PRORIL

CORROSION-RESISTANT PUMP FOR DEMANDING ENVIRONMENTS

DUPLEX STAINLESS STEEL PUMPS

X1A-TANK Series

What is Duplex Stainless Steel?

Duplex stainless steel is a high-performance alloy that combines the microstructures of austenite and ferrite. Its alloying elements include chromium (24–27%), nickel (4–7%), and molybdenum (<4%) .

This “duplex” structure combines the rust resistance and ductility of austenite, with the high strength and corrosion fatigue resistance of ferrite. Compared with conventional SUS 304/316, duplex can withstand higher pressure, stronger corrosion, and provide a longer service life. Duplex materials are widely used in the most demanding environments, such as seawater treatment, chemical processes, slurry handling, and high-salinity conditions. They are the preferred choice for modern high-corrosion-resistant pumps, valve bodies, and pressure vessels.

Key advantages include:

Extremely high mechanical strength
Duplex has a yield strength is about twice that of SUS 304/316, allowing it to withstand high pressure and large flow loads.

Excellent resistance to corrosion fatigue
The ferritic structure effectively suppresses stress corrosion cracking (SCC), making it ideal for high-chloride or high-stress environments.

Superior pitting and crevice corrosion resistance
High chromium and molybdenum content provide excellent resistance against pitting corrosion and crevice corrosion, significantly outperforming SUS 304/316.

Low thermal expansion and high thermal conductivity
Reduces thermal stress and deformation caused by temperature changes, improving long-term stability.

Best acid resistance
Among stainless steels (ferritic, martensitic, austenitic, and duplex), duplex offers the best acid resistance, withstanding pH ranges of 0-14.

Cost-effectiveness
Extended service life and reduced maintenance, lower total ownership costs.

Application Environments

Duplex stainless-steel pumps are ideal for harsh environments with high corrosion, high salinity, and solid-laden fluids:

Seawater or high-chloride environment

- Desalination plants, seawater circulation cooling systems, harbor pumping stations
- Provides stronger resistance than SUS 304 / 316 against chloride-induced pitting and stress corrosion

Wastewater and sludge treatment

- Chemical wastewater, municipal sewage, and other solid-laden media containing acids, alkalis
- High strength and corrosion resistance help minimize wear and damage to the pump

Abrasive environment

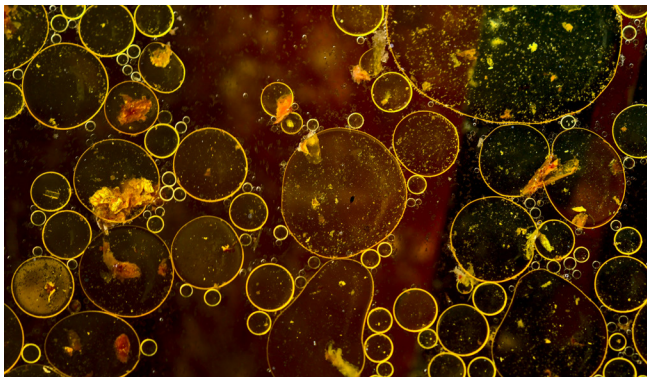
- Mining, pulp and paper, slurry handling, and other processes with abrasive particles
- Superior hardness withstands high-pressure slurries and long-term abrasion, reducing impeller and shaft sleeve wear

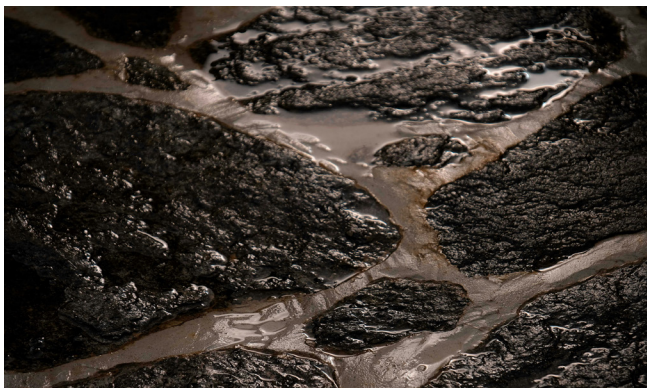
Extreme pressure fluctuations

- High-pressure cleaning, chemical reaction discharge, systems with transient pressure surges

