\$11,041	\$11,262	\$11,487	\$11,717	\$11,951	\$12,190	\$12,434	\$12,682	\$12,936	\$13,195	\$13,459	\$13,728	\$14,002	\$14,282
Gas	\$16,000	\$16,320	\$16,646	\$16,979	\$17,319	\$17,665	\$18,019	\$18,379	\$18,747	\$19,121	\$19,504	\$19,894	\$20,292	\$20,698	\$21,112	\$21,534	\$21,965	\$22,404	\$22,852
Electricity	\$22,000	\$22,440	\$22,889	\$23,347	\$23,814	\$24,290	\$24,776	\$25,271	\$25,777	\$26,292	\$26,818	\$27,354	\$27,901	\$28,459	\$29,029	\$29,609	\$30,201	\$30,805	\$31,421
Capital Outlay	\$10,000	\$10,200	\$10,404	\$10,612	\$10,824	\$11,041	\$11,262	\$11,487	\$11,717	\$11,951	\$12,190	\$12,434	\$12,682	\$12,936	\$13,195	\$13,459	\$13,728	\$14,002	\$14,282
Waste Disposal	\$10,000	\$10,200	\$10,404	\$10,612	\$10,824	\$11,041	\$11,262	\$11,487	\$11,717	\$11,951	\$12,190	\$12,434	\$12,682	\$12,936	\$13,195	\$13,459	\$13,728	\$14,002	\$14,282
Administration																			
Computer Maintenance	\$1,000	\$1,020	\$1,040	\$1,061	\$1,082	\$1,104	\$1,126	\$1,149	\$1,172	\$1,195	\$1,219	\$1,243	\$1,268	\$1,294	\$1,319	\$1,346	\$1,373	\$1,400	\$1,428
Computer Supplies	\$1,500	\$1,530	\$1,561	\$1,592	\$1,624	\$1,656	\$1,689	\$1,723	\$1,757	\$1,793	\$1,828	\$1,865	\$1,902	\$1,940	\$1,979	\$2,019	\$2,059	\$2,100	\$2,142
Administrative Charges	\$206,000	\$206,000	\$206,000	\$200,000	\$204,000	\$208,080	\$212,242	\$216,486	\$220,816	\$225,232	\$229,737	\$234,332	\$239,019	\$243,799	\$248,675	\$253,648	\$258,721	\$263,896	\$269,174
Credit Card Fees	\$3,000	\$3,060	\$3,121	\$3,184	\$3,247	\$3,312	\$3,378	\$3,446	\$3,515	\$3,585	\$3,657	\$3,730	\$3,805	\$3,881	\$3,958	\$4,038	\$4,118	\$4,201	\$4,285
Miscellaneous	\$2,500	\$2,550	\$2,601	\$2,653	\$2,706	\$2,760	\$2,815	\$2,872	\$2,929	\$2,988	\$3,047	\$3,108	\$3,171	\$3,234	\$3,299	\$3,365	\$3,432	\$3,501	\$3,571
Bad Debts	\$1,000	\$1,020	\$1,040	\$1,061	\$1,082	\$1,104	\$1,126	\$1,149	\$1,172	\$1,195	\$1,219	\$1,243	\$1,268	\$1,294	\$1,319	\$1,346	\$1,373	\$1,400	\$1,428
Interest on Water Deposits	\$100	\$102	\$104	\$106	\$108	\$110	\$113	\$115	\$117	\$120	\$122	\$124	\$127	\$129	\$132	\$135	\$137	\$140	\$143
CWRPDA Loan Service	\$44,603	\$44,603	\$44,603	\$44,603	\$44,603	\$44,603	\$44,603	\$44,603	\$44,603	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
COLO Loan Service			\$48,532	\$48,532	\$48,532	\$48,532	\$48,532	\$48,532	\$48,532	\$48,532	\$48,532	\$48,532	\$48,532	\$48,532	\$48,532	\$48,532	\$48,532	\$48,532	\$48,532
Total Expenditures	\$475,603	\$479,903	\$532,783	\$531,110	\$528,708	\$537,174	\$545,808	\$554,611	\$563,588	\$528,139	\$537,474	\$546,993	\$556,699	\$566,597	\$576,690	\$586,983	\$597,478	\$608,181	\$619,095
Ending Cash (Operating)	\$122,108	\$181,778	\$199,359	\$229,621	\$273,512	\$320,389	\$370,314	\$423,350	\$479,561	\$583,618	\$690,984	\$801,728	\$915,920	\$1,033,632	\$1,154,937	\$1,279,909	\$1,408,625	\$1,541,162	\$1,677,599
	Dec-23	Dec-24	Dec-25	Dec-26	Dec-27	Dec-28	Dec-29	Dec-30	Dec-31	Dec-32	Dec-33	Dec-34	Dec-35	Dec-36	Dec-37	Dec-38	Dec-39	Dec-40	Dec-41