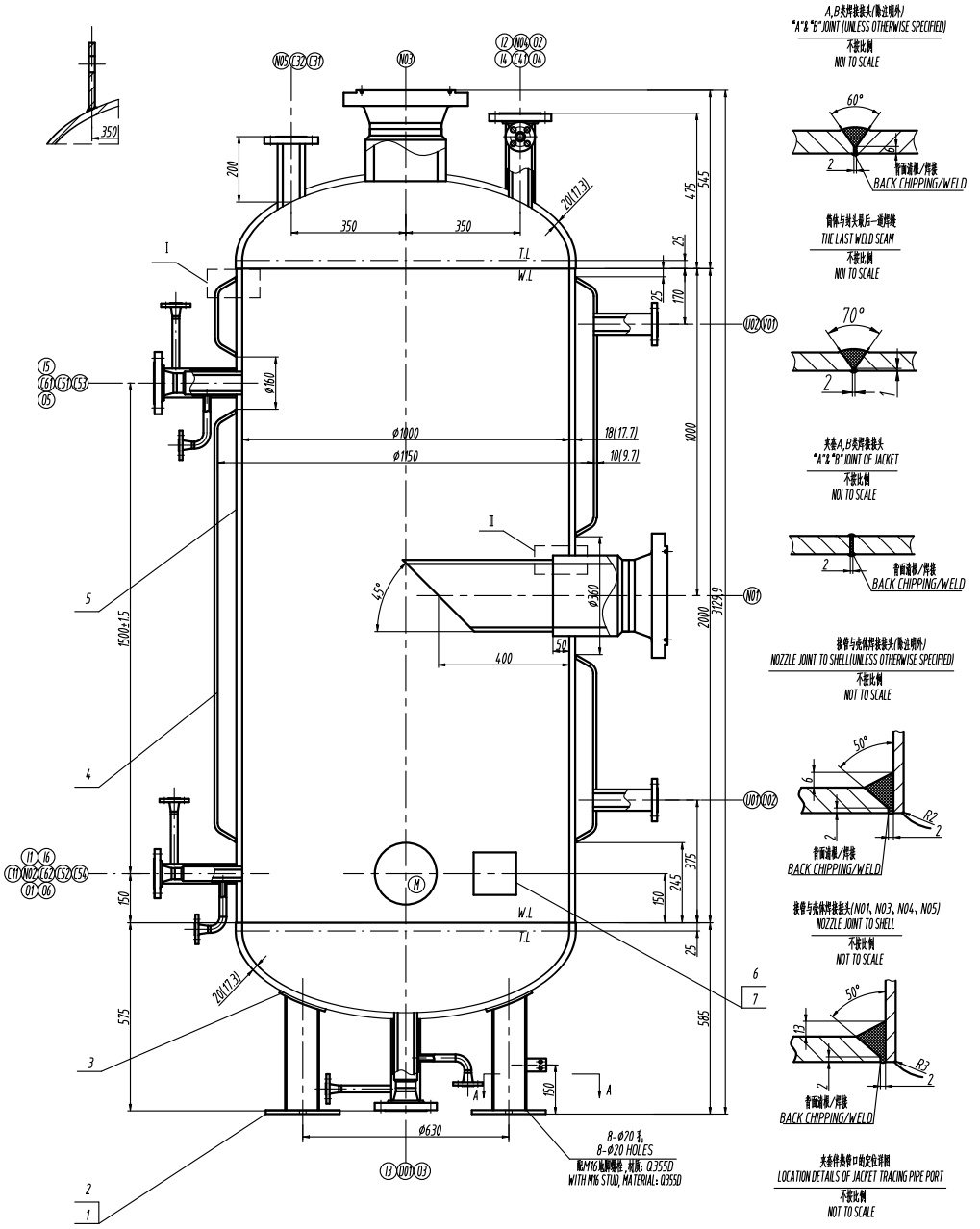


## 设计、制造与检验主要数据表

| 规范、标准 CODE & STANDARD | 《固定式压力容器安全技术监察规程》TSG 21-2016 /各项修改单/ SUPERVISING REGULATION ON SAFETY TECHNOLOGY FOR STATIONARY PRESSURE VESSEL. 《钢制化工容器制造技术要求》HG/T20584-2020 MECHANICAL STANDARD FOR MANUFACTURING STEEL CHEMICAL VESSELS | | | 《压力容器》GB/T150.1 150.4-2024 PRESSURE VESSEL. | | |
|---|---|---|---|---|---|---|
| | 夹套 JACKET | 壳体 SHELL | 压力容器类别 PRESS VESSEL CLASS | Ⅱ | | |
| 工作压力 kg/cm²G WORKING PRESS. | 4.6 | 25.5(NOTE 2) | 焊接规程 WELDING SPEC. | NB/T47015-2023 | | |
| 设计压力 kg/cm²G DESIGN PRESS. | 7.0 | 28.6(NOTE 2) | 焊接材料 WELDING MATERIAL | S31603 | A022、ER316L | |
| 最高允许工作压力 MPa MAX ALLOWABLE OPERATING PRESS. | | | | Q345R | R507、H10Mn2、ER50-6 | |
| 工作温度 ℃ WORKING TEMP. | 70 | 150(NOTE 2) | | S31603Q345R | A312 | |
| 设计温度 ℃ DESIGN TEMP. | 120 | 180(NOTE 2) | | | | |
| 介质(组分) FLUID (COMPONENT) | HW70 | NPG、H2(体积) NPG、H2(VOL.) | 焊接接头形式 WELDING STRUCTURE | 除注明外按HG/T20583-2020规定进行射线检测 ALL PENETRATION FUNCTION IS SPECIFIED IN HG/T20583-2020 EXCEPT AS NOTED | | |
| 介质(密度) FLUID (DENSITY) kg/m³ | 978 | 0.45气/880液 0.45 (GAS) /880(FLUID) | 角焊缝最小厚度 THICK. OF FILLET WELD | 按三倍较小壁厚进行焊接工艺评定 EIGHT OF A WORKING WELD, TAKE THE THICKNESS OF THE THINNER PLATE OF THE WELDED PARTS | | |
| 介质特性 FLUID PERFORMANCE | / | 中度危害/易燃 MODERATE TOXIC/EXPLOSIVE | 法兰与接管的焊接 WELDING OF PIPE AND FLANGE | 按注明焊接规程和压力等级 UNLESS OTHERWISE NOTED, IN ACCORDANCE WITH THE RELEVANT PLUMBING STANDARD | | |