Material Selection

Material	UNS	ASTM / ASME	EN / DIN	Common Name	Main Components
CD4MCu	NS J93370	ASTM A890 Gr.1A/ASTM A743 CD4MCu	EN 1.4517	Duplex 25Cr-5Ni-2Mo-1.5Cu	Pump casing, volute, impeller and other components
S32205	UNS S32205	ASTM A240/A182/A276 2205	EN 1.4462	2205 Duplex	Pump shaft, pump housing, and other components
SUS316	UNS S31600	ASTM A240/A276 316	EN 1.4401/1.4404	AISI 316/316L	Screws, fasteners, and general corrosion-resistant components





Frequently Asked Questions (FAQ)

What are the benefits of using Duplex stainless steel in pumps?

Duplex stainless steels (such as S32205 and CD4MCu) feature a high proportion of ferrite, providing excellent corrosion resistance, high strength, and stability under pressure and temperature fluctuations. Pumps made with Duplex maintain integrity in highly corrosive, high-salinity, solid-laden fluids, extending service life, reducing maintenance, and outperforming SUS 304/316 in long-term reliability.

Why choose Duplex stainless steel instead of relying solely on sacrificial anodes?

Sacrificial anodes (zinc, aluminum, magnesium) protect pumps by corroding first. They are low-cost and simple to install, but require regular inspection and replacement. Without regular check, corrosion can still occur.
Duplex stainless steel (S32205, CD4MCu) offers built-in corrosion resistance and high strength, maintaining stability in high-chloride, high-pressure, and high-flow conditions without external anodes.

How do we choose the right material?

We understand that every site has its own conditions and requirements, so we offer different solutions:

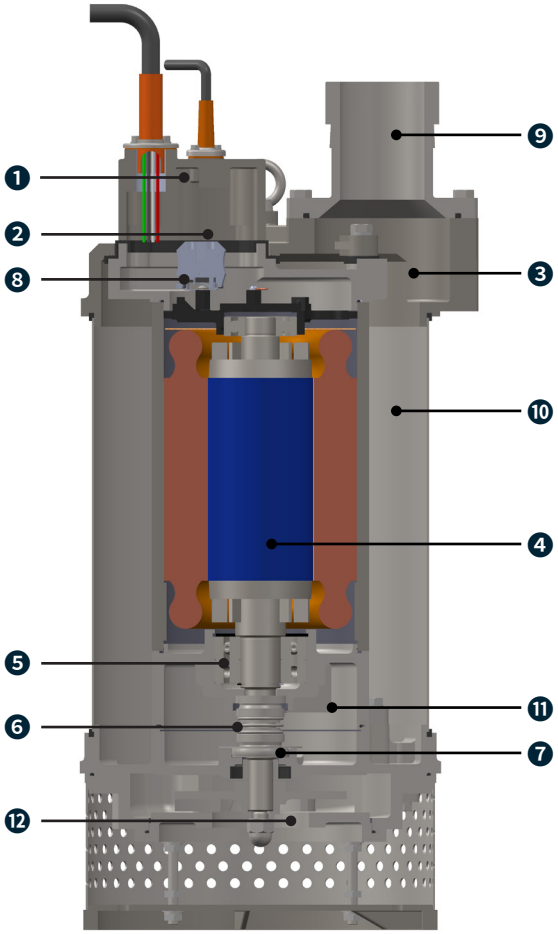
Material Strategy	Suitable Environment
Conventional material + sacrificial anodes	Static or low-flow seawater, cost-sensitive projects, regular maintenance
Duplex stainless steel	Highly corrosive, high-flow, long-service-life applications, difficult-to-maintain sites

This flexibility allows customers to choose the most suitable configuration based on environment, budget, and maintenance strategy.

