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Dragon Aromatics (Zhangzhou) Co., Ltd. (DAC)

对二甲苯工程及整体公用配套工程

DAC PX Complex Project

加氢裂化装置

高压阀门采购规格书

SPECIFICATION FOR HIGH PRESSURE VALVES

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1 总则 GENERAL

1.1 范围 SCOPE

本规格书是关于高压阀门的最低技术要求。除以下要求外，高压阀门还应满足相应标准的其他要求。

This specification is the basic technical requirement for high pressure valves. Except hereinafter required, high pressure valves should conform to other requirements in relative standards.

1.2 规范和标准 STANDARDS AND CODES

在使用本规格书时，尚应符合下列标准最新版本的规定：

The latest edition of the following standards and codes shall form a part of this specification.

- 1) ASME B16.34 《法兰阀、螺纹阀和焊接阀》
Valves Flanged, threaded and welding ends
- 2) ASME B16.5 《管法兰和法兰配件》
Steel pipe flanges and flanged fittings
- 3) ASME B16.10 《阀门的面到面和端到端尺寸》
Face to face and end to end dimensions of valves
- 4) ASME B16.11 《锻制承插焊和螺纹管件》
Forged steel fittings, socket welding and threaded
- 5) ASME B16.20 《管法兰金属垫—金属环垫，缠绕垫和包覆垫》
Metallic gaskets for pipe flanges—ring joint, spiral wound and jacketed
- 6) ASME B16.25 《对焊端部》
Butt welding ends
- 7) ASTM A105 《管道元件用碳钢锻件》
Forgings, carbon steel, for piping components
- 8) ASTM A182 《高温用锻制或轧制合金钢管道法兰，锻制管配件、阀门和零件》
Forged or rolled alloy-steel pipe flanges, forged fittings, and valves and parts for high-temperature service
- 9) ASTM A216 《可熔焊高温用碳钢铸件》
Steel castings, carbon, suitable for fusion welding for high-temperature service

- 10) ASTM A217 《高温承压零件用马氏体不锈钢和合金钢铸件》
Steel casting, martensitic stainless and alloy, for pressure-containing parts suitable for high temperature service
- 11) ASTM A351 《承压元件用奥氏体、奥氏体-铁素体(双相)铸件》
Steel casting, austenitic for high-temperature service
- 11) ASTM A494 《镍和镍合金铸件》
Castings, Nickel and Nickel Alloy
- 11) ASTM A995 《承压元件用奥氏体、奥氏体-铁素体(双相)不锈钢铸件》
Castings, Austenitic-Ferritic (Duplex) Stainless Steel, for Pressure-Containing Parts
- 11) ASTM B564 《镍合金锻件》
Nickel Alloy Forgings
- 12) API 600 《钢制法兰和对焊闸阀》
Steel gate valves, flanged and butt-welding ends
- 13) API 602 《小型钢制闸阀》
Compact steel gate valves
- 14) API 605 《大直径碳钢法兰》
Large-diameter carbon steel flanged
- 15) API 607 《软密封阀门的防火试验》
Fire test for soft-seated quarter-turn valves
- 16) API 608 《法兰、螺纹和对焊金属球阀》
Metal ball valves-flanged, threaded and butt-welding ends
- 17) API 609 《支耳型和对夹型蝶阀》
Lug and wafer type butterfly valves
- 18) API 598 《阀门的检验与试验》
Valve inspection and testing
- 19) API 594 《对夹型和对夹一支耳型止回阀》
Wafer and wafer-lug check valves
- 20) BS 5351 《钢制球阀》
Steel ball valves
- 21) BS 5352 《钢制楔形闸阀、截止阀和止回阀》
Steel wedge gate, globe and check valves 50mm and smaller

- 22) MSS SP-25 《阀门、管件、法兰及接头用标准标志体系》
Standard marking system valves, fittings, flanges and unions
- 23) MSS SP-54 《阀门、法兰、管件及其它管道组成件铸钢件和锻钢件射线检验》
Quality standard for steel castings for valves, flanges and fittings and other piping components-radiographic examination method
- 24) MSS SP-55 《阀门、法兰、管件及其它管道组成件铸钢件外观检查的表面缺陷评定》
Quality standard for steel castings for valves, flanges and fittings and other piping components-Visual method for evaluation of surface irregularities

1.3 说明 EXPLAINING

本规格书以中文版为主，英文版仅供参考。

The Chinese version of specification has precedence to their English translations which is only for reference.

2 制造 MANUFACTURE

2.1 材料 Material

- 2.1.1 阀体、阀盖、法兰和内件等材料，应根据设计条件和制造要求选用，并应符合 ASTM A105、ASTM A182、ASTM A216、ASTM A217 和 ASTM A351 的规定。各种材料的压力-温度等级按 ASME B16.34 的规定。

The materials of valve body, bonnet, flange and trim shall be selected according to design conditions and manufacturing requirements, and shall conform to ASTM A105, ASTM A182, ASTM A216, ASTM A217, and ASTM A351. The pressure-temperature rating of various material shall be in accordance with ASME B16.34.

