

INDUSTRIAL AEROSPACE & DEFENSE



Product Portfolio & Manufacturing Facility

Allweiler India Pvt. Ltd. (Formerly known as Tushaco Pumps)

APAC Distributors

Hiren Mistry - Head – Regional Strategic Business Development, India Pumps

Date: 03rd June 2021

India Leadership Team



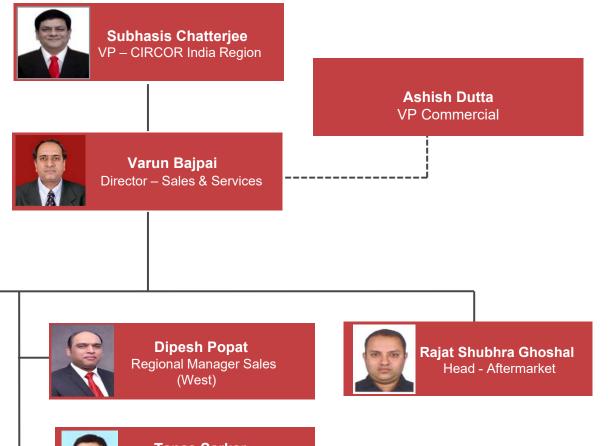
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	Reporting (Subhasis Chatterjee) TOTAL
Subhasis Chatterjee VP – CIRCOR India Region	Direct Reporting03MumbaiMatrix Reporting01Outsourced01
	DamanDirect Reporting01Outsourced00
Shraddha Rajeshirke Executive Assistant	TOTAL 06
	Prabodh Bade Finance, CIRCOR India
Varun Bajpai Director – Sales & Services	
Roxy Rodrigues Director – HR, CIRCOR India	
Hiron Mistry	



Sales & Services Leadership Team



	Reporting (Director - Sales & Services)					
Aftermarket	Direct Reporting	01				
RM - West	Direct Reporting	01				
RM - North	RM - North Direct Reporting					
RM - South	Direct Reporting	01				
RM - East	Direct Reporting	01				
1	OTAL	05				





Pankaj Mishra Regional Manager Sales (North)



Jayaraj Selvaraj Regional Manager Sales (South)



Tapas Sarkar Regional Manager Sales (East)

CIRCOR India Footprint



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CIRCOR India Plants



Allweiler India Pump Division



Facility Size: 102K Sqft built up

Products:

- 3-Screw Pumps ٠
- 2-Screw Pumps •
- **PC-Single Screw Pumps** ٠
- Gear-Lobe-Shuttle Block Pumps ٠
- Lube Oil and Fuel Oil Skids / • Alignments
- Global Engineering
- - **Products:** Industrial Valves .
 - **Refinery Valves**
 - Aerospace & Defense Valves

Facility Size: 103K Sqft built up

Systems

- Global Engineering
 - Global Sourcing

Fully Integrated Manufacturing Facilities



CIRCOR Flow Technologies

Valve Division

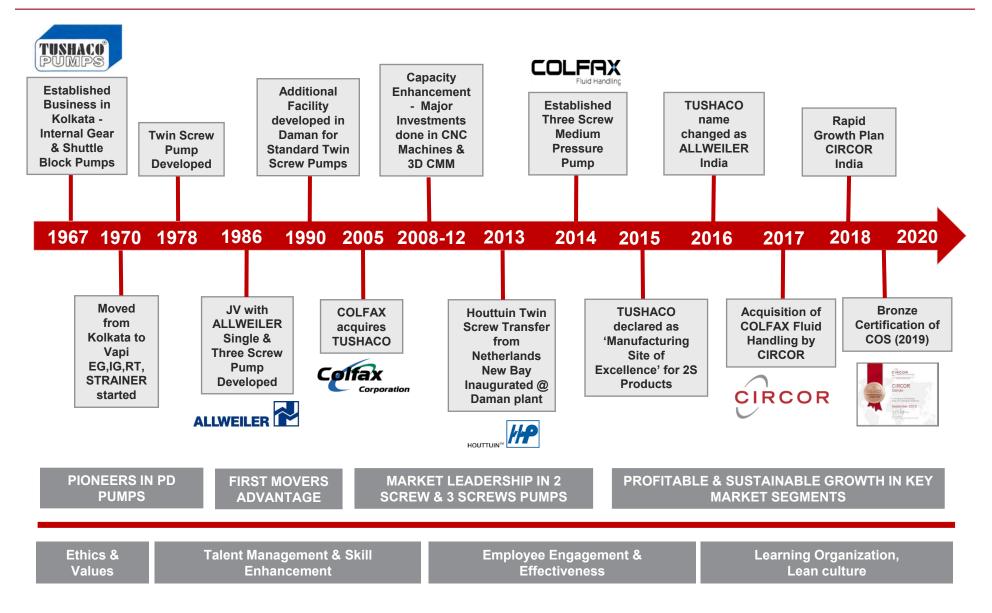




Cell layouts gives an advantage of Laser focus on Products and Processes

Journey of Allweiler India





Markets & Applications





Key Markets Applications

Power Generation	Fuel loading, Unloading, transfer, burner and injection, Jacking oil, Seal oil, lubrication systems applications
General Industry	Steel, Cement, System Packagers, Textile, Paper, Sugar, Rayon, Distilleries, Food & Beverages etc.
Oil & Gas	Crude oil gathering, pipeline services, unloading and loading, transfer, refinery process services
	Transfer of Bitumen, Residual Fuel Oil, Heavy Fuel Oil , Vacuum Residue, Diesel, Lubricating oil
Chemical Process	s Specialty chemicals, Paint, Varnishes, Polymers, Adhesives, Additives, Solvents
Marine & Navy	Lube Oil, hydraulics & fuel pumps; water & ballast pumps; sludge & wastewater pumps; cooling pumps

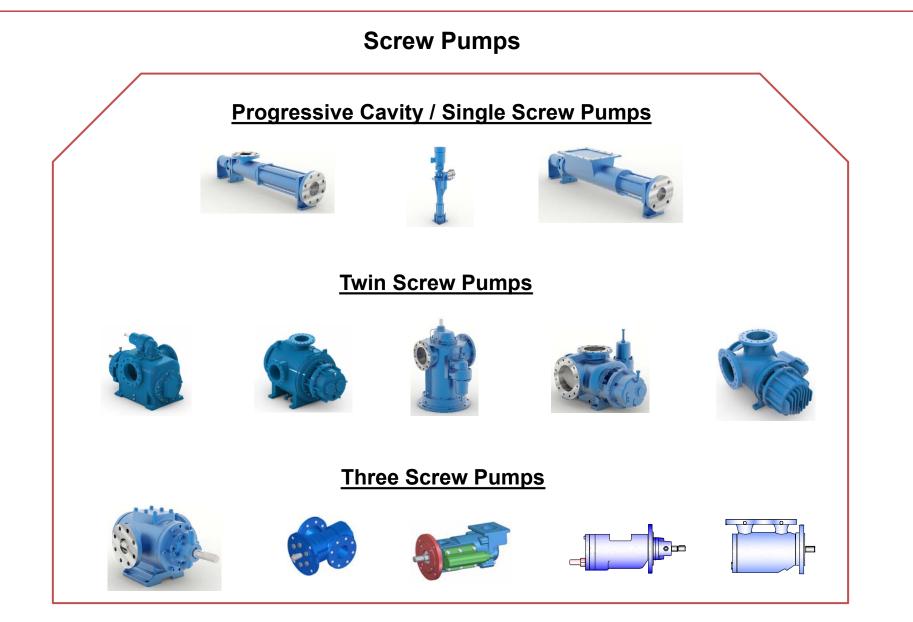
CIRCOR provides deep expertise in critical Applications for Key Markets

Major Customers











Gear / Lobe Pumps



Speciality Centrifugal Pumps (import from Germany or China)