| 安全阀整定压力 kg/cm²G SETTING OF SAFETY VALVE | | 工艺系统专业 DESIGN WITH THE SYSTEM | 产品焊接试板 PRODUCT WELDED TEST COUPONS | | | |
| 设计使用年限 DESIGN WORKING LIFE(YEARS) | 10 | 10 | 备 注 | | | |
| 主要受压元件材料 MAIN MATERIAL | 牌号/型号 NAME | Q345R | S31603 | 结构类型/个数/材料 BOARD TYPE/TOWER / QTY. | | |
| | 标 准 STANDARD | GB/T713.2-2023 | GB/T713.7-2023 | 结构类型/规格 PACKING TYPE / HEIGHT mm | | |
| 腐蚀裕量 CODE ALLOW. mm | | 3.0 | 0 | 涂漆、包覆、运输 PAINT, PACKAGING, TRANSPORTATION | | NB/T10558-2021、22150-00000-MC08 |
| 焊接接头系数 JOINT. EFF. 筒体/封头 | | 0.85 | 1.0 | 管口、支座方位 NOZZLE ORIENTATION | 按管口方位图 ACCORDING TO THE ORIENTATION DIAGRAM OF THE VPU | |
| 耐压试验类别 压力/介质 kg/cm²G TYPE OF PROOF PRESS. TEST | | 14.4/14.2(HYDRO-H/V) | 45.3/44.9(HYDRO-H/V) | 焊接接头类别 JOINT CATEGORY | 检测种类 | 比例 RATIO | 标准 STANDARD | 备注 REMARK |
| 气密试验类别 压力/介质 kg/cm²G TYPE OF LEAK TEST | | | 3.0(氨检漏 B法) | 无损检测 N.D.E | A、B | 壳体 SHELL | 100% | RT-Ⅱ | AB | NB/T47013.2-2015 |
| 容 积 m³ CAPACITY | | 0.33 | 1.87 | | | 夹套 JACKET | 20% | RT-Ⅲ | AB | NB/T47013.2-2015 |
| 换热面积 m² HEAT TRANSFER AREA | | 5.6 | | | C、D | CS | 100% | MT-1 | | NB/T47013.4-2015 |
| 重量系数 FULL EFF. | | | | | | SS | 100% | PT-1 | | NB/T47013.5-2015 |
| 保温材料/厚度 mm INSULATION MATERIAL/THICKNESS | | 60/硅酸铝 60/ALUMINUM SILICATE BLANKET | 100/硅酸铝 100/ALUMINUM SILICATE BLANKET | 定重 操重 | 单个物料最高重 | 基本风压 | 地震设防烈度 | 场地土类别 | 室(地)外 | 防雷等级 | 接地要求 |
| 耐火材料/厚度 mm FIRE PREVENTION THICKNESS | | | | | 21 | 400 | 7(0.15g) | Ⅲ | | | 接地 GROUNDING |

