TESLA

DISK PUMPS™

Made in the USA

TESLA DISK PUMPS™

Moving Your Products to the Future!

At TDP® our pumps are designed for the most abrasive and corrosive particulates, slurries, and sludge. They gently handle the most fragile crystals, sensitive chemicals, and polymer emulsions.

TESLA DISK PUMPS™ are specifically engineered products designed to meet your challenging process requirements. Our pumps are built for toughness and durability against abrasive slurries, sludge, drilling scale, coatings, and filter press feeds. With a unique design, TESLA DISK PUMPS™ can move pipe-size solids without clogging or plugging unlike other pumps. TESLA DISK PUMPS™ use the latest improved designs of disk pump technology. They can also be retrofitted to replace impellers from open, semi-open, recessed, and air/gas entrained particles, high solids, and high viscosities.

MADE IN THE USA MADE IN THE

The three most important features of the Tesla Disk Rotor are:

- Low NPSH requirement
- Ability to handle viscous fluids greater than a centrifugal at higher efficiencies
- Resistance to wear from abrasive liquids

These characteristics are a result of the nature of viscous drag momentum transfer.

How It Works

The newly-designed TESLA DISK PUMPS™ have lower NPSHr and are among the lowest in the centrifugal pumps market. This efficiency is 4-6% better than other similar style pumps. Cutting-edge technology offers close-coupled pumps which save you money and reduce space allocation. Due to the low L3 D4 radial load to rotating disk within the pump housing, any standard C-faced motor from storeroom stock can be used. (No special proprietary motor is needed for back-up spares.)

The following describes boundary layer and viscous drag phenomena, which are two properties of fluids TESLA DISK PUMPS™ use to transfer energy from the motor to the fluid being pumped. Fluid is confined between twin rotating shrouds and rotates with the shrouds. Because the layer of fluid immediately adjacent to the shroud remains "fixed" relative to that shroud face, subsequent layers of fluid resist separation from the adjacent layer and the entire fluid mass begins to rotate. As the fluid gains energy, it moves outward on the TESLA DISK gaining additional energy and continuing on. The actual path of the fluid through the pump becomes a spiral path. TESLA DISK PUMPS™ display similar (but not identical) diameter, RPM, and pressure relationships to that of conventional impeller pumps. The reason for any departure is that fluid velocity is not fixed by the local disk velocity but is rather a function of disk spacing, fluid viscosity and density, radial velocity, and disk velocity. The flow in the rotating disk falls somewhere between forced vortex and free vortex circulation.

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Operational Benefits

Pulsation-Free Smooth Laminar Flow
Pulsation-free flow enhances gentle processing of fragile products and eliminates costly damage while greatly reducing wear to pump, related piping, and instrumentation.

Dry-Run Capability
The disk rotor pump design is capable of being operated indefinitely with zero process fluid.
NOTE: The mechanical seal must be flushed during dry-running.

Dead-Heading Discharge/Starving Suction
It is possible to deadhead the discharge and/or starve the suction for extended periods of time at normal operating speeds with no damage to the pump. (Not including sealing device unless it is properly protected and lubricated.)

Minimal Radial and Axial Loads
Exceptional low radial and axial loads generated by the disk rotor result in extended seal, bearing, and shaft life. This is attributed to laminar flow within the disk.

Low NPSH Requirement
The disk rotor's low NPSH ranges from approximately 1/3 to 1/2 that of conventional centrifugal pumps in the same service due to the smooth laminar flow generated by this design.

No Tight Internal Tolerances
This allows the disk rotor pump to pass large and irregular hard solids as well as a variable solids stream without plugging.

Exceptionally Versatile Design
Capability of handling a wide range of conditions without requiring internal modifications, even with large variations in process viscosity, temperature, solids type or concentration without process interruption.

Long Life for Pump Components
Few, if any, spare parts are required for the disk rotor pump over its life. The oversized shaft, along with minimal axial or radial loads, greatly extend and maximize bearing and seal life.

Low Maintenance/Spare Parts Requirements
Disk rotor pumps are subject to minimal wear even in the most abrasive services due to minimal fluid to pump service contact and laminar flow characteristics.

Maximum Run Time and Reliability
TESLA DISK PUMPS™ are simply the most reliable pumps on the market for hard-to-pump applications. The disk rotor has no close tolerances thus enhancing minimal fluid contacting action. This factor contributes to maximum run time by reducing excessive wear on the internal wet-end preventing unexpected failures.

