.8 Volumetric feeder

.9 Status indication light for the hopper levels and lime slurry mixing tank high level.

.10 Allen Bradley SLC series 505 programmable logic controller, factory programmed for automatic control of all sequences. Refer to Division 17 for PLC specification.

.11 Motor starters as required for equipment supplied.

.2 Alarm lights, audible alarm, and silence pushbutton for the following conditions:

.1 Lime hopper high and low level

.2 Lime Slurry Mixing tank high level

.3 It is intended for the lime feed system PLC to communicate to the in plant PLC via an Ethernet protocol. Provide program documentation to the Consultant with a list of appropriate variables and parameters to be monitored on the plant HMI. **CONFIRM WITH DUNCAN**

.4 A plant flow signal shall be provided to the system supplier to enable lime system flow based control.

2.11 Skid Assembly

.1 The volumetric feeder, lime slurry mixing tank and vacuum conveyance unit shall be factory assembled on a structural skid complete with all piping and wiring.

.2 System shall be factory tested prior to shipment.

.3 Lime storage hopper and conveyance piping shall be shipped loose for field placement.

.4 Installation at the final destination shall be limited to placing the units in position, installing the conveyance piping, connecting a single power source to the control panel and connecting inlet effluent water and lime slurry piping at the interface points.

2.12 Spare Parts

.1 In addition to the requirements in Section 11005, provide the following

.1 Provide one (1) spare solenoid valve

.2 Provide one (1) spare isolation gate valve

.3 Provide one (1) spare adjusting valve

.4 **ANYTHING ELSE??**

2.13 Painting

.1 Factory coat equipment in accordance with Section 09901.

2.14 Concrete and Grout for Support Pads

.1 Refer to Division 3.

3. EXECUTION

3.0 Manufacturer's Representative

.1 Manufacturer's representative shall be required to attend as specified in Section 01650.The number and extent of these visits shall be sufficient to supervise the installation, testing and commissioning of the complete bulk hydrated lime feed system.

3.1 Installation Training

.1 Instruct the installer in the methods and precautions to be followed in the installation of the hydrated lime feed system and related equipment.

.2 Attest to the installer's understanding by completing Form 101 as shown in Section 01650.

3.2 Installation

.1 Ensure the hydrated lime feed system and related equipment is installed in accordance with Section 11020 as required to provide satisfactory service.

.2 Cooperate with the installer to fulfill the requirements for satisfactory installation as documented by Form 102, illustrated in Section 01650.

3.3 Testing

.1 Ensure the hydrated lime feed system and related equipment, including all component parts, operate as intended.

.2 Cooperate with the installer to fulfill the requirements for satisfactory performance of the equipment as documented by Form 103, illustrated in Section 01650.

3.4 Commissioning

.1 Attend during commissioning of the process system which includes the hydrated lime feed system specified in this section to ensure that they function as intended in the process system.

3.5 Training

.1 Provide one 8 hour day of classroom training. The training session is to take place the day after Form 103 is signed. **DO WE WANT THIS?**

.2 Allow for a total of 4 days on-site for testing, commissioning and training.

END OF SECTION

RECTANGULAR DISSOLVED AIR FLOTATION THICKENERS

1. GENERAL

1.0 Work Included

.1 Supply, design and supervise the installation, testing and commissioning of dissolved air flotation (DAF) thickener system(s) each consisting of a rectangular welded steel tank, tank cover, recirculation pump and motor, control panel, saturation tank, air control panel and accessories, pressurized flow piping and fittings, including back pressure control devices, sludge skimming system, drives, hoppers, and other necessary accessories as specified.

1.1 Definitions

.1 The following definitions apply to this section:

.2 Saturation efficiency is defined as the ratio of the actual amount of air dissolved in the full pressurization flow to the theoretical amount that could be dissolved in the pressurization flow at the design pressure and test temperature based on one pressurization pump in operation per air saturation system at given loading

1.2 Submittals

.1 Shop Drawings: Submit in accordance with Section 01300 and Section 11005, including the following:

.1 Design and fabrication details for DAF tankage, signed and sealed by a Professional Engineer.

