APPLICTION BULLETIN
PURE OIL MIST LUBRICATION TO CRITICAL BLOWER

The successfully implement lubrication provided for Blower are for both new project and retrofit equipment by Pure Oil Mist Lubrication.

For new project, pure oil mist lubrication has been specified into project specification by well-known process licensor UOP for all CCR Unit.

For retrofit application, successfully improvement and satisfied result for end user which fully under LSC study and engineering on equipment.

UFP

UOP LLC • 25 East Algonquin Road • Des Plaines, Illinois 60017-5017 USA

OIL MIST LUBRICATION SYSTEM

PROJECT SPECIFICATION

970310 - **533** SHEET 1

REV	DATE	BY	APVD	REV	DATE	BY	APVD
0	14-Mar-13	BML					

Provide an open-loop lubrication system designed to produce, transport and deliver oil mist from a stand alone console located at the base of the CCR to supply bearing lubrication for the following blowers:

Blower Item No (Description)	Casing Type	Oil Mist Type	Driver Type
Equipment Tag No. 60-B-02 (Upper Regeneration Blower)	Overhung	Pure	Motor (Oil or Grease lubricated)
Equipment Tag No 60-B-03 (Lower Regeneration Cooler Blower)	Overhung	Pure	Motor (Oil or Grease lubricated)
Equipment Tag No 60-B-01 (Cooler Blower)	Overhung	Pure	Motor (Oil or Grease lubricated)
Equipment Tag No 60-B-04 (Fines Removal Blower)	Overhung	Pure	Motor (Oil or Grease lubricated)

SEE BASIC ENGINEERING DESIGN QUESTIONNAIRE (BEDQ), ENGINEERING DESIGN INFORMATION (EDI) PROJECT 970307 A.4, SECTIONS 3 AND 4.

Other specifications referenced in this specification:	UOP Standard Specification:	
	UOP Standard Drawing:	
	UOP Project Specifications:	EDI Project 970307-A.4 (BEDQ)

1. General Notes

1.1 Oil Mist Lubrication System - Open Loop

a. System shall include the following:

- 1.2 Air Inlet System
- 1.3 (2) Oil mist reservoirs, Main oil mist generator with an auxiliary back up unit
- 1.4 Cabinet enclosures with mounting stand
- 1.5 Oil Mist System Monitoring and electrical hardware
- 1.6 Manifolds, and Mist reclassifiers
- 1.7 Vent collection assembly and Oil Collection container
- 1.8 Testing requirements
- 1.9 Instruments and Safety Controls
- 2.0 Piping
- 2.1 Tubing
- 2.2 Lubrication oil recommendation

b. System shall NOT include the following:

- Distribution piping and tubing from the generator to the equipment and from the equipment to the vent collection assemblies and oil collection containers is to be provided by the contractor

1.2 Air inlet system

Individual air supply connections shall be supplied for the main oil mist system and auxiliary back up system and shall include the following:

Filter/moisture separators
+ Pressure regulators
+ Air Pressure gauges (dual scale)
+ Isolation SS lever ball valves

1.3 (2) Oil mist reservoirs, Main oil mist generator with an auxiliary back up unit

a. Oil reservoirs shall be constructed of stainless steel.
b. Oil reservoirs shall allow the system to operate for a minimum of 15 days without refill.
c. Minimum reservoir holding capacity shall be three gallons.
d. Oil reservoirs shall have a drain connection with valve that is plugged. The drain valve shall be mounted outside the enclosure.
e. Mist head shall be Vortex type and constructed of aluminum.
f. The atomizing device, generator head, shall have an air by-pass regulator to control mist density.
g. The generator (mist) head shall provide 125% of the required air flow without exceeding the maximum
h. capacity of the head. The head shall also be capable of proper misting operating down to 50% of rated flow.

i. Mist generator shall have an auxiliary back-up unit with the following design features:
+ Oil mist generating capacity shall be equal to and of the same design as the main unit
+ Capable of operating independently from the main generating system

1.4 Cabinet enclosures with mounting stand

a. Both the main and auxiliary oil mist systems shall be enclosed in a fiberglass or 304 SS cabinets
b. Cabinets shall have a vent cap and NPT drain connection
c. Enclosure shall be designed with a single door opening
d. Cabinets shall be mounted on a galvanized steel stand with mounting holes
e. Each cabinet shall have grounding lug connections.

1.5 Oil Mist System Monitoring and electrical hardware

a. Main oil reservoir shall include the following:
- Level sight assembly
- Stainless steel Pressure relief valve
- Low level alarm switch
- Mist pressure gauge
- High and Low mist pressure switches
- Electric Oil heater with adjustable thermostat
- Thermometer
- Power on / off switch

b. Auxiliary oil reservoir shall have the following:
- Level sight assembly
- Stainless steel Pressure relief valve
- Mist pressure gauge
- Electric Oil heater with adjustable thermostat
- Thermometer
- Power on / off switch

1.6 Manifolds, Mist Reclassifiers

a. Stainless steel mist manifolds (one for each equipment train, example one per pump and motor)
b. Stainless steel mist reclassifiers (one for each lubrication point)

1.7 Vent collection assembly and Oil Collection container

a. Each set of bearings shall have a vent collection assembly for the equipment train
b. Vent collection assemblies shall be acrylic with a SS drain
c. Each equipment train shall have a common oil collection container
- Stainless steel collection container
- Drain connection with drain valve

1.8 Testing requirements

a. Pneumatic test for reservoirs
b. Functional / performance test for generators
c. PMI of SS components
d. Dielectric Withstand (Hypot) test to verify that electrical wiring, relays and contactors, and power devices are capable of withstanding a higher-than-normal electrical potential.

1.9 Instruments and Safety Controls

a. Alarm switches for low and high discharge pressure and low oil reservoir level shall be provided. The switches shall be explosion-proof dual switches. The switches shall be closed (energized) during normal operation. The contractor shall provide for local or remote annunciation of oil system alarms. Contractor is also responsible for confirming that all system electrical components are suitable for the hazardous area classification.

b. Local red (fault) and green (normal) status lights shall be provided.

c. Remote alarm dry contacts shall be provided.

d. An annunciators with manual reset sequence shall be furnished by the Purchaser and located in the local control panel.

2.0 Piping

a. All distribution piping and tubing shall be provided by others.

b. Main headers shall be 2 inches (50 mm) galvanized steel pipe and shall not exceed 600 feet (180 meters) in length. The oil mist supply vendor shall insure that the time required for oil mist to reach the most distant point(s) on a header shall not exceed 5 minutes.

c. All headers shall be sloped continuously downward to the console at a minimum rate of 1/240. An auto drain leg shall be used when any portion of the header cannot be continuously sloped to the console due to obstructions.

d. There shall be no block valves in the header downstream of the switching valves that control the flow of mist from the mist generator.

e. Pockets and traps shall be avoided.

f. Branch headers shall be 2 inch (50mm) galvanized steel pipe.

g. Drop points shall be ¾ inch (19mm) galvanized steel pipe and shall come off the top of the headers.

h. There shall be one drop point per equipment set.

i. Horizontal run for each drop point shall not exceed 35 feet (10m).

j. There shall be no more than four elbows (turns) in each drop point.

k. Drop points shall be sloped downward towards the main or branch headers at the rate of 1/240.

l. Drop points shall terminate between 24 inches (60cm) and 48 inches (120cm) above and offset to the equipment to be lubricated. The drop leg should not interfere with access to the rotating equipment.

m. Drop points shall not have block valves.

2.1 Tubing

a. All tubing shall be 304SS

b. All tube fittings shall be Swagelok 316SS.

c. Mist supply lines shall be 1/4" OD tubing.

d. Drain/vent lines shall be 3/8" OD tubing.

e. Pockets and traps shall be avoided in both supply and drain lines.

f. There shall be no block valves in the mist supply and drain lines.

