V Series - VS4 Petrochemical pumps (API 610 11th: 2010)

▼ 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	Documentation schedule	
(includes bronze pack)	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	Manufacturing databook	
(includes silver pack)	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	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	
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. Amarinth reserves the right to alter any information within this document without prior notification. © Copyright 2005-2017. Amarinth Limited. E&OE.





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.
Heavy duty modular design maximising flexibility to suit customer's application.
Advanced computer techniques including 3D modelling, FEA & CFD
API 610 11th: 2010, ISO 13709: 2010
ATEX EC-Directive 94/9/EC
20 barg at 38°C (pressure containing parts)
6.7 barg at 38°C (steam jacketing)
-40°C to 160°C (standard construction)
Up to 715 m ³ /h
Up to 225 m
Up to 1750 rpm
Flange mount
Plate mount (circular / rectangular)
040x025x225 to 200x150x325
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)
Hastelloy B / Hastelloy B	ASTM A494 Gr N 7M	ASTM A494 Gr N 7M
Hastelloy C / Hastelloy C	ASTM A494 Gr CW 12MW	ASTM A494 Gr CW 12MW
Monel / Monel	ASTM A494 Gr M35 1	ASTM A494 Gr M35 1
Titanium / Titanium	ASTM B367 Gr C2	ASTM B367 Gr C2
Customer specified	Other alloys available on request	Other alloys available on request
	including NACE compliant materials	including NACE compliant materials



Features	Technical notes	Benefits	Standard
- 0.11.11.05	Technical notes	Benefits	Standard
 ▼ Casing & delivery pipe Casing construction 	One piece casting with integral suction	Minimal leakage path, prolonged pump life	•
casing construction	cover and 3mm corrosion allowance	willima leakage path, protonged pump me	
	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	Strength & corrosion resistance	•
zemen, pipe communicin	butt welded joints	568 & 5555.5	
Delivery pipe Steam	Schedule 5 seamless pipe with	Strength & corrosion resistance	•
jacket construction	fillet weld joints	0	
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	
	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	Optimised performance	
	mounting plate	Chamaca henominance	
Hydraulic balancing	Backvanes	Low NPSHr	•
Dynamic balancing	ISO 1940 G 2.5	Prolonged pump life matched to	•
, 0		customer requirement	
	ISO 1940 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	Matched to site standard	
•	customer specified		



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Steam jacket supply lange standard ASME class 150 Steam jacket supply piework construction with compression fittings and tubing steam jacket supply pipework construction with compression fittings and tubing steam jacket supply pipework material Customer specified Matched to application Thrust bearing motor pedestal Thrust bearing motor pedestal Thrust bearing implication Grease	Factoria	Technical notes	Donaffa.	Chandand
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Steam jacket supply piework construction with compression fittings and tubing Steam jacket supply pipework with compression fittings and tubing Steam jacket supply pipework with compression fittings and tubing Stainless steal 316 Suits most fluids Thrust bearing ymotor pedestal Thrust bearing tyme Heavy duty bearing unit Long life		ACME I AFO		
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Stami jacket supply pipework material **Ihrust bearing y motor pedestal **Thrust bearing lubrication Oil Marchael Customer specified Marchael to application **Crease Oil Marchael to customer requirement **Design bearing life **E3,000 hours (L10) @ standard dutiles **Bunning temperature **Less than 40°C above embient **Long life, ATEX **Montor pedestal construction **Montor pedestal material **Staniless steel 304L **Customer specified **Coupling & guard** **Coupling & guard** **Coupling syle **Spacer type with metal membranes DBSE 100 / 180 **Construction **Bored & keywayed with extraction holes **Balancing **Inherent by design **Long life **Support plate **Support			Strength and corrosion	
Thrust bearing / motor pedestal Easy maintenance Design bearing life			Suits most fluids	
Thrust bearing type Heavy dury bearing unit Long life □ Primes bearing lubrication Oil Matched to customer requirement □ Design bearing life 2,0000 hours (L10) ⊕ standard duties □ Bunning temperature Less than 40°C above ambient Long life, ATEX □ Montor pedestal construction Montor pedestal construction Montor pedestal material □ Carbon steel □ □ Stainless steel 304L □ Customer specified □ Customer specified □ Construction □ Bored & keywayed with extraction holes □ Ease of removal □ Balancing □ Inherent by design □ Love vibration □ □ Balancing □ Inherent by design □ Love vibration □ □ Balancing □ Inherent by design □ Love vibration □ □ Balancing □ Stole 30 1940 G.2.5 □ Prolonged pump life □ Balancing □ The percent policy of the Customer specified □ Customer specified □ Stainless steel 30 1940 G.2.5 □ Prolonged pump life □ Balancing □ The percent policy □ The per				