.2 Design details for pressurization vessel, signed and sealed by Professional Engineer.

.3 Performance characteristics and other details of recirculation pumps, in accordance with Section 11300.

.2 Installation Requirements in accordance with Section 01650.

.3 Operating and Maintenance Data: Provide for incorporation in operation and maintenance manual as specified in Section 01730. Include complete description of operation together with general arrangement and detailed drawings, wiring diagrams for power and control schematics, parts catalogues with complete list of repair and replacement parts with section drawings illustrating the connections and identifying numbers.

1.3 Service Conditions

.1 Service conditions will be corrosive for equipment located inside the DAF thickening tanks as well as equipment located outside the tanks at ground level or higher.

1.4 Coordination

.1 Coordinate with other divisions to ensure there are no conflicts in the work.

1.5 Quality Assurance

.1 Structural Steel and Welds: Use all structural steel used for equipment fabrication which conforms to the requirements of the Standard Specifications for Steel for Bridges and Buildings and ASTM A36. Conform to the latest standards of the American Welding Society.

.2 Structural Design: Design all steel structural components so that the stresses developed under the specified conditions will not exceed the allowable stresses defined by the latest AISC Standards and the aforementioned standards.

.3 Gear Design: Design all drive unit components in accordance with AGMA 2001-B, 6010-E, and 6034-A as applicable.

.4 Bearing Design: Design main bearings in accordance with AFBMA

1.6 Shipment, Protection, and Storage

.1 Ship the equipment pre-assembled to the degree which is practicable.

.2 Provide storage instructions indicating specific requirements to ensure there is no uneven wear, distortion or weathering of components.

.3 Identify all special storage requirements.

2. PRODUCTS

2.0 Description

.1 Design the DAF thickening equipment section for thickening waste activated sludge (WAS) from a conventional activated sludge municipal wastewater treatment plant. The wastewater tributary to this treatment plant, although mostly of domestic origin, can be expected to contain some industrial waste. The DAF Thickener System increases the solids concentration in WAS, resulting in a Thickened Waste Activated Sludge (TWAS) concentration of 2.5 %. The system skims the TWAS float from the DAF thickener tank, and deposits it in an integral collection trough.

.2 Design DAF thickener sludge and float collection equipment to be installed in a rectangular steel tank.

.3 Sludge is conveyed to the thickener at a flow rate which will vary in response to plant flow, organic loading, and operational requirements.

.4 Include the surface skimmer and associated chains, sprockets, shafts, flights, rails and guards, dewatering beach, flight wiper, retention baffle, effluent weir, drives, variable frequency drive and control panel.

.5 Include a pressurization system including inlet distribution system, pressure regulating valve, saturation tank with level control systems, air control panels and back pressure control valves. Design the systems to achieve the specified air saturation efficiency under all specified operating conditions.

.6 The DAF thickener pressurization system uses recycled DAF effluent. Supply a centrifugal recirculation pump to supply water to the saturation tank.

.7 Remove floating thickened sludge from the surface of the tank with float collectors which sweep the float into a collection trough. The thickened sludge drains by gravity to the TWAS tank.

.8 Design the collector components to operate in a dry tank and construct to meet or exceed working loads created when removing thickened sludge at a concentration of 10% and as deep as 75 mm.

.9 Design the system to permit the future use of polymers as a flocculating aid, while achieving the required solids concentration under average conditions without chemicals.

2.1 Acceptable Manufacturers

.1 Komline Sanderson
.2 WesTech
.3 Eimco
.4 USF/Envirex

2.2 Capacities and Performance

Number of Units		1
Equipment Tag		DAF-402
Maximum Month Flow and Loading Conditions		
	m^3/d	164
	mg/L	3,334
	kg/d	547
Solids Loading Rate, Peak	$kg/m^2/hr$	3
Minimum Area required (one unit out of service)	m^2	7.6
Minimum Recirculation Rate	L/s	2.0
Minimum Air Saturation Efficiency	%	85
Maximum Saturation Pressure	kPa	450
Air to Solids Ratio		0.06

2.3 Materials

.1 Fabricate structural steel components of steelplate a minimum of 6 mm, to ASTM A36.

