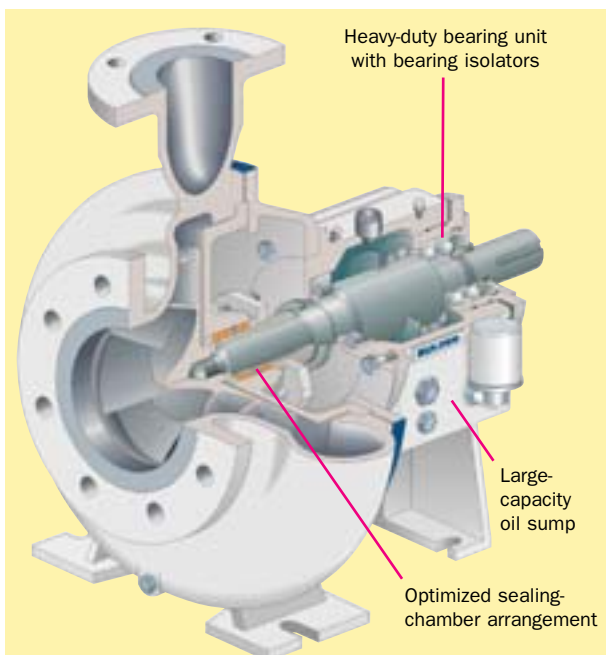




Packaging the CPT ANSI Pump for the HPI Segment

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Standard ASME B73.1 (ANSI) pumps have been used successfully for years in the hydrocarbon processing industry (HPI). Sulzer Pumps has now customized a general duty end-suction pump to meet the needs of the HPI and petroleum industries.

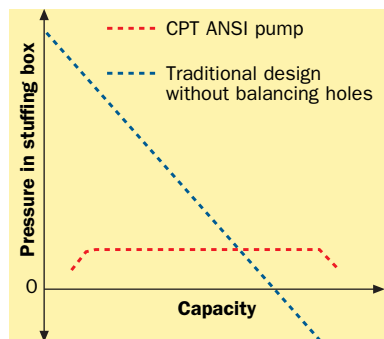


1 Cutaway of the CPT ASME B73.1 (ANSI) process pump.

▶ The CPT ANSI pump is designed for continuous operation in process industries for pumping clean, abrasive, or corrosive liquids. It provides reliable performance and exceeds the latest ANSI (ASME B73.1M-2001) pump standards. CPT pumps are horizontally mounted, single-stage process pumps with a semi-open impeller design, end suction, back pull-out, and an adjustable bearing unit (Fig. 1).

Multiple Sealing Options

The CPT pump is designed to accommodate all common seal types, including single and double component seals, single and double cartridge seals, pumping rings,



2 Effect of balancing holes on pump seal chamber pressure.

and all other peripheral components. Gas seals and systems have also been incorporated into the product offering to allow additional applications.

Sulzer has designed the large bore and taper bore chambers to allow large single and double cartridge seals to be used with a variety of flush and sealing systems, providing better control of the seal environment. The taper bore has axial-flow modifier vanes to prevent solids and air from accumulating at the shaft seal area. The large bore provides the shaft seal an optimal environment for operation by allowing better liquid circulation and better heat dissipation. These designs meet the best available technological standards and provide increased mean time between failures for the sealing area.

The CPT ANSI pump offers a unique sealing arrangement called the ADS Dynamic Seal (see STR 1/2001, p.26), which uses an expeller to form a liquid ring and prevent leakage. It saves water, reduces piping costs—as no sealing liquid is needed—and eliminates packing maintenance. Furthermore, balancing holes in the impeller (Fig.2) keep the pressure level steady around the shaft seal area and thereby increase reliability.

Design of the Bearing Unit

The bearing unit has been optimized for long life.

- ▶ A large diameter shaft minimizes deflection at the shaft seal area. Deflection at the seal is less than the required standard of 0.05 mm (0.002 in).
- ▶ Angular contact bearings for the thrust load have a lifetime L10h

of over 100 000 hours, and the cylindrical roller bearing for the radial load has an average lifetime L10h of over 500 000 hours. Both well exceed the L10h requirements of ASME B73.1-2001 and API 610, 9th edition.

- ▶ The bearing unit incorporates the INPRO VBX isolator as the standard for the pump, but non-metallic and magnetic isolators are also available.
- ▶ Oversized oil sump and splash type lubrication increase L10h life significantly by lowering the temperature and providing a better environment for proper lubrication. Additionally, both purge oil mist and pure oil mist options are available to meet specific project requirements.

Packaging

The Sulzer Pumps Packaging Center in Easley, SC (USA), is fully capable of supplying CPT pumps to meet the demands of the petrochemical, hydrocarbon processing, and petroleum markets. Base plate designs that correspond to ASME B73.1 are in store. PIP RESP002 designs are also standardized in the system to enable rapid response to request. Non-metallic base plates are available in Zanite™ for severe corrosive atmospheres.

