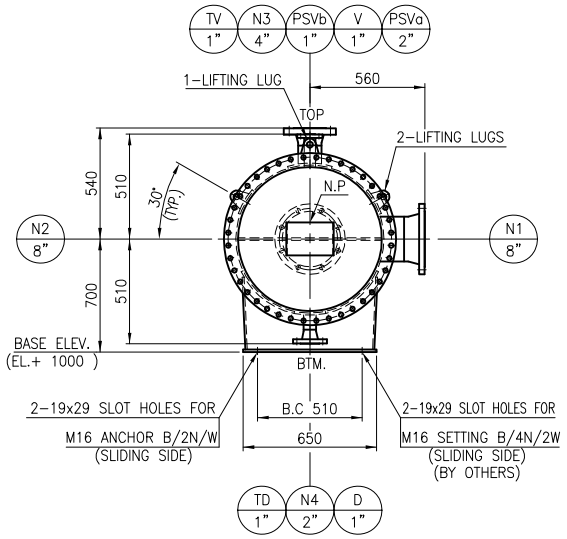
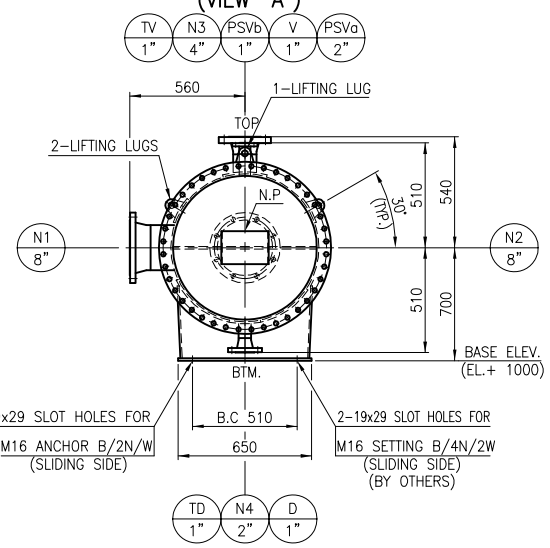
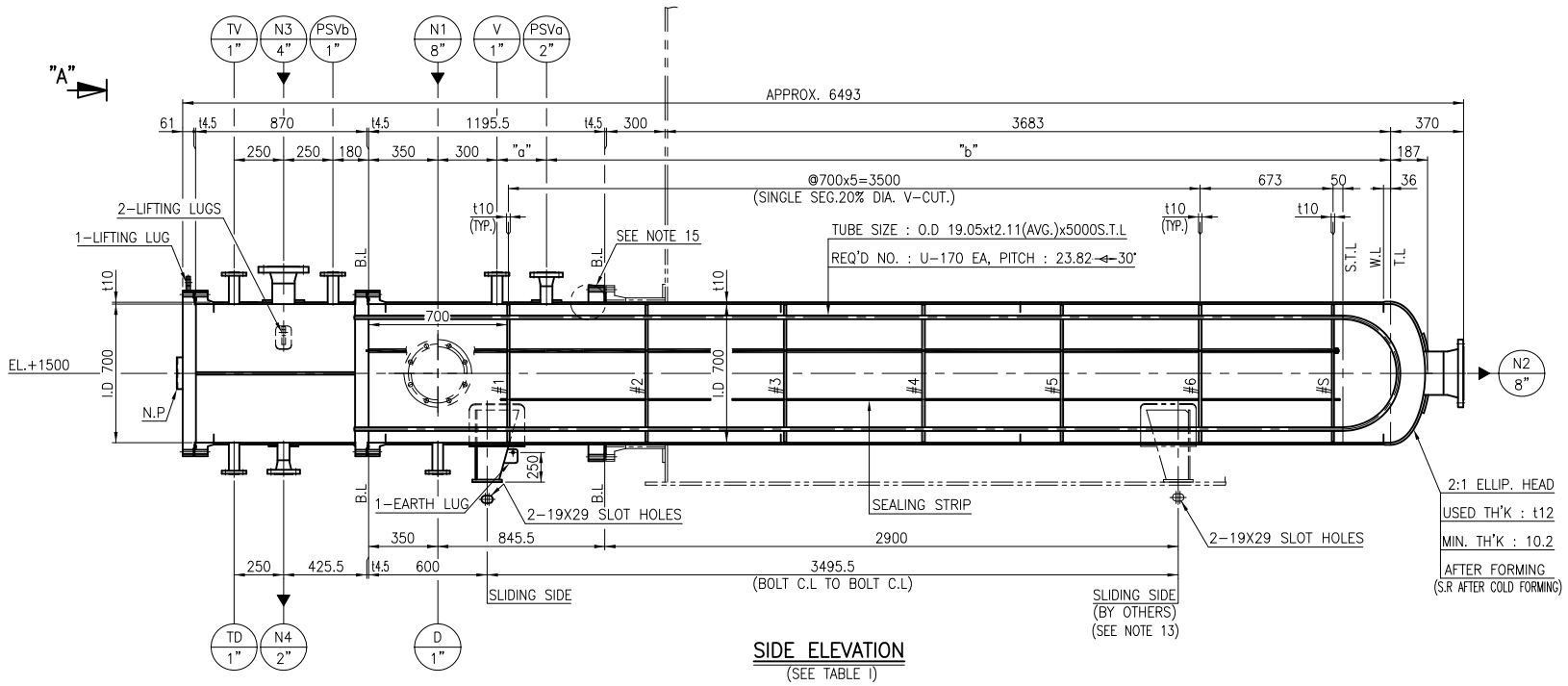