Higher Production Yields and Improved Product Quality
When pumping delicate, shear sensitive, or otherwise sensitive products, the disk rotor increases productivity by reducing product losses due to the minimal contact pumping mechanism and laminar flow. Savings can be phenomenal with some pumps actually paying for themselves in a matter of weeks.

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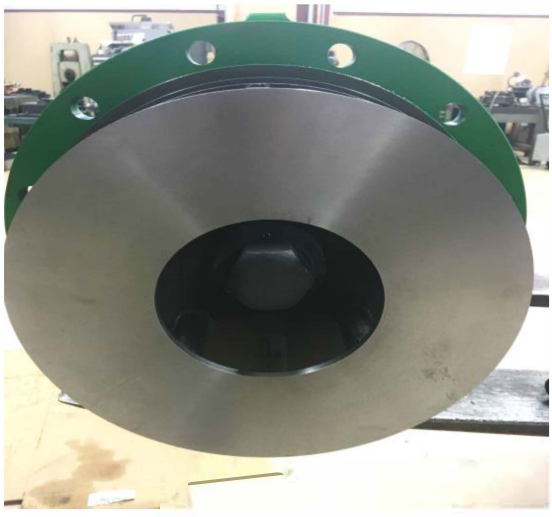

TESLA DISK PUMPS™

"The desire that guides me in all I do is the desire to harness the forces of nature to the service of mankind."

Nikola Tesla (1856 – 1943)

Nikola Tesla invented the disk pump and was issued a patent in 1913. Today, TDP (Tesla Disk Pumps), has perfected the disk pump over many years of testing and design changes.

A disk pump from the outside looks like a conventional centrifugal pump using a typical bearing frame mechanical seal etc. However, instead of an impeller it incorporates a Diskpak. The disk pump has no vanes or blades that cause pulsation or eddy currents in the pump case. This is important in many applications. Special provisions are considered per each application and system design based on where each disk pump is being installed.

Liquids, among other properties, have adhesion and viscosity. As a Diskpak rotates within a pump case, fluid is dragged by the rotating disk. Once in motion, liquid pushes liquid with as little as 1% total contact with the rotating Diskpak. The liquid layer adjacent to the Diskpak is stationary or fixed in respect to the Diskpak and the subsequent layers of fluid resist separation from the bordering layer. As the entire mass begins to rotate, it gains energy resulting in fluid moving outward on the Diskpak in a spiral path to the pump discharge.

Disk pumps are ideally suited for pumping abrasive liquids due to the lack of impingement and/or contact with disks in the Diskpak. As a result, they can outlast comparable centrifugal pumps as much as 10 times in the same service. Disk pumps are also well suited for pumping viscous liquids and are capable of replacing many PD (positive displacement) pump applications with one moving part simplicity. Tesla Disk Pumps handle pressures and capacities equal to conventional slurry pump designs and are capable of much higher capacities than standard PD pumps.

TESLA DISK PUMPS™

Installations

Model BFMLHD 6x4x14/WCB/600#RF
Application: Crude Oil
Materials of Construction: WCB
528 GPM at 280 Ft. TDH
Specific Gravity .953-.956
55 degrees C

SBM 10x8x20H75/125 Submersible
Application: Oil and Water Run Off
Materials of Construction: Ductile Iron
1250 GPM at 40 Ft. TDH
100-400 cPs Viscosity
68-77 degrees F

BFM 4x2x14L25/CD4Mcu/14
Application: TiO2 High Gloss Feed
Materials of Construction: CD4
130 GPM at 53 Ft. TDH
70% Solids 800 cP Viscosity
2.2 Specific Gravity
105 degrees F

BFM 6x4x14H50/A20/14
Application: Sulfuric Acid/ Methanacrlamide
Materials of Construction: Alloy 20
950 GPM at 110.0 Ft. TDH
10% Solids at 0-15% Air
60cP Viscosity 1.5 Specific Gravity
100 degrees C 4-12 pH

SPCC 3x2x10H31/A20/7.75
Application: Storm Water with Acid
Materials of Construction: Alloy 20
300 GPM at 183 Ft. TDH
10% Solids at 1.250% Air
1cP Viscocity & .92 Specific Gravity
212 degrees C 3-12pH

