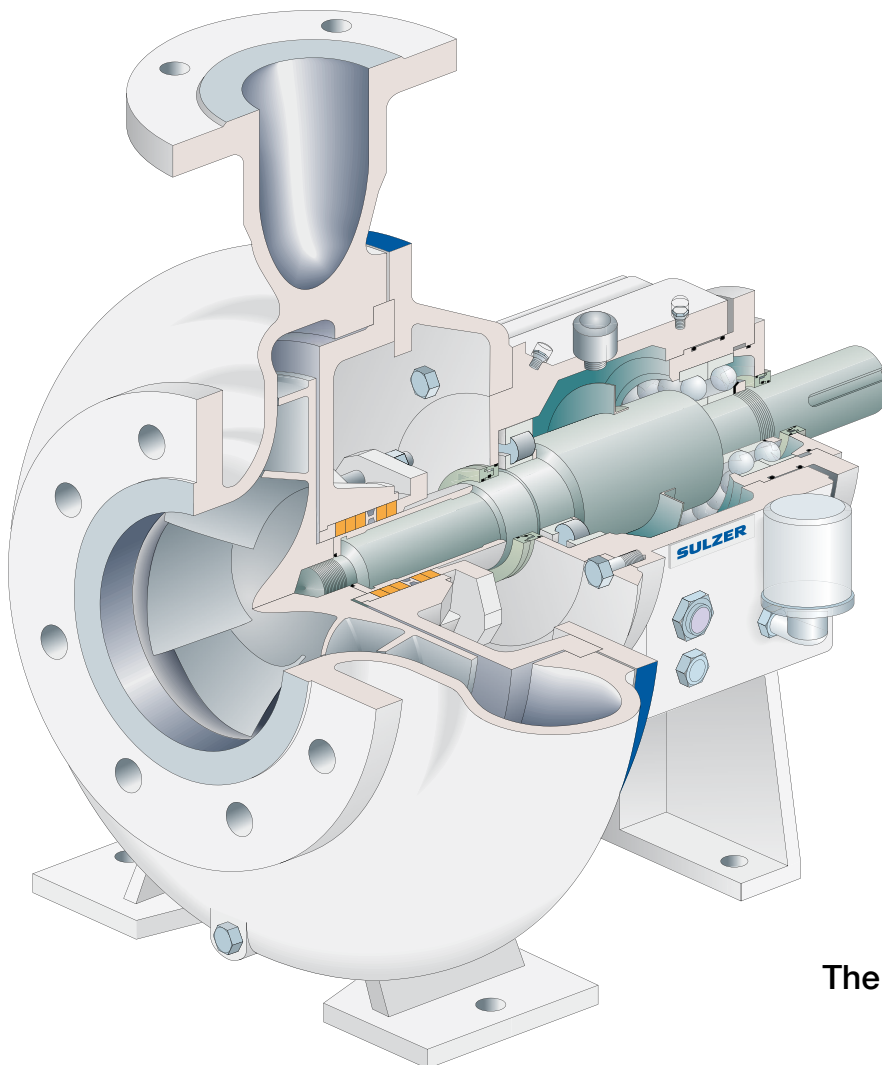


## **CPT Pump for the Petroleum Industry According to ASME B73.1**



The Heart of Your Process

# Sulzer Pumps

Sulzer Pumps is a world leader in reliable products and innovative pumping solutions. Our advanced research and development, detailed process and application knowledge together with a comprehensive understanding of market demands keep us consistently at the leading edge of technical development. Our global network of modern manufacturing and packaging facilities together with sales offices, service centers and representatives located close to major markets provide fast responses to customer needs.

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

- Oil and Gas
- Hydrocarbon Processing
- Pulp and Paper
- Power Generation
- General Industry
- Chemical Process Industry
- Water Industry

## CPT Global Manufacturing Facility



Easley, USA

## Extensive Knowhow for the Petroleum Industry

Refineries, petrochemical plants, tank farms, pipeline booster stations, produced water transfer, and gas plants operate sophisticated processes requiring reliable pumping solutions. Sulzer Pumps, with its high-quality product line, is known for being able to consistently meet these expectations.

The petroleum industry requires the highest standards of safety and emission control. Improvements in equipment, Mean Time Between Failure (MTBF) and lower Total Life Cycle Cost (TLCC) continue to be our high priority issues.