Why use FKM (Viton®) seals in Duplex pumps?

FKM seals provide outstanding chemical resistance, high-temperature stability, and long-lasting sealing force. They withstand acids, alkalis, oils, and cleaning agents without deterioration, operate continuously up to 200 °C (peaks to 250 °C), and resist compression set over time. This reduces maintenance cycles and minimizes downtime risk, ensuring reliable pump operation in harsh environments.

X1A-TANK



KEY BENEFITS

Hydraulic Interchangeable Modular Design — One Pump, Many Possibilities

Why keep multiple pumps when one can do it all? With PRORIL's modular hydraulic system, performance can be tailored by simply changing impellers, volutes, or discharge parts. Combined with dual-voltage options, this flexibility maximizes applications, reduces downtime, minimizes spare parts inventory, and lowers the total cost of ownership—giving you the confidence to meet every challenge with a single pump platform.

Robust Protection System — Motor & Sealing

- H-class motor insulation with integrated Full Load Amperage (FLA) and thermal overload protection; optional thermal and moisture sensors available.
- Dual silicon carbide (SiC) mechanical seals in an independent oil-filled chamber, paired with FKM elastomers, ensure reliable sealing under high pressure, high temperature, and chemically aggressive conditions.
- Heavy-duty oil seals and reinforced shaft sleeves effectively prevent solid particles from entering the seal chamber, minimizing wear and contamination.
- FKM (Viton®) high-performance elastomers provide outstanding resistance to chemicals, high temperatures, and aging, ensuring long-lasting sealing performance in demanding environments.

Top Discharge Design — Compact and Reliable With built-in liquid cooling, pumps run safely even at low water levels

Slim profile (≤450 mm) fits tight spaces, while rugged construction ensures easy transport and handling

❶ Watertight Cable Entry
The cable entry employs an anti-wicking block where each conductor is stripped and encapsulated in epoxy. This feature effectively prevents water from penetrating the motor chamber when the cable end is submerged or the cable sheath is damaged.

❷ Motor Protector
The motor incorporates a circle thermal protector which protects against overheating and dry-run.

❸ Stronger with Duplex
Engineered for demanding environments and long service life.

❹ Submersible Motor
Air filled motor, housed in a watertight casing, conforms to Class H insulation.

❺ C3 Ball Bearings & SS Shaft
High quality of C3 ball bearings and the well-balanced, hardened stainless steel shaft enhance stability during continuous pumping operations.

❻ Double Mechanical Seals (SiC*2)
Located in the oil chamber, the device is made of quality materials with highly wear-resistant silicon carbide that provides extra protection against leakage and dry-run.

❼ Extra Protection
Lip seals and shaft sleeves are utilized for additional protection against wear.

❽ Dedicated Wiring Chamber with Dual-Voltage Option
A dedicated wiring chamber offers space for a dual-voltage switch, moisture sensor, and thermal sensors—providing enhanced safety and operational flexibility. Models up to 20HP support 220/440V wiring, allowing seamless adaptation to different applications.

