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# 1Q Test Report for PC-9

1. Precision Results
2. Surveillance Panel Motion
3. Discrimination
4. Conclusions

# 1Q Test Report for PC-9 Precision

- 1Q Precision with TMC 1005
  - Seven 1Q tests completed
  - Stable oil consumption
  - Consistent piston deposit levels
- The 1Q results have been reviewed by the SCOTE Surveillance Panel for precision and discrimination

# 1Q Test Report for PC-9 Precision

- 1Q results with TMC 1005

1Q EGR Oil Type	Piston Deposits			Oil Consumption			Soot and Wear Metals				
	TLC	TGC	WDP	Initial g/hr	Final g/hr	Ratio F/l	TGA - %	Fe	Cr	Cu	Pb
TMC 1005	36	31	388	11.2	11.9	1.1	1.6	74	7	21	9
TMC 1005	31	41	422	12.8	14.0	1.1	3.6	201	23	7	7
TMC 1005	18	26	417	9.6	6.9	0.7	2.8	172	12	6	6
TMC 1005	8	24	419	12.2	9.2	0.8	2.8	220	11	32	9
TMC 1005	8	36	450	10.6	7.5	0.7	3.1	164	15	11	12
TMC 1005	18	30	402	11.2	6.9	0.6	2.7	113	12	44	3
TMC 1005	19	29	381	10.4	7.5	0.7	2.4	89	12	30	3
mean	20	31	411	11.1	9.1	0.8	2.7	148	13	22	7
1 sigma	11	6	23	1	3						

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# 1Q Test Report for PC-9 Precision

- **Surveillance Panel Recommendation**

- The Single Cylinder Oil Test Engine (SCOTE) Surveillance Panel has unanimously declared the 1Q test ready for the precision matrix. The panel also addressed test shutdowns and EGR cleaning with the following motion:
  - Since the data did not support a severity effect vs. shutdowns, nor did it support severity vs. the number of EGR cooler cleaning - we will continue to use the shutdown protocol developed at the Chicago meeting. That protocol being: Cleaning of the EGR cooler is allowable between 305 - 307 kPa EBP, and mandatory after 307 kPa EBP.
  - The motion passed 8/0/0