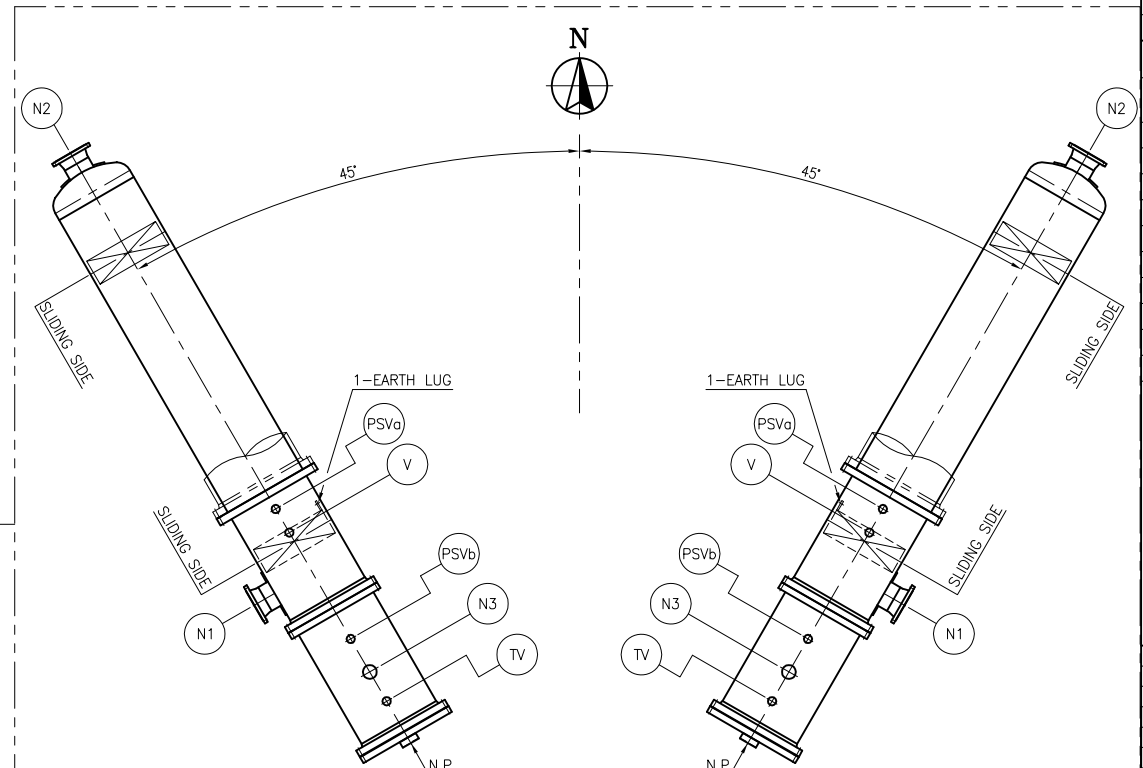

## NOZZLE ORIENTATION
(FOR 6NP-HF-HX-01)
(VIEW "A")




## NOZZLE ORIENTATION
(FOR 5NP-HF-HX-01)
(VIEW "A")




## SIDE ELEVATION
(SEE TABLE I)

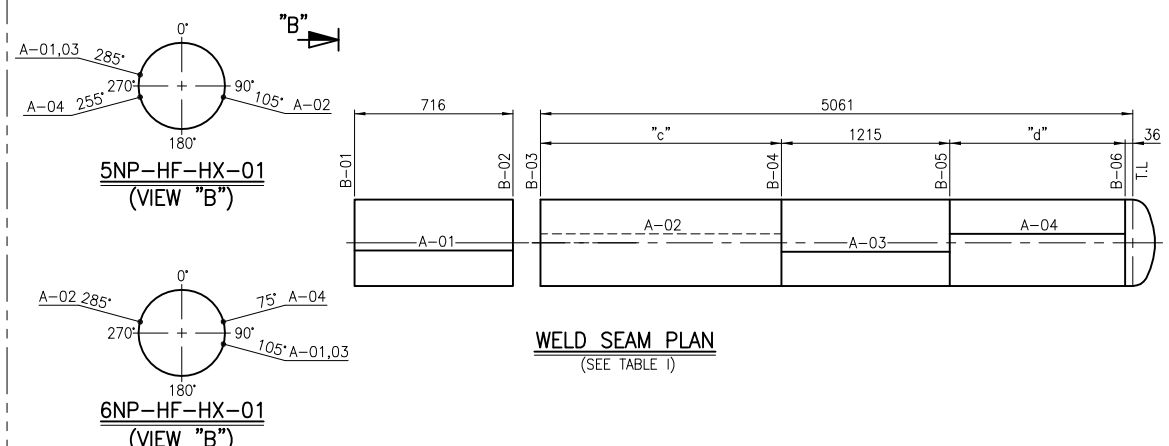



## KEY PLAN
(FOR 5NP-HF-HX-01)

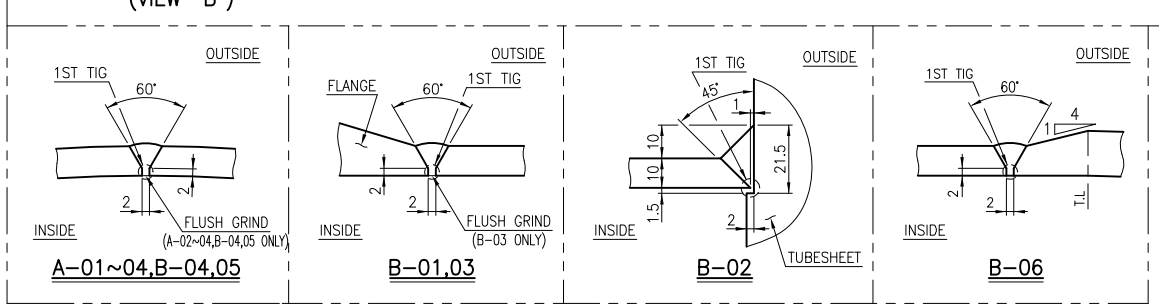
## KEY PLAN
(FOR 6NP-HF-HX-01)

## TABLE I

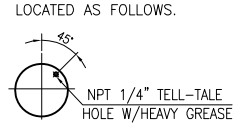
| ITEM No. | "a" | "b" | "c" | "d" |
|---|---|---|---|---|
| 5NP-HF-HX-01 | 300 | 4233 | 2002 | 1844 |
| 6NP-HF-HX-01 | 250 | 4283 | 2000 | 1846 |




## WELD SEAM PLAN
(SEE TABLE I)




8. GASKET MATERIAL
   1) GIRTH FLANGE (TUBE SIDE) : SPIRAL WOUND (t4.5)
      - HOOP : 304 S.S
      - FILLER : FLEXIBLE GRAPHITE
      - INNER RING : 304 S.S
      - PASS PARTITION RIB : METAL JACKET
        a) JACKET : 304 S.S
        b) FILLER : FLEXIBLE GRAPHITE
   2) GIRTH FLANGE (SHELL SIDE) : SPIRAL WOUND (t4.5)
      - HOOP : 304 S.S
      - FILLER : FLEXIBLE GRAPHITE
      - INNER RING : 304 S.S
   3) STD. FLANGE : SPIRAL WOUND (t4.5)
      - HOOP : 304 S.S
      - FILLER : FLEXIBLE GRAPHITE
      - INNER RING : 304 S.S
      - OUTNER RING : C.S
9. THE REINFORCING PAD SHALL HAVE A TELL TALE HOLE AND LOCATED AS FOLLOWS.




