3 DESIGN AND PRINCIPLE OF OPERATIONS

1
GENERAL

The purpose of the MG Dryer is to:

- Dry the sheet to a certain dryness.
- Create the desired gloss of the sheet.

1.1
Sheet Flow

The sheet is transferred to the Dryer in the nip between the Suction Pressure Roll and the Dryer.

1.2
Steam Flow

The heating medium in the Dryer is steam.

The steam is supplied to the Dryer via the rotary steam joint on the Tending Side Journal. Part of the steam is condensed on the inside of the shell. This condensate is removed out of the Dryer through the Internal Condensate Removal System with the help of blow through steam. The condensate and the blow through steam leave the Dryer via the Drive Side Journal.

2
MG DRYER

2.1
Purpose

The sheet is pressed against the Dryer surface in nip between the Suction Pressure Roll and the Dryer, and enters the Dryer at a dryness level of about 40 %.

By means of the Dryer and the Hood, the dryness is increased to a dryness of about 90 %.

Besides the function to dry the sheet, the Dryer creates the desired gloss of the sheet.

2.2
Equipment/Component Descriptions

The Dryer consists mainly of five different cast iron components. (See Figure 2)

- Shell
- T.S. and D.S. Heads
- T.S. and D.S. Journals

The Heads are bolted to the Shell with through going Bolts. (See figure 1)

To prevent steam leakage in this Flange Connection, there is a soft copper Washer placed between the bolt head and the Inner Shell Flange surface.

There is also a tight press fit in the spigot fit between the Shell and the Head to prevent steam leakage in this position. Furthermore the flange surfaces are smeared with a sealing compound before the assembly to prevent steam leakage. The Heads are equipped with injection holes to provide the possibility for injection of extra sealing compound after assembly, if necessary.

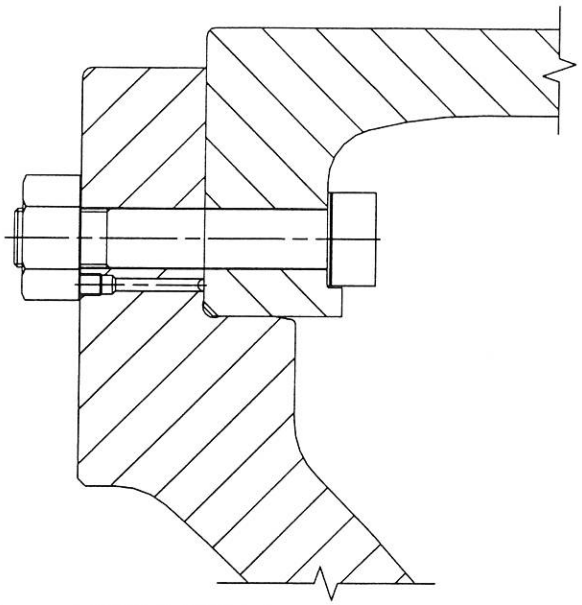

Figure 1

Each head is equipped with a manhole to allow access to the inside of the Dryer.

The two Journals are bolted to the Heads and also bolted together in the flange connection in the center of the Dryer. There is a steam Distribution Ring placed between the Journal Flanges in this position. The T.S. Journal is equipped with a manhole.