2.2 Lubricating Oil

Lube oil ISO 68 synthetic oil. No paraffin's.

Supplier (Recommended):

Total Lubrication Management
colfaxcorp.com/tlm

SUCCESSFUL PURE OIL MIST FOR BLOWER ON CCR

1. **An AROMATICS COMPLEX, CCR UNIT in THAILAND**
   - **2008 – PRESENT, TOTAL 3 BLOWERS + MOTORS APPLIED WITH PURE OIL MIST SYSTEM**

OIL MIST BEARING LIST

Equipment Type: BB=Betweeen Bearing, BL=BLower/fan, GB=GearBox, MH=Motor - Horz, MV=Motor - Vert, OH ANSI=OverHung ANSI, OH API 1=OverHung API (1 pt), OH API 2=OverHung API (2 pt), T=Turbine,

Equip. No. Driver No.	Equip.Type (see Legend)	Equipment Manufacture	Equipment Model No.	Kw	R.P.M.	Number of Points	Reclassifier		Application Method	Applicable Figure for Tubing Connection Work
							Radial or Center Conn	Thrust		
2250-C2	BL	Piller	63973 KKXGAE 80450	144	2970	2	77800503	77800504	PURE	A
2250-CM2	MOTOR - H	WEG	TBD	144	2970	2	77800502	77800502	PURE	E
2250-C3	BL	Piller	7736 KX 40560	75	2955	2	77800501	77800502	PURE	A
2250-CM3	MOTOR - H	WEG	TBD	75	2955	2	77800501	77800501	PURE	E
2250-C4	BL	Piller	20362 KXGAP 80125	15	2895	2	77800501	77800502	PURE	A
2250-CM4	MOTOR - H	WEG	TBD	15	2895	2	77800501	77800501	PURE	E

Lubrication Systems Company
THE RIGHT CHOICE

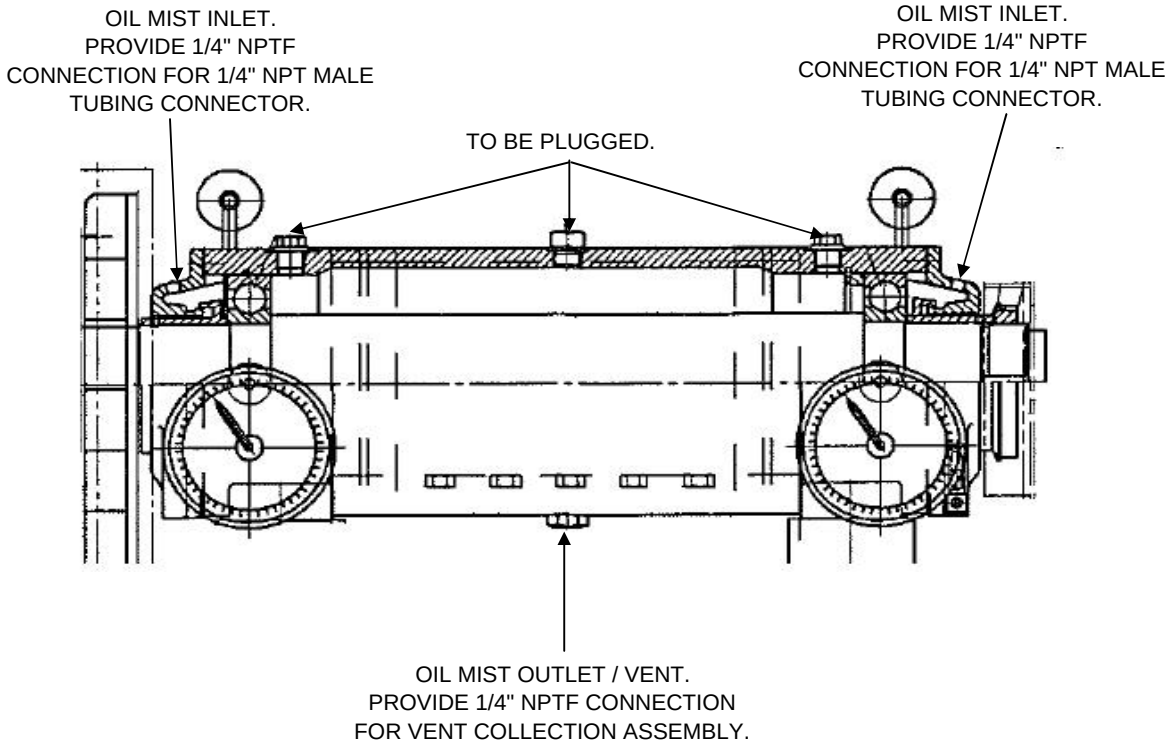


FIGURE A: TYPICAL PURE MIST (DRY SUMP) DETAIL PER OH API 610-8TH ED.

EQUIPMENT DATA				
EQUIPMENT TAG NO.	MANUFACTURER	MODEL	RADIAL	THRUST
2250-C2	PILLER 63973 KKXGAE 80450		6220	6220


5 t

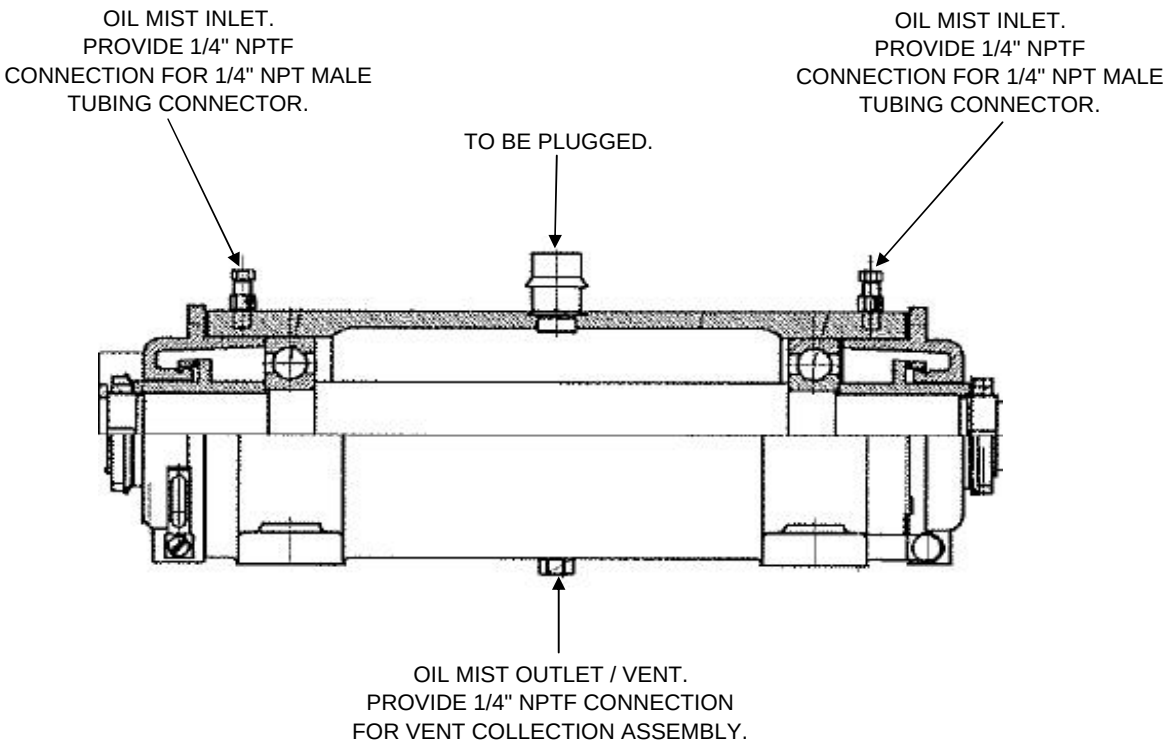


FIGURE A: TYPICAL PURE MIST (DRY SUMP) DETAIL PER OH API 610-8TH ED.

