



The Coordinating European Council

for the Development of Performance Tests for Fuel, Lubricants and other Fluids

Introduction to CEC and CEC Activity Report 2013



Introduction



The Coordinating European Council

for the Development of Performance Tests for Fuel, Lubricants and other Fluids

What is CEC?

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

CEC is an Industry-based organisation for the development of Test Procedures and Methods focusing mainly on:

- Automotive Fuels
- Engine Oils
- Transmission Fluids and Associated Bench Tests



The Coordinating European Council

for the Development of Performance Tests for Fuel, Lubricants and other Fluids

CEC Management Board is made up of members of four Industry Associations:-

1. ACEA: www.ACEA.be

Association des Constructeurs Europeens de l'Automobile

2. ATC: www.ATC-Europe.org

ATC is the Organisation of Europe's biggest additive manufacturers

3. ATIEL: www.ATIEL.org

ATIEL is the Organisation of Europe's leading engine oil manufacturers

4. CONCAWE : www.concawe.be

The Oil Companies' European Association for environment, health and safety in refining and distribution



CEC Mission Statement

- To be Europe's primary resource for the development of tests associated with the development of the vehicle fuel and lubricating fluids required by the European OEMs and defined via Industry Standard Specifications
- These fluids will find application in:
 - Passenger cars
 - Commercial vehicles
 - Off road
 - 2 and 4 stroke motorcycles
 - Ships
- And will be developed with headline attributes of Efficiency, Reliability, Quality and Cost Effectiveness

CEC's Foundation Principle

Managed by
industry
stakeholders

Quality
processes for
test labs

TMS for
bench tests

Rating
workshops

Use of lead
lab to
develop new
tests

**All CEC processes
combine to provide high
quality tests that will
reliably assess the true
performance of a lubricant
or fuel**

Support of
statistics
group

Terms of
reference for
new test
development

Expert fuels
and lubes
advisors

Monitoring
and
referencing of
test engines

Strategy

In order to achieve the Mission,
CEC will focus on four strategic
elements

4 Strategic Elements

1. Field Correlation and Test Relevance

- Development and correlation of new CEC tests to real world or potential field concerns
- Option to generate failure mode or field correlation data

2. Test Quality

- Post development reviews to identify improvement opportunities for future developments
- Developed and maintained to industry best practices
- Timely notification and resolution of issues

3. Streamlined and cost effective test development process

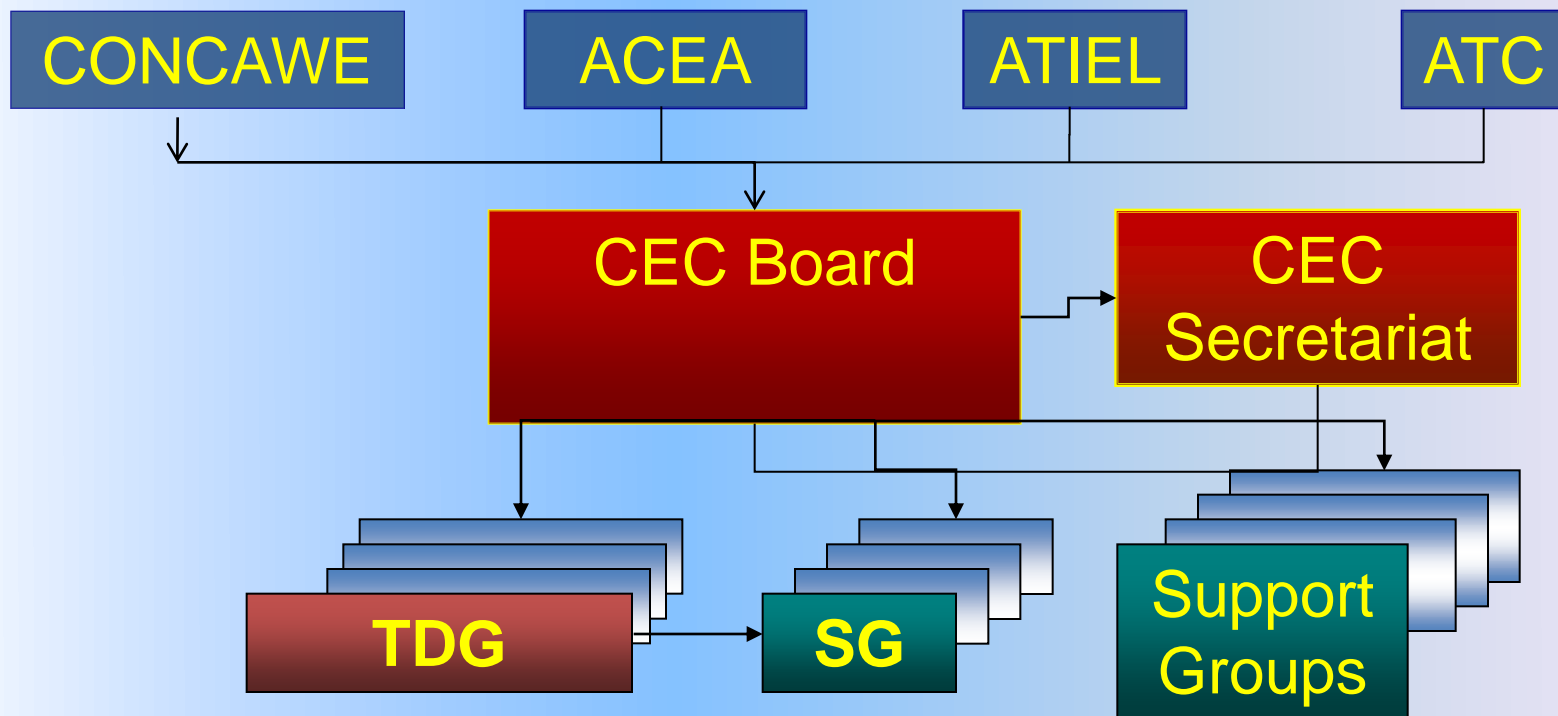
- Clear Terms of Reference
- Clear responsibilities and timelines

