CEC 2009 – Quality Requirements for Fuel and Lubricant Tests

BASE OILS AND LUBRICANTS
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CEC

the Co-ordinating European Council for the development of performance tests for transportation fuels, lubricants and other fluids

CEC

CEC is an Industry-based organisation for the development of Test Procedures / Methods:

- Automotive Fuels, Engine Oils & Transmission Fluids
- Marine & Large Engine Oils
- Two-stroke Engine Oils
- Associated Bench Tests

Note: See 2008 presentation to this conference for details on CEC organization

CEC

CEC provides a platform for :

- ACEA (European Automotive Industry Organization)
- ATC (European Additive Industry Organization)
- ATIEL (European Lubricant Industry Organization)
- CONCAWE (European Fuel Industry Organization)
- Marine engine lubricant industry
- Transmission lubricant industry
- Etc.

to discuss and develop test methods required for product development and quality specifications/ standards

CEC Tests

Currently CEC have:

- 3 lubricant laboratory tests under development
- 1 lubricant rig test under development
- 7 lubricant engine tests in use
- 7 lubricant laboratory tests in use
- 5 fuel engine tests in use
- 1 fuel laboratory test in use
- 4 transmission rig tests in use
- 2 transmission rig tests under development
- 2 transmission laboratory tests in use

New Test Method Development

New test method development will be initiated:

- **supported by ACEA, ATC, ATIEL (lubricants)**
- **supported by ACEA, ATC, CONCAWE (fuels)**

or

- **an Industry initiative**

A Test Development Group (TDG) will be formed having clear Terms of Reference (Objectives) and a leading laboratory with "financial" sponsors.

Current Test Developments

- **T-091 (Torque Converter Clutches W280 and W260)**
- **L-094 (Asphaltenes in marine engine oils)**
- **L-095 (Insolubles in marine engine oils)**
- **L-100 Turbo Charger Deposit Test**
- **T-102 (Start Clutches)**
- **L-103 (Biological degradability)**

Method Designation:

L = Engine Lubricant

T = Transmission Lubricant

F = Fuels

Potential Test Developments

- **Pitting Test (Transmission Lubricant)**
- **Gasoline sludge test (Engine Lubricant)**
- **Test to examine the effect of biodiesel on engine lubricants (Investigation Method)**

Use of CEC Tests

CEC tests are used in the automotive and petroleum industry:

- ACEA Oil Sequences (main activity of CEC)
- Fuel additive development
- Screening tests for OEM discussions (transmissions)
- Screening tests for engine lubricant development
- Screening tests for fuel development
- Supporting physical test methods

CEC Quality Requirements

CEC require that the test results obtained are technically sound and accurate.

Quality requirements have been defined for the test method, test parameters and participating laboratories and are included in the CEC Guidelines.

The CEC Guidelines are regularly reviewed and adjusted to anticipate and comply with the needs of the Industry.

CEC Quality Requirements

These are different for lubricant and fuel tests.

They reflect the different way lubricant and fuel tests are being used.

Laboratories operating CEC tests must comply with the CEC requirements to claim a valid CEC test result.

Laboratory Quality Requirements

All laboratories must have an ISO 9001 equivalent system for the general quality definition and procedures.

For engine/rig tests an ISO 17025 equivalent system is required.

Laboratories must actively participate in CEC Group activities, meetings and round robins. Eg. every laboratory must contribute to the improvement of the test method and share data/experience.

Supporting OEM Requirements

Requirements not only address quality but also safety and OEM confidentiality. This is especially valid for engine tests.

CEC respects the needs of the supporting OEM related to the confidential nature of equipment and software needed to conduct the test.

Test laboratories must accept and satisfy the OEM evaluation prior to installing the test.

Laboratory OEM Quality Requirements

Especially for lubricant engine tests included in the ACEA Oil Sequences additional requirements must be satisfied:

- Audit by supporting OEM
- Confidentiality agreement with OEM

These requirements may exclude laboratories not meeting the "standard" required by CEC and the supporting OEM.

Fuel Test Quality Requirements

Typically for fuel tests a “calibration” fuel is being used to check whether the test method (installation) gives the correct (poor) performance.

Fuel tests are used to develop products that give a better performance than the calibration fuel.

Lubricant Test Quality Requirements

A lubricant test method may be “calibrated” against the “field” using a calibration fluid.

A poor and good reference lubricant are being used to ensure that the test consistently measures the difference in performance for a specific parameter.

These reference lubricants will show performance differences for some parameters but not for all.

Statistical Requirements

Statistical requirements have been defined for:

- **Repeatability (fuel + lubricant test)**
- **Reproducibility (lubricant test)**
- **Discrimination (lubricant test)**

using a calibration fuel or poor and good reference lubricants.