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Oil Matched to customer requirement Design bearing life 25,000 hours (110) @ 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 Carbon steel Customer specified Coupling & guard Coupli	Thrust bearing type	Heavy duty bearing unit	Long life	•
Design bearing life	Thrust bearing lubrication	Grease		•
Design bearing life		Oil	Matched to customer requirement	
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Monitoring Vibration monitoring points Assist planned maintenance ↑ Temperature monitoring points ↑ Motor pedestal material Carbon steel ↑ Stainless steel 304!	Running temperature	Less than 40°C above ambient	Long life, ATEX	•
Temperature monitoring points Carbon steel Carbon steel Stainless steel 304L Customer specified Coupling & guard Coupling style Spacer type with metal membranes Easy maintenance DBSE 100 / 180 Construction Bored & keywayed with extraction holes Ease of removal DBSE 100 / 180 Construction Bored & keywayed with extraction holes Ease of removal DBSE 100 / 180 Construction Bored & keywayed with extraction holes Ease of removal DBSE 100 / 180 Construction Inherent by design Low wibration DBSE 100 / 180 Construction Inherent by design Low wibration DBSE 100 / 180 Customer specified Matched to site standard Standard ATEX DBSE 100 / 180 Customer specified Matched to site standard Standard ATEX Two piece wrap around in stainless steel Non sparking Standard ASME 200 ASME 200 Circular / Tectangular plate Cost benefit Customer specified Matched to customer requirement Construction One piece with 4 lifting eye bolts Rugged construction DBSE 200 Standards ASME 200 ASME 200 ASME 200 ASME 200 ASME 200 Carbon steel Cost benefit DBSE 200 Standards ASME 200 ASME 200 ASME 200 ASME 200 Customer specified Matched to customer requirement DINIER DINIER Motor type Exna, Exe, Exde, Exd Matched to area requirement Motor mounting Flanged for vertical mounting (V1) Matched to site standard Matched to site standard ATEX Supply ASD 440 / 3 / 50 , 440 - 460 / 3 / 60 Matched to site standard Matched to site standard ATEX Supply ASD 440 / 3 / 50 , 440 - 460 / 3 / 60 Matched to site standard Matched to site standard DBS	Motor pedestal construction	Heavy duty fabrication with machined abutments	Superior bearing alignment	•
Carbon steel Stainless steel 304L Customer specified	Monitoring	Vibration monitoring points	Assist planned maintenance	•
Stainless steel 304L Customer specified Coupling & guard Coupling style Spacer type with metal membranes DBSE 100 / 180 Construction Bored & keywayed with extraction holes Balancing Inherent by design IsO 1940 G Z.5 Prolonged pump life Manufacturer John Crane Customer specified Matched to site standard Standard ATEX Guard Two piece wrap around in stainless steel Non sparking ASME class 150 flange Style ASME class 150 flange Crustomer specified Matched to customer requirement Construction One piece with 4 lifting eye bolts Rugged construction Construction One piece with 4 lifting eye bolts Rugged construction Carbon steel Stainless steel 304L Resistance to low temperature Customer specified Matched to customer requirement Customer specified Matched to customer requirement Construction Finance ASME B16.5, ASME B16.47 Customer specified Matched to customer requirement Construction Finance ASME B16.5, ASME B16.47 Customer specified Matched to customer requirement Customer specified Matched to customer requirement Driver Motor type Exna, Exe, Exde, Exd Matched to customer requirement Motor mounting Flanged for vertical mounting (V1) Taindards Sign frames Matched to site standard ATEX Hazardous area requirement Manufacturers ABB, Loher, Siemens or customer specified Matched to site standard ATEX Hazardous area requirement Manufacturers ABB, Loher, Siemens or customer specified Matched to site standard Teanit Customer specification ABB, Loher, Siemens or customer specified Matched to site standard Manufacturers ABB, Loher, Siemens or customer specified Matched to site standard Teanit Customer specification ABB, Loher, Siemens or customer specified Matched to site standard Teanit Paint Customer specification ABC customer specification Matched to site standard Diffshore specification ABC customer specification Matched to site standard Diffshore specification Matched to site standard Teaching Customer specification Matched to site standard Diffshore specification Matched to site s		Temperature monitoring points		
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Customer specified Matched to site standard Standard 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		ISO 1940 G 2.5	Prolonged pump life	
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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		Customer specified	Matched to site standard	
