
API Specification

ISO 10423:2009 (Modified), Petroleum and natural gas industries—
Drilling and production equipment—Wellhead and christmas tree
equipment

6A

20th Edition, October 2010

Specification for Wellhead and Christmas
Tree Equipment

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1.0 Product Description

Specification 6A includes the following requirements for product ordered and may be applicable in addition to any product-specific requirements listed in other sections identified herein:

1.1 PRODUCTS: WELLHEAD & CHRISTMAS TREE EQUIPMENT

1.1.1

API Specification 6A – Introduction

It is necessary that users of this International Standard be aware that further or differing requirements can be needed for individual applications. This International Standard is not intended to inhibit a vendor from offering, or the Purchaser from accepting, alternative equipment or engineering solutions for the individual application. This can be particularly applicable where there is innovative or developing technology. Where an alternative is offered, it is the responsibility of the vendor to identify any variations from this International Standard and provide details.

1.1.2

API Specification 6A – 1.1

This International Standard specifies requirements and gives recommendations for the performance, dimensional and functional interchangeability, design, materials, testing, inspection, welding, marking, handling, storing, shipment, Purchasing, repair and remanufacture of wellhead and christmas tree equipment for use in the petroleum and natural gas industries.

1.1.3

API Specification 6A – 1.2

This International Standard is applicable to the following specific equipment:

a) Wellhead equipment:

- casing-head housings
- casing-head spools
- tubing-head spools
- cross-over spools
- multi-stage head housings and spools

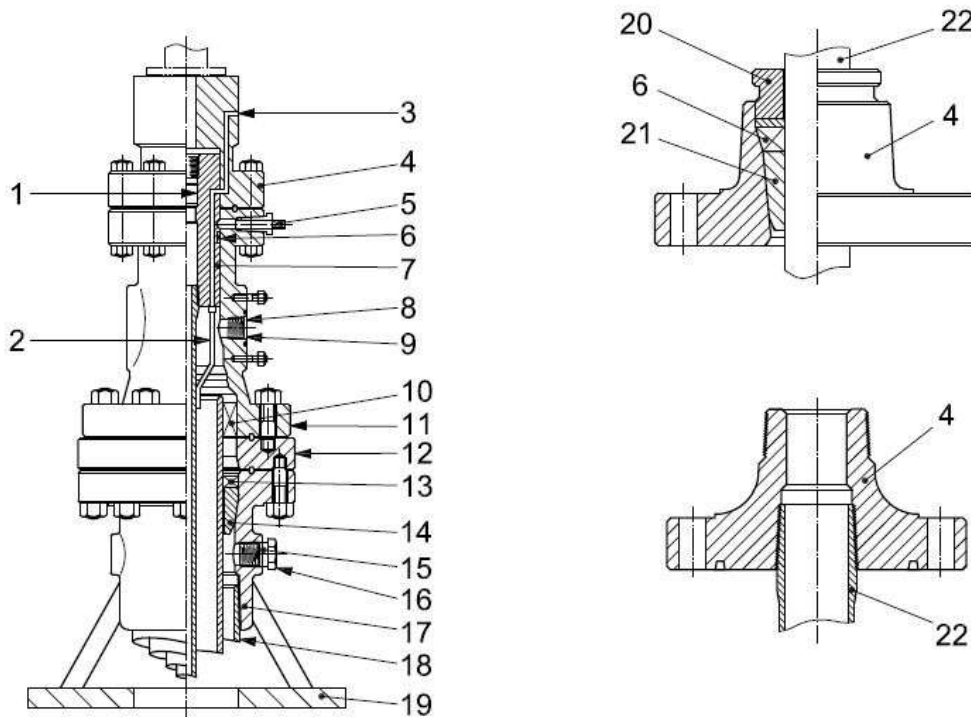
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- b) Connectors and fittings:**
 - cross-over connectors
 - tubing-head adapters
 - top connectors
 - tees and crosses
 - fluid-sampling devices
 - adapter and spacer spools
- c) Casing and tubing hangers:**
 - mandrel hangers
 - slip hangers
- d) Valves and chokes:**
 - single valves
 - multiple valves
 - actuated valves
 - valves prepared for actuators
 - check valves
 - chokes
 - surface and underwater safety valves and actuators
 - back-pressure valves
- e) Loose connectors [flanged, threaded, other end connectors (OEC), and welded]:**
 - weld neck connectors
 - blind connectors
 - threaded connectors
 - adapter and spacer connectors
 - bullplugs
 - valve-removal plugs
- f) Other equipment:**
 - actuators
 - clamp hubs
 - pressure boundary penetrations
 - ring gaskets
 - running and testing tools (see Annex H)
 - wear bushings (see Annex H)

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1.2 Wellhead Equipment Description

1.2.1 API Specification 6A – 1.4 Figure 1



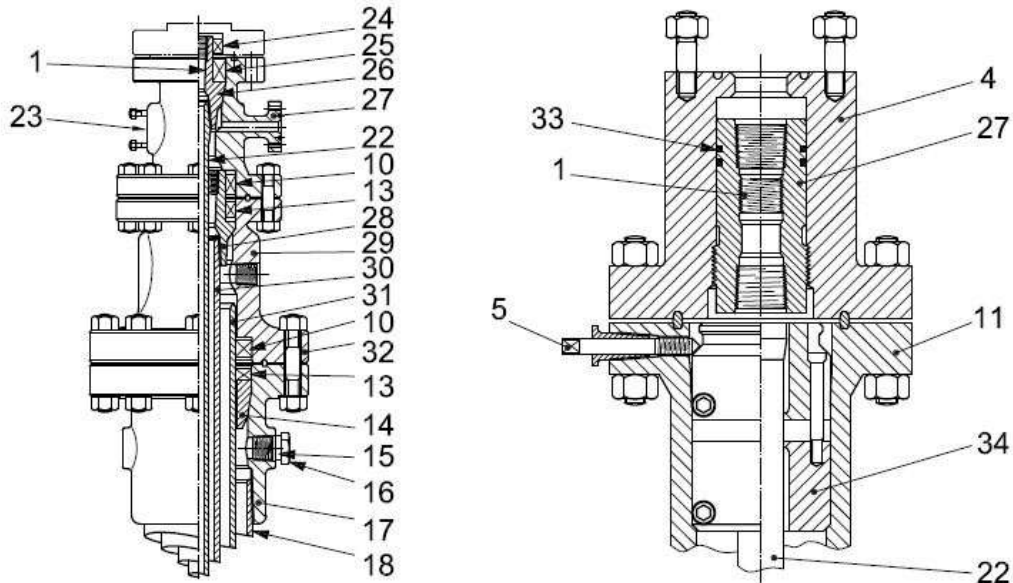
Key

- | | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> 1 back-pressure valve preparation 2 subsurface safety valve control line 3 subsurface safety valve control line outlet 4 tubing-head adapter 5 lock screw 6 tubing hanger pack-off 7 extended neck tubing hanger with subsurface safety valve control line 8 studded side outlet 9 valve-removal preparation 10 bottom casing pack-off 11 tubing-head spool | <ul style="list-style-type: none"> 12 double-studded adapter 13 annular casing pack-off 14 casing hanger (slip style) 15 threaded outlet connection 16 bullplug 17 casing-head housing 18 surface casing 19 wellhead support plate 20 tubing pack-off retainer 21 tubing hanger (slip style) 22 tubing |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

Figure 1 — Typical wellhead assembly nomenclature

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1.2.2 API Specification 6A – 1.4 Figure 1 (cont.)



