Herzog CID 510 DCN measurement for bio fuels

- Biodiesel Fuels, FAME, B100, HVO, BTL, GTL
- Max. viscosity of 6cst @ 40°C
- Fuel Specifications (ASTM D975, D7467, D6751, EN 590, EN 16734, EN 16709, EN 14214)
- New Correlation Equation in ASTM D7668-23 for CN 30 to 70

Keywords: Bio Fuels, viscosity 6cst @40°C, new correlation equation

Introduction:

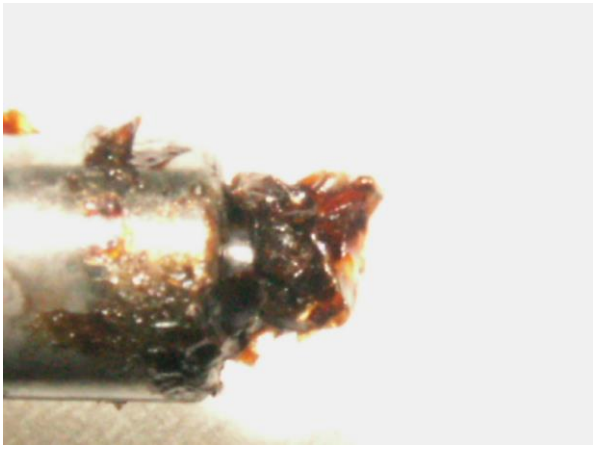
The PAC Cetane ID 510 analyzer is the most thoroughly computer controlled Constant Volume Combustion Chamber (CVCC) based Derived Cetane analyzer currently available. This system is fully automated, offering "One Button" operation for easy use when either calibrating the instrument or running a test sample.
CN is used to be determined by standard single cylinder diesel engines. But the engine technique is too cumbersome and inaccurate. So today instruments like the PAC Cetane ID 510 are used to determine the Derived Cetane Number (DCN).

Biofuel handling:

The instrument can be used for Biodiesel, Biodiesel blends, HVO, BTL, GTL and Cetane improved samples as long as the viscosity does not exceed 6cst @ 40°C. The measurement of 100% FAME is possible.

As a precaution it is recommended to start a regular diesel fuel at the end of the operating period when B100 has been tested, to ensure that no FAME components remain in the injector.

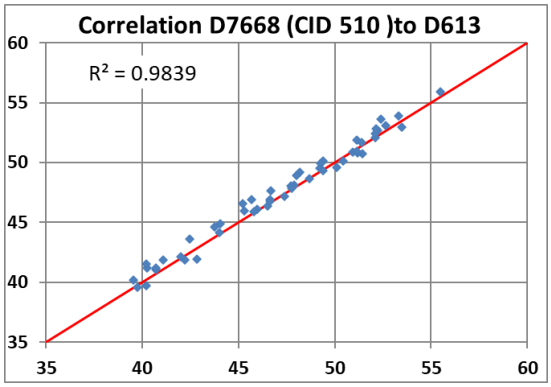
Pure oils, before they become a FAME (Fatty Acid Methyl Ester) can't be measured. This will cause malfunction of the injector.

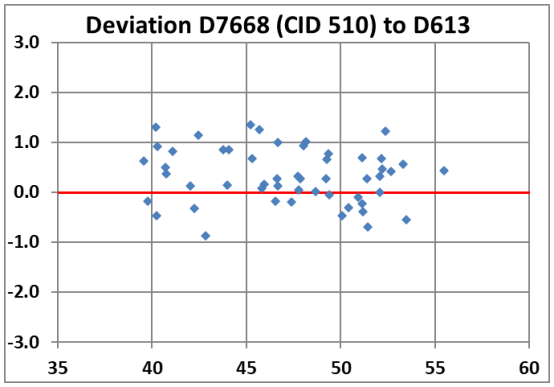


This picture shows the tip of the injector, after running pure palm oil, before it became a FAME.

Precision:

The CID510 is listed in the most common fuel specs such as (ASTM D975, D7467, D6751, EN590, EN16734, EN16709, EN14214)
Participating in International Cross Check Programs like NEG, EI, FAM, the CID has proven to be the most precise DCN measurement in the market.
Below are data based on the NEG RR from 2017 to 2022.

