



European Committee for Standardization

Accutrace fuel marker

Ortwin Costenoble, CEN/TC 19/WG 9 Chair

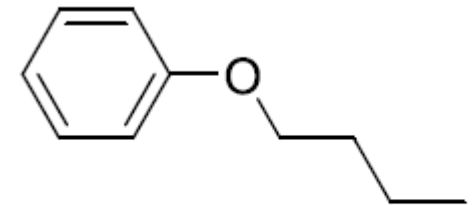
Rob Strik, PAC

ACCUTRACE Fuel Marker 2024



- ▶ EC has selected Dow ACCUTRACE™ Plus Fuel Marker as the new common fiscal marker for tax rebated fuels in the EU
 - ▶ To be adopted by 18 January 2024 by each Member State
 - ▶ Minimal dose 9,5 mg/L BPE (100% dose), usual detection limit $\pm 2\%$ dose (Equals 0,19 mg/l)
 - ▶ No indication for test method or levels of fraud detection

- ▶ Dow used GC-MS with deuterated internal standard
 - ▶ Quantification limit 0,5% dose (Equals 42,5 ug/l)



Butyl phenyl ether (BPE)

ACCUTRACE Fuel Marker 2024



- ▶ Standardization (and definition of acceptable precision) seems required:
 - ▶ UK has not made up its mind which marker they will use
 - ▶ Greece requires an extra tracer in heating oil and marine fuel
 - ▶ Poland develops a one-dimensional GC with sample preparation
 - ▶ Other countries follow CEN guidelines
- ▶ Unknown which level for prosecution is chosen by each country



Standardization



- ▶ Dow used GC-MS with deuterated internal standard
 - ▶ Quantification limit 0,5% dose (Equals 42,5 ug/l)

- ▶ EU Customs labs initially want to investigate in GC-MS or good alternative GC configuration
 - ▶ Several state labs point towards GC-MS – option for speciation of the marker
 - ▶ Alternative GC solution is highly of interest.

- ▶ EI, NEN and DIN mirror committees see benefit in alternative GC Method for delivered product

Standardization



- ▶ CEN decided to work on an EN test method
 - ▶ based on improved Energy Institute developed test method (IP PM EU/16, GC heart-cut) for old Accutrace510 marker

- ▶ Initial talks with EC, DOW and EU Customs Labs
 - ▶ CEN activity on alternative test method appreciated
 - ▶ DOW & German Customs lab organize and perform ILS study on GC-MS method
 - ▶ EC-JRC plans supply of a reference material (July)
 - ▶ EC funds ILS by BIPEA for GC-MS in Q3 2023

- ▶ CEN/TC 19/WG 9 plans to run an ILS for alternative GC-FID, with same samples as EC after this summer



Alternative GC application



- ▶ CEN decided to work on an EN test method
 - ▶ based on improved Energy Institute developed test method (IP PM EU/16, GC heart-cut) for old Accutrace510 marker