CCM 4x3x14/2SSD/DI/A532/13
Application: Recycled Plastics Explosives
Materials of Construction: Ductile Iron & Alloy 532
150 GPM at 14 ft. TDH
1.50 in Solids
1-300 cPs Viscocity 1.00 Specific Gravity
90 degrees F

VSPCCS 3x2x10H31/316/7 Vertical Sump Pump
Application: MDEA Water
Materials of Construction 316SS
44 GPM at 180 Ft. TDH
3.97-27.94cP Viscosity
1.013-1.041 Specific Gravity
41-257 degrees F

BFS 150x100x305H50/HC276/250m
Application: PU 415 Zeolite Feed
10.0m3/h at 22.0 m TDH
0.12 mm Solids 30% Viscosity 100 cPs
Specific Gravity 1.650
30 degrees C 11 pH

BFM 4x3x12H50/CD4Mcu/14
Application: Clay Slurry
Material of Construction: CD4
150 GPM at 80 Ft. TDH
Specific Gravity 1.65-1.75
Solids 68% Viscosity 1000cP

BFM 6x4x17H50/A532/15.03
Application: TiO2
Material of Construction: A532
600GPM at 89 Ft. TDH
0.01 in. Solids at 78%
Specific Gravity 2.34
800cP Viscosity
72 degrees F

Applications

Waste & Water Treatment -

Flash or Rapid Mixing; Flocculation; Carbon Make-Down; Lime Slurry or Slaked Pebble Lime; Polymer or Polyelectrolyte Day Tanks; Water Treatment Chemicals; Mg(OH)2; Phosphates; Filter Aids; Neutralization; Equalization; Scum Mixing; Sludge; Aeration; Anoxic Mixing; Anaerobic Digesters; etc.

Petroleum/Oil and Gas Recovery -

Drilling Mud; Crude Oil; Gasoline; Drill Cuttings; Subsea Cutting recovery; Cuttings for Separation (none shearing); Asphalt, etc.

Pharmaceuticals -

Pharmaceutical Processes; Media Prep; Extraction; Filter Aid; Salt Crystal Slurries; Pill Coatings; Protein; Water, Methanol and Hexane; Polyol; Ferric Nitrate Crystals; Toluene; Organic Solvents; Blood Plasma; etc.

Mineral Processing -

Alumina; Gold Leach; Copper SX Pump Mixers & Settlers; Silver, Platinum or Precious Metals Recovery; etc.

Food & Beverage -

Condiments; Soups; Tomato: Sauce (with chunks), Paste, Juice; Starch; Flavors & Fragrances; Dextrose; Maltose; Fructose; Crystallizers; Fruit Juices; Beverages; Refried Beans; Hydrogenation; Milk; Brewery; Infant Prep.; Cooked Corn, Egg Whites; Corn Syrup; Cola Syrup, Milk and Dairy Products, Molasses; Chicken and By-Products; Poultry Waste; Animal Fat, etc.

CPI & General -

Inks; Pigments; Dyes; Binders; Adhesives; Polish; Styrene; Polymers (numerous); Paints; Titanium Dioxide; Varnish; Gelatins; Emulsions; Cellulous; Flue Gas & Desulphurization; Tall Oil; Plaster; Foundry Prep; Acids; Cosmetics; Health & Beauty Products, Rubber Crum; Carbonators, Gypsum, Sulfonation, Potash; Iron Oxide; Zinc Oxide; Animal Fats; Vegetable Oils; Mud; Fertilizers; Latex; Cutting Fluids; etc.

Engineered & Designed to Meet Your Pumping Needs

TESLA DISK PUMPS™

Chemical/Petrochemical -

Acid slurries; Adhesive; Amide Slurry; Ammonium Bromide Crystals; Calcium Stearate; Carbon Black; Catalyst; Emulsion Latex, Filter Press Feed; Glycol; Methanol Resin; Solvent; Soda Ash; Carbon Slurry; Sulphuric Acid; Titanium Dioxide; Uranium Sludge; Zeolite Slurry; Lime Slurry, etc.

Onshore and Offshore Oil Production - Drilling Mud; Subsea Mud and De- Silter Pumping; Crude Oil; Multiphase Pumping, Sand Oil Slurry Pumping; Gas-Entrained Sludges; Oil Emulsions; Tank Bottom Transfer; etc.

Wastewater Treatment and Disposal - Activated Sludge; Anaerobic Sludge; DAF (Dissolved Air Flotation) Sludge; Digester Slurries; Lime Slurries to 80% Solids, Primary Scum; Sewage (Raw); Slurry with Stringy Material; Thickened Sludge, etc.

