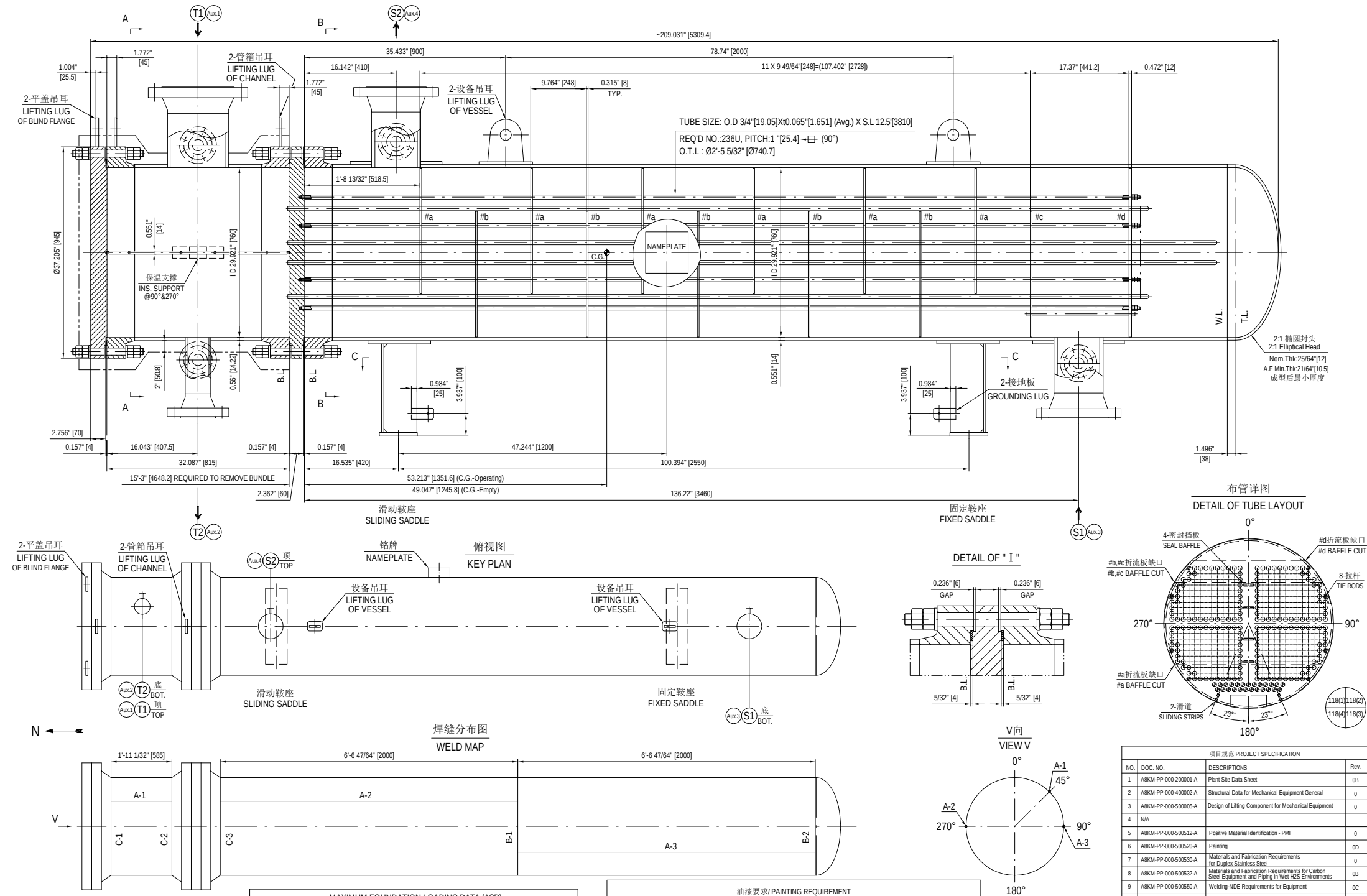




FOUNDATION WEIGHT DATA			
	SADDLE		TOTAL
	SLIDING	FIXED	
EMPTY WEIGHT (Lb)	7344	3516	10860
OPERATING WEIGHT (Lb)	9714	5591	15305
TEST WEIGHT (Field) (Lb)	9785	5797	15582
TEST WEIGHT (Shop) (Lb)	9785	5797	15582

HOLD list 待定项	
NO.	DESCRIPTIONS
	DELETE

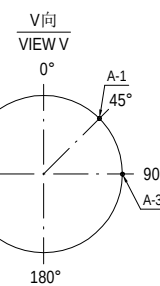
扭矩表 TORQUE TABLE		
部件 PART	螺栓规格 BOLT SIZE	扭矩 (lbf·ft) TORQUE
管箱平盖 CHANNEL BLING	1-1/8"-8UN	611.5
壳体法兰 SHELL FLANGE	1-1/8"-8UN	611.5

MAXIMUM FOUNDATION LOADING DATA (ASD)					
		FIXED SADDLE		SLIDING SADDLE	
		ERECTION	OPERATING	ERECTION	OPERATING
WIND LOAD	TRANSVERSE SHEAR (Lbf)	177.55	177.55	177.55	177.55
	TRANSVERSE BENDING (Lbf-in)	5326.5	5326.5	5326.5	5326.5
	LONGITUDINAL SHEAR (Lbf)	100.2	100.2	100.2	100.2
	LONGITUDINAL BENDING (Lbf-in)	3006	3006	3006	3006
EARTHQUAKE	TRANSVERSE SHEAR (Lbf)	-	2904	-	5046
	TRANSVERSE BENDING (Lbf-in)	-	87120	-	151380
	LONGITUDINAL SHEAR (Lbf)	-	7950	-	7950
	LONGITUDINAL BENDING (Lbf-in)	-	238500	-	238500

