

E-MN-GC

RAI Presentation VP E-MN Re-engineering G-972 Overhaul

Present by Tossaporn E-MN-GC





Problem

G-972 failure

History:

Risk:

ปัจจุบัน G-972 พบปัญหาตัว Pump ทำ pressure ไม่ได้ ซึ่งทาง Maintenance ได้ตรวจสอบจาก History ปัจจุบันใช้งานมา 12 ปี

Root Cause:

สาเหตุที่พบ การเสื่อมสภาพจากการใช้งาน เนื่องจาก pump ได้แช่อยู่ใน Waste water อยู่ตลอด ทำให้มีการเสื่อมสภาพตามอายุการใช้งาน

การแก้ไข:

E-MN-GC ดำเนิน overhaul













Option to Maintenance-Overhual

ขอนำเสนอ option งานซ่อม of Pump G-972

Option 1: เปลี่ยนPump ของใหม่ ทั้งหมดประมาณ 2.5Mbaht

Option 2 : เบิก ALL Spare part 3Mbaht (Remark: แพงกว่าเปลี่ยน ทั้งตัวเนื่องจากราคาแต่ละ part จะสูงกว่า)

Follow E-MN policy:

<u>Choose-Option 3</u>: จัดทำ Local part บางชิ้น เช่น Casingเดิม ตีปลอก , Sleeve and Re-condition Impeller etc. ราคาประเมิน= 1.5 Mbaht

Action by E-MN-GC

| 1. | Received | MN for | G-972 | cannot build | d pressure |
|----|----------|--------|-------|--------------|------------|
|----|----------|--------|-------|--------------|------------|

2. Recheck History MN for G-972

3. Remove pump and Pre inspect for each part

4. Present for option for overhaul to E-MN-GC and E-MN

5. Check spare part which can Re engineering

6. Procurement to contractor for create Drawing and Fabricate

7.QC Part follow Drawing and Record Sheet

8. Overhaul G-972

9.Test Run and check condition pump (Vibration)

10.Collect data for lifetime

completed

completed

completed

completed

completed

20/08/2564-3/09/2564

3/09/2564

4-7/06/2564

9/09/2564

10/09/2564



E-MN-GC ดำเนิน overhaul โดยทำการผสมผสานการ ใช้ part ที่เป็น OEM และ การ Re-engineering part