- 2.1.2 化学成份应符合下表要求。

Chemical composition of valve body's material shall conform to the requirements of the following table.

材料 Material	C	S	P	N	其它成份 Other chemical
321s. s	0.04~0.08%	≤0.025%	≤0.03%	N/A	其他成份满足相应 ASTM 标准规定要求。
304Ls. s	≤0.03%	≤0.025%	≤0.03%	N/A	
C. S	≤0.25%	≤0.03%	≤0.03%	N/A	
1 1/4Cr-1/2Mo 2 1/4 Cr-1Mo	0.05~0.15%	≤0.025%	≤0.02%	N/A	Other chemical requirements shall be in accordance with applicable ASTM standards.
2205 Dup S. S	≤0.15%	≤0.02%	≤0.03%	0.145~0.2%	
2205 Dup S. S	≤0.15%	≤0.02%	≤0.03%	0.145~0.2%	

- 2.1.3 每种代用材料均须经 SEI 批准同意。代用材料应等同或更优于规定的材料，其性能均要满足原规定材料的要求，且应在产品规格书中注明代用材料的物理、化学、机械性能，热处理、晶粒度、制造方法、冶炼方法等内容。

Material substitution shall be approved by SEI, The alternate material shall be equal or superior to specified material, and the properties shall meet all the requirements of original material. Furthermore, it shall be noted in the product specification for alternate material, such as physical, chemical and mechanical properties, heat treatment, grain size, manufacturing method, refining method and so on.

- 2.1.4 接触介质的阀内件，不得使用铜或铜合金，包括黄铜和青铜；接触介质的承压阀内件，应考虑介质对金属的腐蚀裕量，该腐蚀裕量不得小于 3mm。

Trims contacting media are not allowed to use copper alloys, including brass and bronze. Trims corrosion should be considered and the corrosion allowance is not less than 3mm.

- 2.1.5 对于公称直径 DN<100 的合金钢阀与不锈钢阀的支架宜与阀盖材质一致，对于公称直径 DN≥100 的合金钢阀与不锈钢阀的支架材质可为 WCB。

The yoke material for alloy steel valves and stainless steel valves smaller than DN100 should be same as valve bonnet, whereas for the alloy steel valves and stainless steel valves DN100 and larger, the yoke material may be WCB.

- 2.1.6 密封面为堆焊的阀门，其堆焊层材料的耐蚀性应不低于阀体材料。

If an overlay weld deposit is used for the seating surfaces of valves, the corrosion

resistance of the overlay material shall be better than that of body material.

2.1.7 除特殊要求外, 锻件可代替铸件。但未经 SEI 批准同意不得使用铸件代替锻件作为受压元件。

Forging can replace casting unless otherwise specified, but if forging is used as the pressure-containing component, it's not permitted to substitute casting for forging before approved by SEI.

2.1.8 阀座与阀板或阀瓣、阀杆与其配合零件之间应保持硬度差最小值为 50HB, 当两个表面均为硬质合金表面时, 则不要求该硬度差。

The hardness difference between body seating surface and gate seating surface, stem and matching parts shall maintain a minimum 50 HB. When two surfaces are all stellite hard face, the hardness differential is not required.

2.1.9 对 2205 双相不锈钢, 其点蚀当量 PREN 应不低于 34 (PREN= % Cr +3.3%Mo+16%N)。

For duplex stainless steel 2205, PREN should not less than 34 (PREN= % Cr +3.3%Mo+16%N) .

2.1.10 对 2205 双相不锈钢, 按照 ASTM E562 进行金相检测。铁素体含量应在 40~60%。

The content of ferritic of duplex 2205 pipe as per ASTM E562 shall be 40~60%.

2.1.11 阀门的阀体、阀杆等承压件必须来自制造厂所在国。

Pressure containing parts, such as the valve body, stem, etc, shall be made in the valve manufacturer' s country.

2.2 设计与结构 Design and construction

2.2.1 法兰铸钢阀门应采用整体铸造的方法来制造; 锻制法兰阀的阀体和法兰可采用对焊连接形式, 不允许采用承插焊连接; 对焊阀门不允许采用切去法兰阀的法兰的方法来制造。

Flanged-end casting valves must have the flanges integral with the body; For flanged-end forged valves, flange may be welded to the body with butt-welding, but socket welding of flanges to the body is not permitted; It's not permitted to make a butt-welding valve by cutting the flanges from the flanged valve.