Bundle pull out: @150% bundle weight (Lbf)		7650	
NOTE A: TOTAL SEISMIC BASE SHEAR = 7950 lbf			
运输及吊装图 SHIPPING AND LIFTING DETAIL DRAWING	WXCE6829-06	1/1	EN207122-WUXI-9V3-00176
铭牌图 NAMEPLATE DETAIL DRAWING	WXCE6829-05	1/1	EN207122-WUXI-9V3-00176
鞍座及吊耳详图 SADDLE AND LIFTING LUG DETAIL DRAWING	WXCE6829-04	1/1	EN207122-WUXI-9V3-00176
管口详图 NOZZLE DETAIL DRAWING	WXCE6829-03	1/1	EN207122-WUXI-9V3-00176
管束详图 BUNDLE DETAIL DRAWING	WXCE6829-02	1/1	EN207122-WUXI-9V3-00176
壳体图 SHELL DETAIL DRAWING	WXCE6829-01	1/1	EN207122-WUXI-9V3-00176
装配图 II GENERAL ASSEMBLY DRAWING II	WXCE6829-00-II	2/2	EN207122-WUXI-9V3-00172
装配图 I GENERAL ASSEMBLY DRAWING I	WXCE6829-00-I	1/2	EN207122-WUXI-9V3-00172
名称 TITLE	图号 DWG. NO.	张数 SHEET NO.	项目文件号 PROJECT DOCUMENT NO.
图纸汇总表 DRAWING SUMMARY			

油漆要求/ PAINTING REQUIREMENT					
油漆系统 PAINTING SYSTEM	底漆 1st COAT	中间漆 2nd COAT		面漆 3rd COAT	
		油漆名称 PAINT NAME	干膜厚度 DFT (mils)	油漆名称 PAINT NAME	干膜厚度 DFT (mils)
壳程 SHELL SIDE	1	IZ	2.5-4.0	EH	4.0-6.0
管程 TUBE SIDE	NONE	/	/	/	/

材料表 MATERIAL			
CHANNEL		SKID BARS/RAILS/SLIDING STRIPS	SS.304
CHANNEL COVER	SA-182 F53	IMPINGEMENT RODS	SS.304
CHANNEL SHELL	SA-240 S32750	SPACERS	SA-312 TP304
CHANNEL FLANGE	SA-182 F53	EXTERNAL ATTACHMENTS	SA-516 Gr.70N
NOZZLE NECK	SA-240 S32750 / SA-790 S32750	EXTERNAL BOLTING/ NUT (TUBE SIDE)	SA-193 Gr.B7MSA-194 Gr.2H
NOZZLE FLANGE	SA-182 F53	EXTERNAL BOLTING/ NUT (SHELL SIDE)	SA-193 Gr.B7MSA-194 Gr.2H
PASS PARTITION	SA-240 S32750	SUPPORTS	SA-516 Gr.70
SHELL		SLIDING PLATE / BASEPLATE	SA-516 Gr.70
SHELL AND SHELL COVER	SA-516 Gr.70N	SETTING BOLTS	ASTM F3125, Grade A325, Type 1 Heavy Hex with UNC threads (by off-set)
SHELL FLANGE	SA-266 Gr.2N	SHELLSIDE GASKET	Kammprofile (Note 1)
NOZZLE NECK	SA-106 Gr.BN	TUBESIDE GASKET	Kammprofile (Note 1)
NOZZLE FLANGE	SA-105N	GROUNDING LUG	SS.304
TUBE BUNDLE		NAMEPLATE	SS.304
TUBES	SB-622 N10276	NAMEPLATE BRACKET	SA-516 Gr.70N
TUBESHEETS 1/8" TCA	SA-182 F53	COLLAR BOLTS (INTEGRAL)	SA-193 Gr.B7M
BAFFLES	SA-240 304	JACK SCREW / DOWEL PIN	SA-193 Gr.B7M
TIE / SEAL RODS / TIE ROD NUT	SS.304 / SA-194 Gr.8	NOTE1: Serrated solid SS316 core with flexible graphite facings.	



项目规范 PROJECT SPECIFICATION			
NO.	DOC. NO.	DESCRIPTIONS	Rev.
1	ABKM-PP-000-200001-A	Plant Site Data Sheet	0B
2	ABKM-PP-000-400002-A	Structural Data for Mechanical Equipment General	0
3	ABKM-PP-000-500005-A	Design of Lifting Component for Mechanical Equipment	0
4	NA		
5	ABKM-PP-000-500512-A	Positive Material Identification - PMI	0
6	ABKM-PP-000-500520-A	Painting	0D
7	ABKM-PP-000-500530-A	Materials and Fabrication Requirements for Duplex Stainless Steel	0
8	ABKM-PP-000-500532-A	Materials and Fabrication Requirements for Carbon Steel Equipment and Piping in Wet H2S Environments	0B
9	ABKM-PP-000-500550-A	Welding NDE Requirements for Equipment	0C
10	ABKM-PP-000-500726-A	Shell and Tube Heat Exchangers	0
11	SPEC-MED-DOC001	Design Basis for Mechanical Equipment	0
12	SPEC-ENG-DOC001	Supplier-Designed, Shop-Fabricated Pressure Equipment	0
13	SPEC-ENG-DOC002	Shell & Tube Heat Exchanger	0
14	SPEC-ENG-MQ042	Material Certification and Retesting Requirements	0
15	SPEC-ENG-MQ057	Mechanical Equipment Gaskets	1
16	4WGN-10001	Shipment and Packing Specification for Equipment and Materials being Exported Directly by Vendors	6
17	4WEC-1051	Welding of HyCo Plant Equipment	0
18	4WPI-670210	Boil-Up Procedure for Flanged Connections	0
19	ABKM-PP-000-530400-D	Expanded Metal Personnel Protection Details for Shell and Tube Exchangers	0