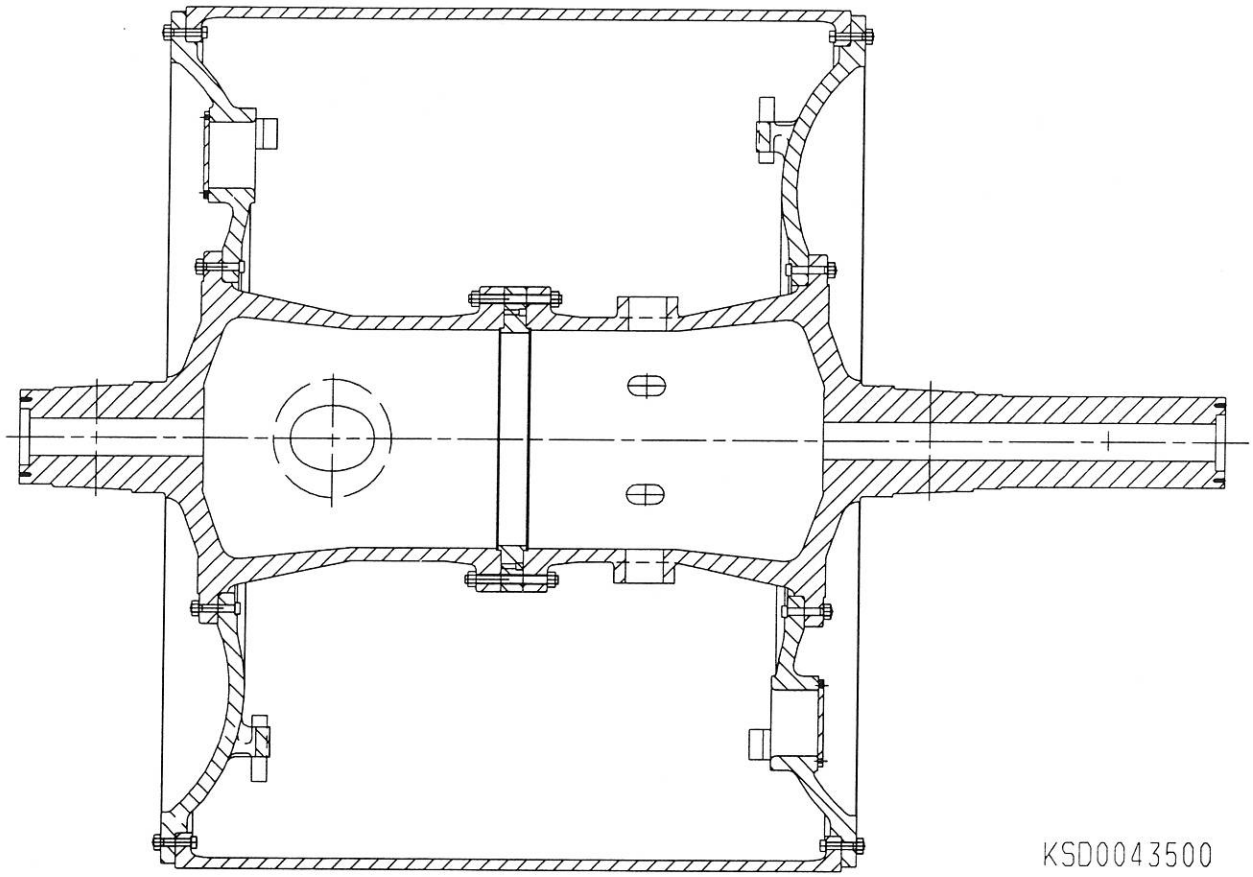

Figure 2

2.3 Principle of Operation

The MG Dryer is supplying drying energy to the sheet in order to evaporate the remaining water in the sheet.

This energy is created through condensing of high pressure steam inside the Dryer.

The steam is supplied to the Dryer through the T.S. Rotary steam joint and then in the center of the Dryer distributed out to the inside shell surface through the Steam Distributor Ring.

The Steam Distributor Ring is equipped with a number of angled pipes pointing in different directions in order to get a good distribution of the steam.

When the steam enters the Dryer the steam pressure is about 150 psi (1034 kPa) at design pressure and with corresponding steam temperature of about 365°F (185°C).

When this hot steam comes into contact with the inside of the shell, it will condensate.

The inside of the shell has a lower temperature due to the cooling effect from the sheet on the outside of the Dryer. It is this condensation that releases the heat energy used for the drying process.