EQUIPMENT DATA				
EQUIPMENT TAG NO.	MANUFACTURER	MODEL	RADIAL	THRUST
2250-C4	PILLER 20362 KXGAP 80125		6311	6311


ELUTRATION GAS
2250-ME2
2250-C4

2. A REFINERY, CCR UNIT IN VIETNAM

- **2007 – PRESENT, TOTAL 3 BLOWERS + 2 PUMPS**

Lubrication Systems Company
THE RIGHT CHOICE

EQUIPMENT BEARING LIST

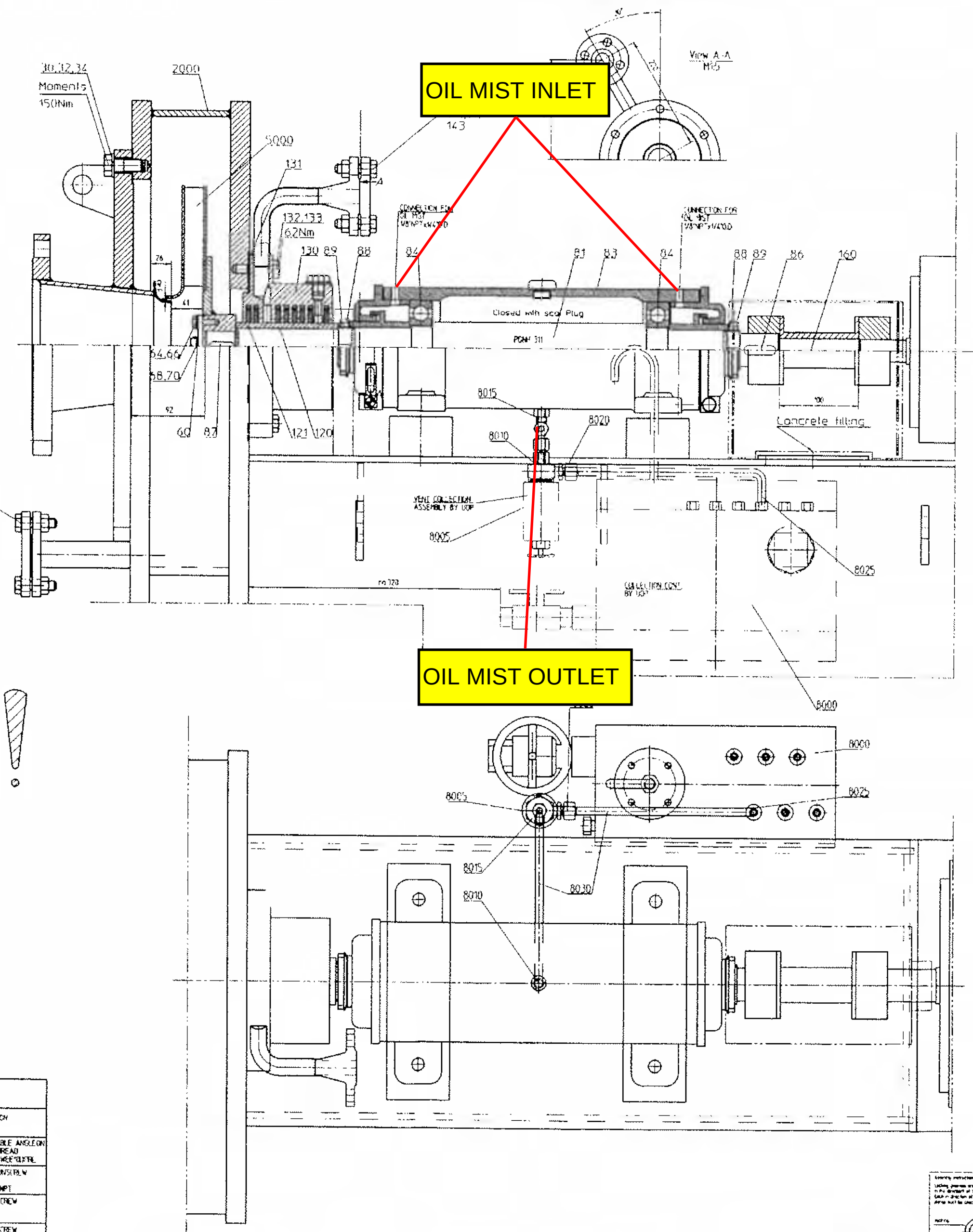
Rev No: 0
Rev Date: 9/25/2007
LSC Job No: 066012

Customer: UOP, LLC
User: PETRO VIETNAM CCR PROJECT
Location: DUNG QUART, VIETNAM
Unit: DUNG QUART REFINERY

Cust. Number: 4500190008
LSC Sales Person: HOUSE
LSC QUOTE NO.: 0
Date of Survey: 9/25/2007

Legend: EquipType: BB=Betweeen Bearing, BL=BLower/fan, GB=GearBox, MH=Motor - Horz, MV=Motor - Vert, OH ANSI=OverHung ANSI, OH API 1=OverHung API (1 pt), OH API 2=OverHung API (2 pt) ANSI, T=Turbine, VERT P 1= Vertical Pump (1 pt), VERT P 2= Vert Pump (2 pt). X1 = Other Machinery (1 pt), X2 = Other Machinery (2 pt).
Seal Type: LAB=Labyrinth, LIP=Contact Seal, ISO=Bearing Isolator / Mag Face Seal

Item No.	Equip. No. Driver No.	Equip.Type (see Legend)	Equipment Manufacture	Equipment Model No.	Power Kw	Speed R.P.M.	Number of Points	Reclassifier		Application Method	Seal Type (see Legend)	SCFM
								Radial or Center Conn	Thrust			TOTAL
												1.92
1	B-1352A	BL	REGEN				2	77800503	77800503	PURE		0.60
2	B-1353A	BL	REGEN				2	77800502	77800502	PURE		0.36
3	B-1351A	BL	REGEN				2	77800502	77800502	PURE		0.36
4	P-1351A	OH - API 1	RUHRPUMPEN	CPP21 3X2X10			1	77800503		PURE		0.30
5	P-1351B	OH - API 1	RUHRPUMPEN	CPP21 3X2X10			1	77800503		PURE		0.30



FOR A PURE OIL MIST SYSTEM BOTH BEARING END CAP DRAIN PASSAGEWAYS MUST BE CLOSED TO PREVENT OIL MIST BYPASSING THE BEARINGS. ONE MEANS TO MEET THIS REQUIREMENT IS TO ROTATE (180°degrees)THE BEARING HOUSING BEARING END CAP Gaskel.