Special Alignments



Pump skid for Vaccume Residue – IOCL Paradip



Pump Skid for Asphalt – HPCL Mahul



Pump Skid for Edible Oil – Adani Wilmer



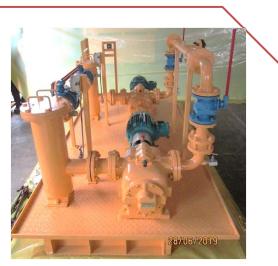
Skid / Systems



Barge Unloading Skid with Twin Screw Pumps



HFO Transfer Skid with Three Screw Pumps



HFO Unloading Pump Skid



HFO Unloading Skid with Three Screw Pumps

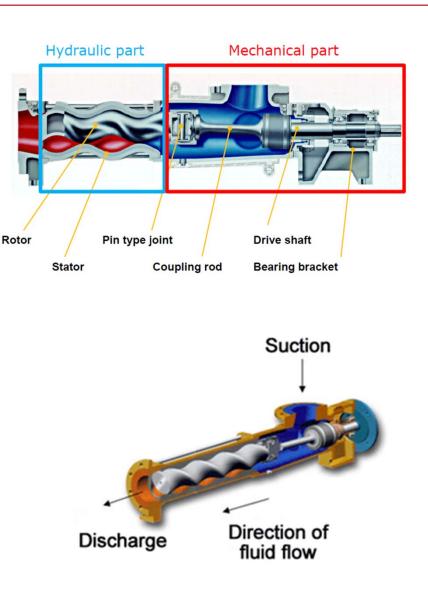


	٤	Screw F	oumps			Non Screw Pumps Strain			ner			
Sing	gle	Τv	vo	Th	ree	L	obe	10	50			
Hor.	Ver.	Hor.	Ver.	Hor.	Ver.	RT	RTBP	IG	EG	SL	SIMPLEX	DUPLEX
T1S	T1S VT	216 – TDSH	211- TDSV	T3ST	T3SVT	RT-03	RTBP-10	R-1-G	25EG	R-20-DS	25	25
T1SB		236 – TDLH	231 – TDLV	T3SM		RT-10	RTBP-20	R-20DG	50EG	R-50-SL	40	40
T1SH		248- TDAH		T3SI		RT-15	RTBP-40	TIG-S-100	75EG	R-100-SL	50	50
T1SHB		229, 249		T3SFP		RT-20		TIG 100	100EG	R-200-SL	65	65
T1S ES		TT		T3SZ		RT-40		TIG 150	150EG		80	80
T1SB ES				SDF		RT-80		TIG 200	HPG1		100	100
T1S AU				TUSET		RT-125			HPG2		125	125
T1S EW									HPG3		200	200
T1SB EW									HPG4		250	250
											300	300

Single Screw Pumps Working Principle & Design



- Single Screw Pump is a Positive Displacement pump and actual Pumping elements are Rotor and Stator
- The Single helical Rotor rolls eccentrically in a double threaded helix Stator of twice the pitch length
- A series of sealed cavities 180 degree are created that progress from Suction to Discharge
- The opposing cavities fill and empty simultaneously resulting in a pulsation less flow
- The fluid travels axially with relatively low velocity and minimal agitation
- The Stator is made of a resilient elastomeric material and vulcanized to the stator pipe/tube providing a slight radial interference of the tool steel / Stainless steel Rotor in the Stator
- The elastomer Stator adds abrasion resistance beyond that of conventional rotary pumps
- The particle tends to imbed rather than abrade the elastomer Stator and also allowing deformation to partially accommodate the solid particles
- The compression fit of the Rotor and Stator enables the pump to handle gaseous liquids and low viscosity liquids
- The Pressure capabilities of the pump are a function of the number of times of the progressive seal lines are repeated



Single Screw Pumps

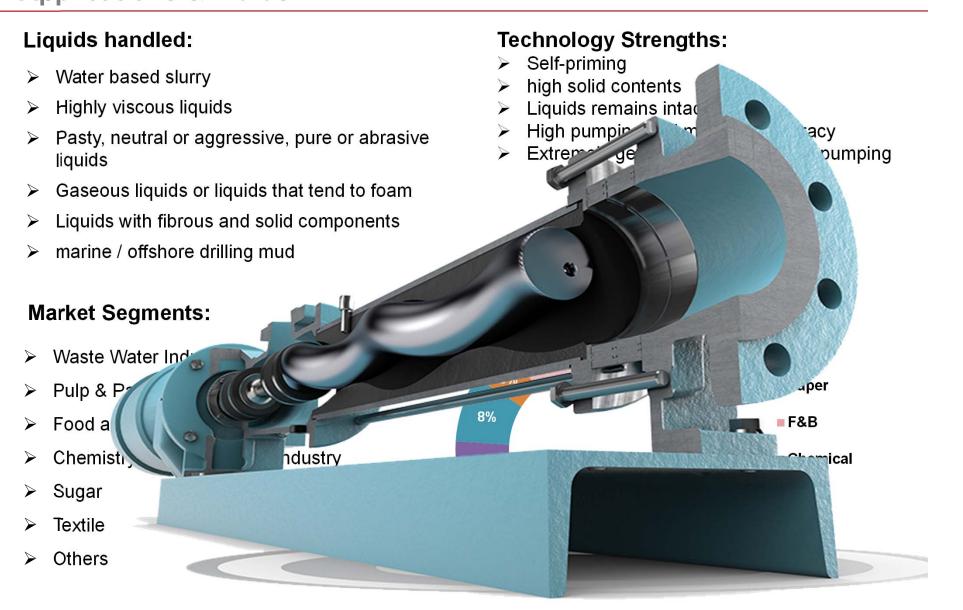
Technical Parameters



Series	T1S, T1SB, T1SES, T1SVT	
Model	12, 25, 32, 50, 100, 200, 380, 550, 750, 1450, 2700, SMP2	
Capacity:	5 to 2700 lpm	T1S SINGLE STAGE
Mounting	Horizontal and Vertical	
Sealing	Gland Packing and Mechanical sealing	
Viscosity Range	1 to 100,000 cSt.	T1S DOUBLE STAGE
Temperature	Up to 120°C	
Rotor and Stator Stage	Single & Double Stage	T1SB SINGLE STAGE T1S VT SINGLE STAGE
Differential Pressure	Single Stage Std. Stator: 6 bar Single Stage EW Stator: 12 bar Double Stage Std. Stator: 12 bar	
	Double Stage EW Stator: 24 bar	T1S ES DOUBLE STAGE

Single Screw Pumps Applications & Fluids



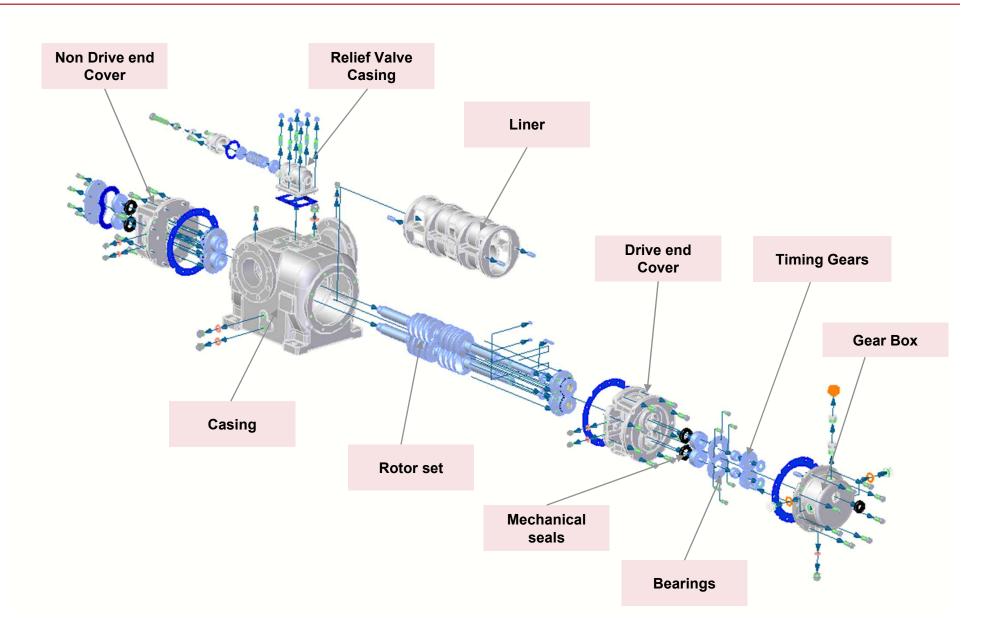






Exploded View

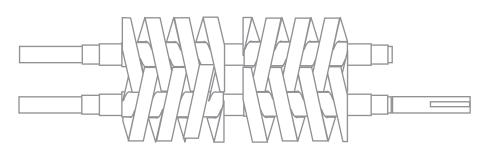


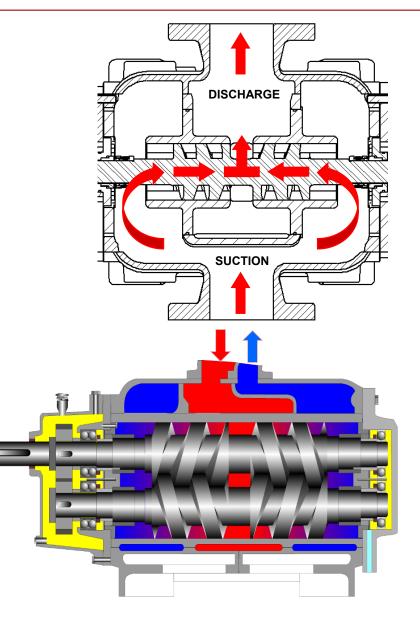


Working Principle



- The Houttuin double entry twin geared screw pump is a self priming, rotary positive displacement pump
- Two Screw Pumps utilizes two intermeshing screws synchronized by a set of external timing gears, which are assembled into a close fit figure-eight-shaped housing
- Flow splits to each end of pump and is transferred to a center discharge port via cavities formed by screw threads and housing
- Symmetry of double-ended pump provides axial hydraulic balance of rotors.
- Timing Gears and bearings maintain clearances between screw flanks
- Pumps operate at a wide range of speeds while dealing with conventional and unconventional fluids with properties like ultra-low and ultra-high viscosity, gas entrainment, contamination and corrosives





