

MATERIALS

SHELL	
BARREL	SA-516 60
CONE	-
FLANGES	SA-266 Gr.2
NOZZLE FROM PIPE	SA-106 Gr.B
NOZZLE FROM PLATE	-
NOZZLE FLANGES	SA-105
COUPLINGS & PLUGS	-
NOZZLE REINF.PAD	SA-516 60
EXCHANGERS SUPPORTS	SA-283 Gr.C
SADDLE WEAR PLATE	SA-516 60
IMPINGEMENT PLATE	-
EXPANSION JOINT	-
NAME PLATE/NAME PLATE SUPPORT	SS 304 / SA 516-GR 60

SHELL COVER	
BARREL	-
COVER	-
FLANGES	-

CHANNEL	
BARREL	SA-516 60
BODY FLANGE	SA-266 Gr.2
HEAD	SA-516 60
FLAT COVER	-
NOZZLE FROM PIPE	SA-106 Gr.B
NOZZLE FROM PLATE	-
NOZZLE FLANGES	SA-105
COUPLINGS & PLUGS	SA-105
NOZZLE REINF.PAD	SA-516 60
PARTITION PLATES	SA-516 60
LINING	-

FLOATING HEAD	
COVER	-
FLANGES	-
SPLIT RING	-

TUBE BUNDLE	
TUBES	SA-179
TUBESHEETS	SA-266 Gr.2
BAFFLES/SUPPORTS	SA-516 60/-
TIE RODS & SPACERS	SA-36 / C.S.

BOLTS & NUTS	
SHELL/COVER	-
SHELL/CHANNEL	SA-193 B7/SA-194 2H
CHANNEL/COVER	-
FLOATING HEAD	-

GASKETS	
SHELL/COVER	-
SHELL/TUBESHEET	-
CHANNEL/TUBESHEET	(NOTE 11)
CHANNEL/COVER	-
FLOATING HEAD	-

GENERAL	
ANCHOR/SETTING BOLTS	SA-307 C OR F1554 Gr.36 (NOTE 8)
SLIDING BAR/ROD / SEALING STRIP	-/-/-
DUMMY TUBE/SEAL ROD	-/-
BLINDED NOZZLE BOLT/NUT (SHELL)	-/-
BLINDED NOZZLE BOLT/NUT (CHANEL)	-/-
BLINDED NOZZLE GASKET	-
TEST RING	-

WEIGHTS & LOADING DATA (NOTE 13)			
TUBE BUNDLE	500 Kgf	SHOP HYDROTEST	2400 Kgf
FABRICATED	1100 Kgf	FIELD HYDROTEST	2400 Kgf
OPERATING	1600 Kgf	LADDER & PLATFORM	- Kgf
SHUT DOWN	1100 Kgf		
WIND		EARTHQUAKE (NOTE 14)	
SHEAR Kgf	MOMENT Kgf-m	SHEAR Kgf	MOMENT Kgf-m
200	100	700	350

NOZZLES

MARK	N.D. in	FLANGES (NOTES 6,7)			SCH./ THK.	R.PAD D.xTHK.	PROJ. (NOTE 5)	SERVICE	NOTES
		RATING	TYPE	FAC.					
S1	4	150#	W.N.	R.F.	160	220X10	410	SHELL INLET	
S2	4	150#	W.N.	R.F.	160	220X10	410	SHELL OUTLET	
T1	4	150#	W.N.	R.F.	160	220X10	306	TUBE INLET	
T2	6	150#	W.N.	R.F.	80	300X10	404	TUBE OUTLET	
D1	1	150#	L.W.N.	R.F.	-/12.8	--	See dwg	TUBE SIDE DRAIN	NOTE 35
V1	1/2	150#	L.W.N.	R.F.	-/8.9	--	See dwg	TUBE SIDE VENT	NOTE 35
D2	1	150#	L.W.N.	R.F.	-/12.8	--	See dwg	SHELL SIDE DRAIN	NOTE 35
V2	1/2	150#	L.W.N.	R.F.	-/8.9	--	See dwg	SHELL SIDE VENT	NOTE 35