### 补充技术要求 Supplementary technical requirements:

1、除注明外，所有尺寸单位为"mm"，法兰螺栓孔应跨装备中心或成对平行线均匀布置。

1. Unless otherwise specified, all dimensions are in millimeters, and flange bolt holes should be evenly distributed along the centerline of the equipment or it's parallel lines.

2、壳体用钢板S31603应符合GB/T713.7-2023的规定，供货状态固溶，表面加工类型ⅡD，钢板还应进行100%超声检测，按NB/T47013.3-2023中的Ⅰ级合格。

2. The steel plate S31603 used for the shell shall comply with the provisions of GB/T713.7-2023, with a supply state of solid fusion and a surface processing type of 1D. The steel plate shall also undergo 100% ultrasonic testing and be qualified as Grade I in NB/T47013.3-2023.

3、S31603锻件应符合NB/T47010-2017《承压设备用不锈钢和耐热钢锻件》中Ⅱ级的要求，

16Mn锻件应符合NB/T47008-2017《承压设备用碳素钢和合金钢锻件》中Ⅲ级的要求。

3. S31603 forgings shall comply with the requirements of Grade III in NB/T47010-2017;

16Mn forgings shall comply with the requirements of Grade III in NB/T47008-2017.

4、S31603焊接管应符合GB/T14976-2012《流体输送用不锈钢无缝钢管》的规定。无缝钢管的壁厚负偏差不大于10%S(S为钢管厚度)。

4. S31603 steel pipes shall comply with the provisions of GB/T14976-2012. The negative deviation of the thickness of seamless steel pipes shall not exceed 10% S (S is the thickness of the steel pipe).

5、S31603材料及焊接接头（包括焊接工艺评定、成品焊接试样）按GB/T4334.-2020方法B进行晶间腐蚀试验，平均腐蚀速率应不大于1.6g/m2.h。腐蚀试件制样和检验按GB/T2134.33-2008的相关规定进行。

5. S31603 materials and welded joints (including welding process qualification and finished welding specimens) shall undergo intergranular corrosion testing in accordance with GB/T4334.-2020 method B. The average corrosion rate shall not exceed 1.6g/m2 h, and the sampling and batch assembly of corrosion specimens shall be carried out in accordance with the provisions of Article B of GB/T2134.33-2008.

6、与工艺介质接触的焊缝应采用氩弧焊打底盖面焊接并成形。

6. The weld seam in contact with the process medium should be covered with argon arc welding and maintained in the welded state.

7、内筒焊接完毕后，应按GB/T150.4-2024第6.5.1条检查圆度。

7. After the welding of the inner cylinder is completed, the roundness should be checked according to Article 6.5.11 of GB/T150.4-2024.

8、液位计管口安装尺寸应满足HG/T20584-2020中的14.2.13条尺寸要求。

8. The installation dimensional tolerance of the liquid level gauge pipe mouth shall comply with the provisions of Article 14.2.13, Clause 6 of HG/T20584-2020.

9、内筒壳体上的A B C D E类焊接接头、异种钢焊接接头、DN<250的接管与法兰的焊接接头应按照NB/T47013.5-2015进行100%渗透检测，合格等级不低于Ⅰ级。

9. The Class A, B, C, D, and E welded joints on the inner cylinder shell, dissimilar steel welded joints, and butt joints between DN < 250 connecting pipes and flanges shall undergo 100% penetration testing in accordance with NB/T47013.5-2015, with a qualification level not lower than Grade I.

10、不锈钢设备水压试验 用水的氯离子含量应小于25mg/L。试验合格后应立即将水排净干。

10. The chloride ion content of the water used for the hydrostatic test of stainless steel equipment should be less than 25mg/L. After passing the test, the water should be immediately drained and dried.