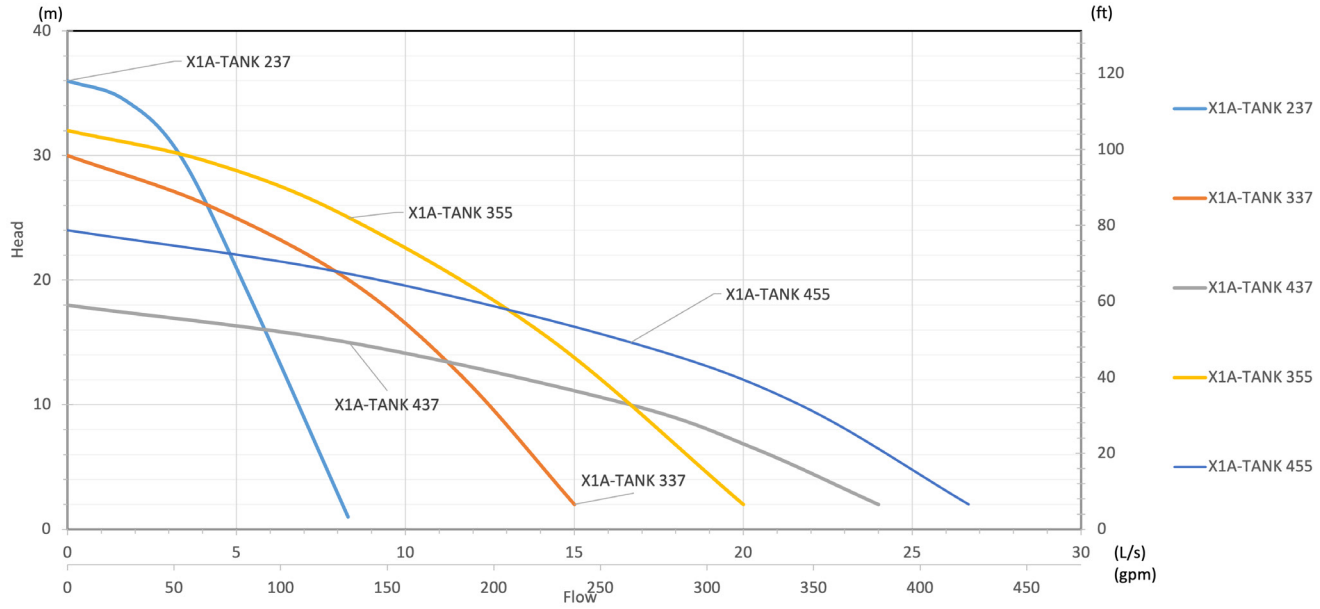
❾ Thread or Hose Discharge
Supports threaded connections and hose fittings for flexible installation.

❿ Top Discharge and Double Housing Design
Designed to construct a water jacket that provides maximum motor cooling effect for continuous operation at low water level, this feature forms the cylindrical and slim shape of the pump and enables the pump to be installed in confined spaces.

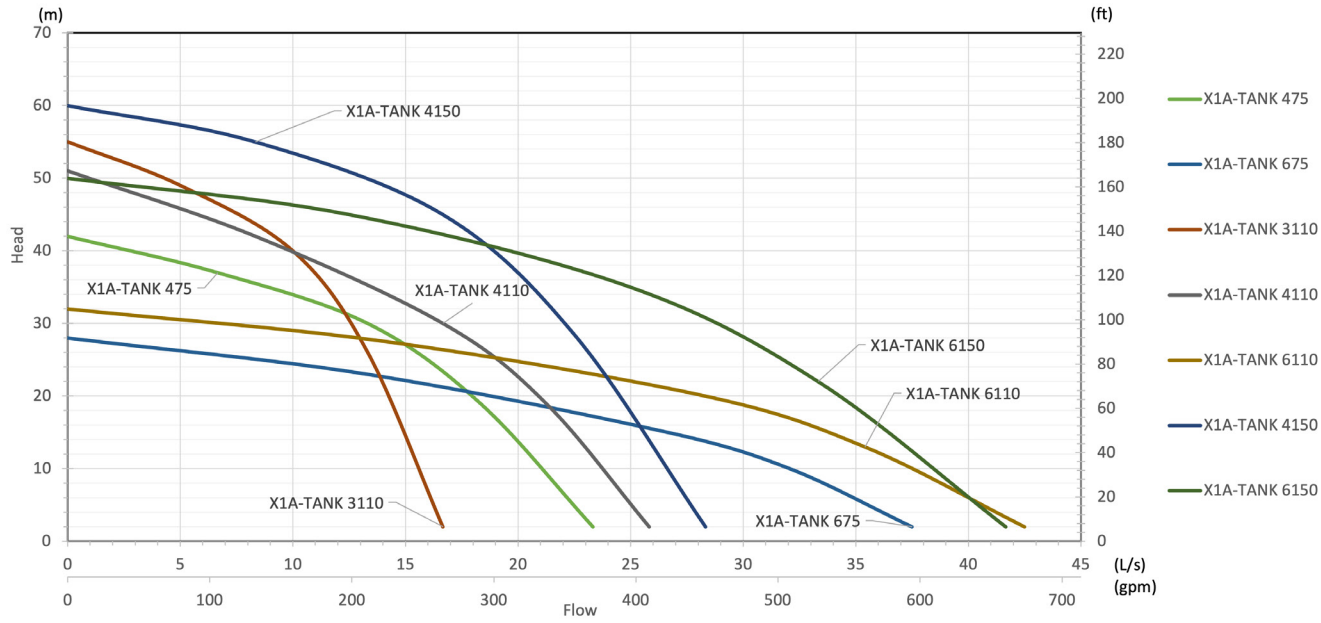
⓫ Eco Lubricant—Seal Cooling
Biodegradable and non-toxic lubricant for mechanical seal cooling, providing reliable protection with minimal environmental impact.

