

| ▼ 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 | Hard copy Electronic CD - Adobe (.pdf), ms office (.xls .doc) | ● |

| ▼ Testing | | | |
|--|--|--------------------------------|----------|
| Pump test | Test standard | Acceptance criteria | Standard |
| Hydrostatic | API610 / ISO13709 | API610 / ISO13709 (1.5 x MAWP) | ● |
| Head & flow | API610 / ISO13709 | ISO9906 Grade 1 | ● |
| Mechanical run - 1 hour at rated duty | API610 / ISO13709 | API610 / ISO13709 | |
| Mechanical run - 4 hours at rated duty | API610 / ISO13709 | API610 / ISO13709 | |
| NPSH at each test point | API610 / ISO13709 | API610 / ISO13709 | |
| Noise – single point at 1m | API610 / ISO13709 | Customer datasheet | ● |
| Vibration – FFT spectrum at each test point | API610 / ISO13709 | API610 / ISO13709 | ● |
| Motor pedestal resonance | API610 / ISO13709 | Customer / Amaranth agreement | |
| ▼ 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 | Delivery pipework | | |
| Positive Material Identification | Excludes minor components (nuts & bolts etc) | | |
| Radiography | Welds (pressure pipework) Castings - shot plan (critical areas) | | |
| Hardness report | NACE (certain materials only – please ask for details) | | |
| Various motor tests | | | |

* 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.

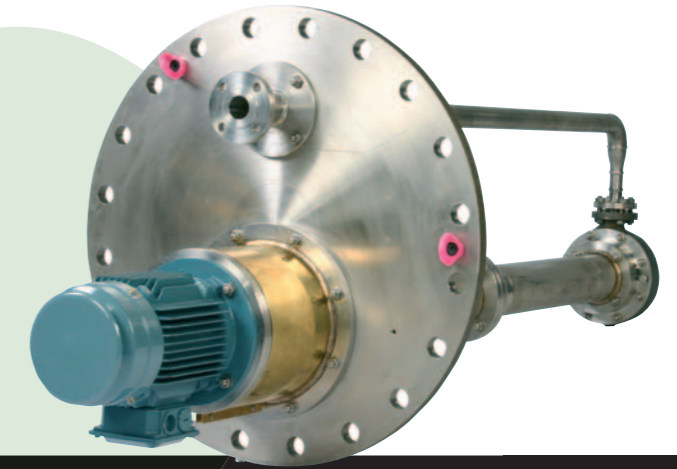
V Series – VS4 sump pumps

(API610 10th : 2004)

technical specification



Amarinth



| ▼ 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 10th : 2004, ISO13709 : 2003 ATEX EC-Directive 94/9/EC |
| Design pressure rating | 20 bar g at 20°C (pressure containing parts) |
| Operating temperature rating | -40°C to 100°C (standard construction) |
| Design temperature | 150° |
| Performance envelope | |
| Flowrate | Up to 500m ³ /h |
| Differential head | Up to 200m |
| Speed | Up to 3600 rpm |
| Configurations | ANSI mount flange Rectangular plate |
| Frame sizes | 040x025x145 to 200x150x410 |
| Design life | 20 years (3 years uninterrupted operation) |

| ▼ Materials | | |
|---|--|--|
| Materials | Casing | Impeller |
| A8 - SS 316 / SS 316 | ASTM A744 CF-8M | ASTM A744 CF-8M |
| I1 - Cast Iron / Cast Iron | ASTM A278 Class30 | ASTM A278 Class30 |
| S8 - Carbon Steel / SS 316 | ASTM A216 WCB | ASTM A744 CF-8M |
| S6 - Carbon steel / 12% Cr SS | ASTM A216 WCB | ASTM A217 Gr CA 15 |
| D1 - Duplex SS / Duplex SS | ASTM A890 Gr 1B CD-4MCuN | ASTM A890 Gr 1B CD-4MCuN |
| D2 - Super Duplex SS / Super Duplex SS | ASTM A890 Gr 5A (UNS J93404) | ASTM A890 Gr 5A (UNS J93404) |
| Hastelloy B / Hastelloy B | ASTM A949 Gr N-7M | ASTM A949 Gr N-7M |
| Hastelloy C / Hastelloy C | ASTM A494 GrCW-12MW | ASTM A494 GrCW-12MW |
| Monel / Monel | ASTM A494 GrM35-1 | ASTM A494 GrM35-1 |
| 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 | | | |
| Construction | One piece casting with integral suction cover and 3mm corrosion allowance | Minimal leakage path, prolonged pump life | ● |
| Fasteners | High tensile matched to casing Customer specified | Matched to fluid | ● |
| Casing gasket | Reinforced graphite Expanded PTFE Customer specified | Covers most fluids Covers certain acid duties Matched to site standard | ● |
| Wear ring | Suction side | Prolonged pump life | ● |
| Jacking screws | Matched to casing | Ease of maintenance | ● |
| Delivery pipe construction | Schedule 40 seamless pipe with butt welded joints | Strength & corrosion resistance | ● |
| Delivery pipe gasket(s) | CSF Spirol wound | Matched to customer requirement | ● |
| Delivery flange standard | ISO PN20 / ANSI 150 ISO PN16 | Matched to site standard | ● |
| Orifice plate | Loose tang type | Matched to customer requirement | ● |
| ▼ Impeller | | | |
| Construction | One piece casting | Strength & integrity | ● |
| Vanes | Francis type – 4 / 5 off | Low NPSHr & stable H/Q curve | ● |
| Style | Shrouded Semi open | Optimum efficiency Handles solids content in fluid | ● |
| Fixing | Keyed with retention nut Lockwasher | Ease of maintenance | ● |
| Wear ring | Suction side | Prolonged pump life | ● |
| Axial adjustment | Shaft lock nuts accessible above mounting plate | Optimised performance | ● |
| Hydraulic balancing | Backvanes | Low NPSHr | ● |
| Dynamic balancing | ISO 1940 G 2.5 ISO 1940 G 6.3 | Prolonged pump life | ● |
| ▼ Columns & line bearings | | | |
| Column construction | Fully welded with flanged & spigoted joints | Maximise strength & alignment | ● |
| Column sizes | 4", 6", 8" (dependant on pump size) | Optimised drive shaft stability | ● |
| Column materials | Stainless steel 316L Customer specified | Suits most fluids Material to match casing / fluid | ● |
| Line bearing type | Grooved bush | Clog resistant | ● |
| Line bearing materials | Carbon / PTFE Customer specified | Suits most fluids Matched to site standard | ● |
| Line bearing lubrication | Pumped fluid External flush | Simplified construction Improved pump life when solids present | ● |
| Maximum distance between bearings | As defined in API610 | Minimised vibration | ● |
| ▼ Shaft & shaft sealing | | | |
| Shaft diameters | 30mm, 40mm, 50mm | | ● |
| Line shaft coupling | Screwed sleeve Screwed sleeve (with locking device) Hardened sleeve | Longer life | ● |
| Shaft materials | Duplex stainless steel Customer specified | Material to match casing / fluid | ● |
| Seal types | Twin grease packed lip Single cartridge (dry running) Double cartridge | Lowest cost ATEX compliant Environmentally safer, ATEX | ● |
| Seal piping arrangements | None Plan 52, 53, 54 Customer specified | Simplified construction Match customers requirements | ● |
| Cartridge seal manufacturers | AES, Burgmann, John Crane or customer specified | Matched to site standard | ● |

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