Pulp and Paper -

Black Liquor Soap; Green Liquor Dregs; Clarifier Sludge, Paper Stock to 18% Consistency; Pulp to 16% Consistency; Kaolin Clay, Filter Rejects; Talloil Soap; Air-Entrained Sludge; Black, Green, White Liquors; Titanium Dioxide TIO2, etc.

Other Major Applications -

Heat Transfer; Mixing Columns, High Viscosity; Dispersion; etc.

Blending; Solid Suspension; Slurry Mixtures; Gas-Liquid; Storage; Batch & Continuous.

Environmental Dredging & Cleanup, Steel and Metal Manufacture; Phosphate Mining; Mine De-Watering; Ceramic, Glass, Pump Stone Applications.

Nuclear and Coal-Fired Power Plant Utilities; Agriculture; Maritime Applications; Hospitals; Filter Press Feed, Filter Cake.

Pump Configurations

API 610 Process Pumps	Designed to meet the 610 standard set by the American Petroleum Institute (API). API 610 standard for pumps for refineries, pipelines, and other hydrocarbon processing applications. The TDP design includes end suction, horizontal, double case, multi stage, vertical cantilever and vertical sump pumps.
Chemical Slurry & Emulsion Pumps	Designed for abrasive and corrosive industrial materials and shear sensitive Latex Emulsions and Teflon Dispersions. The TDP design includes close coupled and long coupled designs.
Dry Pit Pumps	Sewage and waste water pumps. The TDP design includes vertical pedistal mounted designs, run in air submersibles, and special run submerged motos suitable for system upset.
Hydraulic Drive Pumps	The TDP design allows for submerged or surface operation. Manufactured from A532 Hard Iron or many other alloys.
Mud Pumps	Built to transfer heavy sludge or mud. Some larger versions are used for pressure. They are sometimes used on oil rigs to pressurize and circulate fluid. The TDP design includes close coupled and long coupled designs.
Multi-stage High Pressure Slurry Pumps	Designed to transport pipeline slurries or viscous liquids, mine dewatering, crude oil, coal slurry mixture etc. This difuser styled pump is generally manufactured from A352 hard iron suitable for thick, abrasive or high solids slurries. And is capable of sub sea service.
Progressive Cavity Replacement	Replacement Disk pumps suitable for replacing PC pumps with no or minor pipe changes.
Sanitary Pumps 3-A	Pump used to transport fluids that must be processed for sanitary standards. They are designed to meet regulatory requirements. The TDP design includes close coupled and long coupled designs.
Self Priming	With external primer suitable for trailer or skid mounting or with stationary priming chamber. The TDP design includes end suction, close coupled and long coupled designs.
Sewage & Sludge Pumps	Pumps that are most often used to pump sewage to a waste treatment facility. The TDP design includes close coupled, long coupled, submersible and vertical designs.
Slurry Pumps	Manufactured from A352 hard iron suitable for thick, abrasive or high solids slurries. The TDP design includes end suction, horizontal multi-stage, vertical cantilever and vertical sump pumps.
Submersible Pumps	Designed to operate with both pump and motor submerged in the fluid being pumped. TDP includes designs suitable for explosion proof and sub sea service with pressure balanced motor designs.
Vertical Cantilever Pumps	A Slurry, Pump manufactured to demanding standards with no bearings below the mounting plate and can run dry indefinitely with no damage. Total Pump Length (TPL) up to 10 ft.
Vertical Sump and Process Pump	Applications include industrial process, sump drainage, corrosive liquids, pollution control, molten salts. Total Pump Length (TPL) up to 30 ft.
Viscous Liquid Pumps	Designed to accommodate continuous duty with viscous liquids. The TDP design includes end suction, horizontal multi stage, vertical cantilever and vertical sump pumps.
Waste Water Pumps	Pumps used to move wastewater toward or within a waste treatment facility. The TDP design includes end suction, horizontal multi stage, vertical cantilever and vertical sump pumps.

