

COMPREHENSIVE GENERAL CATALOG OF INDUSTRIAL PROCESS SYSTEMS AND PUMP TECHNOLOGIES

1. PURPOSE AND SCOPE

This expanded technical specification covers all production, transfer, and storage processes in the food, dairy, fruit juice concentrate, beverage, olive oil, chocolate, biotechnology, cosmetics, pharmaceutical, chemical, and petrochemical industries. It details all design, manufacturing, material, equipment, automation, testing, and certification criteria of high engineering standard stainless steel equipment to be used in fluid transfer, precise dosing, sterile fermentation, homogenization, chemical reaction, storage, resting, and in-line fully automatic (CIP/SIP) cleaning processes in facilities. All products are under the guarantee of leak-tightness, zero contamination, corrosion resistance, and compliance with international norms (FDA, cGMP, EHEDG, API 650, ASME, PED).

2. HYGIENIC AND INDUSTRIAL PUMP TECHNOLOGIES

- **2.1. Hygienic Progressive Cavity Pumps:** Provides axial transport through continuously advancing cavities created by a single-helical stainless rotor rotating within a double-helical stationary stator. It provides a continuous, pulsation-free (non-surfing or non-pulsing), and linear flow, adapting to precise dosing processes. It transfers easily degradable products such as yogurt, cream, chocolate, and olive paste without emulsifying or altering their viscosity with low shear stress (shear sensitivity). Shows excellent self-priming and volumetric efficiency despite high counter pressures in the discharge line.
- **2.2. Hygienic Positive Displacement Pumps (Lobe and Helical Gear):** Produces high torque at low speeds to transfer high viscosity fluids (mayonnaise, chocolate, etc.) without deteriorating, cutting, or foaming their structure. The rotor and lobe geometry allows soft solid particles of a certain size, such as fruit grains, meat pieces, and olives in the liquid, to pass without being crushed or deformed. Provides a stable flow rate proportional to the rotational speed without being affected by counter pressures.
- **2.3. Hygienic Centrifugal Pumps:** Designed for low and medium viscosity liquids. It has a smooth open impeller geometry that prevents food particles from accumulating behind the impeller and producing bacteria. Optimized to provide minimum NPSH requirements. Risks of corrosion, noise, cavitation, and vibration are at the lowest level; the volute casing minimizes friction losses.
- **2.4. Hygienic Self-Priming Pumps (Liquid Ring):** Even if there is no liquid in the suction line, it generates negative pressure (vacuum) thanks to the liquid ring inside the casing, drawing seamlessly from deep levels. Overcomes the air-lock and cavitation problems experienced by centrifugal pumps when there is an air pocket in the pipelines; can continuously transfer aerated/

foamy liquids. Prevents the formation of blind spots by suctioning CIP cleaning liquids at tank bottoms.

- **2.5. Air-Operated Diaphragm Pumps (AODD):** Operates entirely with the factory compressed air line, does not contain an electric motor. It is self-priming and capable of dry-running. Precise flow adjustment can be made via the regulator. It stops automatically in case of a closed valve and restarts when the line is opened (Stall-Defense). Operates with low mechanical stress, allowing solid/fibrous particles to pass over the valve ball without damage.
- **2.6. Hygienic Drum Emptying Pumps:** A vertical immersion tube discharge system that leaves no residue at the bottom for 200 L standard drums and 1000 L IBC tanks. Mechanism option: An impeller inner shaft is used for low viscosities; a helical eccentric rotor (progressive cavity) pumping mechanism is used for dense viscosities such as tomato paste and glucose. It has a compact, lightweight design and can be balanced with a suspension hook.