2.2.2 闸阀和截止阀要求有上密封座, 上密封面材质与阀门密封面材质一致。

Gate valve and globe valve shall have backseat, the material of backseat should be same as that of valve seat.

2.2.3 除特殊说明外, 闸阀的阀板应采用弹性楔形单阀板。

One piece of flexible wedge shall be furnished for gate valves unless otherwise specified.

2.2.4 软密封阀门应符合 API607(最新版)防火试验要求。

The valve with soft seating shall meet the requirements of fire prevention test in API

607 (latest edition).

2.2.5 阀盖密封垫片应符合 ASME B16.20 或制造标准。

Bonnet gaskets shall conform to ASME B16.20 or valve manufacturer's standard.

2.2.6 柔性石墨填料环，必须与柔性石墨编织填料组合装配。

Flexible graphite packing ring shall be assembled together with flexible graphite braided packing.

2.3 焊接 Welding

2.3.1 有承压焊缝的阀门，供货方应提供焊接规程及工艺鉴定证书。承压焊缝的填充金属的物理、化学性能及耐腐蚀性均应与母体金属接近。

For the valves with containing pressure weld, supplier shall provide the certificate of identification for welding regulation and process. The physical properties, chemical properties and corrosion resistance of filler metal in containing pressure weld shall be close to the base material.

2.3.2 未经 SEI 同意，不允许补焊修复。

Weld repair is not permitted before approved by SEI.

2.4 结构长度 Constructional length

除特殊说明外，阀门结构长度应符合 ASME B16.10 的规定。

Face to face and end to end dimensions of valves shall conform to ASME B16.10 unless otherwise specified.

2.5 连接型式 Connection type

2.5.1 对焊阀门端部应按下表要求加工成坡口型式，并符合 ASME B16.25 标准，其中图 6(B) 的 C 值由设计给定，详见数据表。

The bevel ends of butt welding valves shall be machined according to the following table, and conform to ASME B16.25, the value C in ASME B16.25 Fig.6(B) is provided by SEI, more details see data sheet.

Wall thickness	Welding bevels
$t \leq 22\text{mm}$	ASME B16.25 Fig. 2(A)
$22\text{mm} < t < 60\text{mm}$	ASME B16.25 Fig. 3(A)
$t \geq 60\text{mm}$	ASME B16.25 Fig. 6(B)

2.5.2 承插焊阀门的承插口应符合 ASME B16.11 的规定。

The ends of socket welding valves shall conform to ASME B16.11.

2.5.3 NPS≤600mm(24")的法兰阀门的密封面应符合 ASME B16.5 的要求; NPS>600mm(24")的法兰阀门的密封面应符合 ASME B16.47 B 的要求。

The flange facings of flanged valves DN600 and smaller shall conform to ASME B16.5; The flange facings of flanged valves large than DN600 shall conform to ASME B16.47B.

2.6 对焊与承插焊阀门在现场与管线焊接后,其焊缝将进行热处理。制造厂应考虑现场焊后热处理对阀门的影响,确保阀门的正常使用。现场焊后热处理温度见下表。

For butt-welding and socket-welding end valves, Post Weld Heat Treatment(PWHT) will be performed on site, valve vendor shall take the influence of PWHT on valves into consideration to assure the normal service of valves. The heat treatment temperature on site are as follows for reference:

Valve Material	Heat treatment temperature °C
321s.s 347s.s 347Hs.s	900
1 1/4Cr-1/2Mo 2 1/4 Cr-1/2Mo 5Cr-1/2Mo 9Cr-1Mo	760~780
C.S	650

2.7 阀座内径不应小于 ASME B16.34 附录 A 中表 A1 的要求,任何偏差应经书面批准。

Seat (orifice) diameter shall not be less than the requirement of table A1 in annex A of ASME B16.34, any deviation shall be written approved.

2.9 阀门制造前需将其设计图纸提供给 SEI 确认。

The drawing of valves should be approved by SEI before manufacture.

2.10 证书 Certificate

制造厂必须提供阀门合格证书。

The manufacturers must offer the certificate of product quality.

3 热处理 HEAT TREATMENT

3.1 碳钢要求正火处理, 1 1/4Cr-1/2Mo 和 2 1/4Cr-1Mo 要求正火+回火, 5Cr-1/2Mo 和 9Cr-1Mo 要求完全退火或正火+回火。

Normalizing heat treatment is required for carbon steel (A106B), Normalizing and tempering are required for 1 1/4Cr-1/2Mo and 2 1/4Cr-1Mo, Full Annealing or Normalizing and tempering

are required for 5Cr-1/2Mo and 9Cr-1Mo.

