



MAKE THE FLUID ENDLESS

API 610 SERIES VS1



MODEL: CVL

1. Product Overview

CENTFOS CVL API 610 VS1 pumps are vertical, radially split, single-casing, multistage (optional) bowl-type pumps designed for continuous service in refinery, petrochemical, power and water industries. The design complies with API 610 (12th Edition) requirements, with engineered options to meet project-specific specifications, ATEX, CE and NACE MR0175/0103 when required.

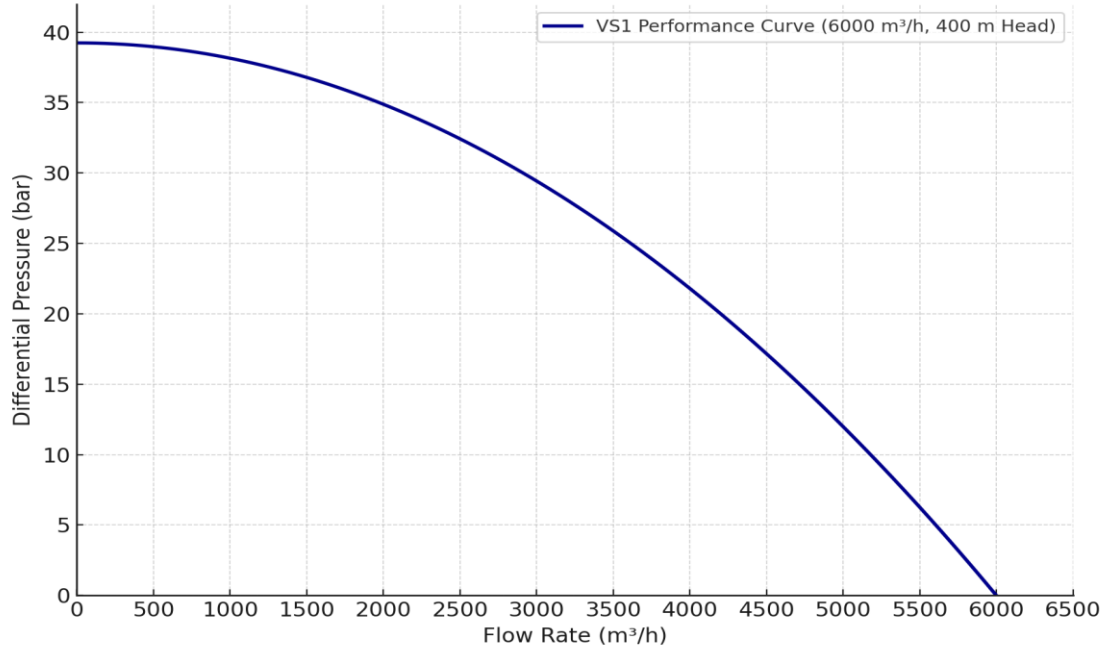
2. Key Advantages

- API 610 (12th Ed.) compliant vertical suspended VS1 configuration.
- High-efficiency hydraulic bowls with interchangeable wear rings and diffuser vanes.
- Heavy-duty thrust bearing housing (API 610, 2-out-of-3 philosophy for reliability).
- Cartridge-type mechanical seals per API 682 (Plan 11, 21, 23, 52, 53A/B/C, 62, 65 as applicable).
- Optimized NPSHr for low suction heads and seawater/deep intake applications.
- Materials from carbon steel to Super Duplex and Nickel-based alloys for sour, corrosive and chloride-laden services.
- Condition monitoring provisions: vibration, temperature, pressure, mechanical seal leakage detection.
- Modular bowl stacking for wide performance coverage and reduced lead time.
- Finite Element Analysis (FEA) validated top-works and barrel rigidity.
- CFD-optimized impellers and diffuser passages to minimise recirculation losses.

3. Hydraulic Performance Envelope

Capacity (Q)	Up to 6,000 m ³ /h (22,680 US gpm)
Differential Head (H)	Up to 400 m (1312ft)
Discharge Pressure Rating	Up to 40 bar (580 psi)
Speed	1,480 / 1,760 / 2,980 / 3,560 rpm (others on request)
Temperature Range	-50 °C to +200 °C
Number of Stages	1 to n (per duty)
NPSHr	As low as project duty requires (consult factory)

CENTFOS API 610 VS1 Pump - Performance Curve



4. Construction & Design Details

- Vertical suspended bowl assembly with line shaft or canned motor options.
- Discharge through column pipe to surface-mounted discharge head.
- API 610 compliant bearing spans with product-lubricated / water-flushed line bearings.
- Replaceable wear rings: casing/bowl and impeller to control leakage and restore efficiency.
- Suction strainer designed to project specifications (mesh size per service).
- Axial thrust taken by heavy-duty oil-lubricated angular contact / tilting pad bearings.
- Coupling: spacer type to allow seal/bearing maintenance without driver removal.
- Top-mounted thrust bearing housing with provisions for temperature and vibration probes.
- Keyed impellers with precision dynamic balancing per ISO 21940 (G 2.5 or better).

