

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>	Electronic CD – Adobe (.pdf), ms office (.xls .doc)	●
	Hard copy	

NDT			
Pump test	Test standard	Acceptance criteria	Standard
<b>Hydrostatic</b>	API 610 / ISO 13709	API 610 / ISO 13709 (1.5 x MAWP)	●
<b>Head &amp; flow</b>	ISO 9906	API 610 / ISO 13709	●
<b>Mechanical run – 1 hour at rated duty</b>	API 610 / ISO 13709	API 610 / ISO 13709	
<b>Mechanical run – 4 hours at rated duty</b>	API 610 / ISO 13709	API 610 / ISO 13709	
<b>NPSH – 4 point</b>	ISO 9906	API 610 / ISO 13709	
<b>Noise – single point at 1m</b>	API 610 / ISO 13709	Customer datasheet	●
<b>Vibration – FFT spectrum at each test point</b>	API 610 / ISO 13709	API 610 / ISO 13709	●
<b>Bearing bracket resonance</b>	API 610 / ISO 13709	Mutual agreement	

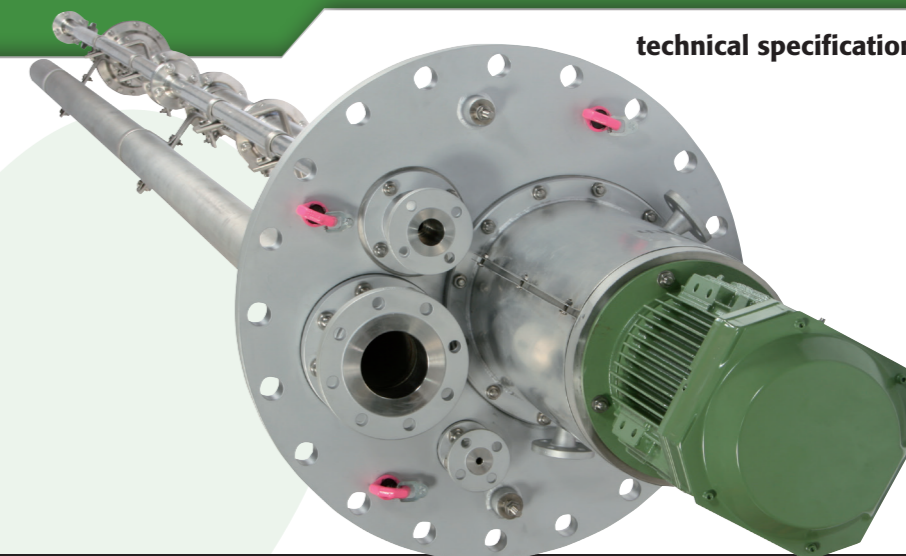
NDE		
<b>Visual examination of cast surfaces</b>	ASME V Article 9 / MSS SP55 (pressure containing castings only)	●
<b>Dye penetrant of machined surfaces</b>	Pressure containing castings only	
<b>Dye penetrant of cast surfaces</b>	Pressure containing castings only	
<b>Dye penetrant of welds</b>	Delivery pipework	
<b>Positive Material Identification</b>	Process wetted (excludes minor components e.g. fasteners)	
<b>Radiography</b>	Welds (pressure pipework)	
	Castings – shot plan (critical areas)	
<b>Hardness report</b>	NACE (compliant material only) MR0175 / ISO 15156	
<b>Various motor tests</b>		

\*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. Amaranth reserves the right to alter any information within this document without prior notification. © Copyright 2005-2017. Amaranth Limited. E&OE.



## V Series – VS4 Petrochemical pumps

(API 610 11th: 2010)



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>	API 610 11th : 2010, ISO 13709 : 2010 ATEX EC-Directive 94/9/EC
<b>Design pressure rating</b>	20 barg at 38°C (pressure containing parts) 6.7 barg at 38°C (steam jacketing)
<b>Operating temperature rating</b>	-40°C to 160°C (standard construction)
<b>Performance envelope</b>	
<b>Flowrate</b>	Up to 715 m <sup>3</sup> /h
<b>Differential head</b>	Up to 225 m
<b>Speed</b>	Up to 1750 rpm
<b>Configurations</b>	Flange mount Plate mount (circular / rectangular)
<b>Frame sizes</b>	040x025x225 to 200x150x325
<b>Design life</b>	20 years (3 years uninterrupted operation)

