

# Cummins ISM Proposed Limits for API CH-4

December, 2006

# ISM Limits for API CH-4

- Proposal for CH-4 in Black
  - (CI-4 Established Limits in Blue)

	1 Test	2 Test	3 Test
Cross-Head Wear, mg, max	7.5 (7.5)	7.8 (7.8)	7.9 (7.9)
Oil Filter Delta Pressure @ 150 Hours, kPa, max	79 (55)	95 (67)	103 (74)
Sludge Rating, merits, min	8.1 (8.1)	8.0 (8.0)	8.0 (8.0)

# ISM Limits for API CH-4

- Why are CH-4 Limits the Same as CI-4 for Crosshead Wear and Sludge?
  - Small Margin of Error Between Good and Poor Oils
  - Must Keep Poor Oils from Passing

# ISM Limits for API CH-4

- Why are CH-4 Limits Different for Oil Filter Delta Pressure?
  - Limits as High as 90 kPa were Proposed for CI-4 Before Settling on 55 kPa
  - Oil 1004, a Borderline Oil for M11 OFDP in CH-4, Can be Made a Borderline Oil in ISM OFDP for CH-4
    - Based upon Limited Data, it Appears that Oil 1004 Behaves Similarly in Both Tests
    - Note that Tiered Limits were Calculated on the Natural Log Scale (+1) Using an  $s=0.3813$  (from 12/2006 LTMS Manual).

# ISM Limits for API CH-4

- Target and Pass Limit Comparisons

API CH-4	Test Limits	Oil 1004 Mean
M11 HST Oil Filter Delta Pressure, kPa, max	79/93/100	80 (78, 53, 89, 111)
ISM Oil Filter Delta Pressure, kPa, max	79/95/103	77 (LSM=72)