.2 Fabricate submerged hardware of AISI Type 316 stainless steel, including anchor bolts.

.3 Fabricate float collectors of AISI Type 304L stainless steel.

.4 Fabricate weir plates of aluminum or AISI Type 304 stainless steel.

.5 Fabricate air saturation tank of 304L Stainless Steel designed per ASME code, Section VIII, Division 1, for 550 kPa, design working pressure. The test pressure shall be 825 kPa.

.6 Fabricate saturation tank nozzle impingement plate and fastening hardware of AISI Type 316 stainless steel.

.7 Fabricate back pressure control valve of cast iron and fastening hardware of AISI Type 316 stainless steel.

2.4 Surface Skimmer

.1 The skimmer consists of two (2) strands of chain running above the liquid surface over two (2) sets of sprockets with flights attached to maintain a vertical position. The flights convey the sludge towards the end opposite the effluent discharge and scrape the sludge over the dewatering beach and into the sludge hopper.

.2 Drive the skimmer by a manually adjustable variable speed drive at speeds of 0.01 to 0.04 m/s.

.3 Support the skimmer on its carrying and return runs by tracks constructed of 6mm minimum structural angles.

.4 For the skimmer-carrying chain, use 488 high strength steel chain.

.5 Provide driven and idler sprockets with hardened tooth bearing surfaces of not less than 360 Brinell and a depth of at least 5 mm, or high strength non-metallic polyethylene sprockets.

.6 Design the flights to pivot, providing a full 360 degrees of movement and with a full length neoprene wiper. Fabricate the flights of 3 mm thick 304L stainless steel and minimum 200 mm high; designed to have the full weight of the flight resist the thickened sludge blanket, or be fitted with a non-corroding spring, to prevent the flight wiper from pivoting beyond the vertical position and provide effective removal of the thickened sludge. Design the flight to allow the wiper to be perpendicular to the beach. Space the flights to provide for the efficient removal of the sludge volumes required but no greater than 1.2 m apart.

2.5 Dewatering Beach

.1 Make the dewatering beach an integral part of the tank. Extend a steel beach plate the full width of the basin.

.2 Provide a 1:4 slope, with the highest point at least 150 mm above the normal water surface to prevent liquid from entering the sludge trough when the skimmer is not operating.

.3 Ensure the beach provides an adequate horizontal surface for the entrapment of the sludge by the skimmer flight.

2.6 Flight Wiper

.1 Provide a wiper at the point of discharge to automatically clean the front side of the skimmer flights.

2.7 Retention Baffle

.1 Extend a retention baffle to an elevation at least 1000 mm below the front edge of the beach.

.2 Locate the baffle a maximum 300 mm from the subnatant weir.

.3 For the retention baffle, use minimum 3 mm thick stainless steel or 10 mm thick high strength FRP.

2.8 Skimmer Drive

.1 Use a directly mounted hollow shaft gear motor with manual speed control.

.2 Fit the drive with a zero speed switch for full protection of equipment in case of excessive loading or skimmer failure. A torque switch with high and low set points may be provided as an alternative to the zero speed switch.

.3 Make the driven sprocket on the skimmer headshaft not less than 630 mm pitch diameter.

.4 The drive chain consists of non-metallic links connected by means of stainless steel grooved 11 mm minimum diameter connecting pin, press fitted into the link and held in place with a locking pin. Ensure the chain is capable of being disassembled and assembled in the field by removing the locking pin and connecting pin.

.5 Make driven sprockets of split dished construction. Use cast iron sprocket body bored, with keyway and set screw, to suit the head shaft. Use driven sprockets that are at least 535 mm pitch diameter and that have not less than 40 teeth for NM 78 chain.

