



VALVE METALIC PARTS WORKING TEMPERATURE

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BOLTING MATERIAL

Bolt	Nuts	Corresponding Valve Body	Minimum Temp.	Maximum Temp.
ASTM A193 Gr B7 ①	ASTM A194 G2 2H	A216 WCB	-29°C	425°C
ASTM A193 Gr B7M	ASTM A194 G2 2HM	A216 WCC	-29°C	425°C
ASTM A320 Gr L7 ④	ASTM A194 Gr 4	A352 LCB	-46°C	343°C
ASTM A320 Gr L7 ④	ASTM A194 Gr 4	A352 LCC	-46°C	343°C
ASTM A320 Gr L7 ④	ASTM A194 Gr 4	A352 LC3	-101°C	343°C
ASTM A193 Gr B16	ASTM A194 Gr 4	A217 WC6	-29°C	593°C
ASTM A193 Gr B16	ASTM A194 Gr 4	A217 WC9	-29°C	593°C
ASTM A193 Gr B16	ASTM A194 Gr 4	A217 C5	-29°C	593°C
ASTM A193 Gr B16	ASTM A194 Gr 4	A217 C12	-29°C	593°C
ASTM A320 Gr B8 ③	ASTM A194 Gr 8	A351 CF8	-198°C	575°C
ASTM A320 Gr B8M ③	ASTM A194 Gr 8M	A351 CF3	-198°C	575°C
ASTM A193 Gr B16	ASTM A194 Gr 4	A351 CF10	-29°C	593°C
ASTM A320 Gr B8M ③	ASTM A194 Gr 8M	A351 CF8M	-198°C	575°C
ASTM A320 Gr B8M ③	ASTM A194 Gr 8M	A351 CF3M	-198°C	575°C
ASTM A193 Gr B16	ASTM A194 Gr 4	A351 CF10M	-29°C	593°C
ASTM A320 Gr B8M ③	ASTM A194 Gr 8M	A351 CF8C	-198°C	575°C
ASTM A320 Gr B8M ③	ASTM A194 Gr 8M	A995 4A	-250°C	575°C
ASTM A320 Gr B8M ③	ASTM A194 Gr 8M	A995 5A	-250°C	575°C
ASTM A320 Gr B8M ③	ASTM A194 Gr 8M	A995 6A	-250°C	575°C
ASTM A320 Gr B8 ③	ASTM A194 Gr 8	B148 C95800	-254°C	575°C
ASTM A320 Gr B8 ③	ASTM A194 Gr 8	B148 C95500	-254°C	575°C

REMARK

- ① Alloy steel bolting, A193 Gr B7 bolts and A194 Gr 2H nuts can only be used at moderate temperatures depending on the permissible differential expansion of valve design which may vary between manufacturers.
- ② ASTM A193 Gr B8/B8M bolting can rate from -198°C to 800°C, while extra high and low temperature should be notified in advance.
- ③ For temperatures lower than -200°C (-325°F) ASTM A320 Gr B8/B8M bolting must be impact tested.
- ④ All L7 bolts and Grade 4 nuts must be Charpy v impact tested for service temperature lower than -29°C.

The above chart shows the combined temperature range, taking into account the valve and bolting material ratings. Refer to ASTM pressure/temperature charts. For limitations of usage and strength levels refer ANSI B16.34.

BODY MATERIAL

Body Material	Equivalent	Minimum Temp.	Maximum Temp.	
HT 200	/	-18°C	210°C	
QT400/QT450	/	-20°C	343°C	
A216 WCB	A105	A105N	-29°C	425°C
A352 LCB	A182 LF2	-46°C	345°C	
A352 LCC	A182 LF2	-46°C	345°C	
A352 LC3	A182 LF3	-101°C	345°C	
A217 WC6	A182 F11	-29°C	595°C	
A217 WC9	A182 F22	-29°C	595°C	
A217 C5	A182 F5	-29°C	650°C	
A217 C12	A182 F12	-29°C	650°C	
A351 CF8	A182 F304	-198°C	575°C	
A351 CF8M	A182 F316	-198°C	575°C	
A351 CF10	A182 F304H	-198°C	816°C	
A351 CF3	A182 F304L	-198°C	575°C	
A351 CF3M	A182 F316L	-198°C	575°C	
A351 CF10M	A182 F316H	-198°C	816°C	
A351 CF8C	A182 F321	A182 F347	-198°C	575°C
A995 4A	A890 4A	A182 F51	-250°C	575°C
A995 5A	A890 5A	A182 F53	-250°C	575°C

A995 6A	A890 6A	A182 F55	-250°C	575°C
Aluminium Bronze	B148 C95800	B148 C95500	-198°C	204°C
Inconel	X-625	X-718	-198°C	649°C
Monel	400	K500	-198°C	450°C
Hastelloy C	C276		-198°C	538°C
Titanium	B367 GR.C2	B367 GR.C3	-198°C	316°C
Alloy 20	A351 - CN7M		-46°C	325°C

REMARK

- ❶ Not suitable for prolonged exposure above 470°C.
- ❷ Flanged ends in 150 class ratings terminate at 538°C.
- ❸ At temperatures above 538°C carbon content must be > 0.04%.
- ❹ At temperatures above 538°C consult ANSI B16.34 for heat treatment requirements.
- ❺ Working temperatures of green colour materials should be reviewed as per 1. ambient temperature&pressure . 2. medium temperature&pressure

TRIM MATERIAL

Trim Material	Equivalent	Minimum Temp.	Maximum Temp.
A105, A105+ENP	/	-29°C	425°C
A276 416, A479 410, A182 F6a	/	-29°C	425°C
A216 WCB	A105 A105N	-29°C	425°C
A352 LCB	A182 LF2	-46°C	345°C
A352 LCC	A182 LF2	-46°C	345°C
A352 LC3	A182 LF3	-101°C	345°C
A217 WC6	A182 F11	-29°C	595°C
A217 WC9	A182 F22	-29°C	595°C
A217 C5	A182 F5	-29°C	650°C
A217 C12	A182 F12	-29°C	650°C
A351 CF8	A182 F304	-198°C	575°C
A351 CF8M	A182 F316	-198°C	575°C
A351 CF10	A182 F304H	-198°C	816°C
A351 CF3	A182 F304L	-198°C	575°C
A351 CF3M	A182 F316L	-198°C	575°C
A351 CF10M	A182 F316H	-198°C	816°C
A351 CF8C	A182 F321 A182 F347	-198°C	575°C
A995 4A	A890 4A A182 F51	-250°C	575°C
A995 5A	A890 5A A182 F53	-250°C	575°C
A995 6A	A890 6A A182 F55	-250°C	575°C
Aluminium Bronze	B148 C95800 B148 C95500	-198°C	204°C
Hastelloy C	C276	-195°C	538°C
Alloy 20	A351 - CN7M	-46°C	316°C

REMARK

- ❶ Minimum Temperature will vary from -100°C to 0°C according to grade of Cr13 and treatment. Must be Charpy v impact tested if lower than -29°C.

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www.kamroo.com
Tel: +86 573 87975353
Email: info@kamroo.com

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Forged Valve

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