

Determination of a laboratory internal repeatability and comparison with standards

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Introduction

Total ACS is a company specialised in additives and special fuels for motorsports applications (Formula 1, moto GP, etc.) and for general public (like Excellium). In the laboratory, several analyses on gasoline and oils are carried out, in order to meet clients' specifications. Each analysis refers to a specific norm that should be followed. To check various devices of the site, audits are performed to answer norms requirements. The aim of these tests was to measure the fidelity of these methods. Especially, checks were performed on analysis of CFPP (Cold Filter Plugging Point), CPT (Cloud Point Tester), PPT (Pour Point Tester), measure of sulfur by UV and vapour pressure.

Experimental methods

12 tests were carried out on each device. For CFPP, PPT and CPT the same base D140 was used. A gasoline sample was employed for measuring sulfur and another base, the EE109, was exploited for pressure vapour. The products chosen for these tests have to be stable on the long range and should not be expensive.

The first process was to run samples in each unit. The second stage consisted in calculating the repeatability of the 12 tests. If one of them was higher than the standard, technicians were working on the device. The second solution consisted in using another product because the tested product was not sufficiently stable.

The last process was to establish control charts to follow the devices and see if there were drifts in time. According to these checks, devices were inspected every month.

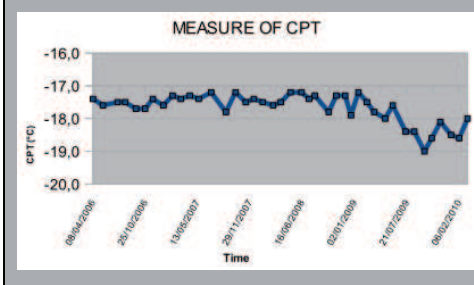
Results and discussion

Here, only the CPT was examined and results are illustrated in Table 1. The repeatability calculated by tests was lower than the norm. The device was considered valid and the control procedure was introduced. Previously, control charts were carried out reference products (oils) and the control chart established for one of CPT station is shown in Fig. 1. Studies demonstrated that values were quite regular until 2009 where the curve began to deviate from the reference value. After verification, the drift control explained the deviation from the reference value and therefore, it was not stable. To conclude, results of tests proved the need to check devices in order to meet clients' requests.

Table 1 : An extract of the table of results for 12 tests

Sample	CPT (°C)
Average	-9.2
SD	0.3
Repeatability	0.8
Repeatability (norm)	2.0

Figure 1 : control chart established from 2006 to 2010 for the CPT control.



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