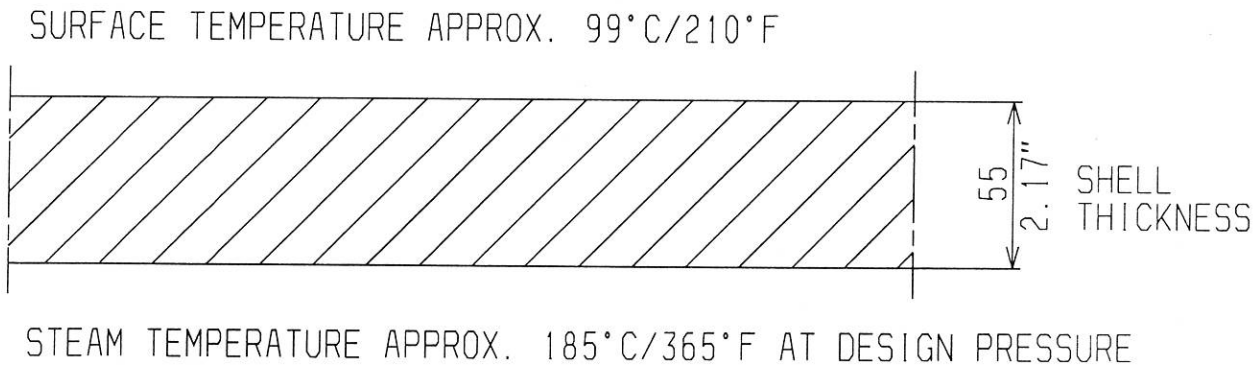

Figure 3

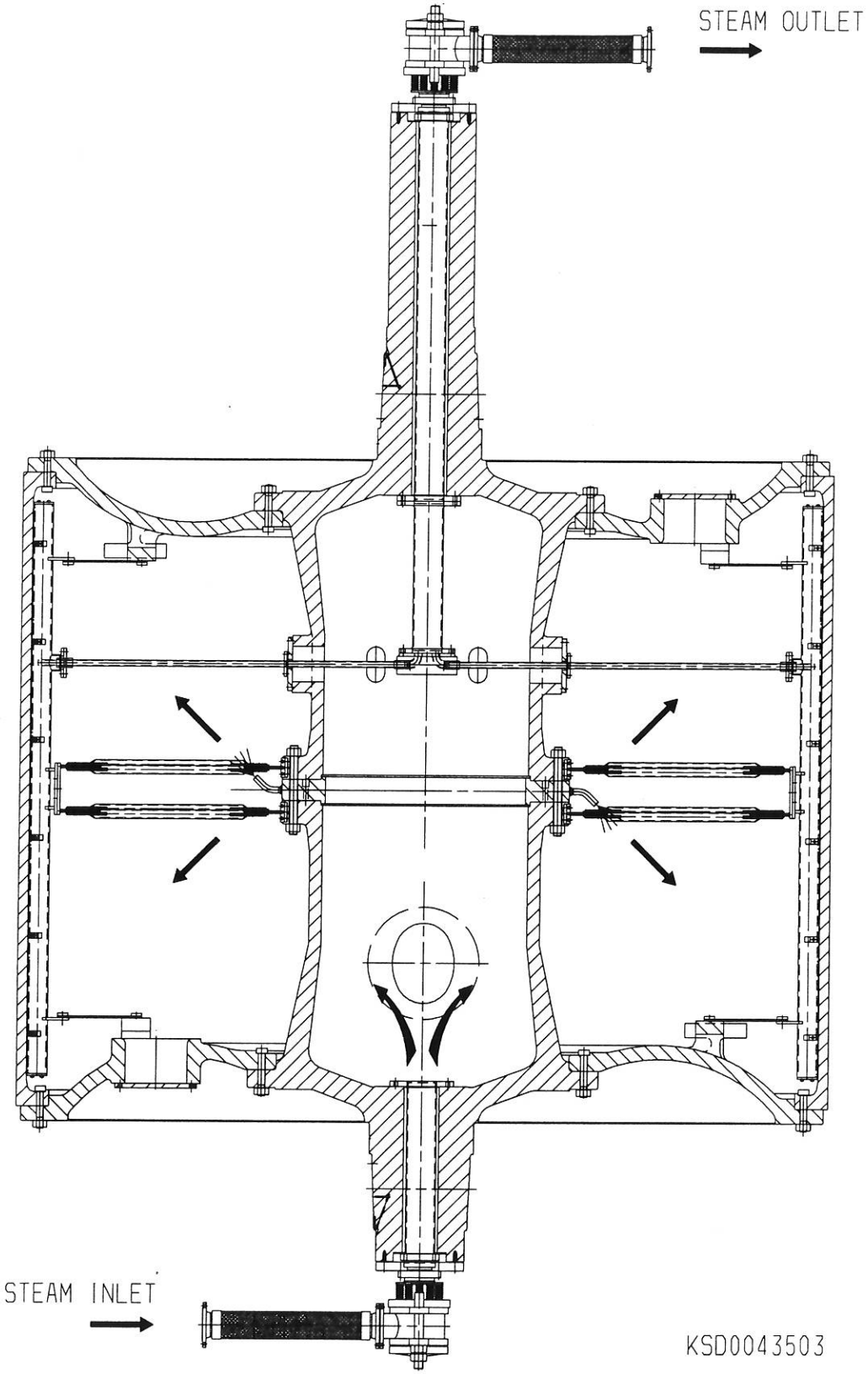

Figure 4

3
CONDENSATE REMOVAL SYSTEM

3.1
Purpose

The condensed steam in the Dryer is collected on the inside of the shell in the form of condensate.

This condensate must be removed from the inside of the shell and this is done with the help of the condensate removal system.

3.2
Equipment/Component Description

The condensate removal system consists of four (4) condensate headers. These headers are mechanically supported with stays from the journals and positioned close to the inside shell surface (Fig. 5).

The condensate is transported from the headers to the central steam collecting pipe through the riser pipes.

The condensate and blow through steam are transported from the steam collecting pipe through the insulated D.S. journal and out of the Dryer through the D.S. Rotary joint (Fig. 6).