Performance Data



Series	Product	Max Capacity	Max Inlet Pressure	Max Outlet Pressure	Viscosity Range	Temperature	
136		20 m ³ /h	1 bar	10 bar	0.6 to 1500 cSt	Lin to 120 °C	
130	2	330 lpm			0.6 10 1500 CSI	Up to 120 °C	
211		300 m ³ /h	10 bar	16 bar	0.6 to 1500 cSt	-5 °C to 100 °C	
211		5000 lpm	TO Dai		0.0 10 1500 CSI	-5 C 10 100 C	
215	245	490 m ³ /h	N.A.	10 bar	20 to 760 cSt	Lin to 90°C	
215		8165 lpm	N.A.		2010760031	Up to 80°C	
216	216	1100 m ³ /h	10 bar	16 bar	0.6 to 1500 cSt	-5 °C to 100 °C	
210		18335 lpm	TO Dai		0.0 10 1500 CSI		
231		300 m ³ /h	10 bar	16 bar	0.6 to 1500 cSt	-5 °C to 100 °C	
231		5000 lpm	TO Dai	To bai	0.0 10 1300 031		
236	6 A	6000 m ³ /h	40 bar	40 bar	0.6 to 1500 cSt	-5 °C to 140 °C	
230	A	100000 lpm	40 bai	40 bai	0.0 10 1300 031		
249		2500 m³/h	10 bar	16 bar	0.6 to 1500 cSt	Up to 140 °C	
243		41675 lpm			0.010 1000 001	00101400	
MR		4175 m³/h	40 bar	40 bar	1 to 5000 cSt	5°C to 150 °C	
		69595 lpm					
тт		3400 m³/h		20 bar	1 to 5000 cSt	Up to 140 °C	
		56675 lpm	-		1000000		

Liquids & Applications



Liquid Handled:

- ➤ Fuel Oils
- Light Oils
- Heavy Oils
- Hydraulic Oils
- Lube Oils
- > Water
- Seawater
- Crude Oil
- Edible Oil
- Water based Paints
- Bitumen,
- Asphalt
- Polymer solutions

Major Applications:

- Bilge/Ballast Pumps
- Cargo Pumps
- General Service
- Pipeline Transport
- Transfer Pumps
- Loading & Unloading
- Fuel Forwarding
- Lube Oil Pumps
- Hydraulic System Pumps

Technology Strengths:

- High reliability, long life
- > Dry running for short spell
- Contamination tolerant
- Wide viscosity range
- Excellent suction capability



Special Executions





POLAR DISCOVERY SINGAPORE MODEL 231.180/122



ALLWEILER NORWAY MODEL: 217.180/122



HANKOOK: KORIA MODEL:248.140(150)/036



CIRCOR- ITALY MODEL: 326.190(210)/66



SEABULK TANKER -USA MODEL: 211.244/136



DAEWOO KOREA MODEL: 211.118/78



CRUSADER CANADA MODEL:MR-150

Twin Screw Pumps Special Executions







Vertical Twin Screw Pumps supplied to French Shipyard Chantiers de L'Atlantique through CIRCOR, France CHANTIERS DE L'ATLANTIQUE





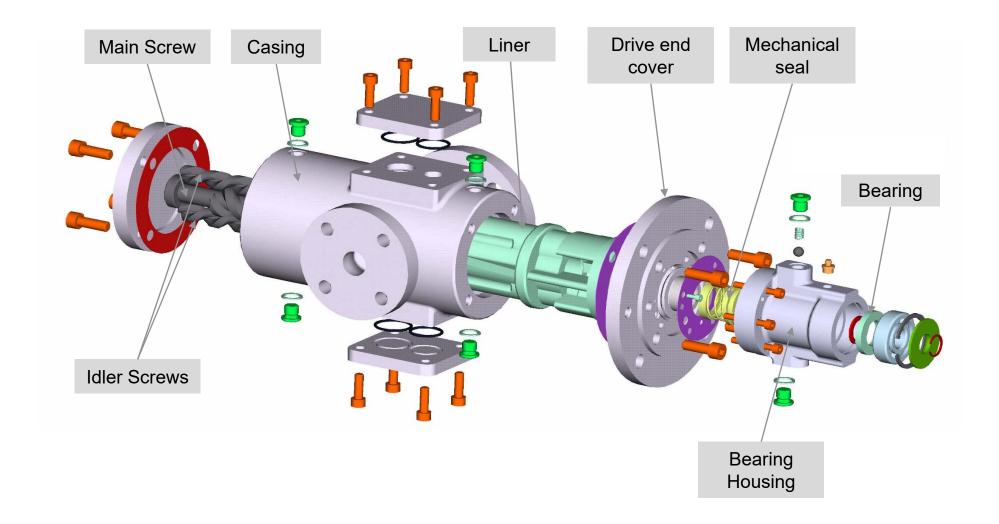
TT Series Twin Screw systems supplied to ENI, Italy





Three Screw Pumps Exploded View

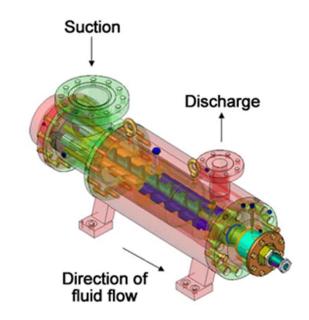


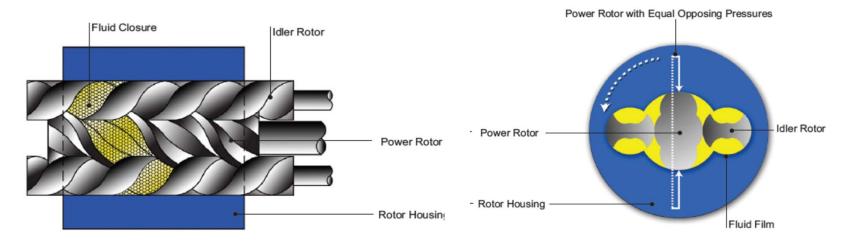


Working Principle



- One Power screw and two Idler screws running in the three precision bores in the housing or liner.
- Profiled Screws form a liquid tight seal between the threads.
- As the screws rotate, cavities are formed, where liquid gets trapped and conveyed from suction chamber to discharge chamber.
- The power rotor does not rotate the idlers. The hydraulic forces acting on screw flanks turn the idlers without torque thus reducing the friction.
- The idlers simply roll over the root diameter of power screw and float freely in housing/liner bores.
- A balance piston on Power rotor takes care of axial thrusts.
- Ball bearing is only for axial positioning of Rotor and safer operation of mechanical seal.







Fluids & Applications



Performance Data

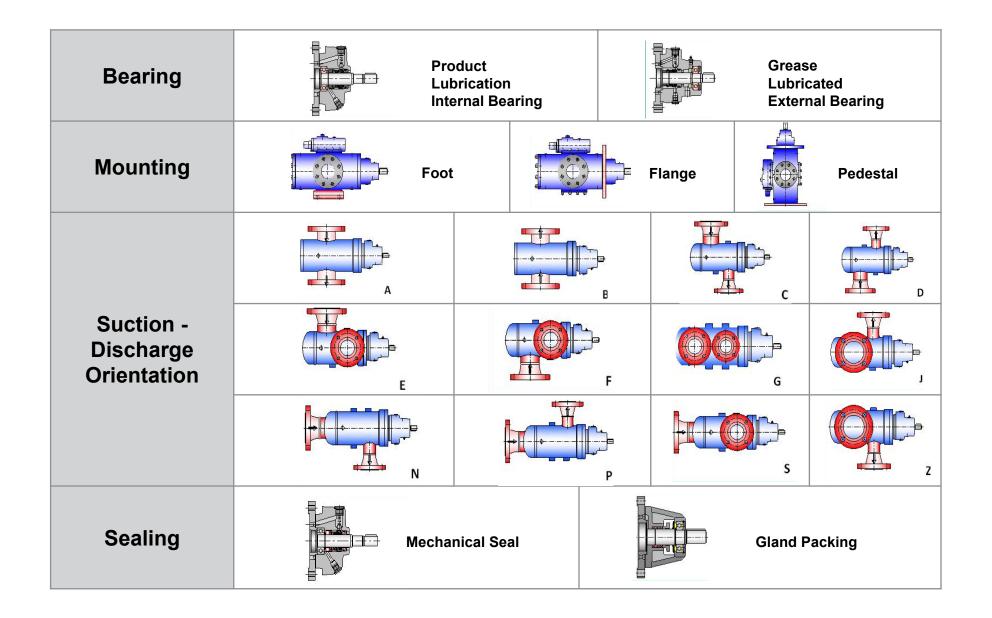


			Performance Data					
Series	Application	Product	Capacity	Differential Pressure max.	Viscosity Range	Temperatur e max.		
T3SI	TransferLubricationCooling		0.9 - 16.5 m ³ /h, 16.5 – 430 lpm	12 bar	15 to 760 cSt	80 °C		
T3SZ	TransferForwardingLubricationCooling		9.3 m ³ /h, 155lpm	12 bar	15 to 760 cSt	125 °C		
T3ST	 Transfer Forwarding Fuel Firing Sealing Lubrication Cooling Governing 		1.8 - 170 m ³ /h, 30 - 2835 lpm	40 bar	12 to 760 cSt	200 °C		
T3SFP	Fuel FiringBoosterLubrication		0.31 - 3.39 m ³ /h 5.1 - 56 lpm	40 bar	15 to 760 cSt	125 °C		
TUSET	 Cooling Transfer Lubrication Cooling 		1.8 – 3.3 m ³ /h 30 – 55 lpm, 12 – 15 m ³ /h 200 – 250 lpm	40 bar	3 to 760 cSt	125 °C		

