

▼ Documentation packs		
Documentation pack	Inclusive documents	Standard
<b>Bronze pack</b>	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	●
<b>Silver Pack (includes bronze pack)</b>	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	
<b>Gold pack (includes silver pack)</b>	Manufacturing databook Material traceability Progress reports (monthly) Paint certificate Nameplate drawing Spare parts interchangeability report Spare parts list – insurance & commissioning	
<b>Documentation format</b>	Hard copy Electronic CD - Adobe (.pdf), ms office (.xls .doc)	●

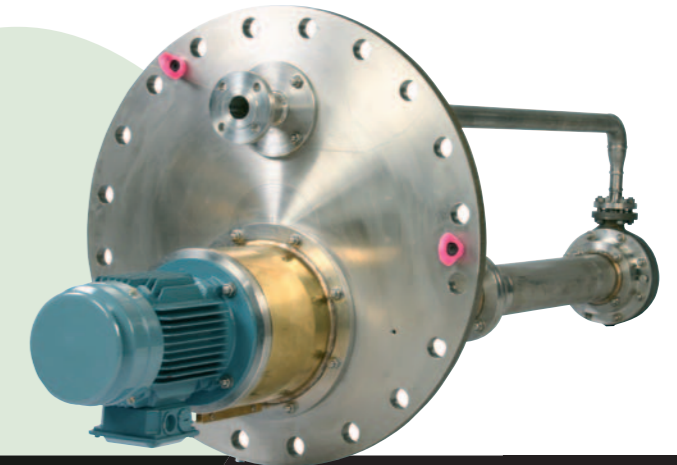
▼ Testing			
Pump test	Test standard	Acceptance criteria	Standard
<b>Hydrostatic</b>	API610 / ISO13709	API610 / ISO13709 (1.5 x MAWP)	●
<b>Head &amp; flow</b>	API610 / ISO13709	ISO9906 Grade 1	●
<b>Mechanical run - 1 hour at rated duty</b>	API610 / ISO13709	API610 / ISO13709	
<b>Mechanical run - 4 hours at rated duty</b>	API610 / ISO13709	API610 / ISO13709	
<b>NPSH at each test point</b>	API610 / ISO13709	API610 / ISO13709	
<b>Noise – single point at 1m</b>	API610 / ISO13709	Customer datasheet	●
<b>Vibration – FFT spectrum at each test point</b>	API610 / ISO13709	API610 / ISO13709	●
<b>Motor pedestal resonance</b>	API610 / ISO13709	Customer / Amaranth agreement	
▼ NDT			
<b>Visual examination of cast surfaces</b>	ASME V Article 9 / MSS SP55 (pressure containing castings only)		●
<b>Dyepenetrant of machined surfaces</b>	Pressure containing castings only		
<b>Dyepenetrant of cast surfaces</b>	Pressure containing castings only		
<b>Dyepenetrant of welds</b>	Delivery pipework		
<b>Positive Material Identification</b>	Excludes minor components (nuts & bolts etc)		
<b>Radiography</b>	Welds (pressure pipework) Castings - shot plan (critical areas)		
<b>Hardness report</b>	NACE (certain materials only – please ask for details)		
<b>Various motor tests</b>			

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

## V Series – VS4 sump pumps

(API610 10th : 2004)

technical specification



▼ General Specification	
<b>General description</b>	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.
<b>Construction</b>	Heavy duty modular design maximising flexibility to suit customer's application.
<b>Design methodology</b>	Advanced computer techniques including 3D modelling, FEA & CFD
<b>Design standards</b>	API610 10th : 2004, ISO13709 : 2003 ATEX EC-Directive 94/9/EC
<b>Design pressure rating</b>	20 bar g at 20°C (pressure containing parts)
<b>Operating temperature rating</b>	-40°C to 100°C (standard construction)
<b>Design temperature</b>	150°
<b>Performance envelope</b>	
<b>Flowrate</b>	Up to 500m <sup>3</sup> /h
<b>Differential head</b>	Up to 200m
<b>Speed</b>	Up to 3600 rpm
<b>Configurations</b>	ANSI mount flange Rectangular plate
<b>Frame sizes</b>	040x025x145 to 200x150x410
<b>Design life</b>	20 years (3 years uninterrupted operation)