⓬ Hydraulic Modular Design
Pump performance can be adjusted by simply changing the impeller, volute, or discharge parts—reducing spare parts and making it easier to meet different job requirements.

Performance Curve X1A-TANK

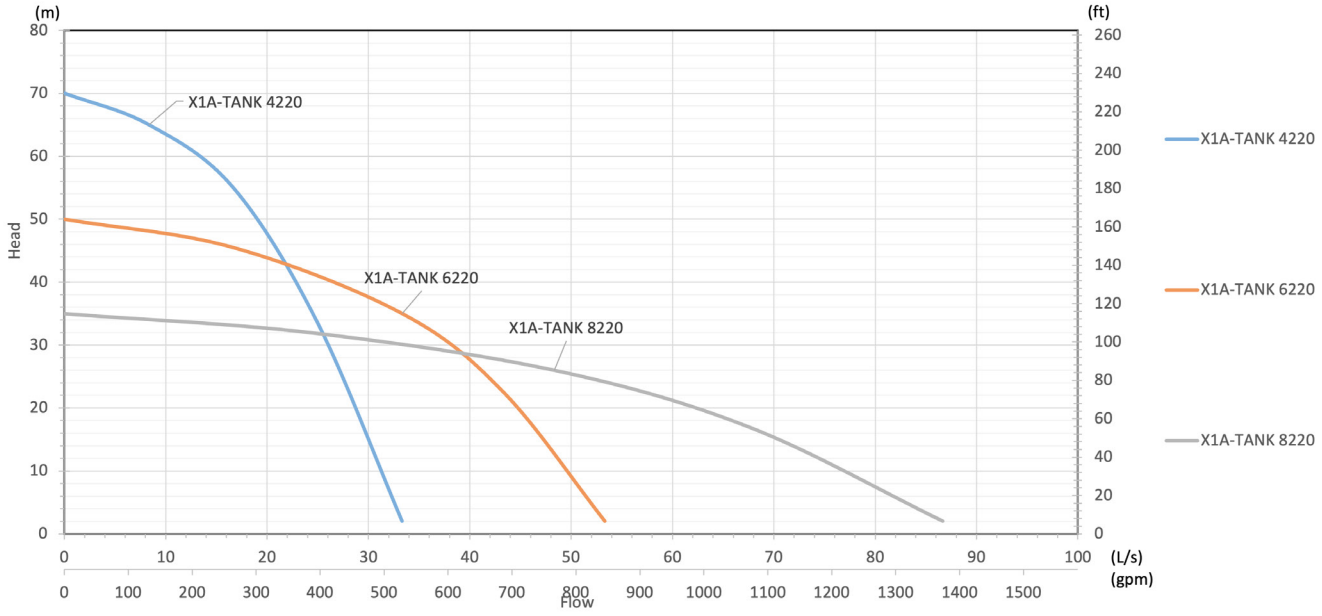


MODEL	OUTLET	POWER	MAX HEAD	MAX FLOW	SOLID PASSAGE	WEIGHT
X1A-TANK 237	2" (50 mm)	5 HP (3.7 kW)	118 ft, 36 m	132 gpm, 8.3 L/s	0.4" (10 mm)	134 lbs (61 kg)
X1A-TANK 337	3" (80 mm)	5 HP (3.7 kW)	98 ft, 30 m	238 gpm, 15 L/s	0.4" (9 mm)	132 lbs (60 kg)
X1A-TANK 437	4" (100 mm)	5 HP (3.7 kW)	59 ft, 18 m	380 gpm, 24 L/s	0.4" (9 mm)	132 lbs (60 kg)
X1A-TANK 355	3" (80 mm)	7.5 HP (5.5 kW)	105 ft, 32 m	317 gpm, 20 L/s	0.4" (10 mm)	132 lbs (60 kg)
X1A-TANK 455	4" (100 mm)	7.5 HP (5.5 kW)	79 ft, 24 m	423 gpm, 26.7 L/s	0.4" (10 mm)	132 lbs (60 kg)