## CPT Design

The CPT is a single stage, foot mounted heavy duty pump which meets or exceeds ASME B73.1 requirements. 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.



## Engineered for Application Flexibility

The CPT is engineered for the customers to meet their exacting requirements, whether for an upstream produced water or refinery caustic application. The CPT has several seal chambers available for a wide range of ASME flush plans and mechanical seals.

There are several different base plate designs such as ANSI Standard, PIP, and API style base plates to further enhance the engineered integrity of the CPT pump.



# CPT Design Features and Benefits

## Centerline Discharge

- Provides self-venting of casing
- Equalizes distribution of pipe stress through integral feet

## Heavywalled Casing

- Corrosion allowance for extended wear
- Back pull-out design allows maintenance of the rotating assembly without disturbing the piping

## Large Diameter Shaft

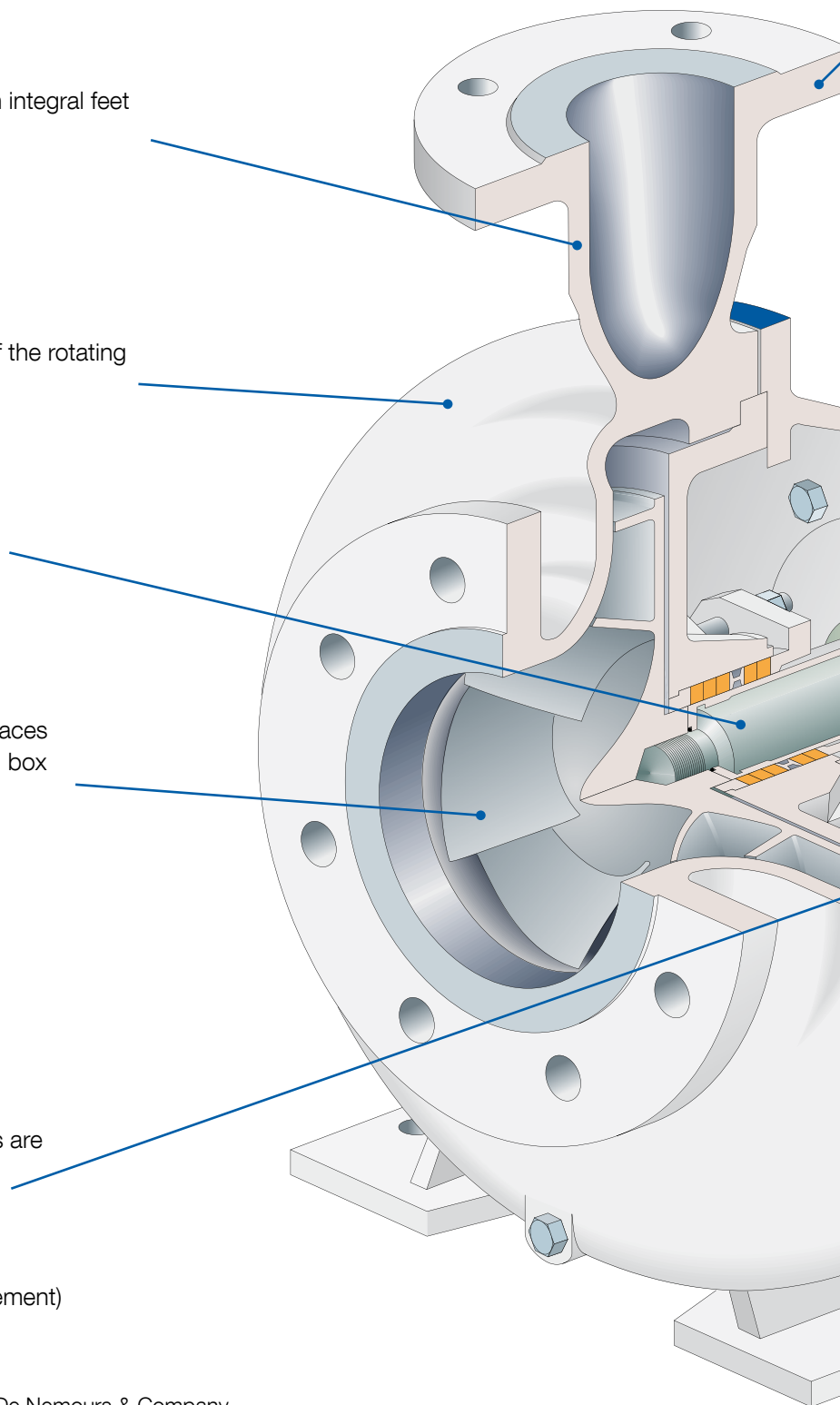
- Low shaft deflection 50  $\mu\text{m}$  (0.002")
- Improved bearing and mechanical seal life
- Solid shaft or hook sleeve design available
- Duplex stainless steel standard