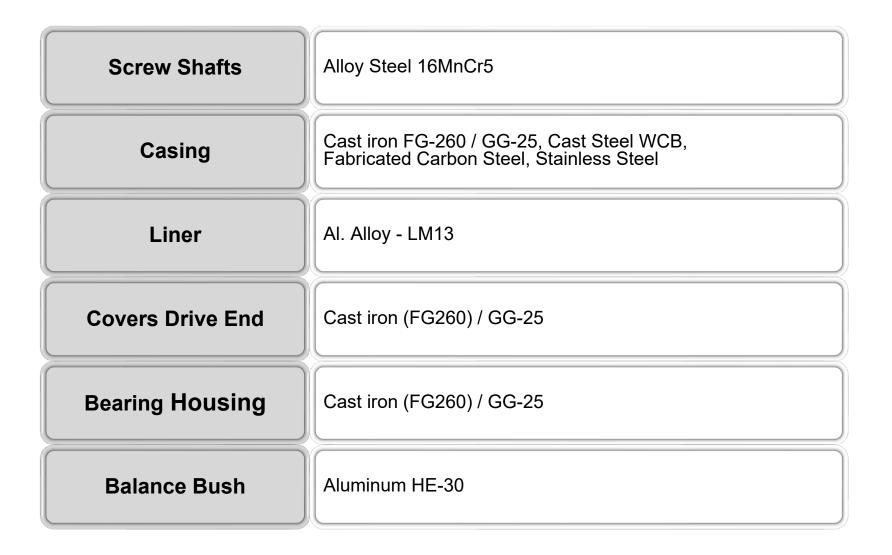
For Special requirements, contact CIRCOR Sales Team

Three Screw Pumps Design Variants





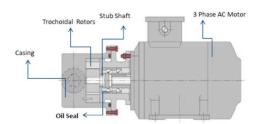




Lobe Pumps – RTBP Series







Technical Parameters:

PRODUCT SPECIFICATION	IS AND FEATURES:
Rotors	Sintered Iron
Casing	Cast Iron
Shaft	20MnCr5
Seal	Oil Seal (Nitrile)
Capacity	10 - 40 lpm
Outlet Pressure	Up to 6 bar
Viscosity	6 - 750 cSt
Temperature	Up to 80°C
Speed	Up to 1450 rpm
Drive	Direct only
Rotation	Anti-clockwise facing pump drive shaft

Applications:

- Transfer of lubricating oils
- Pressure lubrication and cooling of bearings
- il circulation through cooler, gear lubrications, etc.
- Transfer of fuel oils

Value Propositions:

- Capable of running at direct motor speed
- Considerable saving in power
- Low noise and vibrations
- Smooth, pulsation free flow
- Very compact installation
- High suction lift
- Negligible maintenance
- Ease of dismantling and assembly
- Elimination of bearings
- Compact design



Performance Data:

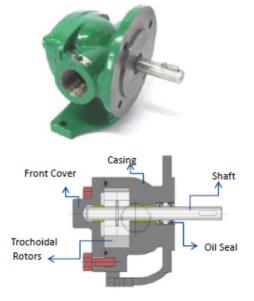
PERFORMANCE DATA:								
Dumm Madal	Capacity /		Suction &					
Pump Model	Power	0	2	4	6	Discharge		
RTBP-10	Capacity (lpm)	11.8	11.54	11.11	10.71	4/2// DCD		
	Power (kW)	0.16	0.22	0.28	0.34	1/2" BSP		
	Capacity (lpm)	25	24	22	21	3/4" BSP		
RTBP-20	Power (kW)	0.26	0.36	0.45	0.55			
DTDD 40	Capacity (lpm)	45	44	43	41	2 / 4// DCD		
RTBP-40	Power (kW)	0.21	0.3	0.5	0.7	3/4" BSP		

Testing medium: Lube Oil Viscosity: 75 cSt Speed: 1450

* For special requirements, contact CIRCOR Sales Team

Lobe Pumps – RT Series





Technical Parameters:

PRODUCT SPECIFIC	TIONS AND FEATURES:
Rotors	Sintered Iron, Cast Iron
Casing	Cast Iron
Shaft	SS 410
Seal	Oil Seal (Nitrile) / Gland / Mechanical Seal
Capacity Outlet	03 - 200 lpm
Pressure	Up to 8 bar
Viscosity	6 - 1500 cSt
Temperature	Up to 80°C
Speed	Up to 1450 rpm
Drive	Direct only
Rotation	Anti-clockwise facing pump drive shaft

Applications:

- Transfer of lubricating oils
- Pressure lubrication and cooling of bearings
- Oil circulation through cooler, gear lubrications, etc.
- Transfer of fuel oils
- Boosting of fuel oil pressure for oil burner service and fuel injection pumps

Value Propositions:

- High speed operation and vibration free running
- Smooth, pulsation free flow
- Negligible maintenance
- High suction lifts and low noise level
- High volumetric efficiency and overall efficiency
- Compact and light weight design
- Ease of dismantling and assembly

Lobe Pumps – RT Series



Performance Data:

PERFORMANCE DATA:

Dumm Mandal	Capacity /			Suction &			
Pump Model	Power	0	2	4	6	8	Discharge
PT 00	Capacity (Ipm)	3.85	3.72	3.60	3.45	3.00	
RT-03	Power (kW)	0.09	0.12	0.17	0.20	0.24	1/4" BSP
DT 40	Capacity (Ipm)	11.8	11.54	11.11	10.71	10	1/2" BSP
RT-10	Power (kW)	0.16	0.22	0.28	0.34	0.45	
RT-15	Capacity (Ipm)	17.6	17	16	15.5	15	1/2" BSP
	Power (kW)	0.24	0.3	0.38	0.48	0.58	
DT 20	Capacity (Ipm)	25	24	22	21	19	1/2" BSP
RT-20	Power (kW)	0.26	0.36	0.45	0.55	0.7	
DT 40	Capacity (Ipm)	45	44	43	41	40	1" BSP
RT-40	Power (kW)	0.21	0.3	0.5	0.7	0.85	
DT 00	Capacity (Ipm)	86	84	82	81	76	4 4 /2" DCD
RT-80	Power (kW)	0.6	0.7	1.1	1.5	1.9	1-1/2" BSP
DT 435/22	Capacity (Ipm)	131	129	126	123	120	2// DCD
RT-125/32	Power (kW)	1.24	1.59	2.03	2.58	3.18	2" BSP

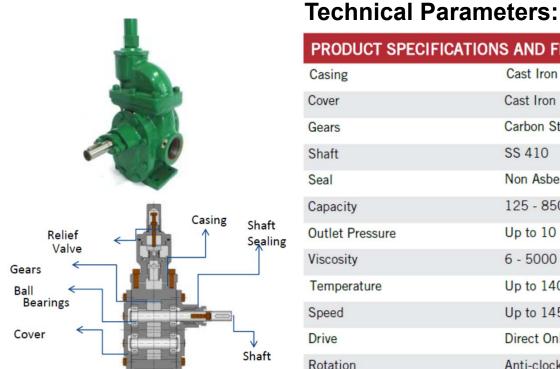
Testing medium: Lube Oil Viscosity: 75 cSt

75 cSt Speed: 1450

* For special requirements, contact CIRCOR Sales Team

External Gear Pumps – EG Series





PRODUCT SPECIFICATIONS AND FEATURES: Cast Iron Casing Cover Cast Iron Carbon Steel - Nitrided Gears Shaft SS 410 Non Asbestos Gland Pack / Mechanical seal Seal 125 - 850 lpm Capacity **Outlet Pressure** Up to 10 bar 6 - 5000 cSt Viscosity Temperature Up to 140°C Up to 1450 rpm Speed Drive Direct Only Anti-clockwise facing pump drive shaft Rotation

Applications:

- Transfer, booster and Process pumping for general industry needs
- Unloading of tank lorries and rail car
- Loading of rail cars, tank lorries and barrel filling

Value Propositions:

- High speed
- No overhung bearing loads
- Protected by a relief valve
- Relatively quiet operation
- Single sealing, external bearing
- Low noise and pulsation
- Reversibility
- Easy maintenance



Performance Data:

PERFORMANCE DATA :

