# INSPECTION REPORT

August 24, 2015

FAHSS / TÜV NORD

## Third Party Inspection and Testing witness of Blast Resistant Double Leave Door

| | Issued by | Checked by | Approved by |
|---|---|---|---|
| **Name / Sig.** | Said Waseem<br>FAHSS/TÜV | Maher El-khidir<br>FAHSS/TÜV | Maher El-khidir<br>FAHSS/TÜV<br>Riyadh Branch Manager |
| **Location** | Riyadh | | |
| **Date of Fulfilled inspection** | 22-August-15. | | |
| **Special and Safety Work Nissren Factory Reference** | SSW/15-197 | | |
| **FAHSS/TÜV Reference** | E-mail Sat 8/22/2015 3:21 PM | | |

TÜV NORD
SAUDI ARABIA

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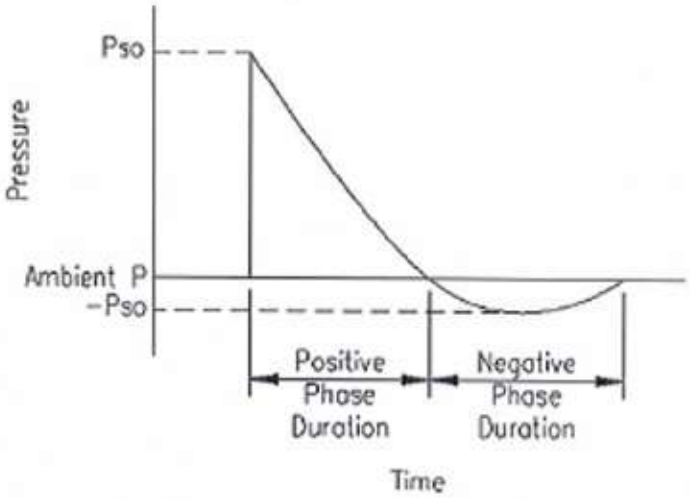
# TESTING FOR BLAST RESISTANT DOUBLE LEAF DOOR




DATE. DAELIM – SPECIAL PROJECTS GROUP MANAGER

DATE. SAMHOON – MANUFACTURING ENGINEER

DATE. TUV NORD – TEST ENGINEER

DATE. TUV NORD – QUALITY ASSURANCE

DATE. TUV NORD – TEST WITNESS

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**To. DAELIM . Co**

**KUWAIT NATIONAL PETROLEUM COMPANY**

**PROJECT: SULPHUR FACILITY**

**TEST REPORT NO: SAM 3229 KU**

## TEST REPORT FOR BLAST RESISTANT DOOR – DOUBLE LEAF

| | | | |
|---|---|---|---|
| - | Double Leaf | : | 3150 mmW x 2900 mmH x 85.5mmT |
| - | Pressure | : | 15.7 Psi |
| - | Time | : | 3 Minutes |
| - | Test Date | : | 22th August 2015 |
| - | Report Date | : | 25th August 2015 |
| - | Sample Identification of Specimen | : | SM – Single |
| - | Manufacturer | : | SAMHOON CO. LTD. |
| - | Source of Supply | : | SEAUF – SOUTH KOREA |
| - | Sample Dimension | : | 3150 mmW x 2900 mmH x 85.5mmT |
| - | Model Number | : | ———————— |
| - | Specimen Details | : | As Attached Drawings |
| - | Test Standard | : | ASTM F2247 – 11 [Standard test method for metal doors used in Blast resistant applications (Equivalent Static Load Method)] |
| - | Procedure Test | : | Comply with B (Materials as specified on drawing) |
| - | Category Required | : | Category 1 |

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## 1. SPONSOR TEST STANDARD SCOPE – ASTM F2247:-

| | |
|---|---|
| 1 | This test method covers the structural performance of metal doors and frames |
| 2 | Hardware (such as latches and hinges) used as a blast resistant doors by is applied |
| 3 | Equivalent static pressure |
| 4 | Static tests are valid for the unit size tested or for smaller units of analogous construction. |
| 5 | This test method requires knowledge of the principles of pressure, deflection, and when applicable, strain gauge measurement. |
| 6 | Specimens may be tested to determine ultimate static capacity or tested to specific static test loads. |

## 2. SPECIMEN PREPARATION:-

| | |
|---|---|
| 1 | Construction – The door panel shall meet the general definition of a metal door as outlined. |
| 2 | The design of the door panel is based upon the target pressure rating established by the specifier or door manufacturer. |
| 3 | Size of the specimen (door panel and frame) shall be representative or larger than the application under investigation. |
| 4 | Space between stiffeners may be filled with insulation. |
| 5 | In case no structural threshold door panel shall be considered as a three side supported, one edge free loading condition for a seating load case, the bottom edge of the door panel is free. |
| 6 | In case a structural threshold, door panel may be considered as a four side supported condition for a seating load case. |
| 7 | Door panel is supported by the restraining hardware During the unseating load case. |
| 8 | Door panel will be attached to the frame with the same quantity and size of hinge fasteners. |
| 9 | Door frame shall be attached to the test fixture using the same quantity, size, and spacing of fasteners or anchors. |

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## 3. CRITERIA CATEGORY:-

| | |
|---|---|
| Category I | The specimen is unchanged (no permanent deformation) after the loading incident and the door is fully operable. The specimen remains intact and responds elastically. In field tests, a tolerance of 2 mm (5/64-inch) difference between pretest and post-test measurements is allowed for elastic response. |
| Category II | The door is operable, but measurable, permanent deformation to the door panel exceeding 2 mm (5/64-inch) has been experienced. The specimen remains as an integral system. |
| Category III | Non-catastrophic failure. No structural failure occurs to the specimen that prevents the specimen from providing a barrier to blast wave propagation. However, the specimen is permanently deformed and the door panel is inoperable. |
| Category IV | The door panel is severely deformed. For the seating direction, the deformation of the door panel must be limited to a level that does not cause the door panel to be forced through the door frame opening. For the unseating direction, the latching mechanism is permitted to fail, allowing the door to swing open; however, the door panel shall remain supported by the hinges and it is evident that the door panel will not become a flying debris hazard. |

## 4. TEST PROCEDURE :-

| | |
|---|---|
| 1 | The door and frame unit was installed into the test chamber as shown in Figures 2 and 3. The test fixture was positioned vertically, with the specimen hung in the operational mode. |
| 2 | The backside of the test chamber was covered with a rubber membrane and back plate, as shown in figures 2 and 4. The membrane allowed uninhibited load transfer to the specimen. The membrane did not prevent movement or failure of the specimen. The membrane was applied loosely, with extra folds of material at each corner and at all offsets and recesses. |
| 3 | The door unit was checked for proper adjustments and clearances in the closed position. |
| 4 | The required deflection devices ware installed at their suggested locations. Refer figure 1. |
| 5 | The test chamber was pressurized until the desired static pressure load was achieved and maintained at a steady state until the deflections from the dial indicators ware read and recorded. This step was repeated for each desired pressure increment. |
| 6 | After a set number of pressure increments, the pressure load was reduced to zero and deflection readings were taken to determine any permanent deformation. The latching device was also checked for proper operation. |
| 7 | The damage level category was determined in accordance to ASTM F2247 criteria. |
| 8 | When the behavior of the door unit under load indicated that sudden failure may occur, the dial indicators were removed to prevent damage to them. Once all the dial indicators were removed, the door unit was continuously loaded until the maximum was reached and the door failed. |