- 3.2 奥氏体不锈钢应进行固溶处理；321、347、347H 还应进行稳定化处理，稳定化温度 $900^{\circ}\text{C} \pm 10^{\circ}\text{C}$ ，每 25mm 壁厚保温 2 小时（4.7min/mm），空冷。

Solution and stabilizing heat treatment are required after processing for austenitic stainless steel. Stabilizing heat treatment shall be at a temperature $900 \pm 10^{\circ}\text{C}$, heat preservation of 2 hours per 25mm wall thickness (4.7min/mm), and air cooling.

- 3.3 双相钢应进行固溶处理。

Solution heat treatment is required for Duplex S.S.

- 3.4 凡热处理的部件应予以纪录并有热处理报告。

Heat treatment shall be recorded and its report is required.

4 检查和试验 INSPECTION AND TESTING

- 4.1 所有阀门（包括阀体、阀盖、阀杆、阀板和阀座）均应进行以下试验：

All valves (include valve body, body-bonnet, stem, wedge and seat ring) shall have the following test performed:

- 4.1.1 化学分析：以满足规格书第 2.1.2 条的要求。

Chemical Analysis: shall meet requirements of ITEM 2.1.2

- 4.1.2 强度试验：以满足相应 ASTM 材料规范的要求。

Tension test: shall meet requirements of ASTM standard.

- 4.1.3 硬度试验：以满足相应 ASTM 材料规范的要求。

Hardness test: shall meet requirement of ASTM standard.

- 4.2 对于所有铸钢阀门的承压部件（包括阀杆），均应进行以下检验：

All the pressure containing parts of castings shall be test in the following manner:

- 4.2.1 铸钢阀门应逐件进行射线检查：

Each Cast steel valves shall have the following x-ray inspection.

- 1) 检查范围：阀体按 ASME B16.34 图 6、7、11；阀板、阀盖铸钢件在凝固过程中易产生缺陷和铸钢件的关键部位、应力集中区域、承压能力薄弱的部位。

Scope of inspection: according to ASME B16.34 drawing 6、7、11 for body; The examination positions of disc and bonnet (cover) shall be determined by valve manufacturers in terms of the following areas: the areas where defects are easy to form in the process of casting solidification and critical areas of casting, stress concentration areas and the weak

containing pressure areas.

2) 程序: 按 ASTM E142

Procedure: according to ASTM E142.

3) 验收标准: ASTM E446 或 ASTM E186 中 A, B, CA, CB, CC, CD 均不低于 2 级, D, E, F, G 类不允许出现缺陷。

Check and accept standards: Shell meet ASTM E446 or ASTM E186 and Category A, B, CA, CB, CC, CD are not less than LEVEL 2, discontinuity of Category D, E, F, G are not acceptable.

4.2.2 对于碳钢、合金钢铸造阀门, 应逐件进行磁粉或液体渗透检查:

Each Carbon steel and Alloy steel casting valve shall be given a magnetic particle examination or a liquid penetration examination.

1) 检查范围: 阀体、阀盖和阀板的外表面及可触及的内表面和阀杆。

Scope of inspection: All external and accessible internal area of body, disc, bonnet (cover) and stem.

2) 程序: 磁粉检查按 ASTM E709 或 A275; 液体渗透检查按 ASTM E165

Procedure: magnetic particle examination according to ASTM E709 or A275; Liquid penetration examination according to ASTM E165

3) 验收标准:

Maximum acceptable indications are as follow:

(A) 线性显示 Linear indications:

(1) 材料厚度小于等于13mm时, 长不大于5mm;

Not large than 5mm long for materials up to 13mm thick;

(2) 材料厚度为13mm~25 mm时, 长不大于6mm;

Not large than 6mm long for materials 13mm to 25 mm thick;

(3) 材料厚度大于25 mm时, 长不大于8mm。

Not large than 8mm long for materials over 25mm thick.

(4) 对于线性显示, 各显示之间的分隔距离必须大于可验收的显示长度。

For linear indications, the indications must be separated by a distance greater than the length of an acceptable indication.

(B) 圆形显示 Rounded indications

(1) 材料厚度小于等于13mm时, 直径不大于5mm;

Not large than 5mm diameter for materials up to 13mm thick;

(2) 材料厚度大于13mm时, 直径不大于6mm。

Not large than 6mm diameter for materials over 13mm thick;

(3) 在一条直线上, 边缘之间相隔小于等于 2 mm(0.06in) 的 4 个或更多的圆形显示为不合格。

Four or more rounded indications in a line separated by 2 mm (0.06in) or less edge to edge are unacceptable.

4.2.3 对于不锈钢及镍合金铸造阀门, 应逐件进行液体渗透检查:

Each Stainless steel and Nickel alloy casting valves shall be given a liquid penetration examination.

1) 检查范围: 阀体、阀盖和阀板的外表面及可触及的内表面和阀杆。

Scope of inspection: All external and accessible internal face of body, disc, bonnet (cover) and stem.