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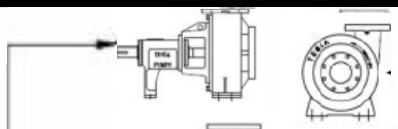
4 Bearing Frames
S – M – ML – L
Speed range from 0-4500 RPM
HP – Fractional to 1500
Bearing Frames crossover
To most sizes

Engineered Pumps
Working Pressure to 3750+ PSI



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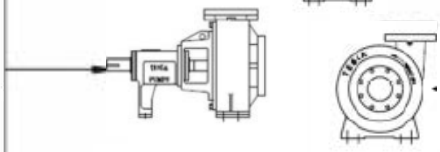
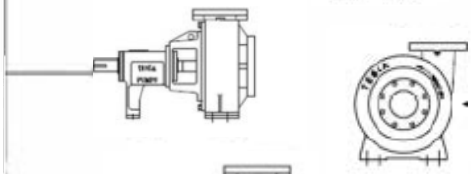


3x1x10
3x2x10



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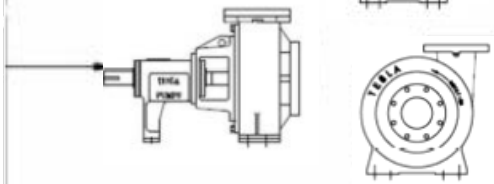
4x2x12
4x3x12
6x4x12



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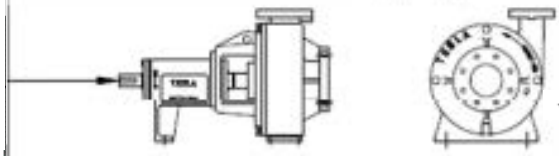
8x6x14
10x8x14



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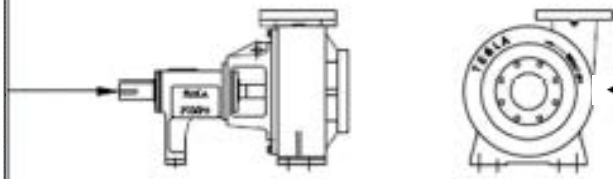
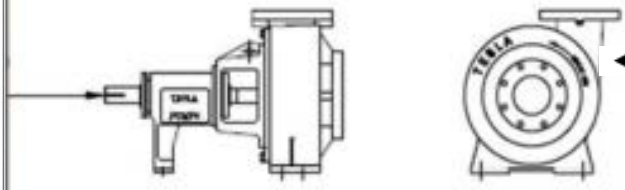
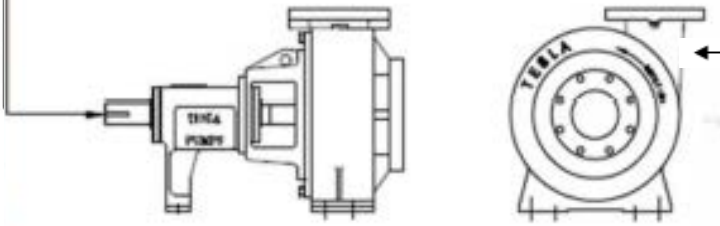
6x4x17
8x6x17
10x8x17
12x10x17



6x4x20
8x4x20
8x6x20
10x8x20
12x10x20



6x6x25
8x6x25
8x8x25
10x10x25
12x12x25
14x14x25



8x6x30
10x8x30
12x10x30
12x12x30
14x14x30
16x16x30
18x18x30
20x20x30

TESLA DISK PUMPS™

Installations

CCS 2x1.5x8H31/CD4/6.06
Application: Carbon Slurry 2497 JA
Material of Construction: CD4
90 GPM at 140.0 Ft. TDH
0.0 in. Solids at 30%
10cP Viscosity 1.250 Specific Gravity
72 degrees C 6.0 pH

BFMHD 6x4x14H50/CD4
Application: Oil & Water
Material of Construction: CD4
581-600 GPM 145 Ft. TDH
5-30 degrees C

CCS 4x2x12H50/CD4/9.65
Application: Klearfac
Material of Construction: CD4
150 GPM at 111 Ft. TDH
600-1500cP Viscosity 1.15 Specific Gravity
95-160 degrees F

BFMM 150x100x356H50/A532
Application: Sludge
Material of Construction: ASTM A532
150 GPM at 22 Ft. TDH
<.25mm. Solids at 80%
80000cP Viscosity 2.3 Specific Gravity
80 degrees C

CCS 2x1.5x82SSD/Alum/316
Application: Salmon Eggs
Material of Construction: Aluminum
25 GPM at 8 Ft. TDH
1cP Viscosity 1 Specific Gravity
75 degrees F