ACHTUNG DICHTUNG ZWISCHEN LAGERDECKEL UND LAGERGEHAUSE UM 180°GRAD VERSETZT MONTIEREN. RÜCKLAUFBOHRUNGEN MÜSSEN VERSCHLOSSEN SEIN

Pos. 8000	COLLECTION CONTAINER
Pos. 8005	VENT COLLECTION ASSAMBLY
Pos. 8010	WEE-R ADJUSTABLE ANGLE ON CONNECTIONE THREAD WITH LOCK NUT WEE*OUFRL
Pos. 8015	GAL-DIRECTLY UNSCREW CONNECTION GAP0DPRL 1/4 NPT
Pos. 8020	GE-DIRECTLY SCREW IN CONNECTION GE*0DPRL 1/8
Pos. 8025	GE DIRECTLY SCREW IN CONNECTION GE*0DPRL 1/4
Pos. 8030	PIPE 10x1.5

CLIENT	UOP
PROJECT.	PETRO VIETNAM
PILLER ORDER NO.	4060 1580 POS.100
MACHINE NO	805 048
LOCATION	VIETNAM
P.O.NO.	4500187655
ITEM NO.	B-1351
CUSTOMER TAG NO	940469-RS14

FINES REMOVAL BLOWER B-1351

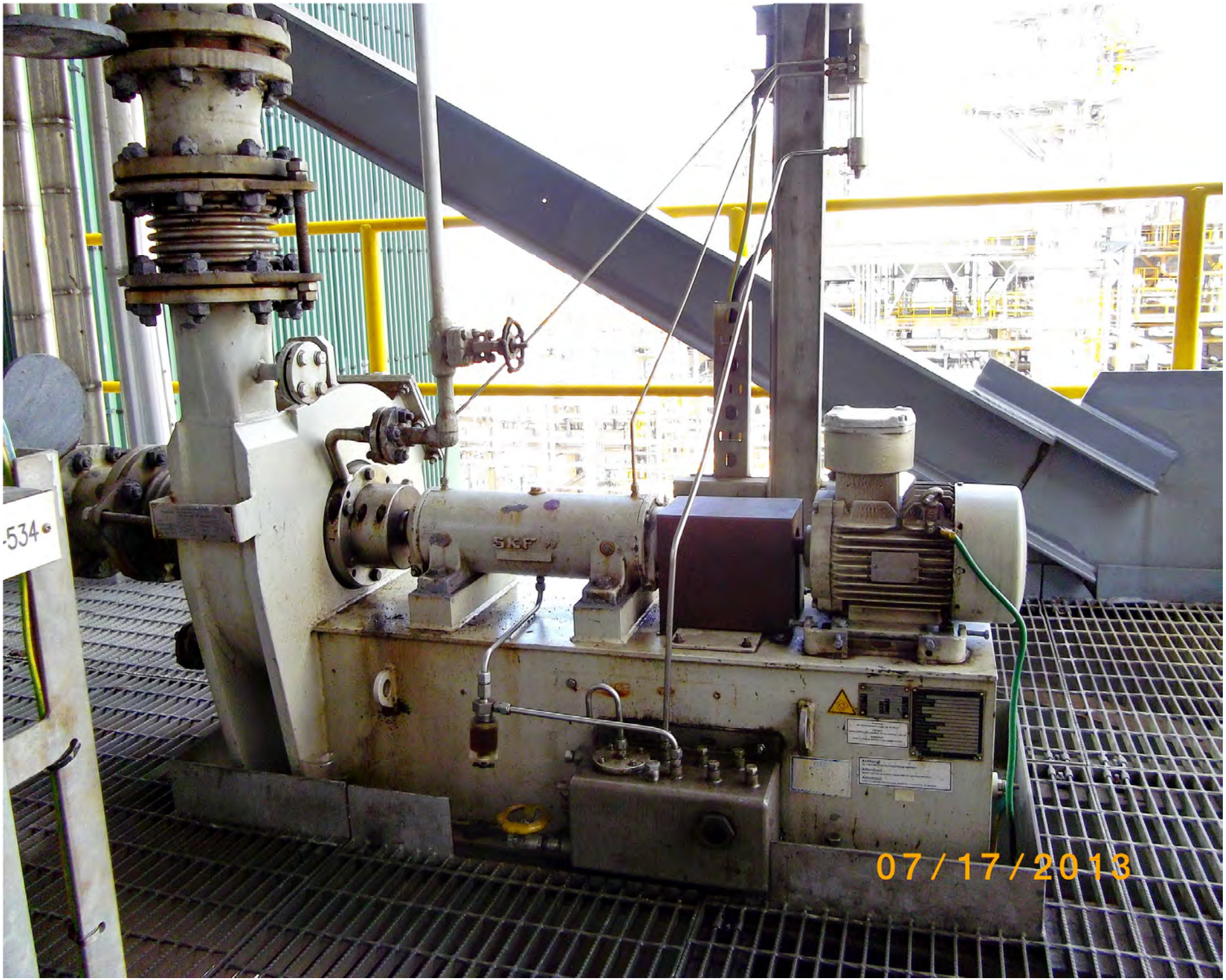
PETRO VIETNAM

EINBAU

INSTALLATION

2557 KXGAP 80100

59.5.135.8055 0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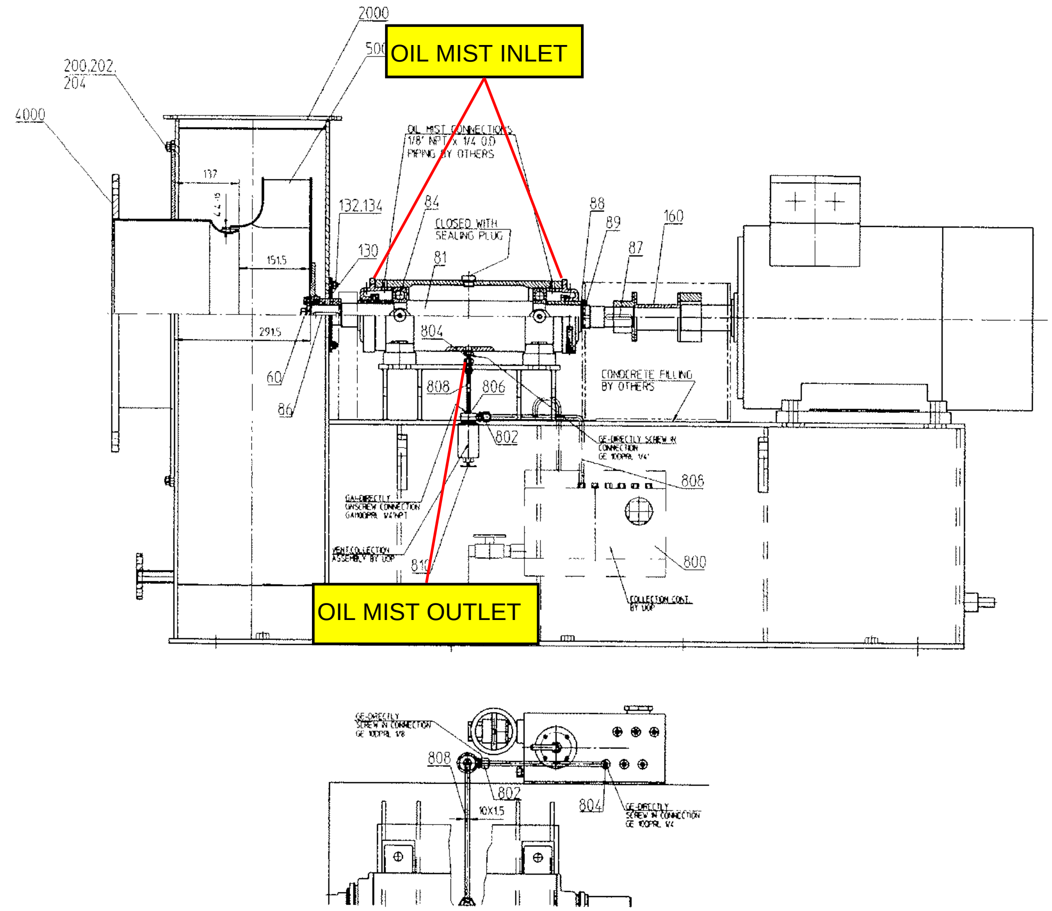