Detail of item spare part for overhaul

รายการซ่อมอุปกรณ์/Re-engineering

Item.100 ตีปอก Wearing Casing

Item.103_ Recondition Impeller กลึง Wearing ตัดเปลี่ยน

Item.214D_กลึง Sleeve BRG Cover 3 EA

Item.701 กลึง Column Pipe

Item.702_กลึง Discharge Pipe

Item.703_Fab. Discharge Connector

Item.105_ กลึง Shaft Lower

รายการที่เปลี่ยน OEM

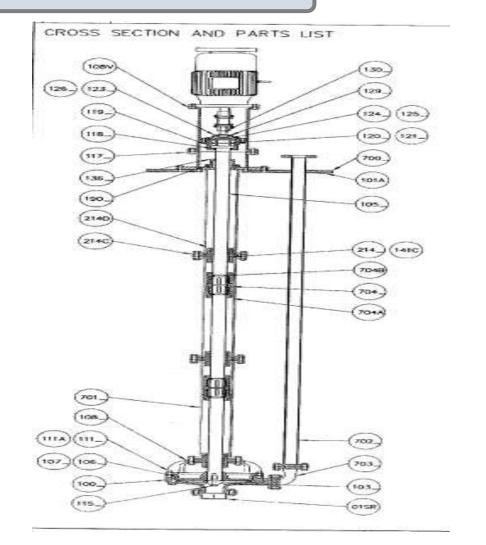
Item.214 เปลี่ยน Sleeve Bearing Carbon

Item.704_ เปลี่ยน Shaft Coupling

Item.704A_ เปลี่ยน Shaft Coupling Nut

Item.704B_ เปลี่ยน Shaft Coupling Ring

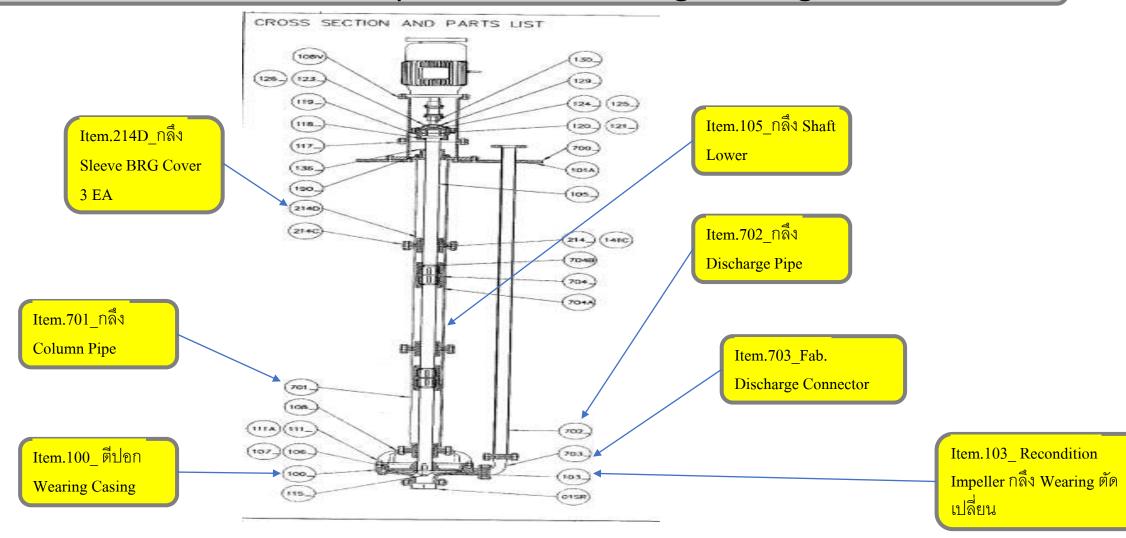
1



2



Cross section of parts list for Re-engineering





Problem

G-972 failure

| รายการช่อมอุปกรณ์ | No Stock | Detail stock | ราคา Stock | ราคา Re- engineering |
|--|-----------------------|--|--------------|----------------------|
| Item.100_ ตีปอก Wearing Casing | 3099.92935.3 | CASING,P/N 100,YOUNG POONG L | 440,700.00 | 72,900.00 |
| Item.103_ Recondition Impeller กลึง Wearing ตัด เปลี่ยน | 3099.92578.3 | IMPELLER,P/N 103,PY103_AV_RVV,YPPC L | 270,384.28 | 40,800.00 |
| Item.214D_กลึง Sleeve BRG Cover 3 EA | 3099.92942.3 | SLEEVE BEARING COVER,214D,YOUNG POONG | 81,000.00 | 24,500.00 |
| Item.701_กิลึง Column Pipe | 3099.92943.3 | COLUMN PIPE,P/N 701,YOUNG POONG L | 396,000.00 | 58,000.00 |
| Item.702_กิลึง Discharge Pipe | 2000 02045 2 | DISCHARGE BIRE DALESS SON VOLDIG BOONG L | 217 222 22 | 100 500 00 |
| Item.703_Fab. Discharge Connector | 3099.92945.3 | DISCHARGE PIPE,P/N 702,703,YOUNG POONG L | 317,800.00 | 103,500.00 |
| Item.105 กลิ้ง Shaft | 3038.00367.3 | SHAFT(LOWER),PY105(1),YOUNG POONG | 257,000.00 | 50,160.00 |
| | | | 1,762,884.28 | 349,860.00 |
| B | Reduce cost for Repai | <u>r</u> | | 1,413,024.28 |