无 损 检 验 NONDESTRUCTIVE EXAMINATION									
焊接接头型式或焊缝编号 JOINT TYPE OR WELD SEAM NO		焊接接头系数 JOINT EFFICIENCY	射线探伤 R.T		超声探伤 U.T	磁粉探伤 M.T	着色探伤 P.T	备 注 REMARK	
			检测比例 EXAM. RATE	合格级别 CLASS OF ACC.	Appendix 12	Appendix 6	Appendix 8		
A,B类 CATEGORY A,B	壳程 SHELL SIDE	0.85	SPOT	UW-52	/	100%	/		
	管程 TUBE SIDE	1.0	100%	UW-51	/	/	100%		
壳程 SHELL SIDE	设备法兰与壳体 GIRTH FLANGE TO SHELL	0.85	SPOT	UW-52	/	100%	/		
	接管与法兰 NOZZLE TO FLANGE	1.0	/	/	/	100%	/		
管程 TUBE SIDE	设备法兰与壳体 GIRTH FLANGE TO SHELL	1.0	100%	UW-51	/	/	100%		
	接管与法兰 NOZZLE TO FLANGE	1.0	100%	UW-51	/	/	100%		
D类 TYPE D	/	/	/	/	/	/	100%		
壳程管与管板的连接接头 SHELL SIDE TO TUBESHEET JOINT		/	/	/	/	/	100%		
注/NOTE: 无损检测要求见“其他要求和说明第5条” or requirements of NDT, see clause 5 of "Other Requirements and Notes"									

设计、制造、检验与验收数据表 DATA SHEET OF DESIGN, FABRICATION, INSPECTION & ACCEPTANCE			
设计、制造、检验与验收标准 STANDARDS OF DESIGN, FABRICATION, INSPECTION & ACCEPTANCE		设计数据 DESIGN DATA	
1. ASME SECTION VIII DIV.1 2021 ED. 2. TEMA Tenth Edition CLASS R 3. API 660-2020 4. NACE MR-0103		名称 DESIGNATION	壳程 SHELL SIDE
		工作压力(NORMAL) OPERATING PRESSURE	50.0 [3.45]
		设计压力(内压/外压) DESIGN PRESSURE (INT/EXT)	120 [8.27] / -
		最大允许工作压力 MAWP (INTERNAL)	326.8 [22.53]
		最大允许工作压力 MAWP (EXTERNAL)	/
		最大允许压力 MAP	378.6 [26.1]
		工作温度(进口/出口) OPERATING TEMPERATURE (INLET/OUTLET)	80 [26.7] / 100 [37.8]
		设计温度 DESIGN TEMPERATURE	150 [65.6]
		最低设计金属温度 MINIMUM	32 [0]
NB REGISTRATION	YES	工作介质 OPERATING FLUID	Cooling Water
ASME CERTIFICATE	YES (With U Designator)	介质密度 DENSITY OF FLUID	62.2 [997]
换热器型式 EXCHANGER TYPE (TEMA)	AEU	介质致死工况 FLUID LETHAL SERVICE	非致死 Nonlethal
传热面积(有效) HEAT TRANSFER SURFACE AREA (EFFECTIVE)	1121.7 [104.2]	特殊工况/程度 SPECIAL SERVICE / SEVERITY	NO
管束间距排列方式 PITCH/PATTERN NO.	1" [25.4] / 90° / 238U	腐蚀裕量 CORROSION ALLOWANCE	1/8 [3.175]
管束外径/壁厚/直段管长 TUBE O.D./WALL THK./LENGTH	0.75" [19.05] / 0.065" [1.62]	RT 检测类别 RT TYPE	RT-3
地震设计规范 SEISMIC DESIGN CODE	ASCE 7-2016 (NOTE 1)	焊缝接头系数(筒体/封头) JOINT EFFICIENCY (SHELL/HEAD)	0.85/0.85
风载设计规范 WIND DESIGN CODE	ASCE 7-2016 Exposure category C	容积 CAPACITY	47.7 [1.4]
基本风速 BASIC WIND VELOCITY	101 [45.2]	程数 NUMBER OF PASSES	1
管口方位 NOZZLE ORIENTATION	按本图 AS PER THIS DWG	冲击试验 IMPACT TEST	不要/NO
制造重量 FABRICATED WEIGHT	10860 [4926]	焊后热处理 POST-WELD HEAT TREATMENT	不要/NO
空重 EMPTY WEIGHT	10860 [4926]	成形后热处理 POST FORMING HEAT TREATMENT	要/YES
安装重量 ERECTED WEIGHT	10860 [4926]	保温类型/厚度 INSULATION TYPE/THK	NA
操作重量 OPERATING WEIGHT	15305 [6942]	工厂水压试验 SHOP HYDROSTATIC TEST	490.9 [33.843]
水压试验(现场)重量 TEST WEIGHT (FIELD)	15582 [7071]	现场水压试验 FIELD HYDROSTATIC TEST	424.9 [29.295]
管束重量 TUBE BUNDLE WEIGHT	5100 [2313]	气密性试验 PNEUMATIC TEST	/