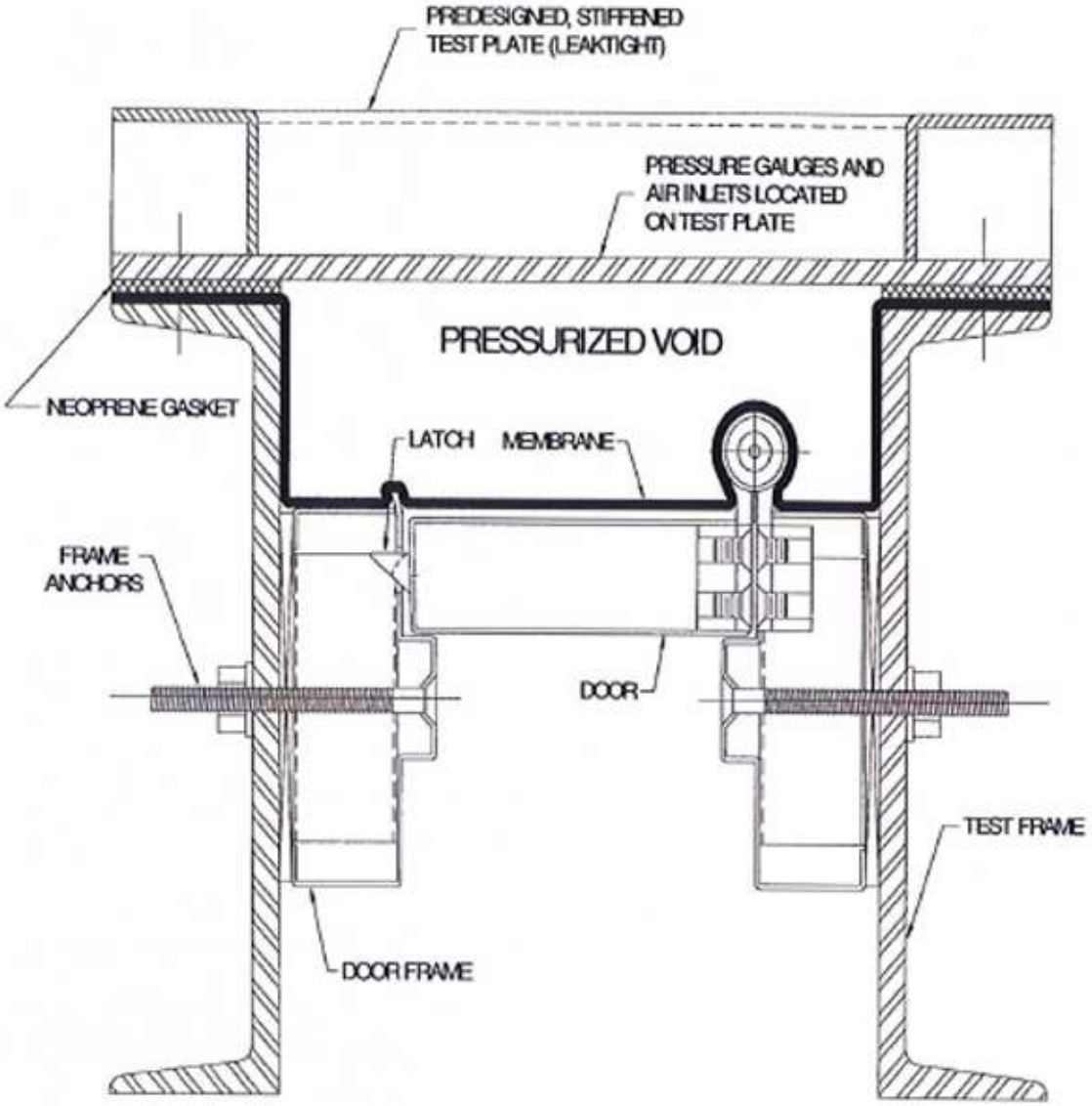
PREDESIGNED, STIFFENED
TEST PLATE (LEAKTIGHT)
PRESSURE GAUGES AND
AIR INLETS LOCATED
ON TEST PLATE
PRESSURIZED VOID
NEOPRENE GASKET
LATCH
MEMBRANE
FRAME
ANCHORS
DOOR
TEST FRAME
DOOR FRAME

Figure 2

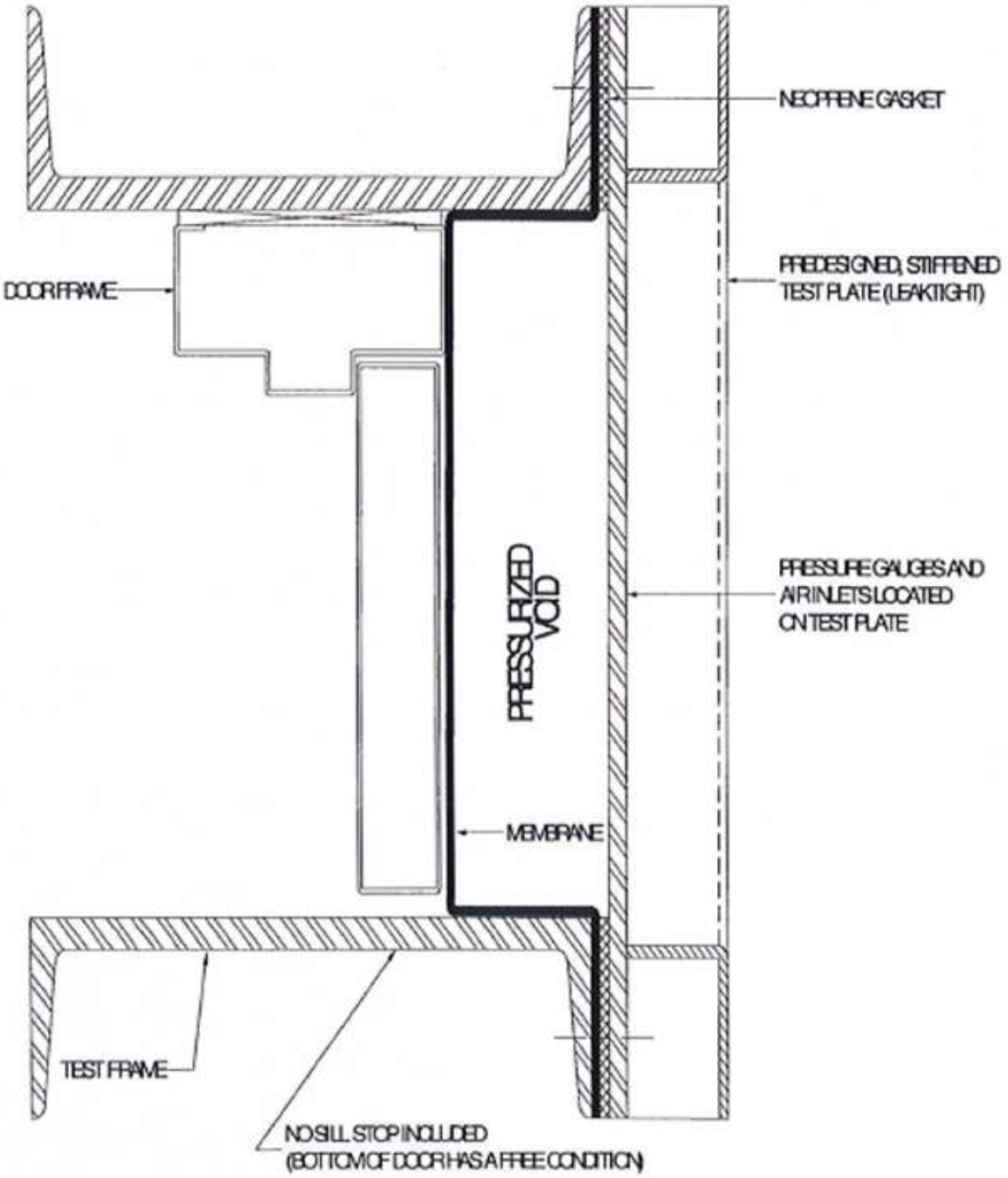
NEOPRENE GASKET
DOOR FRAME
PREDESIGNED, STIFFENED
TEST PLATE (LEAKTIGHT)
PRESSURIZED
VOID
PRESSURE GAUGES AND
AIR INLETS LOCATED
ON TEST PLATE
MEMBRANE
TEST FRAME
NO SILL STOP INCLUDED
(BOTTOM OF DOOR HAS A FREE CONDITION)