.6 Fit drive sprockets with bronze bushings and shear pins. Select driving sprockets on speed reducers that have no fewer than 11 teeth and that are not less than 235 mm diameter.

2.9 Effluent Weir

.1 Provide a minimum 5mm stainless steel weir plate at the weir wall to permit adjustment of the float level, with a vertical travel equal to the rise of the inclined portion of the dewatering beach, or a minimum of 150 mm.

2.10 Tank Cover

.1 Provide a tank cover for the DAF thickener. The tank cover shall be comprised of either FRP or aluminum panels. The DAF tank cover will provide an enclosed vapour space, which will be ventilated for odour control and reduction of humidity in the DAF area.

.2 The DAF tank cover shall be sized to allow lifting by one Operator (<25 kg).

.3 Provide a 600 x 600 mm inspection port with a hinge and handle on the panels at both ends of the DAF tank as well as on every second panel in between the ends. The panels are to facilitate operator inspection of the DAF tank's interior. Ensure that there is a panel over the dewatering beach device.

.4 Provide a 100 mm diameter flange connection for ventilation on the two (2) panels at each end of the DAF tank. Co-ordinate connection details with Division 15 and Mechanical drawings for the ventilation details. Provide flanges with drilling pattern to meet ANSI B16.5. Provide nozzles of 150 mm length. Provide reinforcing pads on the cover as necessary to support the nozzles.

.5 Reinforce the panels to maintain structural integrity.

.6 The seams and reinforcing features will be on the underside of the panels for a smooth appearance and to facilitate cleaning of the panels.

2.11 Sprockets, Shafting and Bearings

.1 Furnish sprockets on all shafts. Traction wheels, idler wheels, or other substitutes are not acceptable. Key sprockets firmly to the headshafts. The skimmer take-up shaft shall have one sprocket set-screwed and one sprocket to run loose on the shaft. Protect all drives by shear pin hubs on either the driving or driven sprocket.

.2 Make all shafting of cold rolled steel, straight and true, extending the full width of the basin. Fabricate the shafts to contain keyways with fitted keys where necessary to connect to the sprockets and drive gears and to be of sufficient size to transmit the power required and to prevent deflection greater than 4 mm/m and to permit the smooth travel of the carrying chain and flights. Ship skimmer shafting as complete subassemblies with sprockets, bearings and set collars in place.

.3 Design the shafts to be supported by and rotated in ball bearings. Use bearings that are grease lubricated in and above water service. Provide the surface skimmer with take-up

bearings, providing not less than 250 mm of horizontal movement and of cantilever design with fabricated steel support base and stainless steel take-up screws.

2.12 Drives

.1 Double reduction right angle worm gear reducer, fully housed, running in oil with anti-friction bearings throughout.

.2 Include a locally-mounted, manual handwheel adjustable variable speed gear drive.

.3 Provide 3 Phase, 600V motor in compliance with Section 11205 operating at a speed of 1800 RPM.

.4 Drive units pre-assembled as a complete assembly.

2.13 Controls

.1 Provide HOA switches for the skimmer, pressurization pump, and air solenoid valve. In HAND mode, the equipment will run on a continuous basis. In AUTO mode, the equipment will run based on a permissive digital contact from the WWTP's SCADA system.

.2 HOA switches to have two sets of auxiliary contacts in the HAND and AUTO positions.

.3 Provide contact for torque alarms.

.4 Provide contact for remaining unit alarms.

.5 Mount controls on the DAF adjacent to the air saturation system.

2.14 Piping

.1 All DAF thickener piping to be standard weight steel.

2.15 Pressurization System

.1 DAF thickener pressurization system consists of an air supply, recirculation pump(s), saturation vessel with associated air control panels and accessories, pressurized flow piping and fittings, including back pressure control devices.