Test Method

Regular round robins are used to collect data on one fuel which will be evaluated statistically.

For lubricant tests, the reference oils are being used to establish acceptability limits (eg. valid test results can only be obtained once the poor and good reference oil test results fall within the acceptability limits).

Test Data Registration

Data on lubricant engine tests related to the ACEA Oil Sequences are reported into the ATC-ERC database.

Data obtained in fuel and other lubricant tests are reported into the CEC Test Monitoring System.

Why Test Data Registration?

To ensure the validity of the test results being used to support fuel and lubricant development and performance claims.

To assist the CEC group in improving the test method.

To provide the test laboratory with an insight in its performance relative to industry.

ATC-ERC Database

ATC uses the ERC database to support the ACEA Oil Sequences as well as CEC and the participating laboratories.

Test operating conditions and results are reported by the participating laboratory.

Test validity depends on complying with the CEC and ERC registration requirements.

CEC Test Monitoring System (TMS)

For all tests not included in the ACEA Oil Sequences CEC have developed the CEC Test Monitoring System.

This is an on-line dynamic system giving participating laboratories an immediate answer relative to their performance versus the other participating laboratories.

It assists the CEC group in understanding the quality of the test method and possible need for improvement.

CEC TMS is unique in industry and provides a clear benefit to the participating laboratories. Rather than waiting for the outcome of the annual round robin the position is known immediately.

CEC TMS

Early 2007 it was decided to move the registration system from the US to Europe with the potential to integrate it fully into the CEC Website and to benefit of administrative efficiency improvements as well as better user liaison.

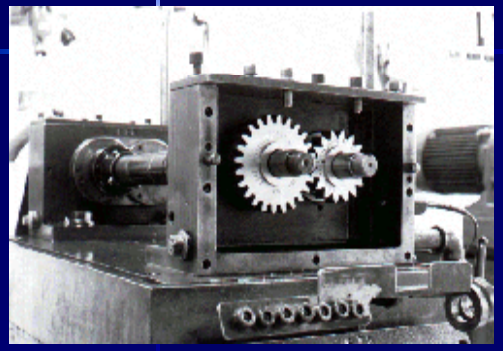
Feedback from working group chairmen has been positive appreciating the easy access and immediate use of the information for test method improvement

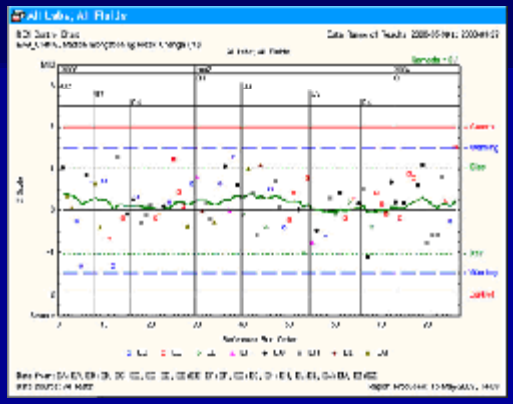
CEC TMS Complexity

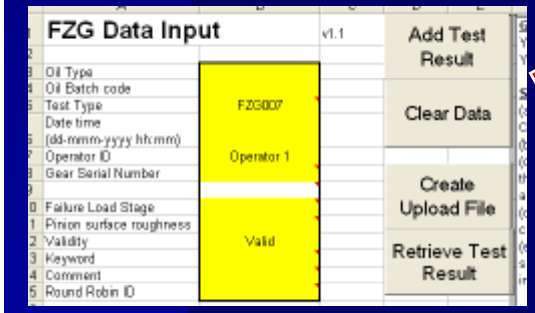
- 185 Labs
- 207 People
- 390 Test participants
- 13 Test types (3 more being developed)

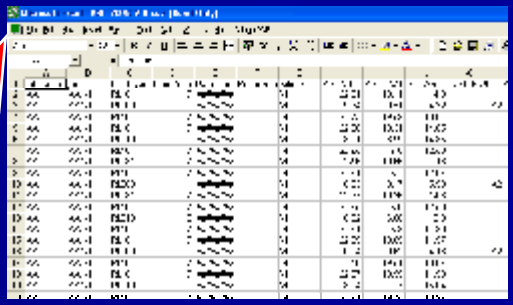
- 34 documents
- 18420 test records
- 611 test targets

Example: FZG Test









Conclusion

Quality is the key driver in test method development and application.

The test method and laboratories must comply with stringent requirements to ensure that test results are valid.

Not every laboratory may qualify as CEC test laboratory.

CEC is committed to quality as well as to satisfying the needs of the Industry.

On behalf of the CEC Management Board

I thank the organizers to allow me to show this presentation to you.