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Cost for overhaul G-972 by E-MN-GC

Re engineering Part =349,860 baht

OEM Part =756,440 baht

Overhaul =150,000 baht

Total cost = 1,256,300 baht

Reduce cost this project=1,413,024 baht

Example Inspection sheet





Power Compression Service Co,.Ltd PROJECT : Overhaul vertrical sum pump

PLANT : GC Glycol TAG No. : G-970 A

EQUIPMENT: Vertrical sum pump SERIAL:

MODEL : 2S 4x3VS-13HH MANUFACTURE : YOUNG POONG

PART INSPECTION REPORT

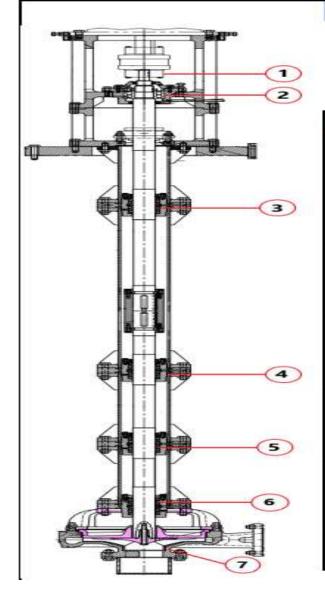
| | 1 | | 34 | D | | PART CO | NDITION | | F | PART EVA | LUATION | |
|------|--|----------|-----|------|---|---------|-----------|-----------------|--------|----------|-------------|----------------------------|
| ITEM | PART IDENTIFICATION | PART No. | QTY | 0000 | | AS FOL | JND CONDI | TION | uo- | DE 1507 | RECONDITION | REMARKS |
| | May control of the second of t | | | GOOD | RUST | SCRATCH | CRACK | DAMAGE(SPECIFY) | KE-USE | REJECT | (SPECIFY) | |
| 1 | CASING | 100 | 1 | X | | | | 10. | X | 1 | | |
| 2 | IMPELLER | 103 | 1 | X | | 20 | | | × | 99 | | |
| 3 | SHAFT | 105 (1) | 1 | | | 1 | | Abrasive wear | | : | Repair | Repair by AST (See page:7) |
| 4 | SHAFT | 105 (2) | 1 | | å | 3 | | Abrasive wear | | ē : | Repair | Repair by AST (See page:7) |
| 5 | CASING COVER | 106 | 1 | X | 8 | 9 9 | | | X | 0 1 | | |
| 6 | COVER GASKET | 107 | 1 | X | | 9 | | | X | ě i | 8 | |
| 7 | OIL SEAL-IB | OILS | 1 | X | | | | | × | | | |
| 8 | BEARING HOUSING | 119 | 1 | X | | | | | X | | | |
| 9 | BEARING-OB | B_BE | 1 | | X | | | | | X | Replace | New spare part |
| 10 | BEARING-IB | B BE | 1 | | X | | | | | X | Replace | New spare part |
| 11 | BEARING HOUSING COVER | 123 | 1 | X | | | | 10 | X | | | |
| 12 | LOCK NUT | 124 | 1 | X | | 1 1 | | | X | | | |
| 13 | LOCK WASHER | 125 | 1 | X | | | | | × | | | |
| 14 | OIL SEAL-OB | OILS | 1 | | | 1 1 | | Deformed | | X | Replace | New spare part |
| 15 | KEY-PUMP | KEY | 1 | X | | 1 1 | | | X | | | 4.500 |
| 16 | DRIVEN SHAFT KEY | KEY | 1 | X | | 1 | | | X | | | |
| 17 | SEAL GLAND | 190 | 1 | X | | 4 4 | | | X | | | |
| 18 | 0-RING-BHSG. COVER | ORIN | 1 | | | - 1 | | Deformed | | X | Replace | New spare part |
| 19 | 0-RING-STUF. BOX & STUF. BOX ADA | ORIN | 3 | | | 37 | | Deformed | 1 | X | Replace | New spare part |
| 20 | SLEEVE BEARING | 214 | 4 | | | 8 | | Abrasive wear | | X | Replace | New spare part |
| 21 | SLEEVE BRG. BOX END | 214C | 1 | X | i e e e e e e e e e e e e e e e e e e e | 3 | | | X | | | |
| 22 | SLEEVE BRG. BOX MID | 214E | 3 | X | ê 6 | 9 | | i i | X | 0 8 | | |
| 23 | SLEEVE BRG. COVER | 214D | 4 | X | | 9 9 | | la e | X | a i | 8 | |
| 24 | COLUMN PIPE | 701 | 4 | X | | | | | × | | | |
| 25 | DISCHARGE PIPE | 702 | 1 | X | | | | | × | | | |
| 26 | SHAFT COUPLING | 704 | 1 | X | | | | | X | | i. | |
| 27 | SHAFT COUPLING RING | 704B | 4 | X | | | | | × | | | |
| 28 | SHAFT COUPLING STOPPER | 704C | 4 | X | | 1 1 | | | X | | | |
| 29 | GASKET-STUFFING BOX ADAP. | 706 | 1 | X | | | | | X | | | |
| 30 | STRAINER | 01SR | 1 | X | | 1 1 | | | X | | | |
| 31 | MECHANICAL SEAL UNIT | B010 | 1 | | | X | | | | X | Replace | New spare part |

