

PUMPS PORTFOLIO



ABOUT TRILLIUM FLOW TECHNOLOGIES®

Built on a rich global history spanning hundreds of years, Trillium Flow Technologies® fuels growth by innovation, an experienced workforce, and our company vision to become the most relied upon flow control solutions company in the world. Our highly engineered valve and pump brands are recognized worldwide for their quality and reliability. Powered by world-class manufacturing and test facilities, we utilize state-of-the-art technologies to service our customer's needs.

Trillium Pumps designs and builds pump packages for custom applications used both on and offshore. The industries we serve include oil and gas, petrochemical, water and wastewater, mining, power generation, and general industry. We have market-specific centers of excellence, product and application specialists, and market channels that deliver our services locally. Our experience allows us to understand your specific needs, and our global footprint and supply chain enables us to support project sites throughout the world.

We are driven by our mission to assist our customers sustainably, efficiently, and passionately by providing critical products and services to help them meet the needs of today's ever-challenging world.

From inquiry to delivery, through project management, engineering, supply chain, manufacturing, and after-sales services, we aim to build relationships with our customers to become a trusted partner delivering quick responses through every project phase to ensure mutual success.

Our comprehensive product portfolio and services will change the way you think about flow control. We are more than design and installation: we are a full-service partner. For all flow control requirements across the markets we serve, Trillium Flow Technologies® can serve as your dedicated flow control resource at any point during the product lifecycle.



GABBIONETA PUMPS® | **ROTO-JET®** | **BEGEMANN®** | **FLOWAY®** | **WEMCO®** | **WSP™**



TRILLIUM PUMPS ITALY - NOVA MILANESE

Founded as Pompe Gabbioneta® in 1897, Trillium Pumps Italy is home to the Gabbioneta Pumps® and Begemann® brands. The facility at Nova Milanese is over 35,000 square meters and houses a sophisticated test room. The entire facility was built to minimize its environmental impact by using green construction materials and installing a photovoltaic plant that provides a significant percentage of the energy consumed. It earned a Leadership in Energy and Environmental Design Green Building Rating System Certification in July 2018. The Nova Milanese testing facility is equipped to perform all centrifugal pump performance and package tests, in full compliance with American Petroleum Institute (API) 610 and American Society of Mechanical Engineers standards.

Trillium Pumps Italy is a member of the Hydraulic Institute, has an Integrated Management System certified to International Organization for Standardization (ISO) 9001:2015, 14001:2015, 45001:2018, and has recently obtained certification for the Social Accountability 8000 standard.

TRILLIUM PUMPS USA - FRESNO

Founded as Floway® in 1934, Trillium Pumps USA™ began by manufacturing pumps for the agriculture and farming industries in California and even manufactured parts for the United States Navy during World War II. The facility now hosts the design, manufacturing, and testing of several US product brands, making it the North American pump headquarters for Trillium Flow Technologies®. This facility was upgraded in 2021 to incorporate state-of-the-art office, manufacturing, and test facilities. The test facility offers a full range of testing services in compliance with Hydraulic Institute and API 610 standards. The office and factory processes are built on the foundations of lean principles, focused on environmental sustainability. Engineering to enhance pump technology and process efficiencies has expanded the breadth of markets served, and it continues to receive global recognition.

COMPREHENSIVE PUMP SOLUTIONS

For Oil & Gas, Petrochemical, Feedwater, & Power Plant
Auxiliary applications at any point during project lifetime, throughout the lifecycle of your product.

BRANDS

GABBIONETA PUMPS®

Gabbioneta Pumps® offers the full range of API 610 pumps for upstream, midstream, and downstream oil and gas applications and it is also a premier choice for reliable flow control solutions in petrochemical, water, fertilizer, power, desalination, and mining markets.

ROTO-JET®

Roto-Jet® offers a complete package of low-flow, high-pressure pitot tube pumps, fully meeting the demanding requirements of API 610 as an alternative to API OH6. Roto-Jet® pumps are built to handle demanding applications across multiple industries.

BEGEMANN®

Begemann® is a range of single entry vertical in-line pumps explicitly designed to British Standard 4082 Class R for the oil and gas market used extensively in downstream and offshore applications. The Begemann® product line are distinctive for their reliability and low ownership costs.

