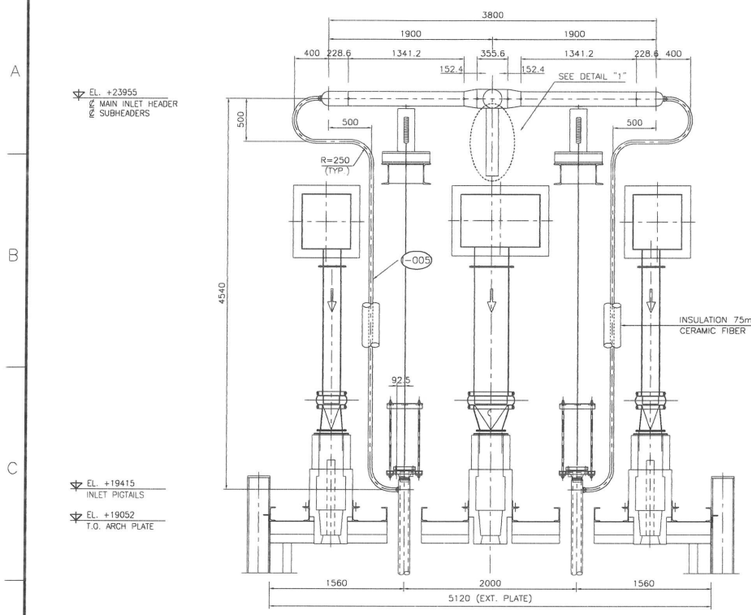
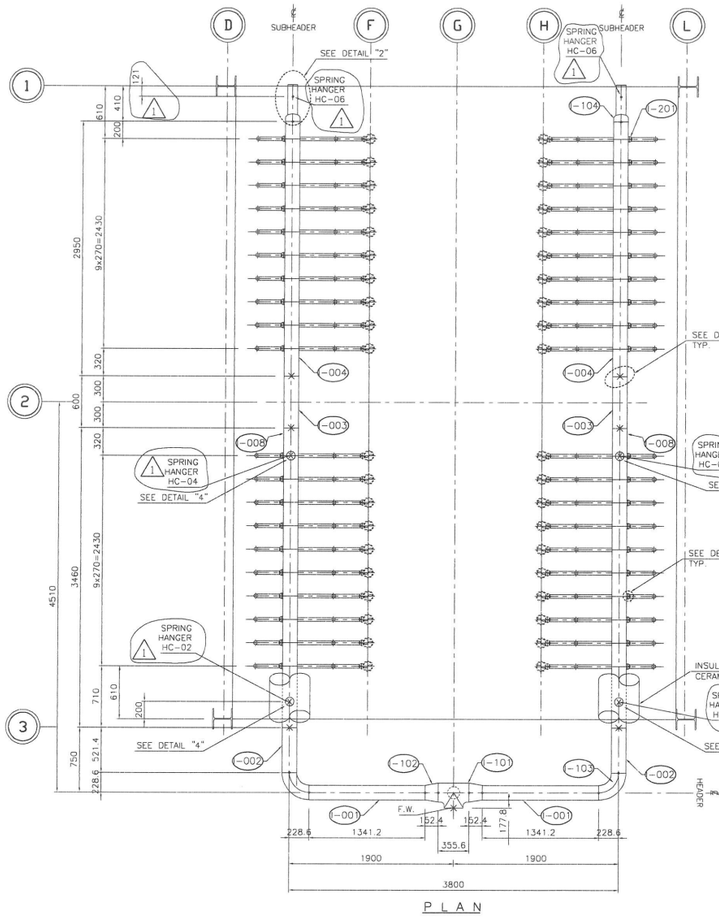
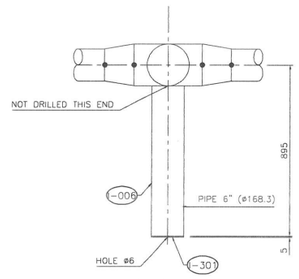
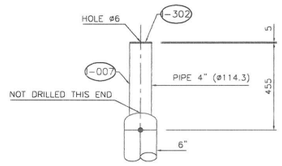


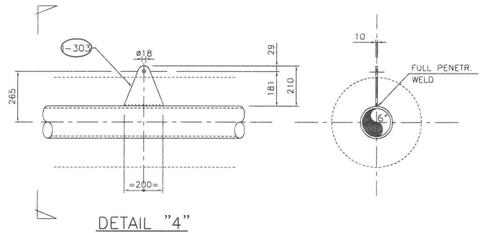




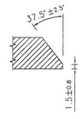
DETAIL "1"
SUPPORT S-06
(SCALE 1:15)



DETAIL "2"
SUPPORT S-05
(SCALE 1:15)