GENERAL NOTES

- UNLESS OTHERWISE NOTED ALL DIMENSIONS ARE IN MILLIMETERS.
- ALL ELEVATIONS ARE MEASURED FROM BASE LINE (B.L.) SEE DETAIL.
- THICKNESS INDICATED ON THIS DRAWING ARE MINIMUM PURCHASER REQUIREMENTS.VENDOR SHALL CHECK AND GUARANTEE THEM ON STRENGTH AS PER CODE & SPECIFICATION.
- HEADS SHALL BE SEAMLESS.
- UNLESS OTHERWISE NOTED OUTSIDE PROJECTION OF NOZZLES ARE MEASURED FROM C.L. OF EXCHANGER TO THE EXTREME FACE OF NOZZLE.
- FLANGES TO BE IN ACCORDANCE WITH ASME/ANSI B.16.5 FOR 24" OR LESS AND ASME/ANSI B.16.47 SERIES B FOR LARGERS.
- SMOOTH FINISH FOR CONTACT FACE OF FLANGES SHALL BE :RAISED FACE: 125-250 MIN. AARH MAX.
- ANCHOR BOLTS SHALL HAVE 248Mpa YIELD STRENGTH, 155Mpa ALLOWABLE TENSILE STRESS AND 82Mpa ALLOWABLE SHEAR STRESS AS MINIMUM.
- SHELL / HEAD THICKNESS AT CONNECTION / ATTACHMENT AREA SHALL BE VERIFIED BY LOCAL STRESS CALCULATION.
- PAINTING SHALL BE AS PER PAINTING SPECIFICATION DOC. NO.: 0970-S1300-003.
- GASKET MATERIAL. : SPIRAL WOUND, 4.5mm THK. HOOP : SS 316L, GRAPHITE FILLER, INNER & OUTER RING C.S. AS PER ASME B16.20.
- ALL SHELL INTERNAL WELDS SHOULD BE SMOOTH GRINDED.
- THE INDICATED WEIGHTS AND LOADS WILL BE FINALIZED AFTER APPROVAL ON MANUFACTURER'S CALCULATION.
- 1/1.4 FACTOR FOR LOAD COMBINATION HAS BEEN APPLIED.
- WELDING PROCEDURE SHALL BE QUALIFIED AT MINIMUM DESIGN METAL TEMPERATURE (M.D.M.T.).
- ALL EXTERNAL ATTACHMENTS SHALL BE OF THE MATERIAL WITH SAME WELDING CHARACTERISTICS AS THE PRESSURE RETAINING MATERIALS TO WHICH THEY ARE DIRECTLY ATTACHED, PARTICULARLY WITH REGARDS TO IMPACT TEST REQUIREMENTS.
- ALL FLANGE BOLT HOLES TO BE STRADDLE TO EQUIPMENT MAIN AXIS.
- MANUFACTURER SHALL DESIGN AND DETERMINE EXACT LOCATION OF LIFTING LUGS FOR HEAT EXCHANGER COMPONENTS, CONSIDERING RELEVANT STANDARD DRAWING AND LOCAL STRESS CALCULATION.
- OUTSIDE EDGE OF ALL PASS PARTITION PLATES TO BE BEVELED WITH CHAMFER 6mm.
- THE MECHANICAL DATA SPECIFIED ON DRAWINGS ARE MINIMUM PROJECT REQUIREMENTS. ADEQUACY AND COMPLIANCE OF DESIGN WITH CODE AND PROJECT SPECIFICATIONS IS MANUFACTURER'S RESPONSIBILITY.
- HEAT EXCHANGER SHALL BE DESIGNED FOR FIELD HYDROTEST IN CORRODED CONDITION. AS PER UG99b.
- BOTH ENDS OF TIE RODS SHALL BE UNC THREADED FOR 50 mm.
- THREADED HOLES IN TUBESHEETS MUST NOT BE COMPLETELY DRILLED. HOLES IN TUBESHEETS TO BE REAMED.
- DIAMETER OF HOLES FOR TIE RODS IN BAFFLES ARE EQUAL TO TIE RODS DIAMETER PLUS +0.3 mm.
- AN APPROPRIATE CHAMFER(2x45) SHOULD BE CONSIDERED FOR EDGE OF BAFFLE HOLES. HOLES IN BAFFLES TO BE REAMED.
- MIN. AMBIENT TEMPERATURE (M.A.T.): 2 °C, MIN.
- PROJECTION OF EARTH CONNECTION SHOULD BE 150mm OR "FIREPROOFING THICKNESS +75mm" FROM OUTSIDE SURFACE OF SUPPORT WHICH IS GREATER.
- TUBE TO TUBESHEET JOINT SHALL BE STRENGTH WELDED FOLLOWED BY LIGHT EXPANSION.
- ONE 12x90° NOTCH FOR DRAIN AND VENT ON BOTTOM SIDE AND TOP SIDE OF EACH BAFFLE SHALL BE PROVIDED.
- IN CASE OF USING EXPANSION JOINT, MANUFACTURER SHALL CONSIDER VENT AND DRAIN ON TOP AND BOTTOM OF IT.
- ONE ø6mm HOLE SHALL BE PROVIDED ON HORIZONTAL PASS PARTITION AS DRAIN.
- VENDOR SHALL CONSIDER 0.35 bar FOR DESIGN DIFFERENTIAL PRESSURE OF CHANNEL PASS PARTITION.
- ALL GIRTH FLANGE AND TUBE SHEET SHALL BE ULTRASONIC TESTED IN ACCORDANCE WITH ASME CODE SECTION V, AND A578 LEVEL II OR EQUIALENT BEFORE ANY MACHINING. IN THIS REGARD, THE REQUIRED SURFACE PREPARATION SHALL BE PER FORMED BY MANUFACTURER.
- FIBER ELONGATION SHALL BE CALCULATED BY VENDOR AND POST FORMED HEAT TREATMENT SHALL BE DONE IF REQUIRED AS PER ASME SEC. VIII UG-79.
- WITH BLIND FLANGE, GASKET and BOLTS& NUTS.

