Proposed CH-4 Limits for Cummins ISM

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Candidate Oil A: M11HST vs. ISM Data

	Oil A	API CH-4 Limits
M11HST		
Xhead wt. loss, mg max.	6.5	6.5
Sludge, min.	8.8	8.7
Oil Filter Delta P, kPa, max.	42	79
ISM(200hrs)		Proposed Limits
Xhead wt loss, mg max.	5.8	7.5
Sludge, min.	8.2	7.9
Oil Filter Delta P(150hrs), kPa, max.	265	
Oil Filter Delta P(100hrs), kPa, max.	27	55
Injector Screw Wear, mg	7.5	
TRWL, mg	62.3	
ISM(200hrs) with M11HST Filter		
Xhead wt loss, mg max.	5.6	
Sludge, min.	8.5	
Oil Filter Delta P(150hrs), kPa, max.	294	
Oil Filter Delta P(100hrs), kPa, max.	11	
Injector Screw Wear, mg	11.5	
TRWL, mg	45.3	

API CH-4 Limits for ISM engine test

Engine Test Data	Oil A	Oil A*	API CH-4 Limits
M11HST			
Xhead wt. loss, mg max.	**6.5**	**3.1**	**6.5**
Sludge, min.	**8.8**	**9.0**	**8.7**
Oil Filter Delta P, kPa, max.	**42**	**24**	**79**
ISM(200hrs)			
Xhead wt loss, mg max.	**5.8**		
Sludge, min.	**8.2**		
Oil Filter Delta P(150hrs), kPa, max.	**265**		
Oil Filter Delta P(100hrs), kPa, max.	**27**		
Injector Screw Wear, mg	**7.5**		
TRWL, mg	**62.3**		
		***Inhibitor boosted**	

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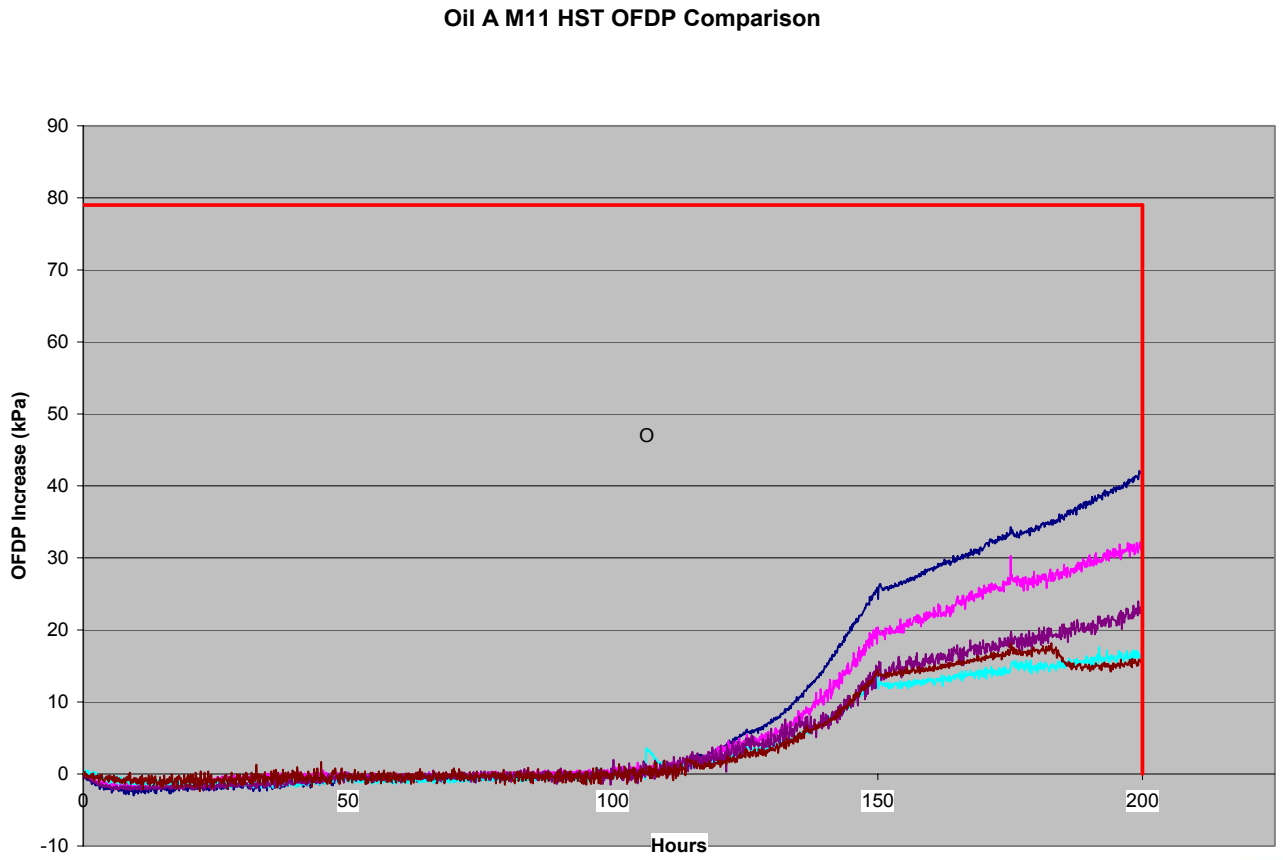
M11HST OFDP on Oil A and Related Formulations



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API CH-4 Limits for ISM engine test

Based on API CI-4 limits for the ISM, we suggest the following limits for API CH-4 be considered:

Crosshead Wt loss, mg (200 hrs)	7.5 max
Sludge (200 hrs)	7.9 min
Filter Delta P, kPa (100 hrs)*	55 max

*The CH-4 level limit is the same as CI-4, except filter plugging is measured at *100 hrs*