Figure 3

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# Double Door Test

## Static Test of Large Double Door

### Test Specimen

Double door as shown in drawings provided by Samhoon Co.Ltd. Overall frame dimensions of the door were 3150 mm by 2900 mm. The hardware provided on the door was limited to two lever handles to operate a single latch point on the active leaf, and manual flush bolts on the inactive leaf. The door was installed in the test frame with bearing supports on the non-load side of the door. No connection details were shown on the drawings. The bearing support approach was agreed upon by ... The perimeter frame was not grout filled as shown on the drawings. The door did not operate well before the test. Each door leaf could be opened, but significant force was required to swing each door. Also, the active leaf did not close such that the latch would engage the inactive leaf, with the bottom of the door fully closed and the top of the door approximately 17 mm from fully closed.

### Response Description

The tested door was satisfied with Category 1 according to ASTM F 2247 criteria about your required test results which high pressure short duration triangular shock loading side-on overpressure of 10 psi (69kPa) with a duration of 20 milliseconds, and the pressure load can be converted 15.7 psi with 3 minutes duration according to ASTM standards.

| Test Specimen Size | | Height | | Width | | |
|---|---|---|---|---|---|---|
| | | inches | mm | inches | mm | |
| | Specimen | 114.17 | 2900.00 | 124.02 | 3150.00 | |
| | FrameContribution | 0.00 | 0.00 | 0.00 | 0.00 | |
| | Total | 114.17 | 2900.00 | 124.02 | 3150.00 | |

**Loaded Area (Height (max 120 inches) x Width (max 120 inches))**

| Height | Width | Area |
|---|---|---|
| 114.17 | 120.00 | 13700.79 |

**Test Loads**

| | | | | | Total Reaction (lbs) | Total Reaction (kN) |
|---|---|---|---|---|---|---|
| Target Load | 15.7 | psi | 108.5 | kPa | 78350 | 348.4 |
| 50% Load | 7.85 | psi | 54.1 | kPa | 34251.75 | 174.25 |

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| Fielded Instrumentation | | | | | | |
|---|---|---|---|---|---|---|
| **Reaction Force Load Cells (Check Appendix A)** | | | | | | |
| Gauge Number | Guage Type | Serial Number | Sensitivity (mV/V) | Reaction at 50% Load | Reaction at 100% Load | |
| R1 | LC8400-200-100K | 328691 | 2.212 | 6717.5 | 13435 | |
| R2 | LC8400-200-100K | 328696 | 2.218 | 4501 | 9002 | |
| R3 | LC8400-200-100K | 328702 | 2.217 | 7625 | 15250 | |
| R4 | LC8400-200-100K | 328708 | 2.211 | 10700 | 21400 | |
| R5 | LC8400-200-100K | 250542 | 2.214 | 7160 | 14320 | |
| | | | Total Reaction | 36703.5 | 73407 | |
| | | Effective Pressure (psi) | | 7.85 | 15.7 | |
| | | Effective Pressure (kPa) | | 54.1 | 108.5 | |
| | | | | | | |
| Laser Distance Meters (Check Appendix B ) | | | | | | |
| | Model | Manfacture Date | Sensitivity (mV/mm) | Deflection at 50% Load (inches) | Deflection at 100% Load (inches) | Deflection at 100% Load (mm) |
| D1 | OADM 2016581/S14F | Feb-12 | 12.5 | 0.3 | 0.61 | 15.49 |
| D2 | OADM 2016581/S14F | Feb-12 | 12.5 | 0.32 | 0.68 | 17.27 |
| D3 | OADM 2016581/S14F | Oct-14 | 12.5 | 0.18 | 0.35 | 8.89 |
| See measurement diagram for instrument locations. | | | | | | |