DESIGN DATA

CALCULAT. CODES	ASME VIII DIV.1- TEMA R	
TEMA TYPE	BEM/VERTICAL	
WIND/SEISMIC CODE	UBC	
WIND SPEED @ 10m AG/WIND EXPOSURE	130 (Km/hr) /C: FLAT, UNOBSTRUCTED	
SEISMIC	UBC ZONE 4 /(Na=1, Nv=1,SOIL PROFILE=Sc)	
WIND/SEISMIC IMPORTANCE FACTOR/Hx to Hr/Ss/S1/Sds/Sa1	1/1.25/0 /0/0.75/1.425/0.75	
	SHELL SIDE	TUBE SIDE
FLUID	Hotoil	H-Naphtha Stripper Reboiler Inlet
DESIGN PRES.(int/ext)	7/- barg	5.4/- barg
DESIGN TEMP.(int/ext)	300/ - (NOTE 26) °c	300 / - (NOTE 26) °c
TEST PRESSURE	AS PER CODE (NOTE 21)	AS PER CODE (NOTE 21)
WORK. PRESSURE (IN)	3.5 barg	0.753 barg
WORK. TEMP. (IN)	260 °c	126.76 °c
WORK. TEMP. (OUT)	220 °c	133.2 °c
FLUID DENSITY	735.1~759 Kg/m3	637~633.8 Kg/m3
CORROSION	3 mm	3 mm
JOINT EFFICIENCY (SHELL/HEAD)	0.85 / -	0.85 / 1
NO. OF PASSES	1	1
RADIOGRAPHY (SHELL/HEAD)	SPOT / -	SPOT/ FULL (NOTE 4)
P.W.H.T.	NO	NO
FIREPROOFING/DENSITY	-	- Kg/m3
TOTAL VOLUME	- m3	- m3
INSULATION/THK.	YES/50 mm	YES/50 mm
HEADS STRESS RELIEVING	NO	NO