5. Materials of Construction (Typical)

Casing / Column / Discharge Head	ASTM A216 WCB / A352 LCB / A351 CF8M / Duplex / Super Duplex
Bowls	ASTM A352 LCB / A351 CF8M / Duplex / Super Duplex
Impellers	ASTM A743 CA6NM / A351 CF8M / Duplex / Super Duplex / Ni alloys
Shaft	AISI 410 / 17-4 PH / Duplex / Super Duplex
Wear Rings / Throat Bush	410SS / 13Cr / 316SS / Alloy 625 / PEEK / Composite
Line Bearings	Carbon, Bronze, Composite (Graphite Filled PEEK, VESPEL®)
Mechanical Seal	API 682 compliant, materials per service
Fasteners	A193 B7 / B8M, A194 2H / 8M, or per material class

6. Sealing System (API 682)

- Single, dual (tandem or back-to-back) cartridge seals.
- Flushing plans: Plan 11, 21, 23, 32, 52, 53A/B/C, 62, 65 as per service needs.
- Bearing isolators / labyrinth seals for top bearing housing.
- Provision for seal leakage detection and API Plan 75/76 for handling vapours (optional).

7. Bearings & Lubrication

- Product lubricated / external flush lubricated line bearings along the column.
- Top thrust bearing: tilting pad or angular contact rolling element bearings (oil bath / oil mist).
- Temperature probes (RTDs) and vibration probes (X/Y) as standard or optional.
- Shaft sleeves at bearing locations to protect the shaft from wear.

8. Instrumentation & Monitoring

- Bearing temperature sensors (RTD/PT100).
- Casing / discharge pressure gauges and transmitters.
- Vibration probes and monitoring to ISO 10816 / API 610 criteria.
- Mechanical seal leakage detection and level switch for seal pot (Plan 52/53).
- Speed, flow and temperature transmitters as per project specification.

9. Testing

- Hydrostatic test per API 610 (1.5 x MAWP).
- Performance test per API 610 (duty + verification points).
- NPSH test (when specified).
- Mechanical run test (4 hours minimum or as project spec).
- Optional string test with driver and seal system.
- Non-destructive tests (NDT): PT/MT/UT/RG as specified.
- Material certificates per EN 10204 3.1 / 3.2 as required.

10. Documentation & QA/QC

- API 610 compliant datasheets and GA drawings (3D/2D).
- Welding procedures (WPS/PQR), ITP, QAP, FAT protocols.
- Bill of Materials (BoM) and traceability records.
- Spare parts list (commissioning + 2-year operation).
- O&M manual with recommended lubrication schedules and troubleshooting guide.
- Vendor prints and MDR (Manufacturing Data Record).

11. Options & Accessories

- Canned (wet pit) execution with suction barrel / can per API 610 VS6 if required.
- Baseplates: fabricated steel or cast, with grout holes and jacking screws.
- Split lantern for easy maintenance of seals and bearings.
- Motor types: TEFC, TEWAC, Ex-d, Ex-e, VFD-ready; API 541/546 motors upon request.
- Coatings for seawater / brine service (epoxy phenolic, ceramic filled, glass flake).
- Cathodic protection for seawater intakes.

12. Ordering Code / How to Specify

Model	VS1
Configuration	Bowl stages, line shaft length, discharge size
Flow / Head	Rated capacity (Q), differential head (H)
Fluid / SG / Viscosity	Process data including gas content, solids
Temperature / Pressure	Operating, design, test values
Materials Class	API 610 S-1 to S-6 / project-specific
Seal Type & Plan	API 682 seal category, arrangement, plan
Instrumentation	Vibration, temperature, pressure, seal leakage
Testing	Performance, NPSH, string, NDT
Compliance	API 610 / 682, ATEX, CE, NACE, ISO, etc.