NOTE 1: ASCE 7-2016, S1=0.579g, Ss=1.616g, SDs=1.077g, SD1=0.996g, Site Class=D IMP, FACTOR=1.5, DESIGN CATEGORY=D, Section 13.3.1 with ap=1.0, Rp=2.5, Ip=1.5 and z=h, Fa=1.0, Fv=1.72L.									
管口表 NOZZLE SCHEDULE									
符号 MARK	数量 QTY.	公称尺寸 NPS	壁厚等级 SCH / THK	公称压力 RATING	连接标准 CONNECTING STANDARD	法兰型式 FLG. TYPE/S.F.	法兰密封面到 设备中心线长度 PROJECTION FROM VESSEL CL. TO FLANGE FACE	用途或名称 SERVICE	备注 REMARKS
T1	1	10"	15/32" [12]	CL300	ASME B16.5-2017	WN/ RF	见图/SEE DWG	TS INLET	
T2	1	4"	SCH80S 0.337"[8.56]	CL600	ASME B16.5-2017	WN/ RF	见图/SEE DWG	TS OUTLET	
S1	1	8"	SCH80 0.512"[12.7]	CL300	ASME B16.5-2017	WN/ RF	见图/SEE DWG	SS INLET	
S2	1	8"	SCH80 0.512"[12.7]	CL300	ASME B16.5-2017	WN/ RF	见图/SEE DWG	SS OUTLET	
Aux.1	1	2"	21/32" [16.6]	CL300	ASME B16.5-2017	LWN/ RF	见图/SEE DWG	T1 AUXILIARY	WITH BLIND
Aux.2	1	2"	21/32" [16.6]	CL300	ASME B16.5-2017	LWN/ RF	见图/SEE DWG	T2 AUXILIARY	WITH BLIND
Aux.3	1	2"	21/32" [16.6]	CL300	ASME B16.5-2017	LWN/ RF	见图/SEE DWG	S1 AUXILIARY	WITH BLIND
Aux.4	1	2"	21/32" [16.6]	CL300	ASME B16.5-2017	LWN/ RF	见图/SEE DWG	S2 AUXILIARY	WITH BLIND
For vent and drain purpose, R 1/4" semicircular hole shall be provided at top and bottom of vertical pass partition plate.									

管口载荷表 NOZZLES LOADS LIST									
NOZZLE	NPS	FORCES (UNIT: Lbf)			MOMENTS (UNIT: Lbf·ft)			ML	MT
		FA	FL	FC	MC	ML	MT		
T1	10"	2580	3240	3240	8020	10180	12960		
T2	4"	1080	1360	1360	1420	1800	2280		
S1	8"	2080	2600	2600	5160	6560	8340		
S2	8"	2080	2600	2600	5160	6560	8340		

NOTE: 2xAPI 150# nozzle loads on process nozzle considered. Flange rating changed to 300# & 600# due to nozzle load impact on flange rating as required by UG-44 (b).

Air Products Project Number		Fluor Project Number	
Project Name		World Energy Renewables Project	
Purchase Order Number		4505688221	
Air Products Open Text document number		EN207122-WUXI-9V3-00172	
Client		WORLD ENERGY PARAMOUNT	
05		供批准/ISSUED FOR APPROVAL	Jianhui Ban
04		供批准/ISSUED FOR APPROVAL	Chengqian Yuan
03		供批准/ISSUED FOR APPROVAL	Jianhui Ban
02		供批准/ISSUED FOR APPROVAL	Chengqian Yuan
01		供批准/ISSUED FOR APPROVAL	Jianhui Ban
版次 REV.		版次说明/DESCRIPTION	设计/REVIEWED
The copyright of this drawing is the property of China Wuxi Chemical Equipment Co., Ltd. (WCE). Unauthorized disclosure or duplication to the third party is not permitted.		设计/REVIEWED	
WCE 无锡化工装备股份有限公司		WUXI CHEMICAL EQUIPMENT CO., LTD.	
设计		Ammonia Stripper Overhead Condenser	
审核		GENERAL ASSEMBLY DRAWING I	
审查		比例: 1:10	
批准		第 1 页 共 2 页	
APPROVED		PAGE 1 OF 2	

其他要求和说明:

Other Requirements and Notes:

1. 一般要求 / General requirements

- 1.1 除注明外, 所有尺寸均以英制为准。括号内标注来制尺寸为参考。
Unless otherwise specified, all dimensions shall be in US customary unit as primary unit and metric unit shown in bracket for reference.
- 1.2 除非另外说明, 法兰螺栓孔应跨中设备中心线或其平行线。
Unless otherwise indicated, all bolt holes of flange shall straddle the center line or parallel line of the equipment.
- 1.4除特殊注明外, 所有承压密封面粗糙度要求为Ra3.2-Ra6.4。
Facing for pressure connections shall be 125-250 AARH unless otherwise specified on the drawing.