3. STORAGE, PROCESS TANKS AND REACTORS

- **3.1. Stainless Steel Dairy and Food Tanks:** Features an internal design that leaves no dead volume (blind spot) for milk, fruit juice, and their derivatives (Ultra Hygiene - FDA/GMP). With high-density (40-42 kg/m³) CFC-Free polyurethane insulation (50-100 mm), it is guaranteed that the product temperature will increase by a maximum of 1°C in 24 hours even if the ambient temperature is 30°C. Optionally, a Rollbond or half-pipe type jacket and a low-speed Teflon scraper agitator can be integrated.
- **3.2. Stainless Steel Olive Oil Storage Tanks:** Oxygen is completely evacuated with the Nitrogen Blanketing system to cut off the contact of olive oil with air and light (Zero Oxidation Guarantee). A fully sealed argon-welded casing provides light insulation. A 15°, 30°, or 45° angled conical bottom design is applied for natural sediment (pomace) to settle and discharge.
- **3.3. Stainless Steel Industrial Storage Tanks (Heavy-Duty):** Complies with API 650, EN 14015, and ASME Section VIII Div. 1 standards. Sized by 3D finite element analysis (FEA) according to seismic loads, wind resistance, specific gravity of the fluid, and operating pressure. Vertical and horizontal body joints are combined with capacity-specific TIG and Plasma Robotic Welding technology to increase penetration. Conical, dished (torispherical), or flat inclined special bottom/roof designs are applied.
- **3.4. Fermentation Tanks and Bioreactors:** Aseptic design; contains no blind holes that threaten microbiological growth. Product outlets are equipped with aseptic diaphragm valves, and the shaft inlet is equipped with a double-acting mechanical seal with a sterile barrier. Temperature control with an accuracy of ±0.1°C is provided with a Rollbond or Half-Pipe jacket. A sterilizable micro-porous ring sparger is added to the bottom for cell oxygen, and 0.22 µm sterile filters are added to the gas supply line.
- **3.5. Stainless Steel Chemical Reactors:** Manufactured in compliance with PED 2014/68/EU, EN 13445, or ASME for polymerization and distillation processes requiring high pressure and vacuum. Resistant to full vacuum and exothermic/endothermic loads. Safety: Features a pressure-sensitive Rupture Disc integrated into the top dish and a safety valve. Leakage is prevented by a double-acting mechanical seal with a barrier fluid system.
- **3.6. Chemical and Acid Storage Tanks:** Secured with Flame Arresters and rupture discs for acid, solvent, and petrochemical products. All electrical components, including sensors, are ATEX Ex-Proof certified. Gaskets are made of PTFE or Viton material resistant to chemical melting.
- **3.7. Agitator Tanks and Stainless Jacketed Tanks:** Equipped with Rollbond (Dimple), Half-Pipe, or Conventional Jacket systems; resistant to hot water, steam, hot oil, or glycol pressures. Insulated with high-density polyurethane or rock wool. Features anti-vortex baffle plates. Propeller/turbine blades are used for low viscosities, and anchor with Teflon scrapers or gate type blades are used for high viscosities.

4. INTEGRATED PROCESS, CLEANING AND MOBILE SOLUTIONS

- **4.1. Fully Automatic CIP (Clean-In-Place) Systems:** Central Washing: An integrated multi-tank skid unit that provides circulation of water, acid (HNO_3), caustic (NaOH), and disinfectant without dismantling the lines. Washing cycles, temperature, and concentration are prescribed via PLC. Chemical depletion is automatically detected and dosed with conductivity sensors. Final rinse water is recovered. A minimum of 1.5 m/s turbulent flow rate is provided. Pipe joints are automatically orbital welded.
- **4.2. Industrial Homogenizers:** Creates stable emulsions by reducing liquid-liquid or liquid-solid mixtures to sizes of 1 to 5 microns with high mechanical shear power using Rotor-Stator Technology. Performs homogenization in a single pass with high-flow transfer for inline lines without requiring a bypass. Operates vibration-free thanks to the dynamic balancing test.
- **4.3. Stainless Steel Mobile Process Units (Skid):** Modular compact units (Plug-and-Play) containing the tank, pump, agitator, piping, and panel. Features 360° rotatable, braked, polyurethane-coated non-marking wheels. An internal CIP spray ball, pump options suitable for viscosity (lobe, diaphragm, centrifugal), and a control panel supported by an inverter and emergency stop are integrated.

