

Call for quotation for E20/25 engine testing

for an extensive engine and vehicle testing programme



Background

Under the EU H2020 research and innovation programme a project has been developed for which the European Commission (EC) and CEN have signed a contract (SA/CEN/RESEARCH/EFTA/000/2014-13) under the Framework Partnership Agreement with CEN-CENELEC (FPA). The project is titled: "Engine tests with new types of biofuels and development of biofuel standards". One of its objectives being to study the overall sensitivity of future (Euro 6c technology) vehicles and the fuel logistics' system towards mid-blend oxygenate ("E20/25") petrol and to prepare a more in-depth Auto-Oil-Ethanol programme on E10+.

The work that this tender covers has the scope to procure certain identified spark ignition type vehicles and test them on their emissions with different E20/25 fuels.

Objectives

The overall objective of the project is to study the overall sensitivity of future (Euro 6c technology) vehicles and the fuel logistics' system towards mid-blend oxygenate ("E20/25") petrol and to prepare a more in-depth Auto-Oil-Ethanol programme on E10+. The impact of a highly oxygenated fuel on regulated gaseous and particle emissions, fuel consumption/CO₂ emissions, non-regulated emissions and vehicle driveability needs to be studied in depth to, in the end, allow E10+ products on the market in the future. This project is a scoping study. The concept of a new petrol fuel quality specification for E10+ is thus established and will in the end be presented to CEN/TC 19 and the EC for further decisions regarding developing deliverables for it.

Tender basics

This tender is part of an overall project funded by the European Commission and executed by the European Standardization Committee, CEN. Project execution is being seconded to NEN, the Dutch Standardization Institute. NEN has appointed a *programme manager* and has installed a group of experts to advise NEN on the effective testing and research required. This *TF1* has established the technical content of this call for quotation and assigned a *project manager* as their technical spokesperson. When indicated as part of the tender, the tenderer may be required to visit meetings of the *TF1* on invitation by NEN. The *programme manager* acts as the contact for the test organization (*tenderer*); he/she will receive the reports and deliverables.

Overall the tender consists of the following:

- I. sufficient volumes of test fuel blends (E20 type gasoline) as delivered by the *project manager*, shall be stored, processed and used for the testing;
- II. the necessary, prescribed vehicles and other equipment to enable testing are procured, checked for correct functioning and stored and maintained under the usual conditions;
- III. a separate vehicle, rented from a car manufacturer of *TF1* and supplied through the *programme manager*, shall be received, checked and stored for the testing as required. After all required tests have been completed it shall be returned to its manufacturer;
- IV. the prescribed engine driveability and exhaust/emission test procedures are executed following a test plan and order proposed by the tenderer. Planning regarding randomized test order of the fuels shall be discussed with the *TF1*;
- V. test results of individual tests are collected and kept;
- VI. individual test (facility) reports and consolidated reports are written and presented to the programme manager;

NEN Energy

PO Box 5059
2600 GB Delft
the Netherlands

Vlinderweg 6
2623 AX Delft
the Netherlands

T (015) 2 690 326
F (015) 2 690 207

energy@nen.nl

Nederlands Normalisatie-instituut

VII. where required assistance in the preparation of proposals for development of CEN deliverables to CEN/TC 19 is given to the *TF1*.

Tasks to be performed

The main tasks of the tenderer during the contracting period are:

- Discussion of the test programme with the *project manager* assigned by the *TF1* and with the *programme manager*;
- Reception of the necessary E20/25-type fuels in large drums, store them to prevent degradation and contamination for the time of the contracting period until they will be used. Remaining fuels shall be returned to the *project manager* or be discarded on request;
- Procuring or leasing the three vehicles in line with Annex A;
- Receive a single prototype vehicle from a European car manufacturer via the *programme manager*. Check and store it before it needs to undergo a similar test cycle as the others. After all required tests have been completed return it to its manufacturer.
- Develop a detailed planning of each of the tests, fuels and vehicles for acceptance by the *TF1*;
- Preparation of the test programme and the vehicles test benches using an E10 type of fuel s reference;
- Execute for each vehicle and each fuel provided the tests as identified in Annex B;
- Evaluation of test results per fuel and engine type and report them to the *project manager*;
- Advise *TF1* regarding the interpretation of the test results towards the driveability and emission effects regarding other engine and vehicle types;
- Participate in the preparation of the final report to the EC and to CEN by *TF1* in order to develop a future detailed test programme for E20/25 fuels.
- Report to the *programme manager* in writing on the exercise and conclusions.