FLOWAY®

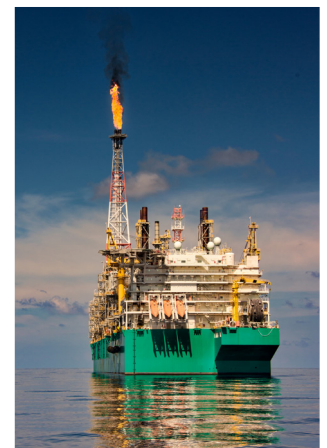
Floway® is an industry leader with more than 80 years of proven experience. The Floway® portfolio includes vertical turbine pumps for water and wastewater tailing and dewatering applications, oil and gas, mining, energy, and industrial markets, internationally.

WEMCO®

WEMCO® includes the Screw-Flow, Torque-Flow®, and Hydrogritter® models recognized globally for clog-free operation in solids handling, serving municipal and industrial customers in markets as diverse as water and wastewater, agrifood, solid, bulk, and sand applications.

WSP®

WSP® includes chop-flow, self-primer, and non-clog pumps designed to handle large solids, fibers, and other hard to pump materials. WSP® products are used in various municipal, industrial oil and gas, and mining markets..



APPLICATION CHART

The Trillium Flow Technologies® product portfolio has a wide variety of pumps for oil and gas, water and wastewater, and other niche engineered applications in power, renewable energy, and fertilizers, both onshore and offshore. Products include a full range of API 610 pumps, vertical pumps, low-flow high-head pitot tube pumps, torque-flow pumps, screw-flow pumps, grit separation systems, and self-primer pumps.

Industries		GABBIONETA PUMPS®	ROTO-JET®	BEGEMANN®	FLOWAY®	WEMCO®	WSP™
Oil & Gas Upstream		•	•		•	•	•
Oil & Gas Midstream		•	•		•		
Oil & Gas Downstream, Refinery		•	•		•		
Liquefied Natural Gas Liquefaction Plants, Regasification Units		•	•		•		
Floating Units FPSO - Floating Production Storage and Offloading Unit FLNG - Floating Liquefied Natural Gas FSRU - Floating Storage and Regasification Units		•	•		•		
Petrochemical, Fertilizer		•	•	•	•		
Water & Wastewater		•		•	•	•	•
Desalination Plants		•		•	•		
Mining		•	•		•	•	•
Power		•	•	•	•		•
General Industry			•	•	•	•	•

TESTING ROOM



The testing room is the operational core at each of our pumps facilities. All tests are fully automated, and the data is continuously recorded by a dedicated PLC. Vibration measurements and analysis are performed per API 610 and ASME standards.

The state-of-the-art Nova Milanese testing room, inaugurated in 2016, is designed to execute centrifugal pump performance tests in full compliance with API 610, Hydraulic Institute, ISO 9906, and ASME standards.

The Trillium Pumps USA™, testing room located in Fresno, California, is one of the most comprehensive testing facilities in the United States, offering a full range of testing services, all of which are fully compliant with testing standards.



Multistage pump test assembly

TESTING CAPABILITIES

- Performance test with NPSH
- Complete units test
- Hydraulic power recovery turbine test
- Bearing housing resonance test
- Axial load measurement on thrust bearings test
- Noise test
- Equipment calibration to ISO & National Institute of Standards and Technology
- Vibration test including spectrum analysis with multiple simultaneous channels
- Impact test to determine the natural structural frequencies (Reed Critical Frequency) of the pump or motor structure
- Pump axial thrust test

NOVA MILANESE

- Horizontal & Vertical pumps capacity up to 12,000 m³/h (53,000 gpm) – several times exceeded
- Horizontal pumps pressure range up to 413 bar (5,990 psi)
- Vertical pump pressure range up to 242 bar (3,500 psi)
- Shop motors available up to 4 MW (5,400 hp)
- Electrical power available up to 8 MW (10,800 hp)
- 4 Ansaldo/Nidec frequency converters with nominal power of 8 MW, 2 MW, 1 MW, and 500 kW
- Voltage up to 13.5 kV
- Ability to run up to 5 pumps at the same time
- 13 test benches
- Hydrostatic testing equipment for pressures to 600 bar (8,700 psi)

FRESNO

- Three test pits for flows ranging from 11 to 10,220 m³/h (50÷45,000 gpm)
- Pressures to 172 bar (2,500 psi)
- Electrical power up to 2,535 kW (3,400 hp)
- Both 50 Hz and 60 Hz power available
- Pump test using a variable frequency drive
- Coating spark test (low voltage and high voltage)
- Engine driven string test
- Hydrostatic testing equipment for pressures up to 345 bar (5,000 psi)