2.材料Materials

2.1受压元件和与受压元件相焊的非受压元件材料应符合ASME Section II项目文件SPEC-ENG-MQ042, A8KM-PP-000-500530-A和MPS文件。

Material of pressure and welded with pressure retaining parts shall be in accordance with ASME Section II, Project specification SPEC-ENG-MQ042, A8KM-PP-000-500530-A and Material Purchasing Specification

2.2所有材料应提供 EN10204中3.1类证书, 且需按照项目规范SPEC-ENG-MQ042的附录A进行复验。

All materials shall be delivered with Certificates 3.1 acc. to EN 10204 and it shall be subjected to retesting per Appendix A of SPEC-ENG-MQ042

2.3材料按照项目文件A8KM-PP-000-500512-A进行PMI。

PMI shall be performed in accordance with specification A8KM-PP-000-500512-A.

2.4所有换热管应为无缝管, 并不得拼接。

All tubes shall be one piece without circumferential & Longitudinal weld seams.

2.5所有SA-106 Gr.B、SA-105N、SA-266 Gr.2N材料应正火+细晶粒状态供货。

The all material of SA-106 Gr.B、SA-105N、SA-266 Gr.2N shall be supply with normalized and Fine grain practice.

3.制造与检验/Fabrication and inspection

3.1设备的制造与检验应符合项目规范A8KM-PP-000-500530-A的要求。

Fabrication and inspection shall confirm to the requirements of ASME code and Project specification A8KM-PP-000-500530-A.

3.2设备的制造公差应按照ASME VIII-1、API-660和TEMAR级中严格的执行。对于外压设备筒体的椭圆度应按照ASME VIII-1 UG-80检查。

Most Stringent tolerances out of ASME Sec.VIII Div.1, API-660 and TEMA Class-R shall be applicable and followed. The out-of-roundness of shell with external pressure shall be inspected according to UG-80.

3.3开孔和附件(包括补强板和垫板)到焊缝的间距应至少2英寸。经买方批准, 如果无法满足以上要求, 则在将接管或附件焊接至换热器之前, 应将焊缝打磨平整, 并对开孔两侧4英寸的距离或附件覆盖的全长加上两侧4英寸的距离进行RT检测。

Openings and attachments (including reinforcing and support pads) shall clear weld seams by at least 2 inches. Subject to approval of the purchaser, if this construction is not possible, the seam weld shall be ground flush and radiographed for a distance of 4 inches on either side of the opening or for the full length covered by an attachment plus 4 inches on both sides prior to welding the nozzle or attachment to the exchanger.

3.4碳钢椭圆封口应冷成形, 成形后进行正火处理。

The ellip.head shall be of Cold-formed, and to be normalized after cold-forming.

3.5所有S32750材料在冷成形后应进行固溶处理。

All cold formed S32750 shall be solution annealed after cold forming.

3.6除非已表明, 接管应与容器内表面轮廓齐平, 其接管端部应打磨呈最小5mm的圆角。

Unless specified otherwise, nozzles shall finish flush with the internal contour of the vessel. All inside edges of nozzle shall be radiused to 5 mm minimum.

3.7补强圈应至少有一个NPT 1/8英寸的试验孔, 位于距离换热器纵轴至少45度的位置。本要求适用于每个补强圈或补强圈的每一部分。在对换热器进行压力测试之前, 应对每个补强圈或补强圈的每一部分的焊缝应通入15psi的压缩空气进行空气和肥皂泡试验。试验孔应保持打开状态, 以便在压力试验期间用作信号孔。

Reinforcing pads shall have at least 1 test hole, tapped 1/8 inch minimum pipe thread, located at least 45 degrees off the longitudinal axis of the exchanger. This requirement applies to each pad or segment thereof. The welds of each pad or segment shall be tested pneumatically to 15psi air-and-soap solution test before pressure testing the exchanger. Test holes shall be left open for use as tell tale holes during the pressure test.

3.8所有承压紧固件上紧应按照项目文件4WPI-670210进行。

All tightening of pressure fastener shall be according to the specification 4WPI-670210.

3.9 1.5"及以上的螺栓使用液压拉伸器上紧。

At and above 1.5" diameter, bolting shall be suitable for hydraulic tensioning.

3.10换热管的贴胀接减薄量应不超过3%。

MAXIMUM ALLOWABLE TUBE WALL THICKNESS REDUCTION SHALL BE 3%.

3.11所有换热管孔边缘距管板上相邻的台阶应不小于1.5mm。

DISTANCE BETWEEN EDGE OF TUBE HOLES AND EDGE OF ALL GASKET GROOVES (INCLUDING PP GROOVES) SHALL NOT BE LESS THAN 1.5 MM.

3.12所有U形管弯制后, 压扁率应不超过换热管外径的10%。

FLATTENING TOLERANCES AFTER BENDING OF U-TUBES SHALL NOT EXCEED 10 % OF THE TUBE OUTSIDE DIAMETER.

4.焊接Welding

4.1设备的焊接规程和焊工资质应符合ASME IX以及项目文件A8KM-PP-000-500550-A及4WEQ-1051的要求。

Welding procedure qualification and welders' performance qualifications shall confirm to the requirements of Section IX of the ASME Code and Project specification A8KM-PP-000-500550-A and 4WEQ-1051.

4.2所有承压焊接接头应采用全截面焊接头形式。

All holding pressure welding joints shall be full penetration weld.

4.3对接焊缝应在背面清根后再进行焊接, 不能清根时应采用氩弧焊打底。

All butt welded joints shall be back chipped and welded. Wherever back chipping is not possible root run shall be welded by GTAW.

4.4本注角焊缝脚高度为较薄板厚度。

The fillet weld height not dimensioned shall be equal to the thickness of thinner plate.

4.5除特别说明外,所有焊缝均为连续焊。

Unless specified, all welds shall be continuous.

4.6禁止使用不可拆卸的焊接背部垫板。

Non-removable welding backing strips or rings are prohibited.

