

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

NDT			
Pump test	Test standard	Acceptance criteria	Standard
Hydrostatic	BSEN25199 / ISO 5199	BSEN25199 / ISO 5199 (1.5 x MAWP)	●
Head & flow (reduced length)	BSEN25199 / ISO 5199	ISO 9906 Grade 2	
	BSEN25199 / ISO 5199	ISO 9906 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 / ISO 5199	ISO 9906 Grade 2	
	BSEN25199 / ISO 5199	ISO 9906 Grade 1	
NPSH – 4 points (close coupled)	BSEN25199 / ISO 5199	ISO 9906 Grade 2	
	BSEN25199 / ISO 5199	ISO 9906 Grade 1	
Noise – single point at 1m	BSEN12693:2000	Mutual Agreement	
Vibration – single point	BSEN25199 / ISO 5199	BSEN25199 / ISO 5199	

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



## T Series – Vertical mounted tank top pumps

(ISO 5199 : 2002)

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 as standard, longer length available on request.
Construction	Heavy duty modular design maximising flexibility to suit customer's application.
Design methodology	Advanced computer techniques including 3D modelling, FEA & CFD
Design standards	ISO 5199 : 2002 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 500m <sup>3</sup> /h
Differential head	Up to 225m
Speed	Up to 3600 rpm
Configurations	ANSI mount flange Rectangular plate
Frame sizes	040x025x145 to 200x150x410
Design life	20 years (2 years uninterrupted operation)

Material Options	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 6A (UNS J93380)	ASTM A890 Gr 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 including NACE compliant materials	Other alloys available on request including NACE compliant materials

Features	Technical notes	Benefits	Standard
<b>▼ Casing &amp; delivery pipe</b>			
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		●
Delivery flange standard	ISO PN20 / ANSI 150 ISO PN16	Matched to site standard	●
Orifice plate	Loose tang type	Matched to customer requirement	
<b>▼ Impeller</b>			
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 and 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	Static ISO 1940 G 2.5 ISO 1940 G 6.3	Prolonged pump life	●
<b>▼ Columns &amp; line bearings</b>			
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	●
<b>▼ Shaft &amp; shaft sealing</b>			
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	Cost benefit 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
<b>▼ Thrust bearing / motor pedestal</b>			
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		●
<b>▼ Coupling &amp; guard</b>			
Coupling style	Non spacer type with metal membranes Spacer type with metal membranes Customer specified	Cost benefit Easy maintenance Matched to site standard	●
Construction	Bored & keywayed	Easy removal	●
Balancing	Inherent by design Dynamic to ISO 1940 G 2.5 (hubs only)	Low vibration Prolonged pump life	●
Manufacturers	John Crane Customer specified	Matched to site standard	●
Standards	ATEX		
Guard	Single piece wrap around in SS 304L	Non sparking/ATEX compliant	●
<b>▼ Support plate</b>			
Style	ANSI 150 flange Plate flange Rectangular plate Customer specified	Sealed environment Cost benefit Matched to customer requirement	●
Construction	Blind flange with lifting points Plate with 4 lifting points	Rugged construction	●
Standards	ANSI B16.5, ASME B16.47		●
Earthing connections	2 off M10 tapped holes		●
Material	Carbon steel Stainless steel 316 Customer specified	Cost benefit Resistance to low temperature	●
<b>▼ Driver</b>			
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	
<b>▼ Paint</b>			
Industrial specification	Air drying alkyd – Bgreen Black 233		●
Refinery specification	3 coat system (Min DFT 225µm) – off grey		
Offshore specification	4 coat system (Min DFT 300µm) – off grey		
Customer specification		Matched to site standard	
<b>▼ Packing</b>			
Road	Palletised & cling wrap		●
Seafreight	Wooden box paper lined Wooden box with vacuum sealed bag	Long term storage Moisture free	
Airfreight	Wooden box paper lined Wooden box with vacuum sealed bag	Long term storage Moisture free	

