VS1 Series
Technical Catalogue
2015

Our Vision

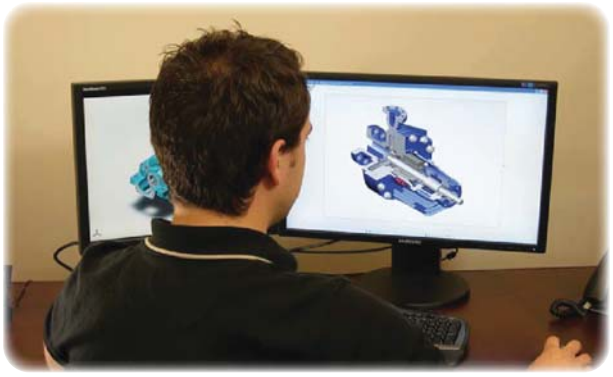
ASK's vision is to be a recognized leader in innovative, sustainable, engineered, and customer-focused solutions for performance critical applications in the oil and gas, hydrocarbon processing, power generation, pulp and paper, and other selected industries.

Our mission

ASK aims to be a multi-industry company with a strong brand, which provides solutions that combine products, services, engineering, and customer-application expertise. The corporation is close to the customer by being direct-sales driven.
Engineering, innovation, and technology are cornerstones. ASK strives to be an attractive employer and to create an environment where employees can excel. The company focuses on creating value for its customers.

ASK Innotec

The research and development unit of ASK supports the other divisions of the company and industrial companies in their development projects by providing a contract including research and special technical services like diagnostics and certified testing as well as one-off production and engineering. ASK innotec has expertise in materials and surface engineering, fluid technology, as well as in mechanics. Its core competencies in research contract also lie in these classical disciplines.



Certification

Certified quality management ISO 9001 with scope of "Design and manufacturing of process centrifugal pumps according to API standard 610".

Product Description

Using modern computer aided design methods, the pumps are specially designed as heavy duty, minimal wear, long life pumps which have been designed in a modular way, with a number of options available, to ensure full compliance to the customers' exact requirements and specifications. A fully compliant API 610 heavy duty baseplate helps achieve low vibration and noise levels which in turn extends the pump's life and ensures maximum running time. A 'space saving' reduced footprint is also available for use where space is at a premium.

The pumps can be fitted with a variety of proprietary components (i.e. seals, motors & couplings) from all the major manufacturers to cater for customers site preferences. Double mechanical seal arrangements can be fitted with an attached seal support system. This can be supplied by Seal Support System which is designed and manufactured by ASK, or another manufacturer's seal support system can be fitted.

To complete the package a full range of standard material options from SG iron and stainless steel, to duplex are available to match your process fluid. NACE compliant materials are also available. Standard documentation packs including manufacturing data books, material certification, and installation & operating manuals are available to suit the application. Performance testing to API610 / ISO 13709 and various NDE (nondestructive examination) & NDT (nondestructive testing) options are offered to ensure full compliance to our customers' applications. Alternative bespoke package can be tailored to fit your exact requirements.

Field of Application

VS1 series, Single or multistage vertical pumps of ASK are are custom engineered and available in a wide range of materials to meet the specific operating requirements present for a large range of applications.

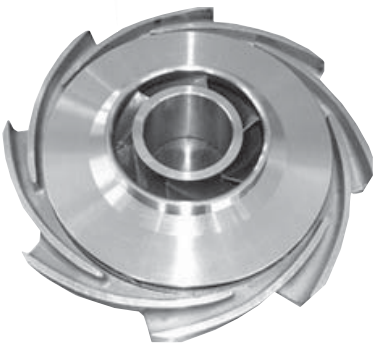
Our fully compliant VS1 pums with latest edition API 610 specifications provide maximum performance and reliability for the most critical wetpit pump applications.

The VS1 pumps can be used in:

- Chemical plants
- Chemicals plants
- Mining plants
- Petrochemicals
- Offshore industries
- Oil and Gas
- Energy generation
- Sea water desalination
- Water distribution
- Firefighting packages
- general applications such as cooling, circulation etc...

