Documentation packs

Documentation pack	Inclusive documents	Standard
Bronze pack	Order acknowledgement (electronic)	●
	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	
	Production programme	
	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	
	Pump HQ performance test curve	
	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 interchangability report	
	Spare parts list – insurance & commissioning	
Documentation format	Electronic CD – Adobe (.pdf), ms office (.xls .doc)	●
	Hard copy	

NDT

Pump test	Test standard	Acceptance criteria	Standard
Hydrostatic	API610	API610 / ISO 13709 (1.5 x MAWP)	●
Head & flow	ISO 9906	API610	●
Mechanical run – 1 hour at rated duty	API610	API610	
Mechanical run – 4 hours at rated duty	API610	API610	
NPSH– 4 point	ISO 9906	API610	
Noise – single point at 1m	API610	Customer datasheet	●
Vibration – FFT spectrum at each test point	API610	API610	●
Bearing bracket resonance	API610	Mutual agreement	

NDE

Visual examination of cast surfaces	ASME V Article 9 / MSS SP55 (pressure containing castings only)	●
Dye penetrant of machined surfaces	ASME V Article 6 and 24 (pressure containing castings only)	
Dye penetrant of cast surfaces	ASME V Article 6 and 24 (pressure containing castings only)	
Dye penetrant of welds	ASME V Article 6 and 24 - Delivery pipework	
Positive Material Identification	Process wetted (excludes fasteners)	
Radiography	ASME V Article 2 and 22 - Welds (pressure pipework)	
	ASME V Article 2 and 22 - Castings – shot plan (critical areas)	
Hardness report	NACE (compliant material only) MR0175 / ISO 15156	
Various motor tests	IEC 60034	

*Pressure containing parts include; volute casing, casing adaptor & delivery pipework. Process wetted parts include shaft, impeller, wear rings, columns, impeller hubcap, lockwasher & screw. A full range of testing and documentation can be tailored to suit your exact requirements. Amarinth reserves the right to alter any information within this document without prior notification.

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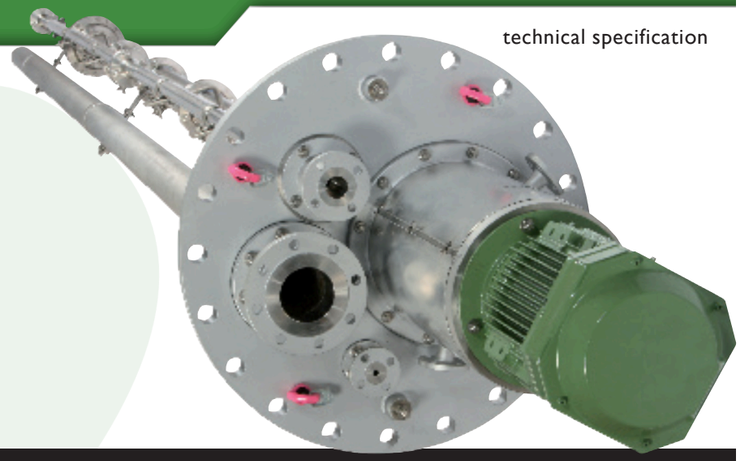
V Series – VS4 Petrochemical pumps

(API610 12th: 2021)

technical specification



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General specification

General description	A range of vertical long shaft single stage centrifugal end suction sump pumps manufactured in a variety of alloys. Designed to suit customer requirements with lengths available up to 6m sump depth.
Construction	Heavy duty modular design maximising flexibility to suit customer's application.
Design methodology	Advanced computer techniques including 3D modelling, FEA & CFD
Design standards	API610 12th : 2021
	ATEX EC-Directive 2014/34/EU
Design pressure rating	20 barg at 38°C (pressure containing parts)
	6.7 barg at 38°C (steam jacketing)
Operating temperature rating	-40°C to 160°C (standard construction)
Performance envelope	
Flowrate	Up to 715 m^3/h
Differential head	Up to 225 m
Speed	Up to 1750 rpm
Configurations	Flange mount
	Plate mount (circular / rectangular)
Frame sizes	040x025x145 to 200x150x325
Design life	20 years (3 years uninterrupted operation)

Material options

Material options	Casing	Impeller
A8 SS316L / SS316L	ASTM A351 CF3M (UNS J92800)	ASTM A351 CF3M (UNS J92800)
S1 Carbon steel / Cast iron	ASTM A216 WCB (UNS J03002)	ASTM A278 Class 30
D1 Duplex SS/ Duplex SS	ASTM A890 Grade 4A (UNS J92205)	ASTM A890 Grade 4A (UNS J92205)
D2 Super Duplex SS/ Super Duplex SS	ASTM A890 Grade 6A (UNS J93380)	ASTM A890 Grade 6A (UNS J93380)
Hastelloy B / Hastelloy B	ASTM A494 Gr N 7M (UNS N30007)	ASTM A494 Gr N 7M (UNS N30007)
Hastelloy C / Hastelloy C	ASTM A494 Gr CW 12MW (UNS N30002)	ASTM A494 Gr CW 12MW (UNS N30002)
Monel / Monel	ASTM A494 Gr M35 1 (UNS N24135)	ASTM A494 Gr M35 1 (UNS N24135)
Titanium / Titanium	ASTM B367 Gr C2 (UNS R52550)	ASTM B367 Gr C2 (UNS R52550)
Customer specified	Other alloys available on request including NACE compliant materials	Other alloys available on request including NACE compliant materials

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MP2510-380 REV F(May 24)