4. Promotion

- Enhanced communication with European stakeholders
- Broadened acceptance of CEC tests to avoid unnecessary duplication

CEC Organisation

CEC Organisation



CEC Management Board

CONCAWE

ACEA

ATIEL

ATC

CEC Board

CEC
Secretariat

Articles of
Association

Guidelines

Test
Methods

Legal requirement

How to operate

End result

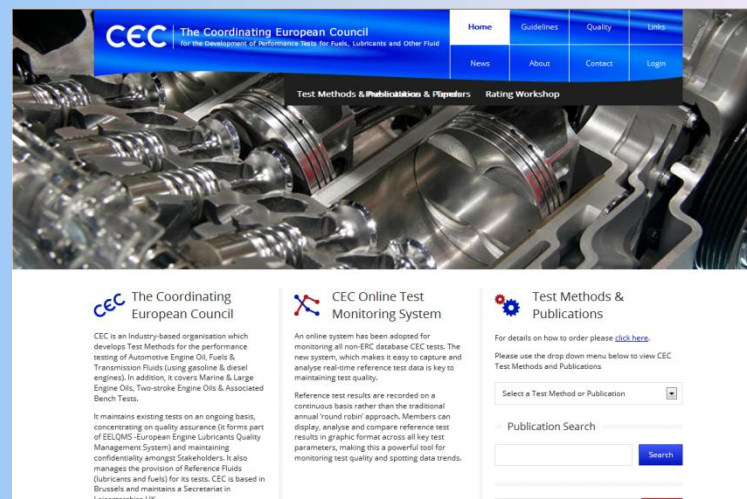


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CEC Secretariat

Website: www.CECtests.org

- Secretarial & administrative support to Management Board
- Finance, Legal and Accounts
- Support to all CEC Groups
- Maintenance, updating and sales of Test Methods
- Maintenance of CEC's secure Web Site and information to stakeholders.
- TMS facilitator
- Helpdesk facility
- Organisation of CEC Conferences



Test Development Process



CEC Test Development Process – TDG's

- The CEC Test development process is covered in CEC Guideline 11.
- CEC proposals for new tests are introduced through the **industry liaison groups** – usually initiated by an OEM and supported by relevant experience and data.
- The proposals must be supported by an assessment of the expressed needs and terms of reference
- CEC selects a lead lab by tender or by direct appointment or after evaluation of quotation. Tenders are evaluated by a small CEC MB team
- Sponsors are recruited for the Test development group (TDG) to pay for the test development.
- Test is then developed with a draft CEC procedure established and repeatability results analysed by the Groups' Statistical representative (SDG).
- Lead laboratory assists other Sponsors to install the test and reproducibility established from RR results from these additional labs.
- If SDG recommends acceptance, CEC MB will approve as a valid CEC test.
- New Valid CEC Lubricant tests usually go into the next ACEA Oil sequences