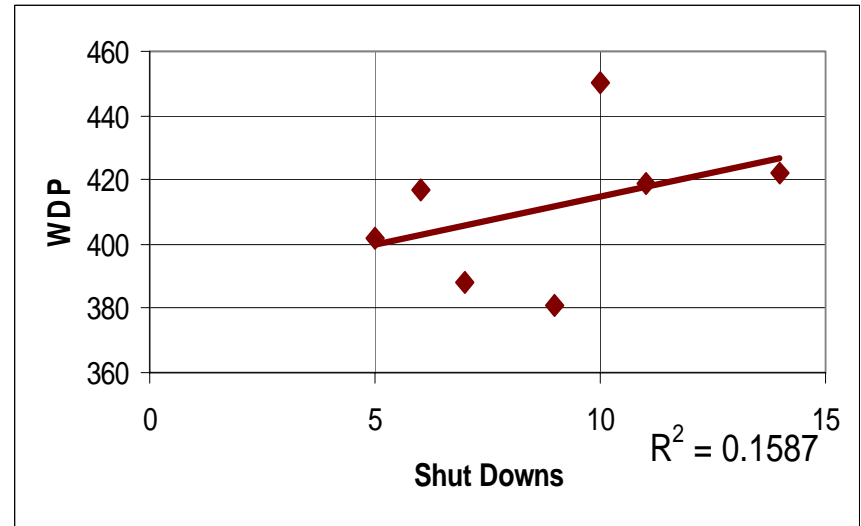
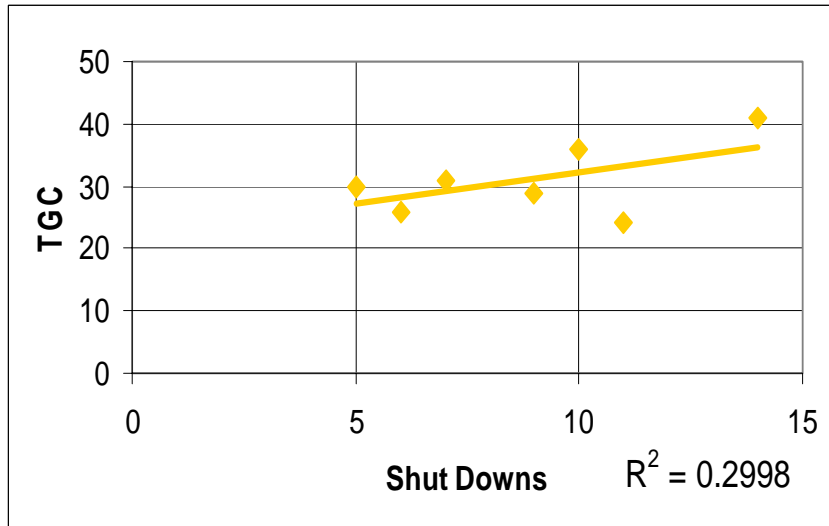
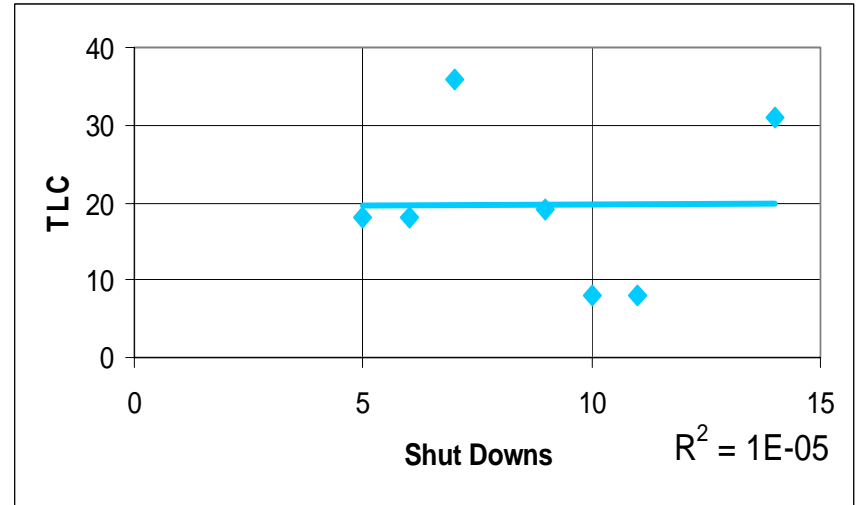
# 1Q Test Report for PC-9 Precision

- 1Q results with TMC 1005
  - ✧ Shut Downs & Cooler Cleaning

1Q EGR Oil Type	Piston Deposits			Oil Consumption			Shut Downs	EGR Cooler Cleaning
	TLC	TGC	WDP	Initial g/hr	Final g/hr	Ratio F/I		
TMC 1005	36	31	388	11.2	11.9	1.1	7	0
TMC 1005	31	41	422	12.8	14.0	1.1	14	2
TMC 1005	18	26	417	9.6	6.9	0.7	6	1
TMC 1005	8	24	419	12.2	9.2	0.8	11	1
TMC 1005	8	36	450	10.6	7.5	0.7	10	0
TMC 1005	18	30	402	11.2	6.9	0.6	5	0
TMC 1005	19	29	381	10.4	7.5	0.7	9	0
mean	20	31	411	11.1	9.1	0.8		
1 sigma	11	6	23	1	3			