IMPELLER	1	LAUFRAD	5000	90.3.475.0015	ST52-3	Ø590
COVER	1	DECKEL	4000	59.3.124.5414	ST52-3/EU	0.63/400/16
FAN CASING	1	GEHAEUSE	2000	59.3.270.9207	ST52-3	0.63/400
VENT COLL ASSEM	1	VENTIL	810		SUPPLIED BY UOP	
TUBE	1	ROHR	808	00.2.656.0151	1.4571	10X1.5
CONNECTION	1	VERSCHRAUBUNG	806	00.3.970.4336	1.4571	GA100PRL 1/4 NPT
CONNECTION	2	VERSCHRAUBUNG	804	00.3.970.4335	1.4571	GE100PRL 1/4
CONNECTION	1	VERSCHRAUBUNG	802	00.3.970.4333	1.4571	GE100PRL 1/8
COLLECTION CONT	1	OLNEBELANLAGE	800		SUPPLIED BY UOP	
HEXAGON SCREW	16	6KT-MUTTER	204	00.3.178.0141	8.8 A3C	M10
DISK	16	SCHEIBE	202	00.3.196.0111	ST A3C	A10.5
SEALING STRIP	1	DICHTBAND	200	00.2.850.0205	PTFE	
COUPLING	1	KUPPLUNG	160	00.4.369.9175	ST	TSKS 0013
DISC	3	SCHEIBE	134	00.3.396.0101	ST A3C	A8.4
HEXAGON SCREW	3	6KT-MUTTER	132	00.3.178.0123	8.8 A3C	M8
SEAL	1	DICHT-SCHEIBE	130	59.2.133.0859	Cu/AFM	DN70
KEY	1	PASSFEDER	87	00.3.349.3061	C 45K	A12x8x56
KEY	1	PASSFEDER	86	00.3.349.3061	C 45K	A12x8x56
NUT	1	WELLENMUTTER	89	00.3.262.0101	ST	KM10
LOCKWASHER	1	SICHERUNGSBLECH	88	00.3.367.0101	ST	MB10
BALL BEARING	2	RILLKUGLAGER	84	00.4.939.5627	ST	6311/C3
BEARING HOUSING	1	LAGERSTUHL	82	00.4.637.1575	GG-25	
SHAFT	1	WELLE	81	59.4.964.5619	ST 52-3	
WASHER	1	DRUCKSCHEIBE	60	59.4.173.0081	ST 52-3	
NAME	STCK PIECE	BENENNUNG	TEIL POS.	ZEICHN NR DRAWING NO.	MATERIAL	ABMESSUNG MEASURE

FOR A PURE OIL MIST SYSTEM BOTH BEARING END CAP DRAIN PASSAGEWAYS MUST BE CLOSED TO PREVENT OIL MIST BYPASSING THE BEARINGS. ONE MEANS TO MEET THIS REQUIREMENT IS TO ROTATE (180°degrees)THE BEARING HOUSING BEARING END CAP Gasket.

ACHTUNG! DICHTUNG ZWISCHEN LAGERDECKEL UND LAGERGEHAUSE UM 180°GRAD VERSETZT MONTIEREN. (RUCKLAUFBOHRUNGEN MUSSEN VERSCHLOSSEN SEIN)

CLIENT.	UOP
PROJECT	PETRO VIETNAM
PILLER ORDER NO.:	40601580/60
MACHINE NO.:	805 847
LOCATION.	VIETNAM
P.O.NO.:	4500187655
ITEM NO	B-1353
CUSTOMER JOB NO.:	940469 R514

COOLER BLOWER B-1353

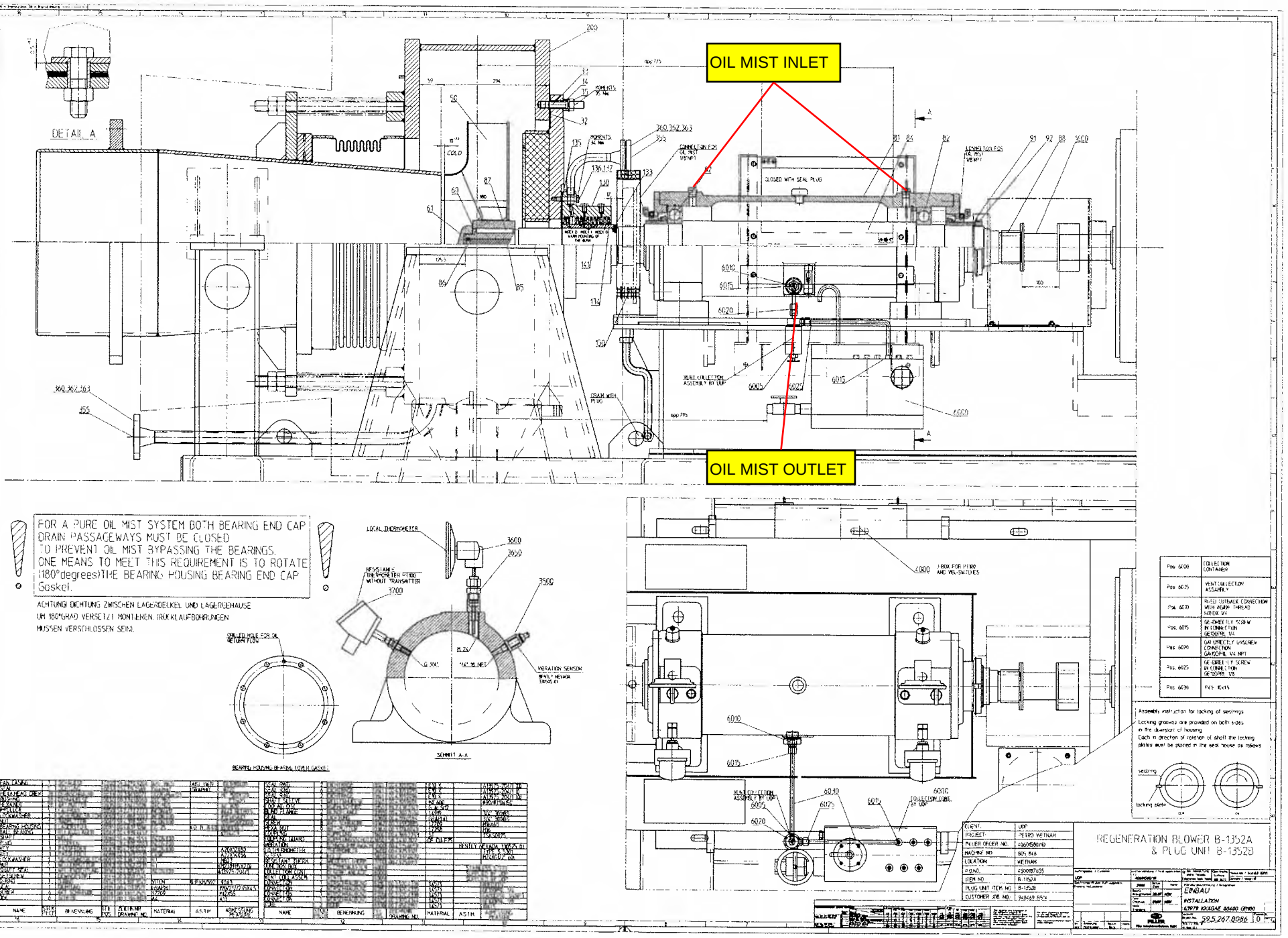
Auftraggeber / Customer: PETRO VIETNAM
Endverwendung / Final application: 40601580/60
2008 | Datum Date | Name
Bearb. Draughtsman: 23.08 JOE
Gepr. Checked: 31.08 JOE
Norm Standard