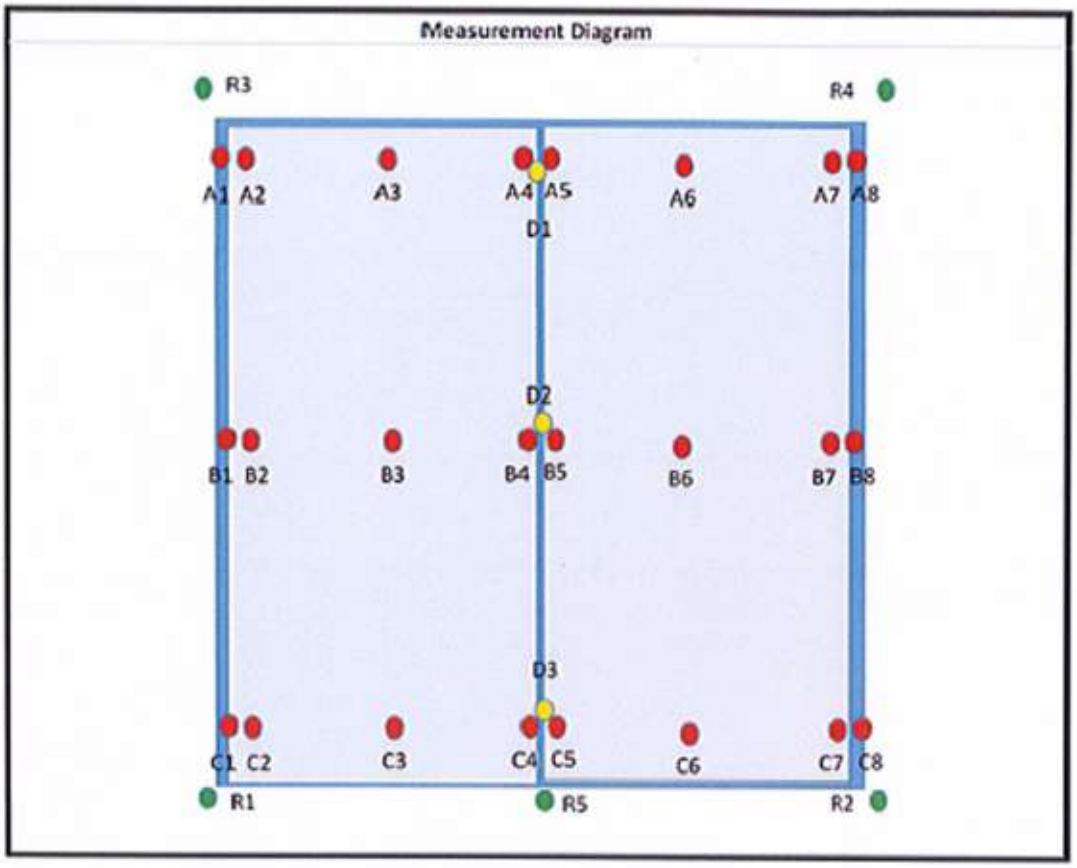
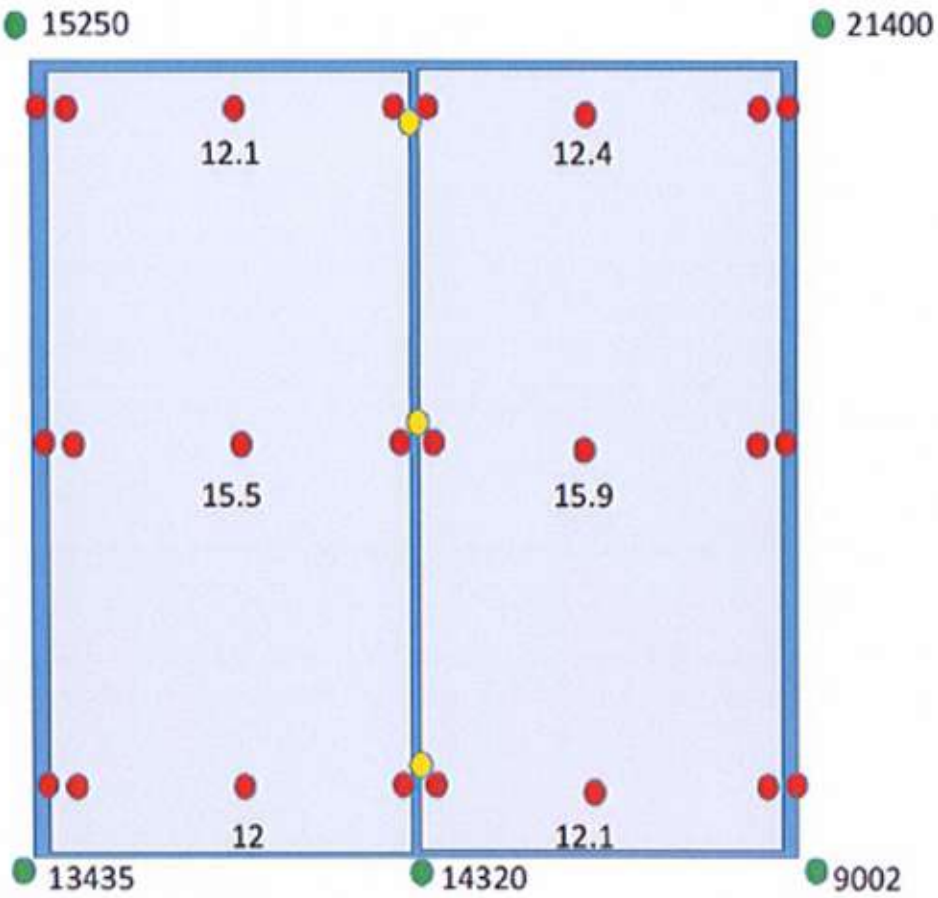
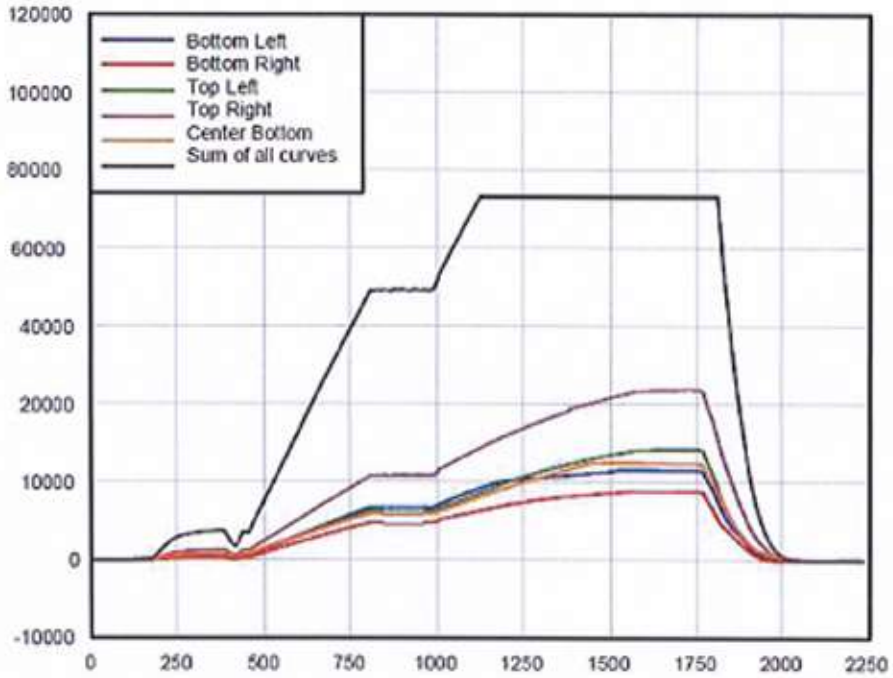

Measurement Diagram
R3
R4
A1
A2
A3
A4
A5
A6
A7
A8
D1
D2
B1
B2
B3
B4
B5
B6
B7
B8
D3
C1
C2
C3
C4
C5
C6
C7
C8
R1
R5
R2