Dumm Mandal	Capacity /	Pressure (bar)				Custian & Discharge	
Pump Model	Power	0	2	4	6	Suction & Discharge	
B 35 56 (35)	Capacity (lpm)	150	145	141	136	2″ BSP	
R-25-EG (35)	Power (kW)	1.38	1.77	2.18	2.72		
R-50-EG (55)	Capacity (Ipm)	234	225	220	215	2" BSP	
	Power (kW)	1.92	2.74	3.37	4.25		
D 75 50 (00)	Capacity (Ipm)	420	410	405	400	3" ANSI, B16.5, 125#	
R-75-EG (80)	Power (kW)	5.35	6.45	7.74	8.21		
	Capacity (Ipm)	655	649	645	638	3" ANSI, B16.5, 125#	
R-100-EG (125)	Power (kW)	7.21	9.92	11.95	12.98	1	

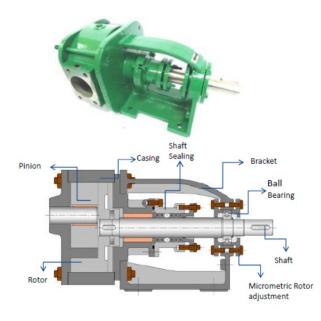
Testing Medium: Lube Oil

Viscosity: 75 cSt Speed: 1450

* For special requirements, contact CIRCOR Sales Team

Internal Gear Pumps – IG Series





Technical Parameters:

PRODUCT SPECIFICATION	S AND FEATURES:
Rotors	Carbon Steel
Casing	Cast Iron
Pinion	Carbon Steel
Shaft	SS 410
Seal	Non Asbestos Gland Pack / Mechanical Seal
Capacity	70 - 800 lpm
Outlet Pressure	Up to 7 bar
Viscosity	40 - 1,00,000 cSt
Temperature	Up to 200°C
Speed	Up to 1450 rpm
Drive	Direct Only
Rotation	Anti-clockwise facing pump drive shaft

Applications:

- Loading, unloading, transfer, circulation and process pumping of a very wide range of products typically as thin as diesel oil to extremely high viscous substances
- Unloading of tank lorries and rail car
- Loading of rail cars, tank lorries and barrel filling

Value Propositions:

- Smooth quite flow
- Excellent self priming
- Insensitive to viscosities
- Single sealing, external bearing
- Low noise and pulsation
- Reversibility
- Easy maintenance



Performance Data:

PERFORMANCE DATA:

Dump Madal	Smand (mmm)	Capacity / Pressure (bar)					Suction &
Pump Model	Speed (rpm)	Power	0	2	4	6	Discharge
D 20 DC	4450	Capacity (lpm)	83	80	77	74	4.4/2// DCD
R-20-DG	1450	Power (kW)	0.8	1.12	1.32	1.52	1-1/2" BSP
TIG-100	960	Capacity (lpm)	230	224	220	217	2" ANSI,B16.5, 150#
		Power (kW)	2.9	3.45	5.20	6.1	
TIC 450	TIG-150 750	Capacity (lpm)	360	352	340	300	2-1/2" SAE
HG-150		Power (kW)	1.9	3.1	4.85	6.72	
TIC 200		Capacity (lpm)	368	362	352	342	
TIG-200	480	Power (kW)	3.1	3.15	5.52	8.19	3" ANSI,B16.5, 150#

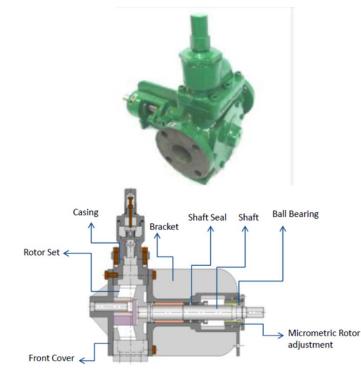
Testing medium: Lube Oil

Viscosity: 75 cSt

* For special requirements, contact CIRCOR Sales Team

Shuttle Block Pumps – SL Series





Technical Parameters:

PRODUCT SPECIFICA	TIONS AND FEATURES:
Rotors	Cast Iron
Casing	Cast Iron
Cover	Cast Iron
Piston	Carbon Steel
Shaft	SS410
Seal	Gland Packing / Mechanical seal
Capacity	220 - 970 lpm
Outlet Pressure	Up to 6 bar
Viscosity	3 - 5000 cSt
Temperature	Up to 140°C
Speed	Up to 1450 rpm
Drive	Direct / V-belt
Rotation	Anti-clockwise facing pump drive shaft

Applications:

- Loading, unloading, transfer, circulation and process pumping of a very wide range of products typically as thin as diesel oil to extremely high viscous substances
- Unloading of tank lorries and rail car ٠
- Loading of rail cars, tank lorries and barrel filling ٠

Anti-clockwise facing pump drive shaft

Value Propositions:

- Handle highly viscous liquids
- Low noise and vibrations
- Smooth, pulsation-free flow
- Front pull out design, rotor removal without dismantling the pump and motor
- High reliability and excellent service life
- High volumetric efficiency, low power requirements
- Long stuffing box construction with external bearing reduces leakages to minimum



Performance Data:

PERFORMANCE DATA:

Pump Model		Capacity /	Pressure (bar)				Suction &
	Speed (rpm)	Power	0	2	4	6	Discharge
R-50-SL 1000	1000	Capacity (lpm)	240	235	230	220	
	1000	Power (kW)	1.3	1.8	2.7	3.5	2" ANSI,B16.5, 125#
R-100-SL 720	720	Capacity (lpm)	452	444	431	415	3" ANSI,B16.5, 125
	720	Power (kW)	1.8	2.4	4.9	6.2	
D 000 01	100	Capacity (lpm)	970	940	918	851	4" ANSI D16 E 150#
R-200-SL	400	Power (kW)	4.85	8.31	13.02	18.00	4" ANSI,B16.5, 150#

Testing medium: Lube Oil Viscosity: 50 cSt

* For special requirements, contact CIRCOR Sales Team

Twin Screw Pumps - Critical Installations



Vacuum Residual Pump in Refinery Twin Screw Pump





Tank Farm Loading Station

Twin Screw Pumps





Twin Screw Pumps - Critical Installations



Tank farm Unloading Twin Screw Pumps



Tank & Terminal Unloading Twin Screw Pumps





Critical Installations



LDO Pump in Power plant Three Screw Pumps



HFO Pump in Refinery Three Screw Pumps



Critical Installations



Installation at Hydro Power plant Three Screw Pumps

Main Oil Pump in Lube oil System Three Screw Pumps





Quality is in our DNA



- Culture of Excellence and Customer Service
- Continuously improve & invest in Processes and Equipment
- World Class Technology, Controlled Processes and high skilled Team



World class Manufacturing facility





CNC Horizontal Machining centre



CNC thread milling machine



CNC Vertical Machining centre



CNC External cylindrical grinder



CNC Turn mill centre



Profile projector system

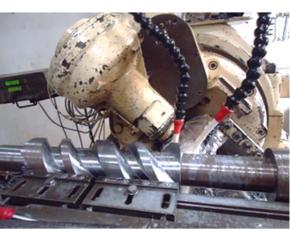


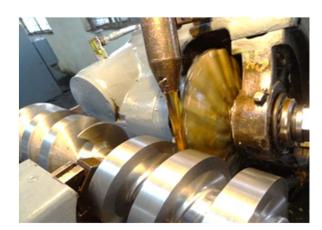
CMM : Co-ordinate measuring machine

Screw / Rotor Shop









Dedicated Machines for PC, Twin and Three Screw Cutting:

Single Screw Machines:

Reinceker Whirling Machines

Twin Screw Machines:

- > Zufenhausen thread millers.
- > Pfauter thread millers
- > Otnima Mauser thread millers
- Holroyd thread millers
- Cylindrical grinding machine

Three Screw Machines:

- WMW Thread miller
- > WMW CNC thread millers
- Holroyd thread miller
- CNC Cylindrical grinder

Machine Shop



Dedicated Machines for high Accuracy:

- Horizontal Machining Center (HMC)
- Vertical Machining Center (VMC)
- Horizontal bore Mill
- > WMW/Toss
- Chucker
- Vertical Turning Lathe
- > Pillar drill, Radial drill,
- Lathe







Tool Management Cell - Screw Shop



Dedicated Tool / Cutter Management Cell for storage, Inspection and Re-sharpening of Cutters as per Profile Templates