.2 Inlet Distribution System

.1 Provide a fabricated steel manifold inlet mixing and distribution system inside the flotation tank, to allow for intimate mixing of the wastewater influent and the flow of recycled pressurization water from the air saturation tank and to distribute the mixed flow evenly across the width of the tank. A distribution system employing valves or other mechanical means is unacceptable.

.3 Air Saturation Tank

.1 Provide vertical, cylindrical welded steel tanks sized for efficient saturation of the pressurized flow with air and separation of large bubbles required to achieve the specified performance. Design the tanks in accordance with ASME Code, Section VIII, Division 1, for 550 kPa gauge pressure design working pressure. Provide liquid level control system for each saturation tank of the excess air bleed-off type and to maintain a constant liquid level in the tank. Maintain the external diameter of the pressure vessel, excluding piping and appurtenances, less than 1.5 metres.

.2 Design the internal arrangement of the saturation tank and size the recirculation pump to achieve and the specified air saturation efficiency. Internal packing, secondary recycle pumps and mixers are not allowed. Minimum discharge velocity of the pressurized flow nozzle(s), if required, is 6 m/sec. Nozzle(s), if required, discharge on a replaceable stainless steel target baffle(s) without impinging directly on the pressure vessel.

.3 Fit the saturation tank with the following:

.1 Pressure manhole, 300 x 400 mm minimum.

.2 Flanged support skirt or legs suitable for anchor bolting with 150 mm diameter holes at 90 degree quadrants to permit access to the drain connection.

.3 A bottom 31 mm diameter drain and valve.

.4 A 19 mm safety valve set for 550 kPa.

.5 A 600 mm armoured sight gauge visible from the air control panel and fitted with gauge valves in addition to top and bottom cleanouts with ball valves.

.6 Mechanically activated level control device with a stainless steel magnetic switch. Mount the switch in an external stilling well fitted to the air dissolving tank. Upon high or low level in the saturation tank, the switches close a common set of contacts to trigger a single alarm. Attach the switches to the saturation tank with two 20 mm ball valve connections.

.7 A pressure gauge with a range of 0 to 690 kPa in accordance with Division 17.

.8 Flanged inlet and outlet connections.

.9 20 mm air inlet connection.

.10 20 mm air bleed connection.

.11 Internal piping and nozzle(s).

.12 Internal dissolution nozzles, if required, with replaceable stainless steel target baffles.

.13 Provide fittings which comply with code requirements so that the sight glass, the level control valve float chamber, and instrumentation connections can be purged with high-pressure plant water without draining the saturation tank.

.4 Air Control Panel

.1 Furnish an air control panel mounted in an open faced 12 gauge steel plate to control the volume and pressure of air delivered to the saturation tank.

.2 Include with the air controls a manually adjustable combined air pressure regulator/ filter/pressure gauge with drip trap, check valve, and solenoid valve.

.3 Provide 120 volt, 60 Hz, single phase power.

.4 Provide alarm for low air pressure. Alarm to be located on the air saturation tank.

.5 Back Pressure Pipe and Control Valve

.1 Provide that portion of the piping system within the DAF thickener tank including the back pressure pipe and control valve, so that the proper back pressure setting can be selected to achieve optimum system performance.

.2 Locate the back pressure control valve to inject the pressurized recycle into the tank near the feedwell inlet. Provide a handwheel operator.

.3 Design the back pressure valve for pressurization flows to a pressure of 750 kPa(g).

.6 Recirculation Pressurization Pump

.1 Provide one recirculation pressurization pump of the single stage, horizontal, base-mounted, end suction, top centerline discharge, centrifugal type with Class 125 flanged connections.

.2 Provide pumps with cast iron casings and impellers, polished steel shaft, hardened 12 percent chrome shaft sleeve, and fabricated steel base plate.

.3 Design the pump to recirculate the listed flow at a total dynamic head appropriate to a saturation tank.

.4 Select the pump to operate within 80% of the Best Efficiency Point (BEP).

.5 Provide pumps with a maximum speed of 3600 RPM.