## Semi-Open Impeller

- Investment casting guarantees smooth surfaces
- Back pump-out vanes for control of stuffing box pressure and axial thrust
- Handles solids and fibrous materials
- Low Flow option
- Teflon®\* impeller o-ring

## Sealing Versatility

- A variety of rear covers/stuffing box designs are available to meet process requirements
  - Packing
  - Mechanical seal
    - Large bore
    - Taper bore (cast-in ribs for flow enhancement)
  - Dynamic seal



\* Teflon® is a registered trademark of E.I. Du Pont De Nemours & Company.



## Flanges

- Meet ASME/ANSI B16.5
- Class 150 RF Standard,  
Optional: Class 300 RF

## Impeller Clearance Adjustment

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

## Heavy Duty Bearings

- Bearing life exceeds all ANSI B73.1 requirements
- Inboard cylindrical roller bearings for maximum radial load carrying capabilities
- Angular contact thrust bearing locked into position, carries radial and axial loads extending service life

## Inpro VBX/Labyrinth Bearing Isolators

- Inboard and outboard bearing protection
- Isolates bearings from environmental contamination
- Multi-port for proper drainage
- Bronze standard (non-metallic available)
- Cooler running bearing unit

## Splash Lubrication

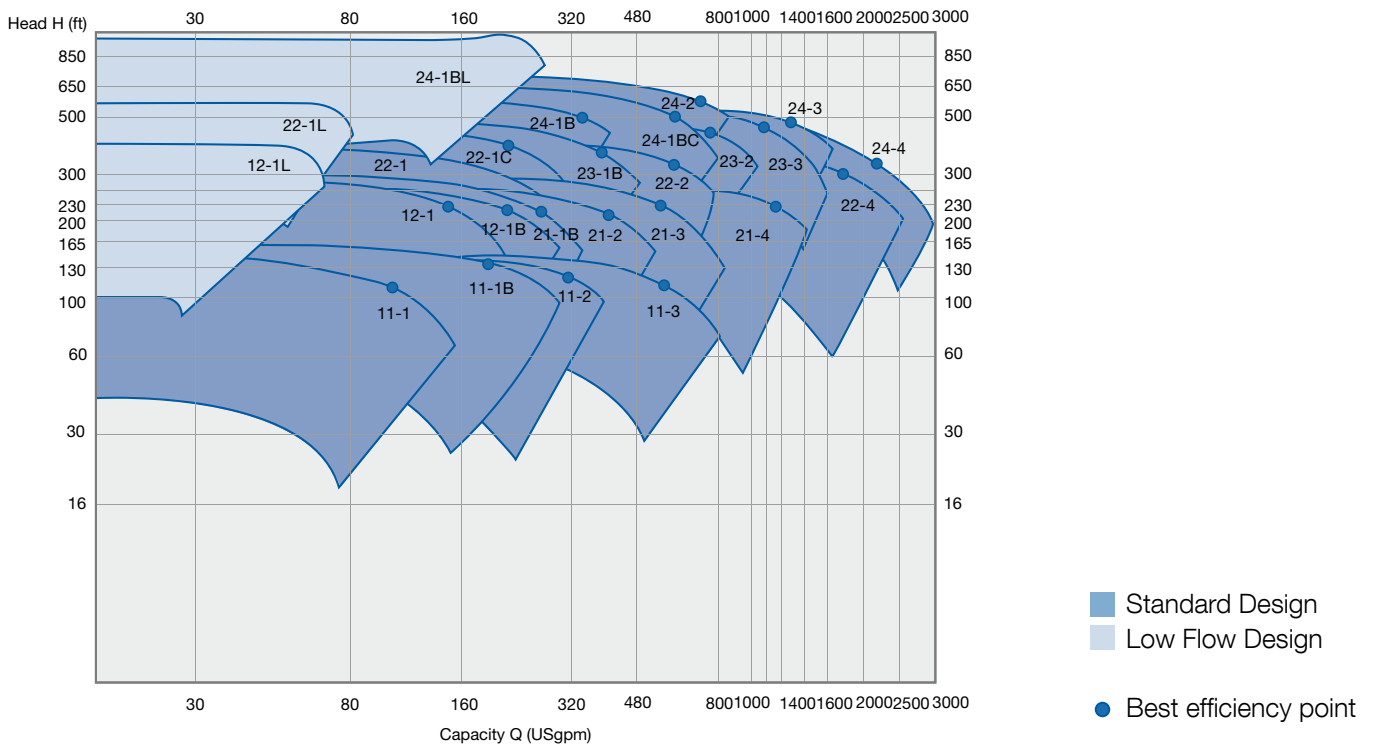
- Directs oil to bearings for efficient cooling and improved lubrication
- Designed for high load applications