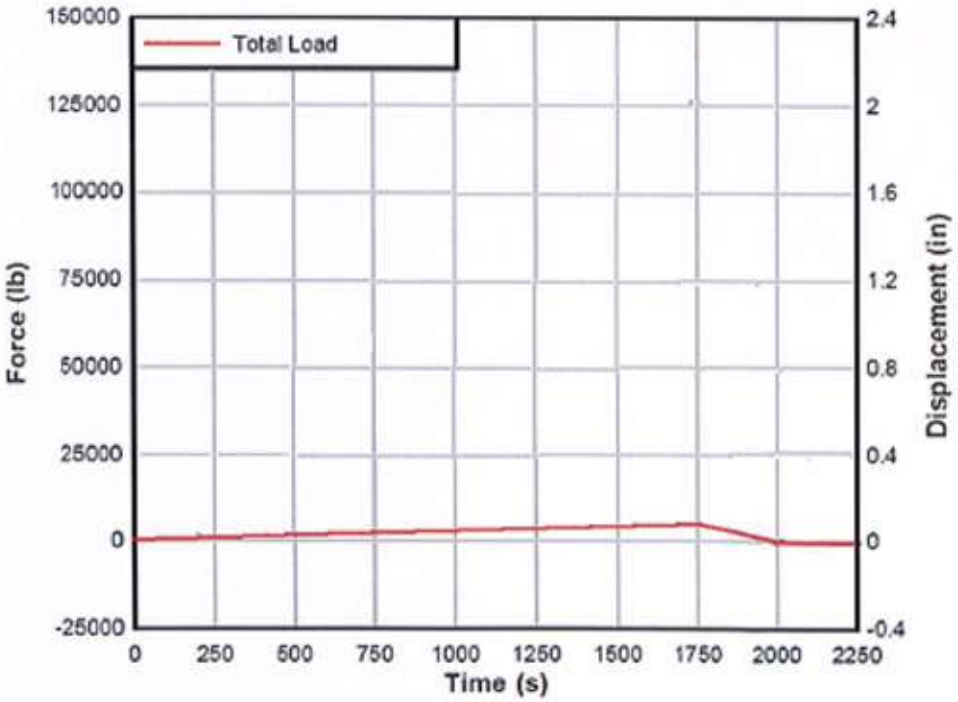
Figure 1


15250
21400
12.1
12.4
15.5
15.9
12
12.1
13435
14320
9002

| Deflection Measurements | | | | | | |
|---|---|---|---|---|---|---|
| Measurement | Pre-Test (inches) | Post-Test (CM) | Permanent Deflection (inches) | Permanent Deflection (mm) | | |
| A1 | 0.08 | 2.1 | 0.05 | 1 | | |
| A2 | 0.29 | 7.3 | 0.05 | 1 | | |
| A3 | 0.48 | 12.1 | 0.05 | 1 | | |
| A4 | 0.45 | 11.5 | 0.05 | 1 | | |
| A5 | 0.46 | 11.7 | 0.05 | 1 | | |
| A6 | 0.49 | 12.4 | 0.05 | 1 | | |
| A7 | 0.30 | 7.5 | 0.05 | 1 | | |
| A8 | 0.09 | 2.3 | 0.05 | 1 | | |
| B1 | 0.13 | 3.2 | 0.05 | 1 | | |
| B2 | 0.39 | 9.8 | 0.05 | 1 | | |
| B3 | 0.22 | 15.5 | 0.05 | 1 | | |
| B4 | 0.56 | 14.3 | 0.05 | 1 | | |
| B5 | 0.57 | 14.4 | 0.05 | 1 | | |
| B6 | 0.63 | 15.9 | 0.05 | 1 | | |
| B7 | 0.36 | 9.2 | 0.05 | 1 | | |
| B8 | 0.12 | 3.1 | 0.05 | 1 | | |
| C1 | 0.09 | 2.3 | 0.05 | 1 | | |
| C2 | 0.29 | 7.3 | 0.05 | 1 | | |
| C3 | 0.47 | 12 | 0.05 | 1 | | |
| C4 | 0.44 | 11.1 | 0.05 | 1 | | |
| C5 | 0.44 | 11.3 | 0.05 | 1 | | |
| C6 | 0.48 | 12.1 | 0.05 | 1 | | |
| C7 | 0.30 | 7.7 | 0.05 | 1 | | |
| C8 | 0.10 | 2.5 | 0.05 | 1 | | |




Force Measurements from Test 1




**Deflection Measurements with Total Force Data**

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# Appendix A

# LARGE-ID THROUGH-HOLE LOAD CELLS
## 2.00 TO 3.13" ID

LC8400-213-10K shown smaller than actual size.

***Compression***
***0-1000 lb to 0-100K lb***
***0-455 kgf to 0-45,372 kgf***

*1 Newton = 0.2248 lb*
*1 daNewton = 10 Newtons*
*1 lb = 454 g*
*1 t = 1000 kgf = 2204 lb*

## *LC8313/LC8400 Large Series*

NIST RoHS Standard

- For Large-ID Applications
- All Stainless Steel Construction
- Rugged Industrial Design

The LC8313, LC8400, and LC8450 Series donut load cells are space-saving solutions to applications requiring a large through-hole. With their rugged construction and design, these load cells are ideal for applications such as loading forces on large bolts or other suspended load applications. These series, with their all stainless steel construction and environmental protection, have proved reliable in tough industrial applications.

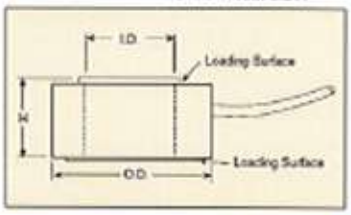
### SPECIFICATIONS

**Output:** 2 mV/V nominal
**Input:** 10 Vdc (15V maximum)
**Accuracy Class:** ±0.5% linearity, hysteresis and repeatability combined
**Zero Balance:** ±2.0% FSO
**Operating Temp Range:** -54 to 121°C (-65 to 250°F)
**Compensated Temp Range:** 16 to 71°C (60 to 160°F)
**Thermal Effects:**
**Zero:** ±0.009% FSO/°C
**Span:** ±0.018% rdg/°C
**Safe Overload:** 150% of capacity
**Ultimate Overload:** 300% of capacity
**Input Resistance:** 360 Ω minimum
**Output Resistance:** 350 ±5 Ω
**Construction:** 17-4 PH stainless steel
**Electrical:** 1.5 m (5') 4-conductor shielded cable

**Dimensions: mm (inch)**

| MODEL | OD | H |
|---|---|---|
| LC8313 | 80 (3.13) | 13 (0.50) |
| LC8400 (1K to 50K) | 102 (4.00) | 25 (1.00) |
| LC8400 (≥100K) | 102 (4.00) | 51 (2.00) |
| LC8450 | 114 (4.50) | 32 (1.25) |

| WIRE | CONNECTION |
|---|---|
| GN | +Output |
| WT | -Output |
| BK | -Input |
| RD | +Input |




| INSIDE DIAMETERS (ID) + = MOST POPULAR X = AVAILABLE | | | | |
|---|---|---|---|---|
| ID CODE | 200 | 213 | 300 | 313 |
| MODEL | 2.00" | 2.13" | 3.00" | 3.13" |
| LC8313 | + | X | | |
| LC8400 | + | X | | |
| LC8450 | | | X | + |

*Also available in metric configurations, consult engineering for details.*

### To Order

| CAPACITY | | MODEL NO. | COMPATIBLE METERS** |
|---|---|---|---|
| **Model LC8313 with a 3.13" OD and Selectable ID** | | | |
| 1 K lb | 455 kg | LC8313-[*]-1K | DP41-S, DP25B-S, DPiS |
| 3 K lb | 1361 kg | LC8313-[*]-3K | DP41-S, DP25B-S, DPiS |
| 5 K lb | 2269 kg | LC8313-[*]-5K | DP41-S, DP25B-S, DPiS |
| 7.5 K lb | 3403 kg | LC8313-[*]-7.5K | DP41-S, DP25B-S, DPiS |
| 10 K lb | 4537 kg | LC8313-[*]-10K | DP41-S, DP25B-S, DPiS |
| **Model LC8400 with a 4.00" OD and Selectable ID** | | | |
| 1 K lb | 455 kg | LC8400-[*]-1K | DP41-S, DP25B-S, DPiS |
| 3 K lb | 1361 kg | LC8400-[*]-3K | DP41-S, DP25B-S, DPiS |
| 5 K lb | 2269 kg | LC8400-[*]-5K | DP41-S, DP25B-S, DPiS |
| 10 K lb | 4537 kg | LC8400-[*]-10K | DP41-S, DP25B-S, DPiS |
| 25 K lb | 11,343 kg | LC8400-[*]-25K | DP41-S, DP25B-S, DPiS |
| 50 K lb | 22,686 kg | LC8400-[*]-50K | DP41-S, DP25B-S, DPiS |
| 100 K lb | 45,372 kg | LC8400-[*]-100K | DP41-S, DP25B-S, DPiS |
| 200 K lb | 90,744 kg | LC8400-[*]-200K | DP41-S, DP25B-S, DPiS |
| **Model LC8450 with a 4.50" OD and Selectable ID** | | | |
| 1 K lb | 455 kg | LC8450-[*]-1K | DP41-S, DP25B-S, DPiS |
| 3 K lb | 1361 kg | LC8450-[*]-3K | DP41-S, DP25B-S, DPiS |
| 5 K lb | 2269 kg | LC8450-[*]-5K | DP41-S, DP25B-S, DPiS |
| 10 K lb | 4537 kg | LC8450-[*]-10K | DP41-S, DP25B-S, DPiS |

*Comes complete with 5-point NIST-traceable calibration and 59 kΩ shunt data.*
*** Visit us online for compatible meters.*
*[*] Select ID Code from table above to complete model number.*
***Ordering Examples:*** *LC8313-200-3K, 3000 lb capacity load cell, 3.13" OD and 2.00" ID.*
*LC8400-200-10K, 10,000 lb capacity load cell, 4.00" OD and 2.00" ID.*
*LC8400-213-25K, 25,000 lb capacity load cell, 4.00" OD and 2.13" ID.*
*LC8450-313-5K, 5000 lb capacity load cell, 4.50" OD and 3.13" ID.*