| INSPECTED BY | REPORTED BY | SUBMITTED TO |
|--------------|-------------|--------------|
| Niphon P. | Noppanun S. | |

Example Inspection sheet



INSPECTION SHEET



| | Description | Bet | ore | Af | ter | Tolerances | Remark | |
|-------------------|------------------------|--------|--------|--------|--------|---|--------|--|
| Point | Description | X | Y | XY | | Min./Max. | Kemark | |
| - 55 | OD Shaft | 28.57 | 28.57 | 28.57 | 28.57 | 20 | | |
| 1 | ID Coupling | 28.57 | 28.57 | 28.57 | 28.57 | 0.00/-0.03 | | |
| | Clearance Fit | 0.00 | 0.00 | 0.00 | 0.00 | | | |
| | OD Shaft | 50.00 | 50.00 | 50.00 | 50.00 | | | |
| | ID Bearing | 50.00 | 50.00 | 50.00 | 50.00 | 0.00/-0.03 | | |
| - | Clearance Fit | 0.00 | 0.00 | 0.00 | 0.00 | | | |
| 3 3 4 5 6 | ID Housing bearing | 110.02 | 110.02 | 110.02 | 110.02 | | | |
| | OD Bearing | 110.00 | 110.00 | 110.00 | 110.00 | 0.00/+0.03 | | |
| | Clearance | + 0.02 | + 0.02 | + 0.02 | + 0.02 | | | |
| | OD Shaft | 59.95 | 59.95 | 60.00 | 60.00 | | | |
| | ID Busing bearing | 60.98 | 60.98 | 60.12 | 60.12 | 0.10-0.20 | | |
| 3 | Clearance | + 1.03 | + 1.03 | + 0.12 | + 0.12 | | | |
| .3 | ID Housing busing | 85.01 | 85.01 | 85.01 | 85.01 | | | |
| | OD Bushing bearing | 85.01 | 85.01 | 85.01 | 85.01 | 0.00/-0.03 | | |
| 5-2- | Clearance Fit | 0.00 | 0.00 | 0.00 | 0.00 | | | |
| 4 | OD Shaft | 59.93 | 59.93 | 60.00 | 60.00 | ======================================= | | |
| | ID Busing bearing | 60.20 | 60.20 | 60.10 | 60.10 | 0.10-0.20 | | |
| | Clearance | + 0.27 | + 0.27 | + 0.10 | + 0.10 | 18 81 | | |
| | ID Housing busing | 85.05 | 85.05 | 85.05 | 85.05 | | | |
| | OD Bushing bearing | 85.05 | 85.05 | 85.05 | 85.05 | 0.00/-0.03 | | |
| | Clearance Fit | 0.00 | 0.00 | 0.00 | 0.00 | | | |
| | OD Shaft | 59.94 | 59.94 | 60.00 | 60.00 | | | |
| | ID Busing bearing | 61.16 | 61.16 | 60.10 | 60.10 | 0.10-0.20 | | |
| 5 | Clearance | + 1.22 | + 1.22 | + 0.10 | + 0.10 | | | |
| 5 | ID Housing busing | 85.05 | 85.05 | 85.05 | 85.05 | | | |
| | OD Bushing bearing | 85.05 | 85.05 | 85.05 | 85.05 | 0.00/-0.03 | | |
| | Clearance Fit | 0.00 | 0.00 | 0.00 | 0.00 | | | |
| | OD Shaft | 59.95 | 59.95 | 60.00 | 60.00 | | | |
| | ID Busing bearing | 60.90 | 60.90 | 60.10 | 60.10 | 0.10-0.20 | | |
| 6 | Clearance | + 0.95 | + 0.95 | + 0.10 | + 0.10 | | | |
| 0 | ID Housing busing | 85.05 | 85.05 | 85.05 | 85.05 | -= == | | |
| 1 | OD Bushing bearing | 85.03 | 85.03 | 85.05 | 85.05 | 0.00/-0.03 | | |
| | Clearance Fit | + 0.02 | + 0.02 | 0.00 | 0.00 | pe | | |
| - 5 | Casing Wear Ring ID. | 120.20 | 120.20 | 120.20 | 120.20 | 2.0 | | |
| 7 | Impeller Wear Ring OD. | 111.09 | 111.09 | 111.09 | 111.09 | | | |
| | Clearance | 9.11 | 9.11 | 9.11 | 9.11 | | | |