Execution of the work

The tenderer shall cooperate in evaluating the performance of representative vehicles of current and recent production (i.e. Euro 6 technologies) when operating on petrol fuels containing up to 25 % (V/V) ethanol or its equivalent in oxygen. A test programme developed by a taskforce led by NEN in order to assess the impact of these fuels on vehicle driveability and overall emissions.

Tests shall be executed on vehicles and not only on engines, as complete fuel supply and after treatment systems have to be taken into consideration. Further detail on each test needs to be discussed with the *project manager* or the *TF1*. The indicated numbers and types of vehicles/engines are the foreseen maximum in terms of amount to be tested; they may change in accordance with decisions by *TF1*.

Tests shall be executed using the E20/25 fuels as delivered by the *programme manager*. All test fuels will be provided in 200 litre sample drums to the *tenderer* by the *project manager* in the amount as determined by the test matrix. Where necessary the *tenderer* may request smaller container sizes. The *tenderer* will present a test planning to the *TF1*.

A test organization representative shall take part in the taskforce meetings (3 foreseen during the contracting period and to take place in Europe) in order to exchange information and cooperate in the advice to the EC and CEN. The representative shall assist the *programme manager* in preparing the final report to the EC.

The *tenderer* shall report to the *programme manager* and *project manager* about the test progress and results providing a weekly progress report. The *programme manager* may visit the test organization facilities to check progress and discuss the testing. The *programme manager* may require an interim written status report for *TF1* information. The *tenderer* shall present a detailed report on

the test execution, results and related advices regarding the impact of each of the fuels tested on emissions and driveability. The test results and reports shall become property of the contractor.

The *tenderer* shall at the end of the project and on request of the programme manager destroy the remaining fuels in his possession.

General confidentiality around the fuels involved, vehicle brands participating and results, etc. shall apply and the *tenderer* shall not distribute any results other than to those involved in the tender.

The *tenderer* will present an overall planning with the tender proposal. This planning shall be confirmed at the first exchange with the *TF1* after the contract signature.

Award criteria for the tendering process

Offers for provision of the testing and reporting are treated individually although consortium offers will also be considered. Offers can also be from a single person, who should have a VAT number and a company registration.

Selection of subcontractors will be based on the following criteria:

1) Documented experience (maximum 40 points):

- number of years working in relevant field
- demonstration of experience in leading and / or managing of similar projects
- demonstration of experience (in organization of and/or participation) in vehicle testing with different fuels
- demonstration of experience with the indicated test methods as described in Annex B
- technical experience and consulting activities in relevant field
- experience in European and/or international standardisation work
- experience in running European or/and international programs

2) Organization - demonstration of ability and understanding of the project (maximum 40 points):

- infrastructure and ideas regarding vehicles, emission testing and alternative fuels handling and testing
- facilities used for the vehicle preparation and testing
- organization of the vehicle preparation, measurements, testing, reporting
- established quality system

Possibility to complete the procurement of the vehicles and start the testing before mid-August will be considered an advantage.

Only offers that pass the selection criteria of scoring minimum 30 points under 1) and 20 points under 2) will be further evaluated. From those passing the minimum scoring a sensible pre-selection (based on the total of the short-list) will be made and the contractor(s) invited for further evaluation in a Q&A meeting session.

3) Quotation price (maximum 20 points). The quotation shall give insight in the costs for:

- fuel handling and storage,
- vehicle procurement;
- preparation of each vehicle,
- execution of each test and where possible the options as described in Annex B,
- total of the costs per vehicle if all tests and fuels as described would be executed, and
- overall organization and exchanges and meetings with the *TF1* and the programme manager.

NEN considers that proposals requesting a budget in the range of 1,5 M€ for the described activities would allow this feasibility study to be addressed

appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

The offer with the highest points in total will be selected.

