



Global
Analyser
Solutions



VUV ANALYTICS

PIONA - VUV analyser

PF200 | 210



- EN 18015, ASTM D8071, EN 228
- 13 oxygenates included
- Identification based on distinct UV spectra
- PIONA, Jet fuel and diesel/biodiesel in one instrument
- Cost per analysis is substantially reduced

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PF200v1

PIONA - VUV analyser

EN 18015 and ASTM D8071 provide complete PIONA compound class characterisation for European fuel specifications such as EN 228, as an alternative to ASTM D6839. Spectroscopy Detection (GC-VUV) from VUV Analytics offers relatively simple instrumentation and automated analysis software with short runtimes and robust and reliable results.

Principle of operation

VUV spectroscopy enables deconvolution of overlapping chromatographic peaks, allowing complex hydrocarbon analyses to be simplified and shortened. VUV absorbance spectra are highly structured and compound-specific, while still showing characteristic similarities within related classes. GC-VUV data is inherently three-dimensional - time, absorbance, and wavelength - providing strong structural specificity.

Because spectra are distinct, the method is not reliant on highly precise retention or cutting times, which can introduce errors in DHA or column-switching systems. VUV enables accurate identification of individual compounds and reliable PIONA class characterisation. GC-VUV uses a simple setup: a Thermo Trace GC1600, a single capillary column, and a VUV-VGA detector. No traps, tuning, or calibration routines are required. Setup is straightforward, running costs are low, and manual data review is minimised.

EN 18015 defines the method's scope, including individual components. Alongside major classes, 13 oxygenated compounds are included in the GC-VUV method (Figure 2).

GC-VUV provides PIONA classification according to ASTM D8071, EN 18015 and EN 228 (figure 1). Besides compound class characterisation, individual compounds benzene, toluene, ethylbenzene, xylenes, methanol, ethanol, MTBE, ETBE, TAME, TAAE, oxygen, isopropanol, isobutanol, tert-butanol, propanol, acetone, tert-pentanol, DIPE, isooctane, naphthalenes are analysed. Excellent equivalence with existing methods D5443 & D6839 (Reformulyzer) is proven after completing an extensive Interlaboratory Study (ILS).

D8071 also shows correlations equations for aromatics (D5769 & D1319), benzene (D3606 & D5769), olefins (D1319 & D6550), and ethanol (D5599), providing five ASTM methods in one. PIONA-VUV is fast: only 34 minutes runtime.

Volume %	C#	P	I	O	N	A	Oxy	Total
	C1							
	C2						10.24	10.24
	C3			0.00				0.00
	C4	1.45	0.09	0.05				1.59
	C5	3.43	7.15	4.02	0.08			14.68
	C6	2.16	8.07	2.37	1.67	0.67		14.94
	C7	1.33	5.83	0.91	1.71	3.22		13.00
	C8	0.61	18.46	0.64	1.70	4.84		26.28
	C9	0.37	3.36	0.19	0.73	5.28		9.93
	C10	0.20	1.01	1.02	0.70	2.27		5.21
	C11	0.05	0.84	0.41	0.39	1.08		2.78
	C12		0.23	0.28	0.01	0.36		0.89
	C13		0.18	0.10		0.16		0.45
	C14		0.06					0.06
	C15		0.00					0.00
	Total	9.62	45.29	10.00	6.96	17.88	10.24	100.00

Figure 1 PIONA report

Report Name	Category	Retention Time (min)	Mass %	Volume %	Mole %	C#
Methanol						
Ethanol	Alcohol	2.77	11.04	10.24	21.12	2
iso-octane	Isoparaffin	6.09	7.31	7.73	5.84	8
Naphthalene	Aromatic	23.55	0.21	0.15	0.14	10
Methylnaphthalenes	Aromatic		0.25	0.18	0.15	11
Benzene	Aromatic	4.93	0.80	0.67	0.90	6
Toluene	Aromatic	9.03	3.82	3.22	3.65	7
Ethylbenzene	Aromatic	14.27	1.02	0.86	0.84	8
Xylenes	Aromatic		4.73	3.98	3.93	8

Figure 2 Example report of individual components

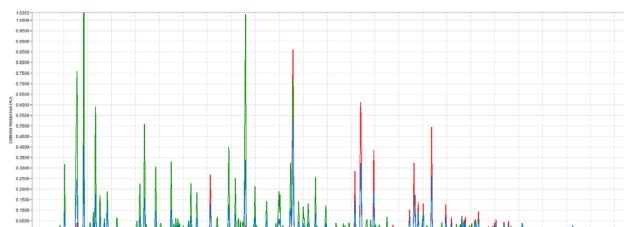


Figure 3 Example chromatogram by VUV-Analyze™ engine, showing spectral filters 170-200 nm (red, aromatics) and 125-160 nm (yellow, saturates). The blue graph represents the total signal.

Specification

- Thermo Trace GC1600 with iConnect SSL (Split-splitless injector), capillary column and VUV VGA-100 detector
- Cryogenic oven cooling (EN18015 only)
- VUV-Analyze software
- Runtime 34 minutes
- Reporting of individual components, PIONA group and physical parameters

Ordering information	PF20X - ABCDE EN18015 (includes cryo valve)			
	PF21X - ABCDE ASTM 8071			
code X	0	1	2	3
GC model, power	1600, 230V	1610, 230V	1600, 115V	1610, 115V

For the selection of options (e.g. GC oven cryo valves, Power plug type and more), see the options table in the order guide.