# 1Q Test Report for PC-9 Precision

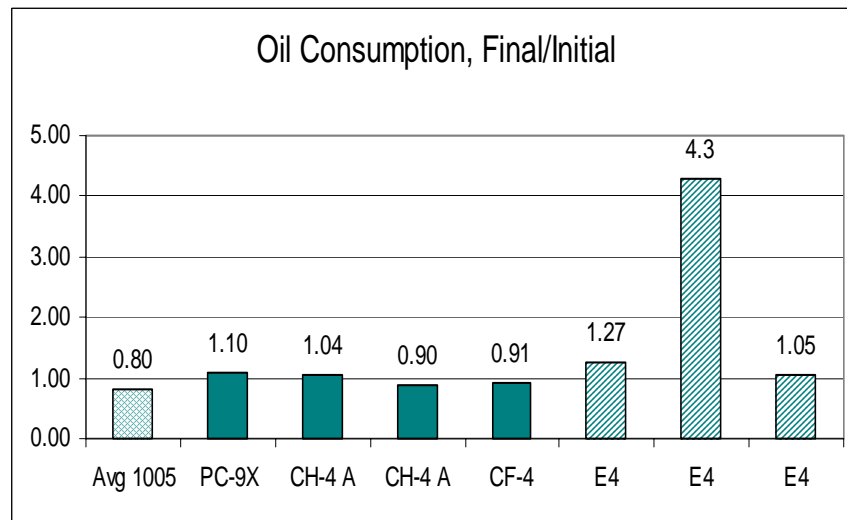
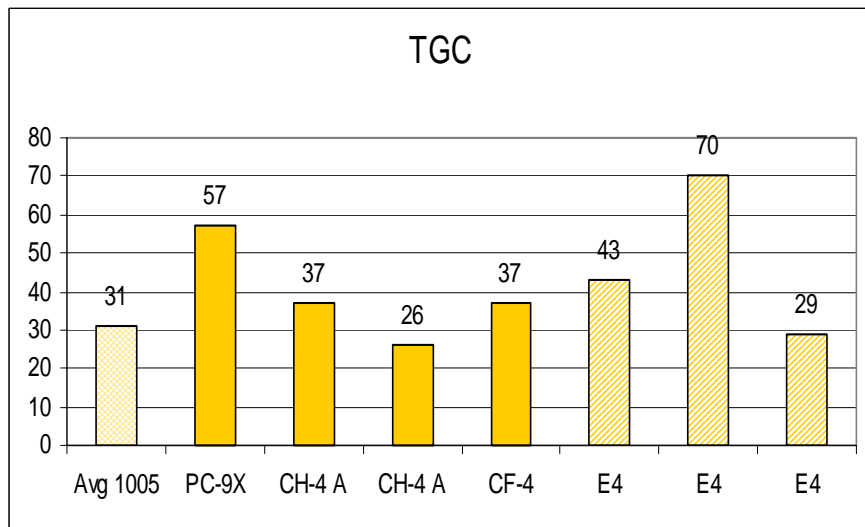
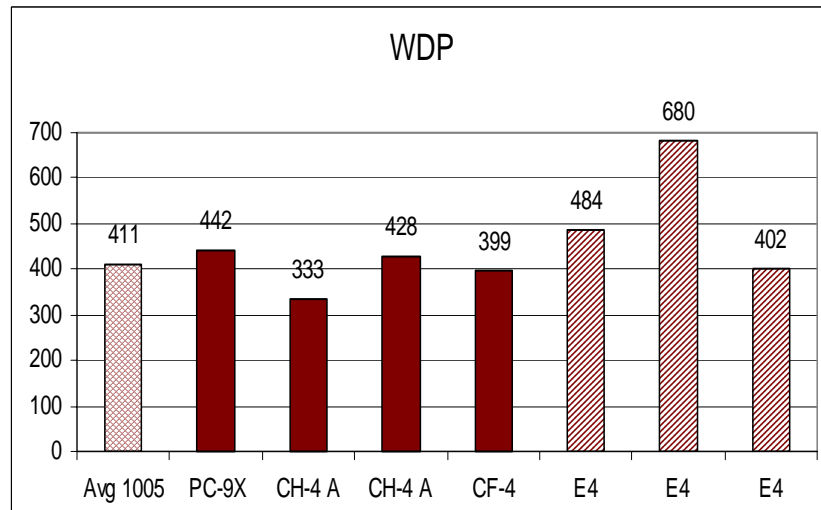
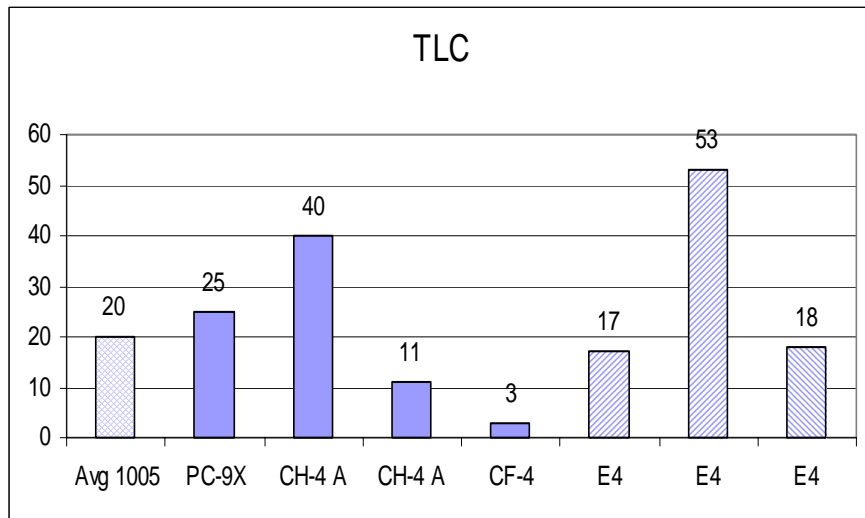
## Shut Downs vs Piston Deposits