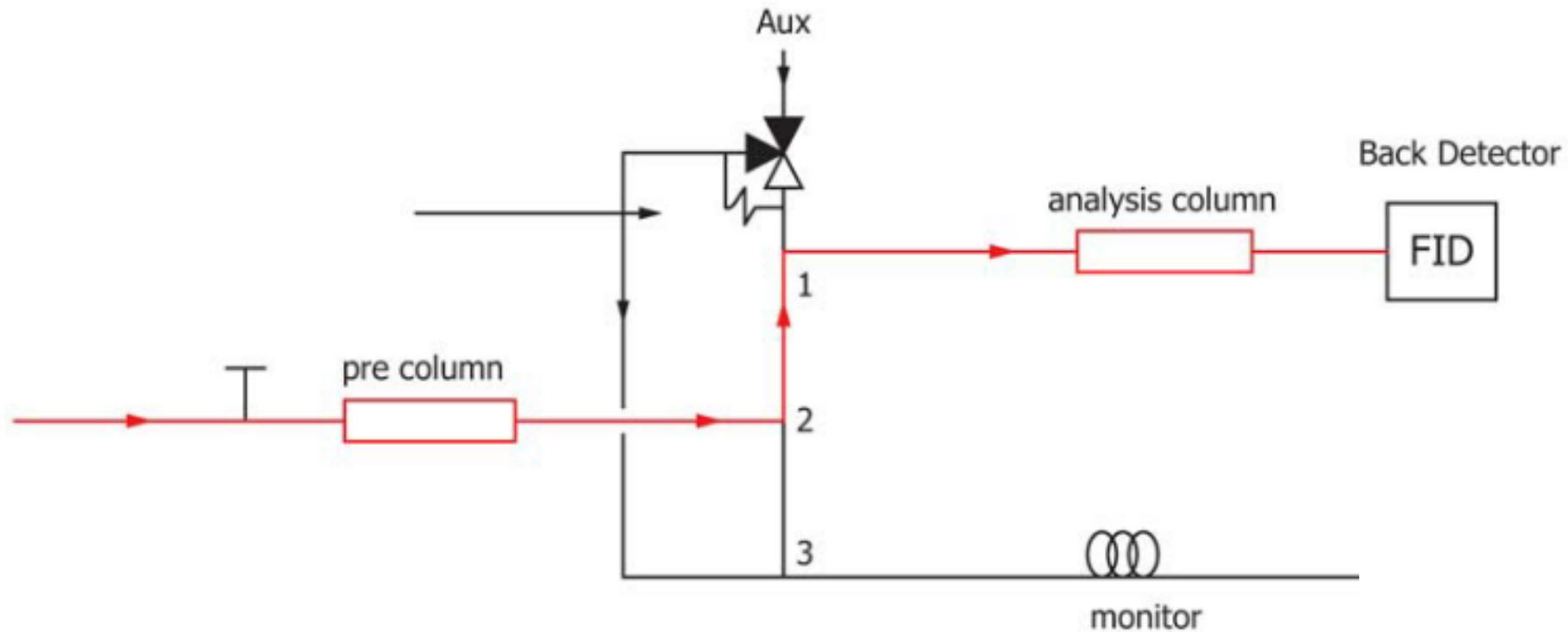
- ▶ Other existing methods using GC heart-cut technique
 - ▶ EN12177 – Benzene content in unleaded petrol
 - ▶ EN13132 – Oxygenate compounds in unleaded petrol
 - ▶ ASTM D7423 – Oxygenates in LPG's
 - ▶ ASTM D7754 – Oxygenates in gasoline

- ▶ PAC performed internal exercise if this GC heart-cut is fit for purpose.
The development of this GC heart-cut method resulted in the release of a new PAC turnkey GC solution called:
AC Fuel marker Analyzer or AC FMA in short.