Key

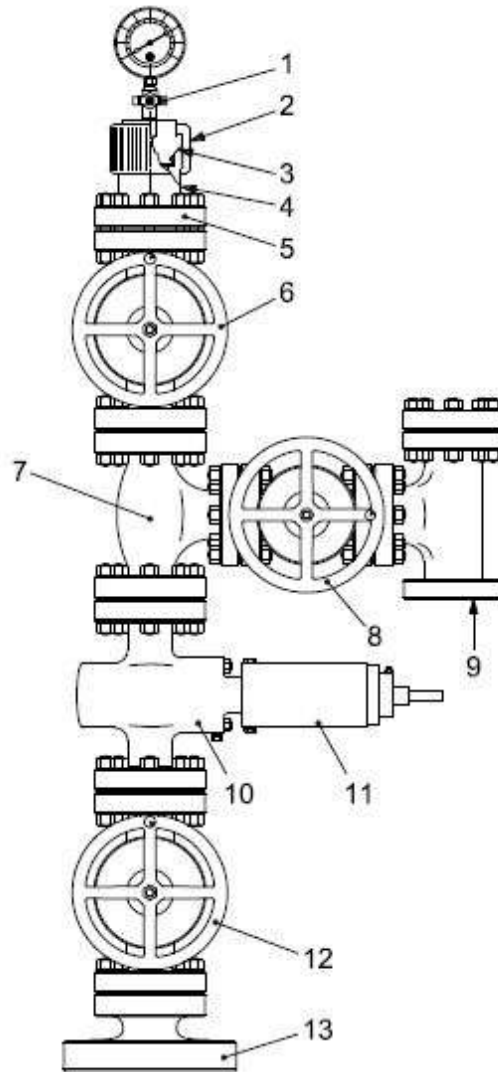
- | | | | |
|----|----------------------------------|----|-----------------------------|
| 23 | studded side-outlet connection | 29 | casing-head spool |
| 24 | extended neck tubing hanger seal | 30 | inner casing |
| 25 | annular tubing hanger seal | 31 | intermediate casing |
| 26 | tubing hanger mandrel | 32 | flanged end connection |
| 27 | flanged outlet connection | 33 | tubing hanger mandrel seals |
| 28 | casing hanger mandrel | 34 | wrap-around hanger pack-off |

Figure 1 — Typical wellhead assembly nomenclature (continued)

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1.3 Christmas Tree Equipment

Description: API Specification 6A – 1.4 Figure 2



- Key**
- | | |
|-----------------------|-----------------------------------|
| 1 gauge valve | 8 wing valve (manual or actuated) |
| 2 bonnet nut | 9 choke |
| 3 blanking plug | 10 surface safety valve |
| 4 body | 11 actuator |
| 5 top connector | 12 master valve |
| 6 swab or crown valve | 13 tubing-head adapter |
| 7 tee | |

Figure 2 — Typical christmas tree nomenclature

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1.4 PRODUCT COMPONENTS

1.4.1

Actuator

API Specification 6A – 3.1.3

Mechanism for the remote or automatic operation of a valve or choke.

1.4.2

Adapter

API Specification 6A – 3.1.4

Pressure-containing piece of equipment having end connections of different nominal sizes and/or pressure ratings, used to connect other pieces of equipment of different nominal sizes and/or pressure ratings.

1.4.3

Annular pack-off

API Specification 6A – 3.1.5

Mechanism that seals off annular pressure between the outside diameter of a suspended tubular member or hanger and the inside diameter of the head or spool through which the tubular member passes or hanger is suspended.

1.4.4

Back-pressure valve

API Specification 6A – 3.1.7

Unidirectional or bidirectional check valve that is installed through the christmas tree, into the tubing hanger, and prevents well fluids from flowing out of the well.

1.4.5

Blind flange

API Specification 6A – 3.1.8

Flange with no centre bore, used to close off completely a flanged end or outlet connection.

1.4.6

Body

API Specification 6A – 3.1.9

Any portion of wellhead and christmas tree equipment between end connections, with or without internal parts, which contains well-bore pressure.

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1.4.7

Bonnet

API Specification 6A – 3.1.10

Pressure-containing closure for a body, other than an end or outlet connection

1.4.8

Bullplug

API Specification 6A – 3.1.12

Pressure-containing closure for a female-threaded end or outlet connection, which may have an internal counter-bore and/or test port.

1.5 CONFIGURATION

Product:

Wellhead & Christmas Tree Equipment

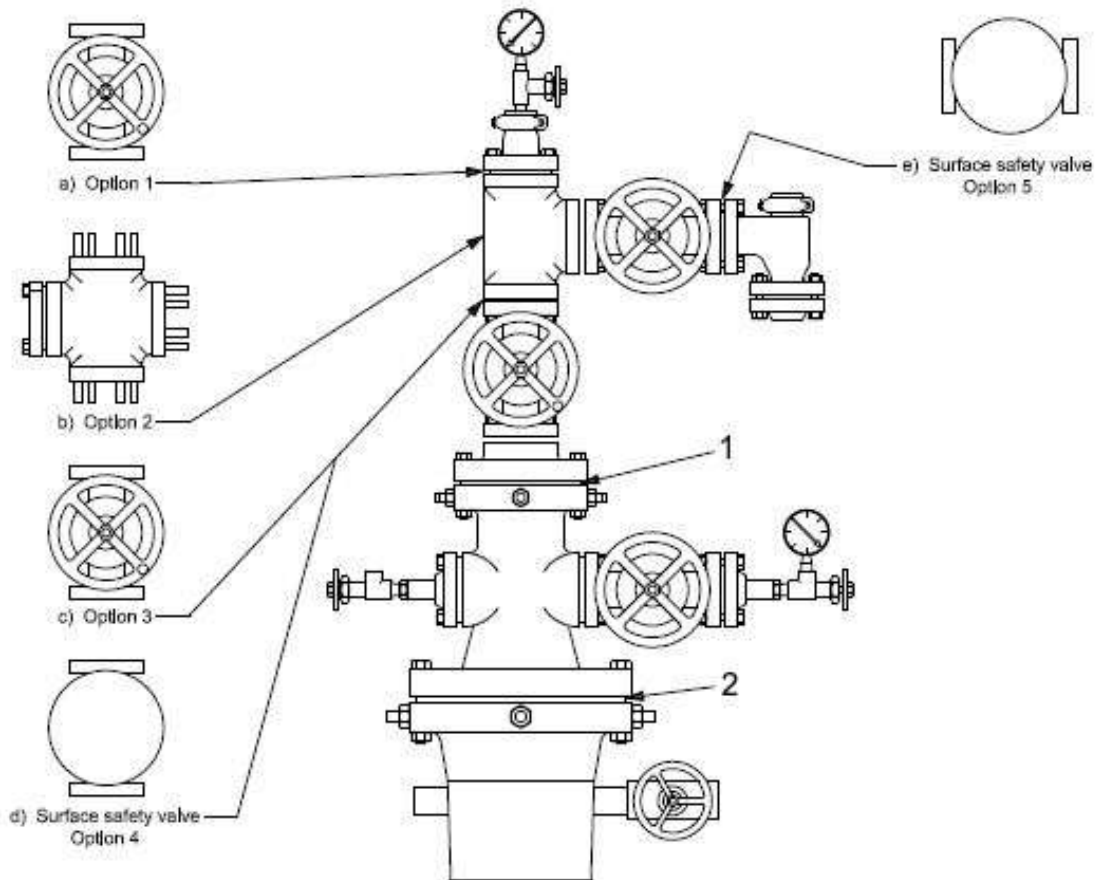
1.5.1

API Specification 6A – Annex A.3

Examples of typical wellhead and christmas tree configurations are shown in Figures A.12 and A.13. Also included are examples of casing and bit programmes that are consistent with the wellheads shown.

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1.5.2 API Specification 6A – Annex A.5 Figure A.12