11、泄漏试验合格后，对接触腐蚀介质的不锈钢表面应进行酸洗钝化处理。所用酸洗钝化膏按GB/T25150-2010规定的方法检测，合格后应对焊缝区域进行彻底清洗干净，不得有残留。

11. After passing the leakage test, the stainless steel surface in contact with the medium should be treated with acid pickling and passivation. The passivation film formed should be tested according to the method specified in GB/T25150-2010. After passing the test, the acid pickling medium must be cleaned thoroughly without any residue.

注：(1)、介质组成 (wt%)：正常工况：甲醇 5.25，异丁醇 1.56，三甲苯 39.77，水 11.84，氢气 41.58，还原工况：氢气0~20V%，氮气和水。

Note: (1) Medium composition (wt%): Normal operating conditions: methanol 5.25, isobutanol 1.56, trimethylbenzene 39.77, water 11.84, hydrogen 41.58, reduction operating conditions: hydrogen 0-20V%, nitrogen and water.

2)、正常工况：工作压力：25.5kg/cm2G，工作温度：150℃，设计压力：28.6kg/cm2G，设计温度：180℃。

再生工况：工作压力：5.1kg/cm2G，工作温度：260℃，设计压力：9.2kg/cm2G，设计温度：280℃。再生工况每两年一次，一次十天。

2) Normal operating conditions: working pressure: 25.5kg/cm2G, working temperature: 150 ° C, design pressure: 28.6kg/cm2G, design temperature: 180 ° C.

Regeneration condition: working pressure: 5.1kg/cm2G, working temperature: 260 ° C, design pressure: 9.2kg/cm2G, design temperature: 280 ° C. The regeneration process is carried out every two years for ten days.

## 管口表 LIST OF NOZZLE

| 符号 ITEM | 公称尺寸 NPS | 公称压力 CLASS/PN | 连接标准 COND.STD. | 连接法兰形式 TYPE | 连接面形式 FACING | 用途或名称 SERVICE | 管子规格 NOZZLE SIZE | 接管法兰中心线高 Hmm/HWM CL TO F.F. | 备注 REMARK |
|---|---|---|---|---|---|---|---|---|---|
| N01 | 8 | 300 | ASME B16.5-2020 | WN | RJ | 进口 IN-LET | Ø246×26 | 800 | |
| N02 | 1×2 | 300 | SH/T3426-2014 | WN | FM | 液相出口 LIQUID OUTLET | Ø44.5×11/Ø60.3×3.65 | 770 | |
| N03 | 8 | 300 | ASME B16.5-2020 | WN | RJ | 气相出口 VG OUTLET | Ø246×26 | 见图 SEE DRAW | |
| N04 | 2×3 | 300 | SH/T3426-2014 | WN | FM | PSV安全阀口 PSV CONNECTION | Ø76.5×N/Ø88.9×5.1 | 见图 SEE DRAW | |
| N05 | 4 | 300 | ASME B16.5-2020 | WN | RJ | 备用口（带堵头） SPARE CONNECTION(W/B) | Ø136.5×20 | 见图 SEE DRAW | |
| U01 | 1 1/2 | 150 | HG/T20615-2009 | LWN | RF | 夹套补水口 JACKETED WATER INLET | Ø65×12 | 770 | |
| U02 | 1 1/2 | 150 | HG/T20615-2009 | LWN | RF | 夹套HW出口 JACKETED HW OUTLET | Ø65×12 | 770 | |
| D01 | 2×3 | 300 | SH/T3426-2014 | WN | M | 排污口 DRAIN | Ø76.5×N/Ø88.9×5.1 | 见图 SEE DRAW | |
| D02 | 1 | 150 | HG/T20615-2009 | LWN | RF | 排污口 DRAIN | Ø48×11 | 770 | |
| V01 | 1 | 150 | HG/T20615-2009 | LWN | RF | 放空口 VENT | Ø48×11 | 770 | |
| C11 | 1 1/2 | 300 | HG/T20615-2009 | LWN | RJ | 液相补口（带堵头） LIQUID CONNECTION(W/B) | Ø70×14.5 | 750 | |
| C31-32 | 2 | 300 | HG/T20615-2009 | LWN | RJ | 气相补口（带堵头） VG CONNECTION(W/B) | Ø84×16 | 见图 SEE DRAW | |
| C41 | 2×3 | 300 | SH/T3426-2014 | WN | FM | 液相补口（带堵头） LIQUID CONNECTION(W/B) | Ø76.5×N/Ø88.9×5.1 | 见图 SEE DRAW | |
| C51-54 | 3 | 300 | HG/T20615-2009 | LWN | RJ | 液相补口（带堵头） LIQUID CONNECTION(W/B) | Ø117×19.75 | 770 | |
| C61-62 | 2×3 | 300 | SH/T3426-2014 | WN | FM | 液相补口（带堵头） LIQUID CONNECTION(W/B) | Ø76.5×N/Ø88.9×5.1 | 770 | |
| I1-5 | 1/2 | 150 | ASME B16.5-2020 | WN | RF | 伴热入口 ACCOMPANYING HEAT. IN-LET | Ø21.3×3.65 | 见图 SEE DRAW | HW70 |
| O1-5 | 1/2 | 150 | ASME B16.5-2020 | WN | RF | 伴热出口 ACCOMPANYING HEATING EXPORT | Ø21.3×3.65 | 见图 SEE DRAW | HW70 |
| M | 6 | 63 | HG/T21531-2014 | WN | RF | 手孔 PLUMING TOWN HOLE | Ø189×24 | 见图 SEE DRAW | A-B.C.D.E.G.H.K |