## Large Capacity Oil Sump

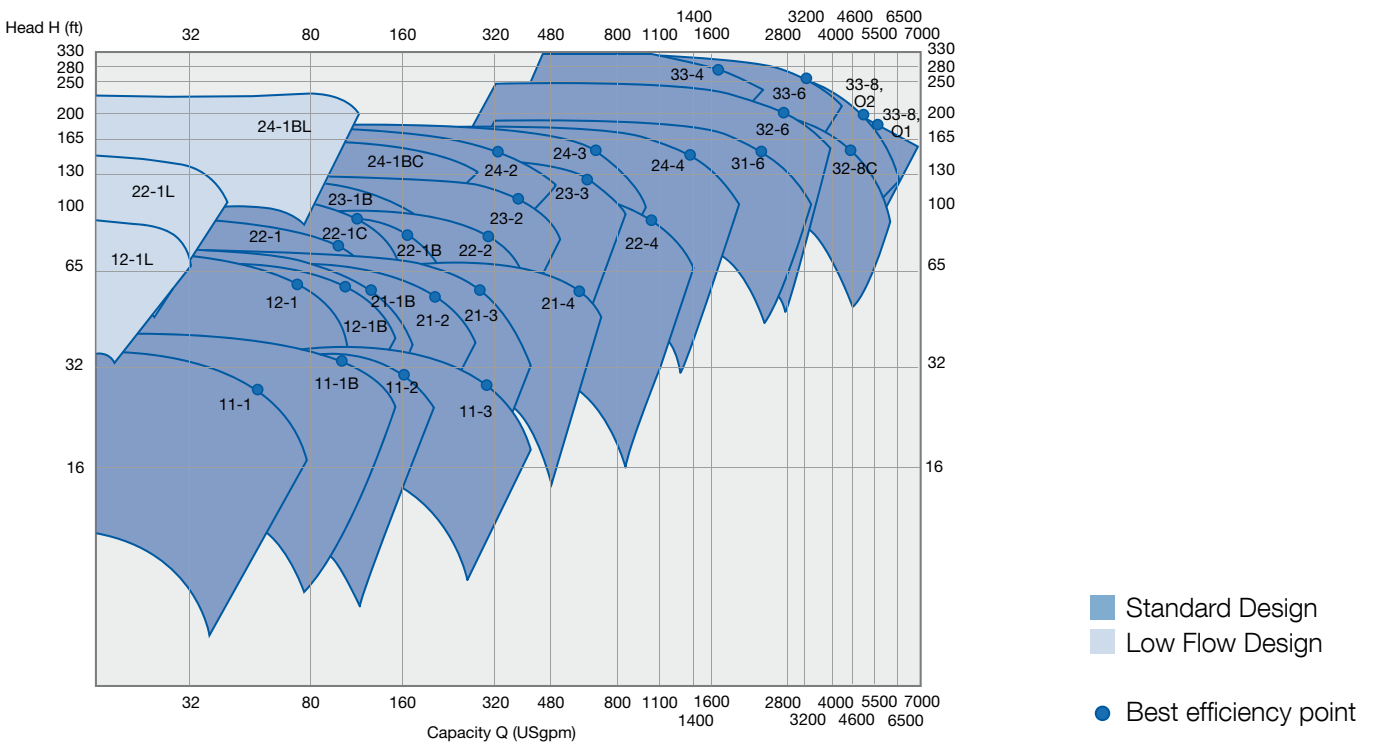
- Improved oil circulation and cooling
- Magnetic oil drain plugs (optional)
- Extra-large, multiple oil return slots
- Bullseye oil level sightglass is standard
- Optional bearing unit cooling