CEC New Test Development Process - 1

- **Template**
 - a) Responsibility – small team consisting of experts and OEM/hardware supplier
 - b) Includes statement of test need and support
 - c) Action: CEC Management Board agreement required
- **Terms of reference (TOR)**
 - a) Responsibility - small team consisting of experts and OEM/hardware supplier and CEC Board representatives
 - b) Action: CEC Management Board agreement required
- **Tender document**
 - a) Responsibility – CEC Secretariat
 - b) Based on TOR
 - c) Includes estimate of costs and timing
 - d) Sent by the CEC Secretariat to all interested parties
- **Selection of Lead Laboratory**
 - a) Responsibility – small team from CEC Management Board
 - b) Evaluates the tenders received
 - c) Lead laboratory chosen by CEC Management Board and informed by CEC Secretariat
- **Setting up a sponsored TDG**
 - a) Responsibility - CEC Secretariat writes to all interested parties asking for sponsorship
 - b) Sponsorship cost estimate is included
 - c) Sponsor TDG consists of OEM/Hardware supplier, Oil company and Additive company representatives and other test laboratories
 - d) Secretariat requests Letter of Intent and payment of sponsor fee



CEC New Test development process - 2

- **First TDG meeting**
 - **Officers for the TDG to be appointed**
 - I. **Chairman: to be ratified by CEC Management Board**
 - II. **Vice Chairman**
 - III. **Secretary**
 - IV. **Procedure Co-ordinator**
 - V. **Reference Fluids Co-ordinator**
 - VI. **Statistician**
- **Test development process**
 - **Lead Lab runs Phase 1**
 - I. **Runs development fluids testing**
 - II. **Establishes test repeatability**
 - III. **Statistician evaluates data**
 - IV. **CEC procedure – Responsibility of TDG Procedure Co-ordinator**
 - V. **Chairman submits results of Phase 1 to CEC Management Board**
 - VI. **CEC Management Board to sign-off in order for Group to move to Phase 2**
 - **Phase 2**
 - I. **Lead Lab assists installations at other labs**
 - II. **Additional Labs run reference fluids to establish in-house repeatability**
 - III. **Statistician evaluates data from all labs to establish Reproducibility and Test Precision**
 - IV. **Chairman presents Phase 2 results to CEC Management Board for acceptance**
- **Transfer from TDG to CEC Surveillance Group – CEC Management Board agrees to transfer to SG**

Quality Requirements & Support Groups

Test Laboratory Quality Requirements

- All laboratories must have ISO 9001 or an equivalent system for general quality definition and procedures.
- For engine/rig/bench tests an ISO 17025 or equivalent system is required.
- Laboratories must actively participate in CEC Group activities, meetings and round robins.
 - E.g. every laboratory must contribute to the improvement of the test method and share data/experience



Test Laboratory OEM Quality Requirements

Additional requirements might need to 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.

CEC Web-Based Test Monitoring

- Simple process for uploading Reference data and Graphical software for analysis of data
- Location: www.cec-tms.net



CEC TMS
ONLINE TEST MONITORING

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CEC Performance Tests

You have entered an incorrect username and / or password. Please try again.

Username:
Password:

Online Test Monitoring

An online system has been adopted for monitoring all non-ERC database CEC tests. Introduction of the new system, which makes it easy to capture and analyse real-time reference test data, will be completed by 2008 and is key to maintaining test quality.

Reference test results are recorded on a continuous basis rather than the traditional manual 'round robin' approach. Members can display, analyse and compare reference test results in graphic format across all key test parameters, making this a powerful tool for monitoring test quality and spotting data trends.

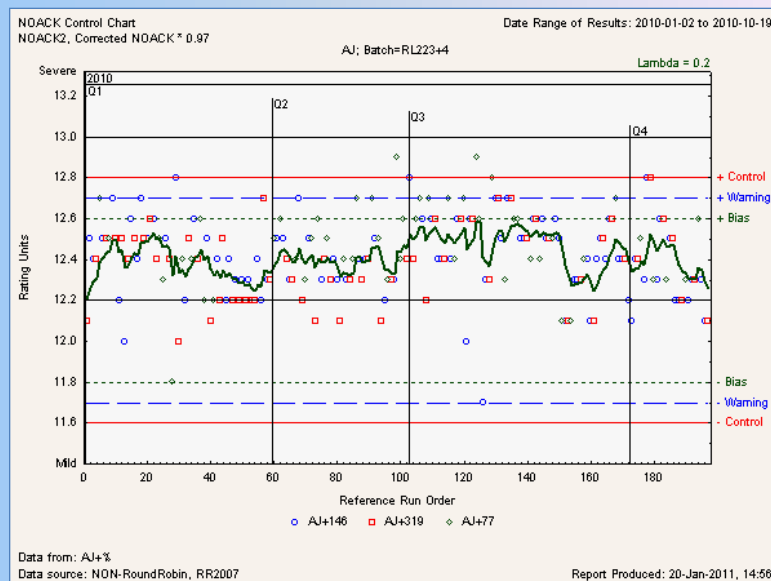
Enter your login details on the left to sign in the CEC Online Test Monitoring System