All ASME B73.1 seal flush plans that duplicate API basic requirements are available. These can be mounted to the base or any other configuration. Dual flushing systems can also be furnished by the packaging center.

Testing and Certificates

The packaging center has a new and modern testing facility that can test pump performance and

execute NPSHr (net positive suction head) testing (Fig. 3). NPSHr testing is done by using the vacuum suppression method and is capable of flows up to 20800lpm (5500gpm) and NPSHa of 0.5–35m (1.6–115ft.). Performance testing to HI 1.6 level B is standard for all pumps produced in Easley, but HI 1.6 level A is also offered as an option.

Material certificates verify that materials furnished comply with the material standard supplied. Certificates can also be issued for vibration testing, hydrostatic testing, and a qualified noise level test. A standard two-part epoxy paint system is utilized for most pumps, but the SP offshore paint specification D50-068 has been used and incorporated into the packaging center system. The CPT pump thereby meets requirements for offshore duty.

Hydrocarbon Processing and Petroleum Applications

The HPI industry is one of the largest users of ASME B73.1 pumps, using thousands of these pumps in almost every type of process. Many petrochemical processes involve acids and light slurries. Onshore and offshore production areas and small gathering installations have used ASME B73.1 pumps for many years in applications for produced water, produced-water transfer, produced-water injection (shallow-

disposal well applications), oily water transfer, oil water skimming, steam injection systems, and oil-loading metering stations (LACT units). In the pipeline market, ASME B73.1 pumps have been used for gathering and tank transfer applications, as well as for water and sour-water applications in and around gas/oil separator units and water separation units. Currently, Conoco-Phillips Pipeline uses CPT pumps for these types of applications in North America.

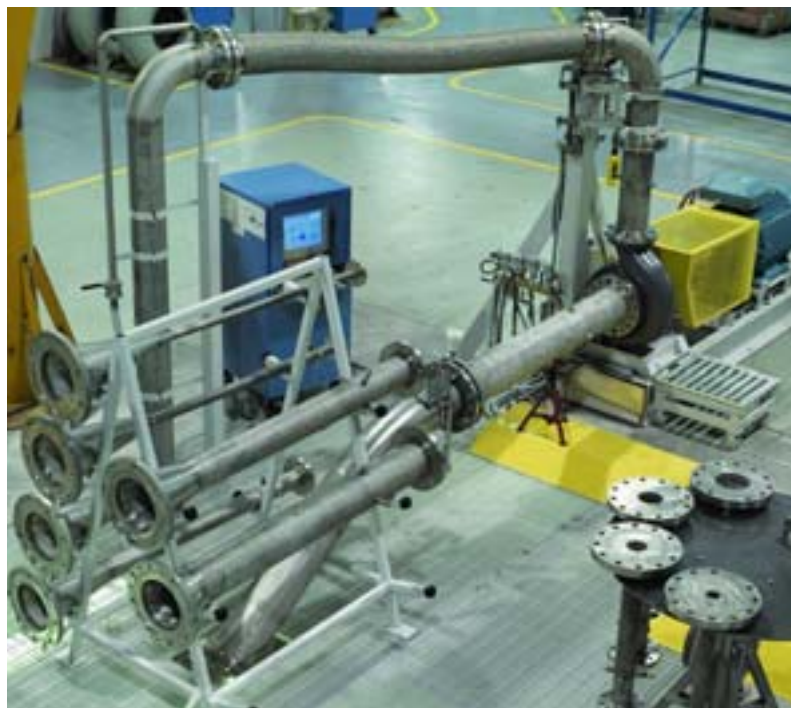
Materials and Compliance Standards

The standard construction material for the CPT is ASTM A890 Grade 3A duplex stainless steel, which provides better corrosion and abrasion resistance than traditional pump materials. In mildly abrasive applications, A890-3A (hardness typically HB230) can last 30–40% longer than conventional materials, commonly known as 316SS, SS2343, W.Nr. 1.4408, or

CF-8M (hardness typically HB170). The CPT is also available in A890-1B (CD4MCuN), A890-5A (super duplex) and super austenitic (654 SMO®), as well as in Hastelloy®, Alloy 20, and ductile iron. The CPT ANSI pump is built in full compliance the latest ASME standard and with part of the API 610 standard. Although the pump is not necessarily appropriate for hazardous applications, it is well suited for utility-type and non-hazardous applications. Many features, such as its heavy-duty design, make this product an excellent companion to the API 610 product line. ◀

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3 This state-of-the-art NPSHr testing station at the Sulzer Pumps Easley, SC (USA), manufacturing plant is used to confirm pump operation.