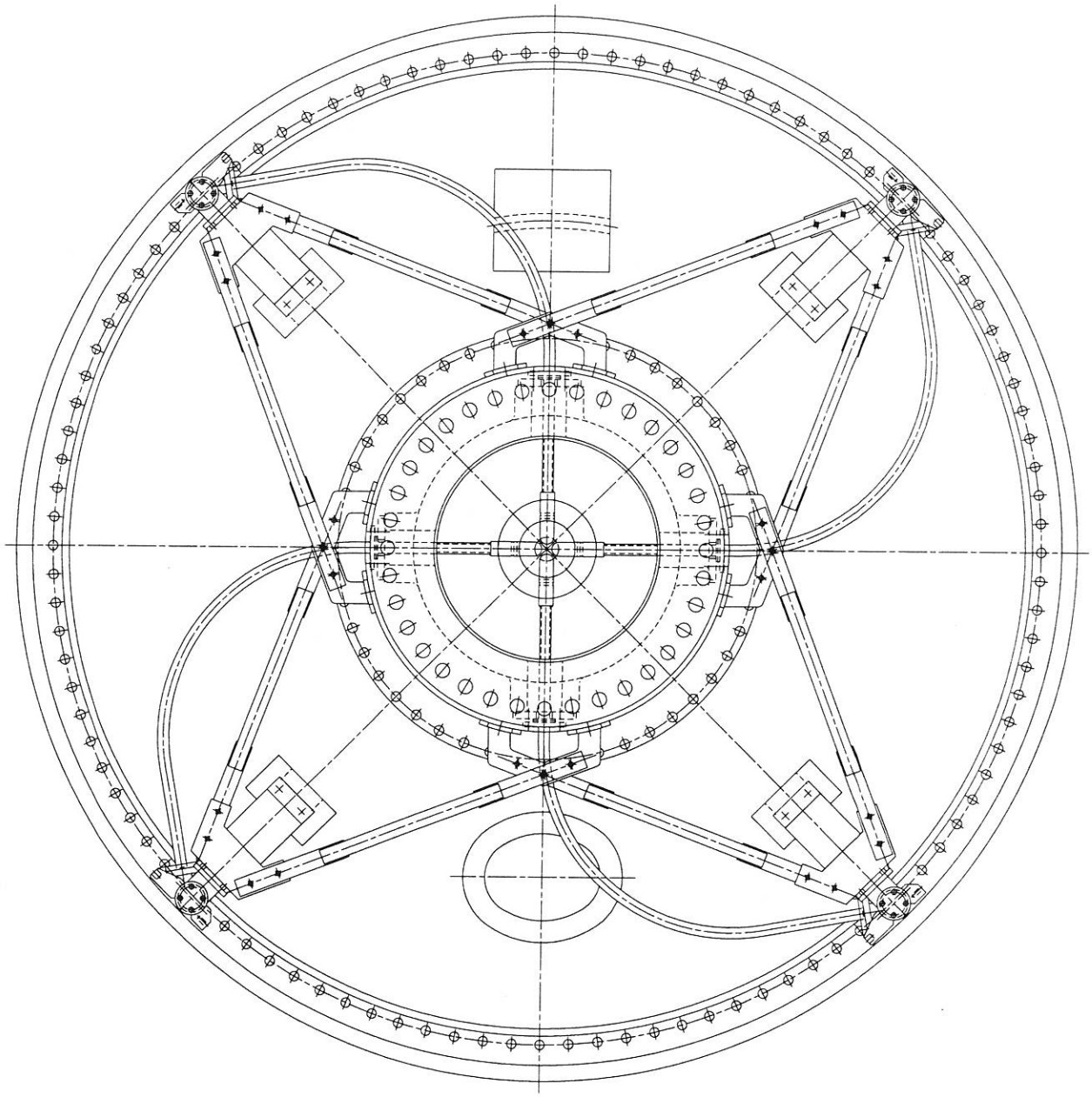

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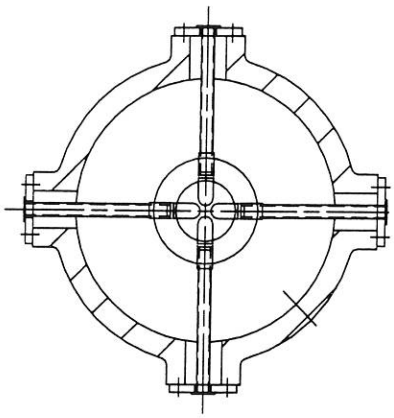
