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	
Silver Pack (Includes bronze pack)	Standard pump GA drawing	
	Hydrostatic test certificate	
	Pump HQ performance test certificate	
	Spare parts list – commissioning	
	Type 2.2 certificates (* pressure containing parts only) - only if contracted	
Gold pack (Includes silver pack)	Quality plan	
	Progress reports (monthly)	
	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	
Documentation format	Hard copy	●
	Electronic CD - Adobe (.pdf), ms office (.xls .doc)	

Testing			
Pump test	**Test standard**	**Acceptance criteria**	**Standard**
Hydrostatic	BSEN25199 / ISO5199	BSEN25199 / ISO5199 (1.5 x MAWP)	●
Head & flow (reduced length)	BSEN25199 / ISO5199	ISO9906 Grade 2	
	BSEN25199 / ISO5199	ISO9906 Grade 1	
Mechanical run - 1 hour at rated duty	Amarinth procedure	Amarinth procedure	
Mechanical run - 4 hours at rated duty	Amarinth procedure	Amarinth procedure	
NPSH – single point (close coupled)	BSEN25199 / ISO5199	ISO9906 Grade 2	
	BSEN25199 / ISO5199	ISO9906 Grade 1	
NPSH – 4 points (close coupled)	BSEN25199 / ISO5199	ISO9906 Grade 2	
	BSEN25199 / ISO5199	ISO9906 Grade 1	
Noise – single point at 1m	BSEN12693:2000	Mutual Agreement	
Vibration – single point	BSEN25199 / ISO5199	BSEN25199 / ISO5199	

NDT	
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	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 columns, impeller hubcap & nut. 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.

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T Series – Vertical mounted tank top pumps

(ISO 5199:2000)

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	ISO5199 : 2000 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°C
Performance envelope	
Flowrate	Up to 500m³/h
Differential head	Up to 200m
Speed	Up to 3600 rpm
Configurations	Rectangular plate ANSI mount flange
Frame sizes	040x025x145 to 200x150x410
Design life	20 years (2 years uninterrupted operation)

Materials		
Materials	**Casing**	**Impeller**
SS 316 / SS 316	ASTM A744 CF-8M	ASTM A744 CF-8M
Cast Iron / Cast Iron	BS EN 1561 Gr EN-GJL-250	BS EN 1561 Gr EN-GJL-250
Cast Iron / SS 316	BS EN 1561 Gr EN-GJL- 250	ASTM A744 CF-8M
SG Iron / SS 316	BS EN 1563 Gr EN-GJS-400-18-LT	ASTM A744 CF-8M
Carbon Steel / SS 316	ASTM A216 WCB	ASTM A744 CF-8M
Carbon steel / 12% Cr SS	ASTM A216 WCB	ASTM A217 Gr CA 15
Duplex SS / Duplex SS	ASTM A890 Gr 1B CD-4MCuN	ASTM A890 Gr 1B CD-4MCuN
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

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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	Matched to fluid	●
	Customer specified		
Casing gasket	Reinforced graphite	Covers most fluids	●
	Expanded PTFE	Covers certain acid duties	
	Customer specified	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		●
Delivery flange standard	ISO PN20 / ANSI 150	Matched to site standard	●
	ISO PN16		
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	Optimum efficiency	●
	Semi open	Handles solids content in fluid	
Fixing	Keyed with retention nut	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	Static		●
	ISO 1940 G 6.3		
	ISO 1940 G 2.5	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	Suits most fluids	●
	Customer specified	Material to match casing / fluid	
Line bearing type	Grooved bush	Clog resistant	●
Line bearing materials	Carbon / PTFE	Suits most fluids	●
	Customer specified	Matched to site standard	
Line bearing lubrication	Pumped fluid	Simplified construction	●
	External flush	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	Lowest cost	●
	Single cartridge (dry running)	ATEX compliant	
	Double cartridge	Environmentally safer, ATEX	
Seal piping arrangements	None	Simplified construction	●
	Plan 52, 53, 54	Match customers requirements	
	Customer specified		
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	Assist planned maintenance	
	Temperature sensor location points		
Motor pedestal materials	Carbon steel		●
	Stainless steel 316L		
	Customer specified		
▼Coupling & guard			
Coupling style	Non spacer type with metal membranes	Lowest cost	●
	Spacer type with metal membranes	Easy maintenance	
	Customer specified	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	Rectangular plate	Lowest cost	●
	ANSI 150 flange	Sealed environment	
	Customer specified	Matched to customer requirement	
Construction	Plate with 4 lifting points	Rugged construction	●
	Blind flange with 3 lifting points		
Standards	ANSI B16.5, ASME B16.47		
Earthing points	2 off M10 screws		●
Material	Carbon steel	Lowest cost	●
	Stainless steel 316	Resistance to low temperature	
	Customer specified		
▼Driver			
Motor type	Safe area, EExN, EExd, EExde, Exe,	Matched to area requirements	
Motor mounting	Flanged for vertical mounting		●
Standards	ISO frames	Matched to site standard	●
	NEMA frames		
	ATEX	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			
Industrial specification	Air drying alkyd - Green Black 233		●
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		

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