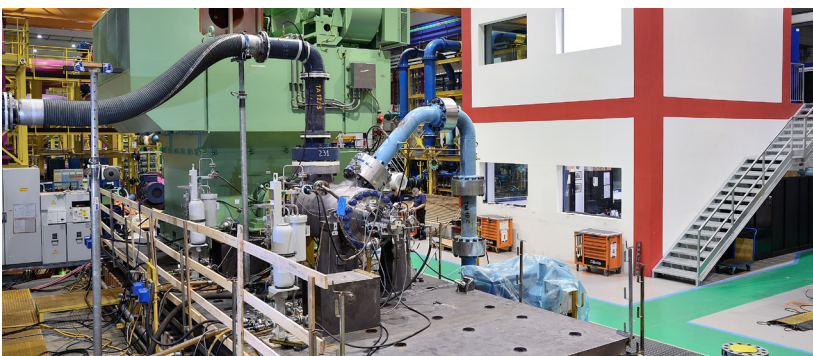
Vertical pump benches



Multistage pump benches



VS1 pump ready for performance test



BB5 pump installed for complete unit test

OUR PROCESS: ENGINEERING TO ORDER



Roto-Jet API 610-OH2

Client needs are an exciting and challenging opportunity to create customized solutions through our engineering expertise, highly skilled resources, and new technologies.

Each pump installed worldwide is built to perform under demanding conditions and provides new opportunities to extend working life, maximize operating efficiency, and mitigate the risk of unplanned downtime.

We can utilize materials from all API 610 classes, including many special alloys to comply with any application and customer need. This makes each Trillium pump genuinely unique.

Customer Specifications



Commercial Operations



Commercial Operations (CO) is the function in charge of the “quote-to-cash” process, starting from the quotation phase and ending with project execution. Composed of different capabilities, CO manages customer relationships, receives quote requests from our sales department, develops the offer, makes cost estimations, and coordinates the whole project in terms of scheduling and profitability.

Engineering



Engineering is structured in two sections, research and development, and project engineering. Research and development, focused on new products, provides support to CO during the bid stage, and the After Sales department throughout the life of the pump. Project Engineering is committed to the flawless execution of each deliverable and documents issue. The engineering team uses state-of-the-art computer 3D design, simulation tools, and high competencies to assure accurate, flexible, high-quality pump and skid design, providing exceptional value and compliance to address each customer's needs.

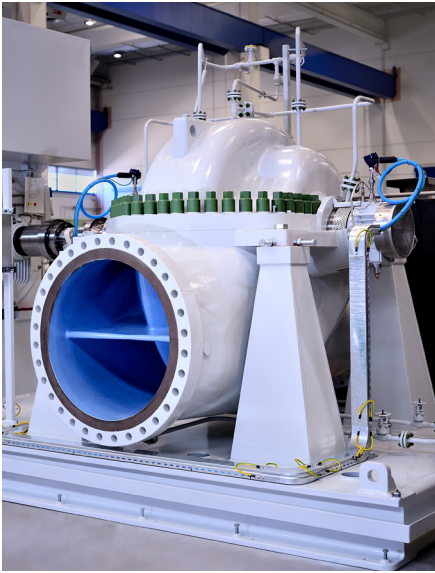


OH3 DSIL water circulation pump for a polypropylene unit

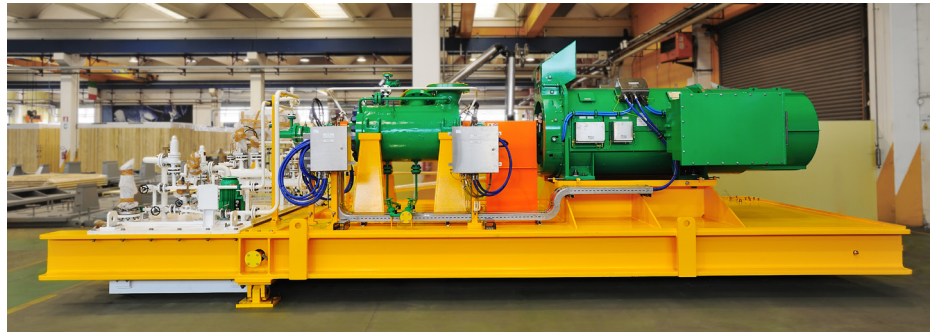
The synthesis of hydraulic design expertise, best-in-class production processes, and impeccable quality standards are incorporated into a highly customized skid design to ensure complete customer satisfaction and project success.



BB2 steam jacketed pump



BB1 AXD high-flow pump



BB5 AHPB pump skid equipped with lube oil and three points gimbal for floating unit installations

Supply Chain



This team of highly skilled people provides the cost and delivery schedule during the quotation stage of the project. Throughout the project execution, they release purchase orders, make periodic expediting activities, and manage the logistic process.