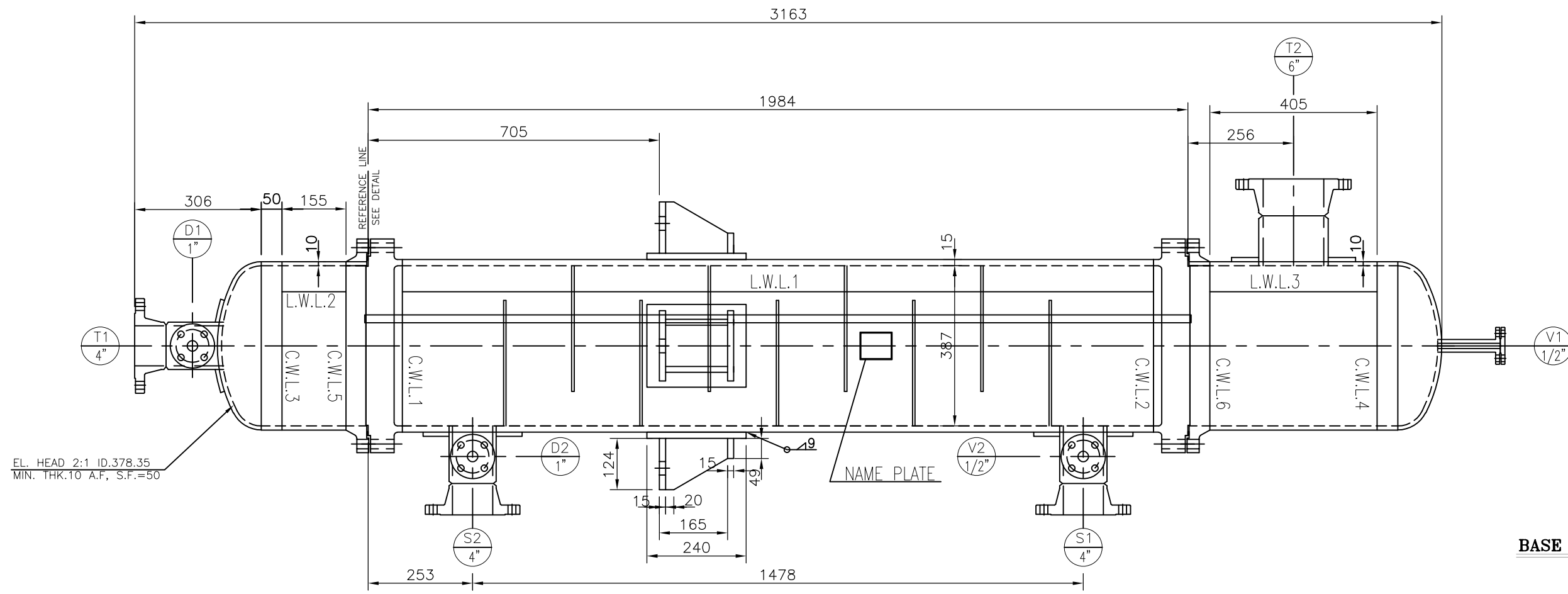
TUBE BUNDLE DATA

NO.TUBES	110
THK. (MIN.)	2.108 mm
PITCH	31.75 mm
SURF. (Gross/Eff)	17.555/17.109 m2
BAFFLE CUT/TYPE	25%/SINGLE-SEGMENTAL
O.D.	25.4 mm
LENGTH	2000 mm
LAYOUT	← 30'
JOINT	(NOTE 28)
SECT.IN SER./PAR.	1/1
REFERENCED DOCUMENT	Doc. No.
PROCESS DATA SHEET FOR E-1108	01

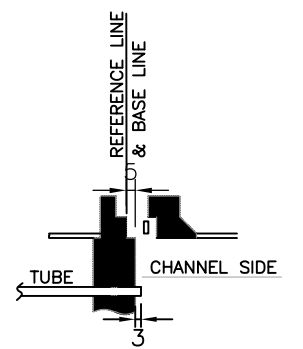
LEGEND

- A.G. = ABOVE GRADE
- C.L. = CENTER LINE
- L. = LIQUID
- M.D.M.T. = MIN. DESIGN METAL TEMP.
- M.A.T. = MIN. AMBIENT TEMP.
- P.W.H.T. = POST WELD HEAT TREATMENT
- R.F. = RAISED FACE
- V. = VAPOUR
- W.N. = WELDING NECK

PROJECT :	
TITLE:	GENERAL ARRANGEMENT DRAWING FOR E-1108 Heavy Naphtha Stripper Reboiler
DOC. No.	SIZE A3
DATE :	SHEET 1 OF 4 REV. 01