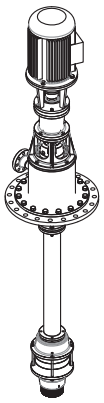
Key Features

- Fully compliant with requirement of API 610 latest edition for VS1 type
- Vertical arrangement (tie-rod design or bolted together stages)
- Single or multistage
- Single suction, radial or mixed flow, closed impellers
- Grease lubricated thrust bearings
- Flanges to ASME B16.5
- A range of alloys available on request including NACE compliant materials
- Tested to API610/ISO13709 procedures – Head, Flow, Noise & Vibration
- A range of API682 seals & systems (PED compliant)



Product Overview

General description	VS1 series is a single suction, single or multi stages, radially split, diffuser type, vertical sump pump
Construction	Heavy duty modular design, maximizing flexibility to meet rigorous customer requirements
Design methodology	Advanced computer techniques including 3D modeling, FEA & CFD
Design standards	API610 11th:2010 / ISO13709:2009 / ATEX EC-Directive 94/9/EC
Design pressure rating	Up to 70 bar g @ 20˚C
Operating temperature	-15˚C to 150˚C (Standard construction)
	-15˚C to 400˚C (Heavy duty construction)
Flow rate	Up to 7200 m^3/h
Differential Head	Up to 650 m
Speed	Up to 3000 rpm
Configuration	Long coupled pump
	Bare shaft pump
	Rotating assembly
Discharge Sizes	Up to DN 500
Design life	20 years (3 years uninterrupted operation)



Designation

Example: VS1 150-315-5stg / 160 2 S6 D115261 200/ EXT4

VS1	150	315	5stg	160	2(1)	S6	D	115261(2)	200	EXT4(3)
Pump type	Discharge nominal dia. in millimeters	Impeller nominal dia. in millimeters	No. of stages	Nominal power of installed driver in kW	No. of poles	Material class acc. to table H1 of API610	Seal type	Seal plan code acc. to API682	Pump length in Centimeters	Area classification
VS1: single suction, single or multi stages, radially split, diffuser type, vertical sump pump acc. to API610	Up to 150mm		Up to 17 pcs. depended on the pump size	up to 1100kW	**2:** 3000rpm **4:** 1500rpm **6:** 1000rpm	S-1 S-3 S-4 S-5 S-6 S-8 C-6 A-8 D-1	**S:** Single mechanical seal **D:** Double mechanical seal	Each two digits stands for a plan: For example "115261" means plans 11, 52, and 61 have been utilized together.	Up to 600cm	**SA:** Safe area **EX:** Explosion proof **T1~T6:** Temperature class

1) For nonelectric drivers refers to the drive speed only.
2) Other seal arrangements are available on request.
3) For other types of driver (nonelectric drivers) abbreviation of the used type will be interpolated.
examples: (ST: Steam Turbine)/(DE: Diesel Engine)/etc.

Material Options

Material Class	Casing	Impeller	Shaft
S1 - Carbon Steel / Cast Iron	ASTM A 216 WCB	ASTM A 48 Class 40B	ASTM A 576 Gr. 1045
S3 - Carbon Steel / Ni-resist	ASTM A 216 WCB	ASTM A 436 Type 1,2,3	ASTM A 576 Gr. 1045
S4 - Carbon Steel / Cast Iron	ASTM A 216 WCB	ASTM A 48 Class 40B	ASTM A 576 Gr. 1045
S5 - Carbon Steel / Carbon Steel	ASTM A 216 WCB	ASTM A743 CF-8M	ASTM A 276 Type 420
S6 - Carbon Steel / 12% Cr SS	ASTM A 216 WCB	ASTM A743 CA6NM	ASTM A 276 Type 420
S8 - Carbon Steel / SS 316	ASTM A 216 WCB	ASTM A744 CF-8M	AISI 316
C6 - 12% Cr SS / 12% Cr SS	ASTM A743 CA6NM	ASTM A743 CA6NM	ASTM A 276 Type 420
A8 - SS 316 / SS 316	ASTM A 743 CF-8M	ASTM A743 CF-8M	AISI 316
D1 - Duplex SS / Duplex SS	EN10213-4 / 1.4517	EN10213-4 / 1.4517	ASTM A 240-SS31803