# 1Q Test Report for PC-9 Discrimination

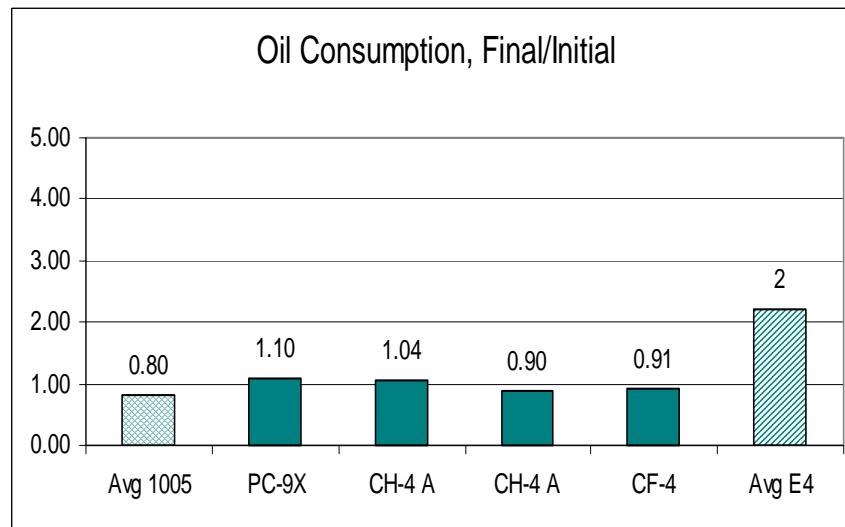
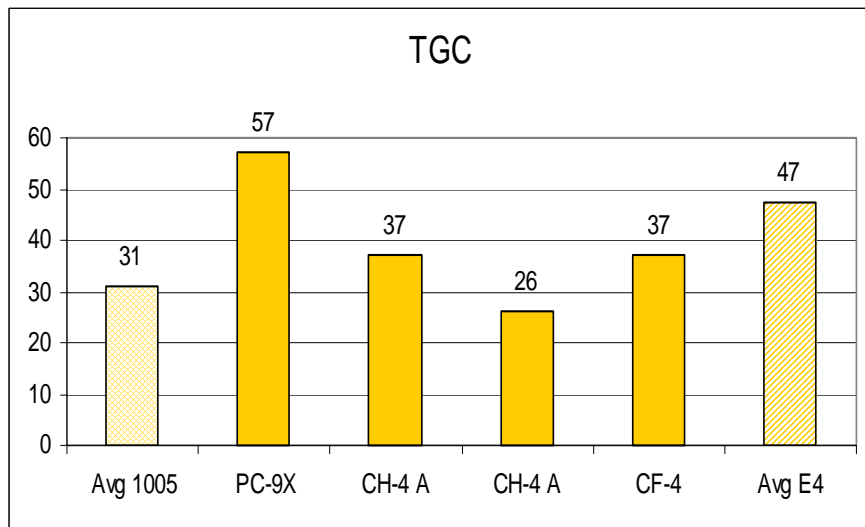
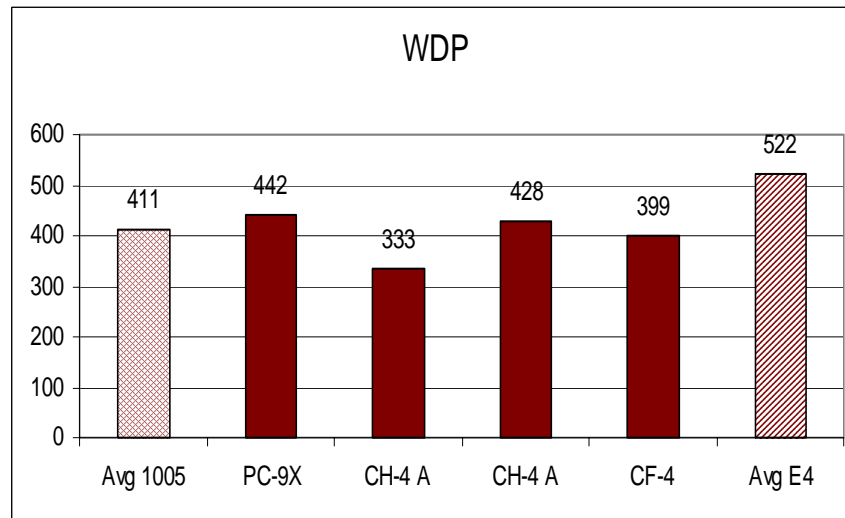
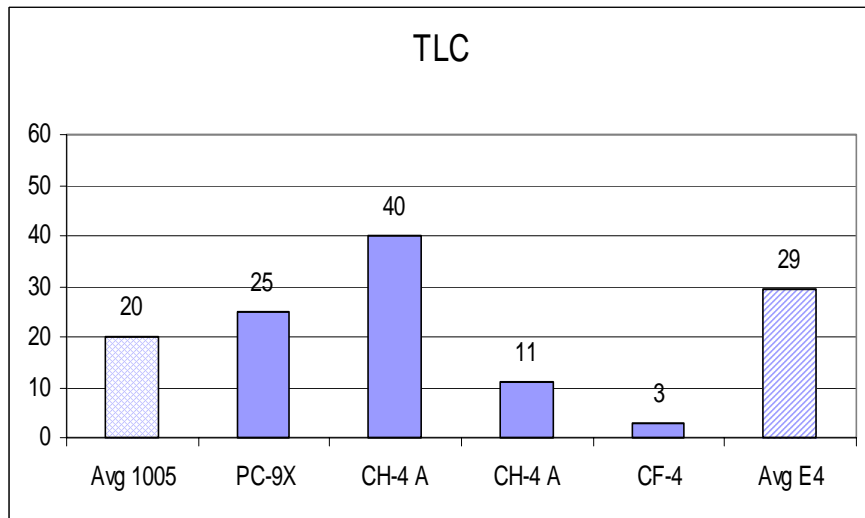
- Several oils were tested to identify performance differences and demonstrate discrimination.
  - Oils Tested
    - ✧ PC-9X
    - ✧ CH-4 15W-40
    - ✧ CF-4 15W-40
    - ✧ ACEA E4 10W-40

