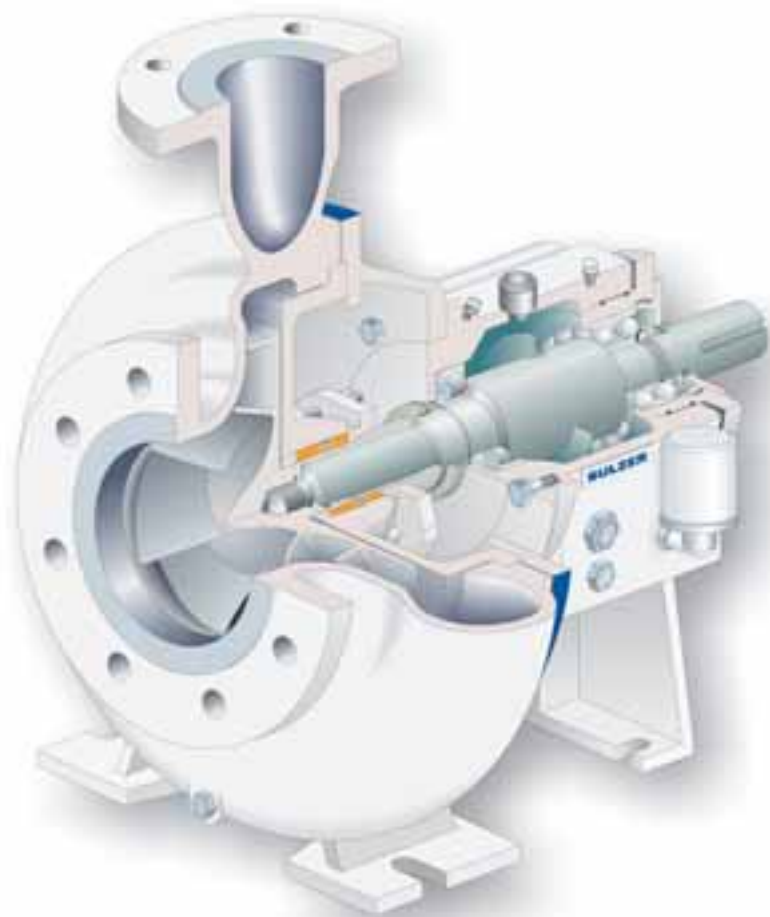


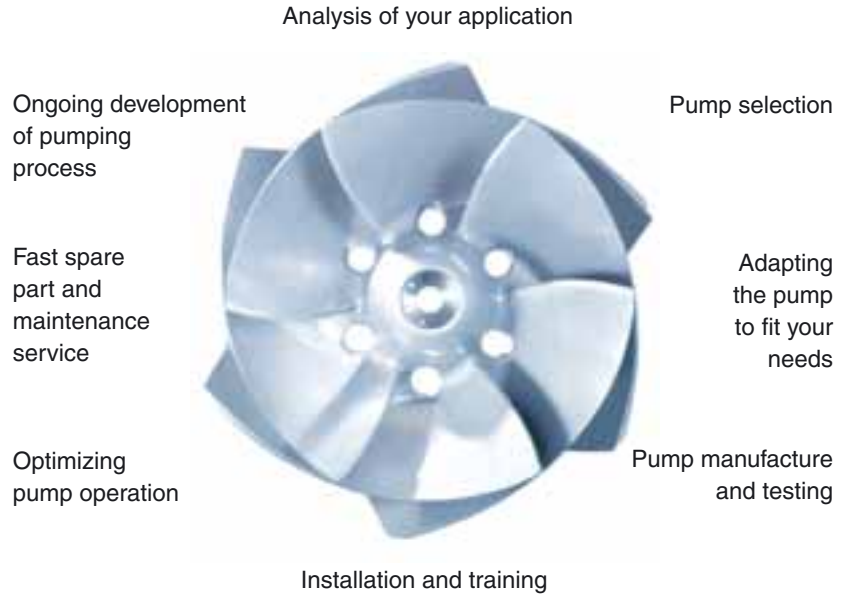
## **Sulzer ASME B73.1 CPT Pump for the Petroleum Industry**



# Sulzer Pumps – working with you from design to operation

Sulzer Pumps combines more than 135 years of experience in pump development and manufacturing with a deep commitment to fully understanding the needs of our customers.

Our detailed process and application knowledge has allowed us to develop innovative pumping solutions for our focus segments including tailor made systems if required. Our active research & development supports this customer-oriented approach.