# CPT Performance Ranges

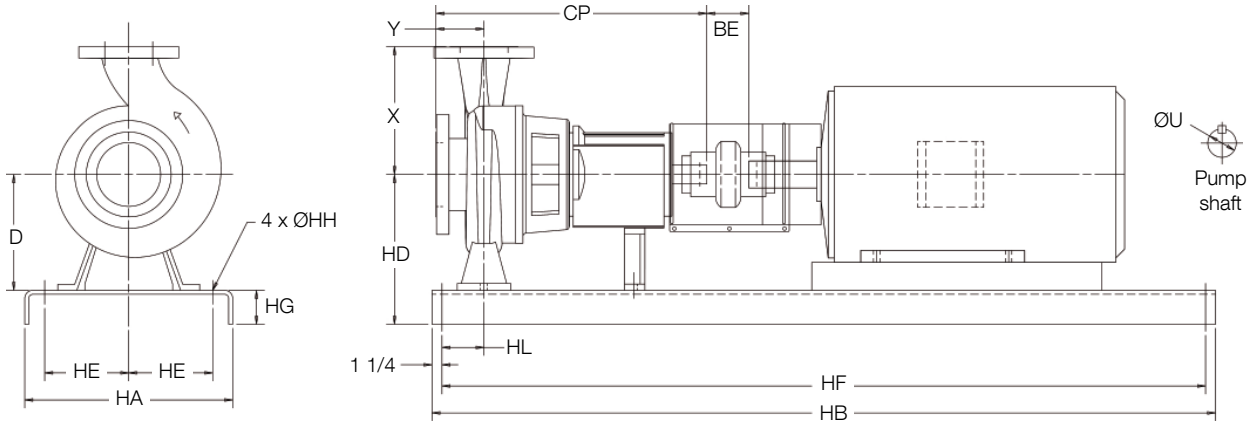
## 3600 rpm



## 1800 rpm



# Dimensions



## CPT Pump Dimensions

Group	Pump	Size	CP	Y	X	BE	D	ØU
1	11-1	1.5x1x6	17.5	4	6.5	3.875	5.25	7/8
	11-1B	3x1.5x6	17.5	4	6.5	3.875	5.25	7/8
	11-2	3x2x6	17.5	4	6.5	3.875	5.25	7/8
	11-3**	4x3x6	18	4	8.5	3.875	7	7/8
	12-1	1.5x1x8	17.5	4	6.5	3.875	5.25	7/8
	12-1L	1.5x1x8	17.5	4	6.5	3.875	5.25	7/8
2	12-1B	3x1.5x8	17.5	4	6.5	3.875	5.25	7/8
	21-1B	3x1.5x8.5	23.5	4	8.5	3.875	8.25	1 3/8
	21-2	3x2x8.5	23.5	4	9.5	3.875	8.25	1 3/8
	21-3	4x3x8.5	23.5	4	11	3.875	8.25	1 3/8
	21-4	6x4x8.5	23.5	4	11	3.875	8.25	1 3/8
	22-1	2x1x10	23.5	4	8.5	3.875	8.25	1 3/8
	22-1L	2x1x10	23.5	4	8.5	3.875	8.25	1 3/8
	22-1C	2x1x10C*	23.5	4	8.5	3.875	8.25	1 3/8
	22-1B	3x1.5x10	23.5	4	8.5	3.875	8.25	1 3/8
	22-2	3x2x10	23.5	4	9.5	3.875	8.25	1 3/8
	22-4	6x4x10	23.5	4	13.5	3.875	10	1 3/8
	23-1B	3x1.5x11	23.5	4	10.5	3.875	10	1 3/8
	23-1BL	3x1.5x11	23.5	4	10.5	3.875	10	1 3/8
	23-2	3x2x11	23.5	4	11.5	3.875	10	1 3/8
	23-3	4x3x11	23.5	4	12.5	3.875	10	1 3/8
	24-1B	3x1.5x13	23.5	4	10.5	3.875	10	1 3/8
	24-1BC	3x1.5x13C*	23.5	4	10.5	3.875	10	1 3/8
	24-2	3x2x13	23.5	4	11.5	3.875	10	1 3/8
24-3	4x3x13	23.5	4	12.5	3.875	10	1 3/8	
24-4	6x4x13	23.5	4	13.5	3.875	10	1 3/8	
3	31-6	8x6x13	33.875	6	16	5.25	14.5	2 3/8
	32-6	8x6x15	33.875	6	18	5.25	14.5	2 3/8
	32-8C	10x8x15C*	33.875	6	19	5.25	14.5	2 3/8
	32-8	10x8x15	33.875	6	19	5.25	14.5	2 3/8
	33-4	6x4x17	33.875	6	16	5.25	14.5	2 3/8
	33-6	8x6x17	33.875	6	18	5.25	14.5	2 3/8
	33-8	10x8x17	33.876	6	19	5.25	14.5	2 3/8