EDV-Kurzbezeichnung / Designation:
EINBAU
INSTALLATION
65463 KX 80400

PILLER
Piller Industrieventilatoren GmbH

Sach-Nr. / Object-No.: 59.5.267.8088 | Format: 1

SKF PD
07/17/2013


OIL MIST INLET
OIL MIST OUTLET
DETAIL A
FOR A PURE OIL MIST SYSTEM BOTH BEARING END CAP DRAIN PASSAGEWAYS MUST BE CLOSED TO PREVENT OIL MIST BYPASSING THE BEARINGS. ONE MEANS TO MEET THIS REQUIREMENT IS TO ROTATE (180°degrees)THE BEARING HOUSING BEARING END CAP Gasket.
ACHTUNG! DICHTUNG ZWISCHEN LAGERDECKEL UND LAGERGEHÄUSE UM 180°GRAD VERSETZT MONTIEREN. ÖLRÜCKLAUFBOHRUNGEN MÜSSEN VERSCHLOSSEN SEIN!
SCHNITT A-A
REGENERATION BLOWER B-1352A
& PLUG UNIT B-1352B
ENGAU
INSTALLATION
595.267.8086 1.0


07/17/2013

3. A REFINERY in Jurong Island, Singapore

- **CCR Blower : 2 Units**

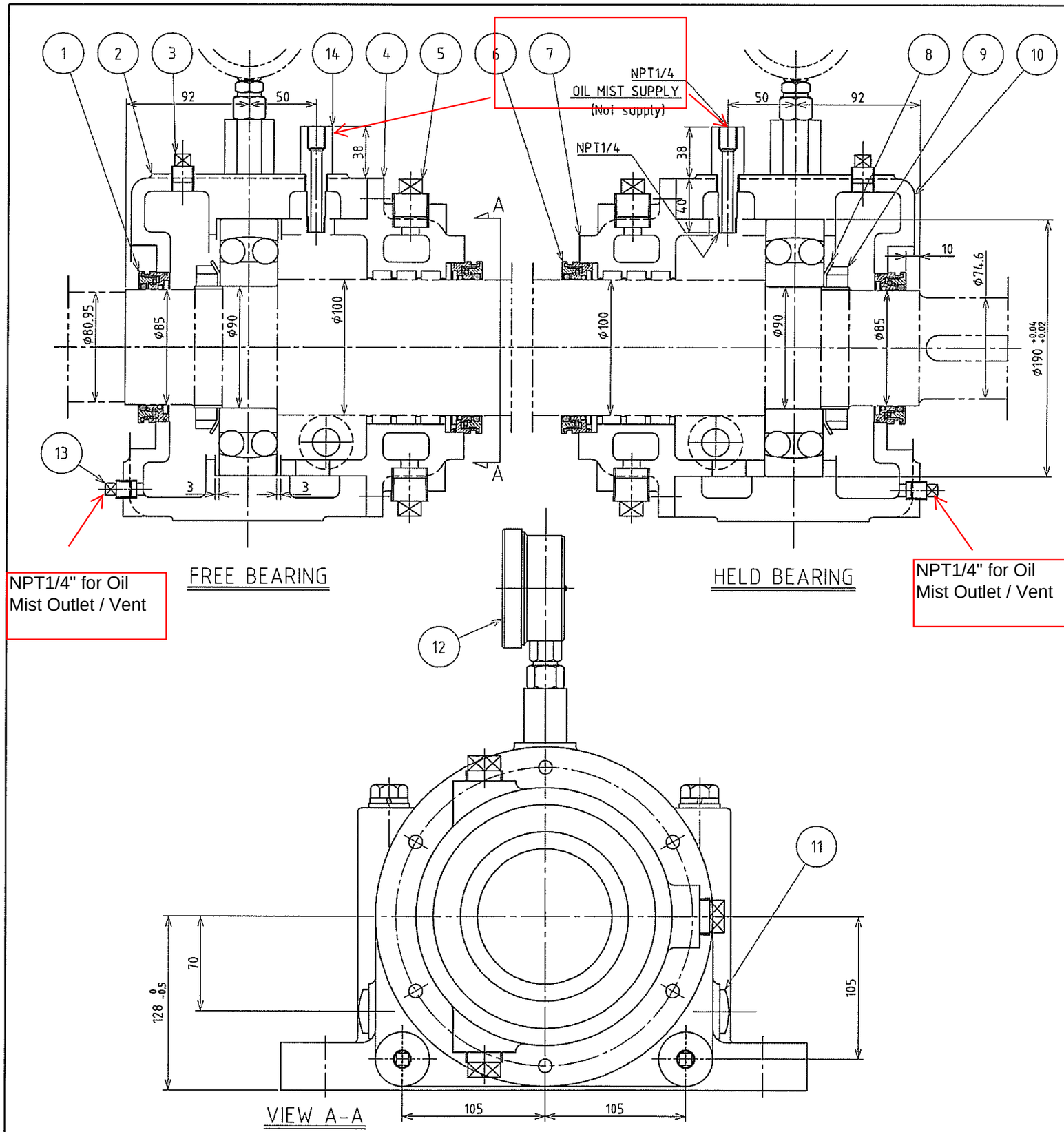
Case History :

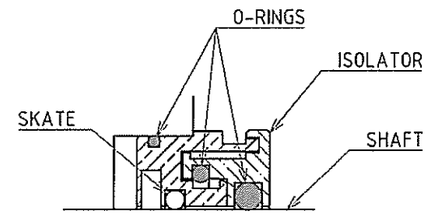
Customer encountered bearing operate at high temperature by oil sump application. Looking for alternative lubrication application to execute bearing high temperature issue.

The Solution :

Pure Oil Mist lubrication had been applied to retrofit to CCR's Blowers, bearing temperature decrease satisfaction. Two units of Lubrimate have been selected to deliver oil mist lubrication to two CCR's Blowers.

MARK	DATE	REVISION	BY





DETAIL OF INPRO SEAL

MARK	NAME OF PARTS	MATERIAL	No.OF REQ'D	REMARKS
14	SOCKET	SS400	2	
13	PLUG	FCM	8	NPT 1/4
12	THERMOMETER		2	
11	SIGHT GLASS	PLASTIC	4	
10	BEARING CASE	FC200	1	
9	BEARING NUT	S30C	2	
8	BEARING WASHER	SS400	2	
7	SIDE COVER	FC200	1	
6	INPRO SEAL		2	100×125 VBXX-D 0.900
5	PLUG	FCM	6	
4	SIDE COVER	FC200	1	
3	PLUG	FCM	2	
2	BEARING CASE	FC200	1	
1	INPRO SEAL		2	85×110 VBXX-D 0.900

SCALE	DATE	No.REQ'D
1 / NTS	2012 9/11	3 SETS
DRAWN	CHECKED	APPROVED
H.S	M.M	
3RD ANGLE PROJECTION	DIM. IN mm	

REMARKS

NEW BEARING HOUSING FOR BLOWER (6618-J & 6619-J)