DETAIL "4"
(SCALE 1:15)



DETAIL "5"
FIELD WELD PREP. (see note 27)
(SCALE 1:1)
(TYP)

GENERAL NOTE

1 - DESIGN, CONSTRUCTION, INSPECTION AND TESTING ACC. TO THE PERTINENT MR. AND APPLICABLE CODES.
2 - WELD PREPARATION TO CONFORM TO ASME B16.25/31.3 & WPS-WPR-PQR ACCORDING TO APPLICABLE RULES OF CODE & ASME SECT. IX
3 - ✖ = F.W. = FIELD WELD, ● = S.W. = SHOP WELD.
4 - ALL DIMENSIONS ARE IN mm, EXCEPT OTHERWISE INDICATED.
5 - ALL THE ELEVATIONS ARE REFERRED TO THE HIGHEST PAVING POINT (HPP) EL.+0.00
6 - PNEUMATIC TEST IN FIELD WILL BE PERFORMED FOR THE SYSTEM "CONVECTION COIL 305-CC02 - INLET - CATALYST TUBE - OUTLET - TRANSFERLINE - PGB".
7 - DELETED
8 - FOR NOT RADIOGRAPHABLE JOINTS OR IN CASES WHERE RADIOGRAPHIC EXAMINATION IS DIFFICULT TO INTERPRET, ULTRASONIC EXAMINATION MAY BE SUBSTITUTED.
9 - MIN. THK AT EXTRADOS AFTER BENDING = 3.03 mm / MIN. THK AT INTRADOS AFTER BENDING = 3.19 mm
10 - WELDOLETS BRANCH SIDE SHALL BE FORGED BLIND. THE HEADER PREFABRICATOR MUST DRILL WELDOLETS AFTER EXECUTION OF HYDROTEST, MANIFOLD SHALL BE PRE-DRILLED BEFORE HYDROTEST (i.e. ø6 mm HOLE), HYDROTEST SHALL BE IN ACC. WITH ASME B31.3.
11 - WATER USED FOR HYDROSTATIC TEST SHALL CONTAIN LESS THAN 25 PPM CLORIDE. AFTER HYDROSTATIC TEST ALL ITEMS SHALL BE CAREFULLY FLUSHED TO REMOVE ANY FOREIGN MATERIAL AND DRIED.
12 - LIQUID PENETRANT EXAMINATION IS REQUIRED FOR:
- EACH BEVEL BEFORE WELDING. - EACH ROOT & FINAL WELD PASS.
EXAMINATION SHALL BE IN ACCORDANCE WITH ASME SECTION VIII DIV. 1 LAST EDITION
13 - IN CASE OF CONTRADICTION BETWEEN BILL OF MATERIAL AND DWG., THE DWG. SHALL GOVERN AND KT SHALL DIRECTLY BE INFORMED. ANY MATERIAL CHANGE SHALL BE APPROVED BY HUALU IN WRITTEN.
14 - ALL BUTT WELDS SHALL BE 100% RADIOGRAPHED PER ASME BPV CODE SECTION VIII DIVISION 1 LAST EDITION.
15 - ALL WELDS SHALL BE FULL PENETRATION.
16 - U/S = UNDER SIDE.
17 - T.O.S. = TOP OF STEEL.
18 - WPS/PQR ACCORDING TO ASME IX LAST EDITION
19 - DELETED
20 - WELDING IN ACCORDANCE WITH ASME BTVC SECTION IX LAST EDITION
21 - 100% PMI TESTING SHALL PERFORMED ON PRESSURE COMPONENTS AND WELDS OF ALLOY MATERIALS.
22 - BEND ARC SURFACE SHALL BE FREE OF CRACKS AND BUCKLES, BEND ARC SURFACE AND 150 mm OF SURFACE ADYACENT TO BENDS SHALL BE CHECKED BY DYE PENETRANT EXAMINATION.
23 - 10% OF PIGTAIL SHALL BE CHECKED OF ULTRASONIC TESTING FOR ALL THE THK AT EXTERNAL RADIUS OF THE BENDS, OVALITY SHALL CHECKED ON 10% OF HAIRPIN. DIFFERENCE BETWEEN MAX AND MIN DIAMETER NOT EXCEED 8%.
24 - TUBES SHALL BE SOLUTION ANNEALED AFTER COLD FORMING, UNLESS THE MANUFACTURER CAN PROVE BY APPROPRIATE MACROGAPH THAT GRAINSIZE HAS NOT DETERIORATED DURING FORMING.
THE ANNEALED SOLUTION SHALL BE CARRIED OUT AT A TEMP. TO ACHIEVE GRAINSIZE AS INDICATED ABOVE.
25 - HARDNESS TEST ACC. TO ASME § 31.3
26 - ALL WELDS ARE SHOP WELDS UNLESS FIELD WELDS.
ON THE DRAWING ONLY INTERMEDIATED WELDS OF TUBES COMPOSED BY TWO PIECES ARE SHOWN.
27 - FOR COMPLETE INFORMATION ABOUT FW PREPARATION AND REQUIREMENTS REFER TO FIELD WPS (BY ERECTION COMPANY)