2) 程序: 按 ASTM E165

Procedure: according to ASTM E165

3) 验收标准:

Maximum acceptable indications are as follow:

(A) 线性显示 Linear indications:

(1) 材料厚度小于等于13mm时, 长不大于5mm;

Not large than 5mm long for materials up to 13mm thick;

(2) 材料厚度为13mm~25 mm时, 长不大于6mm;

Not large than 6mm long for materials 13mm to 25 mm thick;

(3) 材料厚度大于25 mm时, 长不大于8mm。

Not 8mm long for materials over 25mm thick.

(4) 对于线性显示, 各显示之间的分隔距离必须大于可验收的显示长度。

For linear indications, the indications must be separated by a distance greater than the length of an acceptable indication.

(B) 圆形显示 Rounded indications

(1) 材料厚度小于等于13mm时, 直径不大于5mm;

Not large than 5mm diameter for materials up to 13mm thick;

(2) 材料厚度大于13mm时, 直径不大于6mm。

Not large than 6mm diameter for materials over 13mm thick;

(3) 在一条直线上, 边缘之间相隔小于等于 2 mm(0.06in) 的 4 个或更多的圆形显示为不合格。

Four or more rounded indications in a line separated by 2 mm (0.06in) or less edge to edge are unacceptable.

4.3 对于所有锻钢阀门的承压部件(包括阀杆), 均应进行以下检验:

 中国石化工程建设公司 SINOPEC ENGINEERING INCORPORATION	高压阀门采购规格书	编号(NO.)	修改(REV.): 0
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All containing pressure parts of the forging valves (including stem) shall be tested as follow:

4.3.1 锻钢阀门应逐件进行超声波检查:

Each forging valve shall be tested by Ultrasonic Inspection.

- 1) 检查范围: 按 ASME B16.34 中 8.3.2.1 条要求以及阀杆。

Scope of inspection: according to paragraph 8.3.2.1 of ASME B16.34 and stem.

- 2) 程序: 按 ASTM A388 进行

Procedure: according to ASTM A388

- 3) 检查结果应符合下列要求:

The test result shall meet requirements as follow:

- (1) 直探头检验: 不允许出现任何裂纹, 单个缺陷尺寸应不大于当量直径 $\Phi 4\text{mm}$ (对阀杆为 $\Phi 2\text{mm}$);

Straight beam examination: any cracks are not allowed and equivalent diameter of a single defect should be not large than $\Phi 4\text{mm}$ (but not large than $\Phi 2\text{mm}$ for stem)

- (2) 斜探头检验: 不允许出现任何裂纹, V 形槽深为工件壁厚的 3%, 最大值为 3mm.

Angle beam examination: any cracks are not allowed and the sharp-end groove depth is 3% of the delivering wall thickness and the maximum value is 3mm.

4.3.2 对于碳钢、合金钢锻造阀门, 应逐件进行磁粉检查或液体渗透检查:

Each Carbon steel and Alloy steel forging valves shall be given magnetic particle examination or a liquid penetration examination.

- 1) 检查范围: 阀体、阀盖和阀板的外表面及可触及的内表面和阀杆。

Scope of inspection: All external and accessible internal face of body, disc, bonnet (cover) and stem.

- 2) 程序: 磁粉检查按 ASTM E709 或 A275; 液体渗透检查按 ASTM E165

Procedure: magnetic particle examination according to ASTM E709 or A275; Liquid penetration examination according to ASTM E165

- 3) 验收标准:

Maximum acceptable indications are as follow:

- (A) 线性显示 Linear indications:

- (1) 材料厚度小于等于 13mm 时, 长不大于 4mm;

Not large than 4mm long for materials up to 13mm thick;

- (2) 材料厚度为 13mm~25 mm 时, 长不大于 5mm;

Not large than 5mm long for materials 13mm to 25 mm thick;

- (3) 材料厚度大于25 mm时, 长不大于7mm;

Not large than 7mm long for materials over 25mm thick;

- (4) 对于线性显示, 各显示之间的分隔距离必须大于可验收的显示长度。

For linear indications, the indications must be separated by a distance greater than the length of an acceptable indication.

(B) 圆形显示 Rounded indications

- (1) 材料厚度小于等于13mm时, 直径不大于4mm;

Not large than 4mm diameter for materials up to 13mm thick;

- (2) 材料厚度大于13mm时, 直径不大于5mm 。

Not large than 5mm diameter for materials over 13mm thick;

- (3) 在一条直线上, 边缘之间相隔小于等于 2 mm (0.06in) 的 4 个或更多的圆形显示为不合格。

Four or more rounded indications in a line separated by 2 mm (0.06in) or less edge to edge are unacceptable.

4.3.3 对于不锈钢及镍合金锻造阀门, 应逐件进行液体渗透检查:

Each Stainless steel and Nickel alloy forging valves shall be given a Liquid Penetration Examination.