4.7双相钢换热管与管板的焊接及胀接应满足项目规范A8KM-PP-000-500530-A Rev.0第7.0条要求。

For duplex stainless steel tube-to-tubesheet welding and rolling, the article 7.0 of Project specification A8KM-PP-000-500530-A Rev.0 shall be complied.

4.8换热管与管板之间的焊接应采用GTAW工艺, 并添加填充金属。焊接(最小泄漏路径)不得小于换热管壁厚。

Tube-to-tubesheet welds shall be made using the GTAW process with the addition of filler metal. The weld throats (minimum leak paths) shall not be less than the thickness of the tube wall.

4.9换热管与管板分两道焊接,两道焊缝的起点应错开180°,焊接完成后应对焊接接头进行100%PT检测,合格后再进行胀接,胀接完成后再进行100%PT检测。

Tube-to-tubesheet joints shall be welded in two welding layers, the start arc welding point for layer shall be stagger 180 degree, and the final layer shall be examined by 100% PT. After the test, expansion should be performed. 100% PT shall be performed after expansion.

4.10所有双相钢焊接接头外表面均应按照Magne-Gage或Fischer Ferrite进行铁素体检测,按照AWS A4.2进行校准。每1.7m(5英尺)长度最少检测3个点。每条焊接接头铁素体含量的平均值应为30%至70%。

The ferrite content of all accessible completed external surfaces of duplex SS production welds shall be checked using either a Magne-Gage or Fischer Ferrite Scope calibrated in accordance with AWS A4.2. A minimum of three tests shall be made on each 1.7 m (5 feet) of weld. The average value of the tests on each weld shall be 30-70% ferrite.

4.11设备制造完成后,对每种焊接工艺的焊缝应进行至少一组硬度检测。每组检测应包含焊缝两侧母材、热影响区及焊缝金属5个点。检测处焊缝余高应磨平。硬度检测必须用HV10方法。其余硬度检测的要求应符合A8KM-PP-000-500550-A Rev.0B中11.2条。

On the finished vessel a minimum of one hardness test set is required per weld procedure. A set of hardness readings shall consist of at least five measurements including measurements of 1) the base metal on both sides of the weld, 2) the heat-affected zone (HAZ) on both sides of the weld, and 3) the weld metal. The weld profile shall be ground flat across the weld to perform the tests. The hardness must be measured using theHV10 method. The other requirement of hardness test shall comply the item 11.2 of A8KM-PP-000-500550-A Rev.0B.

4.12热处理时,螺纹和垫片密封面应进行保护,避免过度氧化。

Threads and gasket surfaces shall be suitably protected from excessive oxidation during heat treatment.

4.13所有热处理,应准备热处理工艺并提交业主批准。

All the heat treatment shall follow the procedure that prepared and approved by buyer.

4.12壳程筒体相邻纵缝至少错开5倍壁厚。

At least 5 times the wall thickness of the adjacent longitudinal seam of the shell passage cylinder should be staggered.

5.无损检测/Nondestructive examination

5.1所有NDE应满足项目文件A8KM-PP-000-500550-A的要求第10条的要求

NDE requirements shall meet the article 10 of Project specification A8KM-PP-000-500550-A.

5.2设备主体的无损检测要求见“无损检测表”。

The NDE requirement of main parts according to table "NONDESTRUCTIVE EXAMINATION".

5.3所有无损检测(NDE)应满足以下要求: a) 焊接后至少48小时内不得进行;且; b) 焊后热处理(PWHT)后进行。

All nondestructive examination (NDE) shall; a) Not be performed until at least 48 hours after welding and b) Be performed after postweld heat treatment (PWHT).

5.4所有板材制成的接管及管件,其焊缝应进行100%RT检测。

Welded fittings (nozzles, etc.) made from plate shall be 100% RT examined at the fitting fabricator's shop.

5.5应在焊后热处理前对高应力附件(如吊耳)进行射线照相或超声波检查,焊后热处理后应进行磁粉或渗透检测。不允许有裂纹。

Highly-stressed attachments, such as lifting lugs, shall be radiographed or ultrasonically checked before post-weld heat treatment and magnetic particle inspection after post-weld heat treatment. No crack indication is allowed.

5.6设备焊制完成后,其上所有形式的焊接接头均应进行100%PT检测。

All accessible completed production welds shall be examined by PT. PT examination (100%) is required of butt, seal, fillet, socket, weldolet and branch welds and at all pipe support connection welds.

6.试验/Testing

6.1在压力试验期间,工艺管口使用的垫片可由供应商选择通用类型,但对于人孔或带法兰盖的管口,垫片应该与正式垫片的类型相同。试验后,当接头因为任何原因被拆开后,应更换新的正式垫片并重做水压试验。

The gaskets used during pressure testing for process piping connections may be of a generic type, but for the connections that service gasket is supplied, shall be the same type as the service gaskets. When equipment is dismantled for any cause, it shall be reassembled with the new gaskets of the same type & material and re-hydrotested.

6.2用于水压试验的水应为冷凝水、软化水或可溶氯化物含量小于50ppm(按体积计)的饮用水。

Water used for hydrostatically testing shall be condensate, demineralized, or potable with a soluble chloride content of less than 50ppm by volume.

6.3水压试验用水温度应为62.6°F(17°C)到118.4°F(48°C)之间。

The minimum temperature of the fluid used for hydrostatic test shall be 62.6°F (17 °C) to 118.4°F (48°C).