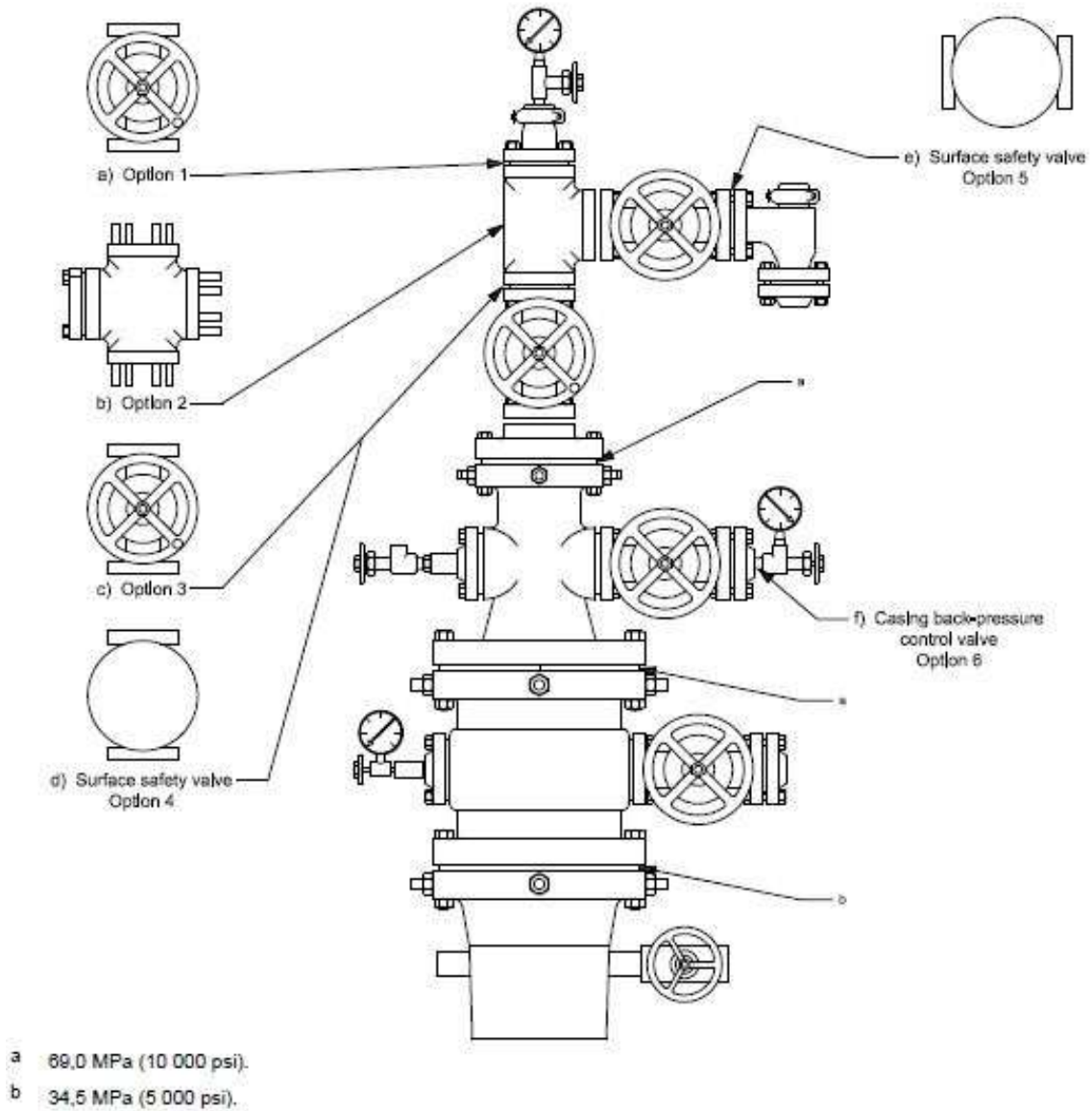
Key

- 1 tubing-head top flange 34,5 MPa (5 000 psi)
- 2 casing-head top flange 20,7 MPa (3 000 psi) or 34,5 MPa (5 000 psi)

Typical programmes			
Casing programme mm (in)	Bit programme mm (in)	Casing head top flange mm; MPa (in; psi)	Tubing head top flange mm; MPa (in; psi)
219,1 (8 5/8) × 139,7 (5 1/2)	200,0 (7 7/8)	279; 20,7 (11; 3 000)	179; 34,5 (7 1/8; 5 000)
244,5 (9 5/8) × 177,8 (7)	215,9 (8 1/2) or 222,2 (8 3/4)	or	
273,1 (10 3/4) × 193,7 (7 5/8)	250,8 (9 7/8)	279; 34,5 (11; 5 000)	

Figure A.12 — Typical wellhead and tree configuration for a 34,5 MPa (5 000 psi) rated working pressure

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**Figure A.13 — Typical wellhead and tree configuration
for a 69,0 MPa (10 000 psi) rated working pressure**

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Typical programmes (SI units)				
Casing programme mm	Bit programme mm	Casing-head housing top flange mm; MPa	Casing-head spool top flange mm; MPa	Tubing-head top flange mm; MPa
406,4 × 273,1 × 193,7	374,7 × 250,8 or 241,3	425; 34,5	279; 69,0	179; 69,0
406,4 × 298,5 × 244,5 × 177,8 liner	374,7 × 289,9 × 215,9	425; 34,5	346; 69,0	179; 69,0
			279; 69,0	
339,7 × 244,5 × 177,8	311,2 × 215,9 × 152,4	346; 34,5	279; 69,0	179; 69,0
273,1 × 193,7 × 127,0	250,8 × 165,1	279; 34,5	279; 69,0	179; 69,0

Typical programmes (USC units)				
Casing programme in	Bit programme in	Casing-head housing top flange in; psi	Casing-head spool top flange in; psi	Tubing-head top flange in; psi
16 × 10 ³ / ₄ × 7 ⁵ / ₈	14 ³ / ₄ × 9 ⁷ / ₈ or 9 ¹ / ₂	16 ³ / ₄ ; 5 000	11; 10 000	7 ¹ / ₁₆ ; 10 000
16 × 11 ³ / ₄ × 9 ⁵ / ₈ × 7 liner	14 ³ / ₄ × 10 ⁵ / ₈ × 8 ¹ / ₂	16 ³ / ₄ ; 5 000	13 ⁵ / ₈ ; 10 000	7 ¹ / ₁₆ ; 10 000
			11; 10 000	
13 ³ / ₈ × 9 ⁵ / ₈ × 7	12 ¹ / ₄ × 8 ¹ / ₂ × 6	13 ⁵ / ₈ ; 5 000	11; 10 000	7 ¹ / ₁₆ ; 10 000
10 ³ / ₄ × 7 ⁵ / ₈ × 5	9 ⁷ / ₈ × 6 ¹ / ₂	11; 5 000	11; 10 000	7 ¹ / ₁₆ ; 10 000

Figure A.13 (continued)

1.6 SPECIFICATION LEVEL

Product: Wellhead & Christmas Tree Equipment

1.6.1 API Specification 6A – Annex A.4.1

Product specification level (PSL) 1 includes practices currently being implemented by a broad spectrum of the industry for service conditions recommended in this annex.

PSL 2 includes all the requirements of PSL 1 plus additional practices currently being implemented by a broad spectrum of the industry for a specific range of service conditions, as described in this annex.

PSL 3 includes all the requirements of PSL 2 plus additional practices currently being implemented by a broad spectrum of the industry for a specific range of service conditions, as described in this annex.

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PSL 3G includes all the requirements of PSL 3 plus additional practices currently being implemented by a broad spectrum of the industry for a specific range of service conditions, as described in this annex. The designation PSL 3G is utilized only in those clauses, subclauses and tables where it is necessary to define the additional gas testing requirements of equipment that can be gas-tested.

PSL 4 includes all the requirements of PSL 3G plus certain additional requirements and is intended for applications that exceed the service conditions usually identified within the scope of this International Standard, and is normally used only for primary equipment.

Figure A.14 shows the recommended specification level for primary equipment. Primary equipment of a wellhead assembly includes the following, as a minimum:

- tubing head
- tubing hanger
- tubing-head adapter
- lower master valve

All other wellhead parts are classified as secondary. The specification level for secondary equipment may be the same as or less than the level for primary equipment.

The selection of a PSL should be based on a quantitative risk analysis, which is a formal and systematic approach to identifying potentially hazardous events and estimating the likelihood and consequences to people, environment and resources, of accidents developing from these events.

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2.0 PURCHASER'S RIGHTS

2.1 COMPLIANCE

Product: **Wellhead & Christmas Tree Equipment**

2.1.1 API Specification 6A – 3.1.88

Qualified Personnel - individual with characteristics or abilities gained through training, experience, or both, as measured against the established requirements of the manufacturer/Purchaser/this International Standard.

2.1.2 API Specification 6A – 4.2.3.2

For material classes DD, EE, FF and HH, the manufacturer shall meet the requirements of ISO 15156 (all parts) (NACE MR0175; see Clause 2) for material processing and material properties (e.g. hardness).

2.2 REPAIR & REMANUFACTURE

Product: **Wellhead & Christmas Tree Equipment**

2.2.1 API Specification 6A – Annex J.1

Annex J defines the requirements for repair and remanufacture of user/purchaser-owned wellhead and christmas tree equipment originally manufactured in accordance with this International Standard for continued service by the user/purchaser.

2.2.2 API Specification 6A – Annex J.2.1

Repair and remanufacture levels (RL) provide the basis for defining and controlling repair and remanufacture of wellhead and christmas tree equipment during its life cycle. RL levels as defined in this annex include requirements consistent with sound industry practices for repair and remanufacture activities.

2.2.3 API Specification 6A – J.2.2

RL levels are representative of the product specifications and, if applicable, product specification level (PSL) to which the equipment was originally manufactured. RL levels indicate the level of technical requirements associated with the repair or

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remanufacture of equipment and do not represent equipment suitability for specific service or performance requirements. Table J.1 summarizes the requirements of this annex to assist the customer and the repairer/remanufacturer in the selection of the appropriate RL level for equipment.

