

API6A MATERIAL SERVICE CATEGORIES & RATING LEVELS

OVERVIEW STANDARDS

Australian Pipeline Valve (APV) standards comply with technical specification API-6A. The description for APV equipment consists of a general description, working pressure, temperature rating material class rating, product specification level (PSL) and performance requirement (PR). These ratings are defined in the following API-6A tables.

To comply with API-6A (ISO 10423), APV offers:
Pressure ratings in psi: 2000, 3000, 5000, 10,000 & 15,000.
Temperature ratings: L, P, R, S, T, U, V, X & Y.
Material class: AA, BB, CC, DD, EE, FF & HH.
Product specification level: 1, 2, 3 & 4 (PSL 1, 2, 3, 4).
Performance requirement: 1 & 2.

TABLE - RECOMMENDED MINIMUM PSL FOR PRIMARY PARTS

NACE	No	Yes	Yes	Yes	No	Yes
High H2S Concentrate	No	No	Yes	No	No	Yes
Close Proximity*	No	No	No	Yes	Yes	Yes
Rated Working Pressure, PSI						
	PSL	PSL	PSL	PSL	PSL	PSL
5,000	1	1	2	2	1	3
10,000	2	2	3	3	3	4
15,000 and up	3	3	4	4	4	4

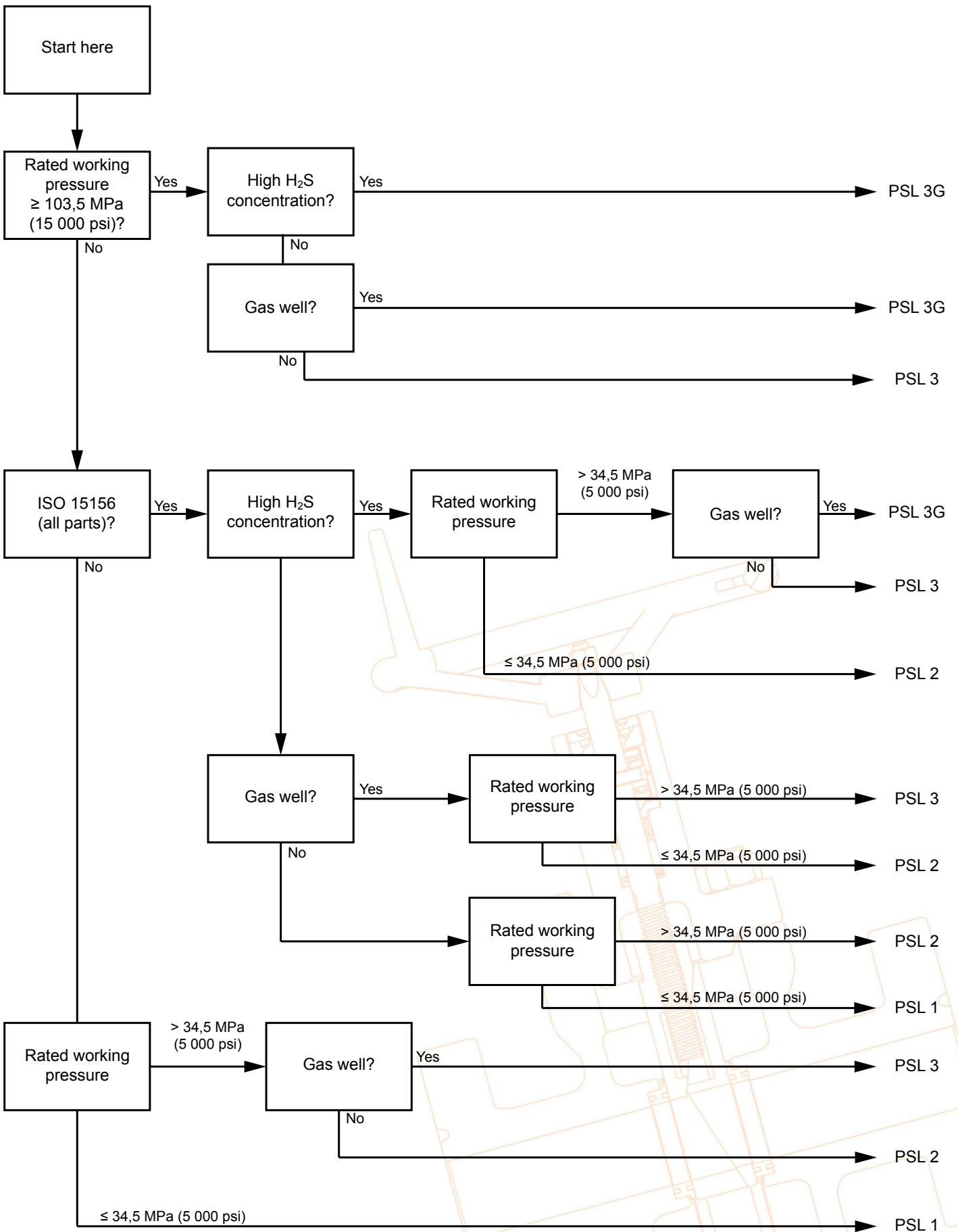
*See paragraph A5 of API-6A 17a. Ed.