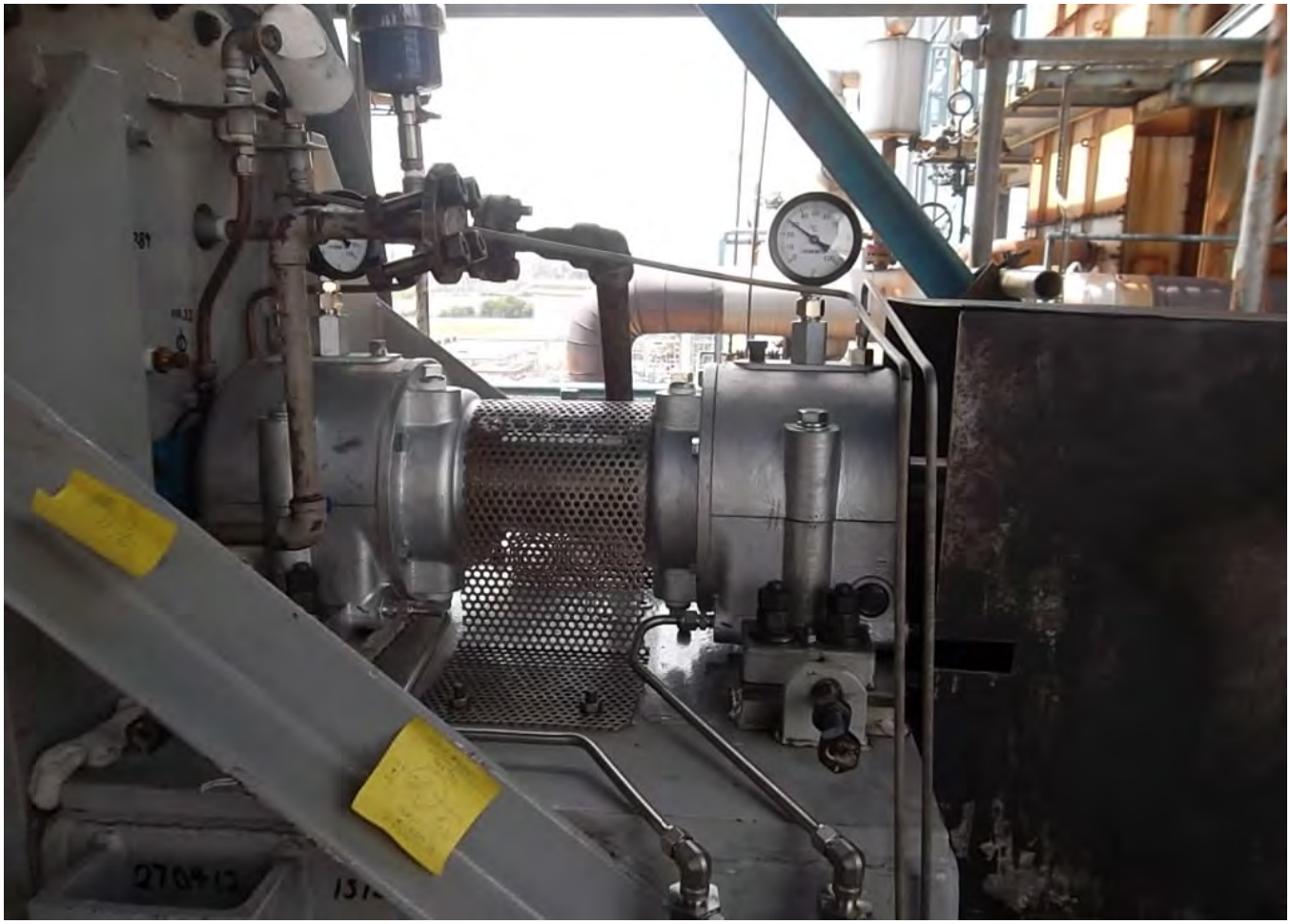
TOKYO JAPAN

WATANABE CORPORATION

NAME SECTIONAL VIEW FOR BEARING

DRAWING No.

A-28731-01




LubriMist

4. A REFINERY in Thailand

- **Process Blowers**

Case History :

Blower has been operated and lubricated by Lube Oil System forced-feed lubrication. Bearing defect at both DE & NDE and lube oil contaminated after dismantling for inspection.

The Solution :

Apply Pure Oil Mist lubrication to deliver premium lubricant technology to execute problem.

Improvement reliability for Blower 08K102 Forced-Feed Lubrication by retrofit Pure Oil Mist Lubrication System

Customer : Star Petroleum Refining Company Limited, Thailand
Case History

Blower 08K102 has been operated and lubricated by Lube Oil System forced-feed lubrication. Bearing defect at both DE & NDE and lube oil contaminated after dismantling for inspection.

After IR team investigate the bearing and Lube Oil System

- Oil contamination in Lube Oil System represented due to water ingression.
- Bearing defect and rust in bearings because continually lubricated by contaminated oil lubrication from Lube Oil System.

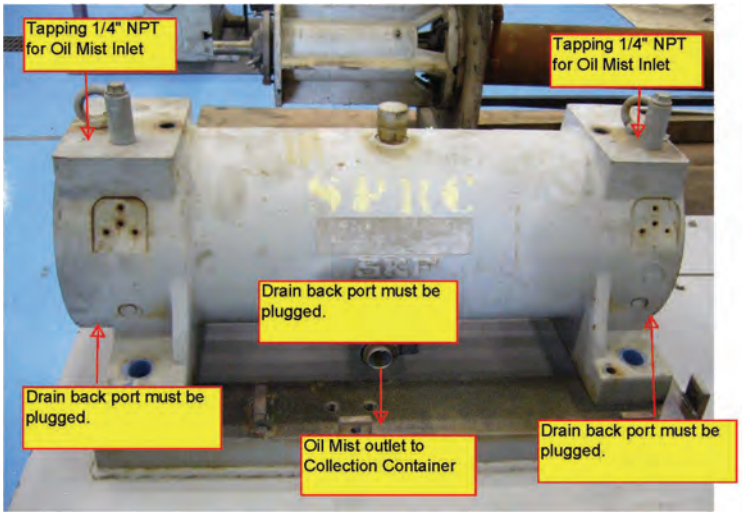
The Solution

Applying pure oil mist lubrication delivers these results:

- Applying pure oil mist prevents ingress of moisture and assures that all metal surfaces are coated with oil, whether in operation or in stand by mode
- Premature bearing failures due to contaminated lubricant are eliminated.
- Stand-by or spare equipment is protected from corrosion when the Blower is not running.

Figure of Oil Mist supply to Blower

Bearing housing need to be modified by drilling two addition holes for oil mist inlet at DE & NDE, drain back port for force-feed lubrication is not required anymore and must be plugged. Purpose to ensure Oil Mist lubrication is properly supply through bearing with no oil mist bypass the bearings.



Oil Mist Installation

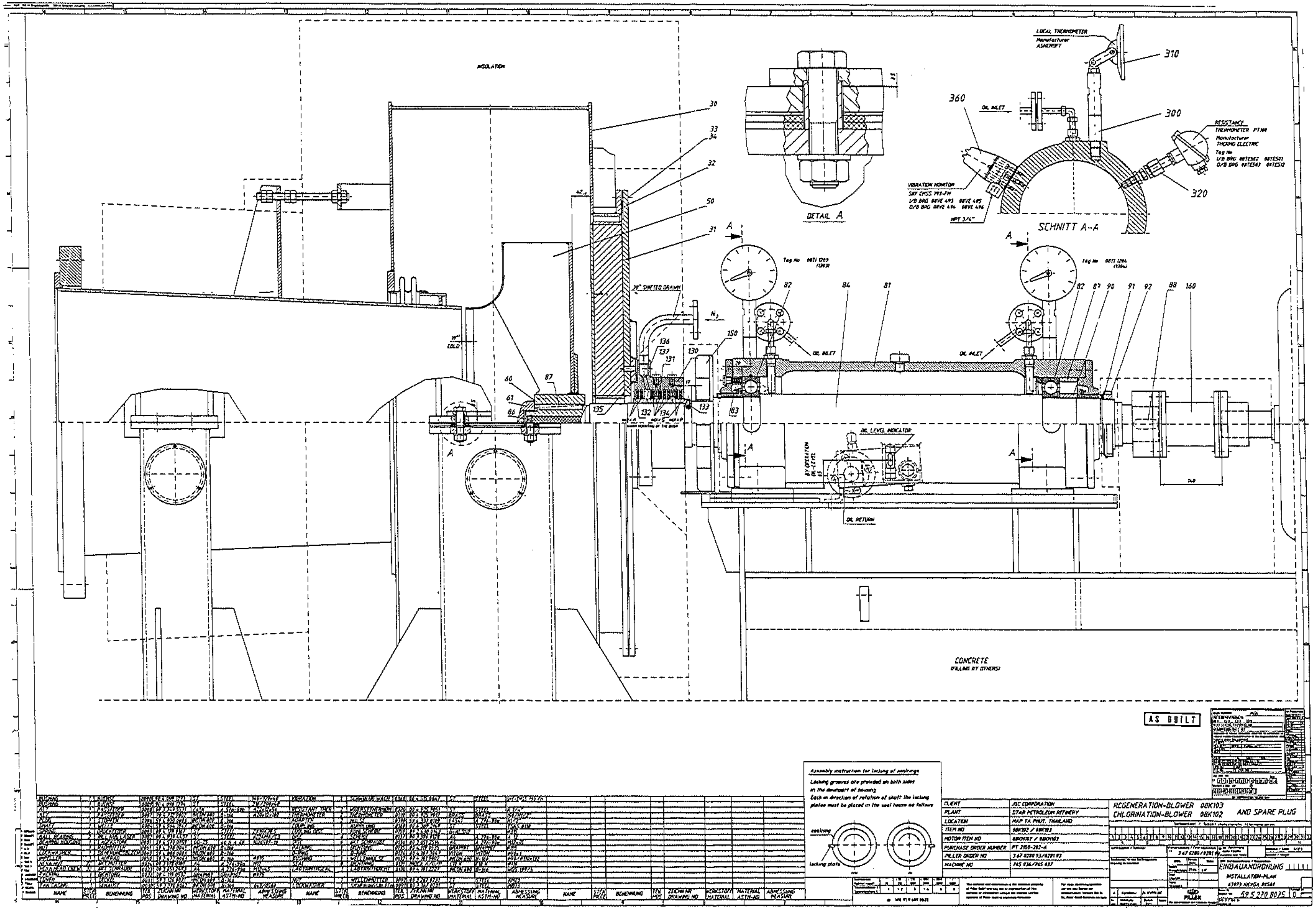
LSC / LWT can install an oil mist system for your Blower to reduce your maintenance costs and increase your equipment availability. We can complete oil mist installation to this blower within 4 hours.