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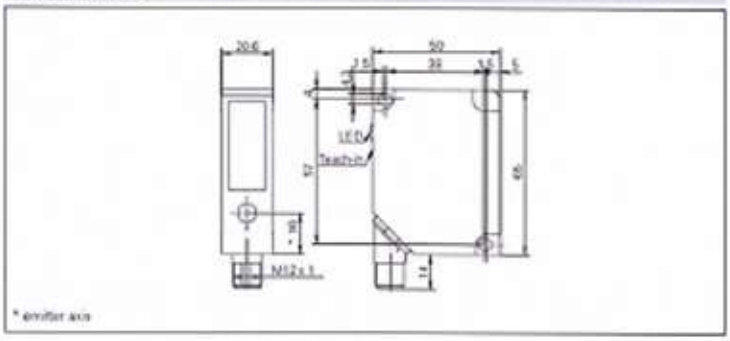
# Appendix B

Baumer — Photoelectric sensors

## Distance sensors — OADM 20 (Laser, connector 8 pins, > 300 mm)

**sample drawing**




| general data | |
|---|---|
| adjustment | Teach-in: button / external |
| power on indication | LED green |
| soiled lens indicator | LED red |
| light source | pulsed red laser diode |
| wave length | 650 nm |
| laser class | 2 |
| **measuring distance Sd = 100 ... 600 mm** | |
| Teach-in range min. | > 10 mm |
| resolution | 0,015 ... 0,67 mm |
| linearity error | ± 0,05 ... ± 2 mm |
| temperature drift | < 0,03 % Sda/K |
| **measuring distance Sd = 200 ... 1000 mm** | |
| Teach-in range min. | > 20 mm |
| resolution | 0,12 ... 2,5 mm |
| linearity error | ± 0,48 ... ± 10 mm |
| temperature drift | < 0,06 % Sda/K |

| electrical data | |
|---|---|
| response time / release time | < 0,9 ms |
| voltage supply range +Vs | 12 ... 28 VDC |
| current consumption max. (no load) | 100 mA |
| output circuit | analog |
| output signal | 4 ... 20 mA / 0 ... 10 VDC |
| load resistance (analog I) | < (+Vs - 6 V) / 0,02 A |
| load resistance (analog U) | > 100 kOhm |
| output current | < 100 mA |
| alarm output | PNP |
| short circuit protection | yes |
| reverse polarity protection | yes, Vs to GND |

**sample picture**

**laser warning**

**remarks**

For objects with a reflectivity < 7 % (OADM 20I6x80/S14F) or < 15 % (OADM 20I6x81/S14F) the response time/release time is increased automatically up to 2,8 ms.

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Baumer

Photoelectric sensors

## Distance sensors

## OADM 20 (Laser, connector 8 pins, > 300 mm)

| mechanical data | |
|---|---|
| width / diameter | 20,6 mm |
| height / length | 65 mm |
| depth | 50 mm |
| type | rectangular |
| housing material | die-cast zinc |
| front optics) | glass |
| connection types | connector M12 8 pin, rotatable |

| ambient conditions | |
|---|---|
| operating temperature | 0 ... +50 °C |
| protection class | IP 67 |

| order reference | measuring distance Sd | beam type | beam width | beam height | beam diameter | ambient light immunity |
|---|---|---|---|---|---|---|
| OADM 20I6480/S14F | 100 ... 600 mm | point | - | - | 2 mm | < 10 kLux |
| OADM 20I6481/S14F | 200 ... 1000 mm | point | - | - | 2 mm | < 5 kLux |
| OADM 20I6580/S14F | 100 ... 600 mm | line | 2,5 mm | 5,5 ... 21 mm | - | < 10 kLux |
| OADM 20I6581/S14F | 200 ... 1000 mm | line | 2,5 mm | 8,5 ... 35 mm | - | < 5 kLux |