Inspection of Profiles of Cutters as well as Templates

Special Design Cutters







Tool Management Cell - Machine Shop

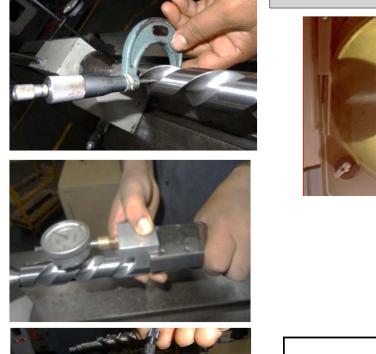


Dedicated Tool Management Cell for storage, Inspection and issuance to Shop



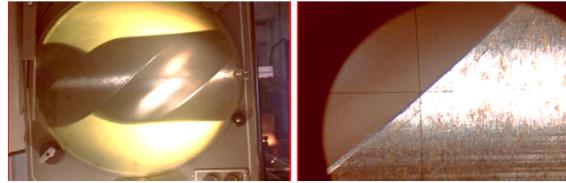
Inspection of Rotors



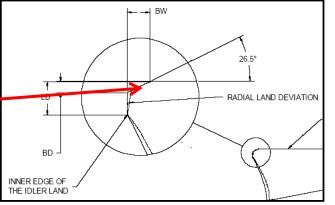


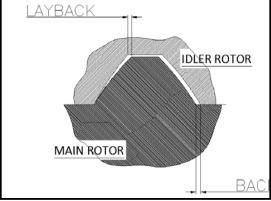


Special Gauges developed for inspection of critical dimensions of Rotors









Inspection of Rotors



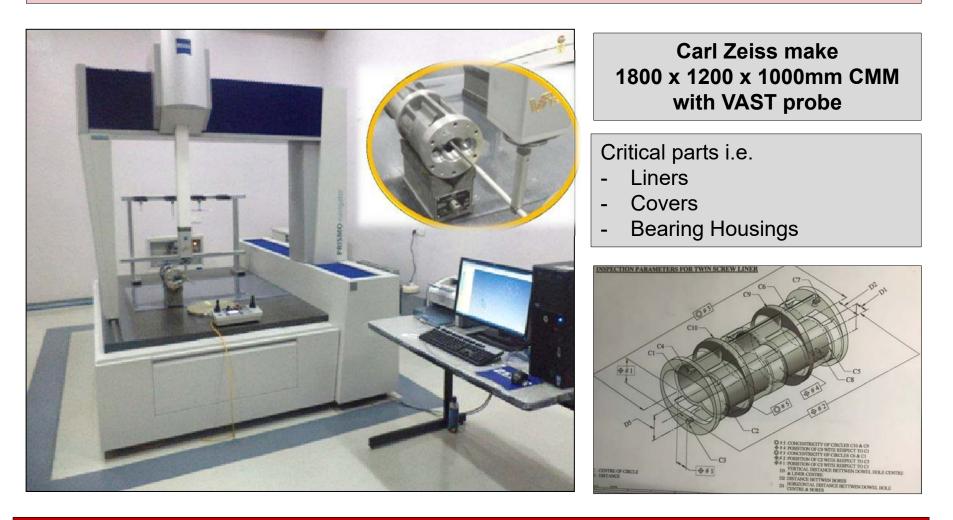


Checking of Critical to Quality Dimensions and Clearances of Rotors

Inspection of Stationary Parts



Critical Stationary Parts inspection by 3D CMM



Used for checking of Geometrical dimension of Parts which are Critical to Quality (CTQ)

Non Destructive Tests Capability



In-house facility with Certified Quality Engineers

Type of Tests

Dye Penetrant Test

It is a very versatile method which uses capillary action of Penetrant dye to detect OPEN to Surface flaws

Ultrasonic Test

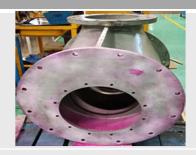
This digital Instrument identify the internal crack, flaws, through the depth of rod, rotor shaft, plates, welds etc.

Magnetic Particle Test

It employs Magnetic Flux Leakage to detect Surface and Near Surfaced defects.

Radiographic Test

It employs uses x-rays and X-rays to detect sub surface flaws



Tests







Routine Testing Facilities









- 100% Pumps are tested in-house for Performance test
- 100% Pump Casings are checked for Hydro test



Type / Special Testing Facilities





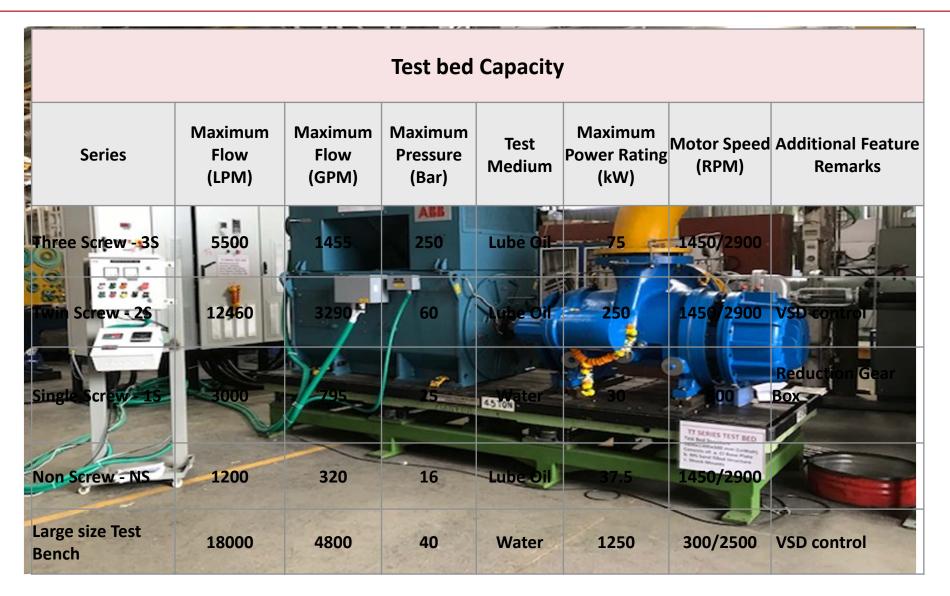
Facility to check 'Air Borne Noise' and 'Structure Borne Noise' as per MIL standards

- > Mechanical Run test
- Performance test
- Endurance test (100 hrs.)
- > Proving run test
- ➤ Tilt test
- ➢ SBN as per MIL 740 2 (SH)
- > ABN as per MIL STD 1474D
- NPSH test









Large Pumps Test set up – 1250kW





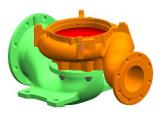
Engineering Expertise



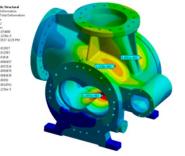
- Highly experienced Engineering Team with more than 100 years of total experience
- Dedicated ETO (Engineer to Order) team providing end to end support containing Technical inquiry evaluation, Order Processing, Test support, After market Service Support
- Design Optimization
- ANSYS, Solid Edge, NX (Unigraphics) and AutoCAD for Product Design & Engineering
- SAP for Product Design Data Management and Customization
- DFMEA, FEA, CFD, QFD Tools used for New Product Design and Value Engineering