▼ Materials		
Materials	Casing	Impeller
<b>A8 - SS 316 / SS 316</b>	ASTM A744 CF-8M	ASTM A744 CF-8M
<b>I1 - Cast Iron / Cast Iron</b>	ASTM A278 Class30	ASTM A278 Class30
<b>S8 - Carbon Steel / SS 316</b>	ASTM A216 WCB	ASTM A744 CF-8M
<b>S6 - Carbon steel / 12% Cr SS</b>	ASTM A216 WCB	ASTM A217 Gr CA 15
<b>D1 - Duplex SS / Duplex SS</b>	ASTM A890 Gr 1B CD-4MCuN	ASTM A890 Gr 1B CD-4MCuN
<b>D2 - Super Duplex SS / Super Duplex SS</b>	ASTM A890 Gr 5A (UNS J93404)	ASTM A890 Gr 5A (UNS J93404)
<b>Hastelloy B / Hastelloy B</b>	ASTM A949 Gr N-7M	ASTM A949 Gr N-7M
<b>Hastelloy C / Hastelloy C</b>	ASTM A494 GrCW-12MW	ASTM A494 GrCW-12MW
<b>Monel / Monel</b>	ASTM A494 GrM35-1	ASTM A494 GrM35-1
<b>Customer specified</b>	Other alloys available on request including NACE compliant materials	Other alloys available on request including NACE compliant materials

Features	Technical Notes	Benefits	Standard
<b>▼ Casing &amp; delivery pipe</b>			
<b>Construction</b>	One piece casting with integral suction cover and 3mm corrosion allowance	Minimal leakage path, prolonged pump life	●
<b>Fasteners</b>	High tensile matched to casing Customer specified	Matched to fluid	●
<b>Casing gasket</b>	Reinforced graphite Expanded PTFE Customer specified	Covers most fluids Covers certain acid duties Matched to site standard	●
<b>Wear ring</b>	Suction side	Prolonged pump life	●
<b>Jacking screws</b>	Matched to casing	Ease of maintenance	●
<b>Delivery pipe construction</b>	Schedule 40 seamless pipe with butt welded joints	Strength & corrosion resistance	●
<b>Delivery pipe gasket(s)</b>	CSF Spirol wound	Matched to customer requirement	●
<b>Delivery flange standard</b>	ISO PN20 / ANSI 150 ISO PN16	Matched to site standard	●
<b>Orifice plate</b>	Loose tang type	Matched to customer requirement	●
<b>▼ Impeller</b>			
<b>Construction</b>	One piece casting	Strength & integrity	●
<b>Vanes</b>	Francis type – 4 / 5 off	Low NPSHr & stable H/Q curve	●
<b>Style</b>	Shrouded Semi open	Optimum efficiency Handles solids content in fluid	●
<b>Fixing</b>	Keyed with retention nut Lockwasher	Ease of maintenance	●
<b>Wear ring</b>	Suction side	Prolonged pump life	●
<b>Axial adjustment</b>	Shaft lock nuts accessible above mounting plate	Optimised performance	●
<b>Hydraulic balancing</b>	Backvanes	Low NPSHr	●
<b>Dynamic balancing</b>	ISO 1940 G 2.5 ISO 1940 G 6.3	Prolonged pump life	●
<b>▼ Columns &amp; line bearings</b>			
<b>Column construction</b>	Fully welded with flanged & spigoted joints	Maximise strength & alignment	●
<b>Column sizes</b>	4", 6", 8" (dependant on pump size)	Optimised drive shaft stability	●
<b>Column materials</b>	Stainless steel 316L Customer specified	Suits most fluids Material to match casing / fluid	●
<b>Line bearing type</b>	Grooved bush	Clog resistant	●
<b>Line bearing materials</b>	Carbon / PTFE Customer specified	Suits most fluids Matched to site standard	●
<b>Line bearing lubrication</b>	Pumped fluid External flush	Simplified construction Improved pump life when solids present	●
<b>Maximum distance between bearings</b>	As defined in API610	Minimised vibration	●
<b>▼ Shaft &amp; shaft sealing</b>			
<b>Shaft diameters</b>	30mm, 40mm, 50mm		●
<b>Line shaft coupling</b>	Screwed sleeve Screwed sleeve (with locking device) Hardened sleeve	Longer life	●
<b>Shaft materials</b>	Duplex stainless steel Customer specified	Material to match casing / fluid	●
<b>Seal types</b>	Twin grease packed lip Single cartridge (dry running) Double cartridge	Lowest cost ATEX compliant Environmentally safer, ATEX	●
<b>Seal piping arrangements</b>	None Plan 52, 53, 54 Customer specified	Simplified construction Match customers requirements	●
<b>Cartridge seal manufacturers</b>	AES, Burgmann, John Crane or customer specified	Matched to site standard	●