2.2.4

API Specification 6A – J.2.3

The original product specification and PSL levels shall be used to determine the RL levels to which equipment may be repaired or remanufactured as follows:

- a)** Equipment identified as originally manufactured to API Spec 6A prior to introduction of PSL levels shall be repaired or remanufactured to RL 1.
- b)** Equipment identified as originally manufactured to PSL 1 shall be repaired or remanufactured to RL 1.
- c)** Equipment identified as originally manufactured to PSL 2 shall be repaired or remanufactured to RL 1 or RL 2.
- d)** Equipment identified as originally manufactured to PSL 3 shall be repaired or remanufactured to RL 1, RL 2 or RL 3.
- e)** Equipment identified as originally manufactured to PSL 4 shall be repaired or remanufactured to RL 1, RL 2, RL 3 or RL 4.
- f)** Equipment identified as originally manufactured to API Spec 14D or ASME SPPE 1 shall be repaired or remanufactured to RL 2.

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2.2.5 API Specification – Annex J.2.3 Table J.1

Table J.1 — Summary of Annex J requirements

Requirement	RL 1	RL 2	RL 3	RL 4
Corresponding PSL level	PSL 1	PSL 2	PSL 3/3G	PSL 4
Equipment identified as originally manufactured in accordance with API Spec 6A prior to introduction of PSL levels	x	—	—	—
Equipment identified as originally manufactured as PSL 1	x	—	—	—
Equipment identified as originally manufactured as PSL 2	x	x	—	—
Equipment identified as originally manufactured as API Spec 14 D, or ASME SPPE 1	—	x	—	—
Equipment identified as originally manufactured as PSL 3, or PSL 3G	x	x	x	—
Equipment identified as originally manufactured as PSL 4	x	x	x	x
Design status indeterminate	x	—	—	—
Design status acceptable	x	x	x	x
Design of product attributes and parts similar to the OPD ^a requirements	x	—	—	—
Design of product attributes and parts meet or exceed OPD requirements	—	x	x	x
Complete disassembly and cleaning	—	x	x	x
Visual examination	x ^b	x	x	x
Dimensional inspection of specified dimensions of this International Standard	x	x	x	x
Surface NDE for remanufactured parts	—	x	x	x ^c
Welding controlled to include material identification	x	x	x	x ^c
Visual weld examination for remanufactured parts	—	x	x	x ^c
Weld surface NDE for remanufactured parts	—	x	x	x ^c
Weld volumetric NDE for remanufactured parts	—	x	x	x ^c
Weld hardness test	—	—	x	x ^c
Hardness testing for sour service	x ^e	x ^e	x ^e	x ^e
Hardness testing to requirements of this International Standard	—	x ^e	x ^e	x ^e
Reassembly traceability	—	—	x	x
Hydrostatic body test	x ^f	x	x	x
Hydrostatic seat test	x	x	x	x
Extended seat test	—	—	x	x
Drift test	x	x	x	x
Gas test	—	—	x ^d	x
Certificate of conformance provided to customer	—	—	x	x
Assembly traceability and test records provided to customer	—	—	x	x
Complete quality control records provided to customer	—	—	—	x

^a OPD indicates "original product definition".
^b Examination required only to extent permitted by disassembly.
^c Welding is not permitted except for weld overlays.
^d Gas test for PSL 3G option only.
^e Applicable to body, bonnet, end and outlet connections and stems.
^f Hydrostatic test required only at working pressure.

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3.0 PURCHASER'S RESPONSIBILITY

3.1 MATERIAL SELECTION

Product: Wellhead & Christmas Tree Equipment

- 3.1.1** API Specification 6A – 4.2.3.2
Choosing material class and specific materials for specific conditions is ultimately the responsibility of the Purchaser.
- 3.1.2** API Specification 6A – 4.2.3.2
In making the material selections, it is the responsibility of the Purchaser to also consider the various environmental factors and production variables listed in Annex A.
- 3.1.3** API Specification 6A – 4.2.3.2
It is the responsibility of the Purchaser to evaluate and determine the applicability of the documented data for the intended application.
- 3.1.4** API Specification 6A – Annex A.2
The effects of external loads (i.e. bending moments, tensions, etc.) on the assembly of components are not explicitly addressed by this International Standard (see 4.2.1.3). The purchaser should specify any exceptional loading configuration.
- 3.1.5** API Specification 6A – Annex A.2
The purchaser should specify whether the design validation procedures in Annex F are applicable.

3.2 DATA SHEETS & ORDERING

Product:

3.2.1 Wellhead & Christmas Tree Equipment

Requirement

- 3.2.1.1** API Specification 6A – Annex A.1
Annex A provides guidelines for enquiry and purchase of wellhead and christmas tree equipment. These guidelines consist of data sheets for completion by the purchaser, a series of typical

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wellhead and christmas tree configurations, and a decision tree for determining product specification levels. An electronic, revisable form of each data sheet can be accessed by clicking on the figure title, as indicated.

The data sheets are designed to perform two functions:

- a)** assist the purchaser in deciding what he wants;
- b)** assist the purchaser in communicating his particular needs and requirements, as well as information on the well environment, to the manufacturer for his use in designing and producing equipment.

To use this annex, a copy of the data sheets should be completed as accurately as possible. The typical configurations should be referred to, as needed, to select the required equipment. The decision tree, given in Figure A.14, together with its instructions, provides the recommended practice as to which PSL each piece of equipment should be manufactured. A copy of the data sheet should then be attached to the purchase order or request for proposal.

3.2.1.2 API Specification 6A – Annex A.2

The following pages contain questions and information that can be used to select wellhead equipment, including chokes and actuators. Figure A.1 contains general information that pertains to the entire well. Figures A.2 to A.11 are designed for use with each type of equipment.

3.2.1.3 **ISO 15156 (all parts)**

API Specification 6A – A.4.2

This applies if the partial pressure of hydrogen sulfide (H₂S) in the produced fluid equals or exceeds the minimum amount specified by ISO 15156 (all parts) (NACE MR0175; see Clause 2) for sour service.

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3.2.1.4 High H₂S concentration

API Specification 6A – Annex A.4.3

Use “Yes” if the H₂S concentration of the produced fluid is such that in air an H₂S concentration of 70 ml/m³ [70 ppm (parts per million)] can develop in case of a leak (human sense of smell cannot detect concentrations higher than 70 ml/m³).

Alternatively, use “Yes” if the radius of exposure (ROE) to 100 ml/m³ (100 ppm) H₂S is greater than 15 m (50 ft) from the wellhead. ROE is defined in Texas Administrative Code, Title 16, Part 1, Chapter 3, Rule 3.36, b) 3); see A.4.5. Other methods of calculating ROE may apply, depending on local regulations.

The above requires the knowledge of the adjusted open-flow rate of offset wells. If this is not available, but if hydrogen sulfide can be expected, a 100 ml/m³ (100 ppm) ROE equal to 1 000 m (3 000 ft) may be assumed.

3.2.1.5 Close proximity

API Specification 6A – Annex A.4.4

Users who are accustomed to the use of the close-proximity and radius-of-exposure concepts may substitute close proximity for gas well in Figure A.14.

The proximity assessment should consider the potential impact of an uncontrolled emission of H₂S threatening life and environment near the wellhead. The following list of items can be used for determining potential risk:

a) 100 ml/m³ (100 ppm) ROE of H₂S is greater than 15 m (50 ft) from the wellhead and includes any part of a public area except a public road. ROE is defined in A.4.5. “Public area” means a dwelling, place of business, place of worship, school, hospital, school bus stop, government building, a public road, all or any portion of a park, city, town, village, or other similar area that one can expect to be populated. “Public road” means any street or road owned or maintained for public access or use

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- b)** 500 ml/m³ (500 ppm) ROE of H₂S is greater than 15 m (50 ft) from the wellhead and includes any part of a public area including a public road
- c)** well is located in any environmentally sensitive area, such as a park, wildlife preserve, city limits, etc.
- d)** well is located within 46 m (150 ft) of an open flame or fired equipment
- e)** well is located within 15 m (50 ft) of a public road
- f)** well is located in or near inland navigable waters
- g)** well is located in or near surface domestic water supplies
- h)** well is located within 107 m (350 ft) of any dwelling

These conditions are recommended minimum considerations. Any local regulatory requirements should be met.

3.2.1.6 Radius of exposure of H₂S

API Specification 6A – Annex A.4.5.1

The following information is taken from Texas Railroad Commission Rule 36. SI metric-equivalent rules are not given, as the method of determining the ROE is used in the United States only. Other methods of calculating ROE may apply, depending on local regulations.