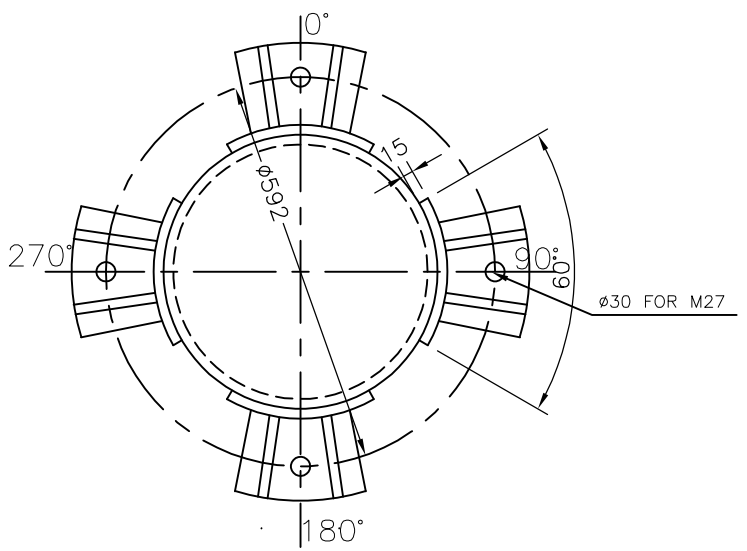


EL. HEAD 2:1 ID.378.35
MIN. THK.10 A.F, S.F.=50

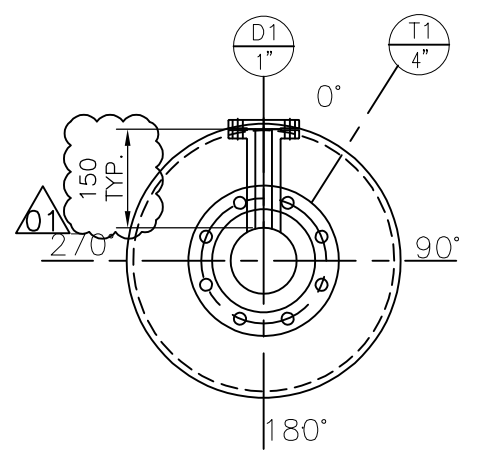


BASE LINE & REFERENCE LINE DETAIL

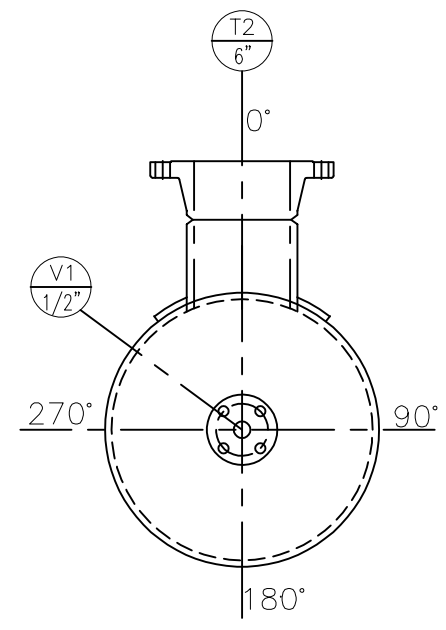
GENERAL ARRANGEMENT
SCALE = 1:12



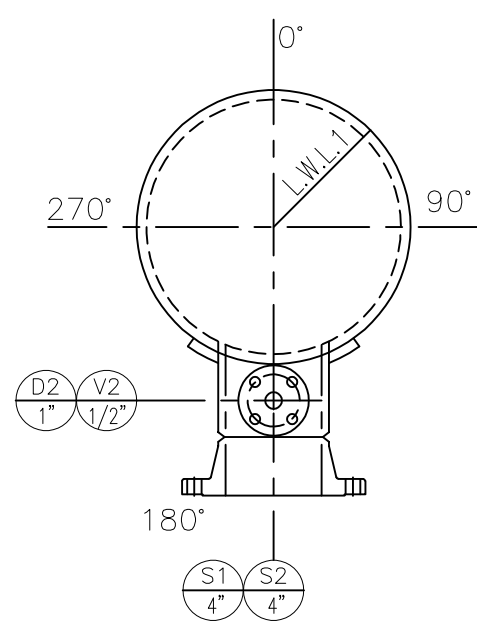
LUG SUPPORT VIEW



BOTTOM CHANNEL



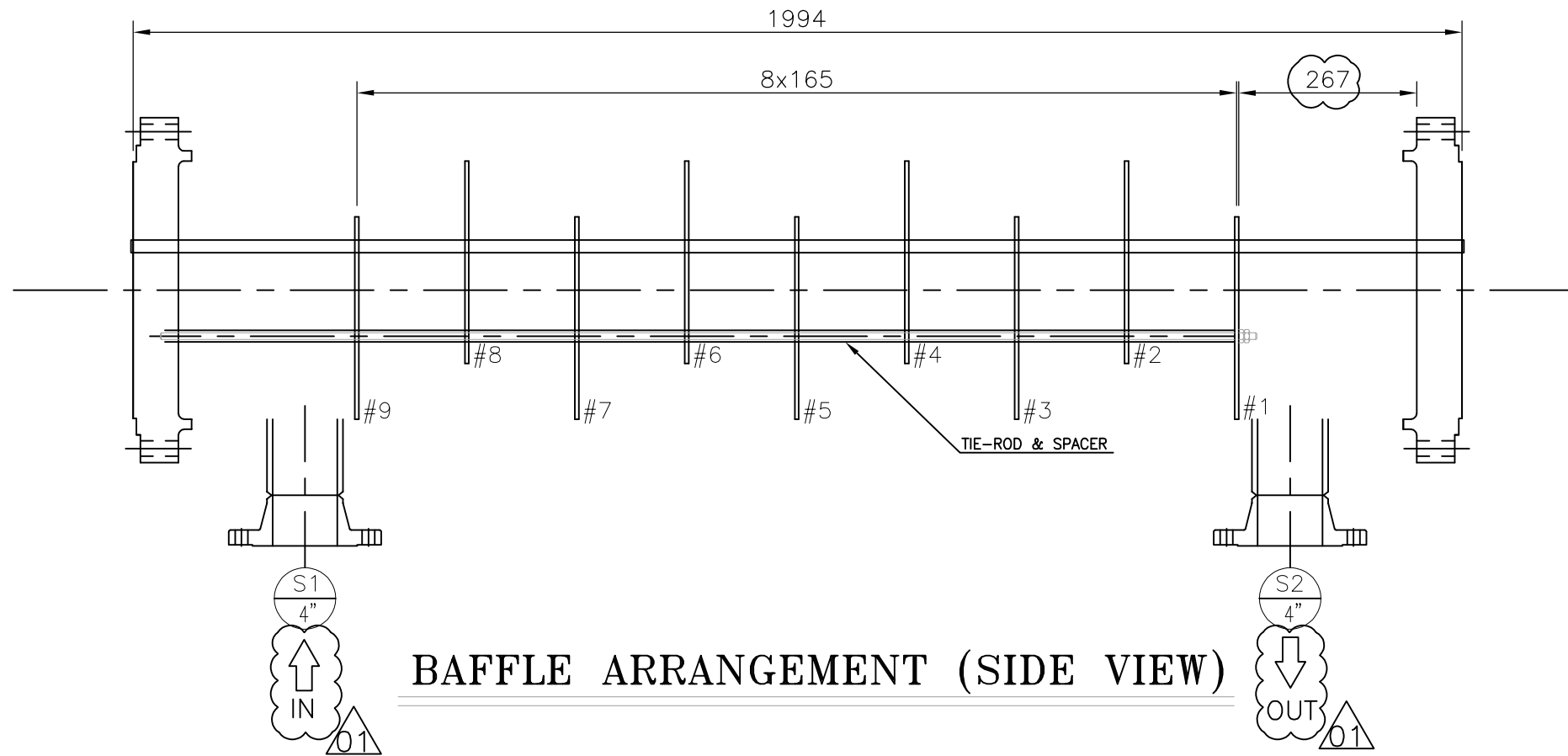
UPPER CHANNEL