Figure 5



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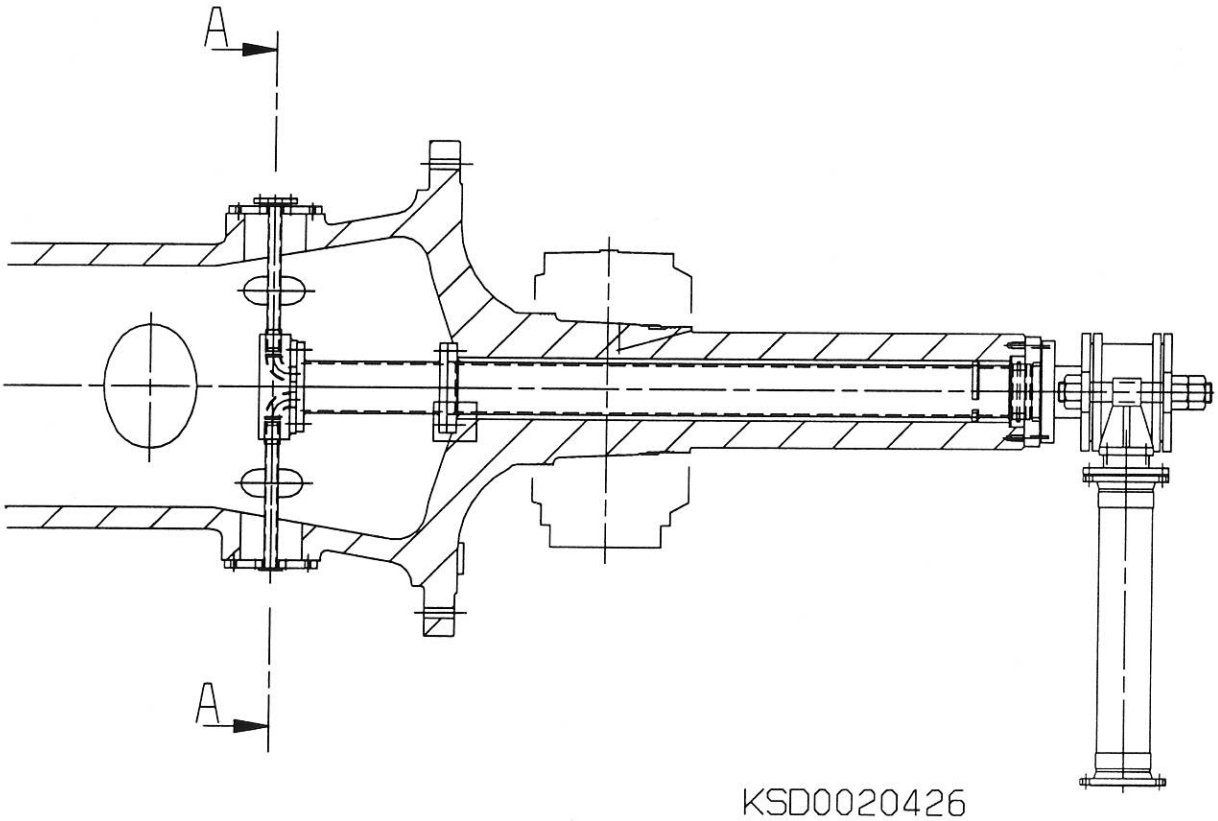

