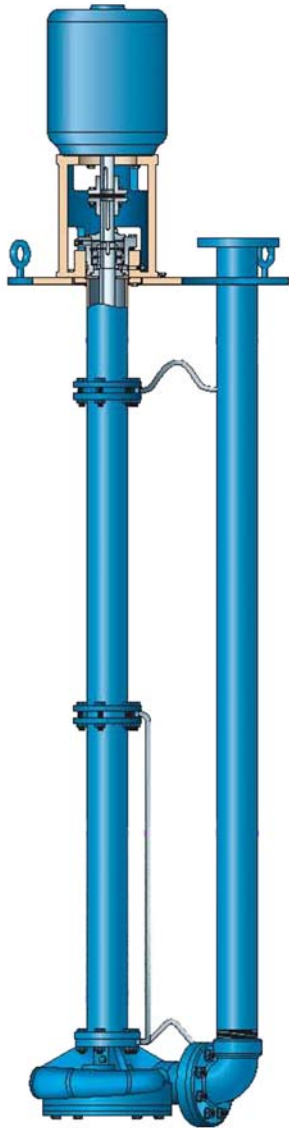


Technical Catalogue



Vertically Suspended Centrifugal Pumps
Acc to API 610 , 10th
API Series
VS4 Models

50Hz, n = 960, 1450, 2900 1/min

Arya Sepehr Kayhan Co

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 primarily 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 at a Glance

The divisions are global leaders in selected industrial markets. Their solutions, products, and services aim to strengthen the competitive positions of ASK's customers.

ASK Pumps	Pumping solutions and services
ASK Electro-power	Components and services for electro-power systems
ASK Innotec	Research and other services for other divisions and external customers

ASK Pumps

ASK Pumps develops and supplies centrifugal pumps. Intensive research and development in fluid dynamics, process-oriented products, and special materials as well as reliable service help the division maintain its leading position in its focus market segments. Its customers come from the oil and gas, hydrocarbon processing, power generation, pulp and paper, water distribution and treatment sectors, as well as from specialized areas in the food and metals businesses.

ASK Electro-power

ASK Electro-power develops and supplies electronic boards, main control panels and protective relays for safety action of power devices such as electric motors, power generators, diesel engines and etc. Intensive research and development in electronics, power transmission and artificial intelligence as well as reliable service help the division maintain its leading position in its focus market segments. Its customers come from the pump stations, power plants, water distribution and treatment sectors, as well as from any industrial factories.

ASK Innotec

The research and development unit of ASK supports the divisions of the company and industrial companies in their development projects by providing contract 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 contract research also lie in these classical disciplines.

ASK Pumps – Customer Support Service

The continuous availability and high operating performance of pumps is the key target for our customer support service organization. Through our highly experienced personnel and application knowledge, we provide a full range of innovative service solutions to our customers to keep their pumps running including;

- Spare Parts
- Field Service
- Repair Services
- Retrofits
- Maintenance Agreements
- Operation Agreements



Fields of Application

ASK pumps provide a broad range of API centrifugal pumps for the demanding applications of the hydrocarbon processing industry. The pumps are designed for the delivery of most fluids found in refinery processes.

- Petroleum refining, production, and distribution
- Petrochemical and demanding chemical processing
- General industrial requiring high temperature

VS4 series have been specifically designed to service the following markets: Biocide / rain, Condensate return, Flare knock out drum, MEG 75% with H₂O, Oily water separator, Sour water sump, Storm water, Utilities Wash down sumps

Design

The Model VS4 is a Vertical Submerged Bearing Sump and process pump designed to meet the requirements of the 10th edition of API Standard 610 (ISO 13709)

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 software the pumps are specifically designed as a heavy duty, minimal wear, long life pump which has been designed in a modular way, with a number of options available, to ensure full compliance to the customer's 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 baseplate 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 customer site preferences. Double mechanical seal arrangements can be fitted with a seal support system attached. This can be supplied by Protect System, which is designed and manufactured by Burgmann, 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 super duplex and hastelloy are available to match your process fluid. NACE & NORSOK 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 API 610 / ISO 13709 and various NDE (non destructive examination) & NDT (non destructive testing) options are offered to ensure full compliance to our customer's specifications. Alternative bespoke packages can be tailored to fit your exact requirements.