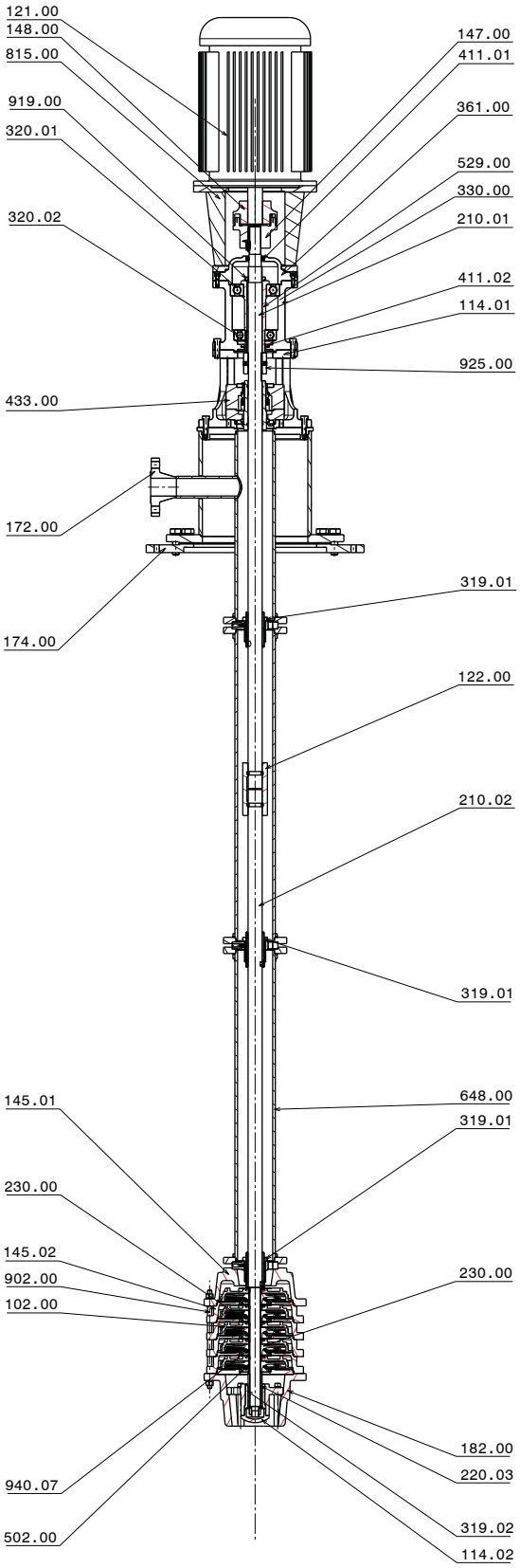
Product Benefits

- Pressurized components are subject to the most rigid quality control within the scope of a highly efficient quality assurance system. A long service life is ensured by a minimum corrosion allowance of 3 mm.
- 2 x API allowable nozzle loads
- Keyed impeller(s) for proper transmission of torque loadings
- Impellers with a high accuracy of shape and excellent surface finish, resulting in high efficiencies.
- Exchangeable impeller wear rings on suction side of the impellers, exchangeable wear rings in the stage casings, exchangeable stage bearing bushes at the rear-side impeller hubs serve to protect the diffusers and act as bearing guide. Clearances according to API 610.
- Low-vibration operation due to dynamic balancing both of the individual impellers and of the complete rotor.
- Special suction impeller designed as the first stage at the lowermost point of the barrel, and thus full utiliztion of the suction head resulting from the barrel length.
- Stage casings with metallic seating are bolted to the suction and discharge casing.
- Thrust bearing oil or grease-lubricated, thrust loads fully isolated from the motor
- Interstage bushes and additional guide bearings lubricated by the liquid handled.
- Bearing material dependent on liquid pumped
- FEA was used to analyze the stand to assure that pumps operate well away from any natural frequencies per API610
- Smooth operation with low vibration levels due to static & dynamic balancing of impeller and other rotating parts.
- ISO-13709 (API 610) Table 6 seal chambers for improved seal life.
- Fits for mechanical seals as per ISO 24109 / API 682 in cartridge design for easy installation and removal