10. ALL THE COUNTER FLANGE PROVIDE BY VENDOR. (INCL. B/N & GASKET)
11. SPARE PARTS
    1) PRE-COMMISSIONING & START-UP
       - GASKET : 100%
       - BOLT/NUT : 10% (MIN. 2 SETS)
    2) 1 YEAR WARRANTY
       - GASKET : 100%
       - BOLT/NUT : 10% (MIN. 2 SETS)
    3) 2 YEARS OPERATION
       - GASKET : 200%
       - BOLT/NUT : 10% (MIN. 2 SETS)
12. THIS EQUIPMENT IS COMBINED WITH STORAGE TANK SIDE FLANGE AS FOLLOWS.
    a) SIZE : 30"
    b) RATING : ASME B16.47 SERIES "B" 150#
    c) NOZZLE NECK TH'K : 20t UNDER
13. SADDLE SHALL BE SUPPLIED BY MANUFACTURER OF STORAGE TANK.
14. SURFACE PREPARATION : SSPC-SP10 NEAR WHITE BLAST CLEANING(SA2.5)
15. TO MATCH BOLT HOLE OF THE STORAGE TANK MUST BE WELDED IN THE SITE.

**FINAL** | **ASME** CODE STAMPED WORK (U)

| NO | DRAWING NAME | DRAWING NO. |
|---|---|---|
| 5 | DETAIL OF NAME PLATE (2/2) | 11314-M12-A1-80002 |
| 4 | DETAIL OF FOUNDATION | 11314-M12-A1-81005 |
| 3 | DETAIL OF SADDLE & NOZZLE | 11314-M12-A1-81004 |
| 2 | DETAIL OF BUNDLE | 11314-M12-A1-81003 |
| 1 | DETAIL OF BODY | 11314-M12-A1-81002 |

## DESIGN DATA

| | | | | | |
|---|---|---|---|---|---|
| CODE | ASME SEC.VIII DIV. 1 2007 ED. + 2009 ADD. + HEI | | TEMA CLASS | "R" (9TH ED.-'07) | |
| SURFACE AREA (EFF.) | 105.4 | $M^2$ | TYPE | H-CEU | |
| NO. OF REQ'D | 2 (TWO) | | CODE STAMP | YES | |
| | SHELL SIDE | | TUBE SIDE | | |
| KIND OF FLUID | HFO 380 | | SECONDARY STEAM / CONDENSATE | | |
| DESIGN PRESS. | 9 | $KG/CM^2G$ | 15.3/F.V | $KG/CM^2G$ | |
| DESIGN TEMP. | 85 | °C | 350 | °C | |
| OPER. PRESS. | ATM | $KG/CM^2G$ | 4 | $KG/CM^2G$ | |
| OPER. TEMP. (IN/OUT) | 55/80 | °C | 151.4/151.4 | °C | |
| HYDRO. TEST PRESS. | 13.5 | $KG/CM^2G$ | 22.95 | $KG/CM^2G$ | |
| PNEUM. TEST PRESS. | - | $KG/CM^2G$ | - | $KG/CM^2G$ | |
| SAFETY VALVE SET PRESSURE | 9 | $KG/CM^2G$ | 15.3 | $KG/CM^2G$ | |
| PRESSURE DROP | 0.17 | $KG/CM^2G$ | 0.5 | $KG/CM^2G$ | |
| M.D.M.T | 6 | °C | 6 | °C | |
| M.A.W.P | 9 | $KG/CM^2G$ | 15 | $KG/CM^2G$ | |
| P.W.H.T | NO | | NO | | |
| S.R AFTER COLD FORMING | YES (HEAD ONLY) | | NO | | |
| RADIOGRAPH (S/H) | SPOT/FULL | | SPOT/- | | |
| JOINT EFFICIENCY (S/H) | 85/100 | % | 85/- | % | |
| CORR. ALLOW. | 3.2 | MM | 3.2 | MM | |
| NO. OF PASS | 1 (ONE) | | 2 (TWO) | | |
| INSULATION (HOT) | 50 | MM | 50 | MM | |
| SEISMIC ZONE | 2A (UBC 97) | | | | |
| WIND VELOCITY | 120 | km/hr | | | |
| PAINTING | AS PER SPEC. No. 11314-GE-SPC-80001 REV.B | | | | |
| WEIGHT (KG) BUNDLE | 2100 | KG | | | |
| WEIGHT (KG) ERECTION | 4050 | KG | EMPTY | 4200 | KG |
| WEIGHT (KG) OPERATING | 6300 | KG | FULL OF WATER | 6400 | KG |
| TUBE & TUBESHEET JOINT | SEAL WELD + HEAVY EXPANDED WITH TWO GROOVES | | | | |
| LOCAL REGULATION LAW | N/A | | | | |