3.2.1.7 Radius of exposure of H₂S

API Specification 6A – Annex A.4.5.2

The location, X₁₀₀, of the 100 ml/m³ (100 ppm) ROE is determined as given in Equation (A.1):

$$X_{100} = [(1,589)(y_{H_2S})(q)]^{0,625} \quad (A.1)$$

The location, X₅₀₀, of the 500 ml/m³ (500 ppm) ROE is determined as given in Equation (A.2):

$$X_{500} = [(0,4546)(y_{H_2S})(q)]^{0,625} \quad (A.2)$$

where

- y_{H_2S} is the mole fraction H₂S in the gaseous mixture available for escape;
- X is the radius of exposure, expressed in feet;
- q is the maximum volume flow rate determined to be available for escape, expressed in cubic feet per day.

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3.2.1.8 Radius of exposure of H₂S

API Specification 6A – Annex A.4.5.3

The volume flow rate used as the escape rate in determining the radius of exposure shall be that specified below, as applicable.

a) For new wells in developed areas, the escape rate shall be determined by using the current-adjusted open flow rate of offset wells, or the field-average current-adjusted open flow rate, whichever is larger.

b) The escape rate used in determining the radius of exposure shall be corrected to standard conditions of 0,101 Mpa (14,65 psia) and 16 °C (60 °F).

3.2.1.9 Corrosivity of retained fluid

API Specification 6A – Annex A.5

To select the desired material class in Table 3, the purchaser should determine the corrosivity of the retained, produced or injected fluid by considering the various environmental factors and production variables listed in Figure A.1. General corrosion, stress-corrosion cracking (SCC), erosion-corrosion and sulfide stress cracking (SSC) are all influenced by the interaction of the environmental factors and the production variables. Other factors and variables not listed in Figure A.1 may also influence fluid corrosivity.

The purchaser should determine whether materials shall meet ISO 15156 (all parts) (NACE MR0175; see Clause 2) for sour service. ISO 15156 (all parts) (NACE MR0175; see Clause 2) is concerned only with the metallic material requirements to prevent sulfide stress cracking and not with resistance to general corrosion.

Consideration should also be given to the partial pressure of carbon dioxide, which generally relates to corrosivity in wells, as shown in Table A.1. This table is a guideline only.

Analysis of produced fluids might not predict the field performance of metallic or non-metallic material.

The minimum partial pressure of carbon dioxide required to initiate corrosion and the relative effect of increasing partial

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pressures on the corrosion rate are strongly influenced by other environmental factors and production variables, such as:

- a)** temperature;
- b)** H₂S level;
- c)** pH;
- d)** chloride ion concentration;
- e)** sand production;
- f)** water production and composition;
- g)** types and relative amounts of produced hydrocarbons.

Finally, the purchaser should consider future service of the well when selecting a material class. This not only should not be limited to anticipated changes in the acid-gas partial pressures for production or increased water production with or without increased chloride content, but also should include consideration of operations such as acidification or other well treatments.

3.2.1.10 API Specification 6A – Annex A.5 Table A.1

Table A.1 — Relative corrosivity of retained fluids as indicated by CO₂ partial pressure

Retained fluids	Relative corrosivity	Partial pressure of CO ₂	
		MPa	(psia)
General service	non-corrosive	< 0,05	(< 7)
General service	slightly corrosive	0,05 to 0,21	(7 to 30)
General service	moderately to highly corrosive	> 0,21	(> 30)
Sour service	non-corrosive	< 0,05	(< 7)
Sour service	slightly corrosive	0,05 to 0,21	(7 to 30)
Sour service	moderately to highly corrosive	> 0,21	(> 30)

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3.2.2: Wellhead Equipment
3.2.2.1 API Specification 6A – Annex A.5 Figure A.1

Wellhead equipment data sheet — General						
Well name(s) and location(s): _____						
Maximum operating pressure: _____						
Anticipated wellhead shut-in pressure: _____						
Temperature ranges anticipated: _____						
Minimum ambient temperature: _____						
Maximum flowing fluid temperature at wellhead: _____						
Anticipated composition of produced fluids: CO ₂ _____ (mg) _____ Chlorides _____ (mg)						
_____ H ₂ S _____ (mg) _____ Other _____						
Anticipated completion or future workover or recovery operations which would affect pressure, temperature or fluid content: _____						
New values: _____						
Are there any government regulations that apply or must be met by this equipment? _____						
If so, which one(s)? _____						
Water or brine pH: _____						
Does ISO 15156 (all parts) (NACE MR0175; see Clause 2) apply? _____						
Will scale, paraffin, corrosion or other types of inhibitors be used? _____						
Inhibitor type: _____		Inhibitor carrier: _____		Batch or continuous inhibition? _____		
Will acidification be performed? _____			Type of acid: _____			
Anticipated production rates:		m ³ /d oil/condensate				
		m ³ /d gas				
		m ³ /d S&W ^a				
Will erosion be a concern? _____		Cause: _____				
External coating? Yes, type _____		No _____				
Internal coating? Yes, type _____		No _____				
Delivery requirements: _____						
Special shipping, packing and storage instructions: _____						
Casing programme						
Top joint in string						
	Size (OD)	kg/m (lb/ft)	Grade	Connection	Total string hanging wt daN (lbs)	Bit size mm (in)
Conductor	_____	_____	_____	_____	_____	_____
Surface casing	_____	_____	_____	_____	_____	_____
Protective casing	_____	_____	_____	_____	_____	_____
Production casing	_____	_____	_____	_____	_____	_____
Tubing	_____	_____	_____	_____	_____	_____
Type of completion: single or multiple _____						
^a Sand and water.						

Figure A.1 — Wellhead equipment data sheet — General

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Wellhead equipment data sheet — Casing-head housing	
Casing-head housing	PSL: _____ PR: _____
Bottom connection:	Size: _____ Rated working pressure: _____ Type: _____
Top connection:	Size: _____ Rated working pressure: _____ Type: _____
Outlets:	Size: _____ Rated working pressure: _____ Type: _____ Number: _____
Equipment for outlets:	Valve-removal plug: _____ Valves (inboard): Qty _____ PSL: _____ PR: _____ Valves (other): Qty _____ PSL: _____ PR: _____ Companion flanges: Qty _____ PSL: _____ Bullplugs: Qty _____ Nipples: Qty _____ Needle valves: Qty _____ Gauges: Qty _____
Lock screws? Yes _____ No _____	Lock screw function: _____
Baseplate requirements: _____	
Special material requirements: _____	
Casing hanger:	
Size: _____	Type: _____
PSL: _____	PR: _____
Temperature rating (Table 2): _____	
Material class (Table 3): _____	
Retained fluid corrosivity (Table A.1): _____	
Witness? Yes ^a _____ No _____	
External coating? No _____ Yes _____ If yes, type _____	
Internal coating? No _____ Yes _____ If yes, type _____	
Flange bolting requirements (Table 62) Non-exposed _____ Exposed _____ Exposed (low strength) _____	
Main run (studs): _____ (nuts): _____	
Outlet inboard (studs): _____ (nuts): _____	
Outlet other (studs): _____ (nuts): _____	
Test and auxiliary equipment:	
Wear bushing: _____	
Running and retrieving tools: _____	
Test plug: _____	
Other requirements: _____	

^a If yes, specify what and by whom.

Figure A.2 — Wellhead equipment data sheet — Casing-head housing

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3.2.2.3 API Specification 6A – Annex A.5 Figure A.3

Wellhead equipment data sheet — Casing-head spool	
Casing-head spool	PSL: _____ PR: _____
Bottom connection:	Size: _____ Rated working pressure: _____ Type: _____
Top connection:	Size: _____ Rated working pressure: _____ Type: _____
Outlets:	Size: _____ Rated working pressure: _____ Type: _____ Number: _____
Equipment for outlets:	Valve-removal plug: _____ Valves (inboard): Qty _____ PSL: _____ PR: _____ Valves (other): Qty _____ PSL: _____ PR: _____ Companion flanges: Qty _____ PSL: _____ Bullplugs: Qty _____ Nipples: Qty _____ Needle valves: Qty _____ Gauges: Qty _____
Lock screws? Yes _____ No _____	Lock screw function: _____
Special material requirements:	_____
Bottom casing spool pack-off size:	_____
	Type: _____ PR: _____
Casing hanger:	Size: _____ Type: _____ PSL: _____ PR: _____
Temperature rating (Table 2):	_____
Material class (Table 3):	_____
Retained fluid corrosivity (Table A.1):	_____
Witness? Yes ^a _____ No _____	
External coating? No _____ Yes _____	If yes, type _____
Internal coating? No _____ Yes _____	If yes, type _____
Flange bolting requirements (Table 62)	Exposed _____ Non-exposed _____
Outlet inboard (studs): _____ (nuts): _____	
Outlet other (studs): _____ (nuts): _____	
Test and auxiliary equipment:	
Wear bushing:	_____
Running and retrieving tools:	_____
Test plug:	_____
Other requirements:	_____

^a If yes, specify what and by whom.