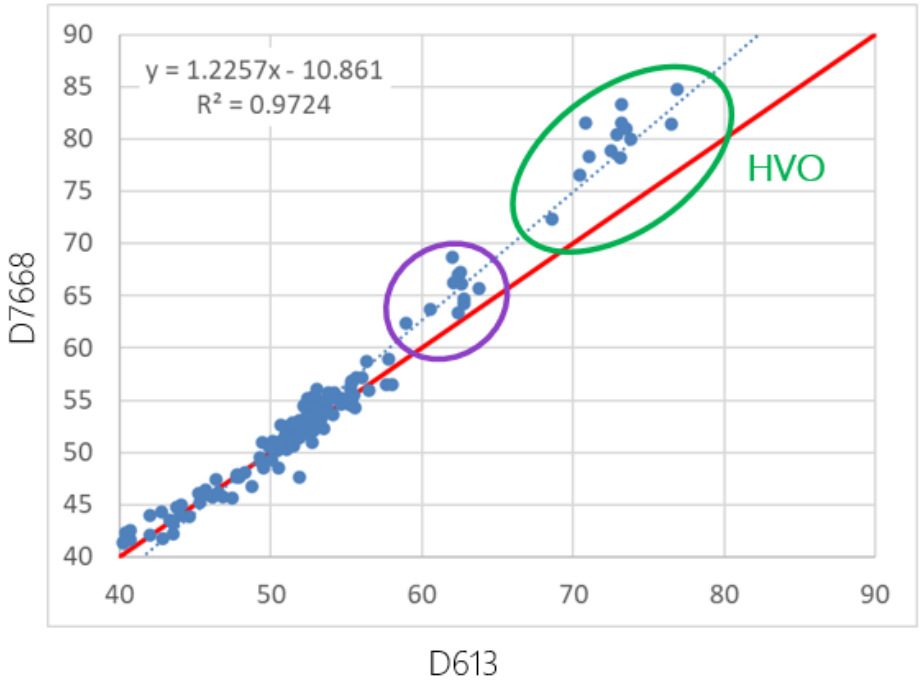




New challenges:

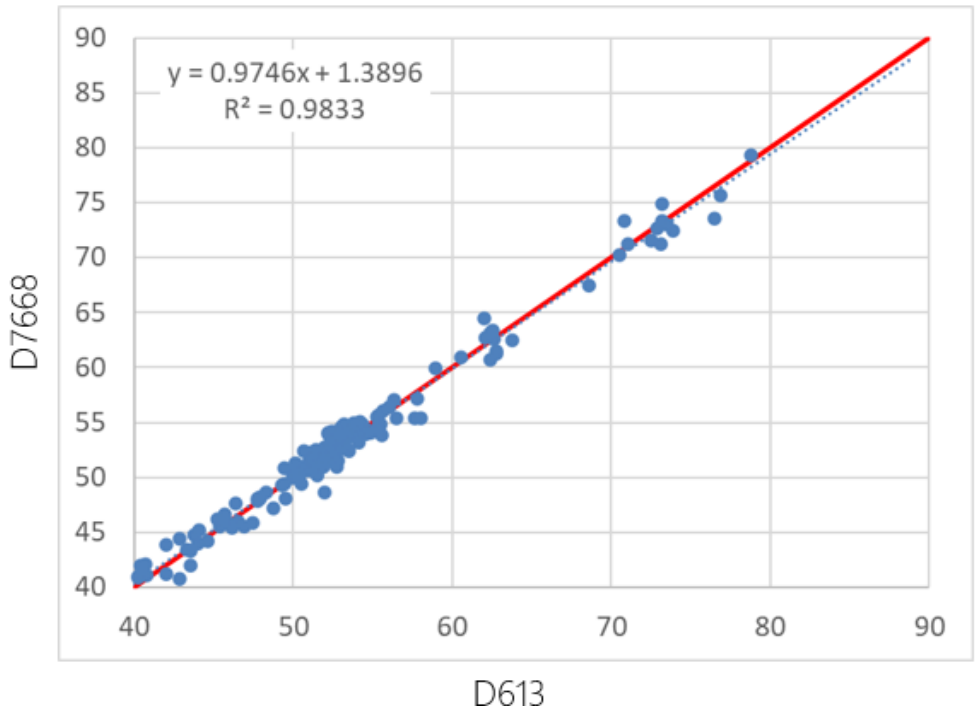
The correlation of the CID works perfect in the range of 35 to 60DCN. In the range of 60 to 65 we see slightly higher results than ASTM D613.

Outside the scope of the actual test method ASTM D7668-17 (above 65) we see significant higher results.



For these high CN samples (e.g. HVOs) it is necessary to extend the DCN Equation from ASTM D7668-17.

Based on all available Cross Check data the DCN Equation was optimized to improve the correlation between 60 and 80.



A new aquation has been develop and is now approved by ASTM. The new formula is published in the latest release of ASTM D7668-23. A new software which contains both formulas will be soon available. The different formulas can be selected in the parameter menu by choosing either ASTM or Extended.

The software with the new equation formulas will be compatible with older instruments without further modifications.

Conclusion:

With the implementation of the new equation formula, the CID510 can be used for an extended range of samples with the known correlation to ASTM D613. This is mainly to address the new sustainable fuel types we see in the market. The instrument is ready for upcoming measurements of new feed stocks from different sources, no matter of FAME, B100 or HVO.