## NOZZLE LIST

| MARK NO. | REQ'D NO. | NECK SIZE | NECK SCH. | NECK MAT'L | FLANGE RATING | FLANGE TYPE | FLANGE FACING | FROM C.L | DESCRIPTION |
|---|---|---|---|---|---|---|---|---|---|
| N1 | 1 | 8" | 80 | SA106-B | ASME 150# | W.N | R.F | 560 | SHELL SIDE INLET |
| N2 | 1 | 8" | 80 | SA106-B | ASME 150# | W.N | R.F | SEE DWG. | SHELL SIDE OUTLET (BY OTHERS) |
| N3 | 1 | 4" | 120 | SA106-B | ASME 300# | W.N | R.F | 540 | TUBE SIDE INLET |
| N4 | 1 | 2" | 160 | SA106-B | ASME 300# | W.N | R.F | 510 | TUBE SIDE OUTLET |
| V | 1 | 1" | - | - | ASME 150# | L.W.N | R.F | 510 | SHELL SIDE VENT (W/ V/V) |
| D | 1 | 1" | - | - | ASME 150# | L.W.N | R.F | 510 | SHELL SIDE DRAIN (W/ V/V) |
| TV | 1 | 1" | - | - | ASME 300# | L.W.N | R.F | 510 | TUBE SIDE VENT (W/ V/V) |
| TD | 1 | 1" | - | - | ASME 300# | L.W.N | R.F | 510 | TUBE SIDE DRAIN (W/ V/V) |
| PSVa | 1 | 2" | 160 | SA106-B | ASME 150# | W.N | R.F | 510 | SHELL SIDE PSV (W/SAFETY V/V) |
| PSVb | 1 | 1" | - | - | ASME 300# | L.W.N | R.F | 510 | TUBE SIDE PSV (W/SAFETY V/V) |

## GENERAL NOTES

1. ALL DIMENSIONS ARE IN MM'S UNLESS OTHERWISE NOTED.
2. ALL FLANGE BOLT HOLES SHALL STRADDLE H/EX. NORMAL CENTERLINE.
3. NOZZLE PROJECTIONS ON SHELL ARE REFERRED FROM CENTER LINE OF H/EX. TO GASKET CONTACT FACE OF FLANGE.
4. GASKET SEATING SURFACE FINISHED AS FOLLOWS.
   -SPIRAL WOUND GASKET (NON STD. FLANGE)
   : 3.2~6.3 MICRON (125~250 AARH) WITH SPIRAL SERRATED.
   -SPIRAL WOUND GASKET (STD. FLANGE)
   : 3.2~6.3 MICRON (125~250 AARH) WITH SMOOTH FINISH.
5. BASE LINE (B.L) INDICATES THE GASKET CONTACT SURFACE OF GIRTH FLANGE.
6. ALL WELDS TO BE CONTINUOUS UNLESS OTHERWISE NOTED.
7. DIMENSIONS TO BAFFLES ARE TO CENTER OF EACH PLATE.

| REV. | DATE | DESCRIPTION | PRED | CHKD | REVD | APPR'D |
|---|---|---|---|---|---|---|
| 5 | 2011.07.25 | FINAL | N-ENG | S.C.KIM | - | J.S.HONG |
| 4 | 2011.07.12 | FOR CONSTRUCTION | N-ENG | S.C.KIM | - | J.S.HONG |
| 3 | 2011.03.31 | FOR CONSTRUCTION | N-ENG | S.C.KIM | - | J.S.HONG |
| 2 | 2011.02.23 | FOR CONSTRUCTION | N-ENG | S.C.KIM | - | J.S.HONG |
| 1 | 2010.12.28 | FOR CONSTRUCTION | N-ENG | S.C.KIM | - | J.S.HONG |
| 0 | 2010.11.17 | FOR CONSTRUCTION | N-ENG | S.C.KIM | - | J.S.HONG |
| A | 2010.10.11 | FOR APPROVAL | N-ENG | S.C.KIM | - | J.S.HONG |

PROJECT NAME
MARAFIQ STG Units 5 & 6 Project

CLIENT
شـــركة مرافـــق الكهرباء والمياه بالجبيل وينبع (مرافـــق)
POWER & WATER UTILITY COMPANY FOR JUBAIL & YANBU
(MARAFIQ)
YANBU, KINGDOM OF SAUDI ARABIA

CONTRACTOR
Hanwha Engineering&Construction

MANUFACTURER
Power HX Tech Co.,Ltd.

DRAWING TITLE
HFO SUCTION HEATER
5NP/6NP-HF-HX-01
(ASSEMBLY)

REV. 5

DRAWING NO.
11314-M12-A1-81001

| SCALE | JOB NO. | CONTRACT NO. |
|---|---|---|
| 1 : 18 | - | 7200011314 |

"A1" SIZE