**Product overview**

General description	A range of vertical long shaft single stage centrifugal end suction sump pumps manufactured in a variety of alloys. Designed to match exact customer requirements with lengths available up to 6m sump depth as standard.
Construction	Heavy duty modular design maximising flexibility to suit customer's application.
Design methodology	Advanced computer techniques including 3D modeling, FEA & CFD
Design standards	<ul style="list-style-type: none"> • API 610 10th : 2004 / ISO 13709 : 2003 • ATEX EC-Directive 94/9/EC
Design pressure rating	20 bar g @ 20°C
Operating temperature	-40°C to 100°C (pressure containing parts)
Design temperature	150°C (standard construction)
Performance envelope	
Flow rate	Up to 450m ³ /h
Differential head	Up to 150m
Speed	Up to 3000 rpm
Support plate Configurations & sizes	<ul style="list-style-type: none"> • ANSI mount circular flange: 20" & 24" • ASME B16.47 Series A circular flange: 30" to 42" • ASME B16.47 Series B circular flange: 30" to 42" • Circular plate: 20" to 42" • Rectangular plate: 800mm x 550mm to 1450mm x 1000mm
Pump sump depth	<ul style="list-style-type: none"> • Min standard pump length: 0.65m • Max standard pump length: 6.0m
Frame sizes	050x125 to 150X501
Design life	20 years (3 years uninterrupted operation)

Key features

- VS4 single stage vertically suspended centrifugal pumps.
- 20 bar pumps to API 610 (10th edition) & ATEX Compliant
- -40°C to 100°C temperature applications
- Shrouded or Semi-Open Impellers
- A range of alloys available on request including NACE compliant materials
- Tested to API610 / ISO13709 procedures – Head, Flow, Noise & Vibration
- A range of API 682 Seals & systems (PED compliant)
- ANSI mount flange or rectangular plate

Materials options

Materials	Casing	Impeller
I1 – Cast Iron / Cast Iron	ASTM A278 Class 25	ASTM A278 Class 25
I2 – Cast Iron / Bronze	ASTM A278 Class 25	Bronze
S1 – Carbon Steel / Cast Iron	ASTM A 216 WCB	ASTM A278 Class 25
S3 – Carbon Steel / Ni-resist	ASTM A 216 WCB	ASTM A 436 Type 1,2,3
S5 – Carbon Steel / Carbon Steel	ASTM A 216 WCB	ASTM A 216 WCB
S6 – Carbon Steel / 12% Cr SS	ASTM A 216 WCB	ASTM A 217 Gr CA 15
S8 – Carbon Steel / SS 316	ASTM A 216 WCB	ASTM A744 CF-8M
A8 - SS 316 / SS 316	ASTM A744 CF-8M	ASTM A744 CF-8M
D1 – Duplex SS / Duplex SS	ASTM A 890 Gr 1B CD-4MCuN	ASTM A 890 Gr 1B CD-4MCuN

- Other alloys, including NACE compliant materials are available on request.
- We offer specific NDT and component documentation to ensure compliance to your exact requirements.



Features	Technical Notes	Benefits	Standards
Casing			
Construction	One piece casting with integral suction cover and 3mm corrosion allowance	Minimal leakage path, prolonged pump life	X
Flange standard	ISO PN20 / ANSI 150 / ANSI 300		
Nozzle loading	API610	Rugged construction	X
Fasteners	ASTM 320 Grade B8MX	Strength & corrosion resistance	X
Gasket	Reinforced graphite	Covers most fluids	X
	Expanded PTFE	Covers certain acid duties	
	Customer specified	Matched to site standard	
Strainer	Bucket type	Easy maintenance	X

Features	Technical Notes	Benefits	Standards
Impeller			
Construction	One piece casting	Strength & integrity	X
Vanes	Radial type	Low NPSHr & stable H/Q curve	X
Style	Shrouded	Optimum efficiency	X
	Semi open	Handles solids content in fluid	
Fixing	Keyed with retention nut & lock washer	Easy maintenance	X
Wear rings	Suction side (shrouded only)	Prolonged pump life	X
Hydraulic balancing	Radial ribs / Balancing holes		X
Dynamic balancing	ISO 1940 G 2.5	Prolonged pump life	X
	ISO 1940 G 1.0	Matched to customer requirement	