13. Typical Dimensional Data (Indicative)

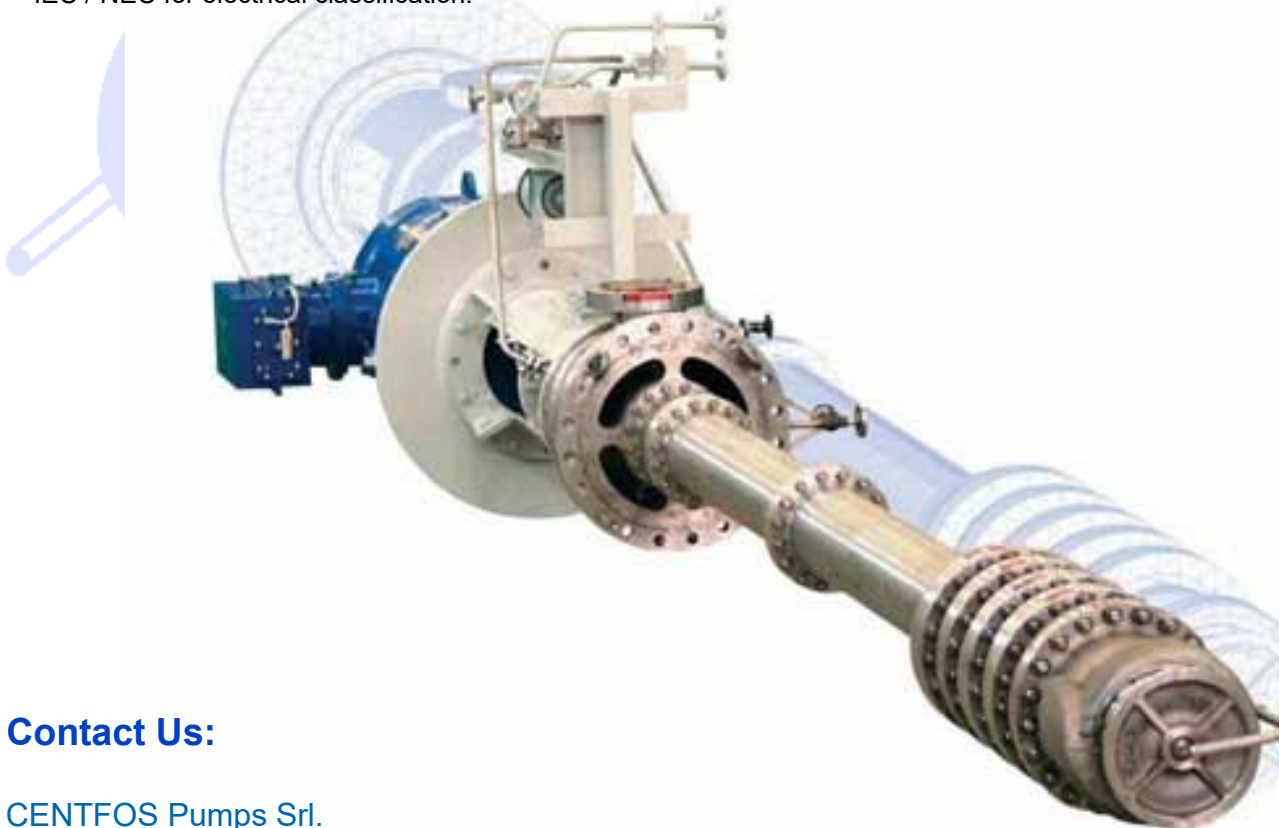
Nozzle Discharge Size	DN 80 to DN 400 (3" to 16")
Column Diameter	As per hydraulic selection
Shaft Diameter (at impeller)	Per power and torque; consult factory
Setting Length	Up to 30 m or more (segmented)
Baseplate / Discharge Head	To project / API 610 requirements

14. Allowable Nozzle Loads (per API 610)

Allowable nozzle loads comply with API 610 criteria for vertical pumps. Specific values will be provided on the certified general arrangement drawing following detailed selection.

15. Standards & Compliance

- API 610 (12th Edition) – Centrifugal Pumps for Petroleum, Petrochemical and Natural Gas Industries.
- API 682 – Pumps – Shaft Sealing Systems for Centrifugal and Rotary Pumps.
- ISO 13709 / ISO 5199 as applicable.
- NACE MR0175/0103 for sour service.
- ATEX 2014/34/EU for explosive atmospheres (optional).
- CE Marking (Machinery, PED).
- IEC / NEC for electrical classification.



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