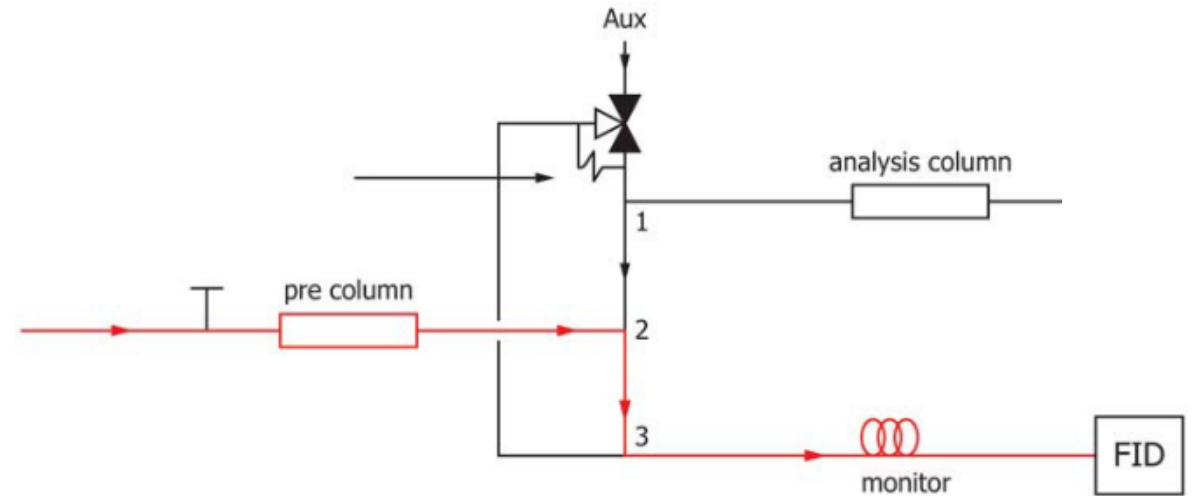
PAC internal exercise

Set-up 'AC Fuel Marker Analyzer™'