## Extensive Product Range

Sulzer Pumps has a long history of providing innovative pumping solutions to business partners in the following industries:

- Oil & Gas
- Hydrocarbon Processing
- Pulp & Paper
- Power Generation
- Food, Metals and Fertilizers
- Water and Wastewater

### Hydrocarbon Processing Industry

Refineries, petrochemical plants and gas plants operate sophisticated production processes requiring reliable pumping solutions. Sulzer Pumps, with its high-quality product line, is known for being able to consistently meet these expectations. Continuous product innovations such as our new line of hermetically sealed, horizontal and vertical process pumps, are helping the industry improve its operational efficiency.

All our pumps are engineered in line with the latest standards issued by ISO ASME B73.1 and API in order to ensure reliable and safe operation.

The Petroleum Industry is one of the core business segments within Sulzer Pumps. Sulzer has focused our product portfolio on these important industries. The CPT is well suited for many applications such as:

- Sour water
- Produced water
- Water injection booster
- Pipeline and tank farm transfer

The market – and therefore our customers – requires specialty applications for each subsegment.

### The CPT Pump

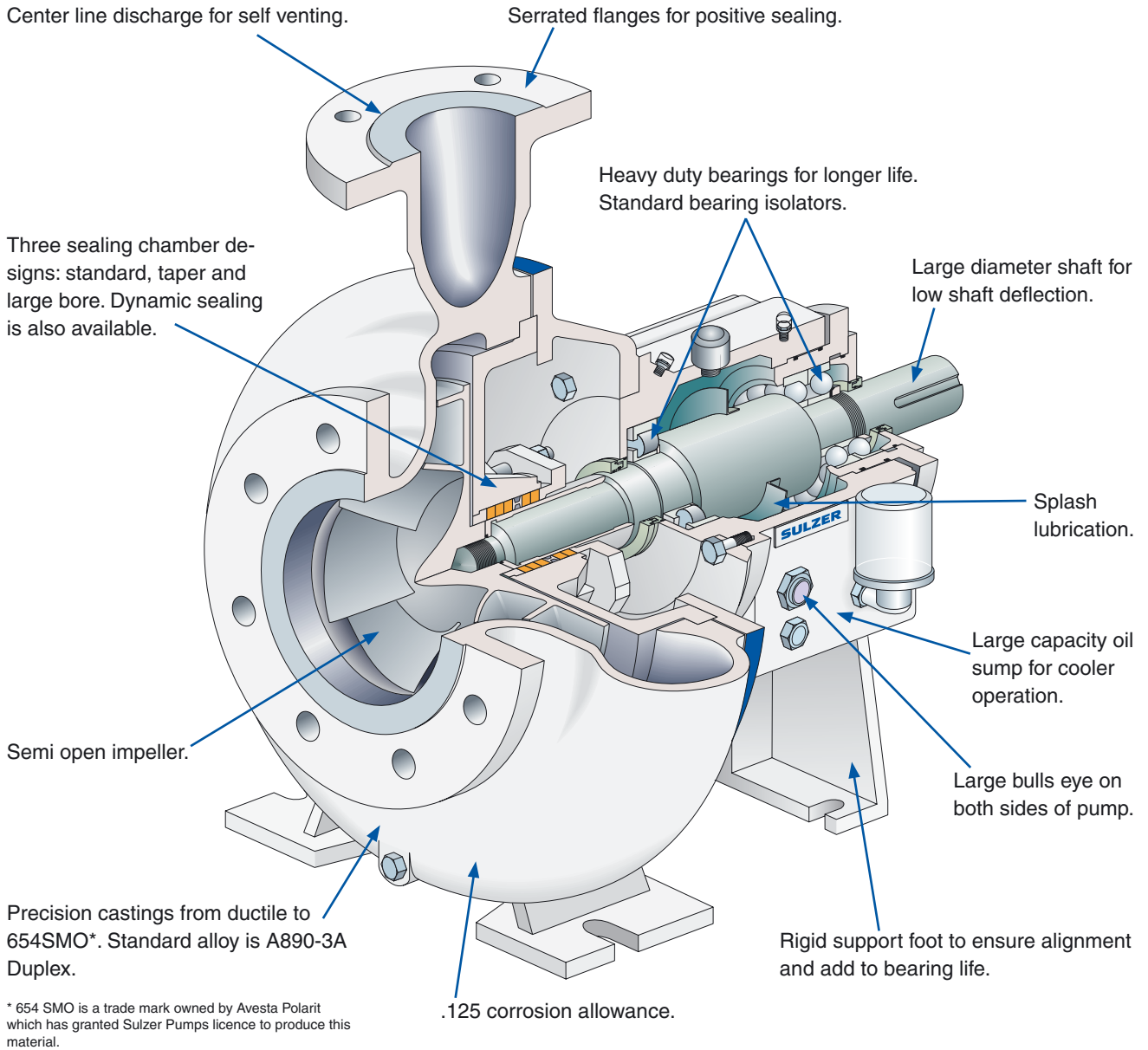
The CPT Advantage pump is manufactured in our Easley, SC plant. It meets or exceeds ASME B73.1 requirements. Rather than building another “me too”