About CEC

CEC is an industry-based organisation for the development of new Test Procedures for the performance testing of Automotive Engine Oil, Fuels & Transmission Fluids (using gasoline & diesel engines). In addition, it covers Marine & Large Engine Oils, Two-stroke Engine Oils & Associated Bench Tests.

It maintains existing tests on an ongoing basis, concentrating on quality assurance (it forms part of EELOMS - European Engine Lubricants Quality Management System) and maintaining confidentiality amongst Stakeholders. It also manages the provision of Reference Fluids (lubricants and fuels) for its tests. CEC is based in Brussels and maintains a Secretariat in Leicestershire UK.

For More information on CEC [click here](#)



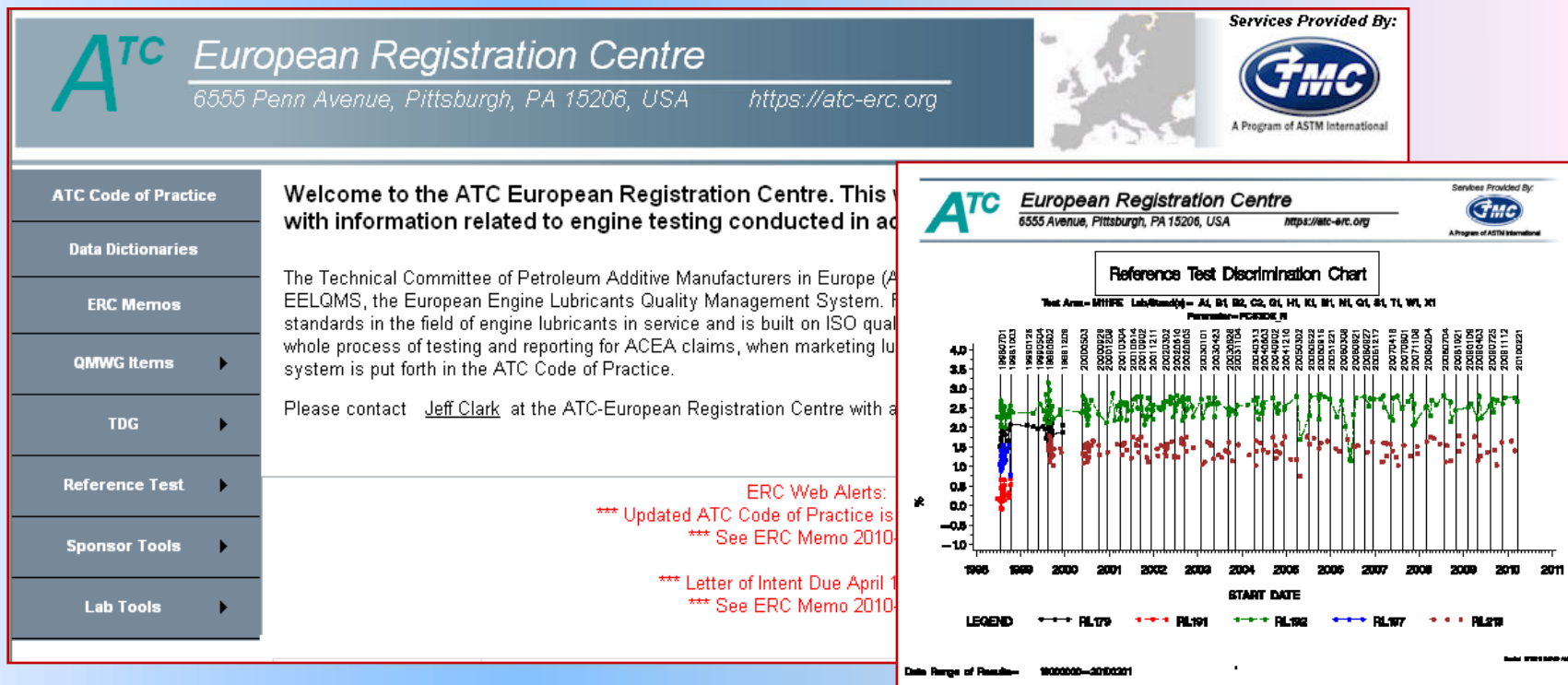
Data from: AJ+X

Data source: NON-RoundRobin, RR2007

Report Produced: 20-Jan-2011, 14:56

ERC – ATC's European Registration Centre
<https://atc-erc.org>

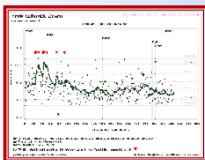
- **Candidate test registration database**
- **Reference test registration database and charting**



Support Groups

- **Statistical Development Group - SDG**

- A designated Statistical Development Liaison Officer allocated to each Group
- Assuring quality of test results



- **Rating Group - RG**

- Regular workshops for Raters
- Ensure Rating is consistent across the industry



- **Reference Fuels Group - RFG**

- A suite of reference fuels are supplied for use within TDG and SG test groups to ensure consistency of fuel used.



- **Reference Oils Group - ROG**