In order to avoid bearing temperature rise and possibly pre-mature bearing failure, one of the following steps must be taken prior to equipment start-up:

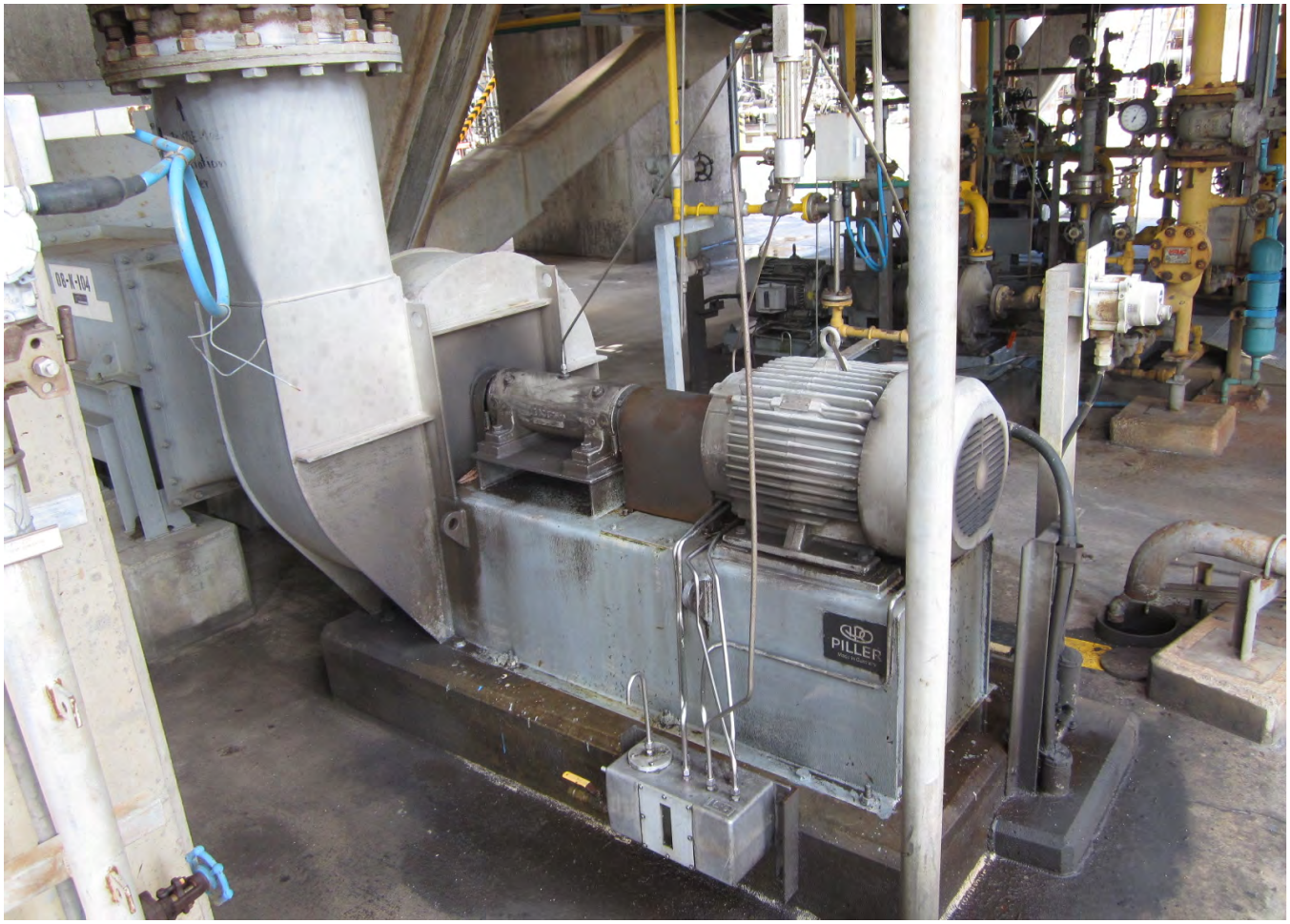
a) The bearings must be pre-lubed with oil for immediate or prior to equipment start-up.

b) Alternatively, oil mist must be properly applied to the equipment for at least 12 hours prior equipment start-up.

LONG WIN THAI CO., LTD. : LSC ASIA REGIONAL SERVICE CENTER
NO. 9/1 NONGWAH RD., HUAYPOANG, MUANG, RAYONG, 21150, THAILAND
TEL. +66 38 692444 FACSIMILE +66 38 692151
EMAIL : INFO@LONGWINTHAI.COM


INSULATION
LOCAL THERMOMETER
Manufacturer ASHCROFT
RESISTANCE THERMOMETER PT100
Manufacturer THERMO ELECTRIC
VIBRATION MONITOR
SKF CMSS 793-FH
NPT 3/4"
OIL INLET
DETAIL A
SCHNITT A-A
30° SHIFTED DRAWN
COLD
OIL LEVEL INDICATOR
OIL RETURN
CONCRETE
(FILLING BY OTHERS)
AS BUILT
Assembly instruction for locking of sealrings
Locking grooves are provided on both sides in the downpart of housing
Each in direction of rotation of shaft the locking plates must be placed in the seal housing as follows
locking plate
NAME
BENENNUNG
ZEICHN NR DRAWING NO
WERKSTOFF MATERIAL
MATERIAL ASTM-NO
ABMESSUNG MEASURE
CLIENT
JGC CORPORATION
PLANT
STAR PETROLEUM REFINERY
LOCATION
MAP TA PHUT, THAILAND
ITEM NO
08K102 / 08K103
MOTOR ITEM NO
PURCHASE ORDER NUMBER
PT 3150-302-A
PILLER ORDER NO
3 47 0280 93/0281 93
MACHINE NO
745 036/745 037
REGENERATION-BLOWER 08K103
CHLORINATION-BLOWER 08K102
AND SPARE PLUG
EINBAUANORDNUNG
INSTALLATION-PLAN
PILLER
59 S 270 8075


8-K-102


PILLER