pump, Sulzer incorporated heavy duty features that others only offer as options, or don't offer at all. The thrust bearings in the CPT are 40 degree angular contact in all but the smallest sizes. Radial loads are handled by a roller bearing which has a higher load capacity than a ball bearing. Inpro VBX bearing isolators add life by keeping dirt out of the oil. Extra large oil sumps hold more oil. Splash lubrication is standard and the bearing housing is drilled and tapped for vibrometer mounting.

Duplex SS is our standard material and is much better suited for produced water and other aggressive fluids than 316SS - at virtually the same price.

The CPT is a pump designed by customers for customers.

# CPT Design Features – Built to the Latest Standards of ASME B73.1



# Materials

The integrity of our materials and the precision of our methods are ensured. As most alloy wet-end components are cast in Sulzer Pumps' own in-house foundry, we are able to go a step further to ensure your CPT Advantage pump is one of the most wear-resistant, corrosion resistant ANSI process pumps you'll ever buy.

## A-890 Grade 3A Duplex Stainless

Sulzer CPT Advantage Series pumps are frequently used in services where resistance to both corrosion and abrasion is necessary. That is why the standard stainless steel chosen for wet-end pump components is ASTM A-890 Grade 3A (ie. 25-5 duplex steel). This Argon Oxygen Decarburization refined duplex cast steel (ferritic austenitic) with high molybdenum and nitrogen content:

- Offers corrosion resistance superior to conventional cast 316SS (CF-8M) and equal to or better than 317SS (CG-3M).

- Provides excellent abrasion resistance that, when used in mildly abrasive services, may last 30% to 40% longer than 316SS.
- Features clearly superior mechanical properties over austenitic alloys and is comparable to most duplex alloys including CD4MCuN and SS2205.

## Heat Treatment

All A-890 Grade 3A castings are solution annealed to maximize corrosion resistance and mechanical properties. This heat treatment consists of heating to and holding at 1950°F minimum for a prescribed time period followed by a rapid water quench.

## Welding

A-890 Grade 3A is a readily weldable metal provided a matching weld filler is used. Castings are heat treated following major welding to restore optimum performance characteristics.

## Corrosion Resistance

Pitting and crevice corrosion that occurs in metals are of particular interest in stainless steel.

The Pitting Resistance Equivalence (PRE) is an index that can help identify an alloy's susceptibility to these forms of corrosion. The higher the PRE number, the greater the metal's resistance to pitting and crevice corrosion.

Alloy	PRE*
A890-3A	35.6
CF-8M	27.5
CD4MCuN	34.5
AISI329	34.0
CN-7M	30.0
CG-3M	30.8
654 SMO	56.0

\*(PRE = Cr% + 3.3 Mo% + 16 N%)

## CPT Material Mechanical Properties

Common name	ASTM	Mechanical properties			
		Tensile x 10 <sup>3</sup> psi	Yield x 10 <sup>3</sup> psi	Elong %	Hardness HB
Cast Iron	A48-900 CL 40B	29			170-220
CD6MN	A890-3A	95	65	25	180-260
2205	A890-4A	90	60	25	180-260
5A	A890-5A	99	75	18	180-260
CD4MCuN	A890-1B	100	70	16	230-260
Ductile Iron	A395 60-40-18	60		18	140-160
329SS	AISI329	87-116	58	18	180-260
316SS	A743 CF-8M	70	30	30	150-190
317SS	A743 CG-3M	75	35	25	150-190
Alloy 20	A743 CN-7M	62	25	35	130-170
654 SMO*	"A240,480,358"	87	51	40	190-220

\* 654 SMO is a trade mark owned by Avesta Polarit which has granted Sulzer Pumps licence to produce this material.