On the effective contract the "General Terms and Conditions for the Provision of Technical Services to NEN" shall apply. A copy of those can be delivered on request. The Contractor should also agree to the fact that the obligation of NEN to pay is subject to the normal functioning of the financing mechanisms of the Commission of the European Union and of the EFTA, through the order voucher(s) relative to the tasks under the Horizon2020 call under the Secure, clean and efficient energy programme: B.2.5. "Engine tests with new types of biofuels and development of biofuel standards" and/or through the Agreements between the Commission of the European Union and CEN on Action SA/CEN/RESEARCH/EFTA/000/2014-13.

Replies to tender

Tenders can be sent (by mail or e-mail) to the programme manager Mr Ortwin Costenoble (energy@nen.nl), as soon as possible, at the latest at Tuesday 23 May 2017. The tender shall contain a specified breakdown of:

- tasks
- costs and expenses for work, travel, consumables and others where relevant
- first planning for the execution of the tasks, which will form the start of the discussion regarding the tender contract.

Start of the project is expected to be not later than September 2017 and to be finished not later than September 2018

Interested parties are invited to an explanatory session on 2 May were they can ask questions about the programme requirement and details on the test procedures, properties to measure, etc. This exchange will take place via a face-to-face-meeting in a location in Brussels. People could also choose to participate in that explanatory session by teleconference.

If necessary, additional information can be obtained via the programme manager, Mr O. Costenoble (T: +31 15 2690 330, e: ortwin.costenoble@nen.nl).

Annex A - Test vehicle requirements

This Annex presents the types of series production vehicles that should be procured for the work. They are in general described as:

- Generic variety of engines, probably that what the public will buy (future perspective)
- Euro6, Direct Injection turbo charged
- Small weight/small engine, heavy weight/small engine and heavy weight/large engine will be used
- The vehicles are identified by a certain power-weight ratio that they need to achieve – different segments are indicated
- Gasoline particulate filter excluded.

#	Vehicle model (Series production)	power weight ratio [kW/t]	Segment
1	Ford Fiesta 1.0L 3door 5 gear (Trend) or similar	40 - 50	Small
2	Peugeot 308 GTi 1.6L THP 6 gear (VIN XX5GNXXXX)	> 120	Compact
3	VW Tiguan 1.4L TSI BlueMotion Technology (Comfortline)	60 - 70	Off-road

In addition, one, eventually two, prototype vehicles which have an extended calibration for the new fuel, will be delivered by the programme manager without cost to the tenderer

Annex B - Vehicle and engine test requirements

The tests shall be done in three repeats per vehicle per fuel in randomized order to allow statistical evaluation (testing order will be provided by TF). With the offer, the *tenderer* shall provide an estimate on volume requirement per fuel considering sufficient volumes to purge the system when switching between fuels/tests.

Use a reference fuel provided by the TF1 for calibration at the beginning in the end and in the middle of the test cycle. This fuel is provided for checking stability of the vehicle running and the injector.

The tenderer shall explain about his procedures on guaranteeing that the vehicle condition is the same before starting every test and also to secure repeatability conditions of each test for each fuel, especially regarding stability of the results, power and determining (or preventing) eventual injector blocking

Maintenance requirements:

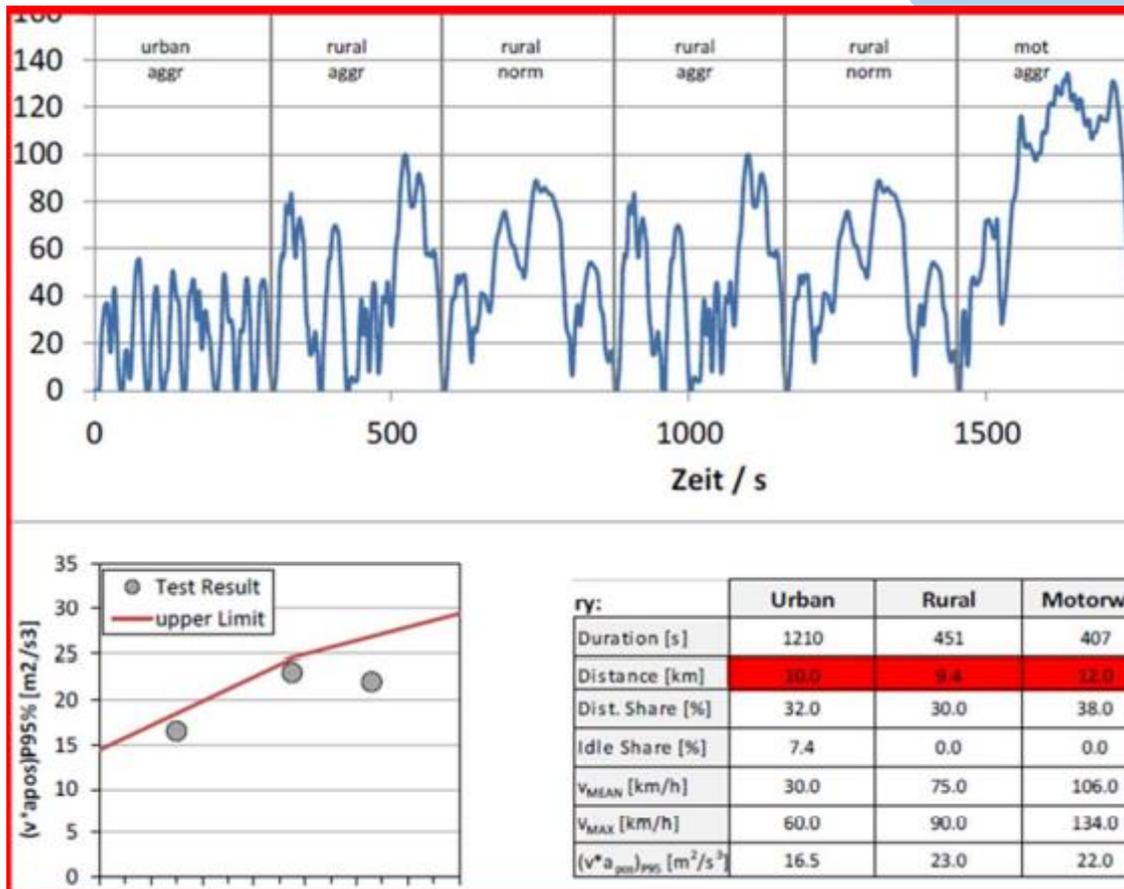
- vehicle pre-conditioning as per each of the tests described
- cleaning of the injectors in between two different fuels
- monitor OBD and ask from the OEM whether the vehicle has OBD adaptation
- Option on measuring unregulated emissions (aldehydes) on the chassis tests
- check the power curve several times during the testing

Vehicle measurement equipment required for driveability testing (items 4 and 5 as below):

LA4 lambda-sensor (Etas), pressure and temperature sensors before, inside and after high pressure pump (high measurement resolution: pressure per crank angle, temperature per 1/s), measuring computer

Vehicle testing required:

1. WLTC at 23°C, measuring HC, NMHC, NO_x, CO, PM, PN, CO₂, fuel economy and aldehydes
 Testing to be done with the 3 series production and 1 prototype vehicles. Please provide the cost for testing a second prototype vehicle (option)
 Testing to be done with 8 fuels (summer grade). Please provide the cost for testing an additional fuel (option)
 Please indicate cost implications, in case the testing would have to be done at 14°C ambient temperature (option).
2. NEDC at -7°C, measuring HC, CO
 Testing to be done with the 3 series production and 1 prototype vehicles. Please provide the cost for testing a second prototype vehicle (option)
 Testing to be done with 8 fuels (winter grade). Please provide the cost for testing an additional fuel (option)
3. RDE simulation on chassis dyno –
 Option 1: RTS95 modified as per figure below and at 23°C ambient temperature.
 Option 2: Tenderer can offer an own cycle (with proven relevance with RDE with PEMS road testing)
 Testing to be done with the 3 series production and 1 prototype vehicles. Please provide the cost for testing a second prototype vehicle (option)
 Testing to be done with 8 fuels (summer grade). Please provide the cost for testing an additional fuel (option).
 Please indicate cost implications, in case the testing would have to be done at 14°C ambient temperature (option).



