Pitot - Tube Pump

STERLING

Combitube

CWHA 4060 to 4302

TECHNICAL DATA

Capacity: 105 m³/h Maximum.
Delivery Head: 1900 m.l.c. Maximum.
Casing Pressure: 160 BarG Maximum.
Pump Speed: 6800 rpm Maximum.
Temperature: 400 °C Maximum.
Materials: Ductile Iron, Stainless Steel, Cast Steel, Chrome steel, Duplex and Hastelloy
Shaft Seal: Mechanical Seal.
Connections: Flanges up to ANSI B 16.5 WN 1500 lbs. or Din up to 250 BarG.
Rotation: Counter clockwise facing shaft end.
Standards API 610 8th Edition or Sterling Standard

APPLICATION

The Combitube Pump has been developed for ‘Low Flow, High Pressure’ applications. The pitot tube design produces a stable, pulsation free flow. The ability to operate with low minimum flow makes the pump suitable for a wide variety of applications, within the performance envelope.

The Combitube is used in:
- Chemical and petro-chemical industries.
- Plastic and rubber industries.
- Paper and cellulose industries.
- Steel mills.
- Reverse osmosis units.
- General industry.

Within these, the Combitube is used for cleaning, descaling, injection, boilerfeed, transport and process duties, pressurising hydraulic systems, and spraying systems.

DESIGN

The Combitube is a single-stage, pitot-tube pump. The liquid enters the pump via the suction line, passes the mechanical seal (the mechanical seal is under suction pressure only) and enters the rotor where it is accelerated up to the rotor speed. The liquid near the largest rotor diameter has a pressure in accordance with the basic laws of centrifugal force. A stationary wing shaped pitot tube is placed inside the rotor and has a circular opening near the outside wall of the rotor. The pitot tube works in two ways: firstly, the liquid enters the pitot-tube at high velocity and under centrifugal pressure created by the rotating rotor casing and secondly, the high velocity energy in the pitot-tube is converted to pressure as the liquid passes along the diffuser section of the pitot-tube. This gives a continuous high pressure output.

CONSTRUCTION

Casing Pressure (Manifold): 160 BarG Maximum.

The maximum casing pressure is the inlet pressure plus the discharge pressure at zero flow. The maximum test pressure is 225 bar depending upon the materials of construction.

Position of Branches:

Branches are in line horizontally opposed on each side of the pump.

Flanges:

The flanges are ANSI up to B 16.5 WN 1500 (Codes 01 to 05) or may be drilled up to DIN 2638 PN 250 (Codes 06 to 09).

Hydraulics:

Standard Hydraulics, code designation A.

Bearings:

The shaft is well supported by a large diameter ball bearing at the rotor end and by two ball bearings or one ball and one roller bearing set at the drive end.

Standard Shaft Seals

- M19 Flowserv Bellows Seal Type CBR-3250
- M20 Flowserv Bellows Seal Type BXCOW-3250
- M21 Flowserv Single Pusher Seal Type GW-3500
- M22 Flowserv Double Pusher Seal Type GW-3500
- M32 James Walker Bellows Seal Type SF-BX

(Other seals may be fitted on request)
### MATERIALS OF CONSTRUCTION

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Code AB</th>
<th>Code BB</th>
<th>Code CB</th>
<th>Code DC</th>
<th>Code EC</th>
<th>Code GD</th>
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<td>Carbon Steel A216 WCB GS (1.0402)</td>
<td>Stainless Steel A487-CANM 13Cr4Ni (1.4313)</td>
<td>Stainless Steel A351-CF8M G-X6CrNiMo18 10 (1.4408)</td>
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<td>O Rings</td>
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### DRIVE

The Combitube is designed to be driven by three phase electric motors of IM B3 construction via a suitable flexible coupling. For non-synchron ous speeds, V-belt drive up to 4700 rpm, gearbox drive up to 6800 rpm and/or a frequency converter is used.

### MANIFOLD CONNECTIONS

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<th>Code</th>
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<td>03</td>
<td>ANSI B 16.5 WN 900 lbs.</td>
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<td>ANSI B 16.5 WN 1500 lbs.</td>
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<td>ANSI Flange - Drilled to DIN 2637 PN 100</td>
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<td>ANSI Flange - Drilled to DIN 2638 PN 160</td>
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### PUMP CODE EXAMPLE

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### COOLING OPTIONS

To provide additional bearing oil cooling when required for high duties and high speeds the Combitube pump range can be fitted with a cooling coil in the oil chamber within the pedestal. For lighter duties a cooling fan may be fitted on the pump shaft to direct cooling air over the fins on the pedestal.

### OIL LEVEL INDICATION

Combitube Pumps are fitted with a sight glass to show the oil level in the pedestal, a constant level oiler bottle may be fitted to suit customer’s preference.

### API 610 STANDARD SPECIFICATIONS

The Combitube pump can be supplied to meet API 610 8th edition standards. This will require special baseplates for which separate drawings will be provided. Special seals and flushing plans can be supplied to meet customer’s requirements.
**SOLIDS HANDLING**

Combitube pumps will operate normally with up to 100PPM suspended solids, but this will depend on the particle size, density and hardness. It is recommended that a 100 Mesh (150 Micron) strainer or equivalent filtration device is installed in the suction line.

**PUMP SECTION DRAWING**

![Pump Section Drawing]

Manifold shown turned through 90 degrees for clarity

Mechanical Seal omitted for clarity

**MECHANICAL SEAL DETAILS**

- **DURAMETALLIC BELLOWS**
  
  SEAL CBR-3250 Code M19

- **FLOWSERVE BELLOWS SEAL**
  
  TYPE BXCOW-3250 Code M20

- **FLOWSERVE SINGLE PUSHER**
  
  SEAL TYPE GW-3500 Code M21

- **FLOWSERVE DOUBLE PUSHER**
  
  SEAL TYPE GW-3500 Code M22

- **JAMES WALKER BELLOWS**
  
  SEALSF-BX Code M32

- **BURGMANN SA4/86 TA1**
  
  GAS SEAL
PUMP DIMENSIONS IN mm

400 SERIES COMBITUBE
OIL LUBRicated
WITH 3" X 2" FLANGED MANIfOLD

Approximate Weight 605 Kg

COMBITUBE PUMP PERFORMANCE ENVELOPE
DIRECT DRIVE PUMP DIMENSIONS IN mm

V-BELT DRIVE PUMP 18.5 kW to 110kW

NOTE: SHAFT CENTRES WILL VARY TO SUIT SPEED RATIO

8 HOLES FOR FOUNDATION BOLTS 24 Dia

2” Dia. DISCHARGE

3” Dia. SUCTION

DIRECT DRIVE PUMP
18.5 kW to 200kW

Pumps with v-belt drive from the motor mounted above the pump can be supplied to suit installations where space is limited. Pumps conforming to API 610 can be supplied, separate GA drawings will be provided to show API baseplate and any specified seal flushing equipment.
STANDARD GEARBOX DRIVE PUMP DIMENSIONS IN mm

AP 610 GEARBOX DRIVE PUMP DIMENSIONS IN mm

Separate GA drawings will be provided to show special baseplates required to suit additional equipment and for seal flushing systems etc.

For further information contact
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Fax: +31 (0)251 22 63 09