## CPT Material Chemical Properties

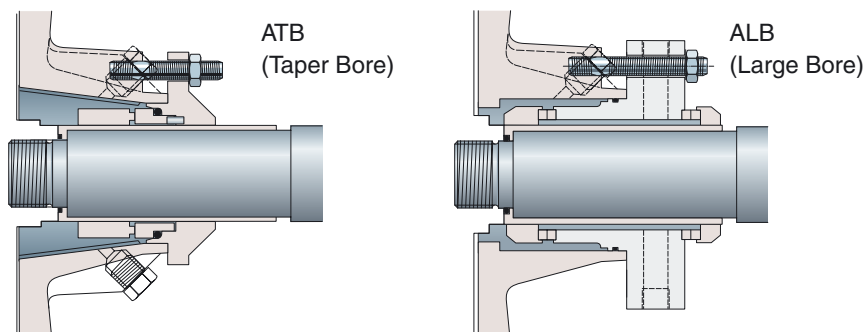
Common name	Chemical analysis %									
	Cr	Ni	Mo	Cu	Si *	Mn *	C *	N	PRE	ASTM
Cast Iron	-	-	-	-	1.7-2.4	.4-.9	3.2-3.7	-	NA	A48-900CL40B
CD6MN	24.0-27.0	4.0-6.0	1.75-2.5	-	1	1	0.06	.15-.25	35.6	A890-3A
2205	21.0-23.5	4.5-6.5	2.5-3.5	-	0.02	1.5	0.03	.1-3	35.1	A890-4A
5A	24.0-26.0	6.0-8.0	4.0-5.0	-	1.0	1.5	0.03	.1-3	43.0	A890-5A
CD4MCuN	24.5-26.5	4.75-6.0	1.75-2.25	2.75-3.25	1.0	1.0	0.04	0.15	35.3	A890-1B
Ductile Iron	-	-	-	-	2.0-2.8	.2-.7	3.2-3.7	-	NA	A395
329SS	24.0-27.0	4.5-7.0	2.5-3.0	-	1.0	-	-	-	34.18	AISI329
316SS	18.0-21.0	9.0-12.0	2.0-3.0	-	2.0	-	0.08	-	27.5	A743 CF-8M
317SS	18.0-21.0	9.0-13.0	3.0-4.0	-	1.5	1.5	0.03	-	30.8	A743 CG-3M
Alloy 20	19.0-22.0	27.5-30.5	2.0-3.0	3.0-4.0	1.5	1.5	0.07	-	30.0	A743 CN-7M
654 SMO**	23.0-25.0	21.0-23.0	"7.1-7.5"	0.3-0.7	-	-	0.025	.45-.55	56.0	A240.480,358

\* for SS maximum values.

\*\* 654 SMO is a trade mark owned by Avesta Polarit which has granted Sulzer Pumps licence to produce this material.

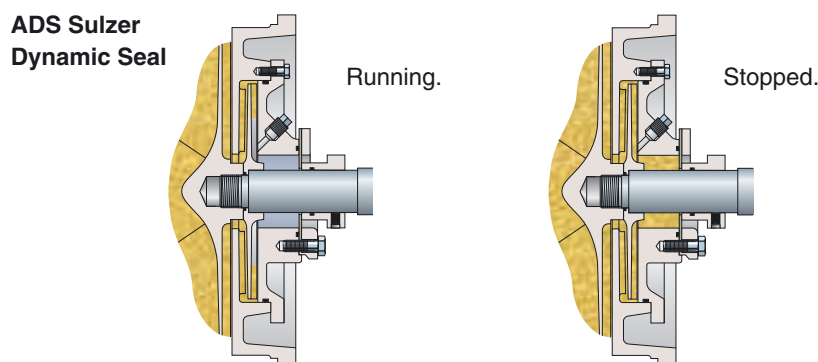
## Seal Chambers

The CPT Advantage offers a variety of seal chambers. Each is designed to help you tailor your CPT Advantage pump to your specific process requirements without sacrificing reliability and longevity. If you're not exactly sure which configuration is best for your process, our engineers will be happy to work with you. We'll analyze your hydraulic requirements and recommend a system.



## Dynamic Seal Option

Sulzer Pumps' dynamic seal uses an expeller to move liquid back into the volute casing and away from the stuffing box when the pump is running. When the pump stops, liquid flows back into the stuffing box, forcing closed an elastomeric static seal to prevent leakage. No outside flush required. Saves water, piping costs and eliminates packing maintenance.



# Bearing Unit

The bearing unit is built as standard for high load applications. Some applications push a power end beyond ANSI design limits.