6.4所有补强圈上的焊缝应在水压试验前进行气密试验。

The welds of each reinforcing pad shall be given an air-and-soap solution test before pressure testing the exchanger.

6.5胀接完成后,水压试验前,应对换热管与管板连接接头进行氦检漏试验。试验时壳程通入低压氮气,壳程与管程压差至少为1barg。最大允许泄漏率为1x10⁻⁵ bar cm³/s。

Helium leak test of tube-to-tubesheet joint integrity after final expansion of the tubes before pressure test. The shell side of the exchanger shall be pressurized with low pressure helium. The pressure difference between the pressurized shell side and tube side of the exchanger shall be at least 1 barg. The maximum allowable leak rate of helium or halogen shall be 1x10⁻⁵ standard cubic centimeters per second (0.76x10⁻⁵ torr liters per second) at a minimum pressure difference of 1 barg.

6.6试验后,应彻底干燥交换器。不允许通过蒸发进行热空气烘干。

Exchangers shall be thoroughly dried after testing. Hot air drying by evaporation is not permitted.

7.表面处理/Surface treatment

7.1设备的油漆按照项目文件A8KM-PP-000-50520-A和油漆工艺。

Surface preparation and painting shall be carried out per Air Products specification A8KM-PP-000-50520-A and Painting procedure.

7.2装运前,热交换器应无异物。每个换热器的内部和外部均应彻底清洁,且应无油脂、焊接飞溅物、氧化皮、熔渣、铁锈和其他异物。

Heat exchangers shall be free of foreign matter prior to shipment. Each exchanger shall be thoroughly cleaned inside and outside, and shall be free of grease, weld spatter, scale, slag, rust, and other foreign matter.

7.3所有紧固件螺栓应涂金属防水润滑油,以防止试验、运输、储存过程中的腐蚀。

Threads of bolts including exposed parts shall be coated with a metallic base waterproof lubricant to prevent aqueous corrosion during testing, shipping, and storage.

8.包装、标记和运输/Packing, Marking & Shipping

8.1设备、备件和松散件的运输准备应符合项目文件4WGN-10001的相关要求。

Preparation for shipping of equipment, spares, and any loose items shall be in accordance with Air Products specifications 4WGN-10001

8.2所有补强圈上试验孔及其垫板透气孔,应在压力试验后,运输前用油脂封堵。

All test holes on reinforcing pad and vent on other pad shall be filled with grease after pressure test and prior to shipment.

8.3换热器应使用0.34 bar g (5 psig)干燥无油空气或氮气,露点为-40C或更低,总油含量(气溶胶、液体、蒸汽)<5mg/m3。开口应正式垫片及全螺栓连接进行密封,以保持运输压力;

Vessels shall be pressurized with 0.34 bar g (5 psig) of dry, oil-free air or nitrogen, with a dew point of -40C or lower and a total oil content (aerosol, liquid, vapor) <5mg/m3. Openings shall be fully bolted in conjunction with service gaskets, to hold the shipping pressure.

8.4充氮的设备应在每个盲板连接处贴上警告通知,清楚地表明该装置是用空气或氮气加压的

Equipment that has been pressurized for shipping shall carry a warning notice at each blinded connection clearly indicating that the unit is pressurized with either air or nitrogen.

8.5所有临时盲板和螺栓应涂上“发光黄色”RAL 1026或类似涂料。

All temporary shipping plugs, metal or plywood cover plates and bolting shall be painted 'luminous yellow' RAL 1026 or similar.

8.6运输时,临时垫片是不允许的。

Temporary shipping Gaskets are prohibited

9.其它/Others

9.1建造,调试和开车备品备件。

-垫片: 200%

-容器法兰及带法兰盖的管口用螺栓/螺母/垫圈: 10% (至少2套)

Spare parts for construction, commissioning, and start-up

-Gaskets for girth flanges and blinded nozzles: 200%

-Stud bolt/nuts for girth flanges and blinded nozzles: 10% (min 2 sets)