Pretest Photograph of Loaded Side of Door

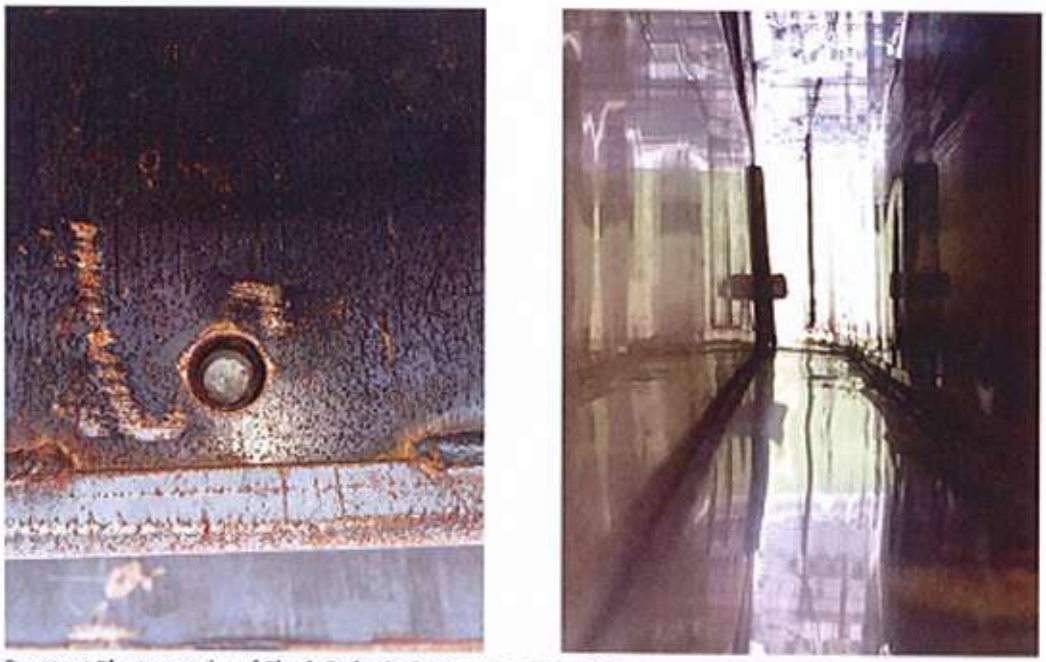

Pretest Photograph of Non-Loaded Side of Door


Pretest Photograph Showing Closing Issue for Active Leaf


Posttest Photograph of Door

Posttest Photograph at Top of Frame

Posttest Photograph at Bottom ofFrame

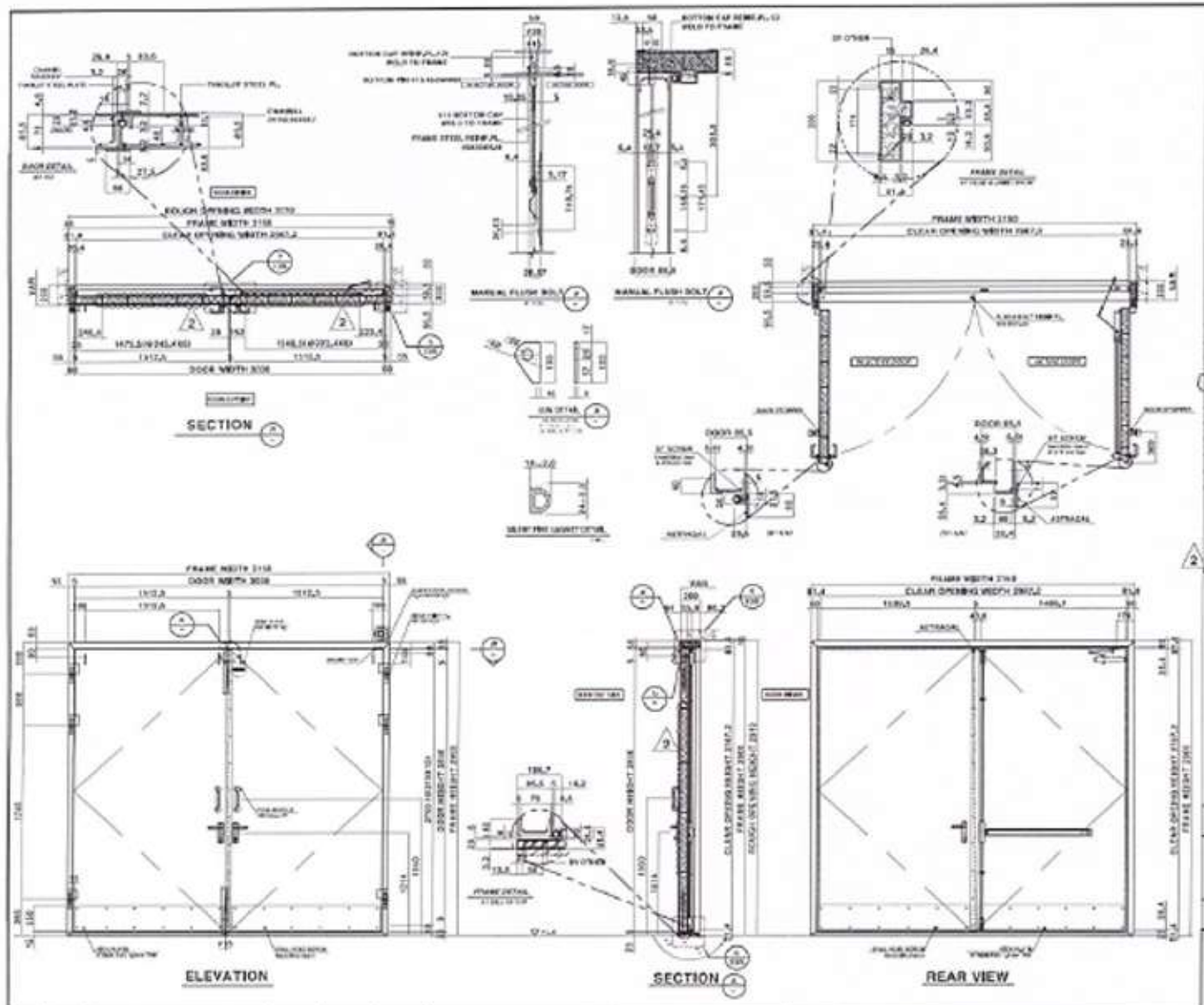


**Posttest Photographs of Flush Bolts in Bottom and Top Frame**

for the content

Eng. Maher El-khidir

*FAHSS/TÜV SAUDI ARABIA*




| REV | DATE | DESCRIPTION | BY | CHKD | APPRD | REFERENCE DRAWINGS |
|---|---|---|---|---|---|---|
| A | | ISSUE FOR APPROVAL | | | | |
| B | | ISSUE FOR APPROVAL | | | | |
| C | | | | | | |
| D | | | | | | |
| E | | | | | | |

| NO. | DESCRIPTION | MODEL NO. or SPEC. | MAKER | REMARKS |
|---|---|---|---|---|
| 1 | HEAVY DUTY SPECIAL HINGE | | SAMHOON | STAINLESS |
| 2 | VENTILATING TYPE PANIC DEVICE | | | STAINLESS |
| 3 | CUT TRIM | | | STAINLESS |
| 4 | DUMMY TRIM | | | STAINLESS |
| 5 | DOOR CLOSER | | KING | STAINLESS COVER |
| 6 | FLUSH BOLT | | KWANG | STAINLESS |
| 7 | DOOR STOPPER | | SAMHOON | STAINLESS |
| 8 | GASKET | | SAMHOON | |
| 9 | KICK PLATE | | SAMHOON | STAINLESS |
| 10 | PULL HANDLE | | SAMHOON | STAINLESS |

SAMHOON ENGINEERING

SAMHOON

SAMHOON CO., LTD.

VENDOR DWG NO.
VP-43-703-001-A01-ALL-SK-12A

KUWAIT NATIONAL PETROLEUM CO.(K.S.C.)
MINA AL-AHMADI REFINERY

DAELIM
SEOUL, KOREA

PROJECT NO. 120660 | CONTRACT NO. CA/CSPD/0822

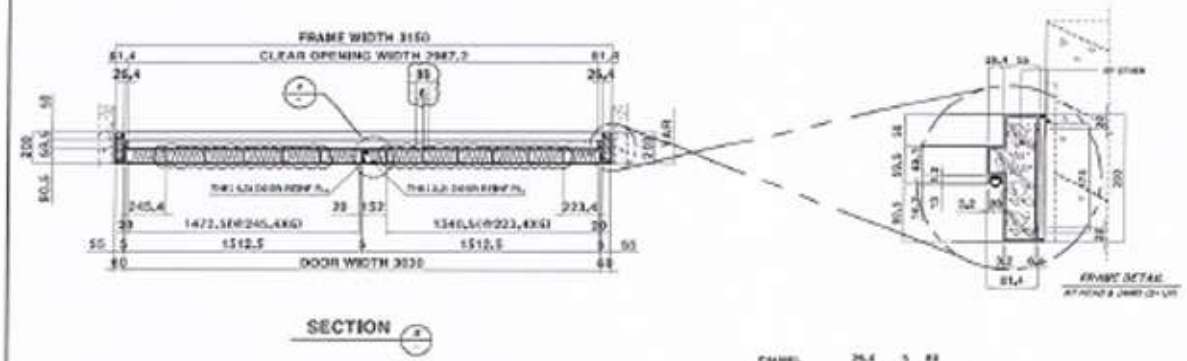
CAD FILE REF. | SHEET NO. 46 OF 52 | SCALE 1/40

TITLE : SULPHUR HANDLING FACILITIES (REVAMP AND NEW) PROJECT (SHFP) AT MAA REFINERY

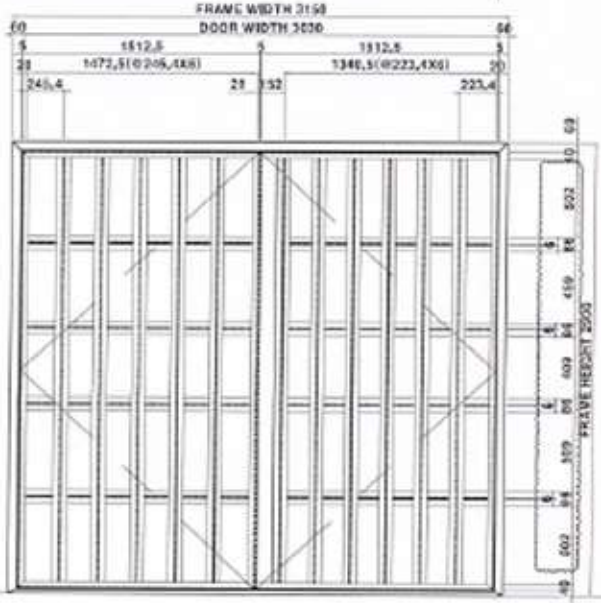
FRAME SIZE 3150.0(W)X2900.0(H)
(N76.A SUBSTATION BUILDING)