BFM 4x2x14/A532/13.6
Application: Salt Water Slurry
Material of Construction: ASTM A532
166 GPM at 92 Ft. TDH
500 Micron Solids at 15.40%
2.5 cP Viscosity 1.18 Specific Gravity
240 degrees F

BFM 4x2x14/340/14
Application: CaCl Slurry
Material of Construction: ASTM A532
250 GPM at 70 Ft. TDH
100-500 Micron Solids at 14%
10cP Viscosity 1.4 Specific Gravity
160 degrees F

CCS 2x1.5x8H31/316/5.2
Application: Polyarylate
Materials of Construction: 316SS
60 GPM at 24 TDH
0.0123 Micron Solid Size
1000cP Viscosity 1.3 Specific Gravity
72 degrees F

CCM 4x3x14/2SSD/WCB/A532/13
Application: Recycled Plastics Material
of Construction: WCB-ASTM A532
150 GPM at 14 Ft. TDH
1.5 in. Solids
1-300cP Viscosity 1 Specific Gravity
90 degrees F

CCS 2x1.5x8/CD4
Application: Brine Water
Material of Construction: CD4
50 GPM at 201 Ft. TDH
0.001-.375" Solid Size at 10%
60cP Viscosity 1.15 Specific Gravity
100 degrees F

BCCS 2x1.5x8 H31/CD4
Application: Sulfuric Acid 98% Water 5%
Materials of Construction: CD4
30-40 GPM at 65 Ft. TDH
10cP Viscosity 1.05 Specific Gravity 150 degrees F

VPCCS 2x1.5x8H31/A20/8."
Application: Benozacor
Material of Construction Alloy 20 40 GPM at 60 Ft. TDH
500cP Viscosity 1.5 Specific Gravity 115 degrees C

VSS 4X3X14H50/CD4
Application: Cake Slurry
120 GPM at 250 Ft. TDH
Material of Construction: CD4
Solids size 0.5-5mm. at 12-18%
1800cPs Viscosity 1.08 Specific Gravity
310 degrees F

BFS 2x1.5x8/316SS
Application: Crude Oil
150 GPM at 155 Ft. TDH
Solids size 0.10 in. at 5%
500cSt Viscosity 0.935 Specific Gravity
65 degrees C

BFM 6x4x14-2GHHD/CD4/11.8
Application: Water Based Acrylic Polymer
Material of Construction: CD4
600 GPM at 100 Ft. TDH
Solid Size 20-25 Micron at 1-3%
2.5cP Viscosity at 1.18 Specific Gravity
240 degrees F

BFM 6x4x17H50/CD4/16.65
Application: TiO2 Filter Feed
Material of Construction: CD4
50-375 GPM at 40 Ft. TDH
Solid Size 0.0123 in. at 75%
400-2500cPs Viscosity at 1.72 Specific Gravity
115 degrees F

Packed

Mechanical Seal

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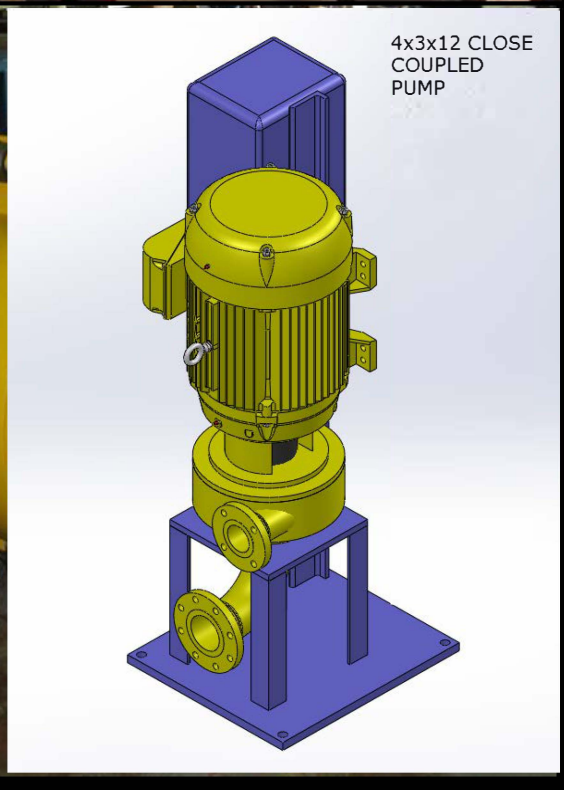

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