Examples are

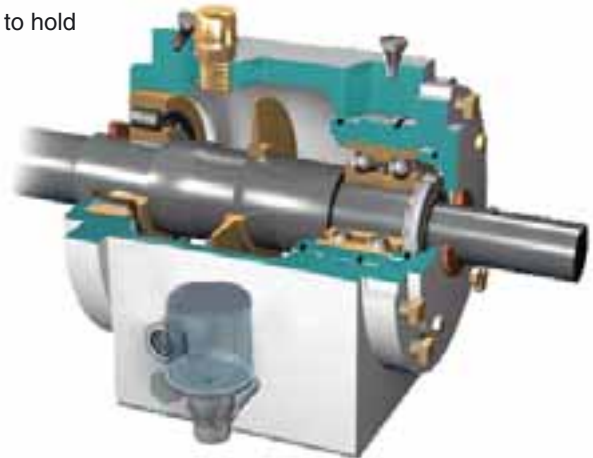
- 1) operation at reduced flows
- 2) pumping high specific gravity liquids
- 3) overhung belt drives

The bearing unit features as standard

- Splash oil lubrication
- Thrust bearing is duplex angular contact ball bearing design
- Radial bearing is cylindrical roller bearing design
- Large oil capacity to reduce temperature
- Inpro VBX/Labyrinth bearing isolators

## Accu-Just™ Impeller Clearance Adjustment

- Quick and accurate impeller adjustments without the use of a feeler gauge or removal of pump.
- Assures concentricity and bearing alignment throughout the impeller's adjustable range.
- No snap ring required to hold bearing.



# Baseplates

Sulzer produces rigid baseplate designs that resist the distortion which can cause pump/motor misalignment. Our baseplates require minimal maintenance and are corrosion resistant for severe environments. Sulzer Pumps offers a complete range of mounting systems to meet your plants requirements. There are 4 different styles of base plates available for the CPT pump. Optional V-belt and custom designs are also available.



ANSI Style 1 is formed steel base for pump and motor.



ANSI Style 6 is a non-metallic base plate for corrosive environments.



ANSI Style 3 is fabricated steel base with full drip rim, drain and end-caps.

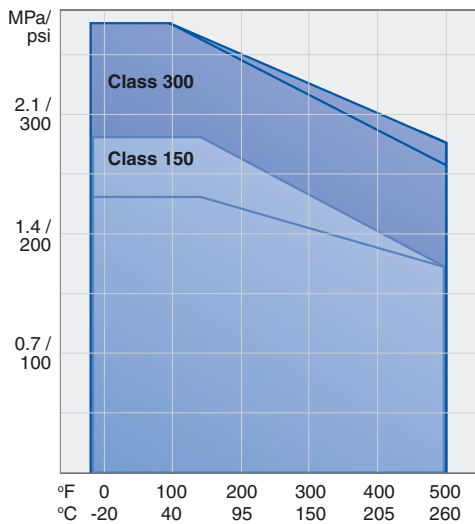


ANSI Style 5 is fabricated steel base plate that complies with PIP specifications.

# Engineering Data

Bearing Unit	No.1	No.2	No.3
<b>Bearing Unit</b>			
Shaft diameters			
At impellers	0.876	1.122	1.769
Under sleeve	1.125	1.875	2.250
At coupling	0.875	1.375	2.375
Between bearings	1.614	2.362	3.622
Solid shaft (thru seal chamber)	1.375	2.125	2.500
Sleeve OD (thru seal chamber)	1.375	2.125	2.500
<b>Power End Data</b>			
Thrust bearing (outboard)	3306A	7309	7315
Radial bearing (inboard)	NUP207EC	NUP311EC	NUP317EC
Radial bearing life, typical (HRS x 10 <sup>3</sup> )	1000	1000	1000
Thrust bearing life, typical (HRS x 10 <sup>3</sup> )	500	200	200
Bearing span	3.92	6.61	9
Shaft overhang	5.142	6.126	9.04
L3/D4 sleeve construction	55	18	29
L3/D4 solid shaft construction	38	11	19
Oil capacity (pints)	0.75	2.4	4.7
Oil fill connection size	.5NPS	.5NPS	.5NPS
Oil drain connection size	5NPS	.5NPS	.5NPS
Constant level oiler connection	0.25	0.25	0.25
Labyrinth isolators (std)	Inpro VBX	Inpro VBX	Inpro VBX

## Pressure / Temperature Limits



Allowed simultaneous pressure and temperature at ASME pressure classes



Liquid End Information	No.1	No.2	No.3
Impeller clearance	0.014	0.014	0.016
Drain tap size (optional)	0.50	0.50	0.50
Suction tap size (optional)	0.25	0.250	0.250
Discharge tap size (optional)	0.25	0.250	0.250
Maximum discharge pressure (#150)	280	280	280
Maximum discharge pressure (#300)	375	375	375
Hydrostatic test pressure	1.5xMAWP	1.5xMAWP	1.5xMAWP
Corrosion allowance	0.125	0.125	0.125



Check our worldwide offices at  
[www.sulzerpumps.com](http://www.sulzerpumps.com)