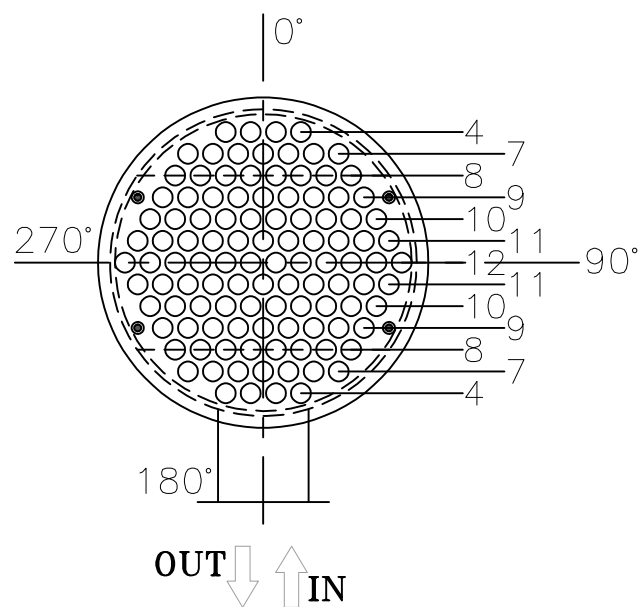
SHELL SIDE

LEGEND		
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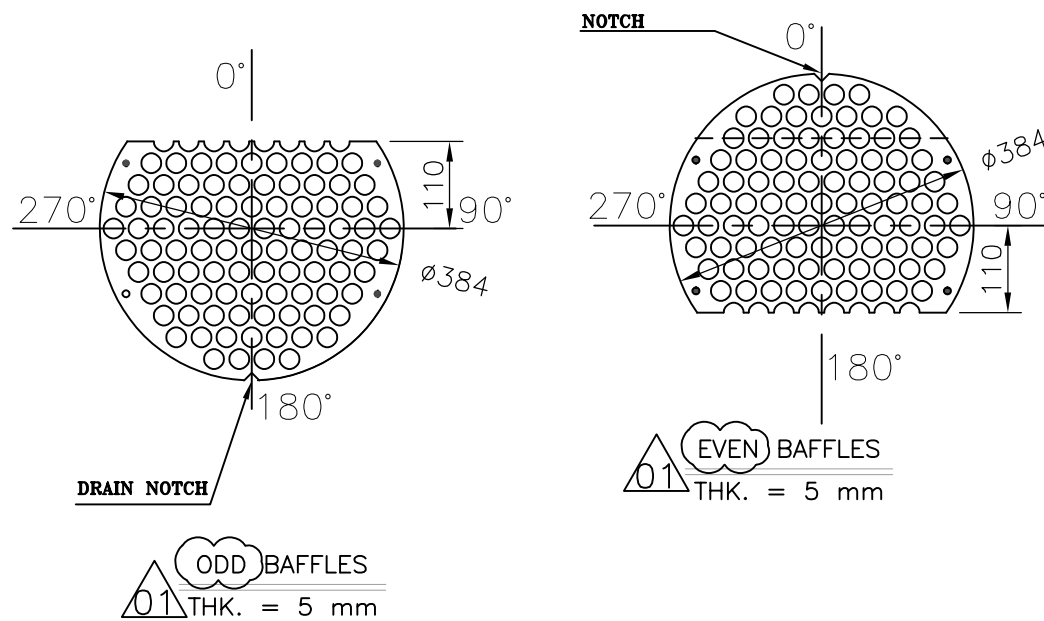
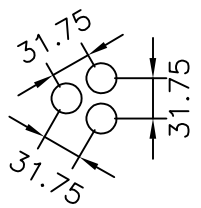
BAFFLE ARRANGEMENT (SIDE VIEW)



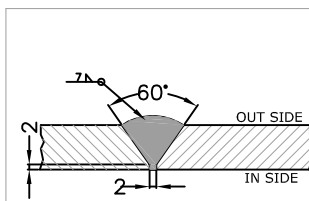
TOTAL : 110 TUBE HOLES

TUBESHEET LAYOUT

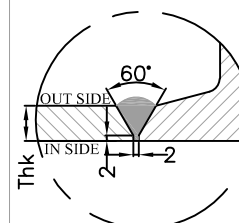
O.T.L. = 374.65 mm
 - 4 TIE-RODS ϕ 12.7mm
 & SUITABLE SPACERS