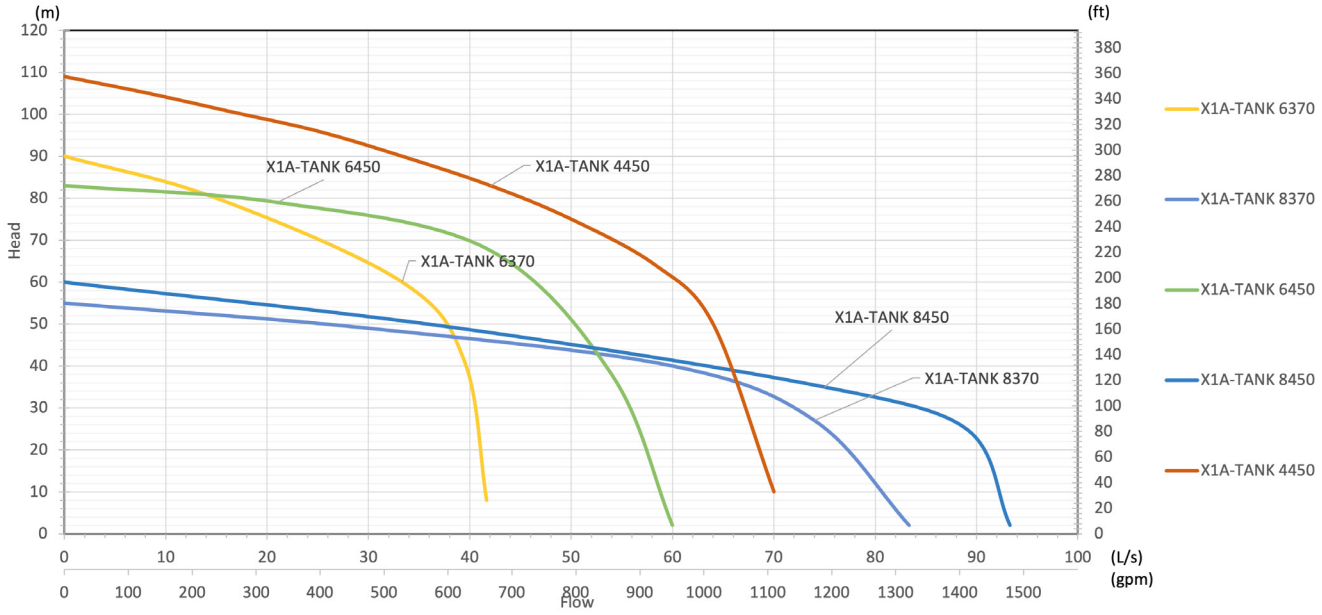


MODEL	OUTLET	POWER	MAX HEAD	MAX FLOW	SOLID PASSAGE	WEIGHT
X1A-TANK 475	4" (100 mm)	10 HP (7.5 kW)	138 ft, 42 m	370 gpm, 23.3 L/s	0.6" (15 mm)	311 lbs (141 kg)
X1A-TANK 675	6" (150 mm)	10 HP (7.5 kW)	92 ft, 28 m	594 gpm, 37.5 L/s	0.6" (15 mm)	311 lbs (141 kg)
X1A-TANK 3110	3" (80 mm)	15 HP (11 kW)	180 ft, 55 m	264 gpm, 16.7 L/s	0.4" (10 mm)	311 lbs (141 kg)
X1A-TANK 4110	4" (100 mm)	15 HP (11 kW)	167 ft, 51m	409 gpm, 25.8 L/s	0.4" (10 mm)	311 lbs (141 kg)
X1A-TANK 6110	6" (150 mm)	15 HP (11 kW)	105 ft, 32 m	674 gpm, 42.5 L/s	0.6" (15 mm)	311 lbs (141 kg)
X1A-TANK 4150	4" (100 mm)	20 HP (15 kW)	197 ft, 60 m	449 gpm, 28.3 L/s	0.6" (15 mm)	311 lbs (141 kg)
X1A-TANK 6150	6" (150 mm)	20 HP (15 kW)	164 ft, 50 m	660 gpm, 41.7 L/s	0.6" (15 mm)	313 lbs (142 kg)

Performance Curve X1A-TANK



MODEL	OUTLET	POWER	MAX HEAD	MAX FLOW	SOLID PASSAGE	WEIGHT
X1A-TANK 4220	4" (100 mm)	30 HP (22 kW)	230 ft, 70 m	528 gpm, 33.3 L/s	0.6" (15 mm)	564 lbs (256 kg)