Figure A.3 — Wellhead equipment data sheet — Casing-head spool

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3.2.2.4 API Specification 6A – Annex A.5 Figure A.4

Wellhead equipment data sheet — Tubing-head spool	
Tubing-head spool	PSL: _____ PR: _____
Bottom connection:	Size: _____ Rated working pressure: _____ Type: _____
Top connection:	Size: _____ Rated working pressure: _____ Type: _____
Outlets:	Size: _____ Rated working pressure: _____ Type: _____ Number: _____
Equipment for outlets:	Valve-removal plug: _____ Valves (inboard): Qty _____ PSL: _____ PR: _____ Valves (other): Qty _____ PSL: _____ PR: _____ Companion flanges: Qty _____ PSL: _____ Bulplugs: Qty _____ Nipples: Qty _____ Needle valves: Qty _____ Gauges: Qty _____
Lock screws? Yes _____ No _____	Lock screw function: _____
Material requirements:	_____
Bottom tubing spool pack-off:	Size: _____ Type: _____ PR: _____
Tubing hanger:	Size: _____ Type: _____ PSL: _____ PR: _____ Back-pressure valve type: _____ Surface-controlled subsurface valve control lines: _____
Temperature rating (Table 2):	_____
Material class (Table 3):	_____
Retained fluid corrosivity (Table A.1):	_____
Witness? Yes ^a _____ No _____	
External coating? No _____ Yes _____	If yes, type _____
Internal coating? No _____ Yes _____	If yes, type _____
Flange bolting requirements (Table 62)	Non-exposed _____ Exposed _____ Exposed (low strength) _____
Main run (studs): _____	(nuts): _____
Outlet inboard (studs): _____	(nuts): _____
Outlet other (studs): _____	(nuts): _____
Test and auxiliary equipment:	
Wear bushing:	_____
Running and retrieving tools:	_____
Test plug:	_____
Other requirements:	_____

^a If yes, specify what and by whom.

Figure A.4 — Wellhead equipment data sheet — Tubing-head spool

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3.2.2.5 API Specification 6A – Annex A.5 Figure A.5

Wellhead equipment data sheet — Cross-over flange	
Cross-over flange	PSL: _____ PR: _____
Bottom connection:	Size: _____ Rated working pressure: _____ Type: _____
Top connection:	Size: _____ Rated working pressure: _____ Type: _____
Pack-off type: _____	
Size: _____	
Temperature rating (Table 2): _____	
Material class (Table 3): _____	
Retained fluid corrosivity (Table A.1): _____	
Witness? Yes ^a _____ No _____	
External coating? No _____ Yes _____ If yes, type _____	
Internal coating? No _____ Yes _____ If yes, type _____	
Flange bolting requirement (Table 62)	Non-exposed _____ Exposed _____ Exposed (low strength) _____
Main run (studs): _____ (nuts): _____	
^a If yes, specify what and by whom.	

Figure A.5 — Wellhead equipment data sheet — Cross-over flange

3.2.2.6 API Specification 6A – Annex A.5 Figure A.6

Wellhead equipment data sheet — Tubing head adaptor	
Tubing head adaptor	PSL: _____ PR: _____
Bottom connection:	Size: _____ Rated working pressure: _____ Type: _____
Top connection:	Size: _____ Rated working pressure: _____ Type: _____
Surface-controlled subsurface safety valve outlets:	
Number: _____	
Size: _____	
Electrical feed-through connection? _____	
Special material requirements: _____	
Temperature rating (Table 2): _____	
Material class (Table 3): _____	
Retained fluid corrosivity (Table A.1): _____	
Witness? Yes ^a _____ No _____	
External coating? No _____ Yes _____ If yes, type _____	
Internal coating? No _____ Yes _____ If yes, type _____	
Flange bolting requirement (Table 62)	Non-exposed _____ Exposed _____ Exposed (low strength) _____
Main run (studs): _____ (nuts): _____	
^a If yes, specify what and by whom.	

Figure A.6 — Wellhead equipment data sheet — Tubing head adaptor

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3.2.2.7 API Specification 6A – Annex A Figure A.7

Wellhead equipment data sheet — Christmas tree and choke									
Christmas tree – Single ___ Dual ___ Solid block ___ Stacked ___									
	Size	Material ^a	PSL	PR	Witness? ^b	External coating? If yes, state type	Flanged bolting requirements ^c Studs Nuts		Ring gasket type
Lower master valve _____									
Upper master valve _____									
Swab (crown) valve _____									
Wing valve—inboard _____									
Wing valve(s)—other _____									
Tee/cross (circle one) _____									
Choke _____									
End flange _____									
Companion flanges _____									
Instrument flanges _____									
Tree cap/top conn. _____									
Rated working pressure: _____									
Retained fluid corrosivity (Table A.1): _____									
Temperature rating (Table 2): _____									
Material class (Table 3): _____									
Upper master prepared for actuator:			Yes ___	No ___	If yes, specify class I or II below PR column				
Wing valve—inboard prepared for actuator:			Yes ___	No ___	If yes, specify class I or II below PR column				
Wing valve—other prepared for actuator:			Yes ___	No ___	If yes, specify class I or II below PR column				
Choke: adjustable or fixed: _____									
Orifice size: _____					Nominal size: _____				
Pressure drop: _____									
Flowline connection:		Size: _____							
		Type: _____							
Special material requirements: _____									
Other requirements: _____									
Upper master valve type actuator requirements:		Pneu./piston _____		Hydr./piston _____		Electric _____			
Supply pressure/power		Pneu./diaphragm _____		Hydr./diaphragm _____		Electric _____			
Air _____ Gas _____									
Wing valve type actuator requirements:		Pneu./piston _____		Hydr./piston _____		Electric _____			
		Pneu./diaphragm _____		Hydr./diaphragm _____		Electric _____			
Supply pressure: _____									
Other: _____									

^a Define or specify material requirements and, if cladding or other corrosion-resistant materials are to be inlaid, state base material type/clad material type, e.g. 4130/625.
^b If yes, specify what and by whom.
^c Indicate required bolting for the applicable retained fluid and temperature classification specified in Table 62.

Figure A.7 — Wellhead equipment data sheet — Christmas tree and choke

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3.2.2.8 API Specification 6A – Annex A.5 Figure A.8

Wellhead equipment data sheet — Compact casing-head housing	
Compact casing-head housing	PSL: _____ PR: _____
A. Bottom connection:	Size: _____
	Rated working pressure: _____
	Type: _____
Outlets:	Size: _____
	Rated working pressure: _____
	Type: _____
	Number: _____
Equipment for outlets:	Valve-removal plug: _____
	Valves (inboard): Qty _____ PSL: _____ PR: _____
	Valves (other): Qty _____ PSL: _____ PR: _____
	Companion flanges: Qty _____ PSL: _____
	Bullplugs: Qty _____
	Nipples: Qty _____
	Needle valves: Qty _____
	Gauges: Qty _____
Lock screws? Yes _____ No _____	Lock screw function: _____
Base plate requirements:	_____
Witness? No _____ Yes ^a _____	
Special material requirements:	_____
Bottom casing spool pack-off:	Size: _____
	Type: _____
Casing hanger:	Size: _____
	Type: _____
	PR: _____
	PSL: _____
Temperature rating (Table 2):	_____
Material class (Table 3):	_____
Retained fluid corrosivity (Table A.1):	_____
External coating? No _____ Yes _____	If yes, type: _____
Internal coating? No _____ Yes _____	If yes, type: _____
Flange bolting requirements (Table B2)	Non-exposed _____ Exposed _____ Exposed (low strength) _____
Outlet inboard (studs): _____	(nuts): _____
Outlet other (studs): _____	(nuts): _____
Other requirements:	_____

^a If yes, specify what and by whom.

