SUBMITTAL	DESCRIPTION	
	2.Lateral ±15%. 3.Torsional ±10% - separation from rated operating point.	
	Report other structural natural frequencies or critical speeds from 0-120% of maximum normal operating speed to allow these to be field-observed and locked out from operation.	
	Report shall be signed and stamped by professionally licensed engineer who performed Work.	
Test Record Transcripts	Before shipping pumps, submit certified 6-point pump curves for factory tests per Test Record Transcript requirements. Where variable speed drives are provided, submit certified 6-point pump curves in four 100 rpm increments throughout pump operating range. Include written report stating date and location pumps were tested and certifying in accordance with AWWA E103 that certified pump curves are accurate and comply with specifications.	
	Before shipping pumps, submit certified vibration test report including test results, torsional and critical speed analysis results, and modal shape signature results stating pump and motor assembly has been tested and vibration falls within limits allowed by HI 14.6 and above	
	Submit results of field tests within 14 days of test completion.	
Motor Data	Refer to motor data requirements of Section 26 05 10.	
Testing Procedures	Submit written test procedures in advance of all field pump tests.	
Warranty	Furnish 3-year warranty from date of final acceptance for pumps and motors. Warranty shall bear appropriate serial numbers.	

B. Refer to Section 01 33 00 for definition of requirements for Shop Drawings, Catalog Data, Installation Instructions, O&M instructions, Certificates of Compliance, Engineering Calculations, and Test Record Transcripts.

1.8 Delivery, Storage, and Handling

A. Refer to Sections 01 65 00 and 01 66 00 for delivery, storage, and handling requirements.

B. Do not ship pumps until District has accepted test reports.

C. Strictly follow Manufacturer's instructions and warranty requirements for delivery, storage, and handling of pumps.

D. Deliver anchor bolts and anchorage devices to be embedded into cast-in-place concrete in ample time to ensure Work is not delayed.

E. Cover pump equipment as required to guard against entry of deleterious matter, and to protect Work from abrasion.

1.9 Project Site Conditions

A. Refer to Section 01 10 01 for full list of project site conditions.

1.10 Unit Prices

A. Refer to Section 01 22 00 for measurement and payment clauses for vertical turbine line shaft well pumps.

PART 2 - PRODUCTS

2.1 Acceptable Manufacturers

A. Acceptable Manufacturers include:

ITEM	MANUFACTURER	MANUFACTURER LOCATION
PUMPS		
Vertical Turbine Line Shaft Pumps	Fairbanks Morse / Pentair	Kansas City, MO (913) 371-5000
	Flowserve Corporation	Hastings, NB (800) 728-7867 Tustin, CA (714) 505-9700
	Goulds / Xylem	Lubbock, TX (806) 763-7867 Irvine, CA (949) 680-4800
	ITT Goulds	Seneca Falls, NY (315) 568-2811 Irwindale, CA (626) 856-5656

ITEM	MANUFACTURER	MANUFACTURER LOCATION
	Sulzer-Johnston Pump Company	Portland, OR (818) 790-7344
	Weir Floway	Fresno, CA (714) 904-1159 Yorba Linda, CA (866) 472-3959
	Accepted equal	
SEALS		
Mechanical Cartridge Seals	A W Chesterton Co Seal 155	Groveland, MA (844) 484-7080
	Flowserve Corporation ISC-2 Series	Hastings, NB (714) 505-9700
	John Crane / Smiths Type 1B	Cerritos, CA (562) 802-2555
	Accepted equal	
Mechanical Cartridge-Mount Pusher Seals	Flowserve Corporation Durametallic® P-50	Hastings, NB (714) 505-9700
	Accepted equal	
Mechanical Split Seals	A W Chesterton Co Seal 442	Groveland, MA (844) 484-7080
	Flowserve Corporation PSS III	Hastings, NB (714) 505-9700
	John Crane / Smiths Type 1B	Cerritos, CA (562) 802-2555
	Accepted equal	
Packing Material	Bluegard / Garlock / Coltec Style 8113 plus Glass-filled Teflon	Palmyra, NY (315) 597-4811
	Accepted equal	
VERTICAL MOTORS		
Motors	General Electric	Fairfield, CT (800) 626-2000
	US Electrical Motors / Nidec	St Louis, MO (888) 637-7333
	Accepted equal	
LUBRICANTS		
Lubricants (Motor)	Chevron-Texaco GST ISO VG32	San Ramon, CA (925) 842-1000
	Exxon-Mobil DTE Light ISO VG32	Irving, TX (800) 243-9966
	Accepted equal	
ANALYSIS AND TESTING		
Finite Element Analysis (FEA) program	Mechanica Software Inc "ProE"	Annapolis, MD (410) 263-0798
	Accepted equal	
Vibration Testing	Allis USA	(949) 661-3324
	Electrical Specialty Products	(909) 737-8827
	Signet Monitoring and Analysis	Lacombe, AB (403) 391-1921
	Accepted equal Class II vibration analyst certified by Vibration Institute of America	

B. Pump manufacturer shall have ≥5 years' recent continuous product history in USA waterworks industry.

C. Pumps furnished shall operate throughout their full submitted pump curve driven by motors of horsepowers specified below or shown on Plans.

D. Pumps requiring larger motor than specified or shown are unacceptable in absence of written statement from District electrical infrastructure, drives and switchgear can support larger motor.

E. Pump curve shall continuously rise from minimum head to shutoff with no intermediate dips.

F. Specified pump and pump curve have been selected based on reference pump noted in Paragraph 2.2 to provide District with optimum performance at multiple operating points, and not solely at best efficiency point.
   1. Contractor may substitute other pumps including pumps from other accepted equal manufacturers, provided the following conditions are met:
      a. Provisions of HI14.6 limiting pump performance testing to 1 "guarantee point" shall be revised to provide 3 guarantee points to acceptance levels described below.
      b. Testing shall demonstrate performance at "Point B Best Efficiency Point (BEP) conforms to Acceptance Level 1E as defined in HI14.6.
      c. Efficiencies at BEP shall meet or exceed specified efficiencies.
      d. Testing shall demonstrate performance at Points A and C conforms to Acceptance Level 1B as defined in HI14.6.