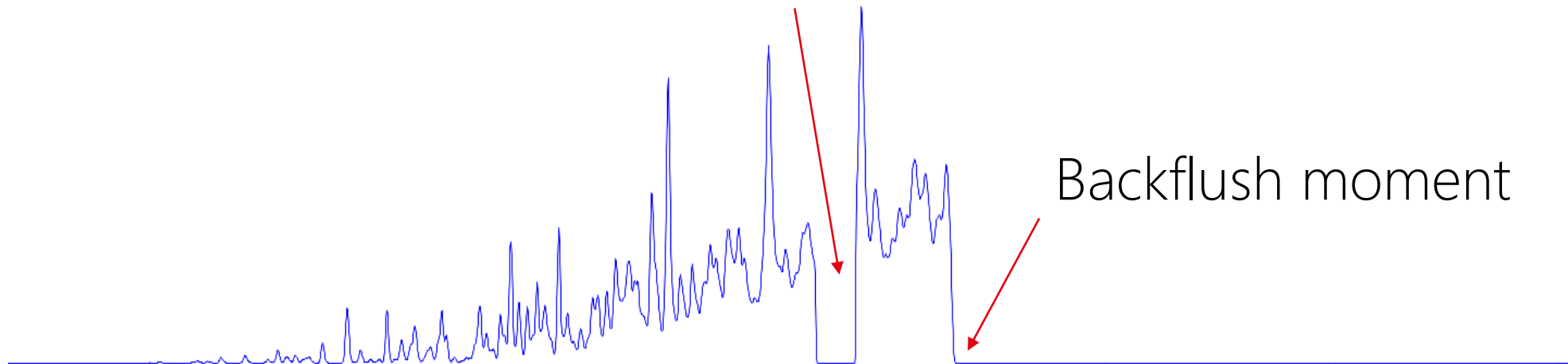


Pre-column Analysis

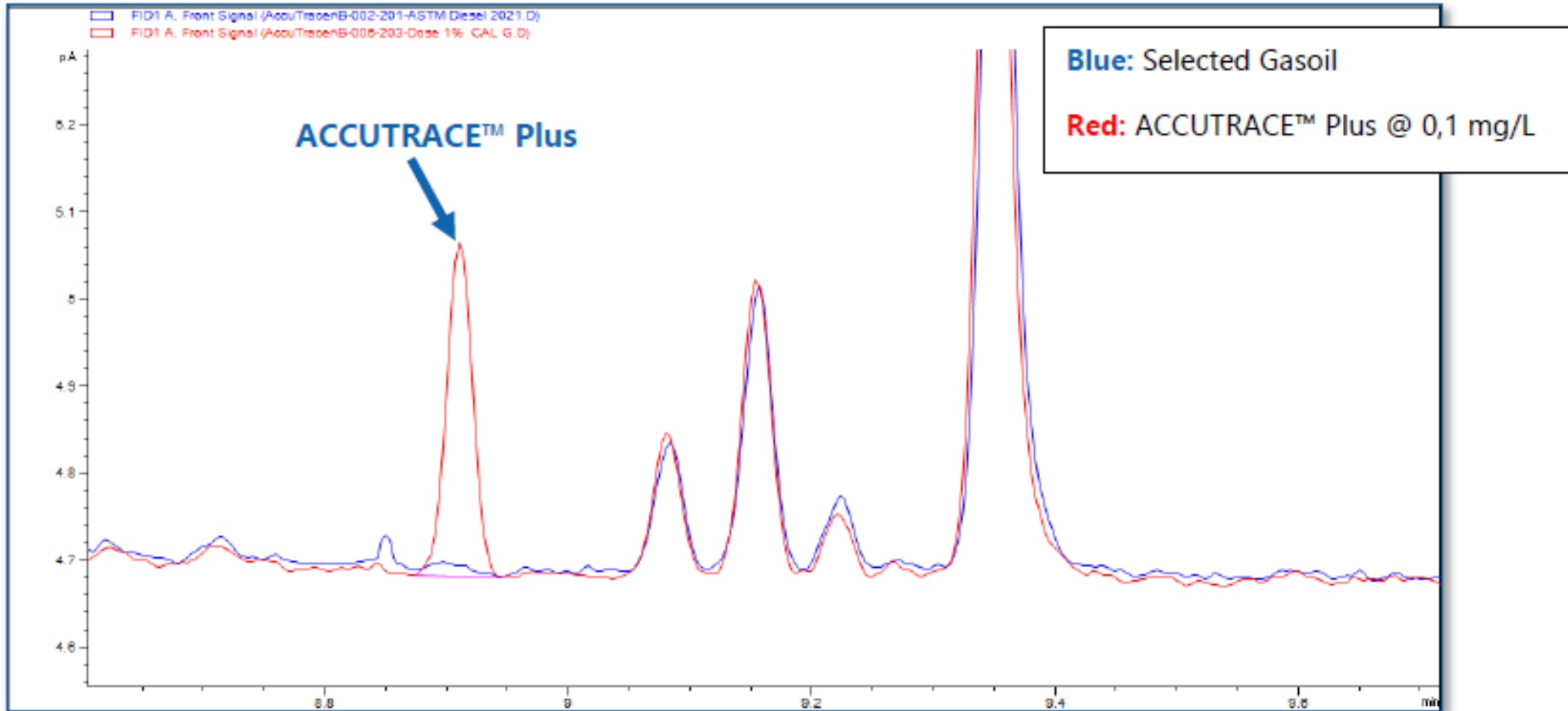
- Pre-column analysis (Gasoil)