.6 Couple pumps to a single speed motor, in accordance with Section 11205.

.7 Compressed Air Source

.1 The air is supplied by an existing plant air system with an operating pressure of 1200 kPa.

2.16 Painting

.1 Factory coat equipment in accordance with Section 09901.

2.17 Spare Parts

In addition to the requirements in Section 11005, provide the following:

.1 Three (3) m of chain.

.2 Two (2) flights.

.3 Pump seals.

.4 One (1) backpressure valve.

.5 One (1) pressurization pump.

.6 One (1) spare solenoid valve.

.7 Provide a list of all spare parts which would be expected to be required under normal conditions for a period of five years. At the Engineer's request, provide a price for these parts.

3. EXECUTION

3.0 Manufacturer's Representative

.1 Manufacturer's representative shall be required to attend as specified in Section 01650.The number and extent of these visits shall be sufficient to supervise the installation, testing and commissioning of the complete DAF Thickener system.

3.1 Installation Training

.1 Instruct the installer in the methods and precautions to be followed in the installation of the pressurization system, the skimmer/collector system and related equipment.

.2 Attest to the installer's understanding by completing Form 101 as shown in Section 01650.

3.2 Installation

.1 Ensure the pressurization system, the skimmer/collector system and related equipment is installed in accordance with Section 11020 as required to provide satisfactory service.

.2 Cooperate with the installer to fulfill the requirements for satisfactory installation as documented by Form 102, illustrated in Section 01650.

3.3 Testing

.1 Ensure the pressurization system, the skimmer/collector system and related equipment, including all component parts, operate as intended.

.2 Undertake series of tests to confirm the efficiency of the air saturation system. Provide written summary of test protocol, one month prior to proceeding.

.3 Cooperate with the installer to fulfill the requirements for satisfactory performance of the equipment as documented by Form 103, illustrated in Section 01650.

3.4 Commissioning

.1 Attend during commissioning of the process system which includes the pressurization system and the skimmer/collector system specified in this section to ensure that they function as intended in the process system.

3.5 Training

.1 Provide one 8 hour day of classroom training. The training session is to take place the day after Form 103 is signed.

.2 Allow for a total of 4 days on-site for testing, commissioning and training.

END OF SECTION

BELT FILTER PRESS

1. GENERAL

1.1 Description

.1 This section specifies the supply, installation and commissioning of a complete sludge dewatering system inclusive of a belt filter press assembly, wash water booster pump, dry polymer system, control system and panel, and other accessories included as part of the dewatering system.

1.2 Submittals

.1 Submit shop drawings in accordance with Section 01300.

.2 Submit operating and maintenance data in accordance with Section 01730.

1.3 Coordination

.1 Conform to the requirements of Sections 01650, 11205 and 09905.

.2 Coordinate with other Divisions to ensure there are no conflicts in the work.

1.4 Shipment Protection and Storage

.1 Ship the belt press completely factory assembled, except for belts and gear motor. Inform installer of any site assembly requirements.

.2 Identify special storage requirements. Store on-site until ready for incorporation in the work using methods recommended by the manufacturer to prevent damage, undue stress or weathering.

2. PRODUCTS

2.1 Acceptable Manufacturers

.1 Komline Sanderson

.2 Phoenix

.3 US Filter

.4 Solids Technology Inc.

.5 Andritz

2.2 Belt-Filter Press Components

.1 General

.1 The entire belt-filter press (filter press) unit shall function as a gravity drainage and belt pressure system.

.2 Belt press to be designed and sufficiently automated to require minimal operator attention.

.2 Main Structural Frame

.1 The structural frame is to be of welded side frames connected by cross members with minimum 12 mm bolts to maintain frame alignment during shipping, installation and operation and shall be fabricated from structural steel channel.

.2 The maximum stress loading on any frame member shall not exceed one-third (1/3) the respective member's yield strength at the design belt operating tension.

