

## Heavy-Duty Diesel Engine Test Category For API CH-4

Requirements	Test Method	Properties	Unit	Limits		
				1 Test	2 Tests	3 Tests
<b>1. LABORATORY TESTS</b>						
1.1 Viscosity Grades		SAE J300		Manufacturer specifies viscosity target within SAE J300 specification		
1.2 High Temperature Corrosion Bench Test	ASTM D6594	Copper increase, max Lead increase, max Tin increase, max Copper corrosion rating, max (D130)	ppm ppm ppm	20 120 50 3	No MTAC <sup>(1),(2)</sup>	
1.3 Foam Test	ASTM D892 (Option A not allowed)	Foaming/Settling, max Sequence I Sequence II Sequence III	mL mL mL	10/0 max 20/0 max 10/0 max	No MTAC <sup>(1),(2)</sup>	
1.4 Shear Stability	ASTM D6278	After shear viscosity SAE 10W-30, min After shear viscosity SAE 15W-40, min	cSt cSt	9.3 12.5	No MTAC <sup>(1),(2)</sup>	
1.5 Volatility	ASTM D5800  ASTM D2887 or ASTM D5480	Noack (SAE 10W-30) Noack (SAE 15W-40) OR GCD (SAE 10W-30) GCD (SAE 15W-40)	% loss % loss % loss % loss	20 18 17 15	No MTAC <sup>(1),(2)</sup>	
<b>2. ENGINE TESTS FOR API CH-4</b>						
2.1 Mack T-8E	ASTM D5967-96 Ext	Relative viscosity @ 4.8% soot, max Viscosity increase @ 3.8% soot, max	cSt	2.1 11.5	2.2 12.5	2.3 13.0
2.2 Mack T-9	ASTM D6483	Liner wear, max Top ring weight loss, max Increase in lead level, max	microns mg ppm	25.4 120 25	26.6 136 32	27.1 144 36
2.3 Cummins M-11	ASTM RR:DO2-1439	Crosshead weight loss, max Filter delta pressure, max Sludge rating, min	mg kPa merits	6.5 79 8.7	7.5 93 8.6	8.0 100 8.5
2.4 Caterpillar 1P	ASTM D6681	Weighted total demerits, max Top groove carbon, max Top land carbon, max Average oil consumption, max Final oil consumption, max Piston ring and liner scuffing	demerits % % gm/hr gm/hr None	350 36 40 12.4 14.6 None	378 39 46 12.4 14.6 None	390 41 49 12.4 14.6 None
2.5 Caterpillar 1K	ASTM RR:DO2-1273	Weighted total demerits, max Groove No. 1 (Top) fill, max Top land heavy carbon, max Average Oil Consumption, max Piston ring and liner scuffing	demerits % % g/bhp-hr None	332 24 4 0.5 None	347 27 5 0.5 None	353 29 5 0.5 None
2.6 Roller Follower Wear Test	ASTM D5966	Pin Wear, max	µm (mils)	7.6 (0.30)	8.4 (0.33)	9.1 (0.36)
2.7 Engine Oil Aeration Test	ASTM RR:DO2-1379	Aeration, max	% volume	8	MTAC applies <sup>(2)</sup>	
2.8 Sequence IIIF	ASTM RR:DO2-1491	Viscosity increase at 60 hours, max	%	295	MTAC applies <sup>(2)</sup>	

<sup>(1)</sup> Not an ACC Test.

<sup>(2)</sup> MTAC is a statistical method for treating engine test results. Consult your sales representative for further information.