- Reference oils are supplied to TDG and SG groups to enable the initial development of tests using calibration oils and to ensure correct severity of testing by running Round Robins and/or setting reference frequency protocols.



Role of CEC in EELQMS


ACEA European Oil Sequences and EELQMS

In 1995 the European industry associations ACEA, ATC and ATIEL developed a quality system to ensure that engine lubricants claiming performance against the ACEA Oil Sequences have been developed and tested according to best industry practices.


This system is called the “**European Engine Lubricant Quality Monitoring System (EELQMS)**”

There are 4 major parts:

1. ACEA European Oil Sequences
2. ATC Code of Practice
3. ATIEL Code of Practice
4. CEC Test Methods



The ATIEL Code of Practice for Developing Engine Oils Meeting the Requirements of the ACEA Oil Sequences




ATC CODE OF PRACTICE

A Code of Practice devised by the members of the European lubricant additive industry. The Code is intended to aid continuous improvement in the development of engine lubricants and the consistency and validity of performance claims made for them.

The Code specifies engine tests, procedures and record keeping.

| L-54 | 01 | Contract | 10-Nov-08 |
|---------------------------|---|----------|-----------|
| CEC Code | L-54-95 | | |
| Test Method | Fuel Economy Effects of Engine Lubricants | | |
| Reg / Engine | Mercedes-Benz M111 E20 | | |
| Status | Surveillance | | |
| Issue N° | 11 | | |
| Date of last modification | 10-Nov-08 | | |
| Review Frequency | Annual | | |