5. MATERIAL SCIENCE, HYGIENE AND SURFACE QUALITY

- **Stainless Steel Alloys:** Suction/discharge casings, connections, rotational components, inner tank bodies, and CIP lines are manufactured from high corrosion-resistant minimum AISI 316L stainless steel. Outer jackets and chassis protections are minimum AISI 304 or 316L quality.
- **Aggressive Process Alloys:** AISI 316Ti, Hastelloy, or Duplex Stainless Steel (EN 1.4462) is selected for highly corrosive storage/reaction processes such as industrial chemicals, solvents, salt water, and sulfuric acid.
- **Surface Roughness Precision (Ra Values):** Delivered at $Ra < 0.8 \mu\text{m}$ for Pumps, $Ra < 0.6 \mu\text{m}$ for Tanks and CIP Systems, and $Ra < 0.4 \mu\text{m}$ for Bioreactors and Homogenizers.
- **Elastomers and Sealing:** O-rings, gaskets, lobe covers, and diaphragms inside the pump are selected from FDA-approved EPDM, NBR, FKM (Viton), Silicone, or PTFE (Teflon) materials resistant to aggressive CIP chemicals, acids, and high heat.

6. SHAFT SEALING (MECHANICAL SEAL TECHNOLOGY)

- **Single Seal:** A front-mounted hygienic single mechanical seal that does not allow product accumulation is used.
- **Double Seal:** A double mechanical seal with a wash (quench/flush) line is preferred for sticky, crystallized, or sugary products.
- **Special Seals with Barriers:** Absolute sealing is established with a double-acting mechanical seal with a sterile barrier in bioreactors and a thermosiphon liquid system in chemical reactors.
- **Face Materials:** Made of Carbon, Silicon Carbide (SiC/SiC), or Tungsten Carbide components against friction and pressure. Mechanical seal or sealless inner guide bearing options are offered in drum pumps.

7. MOTOR, DRIVE AND SAFETY (ATEX) EQUIPMENT

- **Reducer and Inverter:** Heavy-duty high-torque reducers and systems fully compatible with a frequency converter (inverter) for adjusting flow/mixing speed are used.
- **Motor Efficiency:** All electric motors used are in the minimum IE3 high energy efficiency class according to IEC norms. Electric (220V) or air-operated pneumatic plug-and-play motor options are available for drum pumps.
- **ATEX Protection:** In processes using solvents, alcohol, or flammable/explosive chemicals, motors, electrical panels, and connection flanges are supplied fully Ex-Proof (ATEX) certified.

8. QUALITY CONTROL, NDT AND ACCEPTANCE TESTS

- **Hydrostatic Pressure Tests:** All pumps, CIP skids, reactor bodies, and tank heat transfer jackets are subjected to a hydrostatic test under a minimum of 1.5 times the operating/design pressure after manufacturing and pass leak-tightness approval.
- **Non-Destructive Testing (NDT):** Pressure vessel, reactor, tank, and CIP unit welds are inspected for leak-tightness and penetration with 100% Radiographic Testing (RT) and Liquid Penetrant Testing (PT).
- **Dynamic Balancing:** Helical rotors, centrifugal impellers, homogenizer shafts, and agitator components are subjected to electronic dynamic/mechanical balancing tests to prevent vibration and noise. Gear/lobe tolerances are measured.
- **Automation and Suction Simulation:** CIP and mobile skid panels undergo a water circulation test for valve synchronization. Diaphragm, drum, and self-priming pumps pass dry-running tests on a vacuum/cavitation verification rig.