- 1) 检查范围: 阀体、阀盖和阀板的外表面及可触及的内表面和阀杆。

Scope of inspection: All external and accessible internal face of body, disc, bonnet (cover) and stem.

- 2) 程序: 按 ASTM E165

Procedure: according to ASTM E165

- 3) 验收标准:

Maximum acceptable indications are as follow:

(A) 线性显示 Linear indications:

- (1) 材料厚度小于等于13mm时, 长不大于4mm;

Not large than 4mm long for materials up to 13mm thick;

- (2) 材料厚度为13mm~25 mm时, 长不大于5mm;

Not large than 5mm long for materials 13mm to 25 mm thick;

- (3) 材料厚度大于25 mm时, 长不大于7mm;

Not large than 7mm long for materials over 25mm thick;

- (4) 对于线性显示, 各显示之间的分隔距离必须大于可验收的显示长度。

For linear indications, the indications must be separated by a distance greater

than the length of an acceptable indication.

(B) 圆形显示

Rounded indications:

(1) 材料厚度小于等于13mm时, 直径不大于4mm;

For valve parts up to 13mm in thick, indications larger than 4mm in diameter are not permitted.

(2) 材料厚度大于13mm时, 直径不大于5mm。

For valve parts larger than 13mm in thick, indications larger than 5mm in diameter are not permitted.

(3) 在一条直线上, 边缘之间相隔小于等于 2 mm(0.06in)的 4 个或更多的圆形显示为不合格。

Four or more rounded indications in a line separated by 2 mm (0.06in) or less edge to edge are unacceptable.

4.4 阀门的所有对接焊缝要求 100%X 射线探伤, 结果不低于 ASTM E446 或 ASTM E186 中 2 级要求,D, E, F, G 类不允许出现缺陷。

Butt Weld of valve shall be 100% X-ray test. Check and accept standards shall meet ASTM E446 or ASTM E186 and Category A, B, CA, CB, CC, CD are not less LEVEL 2, discontinuity of Category D, E, F, G are not acceptable.

4.5 所有阀门在装配后均应做以下试验

All assembled valves shall be performed the following test.

4.5.1 阀体水压试验(包括泄漏试验), 应符合 API598 标准要求。奥氏体不锈钢阀门试验用水, 水中氯离子含量不得超过 25ppm;

Valve body hydraulic test (include leakage testing) shall be in accordance with API598. The hydraulic test water for austenitic Steel valves shall have a total chloride content less than 25ppm.

4.5.2 高压密封试验、低压密封试验和上密封试验(对于需要上密封的阀门), 应符合 API598 标准要求; High pressure seat closure test, Low pressure seat closure test and back seat test (For valves which require Back seat) shall be in accordance with API598.

4.5.3 操作检查: 阀门应装配完整、性能良好, 用户不需要进行其他工作即可直接使用。

Operation check : Valves should be fully assembled with a good performance, and can be used directly by user.

4.5.4 尺寸检查: 端部尺寸和偏差应符合 ASME B16.5、B16.25、B16.11 标准要求。

Dimensional check: Face to face or end to end dimension and tolerance of valves shall conform

to ASME B16.15、B16.25、B16.11.

- 4.6 所有阀门应逐个进行外观检查, 泪眼及裂纹缺陷不允许出现, 其余缺陷合格标准不应低于 MSS SP-55 的 B 级要求, 且满足如下要求:

Each valve shall have a visual inspection, any hot tear and cracks are not allowed; other defects should meet requirements of level B in MSS SP-55, and conform to the requirements as follow:

- 1) 对深度不大于设计壁厚的 10% 且不浸入最小壁厚的结疤、裂纹、折叠和夹渣等缺陷, 允许研磨清除, 清除缺陷后剩余的壁厚不得小于最小壁厚。否则, 该部件应予报废。

Defects whose depth not large than 10% of the design wall thickness, such as scabs, cracks, folds and inclusions, can be removed by grinding; But the remanent wall thickness after removal of defects shall not be less than the Min Wall Thickness, or else, this valve part shall not be used.

- 2) 对于无损检测查出的深度不大于 0.8mm 的微裂纹, 允许研磨清除。若微裂纹深度大于 0.8mm, 该部件应予报废。

The micro cracks found by NDT whose depth less than 0.8mm can be removed by grinding, valve parts with cracks more than 0.8mm should not be used.

- 4.8 加工完成的奥氏体不锈钢部件均应进行酸洗钝化处理。

Pickling and passivation are required for Austenitic Stainless Steel valve parts.