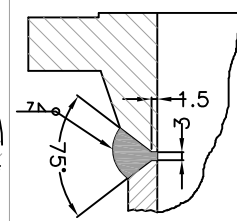
LEGEND	
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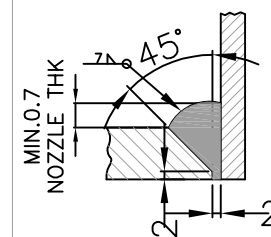
**WELDING DETAIL OF
 CW1~6 & L.W.1~5
 GTAW FOR ROOT PASS**



**CHANNEL TO BODY FLANGE
 WELDING DETAIL CW7,8**

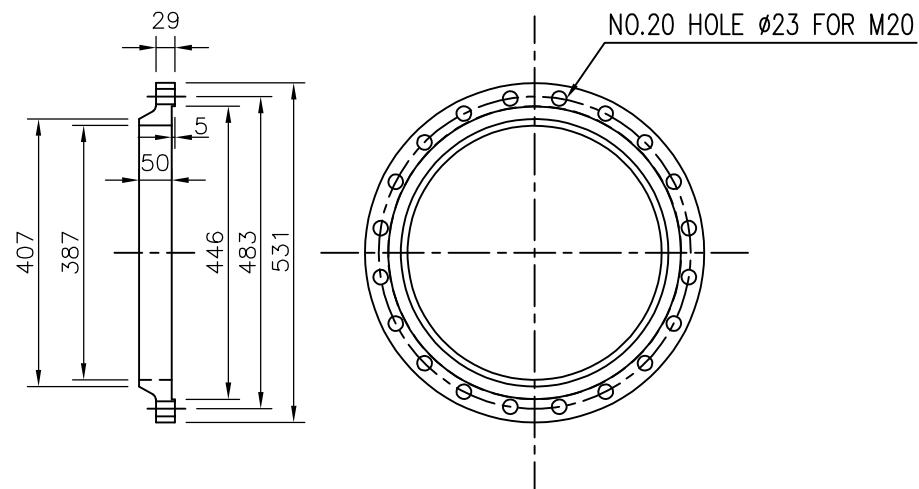


**FLANGE TO PIPE
 GTAW FOR ROOT PASS**

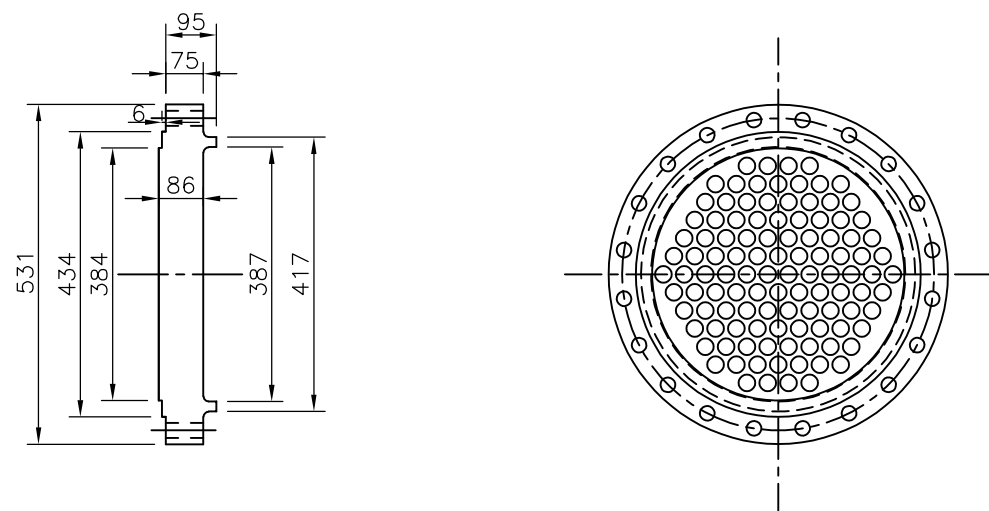


**WELDING DETAIL
 NOZZLE TO SHELL COVER
 NOZZLES**

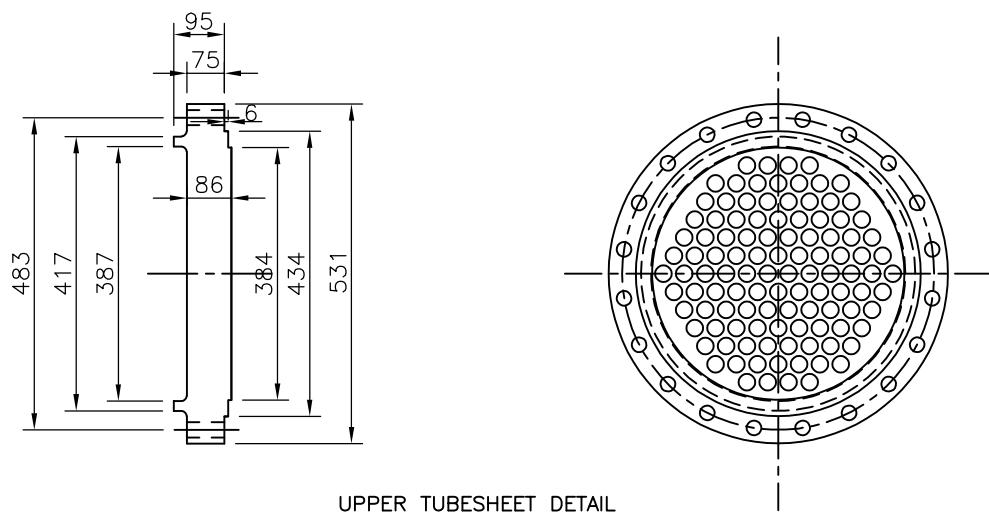
PROJECT :			
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DOC. No.	SIZE	A3	
DATE :	SHEET 3 OF 4	REV.	01