4. Cold start @ -25°C in climate chassis test bench

Testing to be done with the 3 series production vehicles.
Testing to be done with 3 fuels (winter grade). Please provide the cost for testing an additional fuel (option)

 - Vehicle conditioning: store vehicle overnight in test bench at -25 °C.
 - Cold start with 30 minutes idling possibly incl. Lambda-measurement
 - At the cold start an eventual change of air/fuel ratio shall be detected and reported
 - Sensor measurement from beginning of vehicle start

5. Drivability @ 40°C ambient temperature in climate chassis test bench

Testing to be done with the 3 series production vehicles.
Testing to be done with 3 fuels (summer grade). Please provide the cost for testing an additional fuel (option)

 - Vehicle conditioning:
 - Store vehicle overnight in test bench at 40°C
 - Simulate hill driving (10% gradient), stop engine when oil temperature reaches 130°C, condition vehicle 40 minutes at 40°C
 - Vehicle testing with sensor measurements (for each test, before mentioned vehicle conditioning required):
 - Test A: Hot start and low speed driving (10 – 20 km/h) for 50 minutes (for further heating up of HDP), afterwards full load acceleration
 - Test B: Hot start and idling for 120 minutes ("chauffeur driving")
 - Test C: Hot start and full load acceleration

6. EVAP emissions testing and charcoal canister loading

Testing according to new Euro 6d requirement (48h testing) with a vehicle plastic tank (40 % fuel filling) and a connected new charcoal canister in a mini SHED chamber according to below

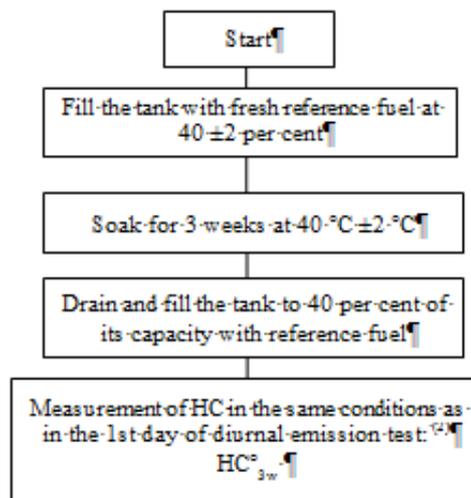
procedure.

Testing to be done with 2 fuel system configurations. Please provide the cost for testing an additional system (option)

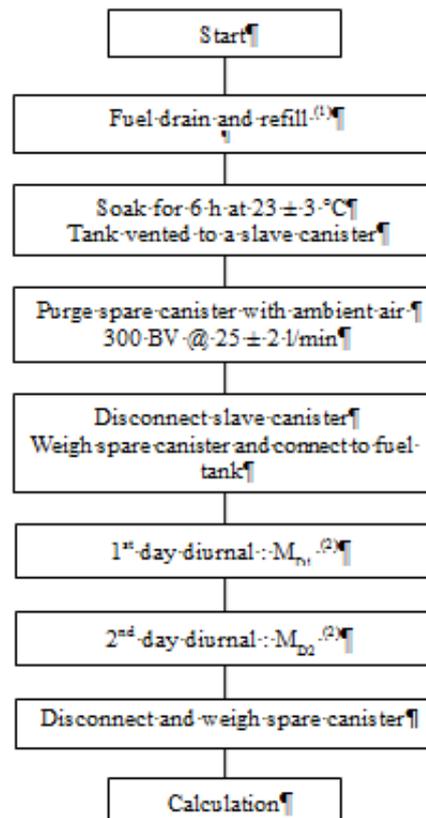
Testing to be done with 4 fuels (summer grade). Please provide the cost for testing an additional fuel (option)

Fuel tank emissions and canister weight increase measurement test procedure

Fuel tank preconditioning (has to be performed once before test start)



Fuel tank emissions and canister weight test



(1) Fuel temp. = 18 °C ± 2 °C
40 ± 2 % of nominal tank capacity

(2) Start temp. = 20 °C
Max. temp. = 35 °C
Delta temp. = 15 °C
Duration = 24 hours
Number of diurnals = 2 days