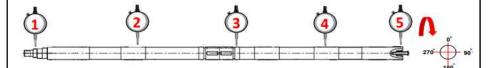
Compression Service Co.,Ltd. PROJECT : Overhaul vertrical sum pump

TAG No.: G-970 A MODEL: 2S 4x3VS-13HH

PLANT : GC Glycol EQUIPMENT: Vertrical sum pump

MANUFACTURE: YOUNG POONG

SHAFT RUN OUT



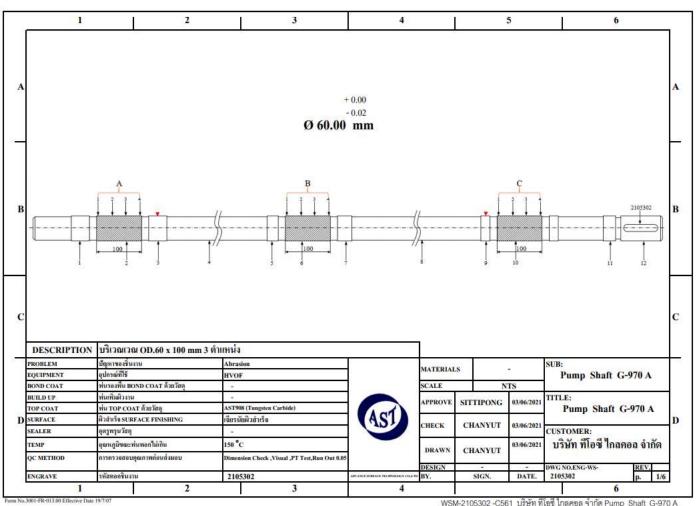
As-found

| B-14 | | Ac | tual | | Deign | D1 |
|-------|------|--------|--------|--------|-------------|--------|
| Point | 0. | 90 | 180° | 270 | Min / Max | Remark |
| 1 | 0.00 | + 0.02 | + 0.27 | - 0.04 | | |
| 2 | 0.00 | + 0.01 | + 0.29 | + 0.19 | 1 | |
| 3 | 0.00 | + 0.04 | + 0.60 | + 0.22 | ± 0.05 TIR | |
| 4 | 0.00 | - 0.19 | - 0.17 | - 0.02 | : 1,000 mm. | |
| 5 | 0.00 | + 0.28 | - 0.34 | + 0.25 | | |

Unit: mm.