PR1 is standard

PR2 also available (increased cycle times on test required)



FLOW CHART - MINIMUM PSL FOR PRIMARY PARTS



Extract from API6A figure A.14, specification for wellhead and christmas tree equipment.

API MATERIAL REQUIREMENTS

MATERIAL CLASS	MINIMUM MATERIAL REQUIREMENTS	
	BODY, BONNET & FLANGE	PRESSURE CONTROLLING PARTS
AA - General Service	Carbon or low allow steel	Carbon or low allow steel
BB - General Service	Carbon or low allow steel	Stainless Steel
CC - General Service	Stainless Steel	Stainless Steel
DD - Sour Service ^a	Carbon or low allow steel ^b	Carbon or low allow steel ^b
EE - Sour Service ^a	Carbon or low allow steel ^b	Stainless Steel ^b
FF - Sour Service ^a	Stainless Steel ^b	Stainless Steel ^b
HH - Sour Service ^a	CRAs ^{bcd}	CRAs ^{bcd}

As per API6A (ISO 10423) 2013:

^a As defined by ISO 15156 (all parts) (NACE MR0175) (See API6A)

^b In compliance with ISO 15156 (all parts) (NACE MR0175) (see API6A)

^c CRA required on retained fluid-wetted surfaces only; CRA cladding of low-alloy or stainless steel is permitted (See API6A)

^d CRA as defined in API6A; ISO 15156 (all parts) (NACE MR0175; see API6A) definition of CRA does not apply.

API TEMPERATURE RATINGS

TEMPERATURE CLASSIFICATION	OPERATING RANGE					
	F°			C°		
	MIN.		MAX.	MIN.		MAX.
K	-75	to	180	-60	to	82
L	-50	to	180	-46	to	82
N	-50	to	140	-46	to	60
P	-20	to	180	-29	to	82
R*	Room Temperature*					
S	0	to	140	-18	to	60
T	0	to	180	-18	to	82
U	0	to	250	-18	to	121
V	35	to	250	2	to	121
X*	0	to	350	-18	to	177
Y*	0	to	650	-18	to	343

* No longer referenced in API6A/ISO 10423-2013

API PRESSURE/TEMPERATURE RATINGS (Y)*

	TEMPERATURE IN °F								
	0 to 250	300	350	400	450	500	550	600	650
Rated Working Pressure PSI	2000	1955	1905	1860	1810	1735	1635	1540	1430
	3000	2930	2860	2785	2715	2605	2455	2310	2145
	5000	4880	4765	4645	4525	4340	4090	3850	3575

* Based on 'Y' Temp. Due to elastomers, Gate Valves & Chokes are temp 'T' or 'U' as standard hence consult separate chart.

PSL (PRODUCT SPECIFICATION LEVEL) MATERIAL REQUIREMENTS

PSL Material Control is found in API Specification 6A, Specification for Wellhead and Christmas Tree Equipment Section 400

PSL (PRODUCT SPECIFICATION LEVEL) QUALITY CONTROL

PSL Material Control is found in API Specification 6A, Specification for Wellhead and Christmas Tree Equipment Section 400

PSL (PERFORMANCE REQUIREMENTS) LEVELS

There are two Performance Requirement Levels, PR1 and PR2. The latter represents more rigorous performance requirements. See API Specification 6A, Section 300 and Section 900. Section 905 covers valves (905.3 - Flowline Valves, 9.5.5 - Actuated Valves).