Features	Technical Notes	Benefits	Standards
Seals & seal plans			
Shaft diameters	30mm, 40mm, 50mm, 60mm, 70mm, 80 mm		
Seal types	API 682 single cartridge	Ease of maintenance	X
	API 682 double cartridge	Environmentally safer	
Seal plans	Plan 13	Optimum seal environment	X
	Plans 11/62, 13, 21, 31, 52, 53, 54	Matched to customer requirement	
	Customer specified		
Manufacturers	Burgmann, John Crane or customer specified	Matched to site standard	

Features	Technical Notes	Benefits	Standards
Bearing Bracket			
Style	One piece casting	Better concentricity, less run out	X
Construction	Heavy duty casting with machined abutments	Superior bearing alignment	X
Bearings	Dual angular contact (axial) plus Roller bearing (radial)	Long life	X
Design bearing life	25,000 hours (L10) @ standard duties		X
Bearing seals	Non contacting bearing isolators	Minimal wear, long life, ATEX	X
	Bearing protectors (Magtecta)	Hermetically sealed, ATEX	
Lubrication	Oil (fluid -40°C to 250°C)	Higher operating temperatures	X
	Grease (fluid -20°C to 120°C)	Lowest cost	
Cooling	Cast fins	Dissipates heat	X
	Fan	Extended temperature range	
	Water cooled heat exchanger	Constant cooling	
Running temperature	Less than 40°C above ambient	Long life	
Monitoring	Vibration monitoring points	Assist planned maintenance	X
	Temperature sensor location points		
Bearing bracket materials	Cast Iron		X
	Carbon steel	Matched to customer requirement	
Shaft materials	stainless steel		X
	Customer specified	Material to match casing / fluid	



Features	Technical Notes	Benefits	Standards
Coupling & guard			
Coupling style	Dry & Flexible Spacer type with metal membranes.	Easy maintenance	X
Construction	Bored & keywayed		X
Balancing	Inherent by design	Low vibration	X
Dynamic	Hubs up to ISO 1940 G 2.5	Prolonged pump life	
Manufacturers	Flender - Siemens , SIT		X
	Customer specified	Matched to site standard	
Standards	ATEX, API 671		X
Guard	Two piece wrap around in Carbon Steel	Non sparking/ATEX compliant	X

Features	Technical Notes	Benefits	Standards
Support plate			
Style	ANSI mount circular flange	Matched to customer requirement	
	ASME B16.47 Series A circular flange	Matched to customer requirement	
	Rectangular plate	Matched to customer requirement	
Construction	Fabricated from rolled steel sections with 4 lifting points	Rugged construction	X
Standards	API 610		X
Earthing bosses	2 off tapped M12 stud / nut / washers		X
	Earth bonding	Matched to customer requirement	
Alignment screws (Up to 160 frame)	Transverse only	Easier alignment	
Alignment screws (180 frame and above)	Transverse & axial		X
Material	Carbon steel	Lowest cost	X
	Cast Iron	Damping vibration	
	SS 304L	Resistance to low temperature	

Features	Technical Notes	Benefits	Standards
Driver			
Motor type	EExN, EExd, EExde, Exe	Matched to area requirements	
Standards	ISO frames	Matched to site standard	X
	NEMA frames		
	ATEX	Hazardous area requirement	
Supply	380 - 440 / 3 / 50	Matched to site standard	X
Manufacturers	ABB, Siemens, WEG, Customer specified	Matched to site standard	

Features	Technical Notes	Benefits	Standards
Paint			
Refinery specification	3 pack epoxy (Min DFT 225µm) - off grey		X
Offshore specification	3 pack epoxy (Min DFT 300µm) - off grey		
Customer specification		Matched to site standard	

Features	Technical Notes	Benefits	Standards
Packing			
Flange blanking	Metal closures with rubber gaskets		X
Road	Palletized & cling wrap		X
Sea freight	Wooden box suitable for sea		
	Wooden box with vacuum sealing		
Air freight	Wooden box suitable for air		

Documentation

ASK understand that the documentation for our pumps is as important as the pump we supply. We have identified three levels of documentation package that we offer as standard aimed at matching the level of documentation to the application for the pump:

- Bronze pack - comes as standard with each order and includes the basic test certificates
- Silver pack - includes GA drawings along with Type 3.1 certificates for major components and a quality plan detailing the build and testing requirements
- Gold pack - is aimed at customers with high specifications for their pumps and comes with a variety of contract management and technical datasheets

The table below lists all of the documents contained within each pack.