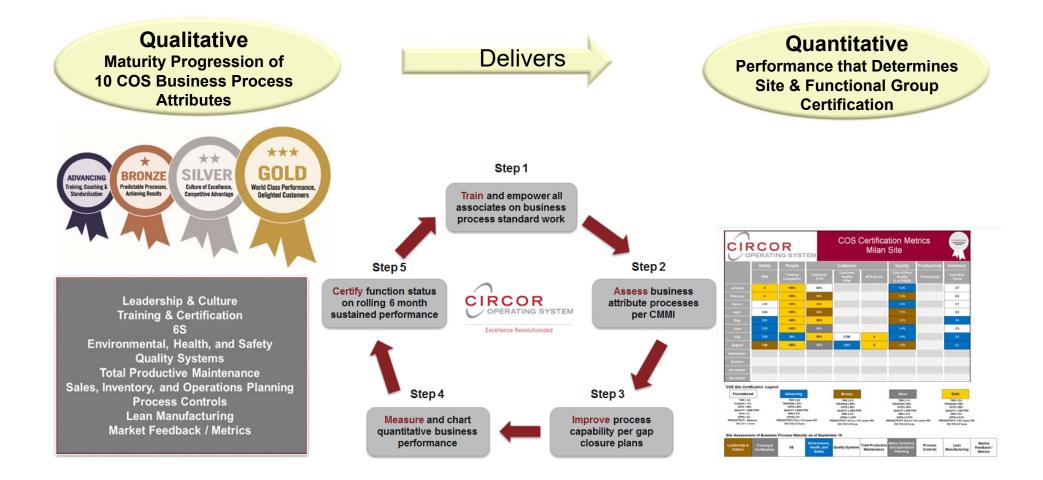






COS – CIRCOR Operating System

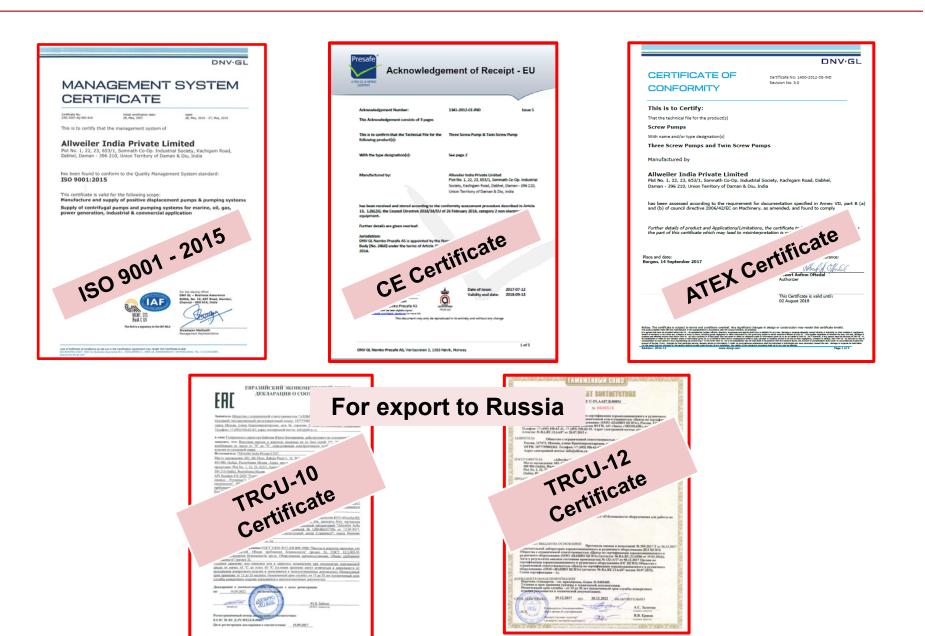




Process Maturity will Deliver Quantifiable Performance Improvement

Quality Certifications





Marine Class Certifications



Customer Name	TUSHACO PUMPS	PVT LTD	Purchase Order No	N
Attending Office	Mumbai		Report Number	BY2514127
First Visit Date	25-Dec-2013		Last Visit Date	03-Jan-2014
Certification Of:	Pump Manufar	sturer: TUSHACO PUMPS I	IVT LTD	Quantity: Two (2)
Survey Location :	Daman	Gujarat		
Equipment Data				
Item Name Manufacturer Numbe Nodel Namber Destination Vessel (t Builden/Shipyerd Builder LD./Hull No. Purchaser Name		Pump 1/ Pump 2 1449317-8942/14493 TDSV 135/092 (211.) YY248989YY24858 VT HALTER MARINI 2015/2015 VT HALTER MARINI	35/092.100.40.5XB) , INC.	
Additional Data				
ABS Stamping Pump Capacity Pressure Head Rated Speed Dasign Pressure Test Pressure		BY2514127<5N> 167 Cu m/hr 102 m 1780 spm 11 bar 24 bar		
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Jatendel for COLOMID DOCKYARD PLC, Skip Na.N. 02/3 First Date of Inspection 8 May 2018 First Date of Inspection 8 May 2018 Attended Material State S			LTD.	
First Date of Inspection i & May 2018 Final Date of Inspection i & Stay 2018 Rules/Standards, pple THS RELEVANT REQUIREMENTS OF THE RULES OF NIPPON KAUL KYOKAL Order Nn Coder Nn C				
Final Date of Inspection : 8 May 2018 Rule/Standards Applied : THE RELEVANT REQUIREMENTS OF THE RULES OF NPPON KAUI KYOKAI : Order No : 456(8)1			PLC, Ship No.NC-0	243
NIPPON KALIT KYOKAL 1 1754011	Date of Inspection			
Order No. 1 976911 Totalatt() of Product 2 2 Periclanto Manifedari's type 1 Alweller Cankdy 2 Steal Steal	Standards Applied	THE RELEVANT REQUIR NIPPON KAUI KYOKAI	EMENTS OF THE R	ULES OF
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Purpose :: Bullets Pump Massificatore's type :: Alwello- purpose Seed Differential Pressure Power Absorbed	ulars			
Capacity Special Pressure Differential Pressure	ia Genterme ⁿ e terme	: Ballast Pump		
Capacity Speed Differential Possure Ower Absorbed	acturer's type	Alweller .		×(
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Sur ^c	nd Inspe-		-	
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262	nd Inspe	200		
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产品使用起定 Revisition for application of product <u>N11</u>	本社の始め 約本力 約本力 10 10 10 10 10 10 10 10 10 10 10 10 10 1	film Bill. superval and contribution of the first's sufficient and a superval sufficient without prior persistence. From tificate without prior persistence.

Thank you



Happy & Satisfied







Questions ??



Backup slides

Performance Data – T3ST Design

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Liquid handled

Lube Oils



Application:

- Transfer
- Loading/Unloading •
- Booster
- **Fuel Firing**
- **Hydraulic** •
- Lubrication and • cooling

Performance data

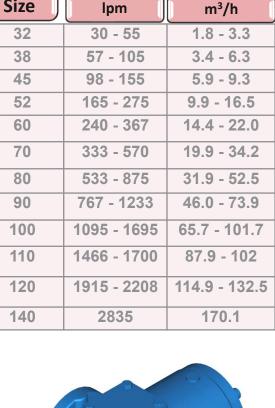
- Capacity
- Viscosity range
- Temperature of
- up to 2835 lpm Q 12 to 760 cSt* V
- up to 125 ° C t
- **Pumped liquid**
- Inlet pressure
- Outlet pressure
- Differential pressure ∆p
- Speed
- Flanges

- (with mechanical seal) up to 200 ° C (with special sealing)
- up to 5 bar ps
- up to 40 bar pd

n

- up to 40 bar
 - up to 3600 rpm
 - according to DIN and ANSI

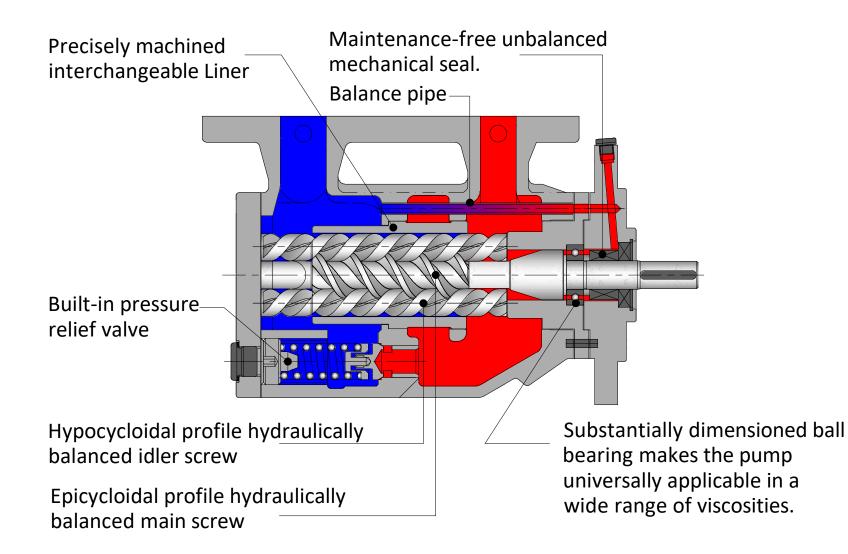
Q_{th} at 1450 rpm Pump Size lpm 32 **Hydraulic Oils** 38 45 **Clean Fuel Oils** 52 Any neutral liquid with 60 **lubricating property** 70 80





Construction & Functionality – T3SFP Design





Performance Data – T3SFP Design



Application:

- Transfer
- Loading/Unloading
- Booster
- Fuel Firing
- Hydraulic
- Lubrication and cooling

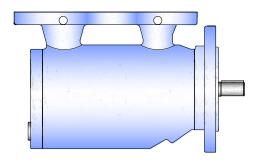
Performance data:

٠	Capacity	Q
•	Viscosity range	V
٠	Temperature of	t
	Pumped liquid	
•	Inlet pressure	ps
٠	Outlet pressure	pd
٠	Differential pressure	$\Delta \mathbf{p}$
٠	Speed	n
•	Flanges	

Liquid handled

- Lube Oils
- Hydraulic Oils
- Clean Fuel Oils
- Any neutral liquid with lubricating property

Pump	Q _{th} at 1	450 rpm
Size	lpm	m³/h
10	5.1 - 14.3	0.31 - 0.86
20	15.2 - 28.1	0.91 - 1.69
40	31.5 - 56.5	1.89 - 3.39

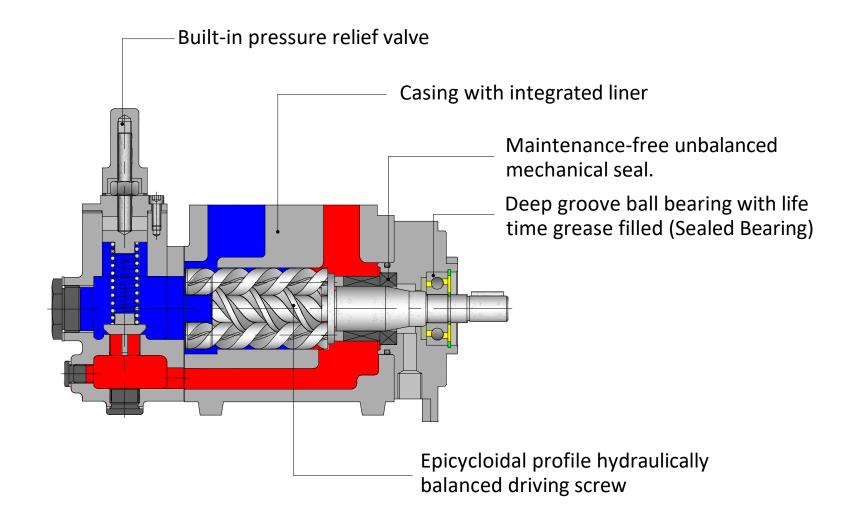




up to 55 lpm 15 to 760 cSt up to 125 ° C

- up to 5 bar up to 40 bar
- up to 40 bar
- up to 3600 rpm
- according to DIN NP16/NP40





Performance Data – T3SI Design



Application:

- Transfer
- Loading/Unloading
- Booster
- Fuel Firing
- Hydraulic
- Lubrication and cooling

Performance data:

Capacity	Q	up to 275 lpm
Viscosity range	V	15 to 760 cSt
Temperature of	t	up to 80 ° C
pumped liquid		
Inlet pressure	ps	up to 5 bar
Outlet pressure	pd	up to 10 bar
Differential pressure	$\Delta \mathbf{p}$	up to 10 bar
 Speed 	n	up to 3600 rpm
 Flanges 		according to Design

Liquid handled

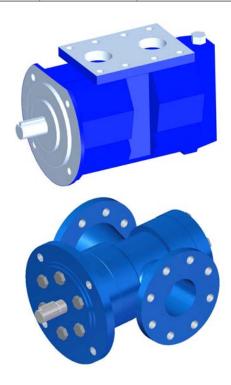
Lube Oils

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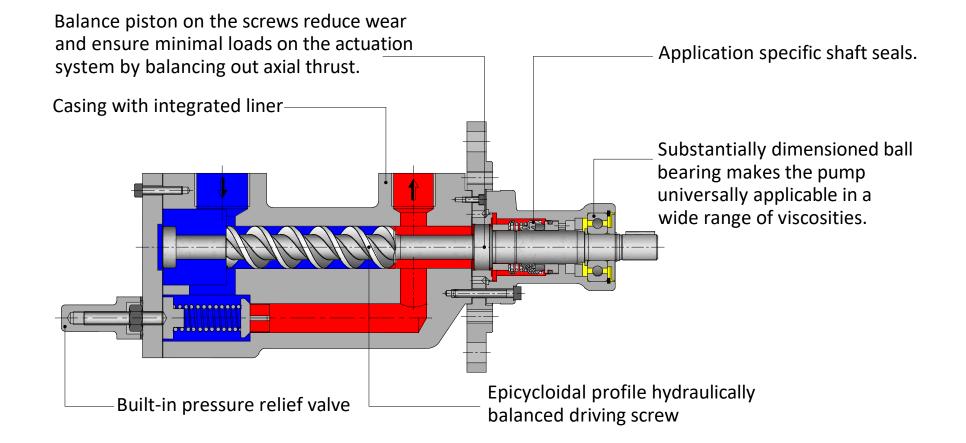
•

- Hydraulic Oils
- Clean Fuel Oils
- Any neutral liquid with lubricating property

Pump	Q _{th} at 1450 rpm	
Size	lpm	m³/h
25	16.5 - 20	0.9 - 1.2
32	30 - 55	1.8 - 3.3
38	57 - 64.5	3.4 - 4.7
45	98 - 115	5.8 - 6.9
52	165 - 207	9.9 - 12.4
60	240 - 275	14.4 - 16.5







Performance Data – T3SZ Design

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Application:

- Transfer
- Loading/Unloading
- Booster
- Fuel Firing
- Hydraulic
- Lubrication and cooling

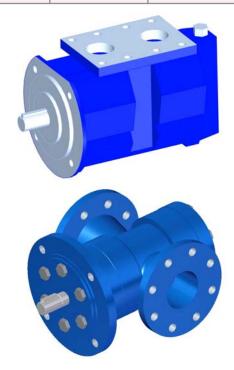
Performance data:

٠	Capacity	Q	up to 155 lpm
٠	Viscosity range	V	15 to 760 cSt
٠	Temperature of	t	up to 125 ° C
	pumped liquid		
٠	Inlet pressure	ps	up to 5 bar
٠	Outlet pressure	pd	up to 12 bar
٠	Differential pressure	$\Delta \mathbf{p}$	up to 12 bar
٠	Speed	n	up to 3600 rpm
•	Flanges		according to Design

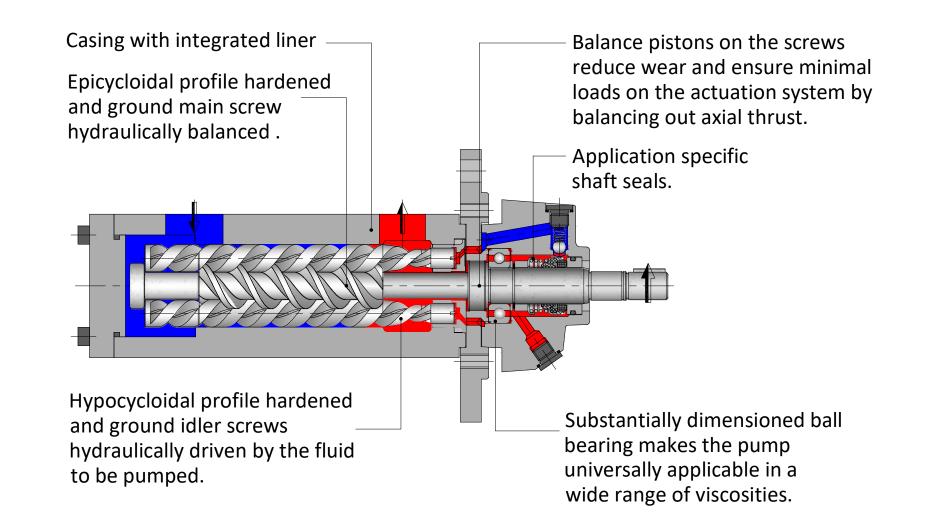
Liquid handled

- Lube Oils
- Hydraulic Oils
- Clean Fuel Oils
- Any neutral liquid with lubricating property

Pump	Q _{th} at 1450 rpm	
Size	lpm	m³/h
20	16.5 - 20	0.9 - 1.2
25	16.5 - 20	0.9 - 1.2
32	30 - 55	1.8 - 3.3
38	57 - 105	3.4 - 6.3
45	98 - 155	5.9 - 9.3







Performance Data – T3SZ Design – Medium Pressure



Application:

- Transfer
- Loading/Unloading
- Booster
- Fuel Firing
- Hydraulic
- Lubrication and cooling

Performance data:

Capacity		Q	30 – 55 lpm
 Viscosity ratio 	nge	V	3 to 760 cSt
Temperatur	e of	t	up to 125 ° C
pumped liq	uid		
Inlet pressu	re	ps	up to 5 bar
Outlet press	sure	pd	up to 40 bar
Differential	pressure	$\Delta \mathbf{p}$	up to 40 bar
Speed		n	up to 3600 rpm
• Flanges			according to SAE

Liquid handled

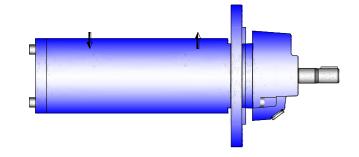
Lube Oils

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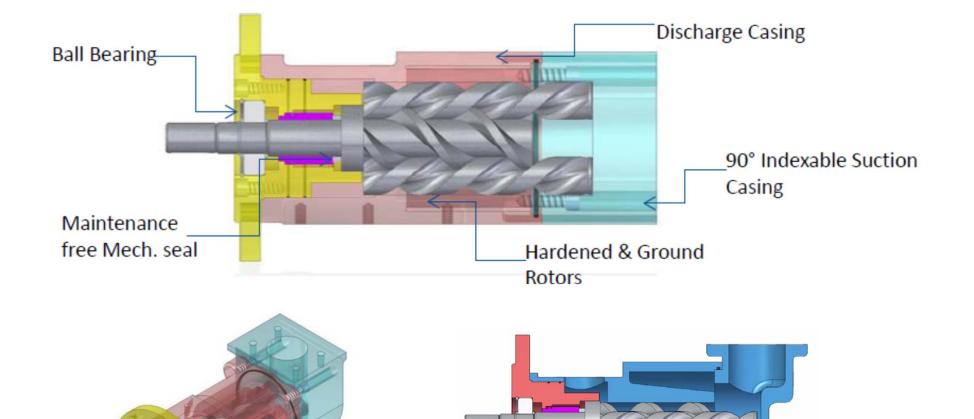
- Hydraulic Oils
- Clean Fuel Oils
- Any neutral liquid with lubricating property

Pump	Q _{th} at 1450 rpm	
Size	lpm	m³/h
32	30 - 55	1.8 - 3.3



Construction & Functionality – TUSET Design





Performance Data – TUSET Design



Application:

- **Transfer** .
- Loading •
- Unloading
- Forwarding
- **Cooling Oil Circulation** •
- **Governing/Booster**

Performance data:

٠	Capacity	Q	30 – 250 lpm
٠	Viscosity range	V	3 to 760 cSt
٠	Temperature of	t	up to 125 ° C
	pumped liquid		
٠	Inlet pressure	ps	up to 5 bar
٠	Outlet pressure	pd	up to 40 bar
٠	Differential pressure	$\Delta \mathbf{p}$	up to 40 bar
٠	Speed	n	up to 3600 rpm
•	Flanges		according to SAE

Liquid handled

Lube Oils

- **Hydraulic Oils**
- **Clean Fuel Oils** .
- Any neutral liquid with ۰ **lubricating property**

Pump Size	Q _{th} at 1450 rpm	
Size	lpm	m³/h
32	30 - 55	1.8 - 3.3
60	200 – 250	12 - 15