.3 Maximum frame deflection is to be L/720 or less, where L is the span length in inches.

.4 After fabrication, the frame is to be hot-dip galvanized in accordance with ASTM-A123.

.5 Frame disassembly shall not be required for roll removal.

.3 Flocculation/Distribution Assembly

.1 Provide 304 stainless steel flocculation and distribution assembly to gently distribute sludge onto the gravity drainage section and to prevent leakage by means of rubber seals against the filtration belt.

.2 Provide a sludge-levelling device of 304 stainless steel to assist in uniform distribution onto the belt.

.3 Provide a flocculation box to minimize turbulence on the conditional sludge.

.4 The inlet to the flocculation box is to limit velocity to less than 2m/s at the design hydraulic loading.

.4 Gravity Drainage Section

.1 Provide gravity drainage dispersion devices to disperse sludge for effective removal of water.

.2 The dispersion devices are to be designed so each one can be moved in either lateral direction and to be a minimum of 300 mm long to turn the sludge over in the gravity section for maximum water removal.

.3 Dispersion devices are to be constructed of ultra-high molecular weight polyethylene.

.4 Each row of plows shall have handles, to provide the capability of rotating the plows out of the flow, for maintenance purposes or process flexibility.

.5 Sludge is to be contained within the drainage section by a 10 ga. Type 304 stainless steel barrier equipped with replaceable polyester seals on each side.

.6 The filter belt, while in the gravity section, is to be supported by framework constructed of 304 stainless steel fitted with UHMW polyethylene wear bars.

.7 The wear bars are to be oriented in a V-shaped (chevron) pattern to maintain continuous support of the belt seam and reduce belt wear.

.5 Adjustable Wedge

.1 Following the gravity dewatering section, provide an adjustable wedge section.

.2 Wedge angle is to be adjustable from one side of the press while press is operating.

.3 Gradual increased pressure is to be applied as belts pass through the adjustable wedge.

.6 Pressure Section

.1 A minimum 750 mm diameter roll is to be used as the initial roll in contact with gravity concentrated sludge.

.2 The minimum roll diameter used in the pressure section is to be 300 mm.

.3 To ensure optimum cake dryness, a minimum of eight (8) rolls is to be used in the pressure area.

.4 Pressure area is to include only areas in actual roll contact and shall be based on drainage through one belt.

.7 Filtration Belts

.1 Each belt is to be a continuous design woven from monofilament polyester strands.

.2 Each belt is to incorporate a mechanical seam that does not interfere with press operation and allows simple, periodic belt replacement.

.3 Each belt is to have a stainless steel clipper lacing with a pin seam arrangement.

.4 Each side of the belt is to have plastic protective coating.

.5 The clipper lacing is also to have a plastic protective coating.

.8 Doctor Blade

.1 The belt-filter press is to be provided with UHMW polyethylene doctor blades to remove dewatered sludge cake from each belt.

.2 The doctor blade is to be replaceable and reversible with two bevelled edges, to be backed with a 304 stainless steel spring tensioning system.

.3 An integral 304 stainless steel cam mechanism, activated from either side of the unit, is to allow the doctor blade to be pivoted away from the roll and safely locked in position for ease of maintenance or blade replacement.

.9 Rolls

.1 Design all roller shafts per ANSI/ASME B 106.IM-1985, accounting for reversed bending fatigue stress.

.2 Design all rolls with a maximum deflection of 1.3 mm at the design belt tension.

.3 Rolls to be constructed with stub shafts.

.10 Bearings

.1 All bearings are to be solid-case pillow block type with double row spherical rollers.

.2 Bearings are to be mounted to roll shafts with an eccentric locking collar for maximum clamping force on the roll shaft.

.3 Bearing housings are to be cast iron, with auxiliary caps on both ends to prevent entry of contaminants and moisture.

.4 The auxiliary caps are to be gasketed, and secured with stainless steel hardware.

.5 The outer cap is to completely close off that side of the bearing housing.

.6 The inner cap is to have an opening for the roll shaft.