### Material options

Material options	Casing	Impeller
<b>A8 SS 316L / SS 316L</b>	ASTM A351 CF 3M	ASTM A351 CF 3M
<b>I1 Cast Iron / Cast iron</b>	ASTM A278 Class 30	ASTM A278 Class 30
<b>S1 Carbon steel / Cast iron</b>	ASTM A216 WCB	ASTM A278 Class 30
<b>D1 Duplex SS / Duplex SS</b>	ASTM A890 Grade 4A	ASTM A890 Grade 4A
<b>D2 Super Duplex SS / Super Duplex SS</b>	ASTM A890 Grade 5A	ASTM A890 Grade 5A
<b>Hastelloy B / Hastelloy B</b>	ASTM A494 Gr N 7M	ASTM A494 Gr N 7M
<b>Hastelloy C / Hastelloy C</b>	ASTM A494 Gr CW 12MW	ASTM A494 Gr CW 12MW
<b>Monel / Monel</b>	ASTM A494 Gr M35 1	ASTM A494 Gr M35 1
<b>Titanium / Titanium</b>	ASTM B367 Gr C2	ASTM B367 Gr C2
<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>Casing 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 / pumpage	Strength & corrosion resistance	●
<b>Casing gasket</b>	Reinforced graphite Expanded PTFE	Covers most fluids Matched to application	●
<b>Wear ring</b>	Suction side (shrouded impeller only)	Prolonged pump life	●
<b>Jacking screws</b>	Matched to casing / pumpage	Ease of maintenance	●
<b>Delivery pipe construction</b>	Schedule 40 seamless pipe with butt welded joints	Strength & corrosion resistance	●
<b>Delivery pipe Steam jacket construction</b>	Schedule 5 seamless pipe with fillet weld joints	Strength & corrosion resistance	●
<b>Delivery pipe gasket(s)</b>	Spiral wound with inner & outer ring	Matched to application	●
<b>Delivery flange standard</b>	ASME class 150		●
<b>Nozzle loading</b>	As defined in API 610	Rugged construction	●
<b>▼ Impeller</b>			
<b>Construction</b>	One piece casting	Strength & integrity	●
<b>Vanes</b>	Francis type	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 and lockwasher	Ease of maintenance	●
<b>Wear ring</b>	Suction side (shrouded only)	Prolonged pump life	●
<b>Axial adjustment</b>	Shaft lock nut 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 1.0	Prolonged pump life matched to customer requirement	●
<b>▼ Columns &amp; line bearings</b>			
<b>Column construction</b>	Fully welded with flanged & spigoted joints	Maximise strength & alignment	●
<b>Column steam jacket construction</b>	Schedule 5 seamless pipe with fillet weld joints	Maximise strength & alignment	●
<b>Column sizes</b>	NPS 4", 6", 8" (dependant on pump size)	Optimised drive shaft stability	●
<b>Column material</b>	Stainless steel 304L Customer specified	Suits most fluids Matched to application	●
<b>Line bearing type</b>	Grooved bush	Optimised lubrication	●
<b>Line bearing material</b>	Carbon graphite / Resin Alternative design	Suits most fluids Maximise strength & alignment	●
<b>Line bearing lubrication</b>	Pumped fluid	Simplified construction	●
<b>Maximum distance between bearings</b>	As defined in API 610	Minimised vibration	●
<b>▼ Shaft &amp; shaft sealing</b>			
<b>Shaft diameter</b>	45mm		●
<b>Line shaft coupling</b>	Screwed connection (with locking device)		●
<b>Shaft material</b>	Duplex stainless steel Customer specified	Matched to application	●
<b>Seal type</b>	Single cartridge (dry running) Double cartridge Customer specified	Ease of maintenance Reduced emissions Matched to site standard	●
<b>Seal plan</b>	Plan 02 Plan 52, 53, 54, 74	Simplified construction Matched to customer requirement	●
<b>Cartridge seal manufacturer</b>	Eagle Burgmann, John Crane or customer specified	Matched to site standard	

Features	Technical notes	Benefits	Standard
<b>▼ Steam jacket pipe</b>			
<b>Steam jacket supply flange standard</b>	ASME class 150		●
<b>Steam jacket supply pipework construction</b>	Schedule 40 seamless pipe screwed with compression fittings and tubing	Strength and corrosion	●
<b>Steam jacket supply pipework material</b>	Stainless steel 316 Customer specified	Suits most fluids Matched to application	●
<b>▼ Thrust bearing / motor pedestal</b>			
<b>Thrust bearing type</b>	Heavy duty bearing unit	Long life	●
<b>Thrust bearing lubrication</b>	Grease Oil	Matched to customer requirement	●
<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>Motor pedestal construction</b>	Heavy duty fabrication with machined abutments	Superior bearing alignment	●
<b>Monitoring</b>	Vibration monitoring points Temperature monitoring points	Assist planned maintenance	●
<b>Motor pedestal material</b>	Carbon steel Stainless steel 304L Customer specified		●
<b>▼ Coupling &amp; guard</b>			
<b>Coupling style</b>	Spacer type with metal membranes DBSE 100 / 180	Easy maintenance	●
<b>Construction</b>	Bored & keywayed with extraction holes	Ease of removal	●
<b>Balancing</b>	Inherent by design ISO 1940 G 2.5	Low vibration Prolonged pump life	●
<b>Manufacturer</b>	John Crane Customer specified	Matched to site standard	●
<b>Standard</b>	ATEX		
<b>Guard</b>	Two piece wrap around in stainless steel	Non sparking	●
<b>▼ Support plate</b>			
<b>Style</b>	ASME class 150 flange Circular / rectangular plate Customer specified	Sealed environment Cost benefit Matched to customer requirement	●
<b>Construction</b>	One piece with 4 lifting eye bolts	Rugged construction	●
<b>Standards</b>	ASME B16.5, ASME B16.47		●
<b>Earthing points</b>	2 off M10 studs / nuts / washers		●
<b>Material</b>	Carbon steel Stainless steel 304L Customer specified	Cost benefit Resistance to low temperature Matched to customer requirement	●
<b>▼ Driver</b>			
<b>Motor type</b>	Exna, Exe, Exde, Exd	Matched to area requirements	
<b>Motor mounting</b>	Flanged for vertical mounting (V1)		●
<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, Loher, Siemens or customer specified	Matched to site standard	
<b>▼ Paint</b>			
<b>Refinery specification</b>	2 coat system (Min DFT 200µm) – RAL 7004 (grey) Customer specification	Matched to site standard	●
<b>Offshore specification</b>	2 coat system (Min DFT 200µm) – RAL 7004 (grey) Customer specification	Matched to site standard	
<b>▼ Packing</b>			
<b>Flange blanking</b>	Metal closures with rubber gaskets		●
<b>Road</b>	Palletised & cling wrap		●
<b>Seafreight / airfreight</b>	Wooden box paper lined Wooden box with vacuum sealed bag	Long term storage Moisture free	