A3

FILE NAME




SECTION

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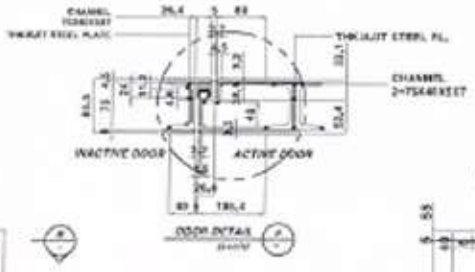


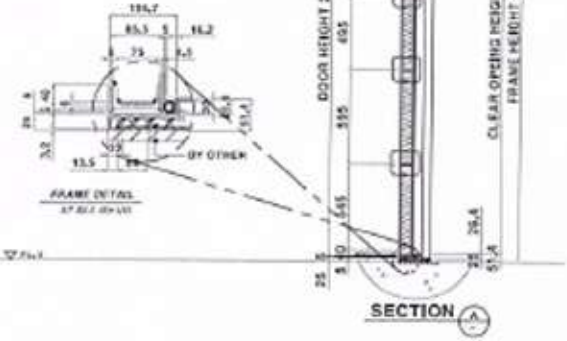


SECTION

NOTES

BILL OF MATERIALS

| NO. | DESCRIPTION | LENGTH | MAKER | QTY | REMARKS |
|---|---|---|---|---|---|
| | | | | | |

SAMHOON ENGINEERING

SAMHOON CO., LTD.

VENDOR DWG NO.
VP-43-703-001-AD1-ALL-SK-128

KUWAIT NATIONAL PETROLEUM CO.(K.S.C.)
MINA AL-AHMADI REFINERY

| REV | DATE | DESCRIPTION | BY | CHKD | APPRD | REFERENCE DRAWINGS |
|---|---|---|---|---|---|---|
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DAELIM
SEOUL, KOREA

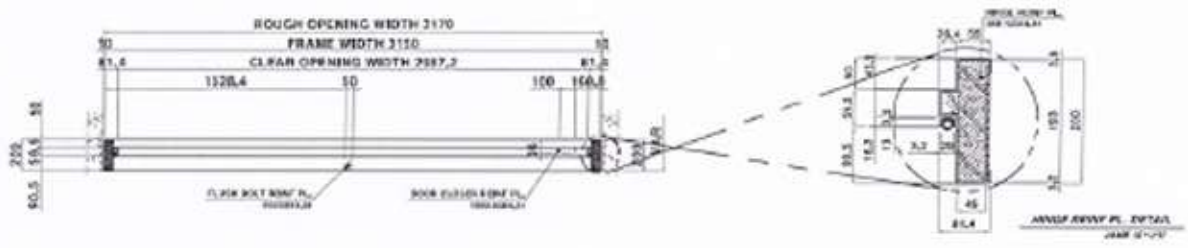
| PROJECT NO. 120588 | CONTRACT NO. CA/CSPD/0022 | |
|---|---|---|
| CAD FILE REF. | SHEET NO. 47 OF 53 | SCALE 1/30 |

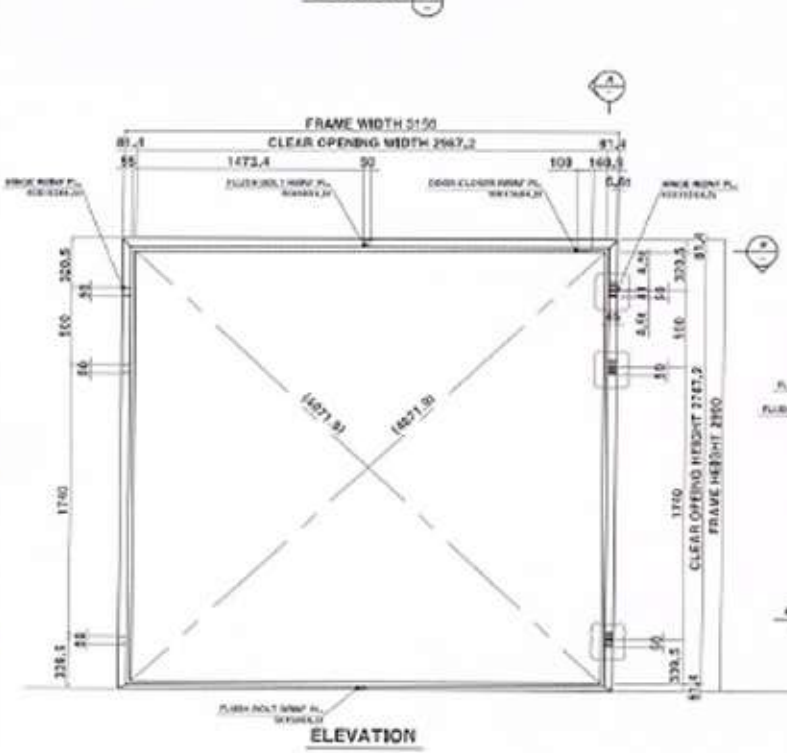
TITLE : SULPHUR HANDLING FACILITIES (REVAMP AND NEW) PROJECT (SHPP) AT MAA REFINERY

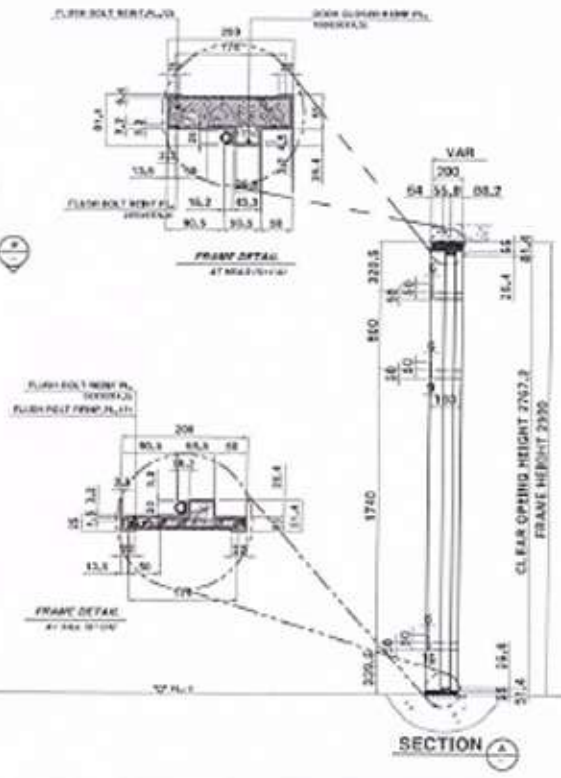
DOOR REINFORCE DRAWING
(M76.A SUBSTATION BUILDING)

FILE NAME

A1




NOTES

BILL OF MATERIALS

| NO. | DESCRIPTION | LENGTH | MARK | QTY | REMARKS |
|---|---|---|---|---|---|
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| REV | DATE | DESCRIPTION | BY | CHKD | APPRD | REFERENCE DRAWINGS |
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SAMHOON ENGINEERING

SAMHOON CO., LTD.

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KUWAIT NATIONAL PETROLEUM CO.(K.S.C.)
MINA AL-AHMADI REFINERY

DAELIM
SEOUL, KOREA

PROJECT NO. 120586 | CONTRACT NO. CA/CSPD/0022
CAD FILE REF. | SHEET NO. 88 OF 93 | SCALE 1/20

TITLE : SULPHUR HANDLING FACILITIES (REVAMP AND NEW) PROJECT (SHFP) AT MAA REFINERY

FRAME REINFORCE DRAWING
(M76.A SUBSTATION BUILDING)

FILE NAME

A1