- 4.9 材料测试证书(PMI)要求: 每炉或每一热处理炉批次的部件 5 件或少于 5 件全部测试; 6 件至 200 件按照 5% 比例且不少于 5 件测试; 200 件以上按照 3% 比例且不少于 10 件测试; 若代表性取样中的任一不合格时, 应对该批次的全部组件进行检验。测试应作记录并立即标识“PMIV”。供货时应提供检测报告。测试元素见下表。

The inspection sample shall be 100% for inspection lots of 5 pieces or less per heat of steel or heat treat batch. For inspection lots of 5 to 200 pieces, the inspection sample shall be 5% but not less than 5 pieces. For inspection lots greater than 200 pieces, the inspection sample shall be 3% but not less than 10 pieces. If any piece from a representative sample is found to be unacceptable, the remainder of that lot shall be examined 100%. PMI testing shall be recorded and marked “PMIV” immediately.

The alloy elements to be checked are as follow:

材料	测试元素	材料	测试元素
1 1/4Cr-1/2 Mo	Cr, Mo	321	Cr, Ni, Ti
5Cr-1/2Mo	Cr, Mo	316	Cr, Ni, Mo
9Cr-1Mo	Cr, Mo	316L	* C , Cr, Ni, Mo
304L	* C , Cr, Ni	347	Cr, Ni, Nb
304	Cr, Ni	347H	* C , Cr, Ni, Nb

- * 验证微量元素的适用方法：特殊的实验室仪器，适用的光学辐射分析仪，可追溯的钢厂合格证结合使用地测量敏感度的化学分析。

Suitable methods for identifying minor elements include: specialized laboratory instruments, suitable optical emission analyzers or a combination of traceable mill certificates and chemical analysis using lower measurement sensitivity.

5 标记 MARKING

5.1 一般规定 GENERAL

5.1.1 所有阀门应按相应的制造标准进行标记，MSS SP-25 应作为最低导则。

All valves shall be marked in accordance with the standard to which they are manufactured, and MSS-SP-25 shall be used as the minimum requirement.

5.1.2 用于色标和标记的涂料不得含有任何有害金属或金属盐，如锡、锌、铅、硫、铜或氯化物等在热态时可引起腐蚀的物质。且涂料应能抗盐水、热带环境或类似情况的腐蚀。

Painting material used for the color coding and stencil marking on components shall not contain a harmful metal, or metal salts, such as tin, zinc, lead, sulfur, copper or chlorides, which cause corrosive attack on heating and shall be resistant to salt water atmosphere, tropical or similar attack.

5.1.3 印记应使用低应力硬印模，且印模应有至少 0.25mm 半径的圆头。

Marking by stamp shall be applied with low-stress hard-die stamping and a low-stress stamp shall be round nosed with a radius of 0.25mm minimum.

5.1.4 标记必须清楚且不易毁坏。

Marking shall be clearly indicated and shall not be easily erased.

5.1.5 标记不能用于下列部位:

Marking shall absolutely not be applied to the following locations:

部件的内表面	Inside of parts
螺纹	Threads
坡口	Bevels
密封面	Sealing Surfaces

5.2 标记 MARKING

5.2.1 一般来说, 标记应包括下列各项, 且容易识别的符号。

Marking shall be carried out, in general, with regard to the following items using easily identifiable symbols.

公称直径	Nominal Size
压力等级	Rating
壁厚或表号	Wall Thickness or Schedule Number(only for butt welded valves)
材料标准和级别	Material Specification and Grade
装料号或炉号	Charge/Heat No.
厂家或商标	Manufacturer's Name or Trade Mark
订单上的编码	Commodity Code as stated on Purchase Order

5.2.2 对难以标记的小尺寸物件, 应用不锈钢丝拴不锈钢标牌的方法来标记。

Small bore items which would be difficult to mark shall have stainless steel labels attached by stainless steel wire.

6 包装和运输 PACKING AND SHIPPING

6.1 阀门在检验和试验之后应放净水, 使其干燥。应提供足够的保护措施以防止运输中的机械损伤和海水大气腐蚀。

After inspection and test, valves shall be completely free of water, dried and prepared for shipment. Adequate protection shall be provided against mechanical damage and atmospheric corrosion in transit.

6.2 阀门端部处应用坚实的木头、金属或塑料档板盖上或塞住, 以防损坏。

Valve ends shall be covered or plugged with substantial wood, metal or plastic closures

in order to avoid damage.

6.3 运输中阀门不能有任何损坏。

For all valves, no damage can be made during shipments.

6.4 包装由生产厂负责。

Packing shall be the responsibility of the manufacturer.

6.5 碳钢、合金钢和不锈钢阀门要分开装运, 不得混装。

All stainless steel (S.S) parts shall be kept away from carbon steel (C.S) and alloy steel (A.S) parts, and packed respective.