As-Built

| Point | | Ac | tual | Deign | Remark | |
|-------|------|--------|--------|--------|-------------|--------|
| Point | 0 | 90 | 180- | 270 | Min / Max | Remark |
| 1 | 0.00 | +0.24 | +0.51 | +0.36 | | |
| 2 | 0.00 | + 0.02 | + 0.09 | + 0.08 | 1 | |
| 3 | 0.00 | - 0.13 | -0.11 | 0.00 | ± 0.05 TIR | |
| 4 | 0.00 | - 0.05 | -0.01 | -0.02 | : 1,000 mm. | |
| 5 | 0.00 | + 0.26 | + 0.07 | - 0.26 | | |



Example Inspection sheet



| CLIENT: | บริษัท ที่โอชี ใกลคอล จำกัด | Report No: 2105302 |
|----------|-------------------------------|--------------------------------------|
| PROJECT: | Pump Shaft G-970 A | Date of test : 03/06/2021 |
| TOOLS: | OUTSIDE MICROMETER 0 - 100 mm | Material : AST908 (Tungsten Carbide) |
| DWG: | | Page 5/6 |











ขณะคำเนินการกลึงปลอกผิว





ขณะคำเนินการพ่นพอก



Problem Risk:

G-972 failure

E-MOC No. E-GC1.1-2021/050

Tossaporn L <E-MN-GC/7152> MoC Number: E-GC1.1-2021/050 Home Search MoC Title : งาน Re-engineering G-972 สำหรับ Spare part for Overhaul ที่ EG Plant Part 1: Initiation NORMAL MoC Form MoC Proposal Form S 1 Tossaporn L <E-MN-GC/7152> 25/08/2021 13:44 F-(TP-PM)-OEMS-005_R2 Plant VP Thongchal M «E-GC/7099» Attachment MoC Champion N/A Plant TOCGC (E-GC) Unit 0 - GENERAL (Migration Data) Is Maintenance Deadline Part 2 30/04/2022 Deadline Part 3 31/07/2022 MoC Category Others Consequence Economic (Total loss) / Serverity Number (2) Change Priority Low Notes System on 25/08/2021 13:44 > Tossaporn L <E-MN-GC/7152> creates MoC System on 25/08/2021 13:44 > Sarawut H <E-MN-GC/7150> is assigned as Division Manager of Initiator to approve MoC
Tossaporn L <E-MN-GC/7152> on 25/08/2021 13:44 > History ซึ่งรูปัน G-972 พบปัญหาตัว Pump ฟา pressure โมโล้ ซึ่งทาง Maintenance โด้ดรวจสอบจาก History ซึ่งรูปันจำนนา 12 ปี Root cau Post



Problem Risk:

G-972 failure

Project MAX : IL1

| Initiative ID | Initiative Name | Owner | Assigned To | Register Date | Update Date | Organization | WBS No | Company | Initiative Type | Stage | Status | Action |
|------------------|--|---|---|------------------|----------------|--------------|-----------|---------|--------------------|-------|----------|--------|
| 2021- 009103 | ลดต่างานช่อม of Pump G- 972 โดยการ Re- Engineering internal spare part | TOSSAPORN.L <e-mn- GC/7152></e-mn- | TOSSAPORN.L <e-mn- GC/7152></e-mn- | 18/08/2021 | 18/08/2021 | EOB | • | Glycol | MAX | • IL1 | Approved | |