Figure A.8 — Wellhead equipment data sheet — Compact casing-head housing

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3.2.2.9 API Specification 6A – Annex A.5 Figure A.9

B. Top connection:	Size: _____
	Rated working pressure: _____
	Type: _____
Outlets:	Size: _____
	Rated working pressure: _____
	Type: _____
	Number: _____
Equipment for outlets:	Valve-removal plug: _____
	Valves (inboard): Qty _____ PSL: _____ PR: _____
	Valves (other): Qty _____ PSL: _____ PR: _____
	Companion flanges: Qty _____ PSL: _____
	Bullplugs: Qty _____
	Nipples: Qty _____
	Needle valves: Qty _____
	Gauges: Qty _____
Lock screws? Yes _____ No _____	Lock screw function: _____
Special material requirements:	_____
Casing hanger:	
	Size: _____
	Type: _____
	PSL: _____
	PR: _____
Temperature rating (Table 2):	_____
Material class (Table 3):	_____
Retained fluid corrosivity (Table A.1):	_____
External coating? No _____ Yes _____	If yes, type: _____
Internal coating? No _____ Yes _____	If yes, type: _____
Flange bolting requirements (Table 62)	Non-exposed _____ Exposed _____ Exposed (low strength) _____
Outlet inboard (studs): _____	(nuts): _____
Outlet other (studs): _____	(nuts): _____
Test and auxiliary equipment: (top and/or bottom)	_____
Wear bushings:	_____
Running and retrieving tools:	_____
Test plugs:	_____
Other requirements:	_____

Figure A.8 (continued)

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3.2.2.10 API Specification 6A – Annex A.5 Figure A.10

Wellhead equipment data sheet — Choke sizing					
Application					
Fluid					
Quantity					
End connections / A&B Dimensions ^a					
Pressure rating/Inlet			Outlet		
Temperature rating					
Material class		Body	Trim		
PSL		PR			
Service conditions at		Max. flow (Units)	Normal flow (Units)	Min. flow (Units)	
Pressure	Inlet				
	Outlet or ΔP				
Temperature at inlet					
Oil	Flow rate				
	S.G. (if available)				
Gas	Flow rate				
	or G.O.R.				
	S.G. (if available)				
Liquid	Flow rate				
	S.G. (if available)				
Manual/actuated					
Actuator type/make/model					
Power source					
Manual override					
Position indication		Local	Remote/position transmitter		
Positioner					
Additional comments					
Adjustable or positive :					
maximum orifice diameter:					
type of flow bean:					
^a See Figures 17 and 18.					

Figure A.10 — Wellhead equipment data sheet — Choke sizing

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3.2.2.11 API Specification 6A – Annex A.5 Figure A.11

Wellhead equipment data sheet — Actuator and bonnet					
Pneumatic	Quantity	Hydraulic	Quantity	Electric	Quantity
Diaphragm	Single _____ Double _____	Conventional	Rising stem _____ Non-rising stem _____		
Piston	Single _____ Double _____	Retained fluid	Rising stem _____ Non-rising stem _____		
		Wirecutter	_____	Wire/cable size	_____
		Self-contained	_____	Stand-alone power source	_____
Supply requirements/specifications					
Pneumatic			Hydraulic		
Availability _____ MPa (psi)			Availability _____ MPa (psi)		
Max. _____ Min. _____			Max. _____ Min. _____		
Clean air _____			Well fluid _____		
Nitrogen _____			non-sour _____ sour _____		
Well gas _____ non-sour _____			Self-contained _____		
Other _____ sour _____			Other _____		
Electric					
Voltage _____					
DC _____ AC _____ Phase _____ Frequency _____					
Current available _____					
Other _____					
Actuator requirements			Field data		
Specifications			Actuator		
Temperature rating (Table 2) _____			Customer _____		
Retained fluid (Table A.1) _____			Field location _____		
Materials class (Table 3) _____			Platform _____		
External coating? No _____ Yes _____			Well No. _____		
If yes type _____			Closed-in tubing head pressure _____ MPa (psi)		
			Accessories		
			Fusible hold-open device _____		
			Manual hold-open device _____		
			Quick exhaust valve _____		
			Position indication a) local _____		
			b) remote _____		
Bonnet requirements					
Size _____		Specification		PSL	
Model _____		SSV PR2 _____		2 _____	
Maximum working pressure _____ MPa (psi)				3 _____	
				3G _____	
				4 _____	
Material class: _____			Temperature rating: _____		

Figure A.11 — Wellhead equipment data sheet — Actuator and bonnet

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3.2.2.12 API Specification 6A – Annex A.5 Figure A.14

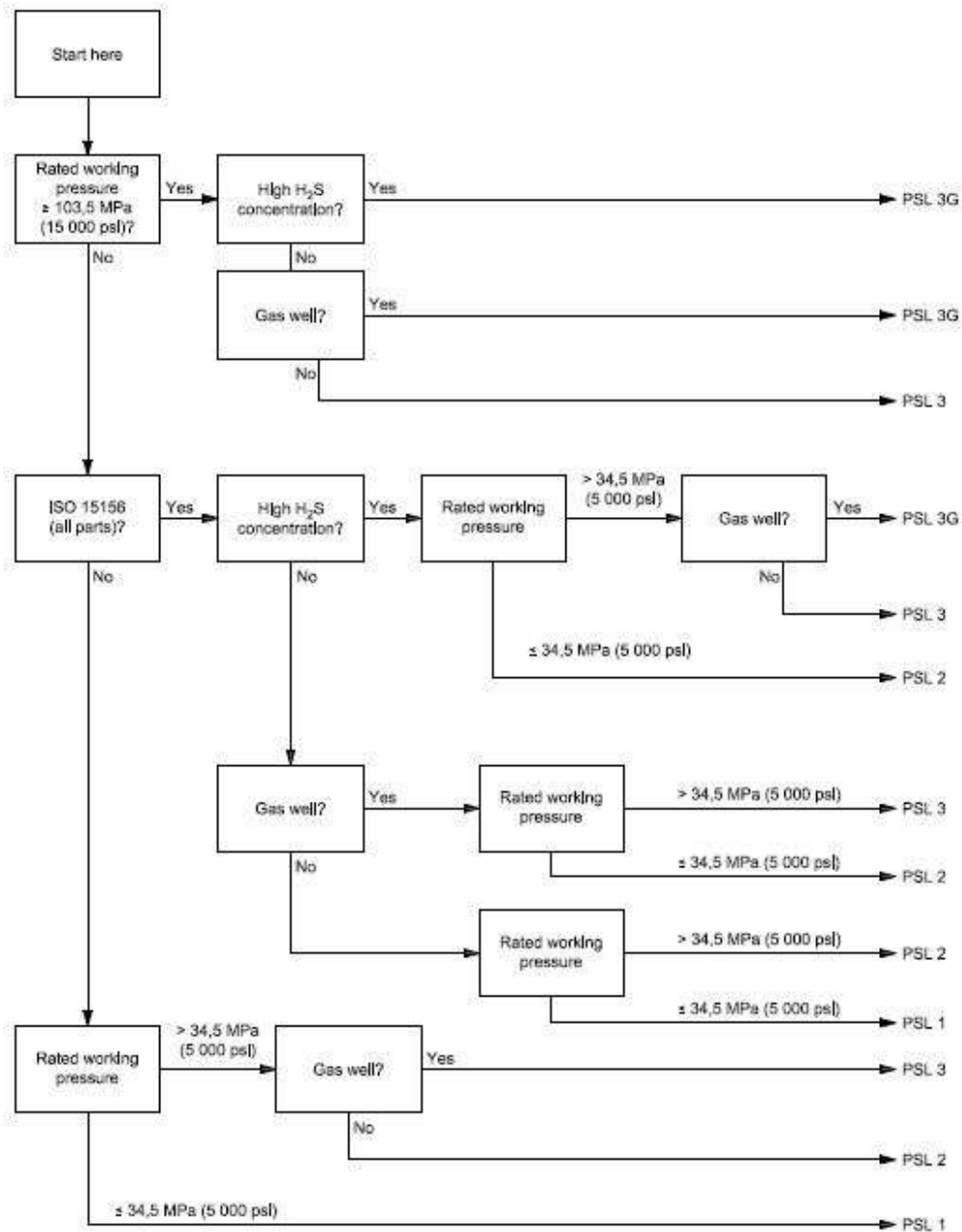


Figure A.14 — Recommended minimum PSL for primary parts of wellhead and christmas tree equipment

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4.0 DESIGN REQUIREMENTS

4.1 PERFORMANCE

Product:

Wellhead & Christmas Tree Equipment

4.1.2

API Specification 6A – 4.1

Performance requirements are specific and unique to the product in the as-shipped condition. All products shall be designed to perform according to the requirements of 4.2 to 4.7 and the relevant requirements specified in Clause 10 while in the pressure and temperature ranges and used with the test fluids consistent with the material class in Table 3 for which they are rated. Other requirements specified by the Purchaser may include load capability, cycles, lubrication and operating force or torque.

4.1.3

API Specification 6A – 4.2.2.1

Equipment shall be designed to operate in one or more of the specified temperature ratings with minimum and maximum temperatures as shown in Table 2, or to minimum and maximum operating temperatures as agreed between the Purchaser and manufacturer.