Manufacturing



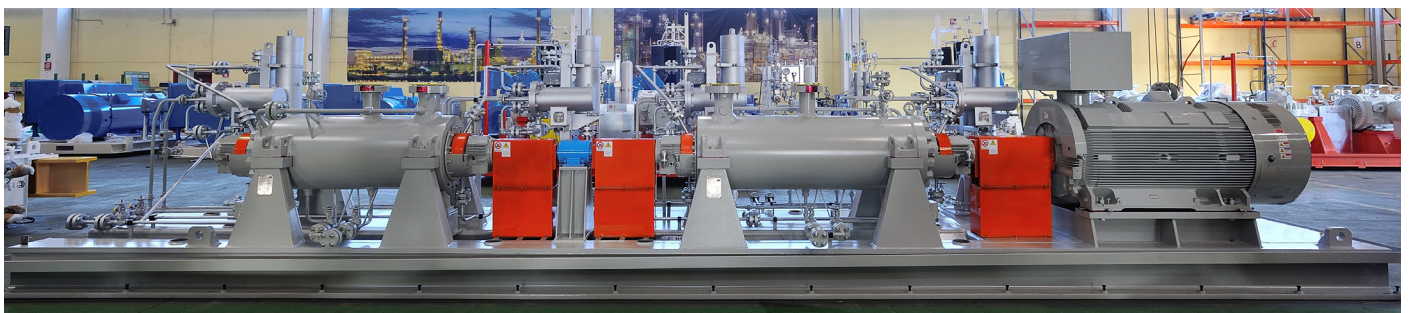
Trillium Pumps employs lean manufacturing methodologies, like Kaizen, Total Production Maintenance, and 5S in our manufacturing processes. Employing qualified welders for each material and application and adopting the best-in-class production process and quality standards results in customized, high-quality assemblies.

After Sale Services



A robust network comprised of individuals, skills, and technologies developed to support our customers around the world in all circumstances.