Documentation Packs		
Documentation Pack	Inclusive documents	Standard
Bronze pack	Order acknowledgement (electronic)	X
	Installation, Operating & Maintenance manual	
	Declaration of conformity	
	ATEX Declaration of conformity - only if contracted	
	Hydrostatic test certificate	
	Pump HQ performance test certificate	
	Spare parts list – commissioning	
Silver pack (Includes bronze pack)	Documentation schedule	
	Quality plan	
	Spare parts list - operating	
	Customer specific pump GA drawing	
	Pump SA & parts list	
	Type 3.1 certificates (* pressure containing + process wetted parts only) -only if contracted	
	Certification databook	
	Pump datasheet	
	Motor type test certificate	
	Motor GA drawing	
	Motor datasheet	
	Motor Declaration of conformity	
	Motor ATEX Declaration of conformity	
Gold pack (Includes Silver pack)	Manufacturing databook	
	Material traceability	
	Progress reports (monthly)	
	Paint certificate	
	Nameplate drawing	
	Spare parts interchangeability report	
	Spare parts list - insurance & commissioning	
Documentation format	Hard copy	X
	Electronic CD - Adobe (.pdf), ms office (.xls.doc)	

- If one of our standard packages does not suit your application, we can tailor our quotation to match your exact requirements. We have a long history of producing customer specific Data books and can supply all our documentation in various electronic formats.



Testing & NDT

All OH2 Series pumps are built to stringent quality control procedures as part of our ISO9001:2008 quality management system. We offer a variety of tests and NDT to suit your exact requirements as detailed below:

Testing			
Pump Test	Test Standard	Acceptance criteria	Standard
Hydrostatic	API 610 / ISO 13709	API 610 / ISO 13709 (1.5 X MAWP)	X
Head and flow	API 610 / ISO 13709	ISO 9906 Grade 1	X
Mechanical run 1 hour at rated duty	API 610 / ISO 13709	API 610 / ISO 13709	
Mechanical run 4 hours at rated duty	API 610 / ISO 13709	API 610 / ISO 13709	
NPSH at each test point	API 610 / ISO 13709	API 610 / ISO 13709	
Noise - single point at 1m	API 610 / ISO 13709	Customer datasheet	
Vibration - FFT spectrum at each test point	API 610 / ISO 13709	API 610 / ISO 13709	X
Bearing bracket resonance	API 610 / ISO 13709	Mutual agreement	

To compliment the final test we also have a number of Non Destructive Tests (NDT) that can be supplied with the pump. The following table details our standard tests:

NDT	
Visual examination of cast surfaces	ASME V Article 9 / MSS SP55 (pressure containing castings only)
Dyepenetrant of machined surfaces	Pressure containing castings only
Dyepenetrant of cast surfaces	Pressure containing castings only
Dyepenetrant of welds	Drain & seal pipe work (if fitted)
Positive Material Identification	Excludes minor components (nuts & bolts etc)
Radiography	Welds (pressure pipe work) Castings - shot plan (critical areas)
Hardness report	NACE (Certain materials only - please ask for details)

- *Pressure containing parts include: volute casing, Casing cover & mechanical seal. Process wetted parts include additional shaft, impeller, wear rings & impeller hub cap, lock washer and nut.*

Dimensions and General Assembly Drawing

For more information please contact us!

Performance Curves

General Notice:

The performance curves are based on acceptance test class ISO 9906 - class 2.

The NPSH values given in the performance curve sheets are measured values which correspond to a loss of discharge head of 3%.

NPSH values at part-load operation:

NPSH values for capacities below $Q = 0.3 \times Q$ optimum can only be measured at considerable expense. Evidence of NPSH values in this range cannot be supplied.



The total heads and the performance characteristics apply to media with a density $\rho=1.0 \text{ kg/dm}^3$ and a kinematic viscosity ν up to $20 \text{ mm}^2/\text{s}$. If the density is $\neq 1.0$, the friction must be multiplied by ρ . For viscosities $> 20 \text{ mm}^2/\text{s}$, the cold water data must be calculated and effect of viscosity on pump performance must be determined.

On special pump designs (reinforced bearings, special shaft seals) losses friction must be taken into account and indicated separately in the data sheet.

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