## CPT Base Dimensions (not for construction)

Group	Base	Max motor frame	HA	HB	HE	HF	ØHH	HL	HG max	HD max
1	139	184T	15	39	4.5	36.5	3/4	4.5	3.75	9
	148	256T	18	48	6	45.5	3/4	4.5	4.13	10.5
	153	326TS	21	53	7.5	50.5	3/4	4.5	4.75	12.88
2	245	184T	15	45	4.5	42.5	3/4	4.5	3.75	12/13.75***
	252	215T	18	52	6	49.5	3/4	4.5	4.13	12.38/14.13***
	258	286T	21	58	7.5	55.5	1	4.5	4.75	13/14.75***
	264	365T	21	64	7.5	61.5	1	4.5	4.75	13/14.75***
	268	405TS	26	68	9.5	65.5	1	4.5	4.75	14.75
	280	449TS	26	80	9.5	77.5	1	4.5	4.75	15.25
3	368	286T	26	68	9.5	65.5	1	6.5	4.75	18.75
	380	405T	26	80	9.5	77.5	1	6.5	4.75	18.75
	398	449T	26	98	9.5	95.5	1	6.5	4.75	18.75

\* Designates higher hydraulic range.

\*\* Note that CPT 11-3 is not part of ANSI specification and may have different dimensions.

\*\*\* Note that numbers depend on pump size D=8.25"/D=10".

# Materials

## A-890 grade 3A Alloy

Sulzer CPT ANSI 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.

This 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-8M).
- Provides excellent abrasion resistance (230 BHN) 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 CD4-MCu and SS2205.

## CPT Material Mechanical Properties

Common name	ASTM	Mechanical properties			
		Tensile (10 <sup>3</sup> psi)	Yield (10 <sup>3</sup> psi)	Elong (%)	Hardness (HB)
Cast iron	A278 CL200	29			170-220
CD6MN	A890-3A	95	65	25	180-260
2205	A890-4A	90	60	25	180-260
5A	A890-5A	100	75	18	180-260
CD4MCuN	A890-1B	100	70	16	160-200
Ductile iron	A395	60	40	18	160
329SS	AISI329	87-116	58	18	180-260
316SS	A743 CF-8M	70	30	30	150-190
317SS	A743 CG-8M	75	35	25	150-190
Alloy 20	A743-CN-7M	62	25	35	130-170
654 SMO*	"A240,480,358"	109	62	40	190-220

## CPT Material Chemical Properties

Common name	Chemical analysis (%)									
	Cr	Ni	Mo	Cu	Si	Mn	C	N	PRE	ASTM
Cast iron					1.7-2.4	0.4-0.09	3.2-3.7		NA	A278 CL200
CD6MN	24.0-27.0	4.0-6.0	1.75-2.5		0.04	1	0.06	0.15-0.25	35.60	A890-3A
2205	21.0-23.5	4.5-6.5	2.5-3.5	1.0 max	0.02	1.5	0.03	0.1-0.3	35.10	A890-4A
5A	24.0-26.0	6.0-8.0	4.0-5.0		1.0	1.5	0.03	0.1-0.3	43.00	A890-5A
CD4MCuN	24.5-26.5	4.6-6.0	1.75-2.25	2.75-3.25	1.0	1.0	0.4	0.15	35.30	A890-1B
Ductile iron					2.0-2.8	0.2-0.7	3.1-3.7		NA	A395
329SS	24.0-27.0	4.5-7.0	2.5-3.0		1.0				34.08	AISI329
316SS	18.0-21.0	9.0-12.0	2.0-3.0		2.0		0.08		27.50	A743 CF-8M
317SS	18.0-21.0	9.0-13.0	3.0-4.0		1.5		0.08		30.90	A743 CG-8M
Alloy 20	19.0-21.0	27.5-30.5	2.0-3.0	3.0-4.0	1.0	1.7	0.07		30.00	A743 CN-7M
654 SMO*	24.0-25.0	21.0-23.0	"7.0-8.0"	0.30-0.60	0.5	2.0-4.0	0.02	0.45-0.55	56.1	A240.480,358

\* AVESTA 654 SMO is a trademark owned by Outokumpu Stainless which has granted Sulzer Pumps licence to produce this material.



