



DATA SHEET No 4 Titanium and Methanol

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Anhydrous methanol is able to cause stress corrosion cracking (SCC) of titanium and titanium alloys. Industrial methanol is frequently diluted for safety and the water content (typically 5% by weight) is adequate to provide immunity to titanium and for there to be no problem in most practical applications.

In the past the specification of a minimum water content of 2% has proved adequate to protect commercially pure titanium equipment for all but the most severe conditions. The use of methanol with 5% water provides inhibition for all but the most severe conditions of sustained exposure likely to be experienced by the most resistant titanium alloys used in offshore oil and gas applications. For these alloys containing ruthenium or palladium working at higher temperatures and pressures in more aggressive environments a revised limit of 10% minimum water content of methanol.

The following table provides conservative guidelines, which are based on room temperature, sodium chloride saturated methanol tests conducted with applied stress at or above the alloy yield strength and/or at slow strain rate to failure.

Titanium alloy grade	Minimum Water Content to Prevent SCC in Methanol	
	Intermittent Exposure ¹	Sustained exposure ²
C. P. Grades 1,2,7,11,16,17	2.00%	2.00%
Alloy Grade 9, Ti-3Al-2.5V	2.00%	2.00%
Alloy Grade 12 Ti -0.3Mo-0.8Ni	2.00%	2.00%
Alloy Grade 5 Ti-6Al-4V	3.00%	3.00%
Alloy Grade 23, Ti-6Al-4V ELI	3.00%	3.00%
Alloy Grade 29, Ti-6Al-4V- Ru	5.00%	10.00%
Alloy Grade 28, Ti-3Al-2.5V-.1Ru	2.50%	3.00%
Alloy Grade 19 (Beta C)	5.00%	5.00%
Alloy Grade 20 (Beta C + Pd)	5.00%	10.00%

1. Intermittent = Short term non-continuous

2. Sustained = Long term continuous

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