X1A-TANK 6220	6" (150 mm)	30 HP (22 kW)	164 ft, 50 m	845 gpm, 53.3 L/s	0.8" (20 mm)	571 lbs (259 kg)
X1A-TANK 8220	8" (200 mm)	30 HP (22 kW)	115 ft, 35 m	1374 gpm, 86.7 L/s	0.8" (20 mm)	581 lbs (264 kg)



MODEL	OUTLET	POWER	MAX HEAD	MAX FLOW	SOLID PASSAGE	WEIGHT
X1A-TANK 6370	6" (150 mm)	50 HP (37 kW)	295 ft, 90 m	660 gpm, 41.7 L/s	0.4" (10 mm)	1124 lbs (510 kg)
X1A-TANK 8370	8" (200 mm)	50 HP (37 kW)	180 ft, 55 m	1321 gpm, 83.3 L/s	0.8" (20 mm)	1124 lbs (510 kg)
X1A-TANK 4450	4" (100 mm)	60 HP (45 kW)	358 ft, 109 m	1110 gpm, 70 L/s	0.4" (10 mm)	1201 lbs (545 kg)
X1A-TANK 6450	6" (150 mm)	60 HP (45 kW)	272 ft, 83 m	951 gpm, 60 L/s	0.4" (10 mm)	1168 lbs (530 kg)
X1A-TANK 8450	8" (200 mm)	60 HP (45 kW)	197 ft, 60 m	1479 gpm, 93.3 L/s	0.8" (20 mm)	1168 lbs (530 kg)

* This catalog lists only the dewatering series of Duplex stainless steel products.
For other applications or requirements, please feel free to contact us.