### 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.

ASTM	PRE*
A890-3A	35.6
A743 CF-8M	27.5
CD4MCu	35.30
AISI329	34.08
A743 CN-7M	30.0
A743 CG-8M	35.10

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

### 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

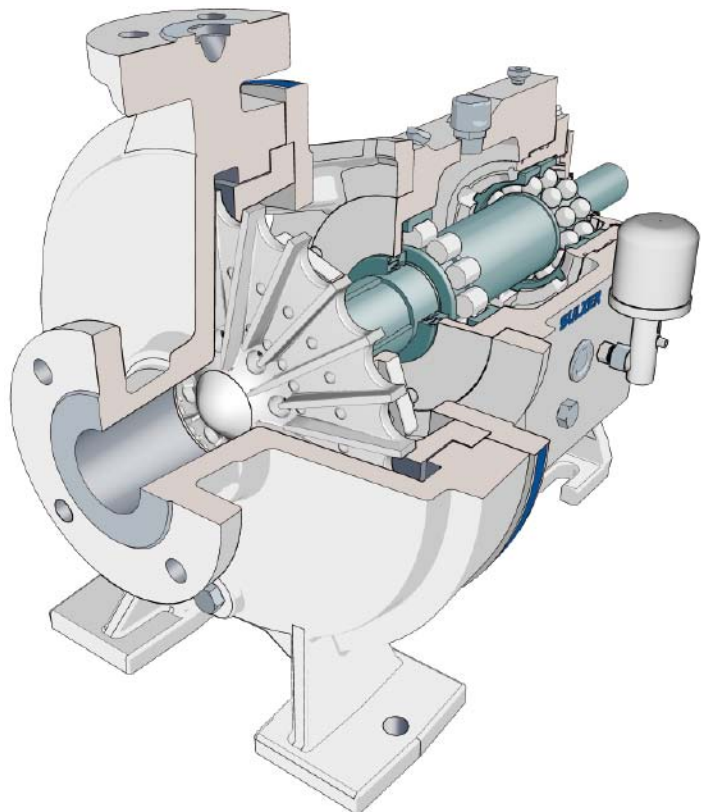
A-890 Grade 3A is a readily weldable metal.



## Sulzer CPT-LF Pumps – Designed for Your Demanding Low Flow Applications

Not all end suction pumps are intended to run at low flow/high head conditions. The Sulzer CPT Low-Flow ANSI pump is specifically designed to meet these requirements.

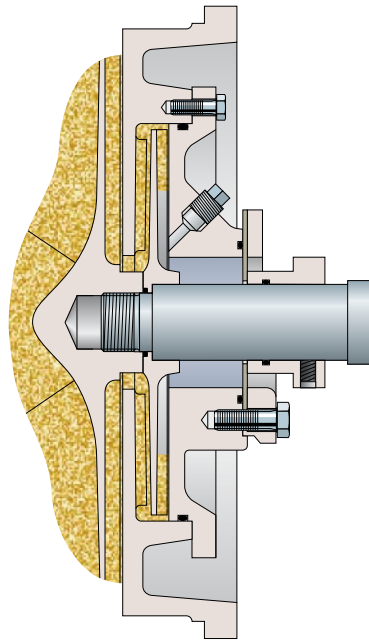
The Sulzer radial vane impeller and concentric casing design matched with inboard roller bearings and duplex angular contact outboard bearings extend the Mean Time Between Failures (MTBF) and reduce overall maintenance cost.