.7 Housing and auxiliary caps shall be coasted with epoxy paint, 8 mils minimum.

.8 All hardware, grease fittings, and drain plugs are to be stainless steel.

.9 Bearings to be fitted with four-point seals, consisting of a shaft mounted seal carrier, a V-ring seal, a labyrinth seal and an internal spring-loaded lip contact seal.

.10 Bearing seals to accommodate ± 1.5° of misalignment without loss of seal effectiveness.

.11 Bearing L-10 life shall be a minimum of 580,000 hours, based on AFBMA calculations.

.11 Filtrate Collection

.1 Provide drainage pans to prevent rewetting of dewatered filter cake.

.2 Gravity filtrate and pressure filtrate to be collected to common drainage points by 14 gauge, 304 stainless steel drain pans with standard NPT connections.

.12 Belt Washing Drive

.1 Following cake discharge, each polyester belt is to be continuously washed using a high pressure, low volume, 304 stainless steel shower assembly.

.2 Provide Y-strainer to remove any particles which may enter the shower assembly.

.3 Each shower assembly is to have replaceable brass or stainless steel nozzles.

.4 Provide type 304 stainless steel housing to completely contain the high velocity water spray.

.5 Provide integral stainless steel brushes, operated by an externally mounted handwheel to clean the spray nozzles.

.6 Splash panels or shields are acceptable to contain splashing or over spray with the limits of the press.

.7 Wash water is to be collected in trays beneath each shower belt.

.13 Belt Tracking

.1 Belt positioning for each belt is to be continuously and automatically monitored by sensing units (live hydraulic control valves or pneumatic) which are to be installed with guide devices.

.2 The guide device is to ride the edge of the polyester belt.

.3 The micro-torque unit is to sense belt misalignment and automatically walk the belt back to the normal operating position by means of a live hydraulic cylinder attached to the tracking roll.

.4 The opposite end of each tracking roll is to incorporate a self-aligning pillow block bearing which allows the tracking rolls to pivot in a horizontal plane.

.5 Belt tracking is to be automatically operated by the hydraulic power pack or air compressor.

.6 Provide a limit switch on each side of each belt to detect extreme belt travel and initiate a shutdown signal and sound an alarm.

.7 Position the limit switches for the pressure section to sense both belts simultaneously.

.14 Belt Tensioning

.1 Equip each belt in the pressure section with a hydraulic cylinder belt tension or pneumatic bellows system operated by the hydraulic power pack or pneumatic system to automatically insure proper belt tension while dewatering varying thicknesses of sludge.

BELT FILTER PRESS

.2 Belt tensioning is to be operated by the hydraulic powerpack or pneumatic system such as an air compressor.

.3 The belt tension system is to assure parallel movement of the tension rolls by use of a rack and pinion system.

.4 Rack and pinion gears are to be constructed of free-machining yellow brass.

.15 Belt Drive Assembly

.1 The belt drive assembly is to consist of a shaft-mounted gear reducer with an integral gear motor mounted on a single drive roller.

.2 The belt drive speed is to be infinitely variable by means of a variable frequency drive.

.3 The gear reducer is to have two-stage gearing, with the follow output shaft parallel to the input shaft, and a torque arm lug as an integral part of the gearbox housing.

.4 Provide the following features:

.1 Minimum gear efficiency.

.2 Stainless steel nameplates.

.3 High capacity, anti-friction bearings submerged in oil and splash lubricated.

.4 197.2:1 gear ratio.

.5 The drive motor is to be type DT with severe duty protection with the following features:

.1 3 phase, 60 Hz, 600 V.

.2 Totally enclosed fan-closed (TEFC) enclosure.

.3 Continuous duty.

.4 NEMA Design B.

.5 Electrical standards per NEMA publication MGI.

.6 Dimensional standards per IEC.

.7 Class F insulation.

.8 Copper wound stator.

.9 Stainless steel nameplate.

.10 1.15 service factor.