API6A TRIM TYPES

TRIM CODE	API SPEC, 6A RETAINED FLUID RATING	TRIM TYPE
T-21	AA	STANDARD TRIM For essentially non corrosive liquids or gases. Typical are crude and reined oils, natural or refined gases and processed hydrocarbons. Typical uses are wellheads, manifolds flowlines, and other similar installations requiring a through conduit valve. The temperature limitations are 0° to 250°F (-17.7°C to 121°C).
T-22	BB	STAINLESS TRIM For substantially the same service as T-21 but where the corrosion resistance of 13% Chrome Stainless Steel internal parts are desirable. Also usable for mildly corrosive fluids and gases where limited corrosion of the internal body surfaces can be tolerated. The temperature limitations are 0° to 250°F (-17°C to 121°C). Recommended when partial pressure of CO2 is greater than 7.3.
T-23	CC	FULL STAINLESS STEEL TRIM For any liquid or gaseous product for which the resistance of the 13% Chrome Stainless is adequate. Also used where the resistance of Stainless Steel is desirable from the standpoint of product purity. The temperature limitations are 0° to 250°F (-17.7°C to 121°C). Recommended when partial pressure of CO2 is greater than 30.
T-24	DD	SOUR GAS & OIL
S-24	EE	Primarily for sour gas and oil where resistance to Hydrogen Sulfide embrittlement is required. Also suitable for other chemicals, products or hydrocarbons when H2S is present. May be used when CO2 is present in smaller amount then H2S. The temperature limitations are 0° to 250°F (-17.7°C to 121°C).
T-26	FF	STAINLESS SOUR GAS AND OIL TRIM Primarily for sour gas and oil when the CO2 exceeds the H2S content. It is intended to provide resistance to the metal loss type of corrosion usually associated with CO2, plus resistance to Hydrogen Sulphide embrittlement. The temperature limitations are 0° to 250°F (-17.7°C to 121°C).
T-27		WATERFLOW (UNINHIBITED) Primarily for use in untreated or uninhibited brackish saline water typically associated with oilfield waterflood projects and/or disposal wells in which the internal plastic coating of the body surfaces provides resistance to salt water corrosion. The internal parts are also resistant to Sulfide embrittlement and corrosion. The temperature limitation are 0° to 250°F (-17.7°C to 121°C).
T-36	AA	LOW TEMPERATURE – STANDARD TRIM – GENERAL OILFIELD For essentially non-corrosive liquids or gases. Typical examples are crude and refined oils, natural or refined gases and processed hydrocarbons. Typical uses are wellheads, manifolds, flowlines and other similar installations requiring a through conduit valve. The temperature limitations are -50° to 180°F. (-45°C to 82°C).
T-37	DD	LOW TEMPERATURE – SOUR GAS AND OIL
S-37	EE	Primarily for sour gas and oil where resistance to Hydrogen Sulphide embrittlement is required. Also suitable for other chemicals, products or hydrocarbons where H2S is present. May be used when CO2 is present in smaller amounts than H2S. The temperature liitations are -50°C to 180° F (-45°C to 82°C).

SPECIAL TRIMS AND TEMPERATURE RANGES AVAILABLE UPON REQUEST.

Valve Trim Chart for API6A Gate & Choke Valves

API 6A TEMPERATURE CLASS P: SERVICE -20°F TO 180°F (-29°C TO 82°C)

SERVICE	TRIM	API MATERIAL CLASS	PRESSURE RATING PSI	MATERIALS				
				BODY & BONNET	BONNET SEAL	GATE* & SEGMENT	SEAT	STEM
General Oilfield Gas, Oil	T21	AA	2,000 3,000 5,000	Carbon or Low Allow Steel	CS	4130 w/QPQ	4130 w/TFE ²	4130 w/MDC ⁵
General Moderately Corrosive CO ²	T22	BB	2,000 3,000 5,000	Carbon or Low Allow Steel	SS	410	410	17-4PH w/MDC ⁵
General Moderately Corrosive CO ²	T23	CC	2,000 3,000 5,000	API 60K CA6NM Stainless Steel	SS	410	410 w/TFE ²	17-4PH w/MDC ⁵
Sour (H ₂ S) Service NACE ⁴ MR01-75	T24	DD	2,000 3,000 5,000	API 60K Alloy Steel	SS	4130 or 17-4PH Nitrided	4130 w/TFE ²	17-4PH w/MDC ⁵
Sour (H ₂ S) Service NACE ⁴ MR01-75	S24	EE	2,000 3,000 5,000	API 60K Alloy Steel	SS	4130 or 17-4PH Nitrided	410 w/TFE ²	17-4PH w/MDC ⁵
Corrosive (CO ²) & Sour (H ₂ S) NACE ⁴ MR01-75	T26	FF	2,000 3,000 5,000	API 60K CA6NM Stainless Steel	SS	17-4PH	17-4PH w/TFE ²	17-4PH w/MDC ⁵
Waterflood	T27	EE	2,000 3,000 5,000	API 60K Alloy Steel w/Plastic Coat	SS	17-4PH	17-4PH w/TFE ²	17-4PH w/MDC ⁵
API 6A TEMPERATURE CLASS L: SERVICE -50°F TO 180°F (-46°C TO 82°C)								
General Oilfield Gas, Oil	T36	AA	2,000 3,000 5,000	API 60K Alloy Steel	CS	4130	4130 w/TFE ²	17-4PH w/MDC ⁵
Sour (H ₂ S) Service NACE ⁴ MR01-75	T37	DD	2,000 3,000 5,000	API 60K Alloy Steel	SS	4130	4130 w/TFE ²	17-4PH w/MDC ⁵
Sour (H ₂ S) Service NACE ⁴ MR01-75	S37	EE	2,000 3,000 5,000	API 60K Alloy Steel	SS	17-4PH	4130 w/TFE ²	17-4PH w/MDC ⁵

- | | | |
|---|--------|------------------------------|
| 1 | QPQ | NITRIDE |
| 2 | TFE | TEFLON |
| 3 | HF6 | STELLITE#6 |
| 4 | CHARPY | V NOTCH IMPACT TEST |
| 5 | MDC | MOLYBDENUM DISULFIDE COATING |

*or, in the case of chokes relates to needle/disc/bean.

This list is provided as a guide only. Australian Pipeline Valve reserves the right to provide alternate materials without prior notice.

~ AUSTRALIAN PIPELINE VALVE SHORT LEAD TIME API6A VALVE AND WELLHEAD MANUFACTURER ~