9. STANDARD CAPACITY AND DESIGN TABLES

Table 1: Dairy, Food, and Process Tanks

(Polyurethane thickness can be revised between 50-100mm)

Volume	Diameter (mm)	Insulation	Recommended Material
5.000 L	1.800	50 mm Polyurethane	AISI 304/316L
10.000 L	2.300	60 mm Polyurethane	AISI 304/316L
15.000 L	2.400	60 mm Polyurethane	AISI 304/316L
20.000 L	2.600	80 mm Polyurethane	AISI 304/316L
25.000 L	2.800	80 mm Polyurethane	AISI 304/316L
50.000 L	3.200	100 mm Polyurethane	AISI 304/316L
150.000 L+	Project Based	On-Site Production	Milk Silos / AISI 304/316L

Table 2: Olive Oil Storage Tanks

(Bottom angle is specially calculated according to the plant filter, includes nitrogen blanketing)

Volume	Diameter (mm)	Height (mm)	Body Thickness	Material Class
3.000 L	1.400	2.000	3 mm	AISI 304/316L
5.000 L	1.600	2.500	4 mm	AISI 304/316L
10.000 L	2.200	2.750	4 mm	AISI 304/316L
15.000 L	2.400	3.300	4 mm	AISI 304/316L
20.000 L	2.600	4.000	5 mm	AISI 304/316L
25.000 L	2.800	4.200	5 mm	AISI 304/316L
50.000 L	3.200	6.500	6 mm	AISI 304/316L
150.000 L+	Custom Production	Custom Production	Integrated Silo	AISI 304/316L

Table 3: Industrial Heavy-Duty Tanks

(Produced within seismic loads and FEA analysis)

Volume	Diameter (mm)	Height (mm)	Recommended Material Class
5.000 L	1.600	2.500	AISI 304/316L
10.000 L	2.200	2.750	AISI 304/316L
25.000 L	2.600	4.800	AISI 304/316L
50.000 L	3.200	6.500	AISI 304/316L
75.000 L	3.500	7.800	AISI 304/316L
100.000 L	3.800	8.800	AISI 304/316L
150.000 L+	On-Site	On-Site	Modular Manufacturing and Installation

Table 4: Chemical and Acid Tanks

(Thicknesses are shaped according to specific gravity and FEA)

Volume	Diameter / Height (mm)	Body/Bottom Thickness	Recommended Material Alloy
5.000 L	1.600 / 2.500	4 mm / 5 mm	AISI 316L/316Ti / Duplex
10.000 L	2.200 / 2.750	5 mm / 6 mm	AISI 316L/316Ti / Duplex
20.000 L	2.600 / 4.000	6 mm / 8 mm	AISI 316L/316Ti / Duplex
30.000 L	5.000 / 2.800	8 mm / 10 mm	AISI 316L/316Ti / Duplex
50.000 L	3.200 / 6.500	8 mm / 10 mm	AISI 316L/316Ti / Duplex
100.000 L+	On-Site	Custom Calculation	Hazardous Material Silo

10. ON-SITE INSTALLATION SERVICE AND LOGISTICS

Tanks and modular systems up to 100,000 Liters are manufactured and shipped as a single piece within the factory. In special projects where the facility door width is limited or requires a mega capacity of over 100,000 Liters; steel plates and modular equipment whose laser cutting processes have been completed in advance are transported to the operation area by the On-Site method and assembled and tested on your site by our expert welding engineers.

11. CONTACT AND SUPPORT INFORMATION

- **Head Office Address:** Organize Sanayi Bölgesi, Kemalpaşa OSB, 10. Sk. No:6, 35730 Kemalpaşa / İzmir
 - **Head Office Phone:** +90 (232) 877 0 444
 - **Chrome Tank Division:** +90 (532) 412 51 52 (Phone & WhatsApp)
 - **Pumps Division:** +90 (533) 495 99 94 (Phone & WhatsApp)
 - **E-Mail:** info@welltech.com.tr
-

All technical details, capacity variations, and equipment are designed in line with Welltech® advanced engineering standards, FDA, and cGMP norms.

All copyright and trademark rights reserved. 2026