

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 interchangeability 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	API 610 / ISO 13709	API 610 / ISO 13709 (1.5 x MAWP)	●
Head & flow	ISO 9906	API 610 / ISO 13709	●
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 – 4 point	ISO 9906	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	●
Bearing bracket resonance	API 610 / ISO 13709	Mutual agreement	

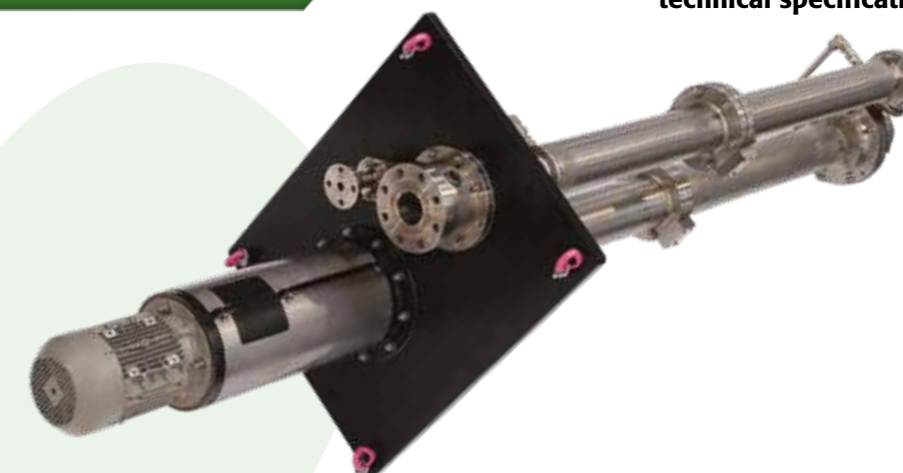
NDE		
Visual examination of cast surfaces	ASME V Article 9 / MSS SP55 (pressure containing castings only)	●
Dye penetrant of machined surfaces	Pressure containing castings only	
Dye penetrant of cast surfaces	Pressure containing castings only	
Dye penetrant of welds	Delivery pipework	
	Steam jacket	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

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

V Series – VS4 Sulphur pumps

(API 610 11th: 2010)

technical specification



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	API 610 11th : 2010, ISO 13709 : 2010 ATEX EC-Directive 94/9/EC
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	040x025x225 to 100x050x410
Design life	20 years (3 years uninterrupted operation)

Material options		
Material options	Casing	Impeller
A8 SS 316L / SS 316L	ASTM A351 CF 3M	ASTM A351 CF 3M
I1 Cast Iron / Cast iron	ASTM A278 Class 30	ASTM A278 Class 30
S1 Carbon steel / Cast iron	ASTM A216 WCB	ASTM A278 Class 30
D1 Duplex SS / Duplex SS	ASTM A890 Grade 4A	ASTM A890 Grade 4A
D2 Super Duplex SS / Super Duplex SS	ASTM A890 Grade 6A (UNS J93380)	ASTM A890 Grade 6A (UNS J93380)
Titanium / Titanium	ASTM B367 Gr C2	ASTM B367 Gr C2
Customer specified	Other alloys available on request including NACE compliant materials	Other alloys available on request including NACE compliant materials

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 Expanded PTFE	Covers most fluids 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 Semi open	Optimum efficiency 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 1940 G 2.5 ISO 1940 G 1.0	Prolonged pump life matched to customer requirement	●
▼ 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 Customer specified	Suits most fluids Matched to application	●
Line bearing type	Grooved bush	Optimised lubrication	●
Line bearing material	Carbon graphite / Resin Alternative design	Suits most fluids 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) Double cartridge Customer specified	Ease of maintenance Reduced emissions Matched to site standard	●
Seal plan	Plan 02 Plan 52, 53, 54, 74	Simplified construction 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 Customer specified	Suits most fluids 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 Temperature monitoring points	Assist planned maintenance	●
Motor pedestal material	Carbon steel Stainless steel 304L Customer specified		●
▼ Coupling & guard			
Coupling style	Spacer type with metal membranes DBSE 100 / 180	Easy maintenance	●
Construction	Bored & keywayed with extraction holes	Ease of removal	●
Balancing	Inherent by design ISO 1940 G 2.5	Low vibration Prolonged pump life	●
Manufacturer	John Crane 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 Circular / rectangular plate Customer specified	Sealed environment Cost benefit 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 Stainless steel 304L Customer specified	Cost benefit Resistance to low temperature Matched to customer requirement	●
▼ Driver			
Motor type	Exna, Exe, Exde, Exd	Matched to area requirements	
Motor mounting	Flanged for vertical mounting (V1)		●
Standards	ISO frames NEMA frames ATEX	Matched to site standard Hazardous area requirement	●
Supply	380 – 440 / 3 / 50, 440 – 460 / 3 / 60	Matched to site standard	
Manufacturers	ABB, Loher, Siemens or customer specified	Matched to site standard	
▼ Paint			
Onshore specification	2 coat system (Min DFT 200µm) – RAL 7004 (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 Wooden box with vacuum sealed bag	Long term storage Moisture free	