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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 Exna, Exe, Exde, Exd 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 Matched to site standard ABB, Loher, Siemens or customer specified Matched to site standard → Paint Refinery 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 Wooden box paper lined Long term storage	Construction	One piece with 4 lifting eye bolts	Rugged construction	•
Carbon steel Cost benefit ● Stainless steel 304L Resistance to low temperature Customer specified Matched to customer requirement Motor type Exna, Exe, Exde, Exd 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, Loher, Siemens or customer specified Matched to site standard Paint Customer specification Matched to site standard Offshore specification 2 coat system (Min DFT 200µm) - RAL 7004 (grey) ● Customer specification Matched to site standard Pracking 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	Standards	ASME B16.5, ASME B16.47		•
Stainless steel 304L Resistance to low temperature Customer specified 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 Matched to site standard ATEX 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 Refinery 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 Long term storage	Earthing points	2 off M10 studs / nuts / washers		•
Customer specified Matched to customer requirement Motor type Exna, Exe, Exde, Exd Matched to area requirements Motor mounting Flanged for vertical mounting (V1) ● Standards ISO frames Matched to site standard ATEX 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 Refinery specification 2 coat system (Min DFT 200µm) − RAL 7004 (grey) ● Customer specification Matched to site standard ● 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	Material	Carbon steel	Cost benefit	•
Motor type Exna, Exe, Exde, Exd 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, Loher, Siemens or customer specified Matched to site standard Paint Paint Customer specification Matched to site standard Offshore specification 2 coat system (Min DFT 200µm) − RAL 7004 (grey) ● Customer specification Matched to site standard Packing 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		Stainless steel 304L	Resistance to low temperature	
Motor type Exna, Exe, Exde, Exd 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, Loher, Siemens or customer specified Matched to site standard ▼ Paint Customer specification Matched to site standard Offshore 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 Long term storage		Customer specified	Matched to customer requirement	
Standards ISO frames Matched to site standard				
Standards ISO frames Matched to site standard	Motor type		Matched to area requirements	
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, Loher, Siemens or customer specified Matched to site standard Paint Refinery specification 2 coat system (Min DFT 200µm) − RAL 7004 (grey) Customer specification Matched to site standard Offshore 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 Long term storage				•
ATEX 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 Refinery specification 2 coat system (Min DFT 200µm) − RAL 7004 (grey) Customer specification Matched to site standard Offshore 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 Long term storage	Standards			•
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 2 coat system (Min DFT 200μm) – RAL 7004 (grey) • Customer specification Matched to site standard Offshore specification 2 coat system (Min DFT 200μm) – RAL 7004 (grey) Customer specification Matched to site standard Packing Metal closures with rubber gaskets • Road Palletised & cling wrap • Seafreight / airfreight Wooden box paper lined Long term storage				
Manufacturers ABB, Loher, Siemens or customer specified Matched to site standard Refinery specification 2 coat system (Min DFT 200μm) − RAL 7004 (grey) ■ Customer specification Matched to site standard Offshore specification 2 coat system (Min DFT 200μm) − RAL 7004 (grey) Customer specification Matched to site standard ▼ Packing Metal closures with rubber gaskets ■ Road Palletised & cling wrap ■ Seafreight / airfreight Wooden box paper lined Long term storage				
▼ Paint Refinery specification 2 coat system (Min DFT 200μm) − RAL 7004 (grey) Customer specification 3 coat system (Min DFT 200μm) − RAL 7004 (grey) Customer specification 4 coat system (Min DFT 200μm) − RAL 7004 (grey) Customer specification Flange blanking Metal closures with rubber gaskets Road Palletised & cling wrap Seafreight / airfreight Wooden box paper lined Long term storage				
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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	Off-1	•		
▼ Packing Metal closures with rubber gaskets ● Road Palletised & cling wrap ● Seafreight / airfreight Wooden box paper lined Long term storage	Uttshore specification		· · · · · · · · · · · · · · · · · · ·	
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Seafreight / airfreight Wooden box paper lined Long term storage				•
	Road	- ·		•
Wooden box with vacuum sealed bag Moisture free	Seatreight / airtreight			
		wooden box with vacuum sealed bag	ivioisture tree	