7 阀门规格书使用说明 INSTRUCTION OF VALVE SPECIFICATION

7.1 各类阀门的规格分别见下列规格表。同类阀门以不锈钢阀、合金钢阀和碳钢阀的顺序排列。同一阀体材质、同一端面连接型式的阀门, 按公称压力从小到大排列。

The specifications of all kinds of valves are specified in the following tables. Similar valves are listed in the sequence of stainless steel valves, alloy steel valves and carbon steel valves. The valves with the same body material and same connection type are listed from low pressure rating to high pressure rating.

7.2 本规格表中使用的代号、缩写词解释如下:

The codes and abbreviations used in the tables are decoded as follows:

a) 材料 Material

材质 Material	代号 Code	材质 Material	代号 Code	材质 Material	代号 Code
304	K9	316L	K4	316	K8
CF8	KZ9	13Cr	K13	4Cr14Ni14W2Mo	K14
CF3M	KZ4	CF8M	KZ8	321	K11
347	K15	CF8C	KZ15	30CrMoA	C5
F5	G1	F11	D1	F22	E1
25Cr2MoVA	C4	35CrMoA	C3	25Cr2Mo1VA	C7
C5	GZ1	WC6	DZ1	WC9	EZ1
A105	A12	35#	A6	25#	A7
WCB	A11	304L	K18	A217 C12A	JZ91
钴铬钨合金	STL	柔性石墨	FG	HT200	HT

Stellite	Flexible graphite	347H	K16
镀硬铬	HCr 聚四氟乙烯	PTFE	F91
Hard Cr plated	Polytetrafluoroethylene	F9	J9
	A351 CF3	KZ18	A217 C12
			JZ9

B462 UNS N08020 F20

B564 N08825 W25 A182 F51 K25

A494 CU5MCuC WZ25 A995 CD3MN KZ25

b) 结构特征 Construction features

螺栓连接阀盖 B. B	螺纹连接阀盖 T. B	明杆支架型 OS&Y
Bolted Bonnet	Threaded Bonnet	Outside Screw & Yoke

升降式阀瓣 LF	旋启式阀瓣 SW	弹簧推拉式阀瓣 SP
Lift Disc	Swing Disc	Spring Loaded Disc

蝶板可调, 双偏心, 球面密封 TA
Adjustable disc, Bi-eccentric, Spheric seating surface

蝶板可调, 三偏心, 球面密封 TC
Adjustable disc, Tri-eccentric, Spheric seating surface

压力自紧密封阀盖 PSB	圆盘式 DS	双金属片 TM
Pressure Sealing Bonnet	Disc type	Bi-metal

浮动直通式 FS	固定球, 通径 TF
Floating Ball & Straight Through	Trunnion Ball & Full Port

固定球, 缩径 TR	焊接阀盖 W. B
Trunnion Ball & Reduced Port	Welded Bonnet

斜盘式 TT	双半式 DP
Tilting Disc	Dual Plate

c) 法兰密封面型式 Flange facing

光滑面 RF	凹面 FE	环连接面 RJ
Raised Face	Female Face	Ring Joint

d) 端面连接型式 End connection

一端焊接、另一端丝堵 WPL	承插焊连接 SW	内螺纹连接 THR
Welding at one end, plug at another	Socket Welding	Female thread

一端承插焊、另一端内螺纹 SW/THR	壁厚偏差 TFWT
Socket Welding at one end, thread at another	Tolerance for wall thickness

e) 垫片 Gasket

低碳钢芯片-柔性石墨复合垫 COAG

Low carbon steel core-flexible graphite composit gasket

不锈钢芯片-柔性石墨复合垫 COKG

Stainless steel core-flexible graphite composit gasket

不锈钢芯片-柔性石墨缠绕垫 SWKG

Stainless steel core-flexible graphite composit gasket

不锈钢-柔性石墨密封环 GRS2

Stainless steel-flexible graphite sealing ring

304 椭圆垫 OVK9

304 s.s oval ring gasket

10#八角垫 OCA2

10# Octagonal ring gasket

304 八角垫 OCK9

304 s.s octagonal ring gasket

10#椭圆垫 OVA2

10# oval ring gasket

321 八角垫 OCK1

321 s.s octagonal ring gasket

347 八角垫 OCK5

347 s.s octagonal ring gasket

316 八角垫 OCK8

316s.s octagonal ring gasket

316L 八角垫 OCK9

316s.s octagonal ring gasket

f) 填料 Packing

不锈钢金属丝与柔性石墨编织填料 GWF

Stainless steel wire & flexible graphite braided packing

不锈钢金属丝与柔性石墨编织填料 + 柔性石墨填料环 GFL

Stainless steel wire & flexible graphite braided packing + flexible graphite packing ring

聚四氟乙烯填充 PTFE

PTFE filling

g) 驱动方式 Actuator

伞齿轮传动

A

Bevel Gear operation

正齿轮传动

B

Spur Gear operation

涡轮传动

C

Worm Gear operation

手动

Manual operation

省略

Default