Features	Technical notes	Benefits	Standard
Casing & delivery pipe			
Casing construction	One piece casting with integral suction cover and 3mm corrosion allowance	Minimal leakage path, prolonged pump life	●
Fasteners	High tensile matched to casing/ pumpage	Strength & corrosion resistance	●
Casing gasket	Reinforced graphite	Covers most fluids	●
	Expanded PTFE	Matched to application	
Wear ring	Suction side (shrouded impeller only)	Prolonged pump life	●
Jacking screws	Matched to casing/ pumpage	Ease of maintenance	●
Delivery pipe construction	Schedule 40 seamless pipe with butt welded joints	Strength & corrosion resistance	●
Delivery pipe Steam jacket construction	Schedule 5 seamless pipe with fillet weld joints	Strength & corrosion resistance	●
Delivery pipe gasket(s)	Spiral wound with inner & outer ring	Matched to application	●
Delivery flange standard	ASME class 150		●
Nozzle loading	As defined in API 610	Rugged construction	●
Impeller			
Construction	One piece casting	Strength & integrity	●
Vanes	Francis type	Low NPSHr & stable H / Q curve	●
Style	Shrouded	Optimum efficiency	●
	Semi open	Handles solids content in fluid	
Fixing	Keyed with retention nut and lockwasher	Ease of maintenance	●
Wear ring	Suction side (shrouded only)	Prolonged pump life	●
Axial adjustment	Shaft lock nut accessible above mounting plate	Optimised performance	●
Hydraulic balancing	Backvanes	Low NPSHr	●
Dynamic balancing	ISO 21940-11 G 2.5	Prolonged pump life matched to customer requirement	●
	ISO 21940-11 G 1.0		
Columns & line bearings			
Column construction	Fully welded with flanged & spigoted joints	Maximise strength & alignment	●
Column steam jacket construction	Schedule 5 seamless pipe with fillet weld joints	Maximise strength & alignment	●
Column sizes	NPS 4", 6", 8" (dependant on pump size)	Optimised drive shaft stability	●
Column material	Stainless steel 304L	Suits most fluids	●
	Customer specified	Matched to application	
Line bearing type	Grooved bush	Optimised lubrication	●
Line bearing material	Carbon graphite / Resin	Suits most fluids	●
	Alternative design	Maximise strength & alignment	
Line bearing lubrication	Pumped fluid	Simplified construction	●
Maximum distance between bearings	As defined in API 610	Minimised vibration	●
Shaft & shaft sealing			
Shaft diameter	45mm		●
Line shaft coupling	Screwed connection (with locking device)		●
Shaft material	Duplex stainless steel		●
	Customer specified	Matched to application	
Seal type	Single cartridge (dry running)	Ease of maintenance	●
	Double cartridge	Reduced emissions	
	Customer specified	Matched to site standard	
Seal plan	Plan 02	Simplified construction	●
	Plan 52, 53, 54, 74	Matched to customer requirement	
Cartridge seal manufacturer	Eagle Burgmann, John Crane or customer specified	Matched to site standard	

Features	Technical notes	Benefits	Standard
Steam jacket pipe			
Steam jacket supply flange standard	ASME class 150		●
Steam jacket supply pipework construction	Schedule 40 seamless pipe screwed with compression fittings and tubing	Strength and corrosion	●
Steam jacket supply pipework material	Stainless steel 316	Suits most fluids	●
	Customer specified	Matched to application	
Thrust bearing / motor pedestal			
Thrust bearing type	Heavy duty bearing unit	Long life	●
Thrust bearing lubrication	Grease		●
	Oil	Matched to customer requirement	
Design bearing life	25,000 hours (L10) @ standard duties		●
Running temperature	Less than 40°C above ambient	Long life, ATEX	●
Motor pedestal construction	Heavy duty fabrication with machined abutments	Superior bearing alignment	●
Monitoring	Vibration monitoring points	Assist planned maintenance	●
	Temperature monitoring points		
Motor pedestal material	Carbon steel		●
	Stainless steel 304L		
	Customer specified		
Coupling & guard			
Coupling style	Spacer type with metal membranes DBSE100 / 180	Easy, maintenance	●
Construction	Bored & keywayed with extraction holes	Ease of removal	●
Balancing	Inherent by design	Low vibration	●
	ISO 21940-11 G 2.5	Prolonged pump life	
Manufacturer	John Crane / BIBBY		●
	Customer specified	Matched to site standard	
Standard	ATEX		
Guard	Two piece wrap around in stainless steel	Non sparking	●
Support plate			
Style	ASME class 150 flange	Sealed environment	●
	Circular / rectangular plate	Cost benefit	
	Customer specified	Matched to customer requirement	
Construction	One piece with 4 lifting eye bolts	Rugged construction	●
Standards	ASME B16.5, ASME B16.47		●
Earthing points	2 off M10 studs / nuts / washers		●
Material	Carbon steel	Cost benefit	●
	Stainless steel 304L	Resistance to low temperature	
	Customer specified	Matched to customer requirement	
Driver			
Motor type	Safe Area Ex ec, Ex eb, Ex dbeb, Ex db	Matched to area requirements	
Motor mounting	Flanged for vertical mounting (V1)		●
Standards	ISO frames		●
	NEMA frames	Matched to site standard	
	ATEX	Hazardous area requirement	
Supply	380 – 440 / 3 / 50, 440 – 460 / 3 / 60	Matched to site standard	
Manufacturers	ABB, Brook Crompton, Innomotics or specified	Matched to site standard	
Paint			
Refinery specification	2 coat system (Min DFT 200µm) – RAL7004 (grey)		●
	Customer specification	Matched to site standard	
Offshore specification	2 coat system (Min DFT 200µm) – RAL7004 (grey)		
	Customer specification	Matched to site standard	
Packing			
Flange blanking	Metal closures with rubber gaskets		●
Road	Palletised & cling wrap		●
Seafreight/ airfreight	Wooden box paper lined	Long term storage	
	Wooden box with vacuum sealed bag	Moisture free	

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