Global Analyser Solutions

Oxygenates analyser ASTM D4815

- MTBE, ETBE, TAME, DIPE, tertiary-amyl alcohol and C_1 to C_4 alcohols in gasoline
- Modular iConnect injector and detector
- High uptime

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PF400v1

Oxygenates analyser - ASTM D4815

Oxygenated components such as ethers and alcohols are commonly used as fuel additives to reduce engine knocking and increase a fuel's octane rating. These anti-knock agents are specified and regulated to maintain acceptable commercial petrol quality. Their analysis is carried out using standardised procedures, such as those described in ASTM D4815.

Principle of operation

ASTM Method D4815 employs a dual-column setup, a 10-port switching valve, liquid sample injection, and FID detection (Figure 1). A highly polar micro-packed TCEP column serves as the first separation stage, retaining oxygenates and heavy hydrocarbons while venting light hydrocarbons. Oxygen-containing components are then transferred to a non-polar wide-bore column via the switching valve, where they are separated by boiling point. Following the elution of TAME (tert-amyl methyl ether), the valve is switched to backflush the heavy hydrocarbon fraction to the detector (Figure 2). Siltek®/Sulfinert®-treated tubing throughout the sample pathway prevents adsorption of oxygenates, ensuring accurate analysis. The 10-port diaphragm valve is housed in an independently heated isothermal oven, eliminating cold spots and providing long-term valve reliability. Figure 3 shows the repeatability,

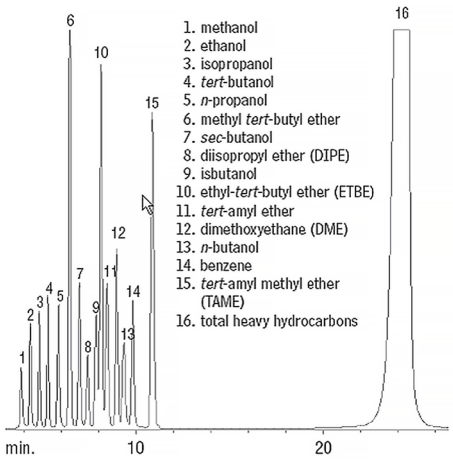

Figure 2 Chromatogram ASTM D4815 analyser

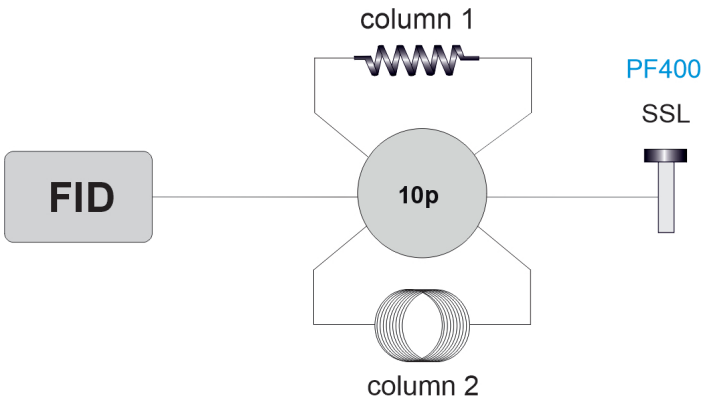

Figure 1 Diagram ASTM D4815 analyser

	methanol Area	ethanol Area	iso-propanol Area	tert-butanol Area	n-propanol Area	MTBE Area	sec-butanol Area	DIPE Area
	63270608.00	116907659.00	132222037.00	188493863.00	154701553.00	96730492.00	163275989.00	103948218....
	63107282.00	115167155.00	129645627.00	184103697.00	151462471.00	94548119.00	159355677.00	101323061....
	63488695.00	115711239.00	130257330.00	184986922.00	152205250.00	94785798.00	160027158.00	101459211....
	61926993.00	113277238.00	127490613.00	181083453.00	149044444.00	93080557.00	156884630.00	99751325.00
	64983316.00	118486400.00	133795125.00	190598015.00	156237140.00	98073652.00	164676943.00	105471776....
	61566054.00	112398168.00	126432574.00	179676025.00	147946145.00	92020934.00	155665435.00	98601285.00
	62799844.00	114292002.00	128557785.00	182513989.00	150113173.00	94106693.00	157934608.00	100944516....
	63886931.00	116390923.00	130986661.00	185972432.00	152816665.00	95792708.00	160705901.00	102649199....
	62407023.00	113729828.00	128163965.00	182257677.00	149680992.00	93924491.00	157716594.00	100864102....
	63415742.00	115583013.00	130086503.00	184668771.00	151832433.00	94951867.00	159690391.00	101682148....
Min:	61566054.00	112398168.00	126432574.00	179676025.00	147946145.00	92020934.00	155665435.00	98601285.00
Max:	64983316.00	118486400.00	133795125.00	190598015.00	156237140.00	98073652.00	164676943.00	105471776....
Mean:	63085248.80	115194362.50	129763822.00	184435484.40	151604026.60	94801531.10	159593332.60	101669484....
Std Dev:	985627.10	1828076.99	2221860.17	3326686.29	2556404.72	1746190.60	2787590.17	1973200.34
%RSD:	1.56	1.59	1.71	1.80	1.69	1.84	1.75	1.94

	iso-butanol Area	ETBE Area	DME Area	TAA Area	n-butanol Area	benzene Area	TAME Area
	187948753.00	104301002.00	213134173.00	77548694.00	172727124.00	196602543.00	196464683.00
	183245406.00	101649670.00	207584655.00	75587109.00	168155405.00	192498522.00	191066018.00
	183779397.00	101972250.00	208438393.00	75901233.00	168617375.00	193279798.00	191848936.00
	180886586.00	100546119.00	201269247.00	74394422.00	165526128.00	189573064.00	188548990.00
	188889541.00	106054778.00	216368082.00	78371451.00	173243074.00	199106415.00	199040250.00
	178251549.00	100002235.00	200901944.00	73738215.00	164289728.00	187670455.00	186426030.00
	181006617.00	101787268.00	205269188.00	75039952.00	166483876.00	191553999.00	190112580.00
	183856608.00	103719848.00	208635343.00	76471452.00	169071195.00	195033347.00	193549997.00
	180762820.00	101849101.00	204971301.00	74951308.00	166232712.00	190865845.00	190199882.00
	183379319.00	102309018.00	206613902.00	75894519.00	168063444.00	193591466.00	192092415.00
	178251549.00	100002235.00	200901944.00	73738215.00	164289728.00	187670455.00	186426030.00
	188889541.00	106054778.00	216368082.00	78371451.00	173243074.00	199106415.00	199040250.00
	183120859.60	102419128.90	207318642.80	75789835.50	168243006.10	192977545.40	191934978.10
	3342965.94	1805204.68	4792903.33	1402742.08	2908088.92	3364341.67	3689983.45
	1.83	1.76	2.31	1.85	1.73	1.74	1.92

Figure 3 Method repeatability

Instrument specification

- Thermo Trace GC1600 with iConnect SSL (Split-splitless injector), 10 port diaphragm gas switching valve (rotary valve is optional), micropacked and capillary columns, FID
- Chromeleon chromatography data system
- Runtime 25 minutes

Ordering information	PF40X - ABCDE			
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.

About GAS

Global Analyser Solutions provides GC & GC-MS solutions for Energy, Refinery, Chemical and Environmental markets. Our analysers address a broad spectrum of measuring requirements with high precision and reliability. Please reach out for more information on our website. www.gassite.com