Deans Heart – cut

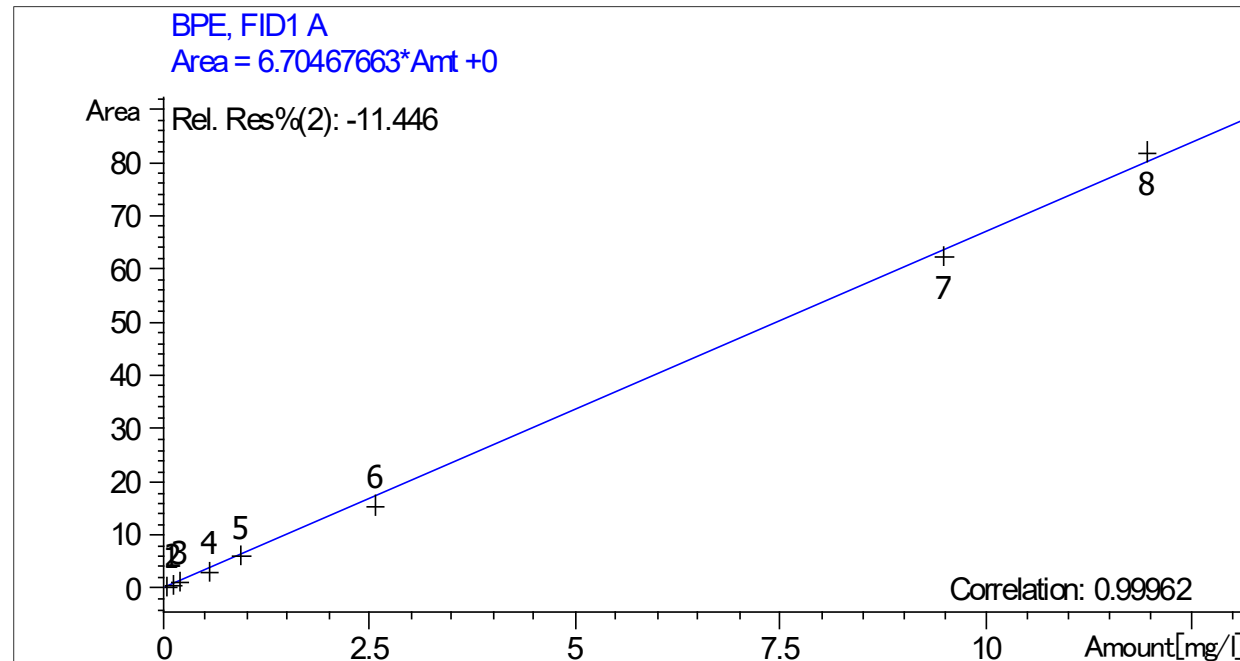


BPE VS Gasoil matrix

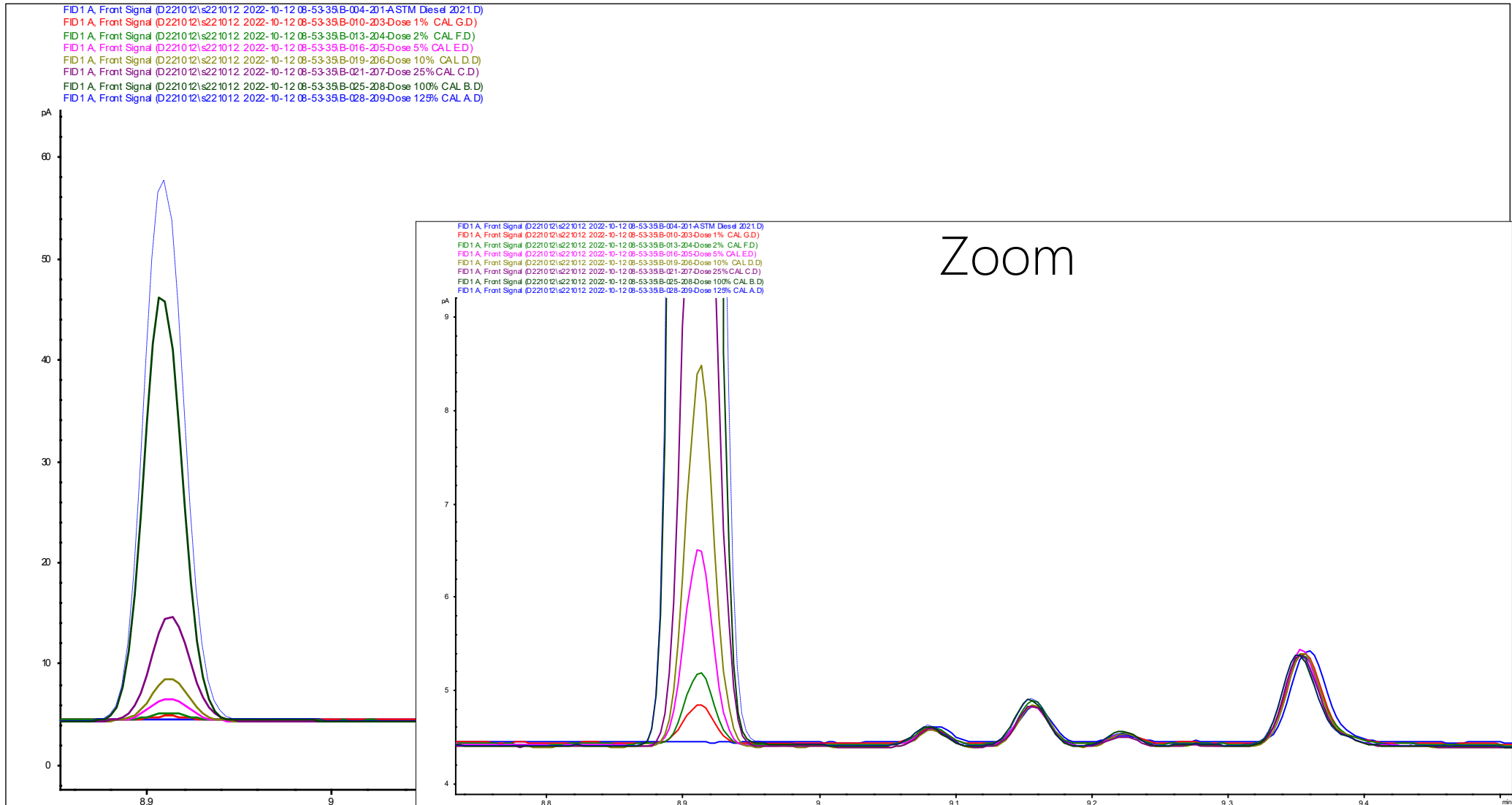


Calibration in diesel

Target dose level	Actual Conc (mg/L)
136%	12.95
103%	9.77
27%	2.57
10%	0.95
5%	0.49
2%	0.19
1%	0.10