# 1Q Test Report for PC-9 Discrimination

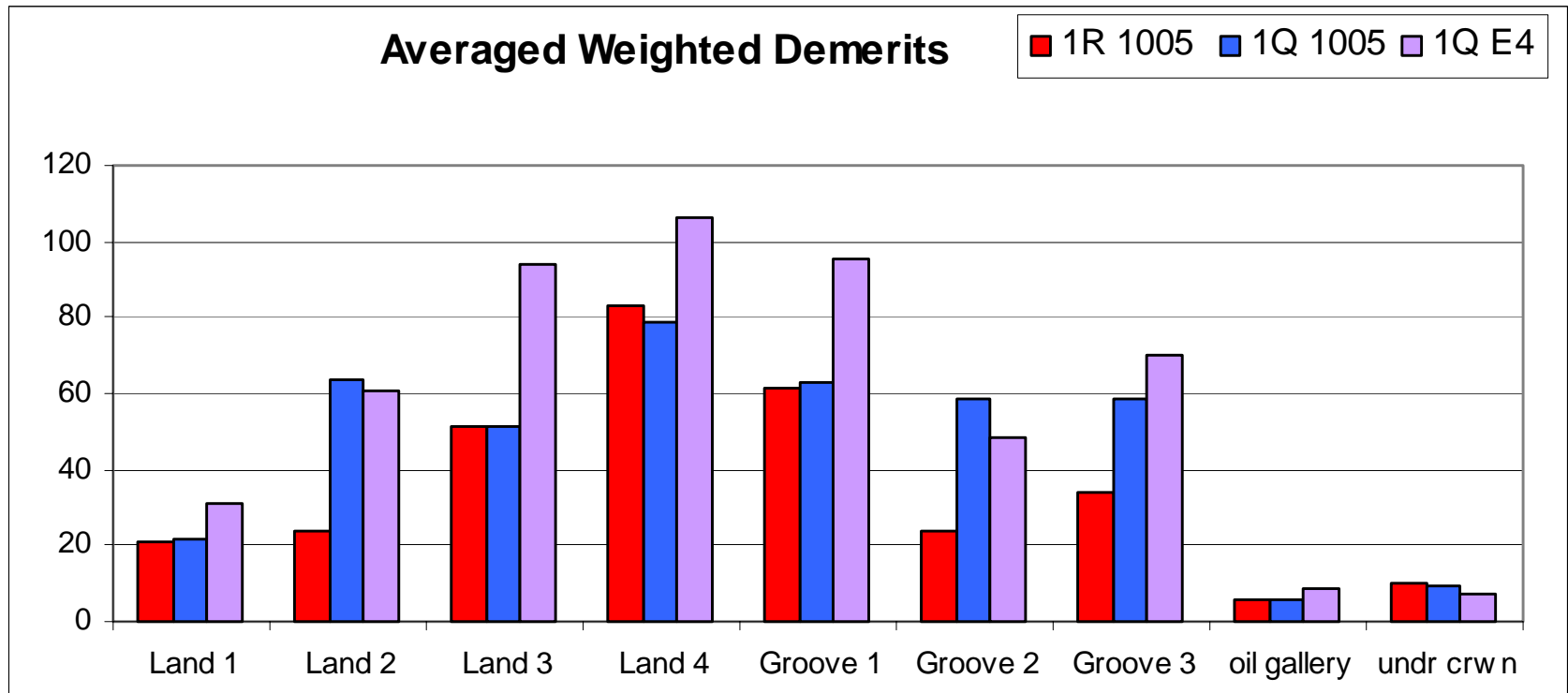




# 1Q Test Report for PC-9 Discrimination

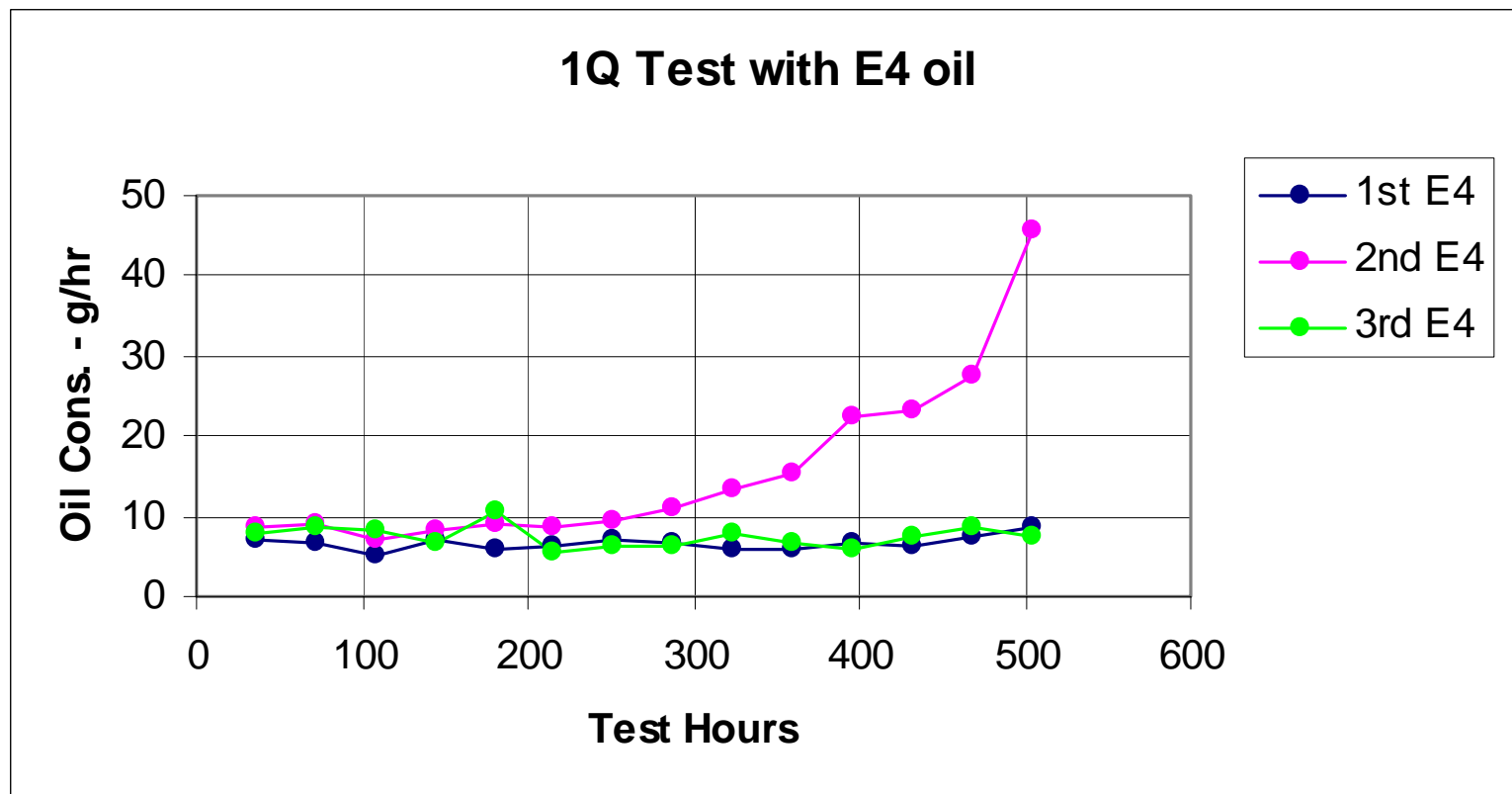


# 1Q Test Report for PC-9 Discrimination



- ✧ Average of 5 1R tests with TMC 1005
- ✧ Average of 7 1Q tests with TMC 1005
- ✧ Average of 3 1Q tests with E4.

# 1Q Test Report for PC-9 Discrimination



▸ E4 oil consumption comparison

# 1Q Test Report for PC-9 Discrimination

- The average performance of the E4 oil demonstrates discrimination in the areas of WDP, TGC, and oil consumption.
- The 1Q test with EGR produces lower land piston deposits that can result in ring sticking and loss of oil control.

# 1Q Test Report for PC-9 Conclusions

- ▶ The SCOTE Surveillance Panel has declared the 1Q test ready for matrix testing.
  - ✧ Demonstrated precision with TMC 1005
  - ✧ Demonstrated discrimination between TMC 1005 and an ACEA E4 oil.
  - ✧ Approved test procedure with provisions for cleaning the EGR cooler.
- Based on the above statements, 1Q test is ready for matrix testing in PC-9.