INSULATION QUANTITY

INSULATION - CERAMIC FIBER 6PCF (75mm THK.)	m^3	6.5
INSULATION - CERAMIC FIBER 6PCF (150mm THK.)	m^3	3.3
EXTERNAL SHEET. THK. 0.45 mm (MAT.: ALLUMINIUM SHEET)	m^2	166

TUBES

M.T.O. N° K196-305-MTO-0121-003 SH.3
KT DWG. N° K196-305-DW-0121-003

REV.	POS.N	QTY	DESCRIPTION	LENGTH	EXTRA LENGTH	TOTAL LENGTH	MATERIAL	REMARKS
A	I=001	2	PIPE 6" SCH.80	1341	–	1341	A312 TP 347H	
C	I=002	2	PIPE 6" SCH.80	521.4	150	671.4	A312 TP 347H	TO BE ADAPTED
A	I=003	2	PIPE 6" SCH.80	600	200	800	A312 TP 347H	TO BE ADAPTED
A	I=004	2	PIPE 6" SCH.80	2950	–	2950	A312 TP 347H	
B	I=005	40+2	1¼" Sch.40	5600	200	5800	A312 TP 347H	
B	I=006	1	PIPE 6" SCH.80	895	–	895	A312 TP 347H	TO BE ADAPTED
B	I=007	2	PIPE 4" SCH.80	455	–	455	A312 TP 347H	TO BE ADAPTED
C	I=008	2	PIPE 6" SCH.80	3460	–	3460	A312 TP 347H	

FITTINGS (BENDS,ELBOWS,CAPS,REDUCTIONS,TEES)

M.T.O. N° K196-305-MTO-0121-003 SH.4
KT DWG. N° K196-305-DW-0121-003

REV.	POS.N	QTY	DESCRIPTION	MATERIAL	REMARKS
A	I=101	1	8" Sch.80 TEE	A403 WP 347H	
A	I=102	2	8" Sch.80 x 6" Sch.80 CONCENTRIC REDUCTION	A403 WP 347H	
A	I=103	2	6" Sch.80 90° L.R. ELBOW	A403 WP 347H	
A	I=104	2	6" Sch.80 CAP	A403 WP 347H	

FORGED FITTINGS (FLANGES,WELDOLETS,ELBOLETS,ETC.)

M.T.O. N° K196-305-MTO-0121-003 SH.5
KT DWG. N° K196-305-DW-0121-003

REV.	POS.N	QTY	DESCRIPTION	MATERIAL	REMARKS
A	I=201	40	1¼" Sch.40 x 6" Sch.80 WELDOLET (FULL COMPENSATION)	A182 F 347H	(e) (f)

MISCELLANEOUS (GASKETS,STUD BOLTS,NUTS,ETC)

M.T.O. N° K196-305-MTO-0121-003 SH.6
KT DWG. N° K196-305-DW-0121-003

REV.	POS.N	QTY	DESCRIPTION	MATERIAL	REMARKS
B	I=301	1	PLATE ø168.3 x 5 Thk.	A240 Gr. 304	
A	I=302	2	PLATE ø114.3 x 5 Thk.	A240 Gr. 304	
B	I=303	4	PLATE 200 x 210 x 10 Thk.	A240 Gr. 304	

GENERAL NOTES FOR MATERIAL

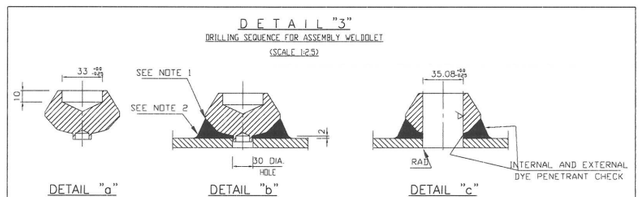
M.T.O. N° K196-305-MTO-0121-003 SH.2
KT DWG. N° K196-305-DW-0121-003