CEC RELEASE DATE 10th November



ACEA EUROPEAN OIL SEQUENCES

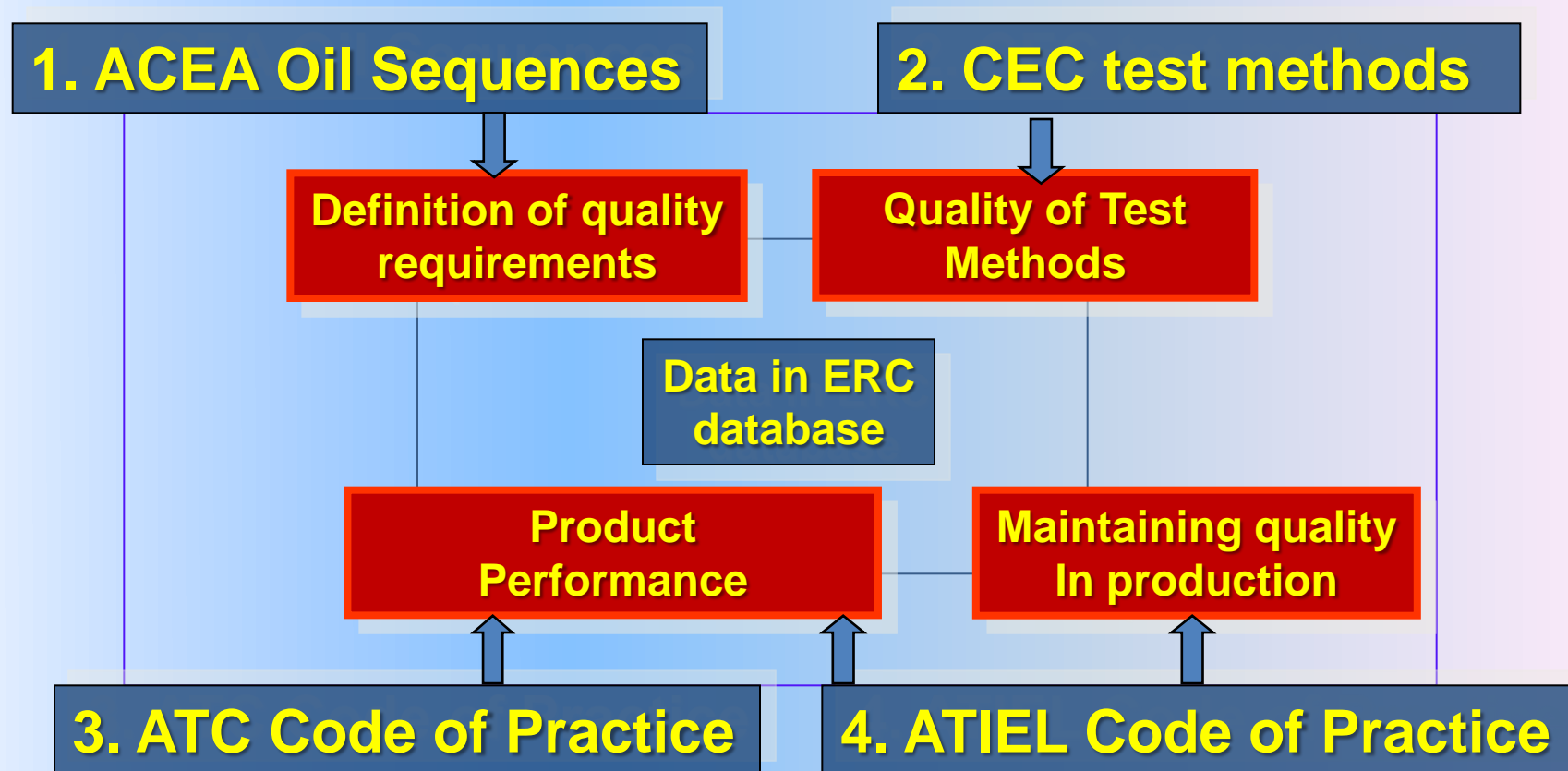
2010

SERVICE FILL OILS FOR GASOLINE ENGINES LIGHT DUTY DIESEL ENGINES ENGINES WITH AFTER TREATMENT DEVICES and HEAVY DUTY DIESEL ENGINES

Laboratory tests for gasoline and light duty diesel engine oils. Engine tests for gasoline and light duty diesel engine oils. Laboratory tests for engine with after treatment devices. Engine tests for engine with after treatment devices. Laboratory tests for heavy duty diesel engine oils. Engine tests for heavy duty diesel engine oils.

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RGR 210-000484-04

CEC's Role in EELQMS



New and Potential Test Developments

Test Developments - In progress

- TDG L-104 OM646LA, Effects of Biodiesel Fuel
- TDG L-106 DV6 Euro 5, Soot Handling Test
- TDG-L-107 M271EVO Sludge Test
- TDG-T-108 Pitting Test for Gear Lubricants
- TDG-L-109 Oxidation Test in the Presence of Biodiesel Fuel
- TDG-F-110 Internal Diesel Injector Deposit Test
- TDG-L-111 EP6 Gasoline Engine Test for High Temperature Deposits

Other Activities

- CEC L-39-96 Seals Special Project Group to look for new elastomers

New Test Development (TDG):

TDG-T-108 - Development of a Pitting Test for Gear Lubricants

Approach

- New test to determine and to discriminate the pitting load carrying capacity of gear lubricants

Hardware:

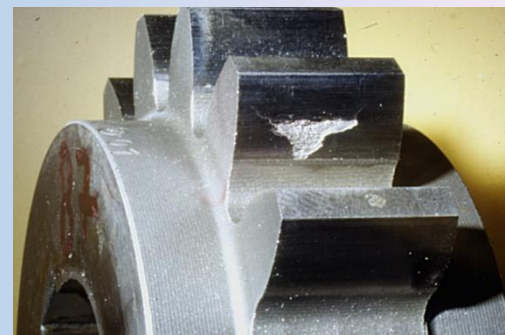
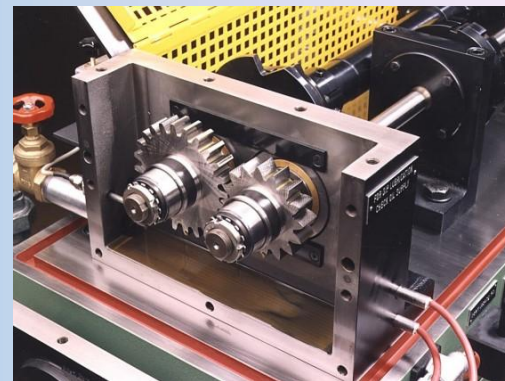
- FZG-gear test rig acc. ISO 14635
- Test gears type FZG-C-PT

Criteria:

- Optimized conditioning procedure for the test gears
- Limited micro-pitting in the test
- Specification of pitting load capacity classes
- Evaluation of reached pitting lifetime

First meeting:

- 17th April 2012



Test rig: FZG gear test rig, $a = 91.5$ mm (ISO 14635)

Test gears: FZG-C-PT, $m = 4.5$ mm, $i = 1.5$ (with pitting damage)

New Test Development Group (TDG):

TDG-L-109 - Oxidation Test for Engine Oils Operating in the Presence of Biodiesel Fuel

Scope:

- Laboratory oxidation test which checks the oxidation performance of engine oils in LD and HD engines run with biodiesel.

Status:

- First meeting: 09th Jan 2013
- Number of meetings in 2013: 4 meetings / 3 phone conferences
- Next meeting: 13th Mar 2014
- 98 oxidation tests with various conditions have been carried out
- 8 LD and 6 HD oils have been tested
- 2376 measurements have been carried out

Already Defined:

- Apparatus as in CEC L-105
- Air flow, catalyst
- Fuel type: B100 (80% RME / 20% SME) from TDG-L-104
- Fuel concentration: 7% at start of test
- Main parameter: V40 / V100, oxidation (IR)

Forecast:

- Review of comparison data of field test
- Fixation of test conditions for LD and for HD engine oils



New Test Development Group (TDG):

TDG F-110 – Internal Diesel Injector Deposit Test

Terms of Reference for TDG-F-110

Performance criteria

- Protection from IDID
- Maintain Cold Startability
- Prevent rough running and erratic idle

Hardware

- PSA's DW10C 2l engine. PSA will provide technical support, engine hardware, adaptation parts, open ECU (during test development), and semi-open ECU (when test is developed).

Fuel

- CEC DF-79 (B0 fuel also used in the DW10B Nozzle Coking test)

First meeting:

- 27th June 2013



Type : DW10C, Euro 5, Common Rail

Size: 1997 cc

Power : 120 kW @ 3750 rpm

Torque rating: 340 N.m @ 2000 rpm

New Test Development Group (TDG):

TDG L-111 – Gasoline Cleanliness Test

Terms of Reference for TDG-L-111

Performance criteria

- Piston Cleanliness
- Turbocharger Deposit
- Other parameters such as oil degradation and valve deposit to be monitored during test development

Hardware

- PSA's EP6CDT 1.6L TGDI (Turbocharged Gasoline Direct Injection) engine, with intake VVT and variable displacement oil pump. PSA will provide technical support, engine hardware, adaptation parts, open ECU (during test development)

Fuel

- E10 fuel specified by PSA with optimised requirements to be in line with commercially available E10 fuel

First meeting:

- 24th September 2013



Type : EP6CDT, Euro 5, TGDI

Size: 1598 cc

Power max. :

115 kW @ 5800 rpm – 6000 rpm

Torque max.:

240 N.m @ 1600 rpm – 4000rpm



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Appendix

- Catalogue of CEC Test Methods



CEC Test Methods

Automotive Fuels

- CEC F-05-93 - Inlet Valve Cleanliness in the MB M102E Engine
- CEC F-16-96 - Assessment of the Inlet Valve Sticking Tendency of Gasoline Fuels (VW Waterboxer Gasoline Engine)
- CEC F-20-98 - Deposit Forming Tendency on Intake Valves.
- CEC F-23-01 - Procedure for Diesel Engine Injector Nozzle Coking Test (PSA XUD9A/L 1.9 Litre 4 Cylinder indirect injection diesel engine)
- CEC F-98-08 - Direct Injection, Common Rail Diesel Engine Nozzle Coking Test.
- CEC M-92-03 – Code of Practice - Engine Non-Start Problems Relating to CCD Flaking (CCDs = Combustion Chamber Deposits)