4.1.4

API Specification 6A – 4.7

Manufacturers shall document their design validation procedures and the results of design validation of designs. The design validation procedures, including acceptance criteria for SSVs and USVs, are given in Annex I. Additional validation procedures, including acceptance criteria, are given in Annex F for use if specified by the manufacturer or Purchaser.

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5.0 TESTING REQUIREMENTS

5.1 DATA SHEETS

Product:

Wellhead & Christmas Tree Equipment

5.1.1

API Specification 6A – Annex J.7.10

RL 3 shall be tested according to the requirements of PSL 3 or PSL 3G, as applicable, and specified by the user/Purchaser.

5.1.2

Christmas Tree Equipment

API Specification 6A – 10.13.7

Any disassembly, removal or replacement of parts or equipment after testing shall be as agreed with the Purchaser.

5.1.3

Valves & Actuators

5.1.3.1

API Specification 6A – 10.20.7.2

The following shall be furnished to the Purchaser:

Each SSV/USV shall be delivered to the purchaser with a completed SSV/USV functional test data sheet in accordance with Figure 24.

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5.1.3.2: API Specification 6A – 10.20.7.2 Figure 24

SSV/USV functional test data sheet (example)	
SSV/USV valve data:	
Manufacturer _____	
Valve catalog or model No. _____	Serial No. _____ Size _____
Rated working pressure _____	Temperature class _____
Valve bore _____	Material class _____ PSL _____ PR2 class _____
Class II SSV/USV valve performance test agency _____ Test report No. _____	
SSV/USV actuator data:	
Manufacturer _____	
Actuator catalog or model No. _____	Serial No. _____ Size _____
Rated working pressure _____	Temperature rating _____
Material class _____	PSL _____ PR 2 class _____
Functional test data:	
I. SSV/USV actuator seal test _____ Performed by _____	
Pneumatic _____	Hydraulic _____
At 20 % of working pressure rating	
Beginning time _____	Test gauge pressure reading _____
Ending time _____	Test gauge pressure reading _____
At 100 % of working pressure rating	
Beginning time _____	Test gauge pressure reading _____
Ending time _____	Test gauge pressure reading _____
II. Drift check	
Drift mandrel OD _____	
Visual inspection _____	Performed by _____
III. SSV/USV actuator operational test _____ Performed by _____	
Number of cycles completed _____	
IV. SSV/USV valve body and bonnet hydrostatic test performed by _____	
Required test pressure _____	
Primary pressure-holding period	
Beginning time _____	Test gauge pressure reading _____
Ending time _____	Test gauge pressure reading _____
Secondary pressure-holding period	
Beginning time _____	Test gauge pressure reading _____
Ending time _____	Test gauge pressure reading _____
V. SSV/USV valve seat test performed by _____	
SSV/USV valve type: Unidirectional _____ Bidirectional _____	
Required test pressure _____	
Primary seat test (pressure applied from downstream end)	
Beginning time _____	Test gauge pressure reading _____
Ending time _____	Test gauge pressure reading _____
Secondary seat test (pressure applied from downstream end)	
Beginning time _____	Test gauge pressure reading _____
Ending time _____	Test gauge pressure reading _____
Tertiary seat test (pressure applied from downstream end)	
Beginning time _____	Test gauge pressure reading _____
Ending time _____	Test gauge pressure reading _____
Certified by _____ Company _____	
Title _____	Date _____

Figure 24 — Example of an SSV/USV functional test data sheet

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6.0 SHIPPING REQUIREMENTS

6.1 REPORTS

Product: **Christmas Tree Equipment**

6.1.1 API Specification 6A – 10.13.7
 Christmas trees shall be stored and shipped in accordance with
 Clause 9.

6.1.2 **Valves & Actuators**

6.1.2.1 API Specification 6A – 10.20.7.2
 A report in accordance with Figure 25 shall be furnished to the
 purchaser.

6.1.2.2 API Specification 6A – 10.20.7.2 Figure 25

Surface safety valve or underwater safety valve shipping report (example)			
SSV/USV valve data:			
Manufacturer _____			
Catalogue or model No. _____	Serial No. _____	Size _____	
Working pressure rating _____	Temperature rating: Max. _____	Min. _____	
Material class _____	PSL _____	PR2 class _____	
Date of manufacture (month and year) _____			
Class II SSV/USV valve performance test agency _____		Test report No. _____	
SSV/USV actuator data:			
Manufacturer _____			
Catalogue or model No. _____	Serial No. _____	Size _____	
Working pressure rating _____	Temperature rating: Max. _____	Min. _____	
Material class _____	PSL _____		
Date of manufacture (month and year) _____			
Customer _____		Purchase order No. _____	
Function test date _____	Shipment date _____		
Inspected by _____			

Figure 25 — Example of a surface safety valve or underwater safety valve shipping report

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7.0 DOCUMENTATION REQUIREMENTS

7.1 INSTRUCTIONS / MANUAL

Product: **Wellhead & Christmas Tree Equipment**

7.1.1 API Specification 6A – 9.4

The manufacturer shall furnish to the Purchaser suitable drawings and instructions concerning field assembly and maintenance of wellhead and christmas tree equipment, if requested. This includes, if relevant, an operating manual for equipment specified in Annex H.

7.1.2 **Actuator**

API Specification 6A – 10.16.8.2

The manufacturer shall furnish to the Purchaser suitable drawings and instructions concerning field assembly and maintenance of actuators, if requested.

7.1.3 **Valves & Actuators**

7.1.3.1 API Specification 6A – 10.20.7.2

The following shall be furnished to the Purchaser:

- Operating manual - An operating manual meeting the requirements of 10.20.7.3 shall be furnished to the purchaser.

7.1.3.2 API Specification 6A – 10.20.7.3.1

The following minimum design information shall be included:

- a)** type, model and size for which the manual is applicable
- b)** performance requirements for which these types, model, and sizes are suitable
- c)** temperature and working pressure ranges for which the unit(s) are designed
- d)** drawings and illustrations giving dimensional data of unit(s), as required, for installation or operation
- e)** parts list

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- 7.1.3.3** API Specification 6A – 10.20.7.3.2
The following minimum inspection and testing information shall be included:
- a)** checklist for visual inspection prior to hook-up;
 - b)** written and graphic instructions for field hook-ups;
 - c)** appropriate test procedures.
- 7.1.3.4** API Specification 6A – 10.20.7.3.3
Proper installation methods shall be clearly written and illustrated as necessary. Any necessary preliminary lubrication or greasing shall be specified in detail. Warnings to indicate potential danger to personnel or cautions to indicate potential danger to equipment shall be clearly marked "Warning" or "Caution".
- 7.1.3.5** API Specification 6A – 10.20.7.3.4
The following minimum operation and maintenance information shall be included:
- a)** maintenance requirements, including recommended intervals of maintenance;
 - b)** proper operating techniques;
 - c)** disassembly and assembly instructions;
 - d)** assembly diagram showing individual parts in proper relationship to one another;
 - e)** repair instructions and precautions, including a chart listing symptoms, probable cause(s) of the problem, and repairs necessary.

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7.2 RECORDS

7.2.1

Wellhead & Christmas Tree Equipment

7.2.1.1

API Specification 6A – 7.5.3.1

Records that shall be furnished to Purchaser

These records shall be provided by the manufacturer to the original Purchaser of equipment made to comply with this International Standard.

7.2.1.2

API Specification 6A – 7.5.3.1

These records, if applicable, shall be identical to or contain the same information as those retained by the manufacturer.

7.2.1.3

API Specification 6A – 7.5.3.1

These records provided by the manufacturer shall prominently reference part serial number(s).

7.2.2

Body, bonnet, end and outlet connections, stem, valve-bore sealing mechanism, mandrel tubing hanger and casing hanger and back-pressure valves.

API Specification 6A – 7.5.3.2

For PSL 4, the following records are required:

- NDE records
- hardness test records
- material test records
- heat treatment records

7.2.3

Non-Metallic Sealing Material

API Specification 6A – 7.5.3.5

For PSL 4, certification of compliance is required, stating that non-metallic seals conform to PSL 4 of this International Standard.

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Equipment

7.2.4

Assembled Equipment

API Specification 6A – 7.5.3.6

For PSL 3, the following records are required:

- certificate of compliance stating that equipment conforms to PSL 3 of this International Standard, and the temperature and material class
- assembly traceability records
- pressure test records

For PSL 3G and PSL 4, all records/certifications for PSL 3 are required with the addition that gas-test records shall also be furnished.