Features	Technical Notes	Benefits	Standard
<b>▼ Thrust bearing / motor pedestal</b>			
<b>Thrust bearing type</b>	Self contained bearing unit		●
<b>Thrust bearing lubrication</b>	Grease		●
<b>Design bearing life</b>	25,000 hours (L10) @ standard duties		●
<b>Running temperature</b>	Less than 40°C above ambient	Long life, ATEX	●
<b>Pedestal construction</b>	Fully welded fabrication	Better alignment	●
<b>Monitoring</b>	Vibration monitoring points Temperature sensor location points	Assist planned maintenance	●
<b>Motor pedestal materials</b>	Carbon steel Stainless steel 316L Customer specified		●
<b>▼ Coupling &amp; guard</b>			
<b>Coupling style</b>	Non spacer type with metal membranes Spacer type with metal membranes Customer specified	Lowest cost Easy maintenance Matched to site standard	●
<b>Construction</b>	Bored & keywayed	Easy removal	●
<b>Balancing</b>	Inherent by design	Low vibration	●
<b>Dynamic</b>	Hubs up to ISO 1940 G 2.5	Prolonged pump life	●
<b>Manufacturers</b>	Autoguard Customer specified	Matched to site standard	●
<b>Standards</b>	ATEX		●
<b>Guard</b>	Single piece wrap around in SS 304L	Non sparking/ATEX compliant	●
<b>▼ Support plate</b>			
<b>Style</b>	ANSI 150 flange Rectangular plate Customer specified	Sealed environment Lowest cost Matched to customer requirement	●
<b>Construction</b>	Blind flange with 3 lifting points Plate with 4 lifting points	Rugged construction	●
<b>Standards</b>	ANSI B16.5, ASME B16.47		●
<b>Earthing points</b>	2 off M10 screws		●
<b>Material</b>	Carbon steel Stainless steel 316 Customer specified	Lowest cost Resistance to low temperature	●
<b>▼ Driver</b>			
<b>Motor type</b>	Safe area, EExN, EExd, EExde, Exe,	Matched to area requirements	●
<b>Motor mounting</b>	Flanged for vertical mounting		●
<b>Standards</b>	ISO frames NEMA frames ATEX	Matched to site standard Hazardous area requirement	●
<b>Supply</b>	380 – 440 / 3 / 50, 440 – 460 / 3 / 60	Matched to site standard	●
<b>Manufacturers</b>	ABB, ATB, Brook Hansen, Loher, Seimens, TECO, WEG, Customer specified	Matched to site standard	●
<b>▼ Paint</b>			
<b>Refinery specification</b>	3 pack epoxy (Min DFT 225µm) - off grey		●
<b>Offshore specification</b>	3 pack epoxy (Min DFT 300µm) - off grey		●
<b>Customer specification</b>		Matched to site standard	●
<b>▼ Packing</b>			
<b>Road</b>	Palletised & cling wrap		●
<b>Seafreight</b>	Wooden box suitable for sea Wooden box with vacuum sealing		●
<b>Airfreight</b>	Wooden box suitable for air		●