Figure 6

3.3 Principle of Operation

The condensate inside the Dryer shell is, during operation, exposed to very high centrifugal forces which makes removal of the condensate from the Dryer very difficult.

To achieve this the Dryer steam system is adjusted so that a certain amount of steam is blown through the system. This blow-through steam is carrying the condensate and removing it from the inside of the Dryer.

4

BEARINGS WITH LUBRICATING UNIT

4.1 Purpose

The Dryer is a very heavy piece of rotating machinery part. The weight of this Dryer is about 40 metric tons.

To carry this weight the Dryer is equipped with two large spherical Roller bearings.

The T.S. Bearing Housing is designed to allow the bearing to slide axially in order to handle the thermal expansion of the Dryer.

The Bearings are oil lubricated for lubricating and cooling purposes.

4.2 Equipment/Component Description

The Bearings for this Dryer are SKF Spherical Roller Bearings with conical inner rings (See Fig.7).

The designation of the Bearing is: 23168 CCK/HA3/C084/W33

The Bearing clearance is C4.

The Bearings are designed for oil lubrication. Oil inlets are at the sides of the Bearing Housing.

There are four outlets on each Bearing Housing. Of these only two need to be connected.

The Bearings have a separate Circulating Oil System

4.3 Principle of Operation

The Bearings are designed to withstand the loads both during normal running and crawl speed.

The temperature of the Bearings is kept within allowable limits with the help of circulating oil.

The oil flow for the Bearings is calculated to 1,59 US gallons (6 l)/min per bearing and an inlet oil temperature of 104 °F (40 °C).
Oil viscosity ISO VG 460.