9.2人身防护网及预埋件由设备供应商提供。防护网应单独发货到现场,由施工方在现场安装。

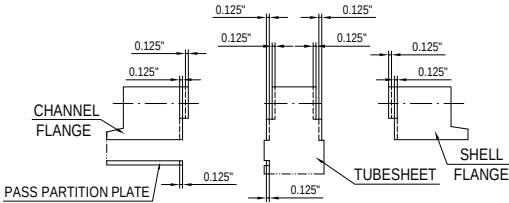
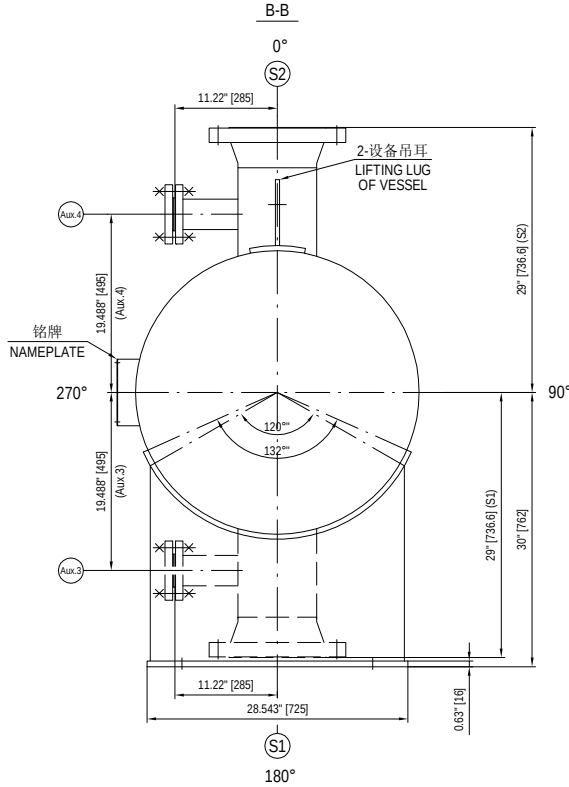
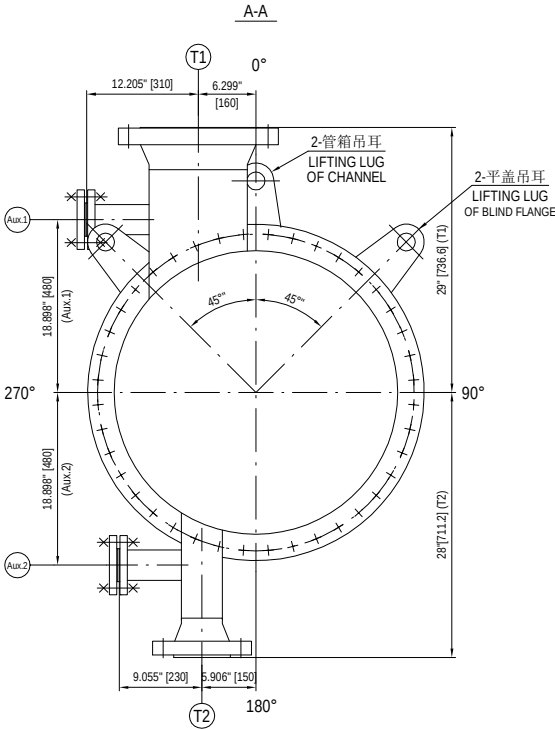
Personal Protection (PP) Insulation and its support clips are in Vendor's scope, but Installation of PP cages is in Site Contractor's scope. So, the PP Cages shall be shipped loose.

9.3将来可按API 660 7.4.11、7.5.2.5和7.7.15,对设备法兰及管板密封面进行再次机加工。

Future Machining allowance shall be provided as specified in API-660 clause nos. 7.4.11, 7.5.2.5 and 7.7.15.

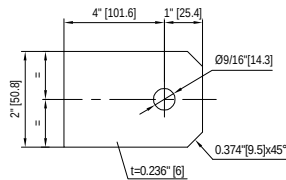
9.4 As per API-660 Clause no. 9.1.2, For removable-bundle heat exchangers, the permissible out-of-roundness of a completed shell, after all welding and any required heat treatment, shall allow a metal template to pass through the entire shell length without binding. The template shall consist of two rigid disks (each with a diameter equal to the diameter of the transverse baffle or support plate) rigidly mounted perpendicularly on a shaft and spaced not less than 300 mm (12 in.) apart.

9.5 Nothing mark shall be done on saddle by removable paint for easy north identification of equipment

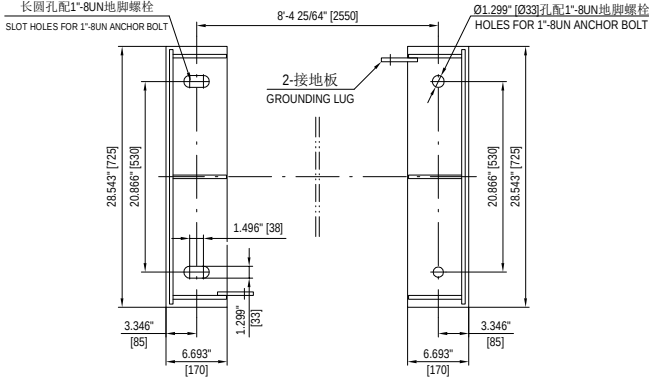


*FUTURE MACHINING ALLOWANCE (AT SITE)
-GASKET SURFACE OF TUBESHEET:0.125"
-GASKET SURFACE OF GIRTH FLANGE:0.125"
-PASS PARTITION RIB OF TUBESHEET AND FLAT COVER:0.125"
-PASS PARTITION PLATE:0.125" (BOTH SIDE)
-GIRTH FLANGE OUTER FACE:0.125"
-EXTENDED FLANGE FACE OF TUBESHEET 0.125"
-GASKET SURFACE & OUTER FACE OF FLAT COVER

接地板详图
DETAIL OF GROUNDING LUG



C-C



AIR PRODUCTS		world energy		FLUOR			
Air Products Project Number		/		Fluor Project Number		ABKM	
Project Name		World Energy Renewables Project		RFO No.		ABKM-4-410-RQ	
Purchase Order Number		4505688221		PO/Contract No		/	
Air Products Open Text document number		EN207122-WUXI-9V3-00172		Project Area		/	
Client		WORLD ENERGY PARAMOUNT		Client Doc No:		/	
05	供批准/ISSUED FOR APPROVAL	Jianhui Ban	Chengqian Yuan	Hu Yang	20-Jun-23		
04	供批准/ISSUED FOR APPROVAL	Jianhui Ban	Chengqian Yuan	Hu Yang	07-May-23		
03	供批准/ISSUED FOR APPROVAL	Jianhui Ban	Chengqian Yuan	Hu Yang	27-Feb-23		
02	供批准/ISSUED FOR APPROVAL	Jianhui Ban	Chengqian Yuan	Hu Yang	29-Dec-22		
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批准		第 2 页 共 2 页		PAGE 2 OF 2			
APPROVED							