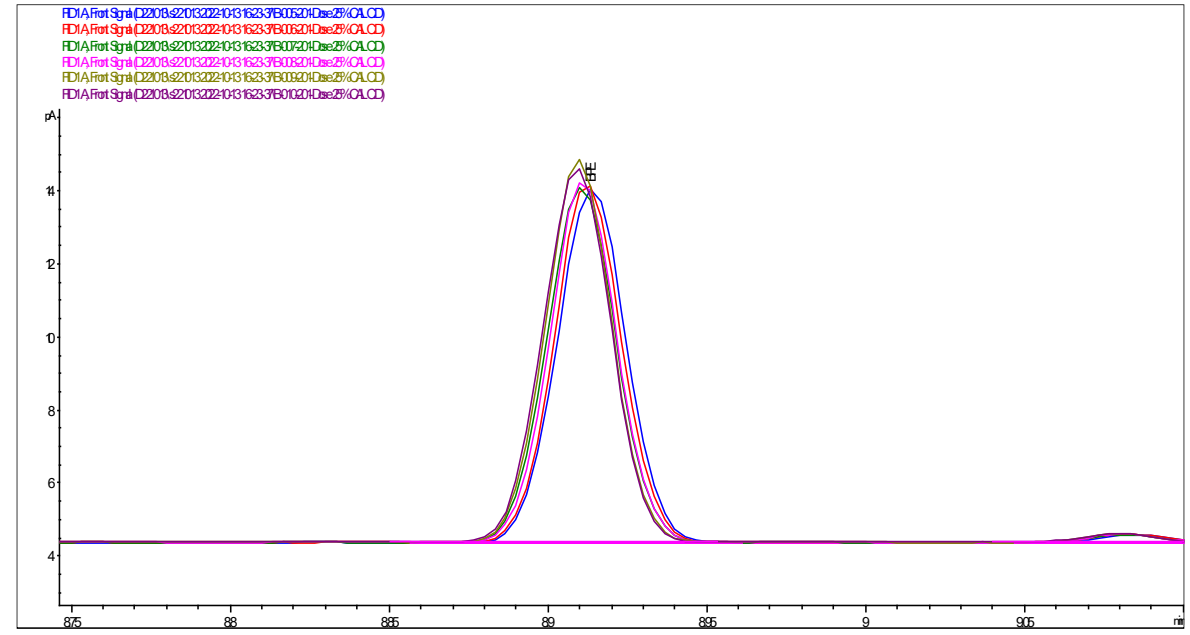


Calibration in diesel



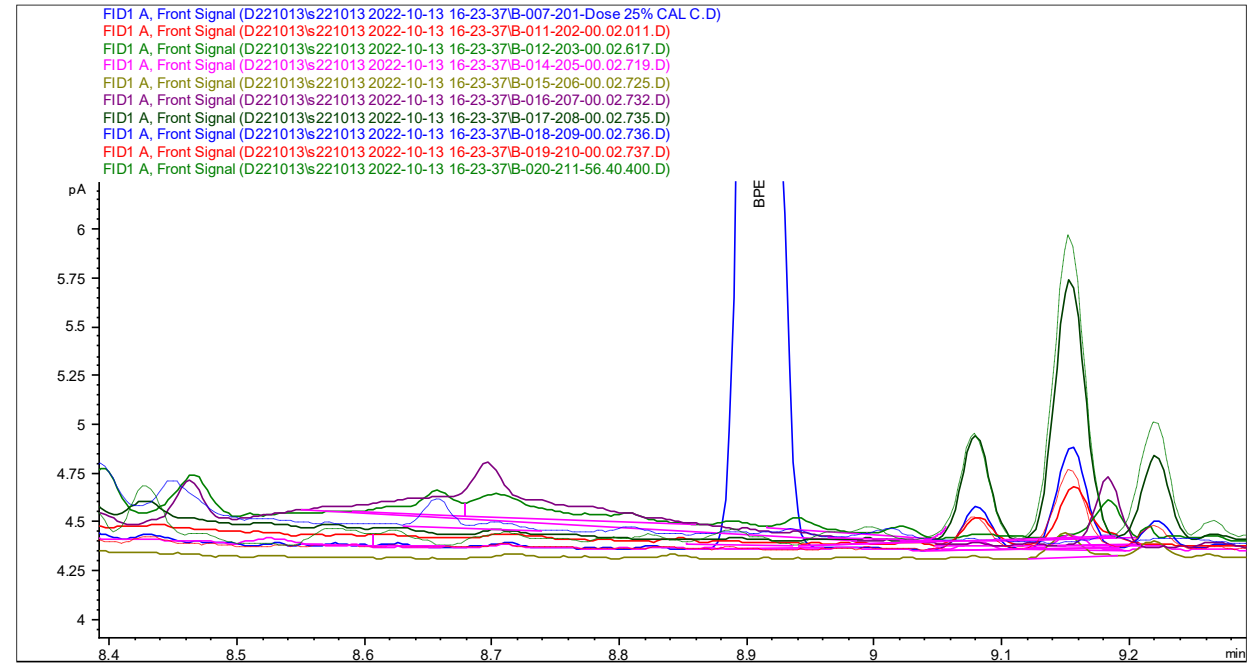
AC Fuel Marker Analyzer - Repeatability

Repeatability	Conc (mg/L)
inj 1	2.25
inj 2	2.22
inj 3	2.26
inj 4	2.22
inj 5	2.32
inj 6	2.33
Average	2.27
stdev	0.05
RSD	2.1%



Accutracer - Selectivity

Sample	Sample description
00.02.011	Jet Fuel Simdis
00.02.617	Reference 100 ppm FAME In AVTUR
00.02.719	PNA in Diesel Reference
00.02.725	MDA Reference Gasoil
00.02.732	QC, jetfuel, Sulfur
00.02.735	Diesel B7, N, S
00.02.736	Jet Fuel, N, S
00.02.737	Heating Oil, N, S
56.40.400	Reference GasOil (140-400°C)



PAC AC Fuel Marker Analyzer™

- Simple & robust alternative for GC-MS method
- Proven performance
- Allows to test for ACCUTRACE™ Plus at 1% to 100% dope level in distillate products
- Method under development as standard in CEN (reproducibility expected by end of 2023)



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