Complete Packaged Pump System

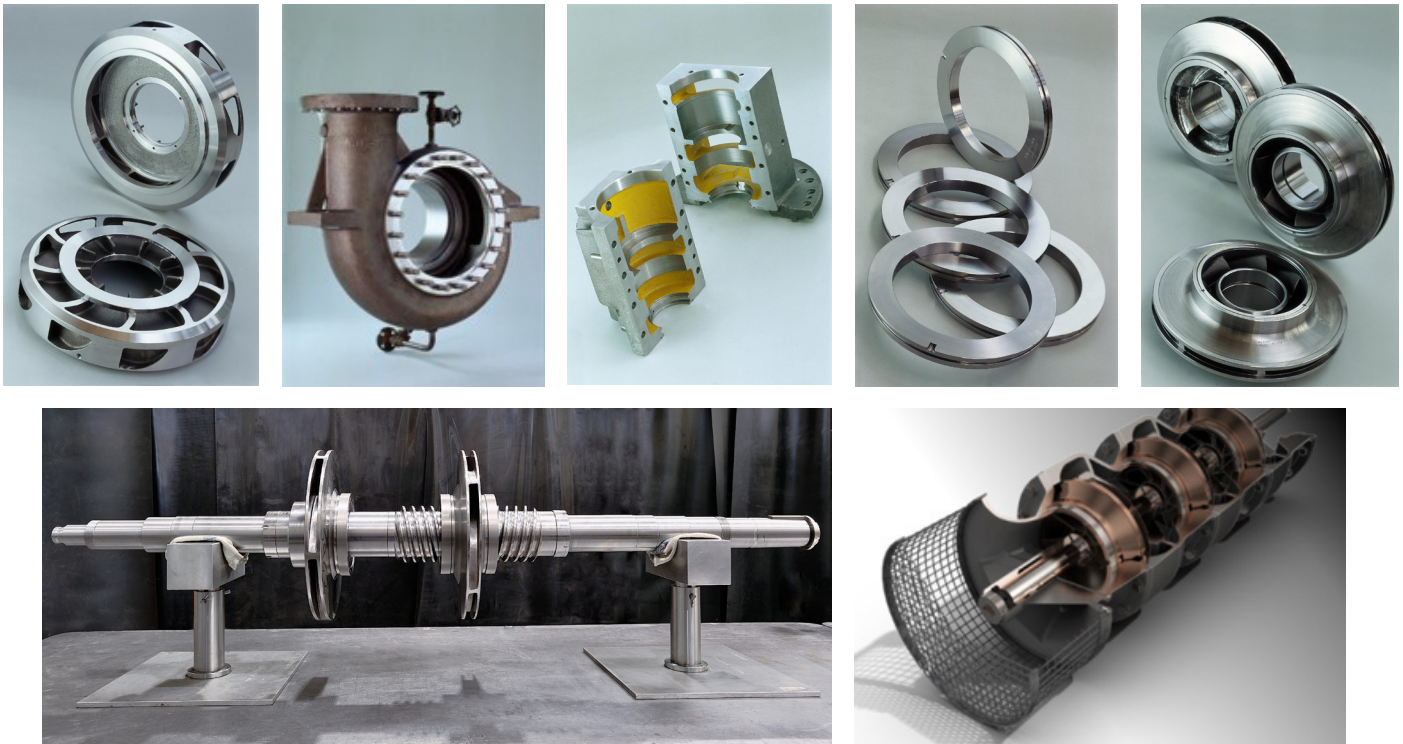


BB5 AHPB pumps train with BB5 AHPB used as Hydraulic Power Recovery Turbine

AFTER SALES SOLUTIONS

Our technical and field support team is focused on helping each customer and end-user maximize the output value from our pumps.

A wide variety of services are provided by this dedicated team, including commissioning, troubleshooting, site supervision, spare parts replacement, long term service agreements, pump rerating, retrofitting, warranty extensions, and training.



All pumps are part of a modular system: many parts are common across different ranges.

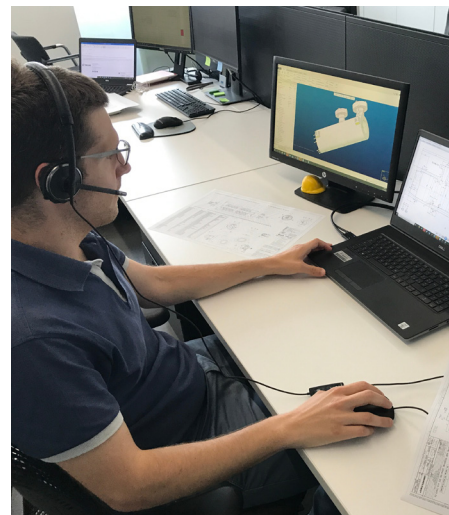
AFTER SALES SERVICES IN DETAIL

- Post order account management with a dedicated project team
- Remote technical assistance for installations onshore and offshore
- Technical support through qualified personnel for installation, commissioning, maintenance, and field service engineering, both onshore and offshore.
- Warranty extension with analysis of current status and extension of warranty terms.
- Long term service agreements with suggestions for scheduled maintenance and spare parts packages.
- In-house or onsite training packages for engineering, operations, and maintenance personnel for installed base models or specific new pumps.
- Diagnosis and problem detection onsite using a pump health check, data and report analysis, and creation of a maintenance program.
- Original spare parts supply
- Revamping and retrofit for Begemann® or Gabbioneta Pumps®
- Replacement for Begemann®, Gabbioneta Pumps®, and third-party manufacturer pumps.

REMOTE ASSISTANCE: AUGMENTED REALITY

Augmented reality is a new technology often used by our team of experts that offers the opportunity to uniquely support operators around the world by overlaying information and graphics from our headquarters virtually to wherever the operator is located.

Graphic images can remain virtually linked to real objects, making remote support interactive and enriching the scenario with useful information.



Certified Personnel



A team of certified service engineers available for diagnosis onsite.



GABBIONETA PUMPS®

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ROTO-JET®

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BEGEMANN®

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FLOWAY®

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WEMCO®

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WSP™



COMPANY CHARTERS

HUMAN RESOURCES

We aim to foster a respectful, open, and collaborative work environment that benefits from and values the spectrum of individual differences. We recognize that effective teams are diverse teams, where different views, perspectives, and experiences are encouraged and valued.

ENVIRONMENT, HEALTH, AND SAFETY

We believe that all injuries and occupational illnesses are preventable. There is no business objective that will take priority over health and safety. There is no task that is so important or urgent that it cannot be done safely.

We believe safety is everyone's responsibility.

SUSTAINABILITY

We aim to sustainably and passionately assist our customers by providing high-quality products and services. In every aspect of our business, we are committed to bettering our customers, our employees, and the communities around the world in which we operate.

DELIVERING QUALITY IN ALL THAT WE DO

Our Quality, Environmental, Health, and Safety Management system through strategic-risk based planning, performance metrics, and continuous improvement allows us to assist our customers by providing critical products and services to help them meet the needs of today's challenging world.



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Certified: ISO 9001:2015, ISO 14001:2015, ISO 45001:2018, SA 8000

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