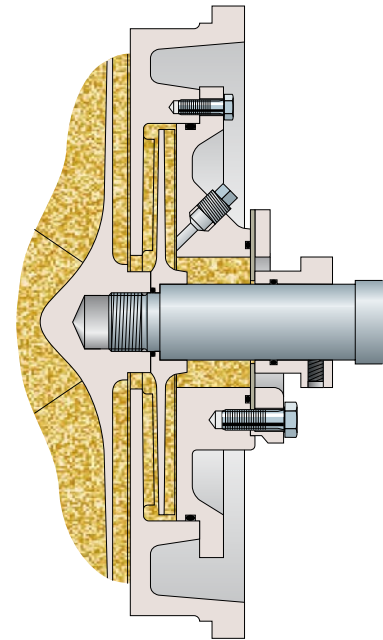
# Shaft Sealing

## Dynamic Seal

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.



Sulzer Dynamic Seal running

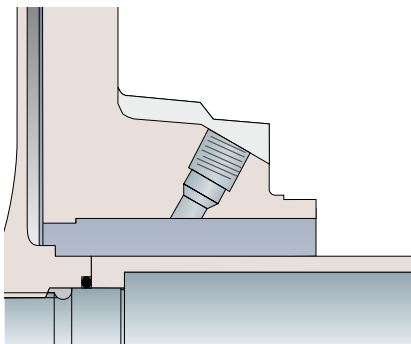


Sulzer Dynamic Seal stopped

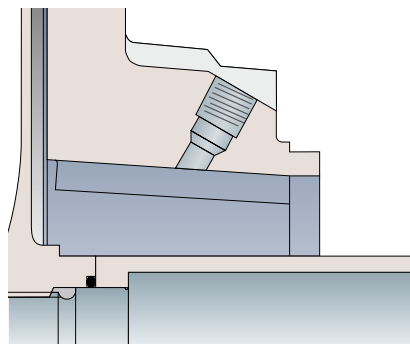
## Seal Chambers

The CPT design offers a variety of seal chambers. Each is designed to tailor CPT pumps to specific process requirements enhancing reliability and longevity.

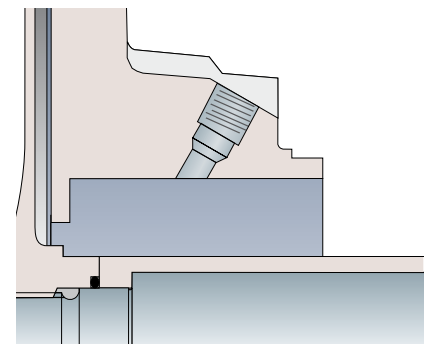
Our engineers work closely with the customers to find the optimum fit. With our research centers and advanced engineering we support the customer in selecting the best solution.



**Standard Bore Box** accommodates most single component and cartridge mechanical seals as well as standard packing.



**Tapered and Ribbed Bore Box** features a seal chamber designed for single and double mechanical seals. The cast ribs inside the stuffing box convert circular flow into axial flow, reducing wear and extending longevity.



**Large Bore Box** is designed for seals with large gland bolt circles. It accommodates most single and double mechanical seals, as well as cartridge or component seals. The oversized chamber helps reduce running temperatures while improving lubrication and circulation.

# Baseplate Options

Our baseplates require minimal maintenance and are corrosion resistant for severe environments. Sulzer Pumps offers a complete range of mounting systems to meet your requirements. Optional V-belt and custom designs are also available. Contact your local Sulzer representative for details.



## Standard Baseplate (Style 1)

Sulzer Pumps standard formed steel baseplate meets ANSI specifications for pump/motor mounting. A single grout hole and epoxy paint are standard. An optional stainless steel catch basin or all stainless steel construction is available.



## Non-Metallic Baseplate

Sulzer Polymer Composite baseplate design is provided with a standard guaranteed surface flatness of 0.015" or 0.005" end-to-end, carbon or SS inserts, leveling holes and machined riser blocks.



## Drip-Lip Baseplate (Style 3)

The Drip-lip baseplate with welded end caps and optional center I-Beam support includes a sloped drainage channel to a welded drain connection. Options include motor alignment bolts, additional grout vent holes and all stainless steel construction.



## PIP Baseplate

This baseplate is designed to current PIP requirements and is standard with grout hole, raised mounting pads machined to 0.002 in/ft surface flatness, motor alignment bolts, additional welded supports, sloped full drain rim, lifting lugs and continuous welded steel construction. Options include leveling screws, stilt and spring mounting and all stainless steel construction.



[www.sulzerpumps.com](http://www.sulzerpumps.com)