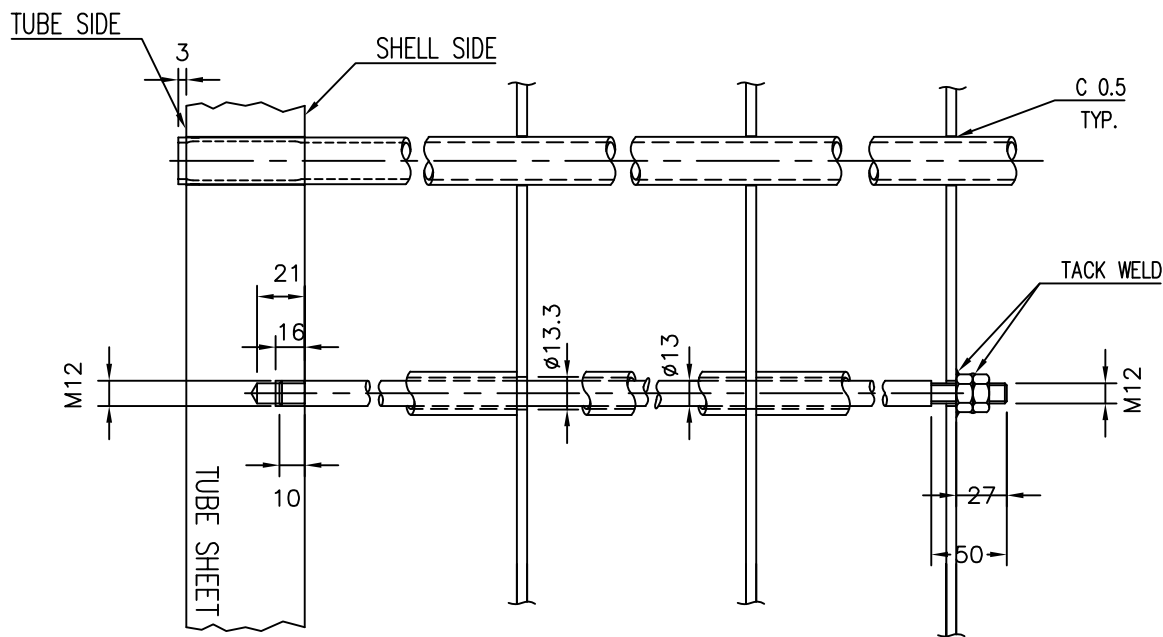
BODY FLANGE DETAIL



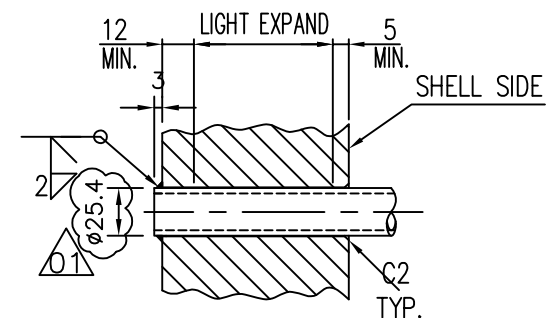
LOWER TUBESHEET DETAIL



UPPER TUBESHEET DETAIL



TIE ROD & SPACER DETAIL



TUBE TO TUBE SHEET JOINT
SEE NOTE 2 , 5

NOTES:

1. FOR FABRICATION TOLERANCES REFER TO "TEMA".
2. TUBE TO TUBESHEET JOINT SHALL BE STRENGTH WELDED WITH GAS LEAK TEST
3. THREAD ACCORDING TO ASME B.1.1
4. EDGES OF HOLES IN BAFFLES SHALL BE ROUNDED (R=2mm) OR BEVELED.
5. DRILLING AND TOLERANCES OF TUBESHEET PER TEMA STANDARD FIT.
6. DIMENSIONS REFERED TO BAFFLES OR SUPPORTS ARE MEASURED FROM CENTER OF EACH ONE.

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GENERAL ARRANGEMENT DRAWING FOR E-1108
Heavy Naphtha Stripper Reboiler

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DATE :	SHEET 4 OF 4	REV. 01