Thank You



Back up

History

| Order No | Ty.,# | Tag | JobTitle | Create | Object | Part | Problem | Cause | Activity | Discipline | <> | Total | 2015 | 2016 | 2018 |
|------------|-------|----------|--|-----------|--------|--------------------|---------------------------------------|-------------------------|------------|----------------------|-----------------|-----------|-------|-------|-----------|
| 200217453 | CM | D-G-972 | G-972 ไม่สามารถทำ Pressure ได้ | 23-ก.ค21 | | | | | | E-MN-GC / Mech(GC) | | 787648.05 | | | |
| 200124851 | CM | D-G-972 | line pressure gauge G-972 ผุกร่อน | 28-ส.ค18 | Pumps | Pump unit - Casing | Material failure - Wear | Failure operate/maint | Check | E-MN-GC / Mech(GC) | | | | | |
| 200123410 | CM | D-G-972 | (EFR) G-972 pump เสียงดัง | 10-ส.ค18 | Pumps | Pump unit - Casing | Material failure - Wear | Failure operate/maint | Check | E-MN-GC / Mech(GC) | | 378578.75 | | | 378578.75 |
| 200116674 | CM | D-G-972A | Verify foot valve G-972A | 28-พ.ค18 | Pumps | Pump unit - Valves | External influence - Blockage/plugged | Failure operate/maint | Check | E-MN-GC / Mech(GC) | | 45800 | | | 45800 |
| 200115968 | CM | D-G-972A | G-972A repair valve suction | 22-พ.ค18 | Pumps | Pump unit - Valves | Material failure - Wear | Failure operate/maint | Check | E-MN-GC / Mech(GC) | | | | | |
| 200102483 | CM | D-G-972 | Check valve pass | 18-ธ.ค17 | Pumps | Pump unit - Valves | Material failure - Wear | Failure operate/maint | Check | E-MN-GC / Mech(GC) | | | | | |
| 200051405 | CM | D-G-972 | G-972A ทำ flow ไม่ได้ | 14-มี.ค16 | | | Material failure - Wear | Failure operate/maint | Check | E-MN-GC / Mech(GC) | | | | | |
| 200047989 | CM | D-G-972 | G-972A body valve leak | 29-ม.ค16 | | | Material failure - Wear | Failure operate/maint | Check | E-MN-GC / Mech(GC) | | 50000 | | 50000 | |
| 200039734 | CM | D-G-972 | G-972A ตรวจสอบ Foot valve | 12-ต.ค15 | | | Material failure - Wear | Failure operate/maint | Check | E-MN-GC / Mech(GC) | | 15170 | 15170 | | |
| 200038167 | CM | D-G-972 | G-972A ทำ pressure ไม่ได้ | 21-ก.ย15 | | | Material failure - Wear | Failure operate/maint | Check | E-MN-GC / Mech(GC) | | | | | |
| Z100087866 | CM | D-G-972 | C100087866 G-972 ทำ presure ไม่ได้ Vibra | 21-มี.ค14 | | | Low pressure | Over Clearance | Repair - C | E-MN-GC / Mech(GC) | | | | | |
| 200000976 | CM | D-G-972 | C100087561 G-972A foot valve | 17-มี.ค14 | | | Internal leakage | Leakage | Replace | E-MN-GC / Mech(GC) | | | | | |
| Z100039869 | CM | D-G-972 | C100039869 G-972 Flange discharge leak (| 10-ก.ค11 | | | Defect,damage,flange nozzel broken | End of life,flange nozz | Other (Sp | e E-MN-GC / Mech(GC) | | | | | |
| Z100012596 | CM | D-G-972 | C100012596 G-972 Noise at coupling | 4-ม.ค10 | | | Abnormal Noise | Process related proble | Repair - C | E-MN-GC / Mech(GC) | | | | | |