a) FOR BENDS, ONLY IF MADE FROM BENT PIPES, THE THK. AFTER BENDING SHALL BE NOT LESS THAN THE SCHEDULE OR MINIMUM WALL INDICATED IN NOTE (9)
b) ALL MATERIAL CERTIFICATES SHALL BE IN ACCORDANCE WITH PERTINENT ASTM STD'S AND FURNISHED AS PER EN 10204-3.1
c) 100% P.M.I. REQUESTED ON ALLOY STEEL & S.S. FOR EACH COMPONENT (MIN. ONE TEST / EAT).
d) THE PROPERTIES OF THE FINISHED TUBE SHALL CORRESPOND TO ASTM A312 TP347H/ASME SA312 TP347H ALLOY SOLUTION ANNEALED MATERIAL.
e) WELDOLETS SHALL BE FORGED BLIND THE TUBE PREFABRICATOR MUST DRILL WELDOLETS AFTER EXECUTION OF HYDROTEST.
f) FULL COMPENSATION: TO BE CALCULATED FOR Pdes. = 3585 kPa (g), Tdes. = 680°C AND TAKING IN NO CONSIDERATION THE CONTRIBUTE OF THE RUN PIPE. THE FULL AREA REQUIRED FOR COMPENSATION SHALL BE PROVIDED BY WELDOLET.
g) VENDOR SHALL PROVIDE MECHANICAL CALCULATIONS FOR FULL COMPENSATION COMPONENTS (WELDOLET) ACCORDING TO CODE.

DESIGN DATA

PART		PIGTAILS	SUBHEADER	HEADER
FLUID		PROCESS GAS+STEAM	PROCESS GAS+STEAM	PROCESS GAS+STEAM
DESIGN-PRESSURE	kPa (g)	3585	3585	3585
DESIGN-TEMP.	°C	680	680	680
CORROSION ALLOWANCE	mm	0	0	0
HYD.-TEST PRESS. (PREFABRICATOR SHOP)	kPa (g)	N.A.	18810	18810
HYD.-TEST PRESS. (SHOP, AFTER MODULARIZATION)	kPa (g)	14900		N.A.
PNEUMATIC TEST PRESS. (FIELD)	kPa (g)	(6)		
EMPTY WEIGHT	kg	800	650	350
OPERATION WEIGHT	kg	800	650	350
WEIGHT FULL OF WATER	kg	1000	730	450
VOLUME	m^3	0.2	0.08	0.10
POST WELD HEAT TREATMENT		N.A.		
RADIOG. SHOP WELD PERC.	%	100		
RADIOG. FIELD WELD PERC.	%	100		
DYE PENETRANT	%	100		
PMI	%	100 (c)		
ULTRASONIC EXAMINATION	%	(8)		
MAGNETIC EXAMINATION	%	(8)		
DESIGN AS PER	KT MR/ASME B31.3			
CONSTRUCTION AS PER	KT MR/ASME B31.3			
INSPECTION BY	KT/CLIENT			

IMPORTANT NOTE:
- BEFORE SITE WELDING, CHECK THE PRESENCE OF EXTRA LENGTH ON PIPES, IF ANY THE EXTRA LENGTH MUST BE REMOVED BEFORE START TO WELD.



ASSEMBLY NOTES
(SHOP WELDED TO MANIFOLD)

1) THE WELD MUST CONSIST OF CONTINUOS LAYERS. EACH PASS WILL BE STAGGERED AT THE START AND STOP POINTS A MINIMUN OF 12mm. COMPLETION OF WELDING ON ONE SIDE OF COUPLING PRIOR TO WELDING THE OTHER SIDE WILL NOT BE PERMITTED (SEE DATAIL "d").
2) WELD TO BE BLENDED SMOOTH INTO BASE METAL WITH CONCAVE FILLET. NO UNDERCUTTING PERMITTED.
3) FULL PENETRATION WELDED, BORE TO BE MACHINED AFTER WELDING.

DETAIL "d"
WELD PASS DIAGRAM

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CAD CODE: K196-305-DW-0121-003
PROJ N.: K196
STEAM REFORMER PACKAGE, CHARGE HEATER AND COMBINED FEED HEATER
NATIONAL REFINERY LIMITED UPDATED PROJECT
KARACHI - PAKISTAN
INLET SYSTEM
1:33.3 Scale | K196 Project | 305 Unit | DW 0121 - 003 Doc. Code & Serial No. | 1 of 3 Page | -1 Rev.

REV.	DATE	REVISION DESCRIPTION	PRP.	VRF.	APPR./ AUTHOR.
1	2016 10-08	ISSUE FOR CONSTRUCTION	ICE	SOR	ALC/GDI
0	2016 28-07	ISSUE FOR CONSTRUCTION	ICE	SOR	ALC/GDI
D	2016 14-07	ISSUE FOR APPROVAL	ICE	SOR	ALC/GDI
C	2015 23-11	ISSUE FOR APPROVAL	ICE	GDI	MB/GDI
B	2015 28-07	ISSUE FOR APPROVAL	ICE	GDI	FP/GDI
A	2015 27-04	ISSUE FOR APPROVAL	STP	FP	FP/GDI

DISCI. | SQUAD CHECK | NAME | DATE

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