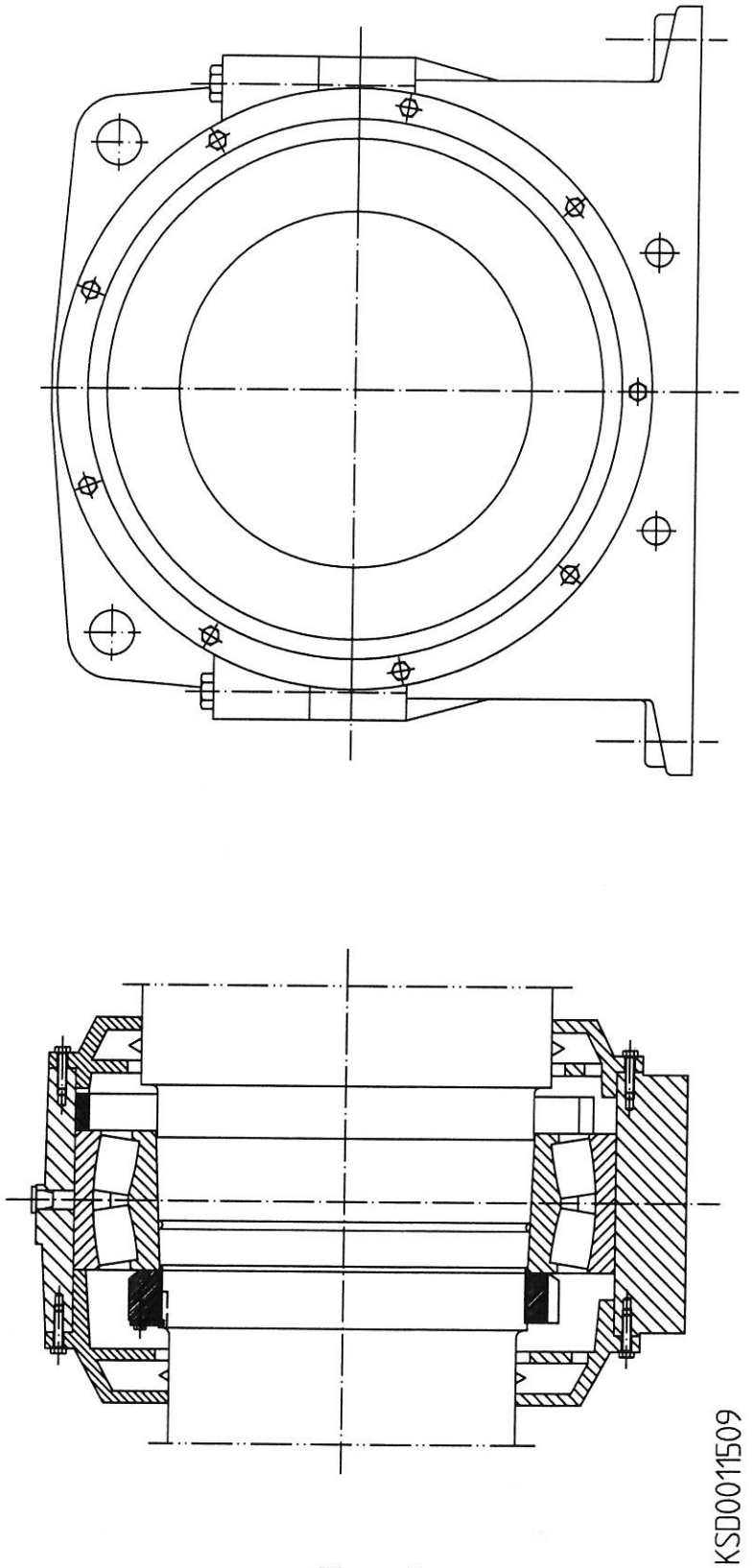

Figure 7

5

STEAM AND CONDENSATE ROTARY JOINTS

5.1 Purpose

The Steam and Condensate Rotary joints serve as a connection between the rotating Dryer and the external Steam and Condensate System.

5.2 Equipment/Component Description

This Dryer is equipped with 5" Johnson rotary joints.
Type 950LJTRFDM-PT.