Datasheet

| SAMSUNG ENGINEERING CO., LTD. | JOB NO. <u>SC-1069</u> ITEM NO. <u>G-972</u> | |
|---|--|--------|
| ENGINEERING | PURCHASE ORDER NO. | |
| SEOUL, KOREA | SPECIFICATION NO. | |
| CENTRIFUGAL PUMP (VERTICAL) | REVISION NO. 01 DATE Apr. 22. 2005 | |
| DATA SHEET | PAGE 1 OF 6 BY | |
| SI UNITS | | |
| APPLICABLE TO : C PROPOSALS PURCHASE O AS BL | ILT . | |
| FOR TOC GLYCOL COMPANY LIMITED | UNIT | |
| SITE RAYONG, THAILAND | SERVICE_ Neut. W.W. Trans. Pump | |
| NO. REQ 1 PUMP SIZE 2S 4X3VS-13HH | TYPE VERTICAL NO. STAGES ONE | |
| MANURACTURER YOUNG POONG PRECISION CORPORAT | | |
| | Y MANUFACTURE O BY MANUFACTURER OR PURCHASER | |
| | GENERAL(3.1.1) | _ |
| PUMPS TO OPERATE IN(PARALLEL) NO. MOTOR DRIVE | | |
| (SERIES) WITH PUMP ITEM NO | | - |
| 를 받는 사람들은 사람들은 사람들은 다른 사람들이 되었다. 그는 사람들은 사람들은 사람들은 사람들은 사람들은 사람들은 사람들은 사람들은 | PUMP ITEM NO | |
| - | TURBINE ITEM NO B) VENDOR TURBINE PROVIDED BY | |
| GEAR PROVIDED B MOTOR PROVIDED MOTOR MOUNTED MOTOR MOUNTED | | |
| | | |
| EAR DATA SHT. N MOTOR DATA SHT. | | |
| OPERATING CONDITIONS | SITE AND UTILITY DATA(CONT'D) | |
| CAPACITY, NORMAI (m'/h) RATED 80 (m'/h) | WATER SOURCE | |
| OTHER | - ' Long Control of the Control of t | .5.2.6 |
| SUCTION PRESSURE MAX./MIN/ (kg/ar a) | INSTRUMENT AIR : MAX/MIN. PRES/(kg/or g) | |
| ■ DISCHARGE PRESSURE(kg/cd/g) | LIQUID | |
| ● DIFFERENTIAL PRESSURE (kg/or) | ● TYPE OR NAME OF LIQUID WATER | |
| DIFF. HEAD 25 (m) NPSHA FLOODED (m) | ● PUMPING TEMPERATURE: | |
| PROCESS VARIATIONS (3.1.2) | NORMAL 40 (C) MAX (C) MIN. (C) | |
| ARTING CONDITIONS C (3.1.3) | ◆ VAPOR PRESSURE (kg/cd a) @ P.T. (℃) | |
| SERVICE: CCONT. INTERMITTENT(STARTS/DAY | RELATIVE DENSITY(SPECIFIC GRAVITY): | |
| C PARALLEL OPERATION REQ'D(2.1.11) | NORMAL 0.99 MAX. MIN. | |
| SITE AND UTILITY DATA | C SPECIFIC HEAT, CP (KJ/kg °C) | |
| LOCATION : (2.1.29) | ● VISCSITY 0.66 (Cp) @ P.T. (℃) | |
| CINDOOR CHEATED CUNDER ROOF | C MAX. VISCOSIT(Cp) | |
| OUTDOOR UNHEATED C PARTIAL SIDES | | .1.8) |
| GRADE • MEZZANINE C | C CHLORIDE CONCENTRATION(PPM) (3.5.2 | 2.6) |
| ELECTRIC AREA CLASSIFICATION(2.1.22/3.1 | CH ₂ S CONCENTRATION(PPM (2.11.1.1 | |