### 接管载荷 LOADS AND MOMENTS ON CONNECTION TABLE

| 接管 NOZZLE | P (N) | VC/V1 (N) | VL/V2 (N) | MC/M1 (N.m) | ML/MT (N.m) | ML/M2 (N.m) |
|---|---|---|---|---|---|---|
| N01 | 11200 | 8400 | 11200 | 4480 | 6720 | 5824 |
| N03(20%) | 2240 | 1680 | 2240 | 896 | 1344 | 1165 |
| D01 | 2800 | 2100 | 2800 | 280 | 420 | 364 |
| -- | -- | -- | -- | -- | -- | -- |

| 1 | NB/T47065.4-2018 | 支座B2.h=336 EARTH PLATE | 4 | 10.Q235B/S31603 | 7.0 | 28.0 | 标准图 | |
|---|---|---|---|---|---|---|---|---|
| 件号 PARTS NO. | 图号或标准号 DWG. NO. OR STD NO. | 名 称 PARTS NAME | 数量 Q'TY. | 材 料 MAT'L | 单件(kg) SINGLE | 总计(kg) TOTAL | 备 注 REMARKS | |
| 设备自重（供货质量）NET MASS (Kg) | | | | 2370 | | | | |
| 空质量 EMPTY MASS (Kg) | | | | | | | | |
| 操作质量 OPERATING MASS (Kg) | | | | | | | | |
| 盛水质量 MASS OF FULL WATER (Kg) | | | | 4670 | | | | |
| 最大可拆件质量 MAX. REMOV. PART MASS (Kg) | | | | | | | | |

| GK | R25010-GK | 管口零件 NOZZLE PARTS | 1 | | | 523.91 | |
|---|---|---|---|---|---|---|---|
| 9 | R25010-9 | 氮封法兰 NITROGEN SEALED FLANGE | 1 | Q235B | 25.5 | | |
| 8 | HG/T21574-2018 | 吊耳 TPA-2-35 EYELETS | 2 | S31603 | 4.4 | 8.8 | 标准图 |
| 7 | | 铭牌架 LABEL FRAME | 1 | S31603 | | 2.0 | 标准图 |
| 6 | R25010-6 | 铭牌 NAMEPLATE | 1 | S30408 | | / | |
| 5 | | 夹套 DN1100×10 JACKET | 1 | S31603 | 913 | H=2000 | |
| 4 | | 夹套 DN1150×10 JACKET | 1 | Q345R | 488 | H=1730 | |
| 3 | GB/T25198-2023 | 壳体封头 EHA(1100×20(17.3) SHELL HEAD | 2 | S31603 | 188 | 376 | |
| 2 | | 接地板 EARTH PLATE | 2 | S30408 | 0.5 | 1.0 | L=140 |

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| 设计 DESIGN | | 压力缓冲罐 PRESSURE BUFFERING TANK | 图号 DWG. NO. | R25010-00 |
|---|---|---|---|---|
| 校 核 CHD. | | | 项目 SECTION | 年产4万吨聚乙二醇(PEG)和甲氧基聚乙二醇(MPEG)装置 30000 TPA PEG/MPEG PROJECT |
| 审 核 DISC APP. | | | 位号 ITEM NO. | V2301 |
| 标 准 CODE APP. | | 总装配图 Assembly DWG | 版 次 REV. | C00 施工图 |
| 工艺专业 PRO SIGN | | | | A01 计审图 |
| 批 准 APPR. | | | 比例 SCALE | 1:8 第 页 OF 共 页 |