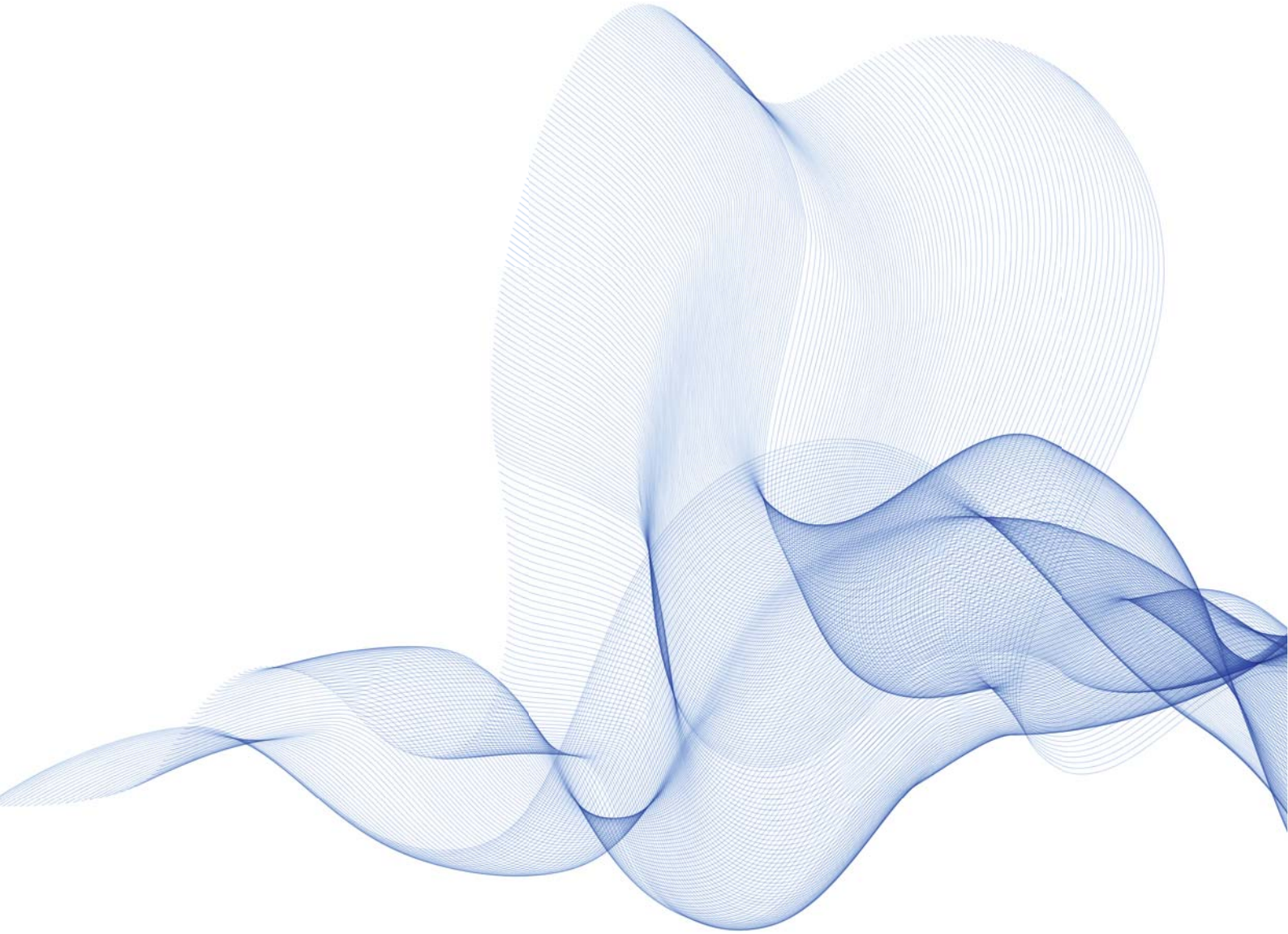
Product Options

- Materials variety acc. to API 610
- Various types of cartridge mechanical seals available
- Design available for non-Hydrocarbon Applications
- Impeller trimmed to match the specified duty point
- Wide range of hydraulic designs to suit all applications
- Grease or oil lubricated bearing bracket
- A variety of instrumentation options are available for monitoring all key operating parameters (temperature, pressure, vibrations, etc.)
- Circular or rectangular sole plate available

General Sectional Drawing



Part no.	Part name
102.00	Diffuser
114.01	Cover
114.02	Cover
121.00	Electro motor
122.00	Intermediate coupling
145.01	Stage casing
145.02	Stage casing
147.00	Coupling hub
148.00	Coupling hub
172.00	Discharge flange
174.00	Steel plate
182.00	Suction piece
210.02	Shaft
220.00	Shaft sleeve
230.00	Impeller
319.01	Bush bearing
319.02	Bush bearing
319.03	Bush bearing
319.04	Bush bearing
320.01	Deep groove ball bearing
320.02	Deep groove ball bearing
330.00	Bearing housing
361.00	Bearing cover
411.01	Lip seal
411.02	Lip seal
433.00	Mechanical seal
502.00	Wear ring
529.00	Bearing sleeve
648.00	Column pipe assembly
815.00	Motor connector piece
902.00	Tie-rod stud
919.00	Chuck nut
925.00	Tightening bush
940.00	Parallel key



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