CEC Test Methods

Engine Oils – Passenger Cars

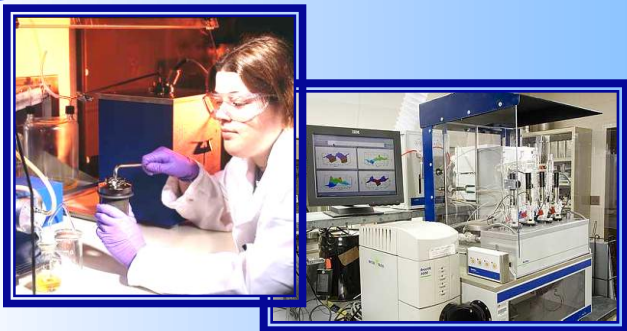
- CEC L-38-94 - Gasoline Engine Valve Train Scuffing Test (PSA TU3 Engine)
- CEC L-53-95 - Evaluation of Sludge in Gasoline Engines (MB M111 E20)
- CEC L-54-96 – Fuel Economy Effects of Engine Lubricants (MB M111 E20)
- CEC L-78-99 – DI Diesel Ring Sticking & Piston Cleanliness Test (VW 1.9L Turbocharged)
- CEC L-88-02 - Evaluation of Oil Viscosity Increase, High Temperature Deposits & Ring Sticking in Gasoline Engines (Peugeot TU5 JP+)
- CEC L-93-04 - Oil Dispersion Test at Medium Temperature for Passenger Car Direct Injection Diesel Engines

Engine Oils – Heavy Duty Diesel

- CEC L-101-09 - Piston Cleanliness and Bore Polishing Test (OM 501LA)

Engine Oils – Light & Heavy Duty Diesel

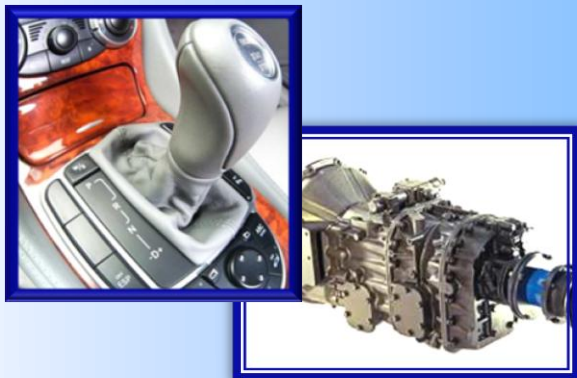
- CEC L-99-08 – Evaluation of engine crankcase lubricants with respect to low temperature lubricant thickening & wear under severe operating conditions (OM646LA)



CEC Test Methods

Bench Tests

- CEC L-14 - 93 Shear Stability of Lubricating Oils Containing Polymers (Fuel Injection Pump)
- CEC L- 36 - 90 The Measurement of Lubricants Dynamic Viscosity, High Shear
- CEC L- 39 - 96 The Evaluation of Oil - Elastomer Compatibility (Laboratory Test)
- CEC L- 40 - 93 Evaporation Loss of Lubricating Oils (NOACK Evaporative Tester)
- CEC L- 48 - 00 Oxidation Stability of Lubricating Oils used in Automotive Transmissions
- CEC L- 82 - 97 Spectrophotometric determination of Soot in Used Engine Oil
- CEC L- 83 - 97 Measurement of Kinematic Viscosity @100 Deg C of Used Oil Samples
- CEC L- 85 - 99 Hot Surface Oxidation Pressure Differential Scanning Calorimeter (PDSC)
- CEC F- 06 - 96 Measurement of Diesel Fuel Lubricity (HFRR fuel lubricity tester)
- CEC L-103 -12 Biological Degradability of Lubricants in Natural
- CEC L-105 -12 Low Temperature Operability Test



CEC Test Methods


Transmission Fluids


- CEC L-07-A-95 - Load Carrying Capacity Test for Transmission Lubricants (FZG Test Rig)
- CEC L-45-99 - Viscosity Shear Stability of Transmission Lubricants (Taper Roller Bearing Rig)
- CEC L-66-99 - Evaluation of the Synchromesh Endurance Life using the FZG SSP 180 synchromesh test rig
- CEC L-84-02 - FZG Scuffing Load Carrying Capacity Test for High EP Oils



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CEC - Website: www.cectests.org



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Test Methods & Publications

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