For further information
see Section 5, Enclosures

5.3 Principle of Operation

See Section 5, Enclosures

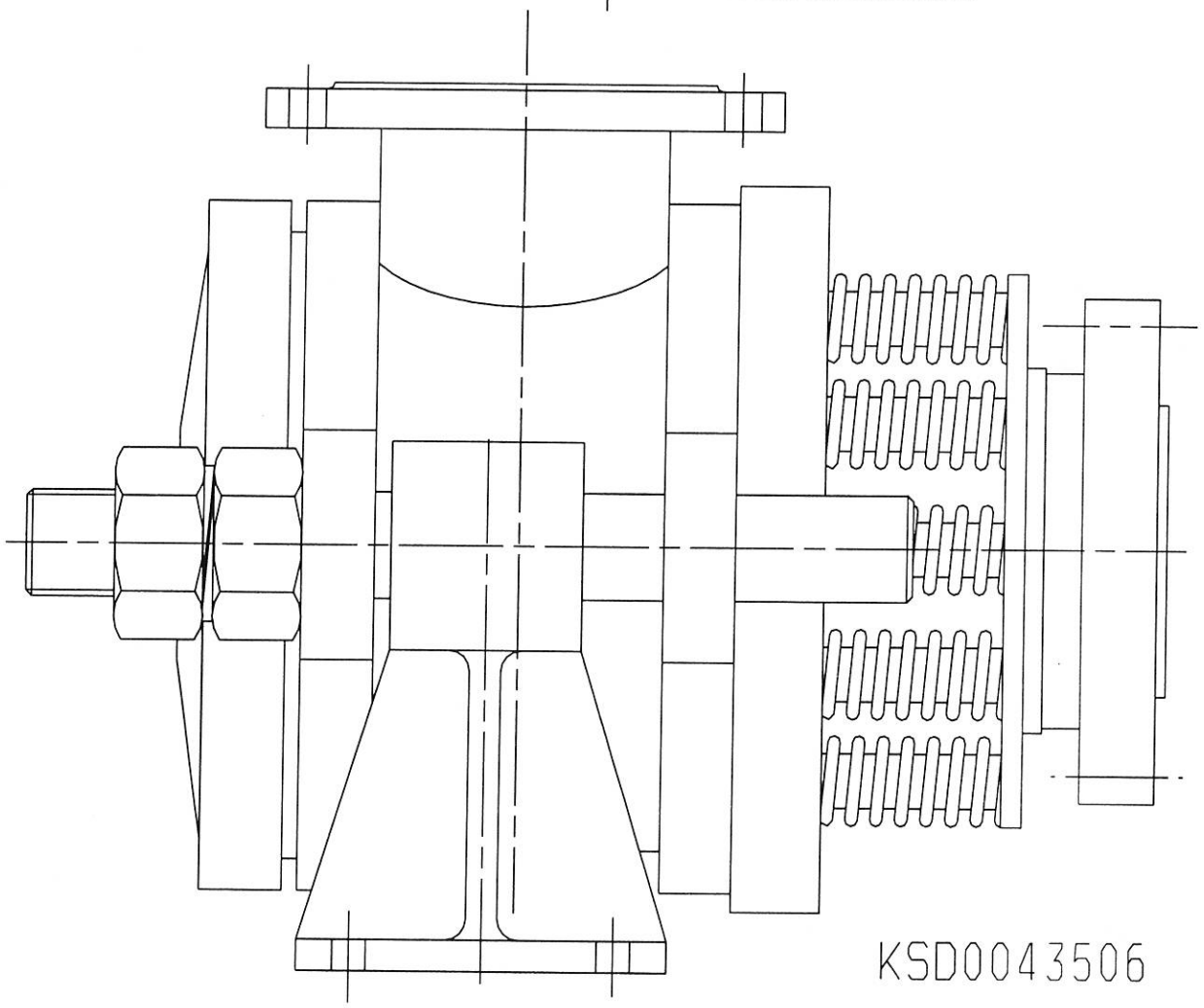

Figure 8

6
SHAFT MOUNTED GEARBOX

6.1
Purpose

The Shaft Mounted Gearbox serve as a speed reducer between the prime mover and the Dryer.

6.2
Equipment/Component Description

This Dryer is delivered with a single input Falk 2137 Z2-S gearbox.

Input:	1750 rpm
Output:	44.8 rpm
Ratio:	39.05:1
Service rating:	200 HP
Service factor:	1.34
Oil capacity:	29 Gals
Approx. weight without oil:	8470 lbs

For further information see Falk manual last in Section 5. (Enclosures)

6.3
Principle of Operation

see Falk manual
last in Section 5. (Enclosures)