



Global
Analyser
Solutions

Detailed Hydrocarbon Analyser

- Solutions comply with all ASTM, CEN, DIN, IP and ISO methods
- DHA calculations fully integrated in Chromeleon datasystem
- High uptime due to modular injector/detector technology
- Data merge of DHA Front End and High Temp SIMDIST

Get ready for tomorrow's analytics

AN20WA1223B

GAS offers custom configured GC analysers for many application fields for over 50 years. GAS analysers are designed to meet many standardised methods from GPA, ASTM, UOP, ISO, EN and others. The efficient configurations are based on proven GC technology, resulting in robust, highly productive instruments with an optimal return on investment.

Detailed analysis of light petroleum streams is essential for hydrocarbon processing. GAS DHA analysers offer full characterisation of hydrocarbon streams like spark ignition engine fuels and gasoline blending feedstocks. The dedicated, fully automated software provides detailed reporting of sample composition and physical properties, and a straightforward workflow.

GC instruments

DHA methods are based on obtaining as much separation as possible of individual components, using a single high resolution capillary column (figure 4). Undiluted samples are injected using Split-Splitless or PTV injector with high split ratio, and FID is used for detection. The Thermo Trace GC1600 (figure 1) is the optimal choice for this type of analysis, because the low thermal mass oven design offers superb retention time stability. This is of great importance for DHA, since component identification relies on retention time indices from a database.

InstantConnect module concept

The Trace 1600 GC offers unique InstantConnect injector and detector modules, which can be exchanged by the user in minutes, guaranteeing high uptime and low maintenance costs. See figure 2.

Columns and options

DHA columns are described by ASTM and other standardised methods. Restek Rtx-1, 50m*0.21mm is applied for ASTM D5134, while Rtx-DHA 100, 100m*0.25mm, is used for ASTM D6729. An optional tuning column is available for enhanced separation of oxygenated components (ASTM D6730/PIONAX). Depending on the complexity of the sample, GC oven programming starts at 30 °C or at sub-ambient temperatures (cryogenic cooling option). The latter is especially needed in case of high olefin content and/or C1-C3 light petroleum compounds. The typical analysis time for fast DHA is 80 minutes, and 140 minutes for the classical DHA method.



Figure 2 InstantConnect Modular injectors & detectors



Figure 1 DHA based on Thermo Trace GC1600 and AS 1610 autosampler

Detailed Hydrocarbon Analysis									
Instrument	GC1	Sequence name	# Data G.A.S. FAST DHA pack (ASTM D6730)						
Instrument Method	DHA	Data Vault	ChromleonLocal						
Processing Method	DHA - D6730 Calibration PIONA	Report Template	DHA Report D6730 V2.6						
Data File	DEHA-X	Seq. Line	8						
Injection Date	15/Aug/2014	Vial no.	116						
Injection Time	14:58	Inj Vol (uL)	0.2						
Calculation Type	Total	Peaks	159						
Physical property report									
Density @ 60/60 °F	0.7342	Notes:							
RVP @ 100 °F (psi)	4.75								
Research ON (RON)	65.8								
Motor ON (MON)	62.2								
MW (g/mol)	104.82	Gross Heat combustion @ 77 °F (25 °C)	Btu/lb	45570					
Bromine number	16.99	Nett Heat combustion @ 77 °F (25 °C)	18281	42522					
Composition report (mass %) Filter: PIONAX									
Carbon	n-Paraffins	iso-Paraffins	Olefins	Naphthenes	Aromatics	Oxygenates	Unknowns	Total	
C1						0.23		0.23	
C2						4.76		4.76	
C3	0.03						0.02	0.05	
C4	1.14	0.34					0.04	1.52	
C5	3.49	2.75	1.37			1.84	1.21	10.65	
C6	3.78	6.89	1.88	2.66	1.63	1.56		18.40	
C7	2.58	7.72	1.36	5.15	3.02		0.05	19.88	
C8	1.55	5.02	0.55	2.74	3.33		0.63	13.83	
C9	1.18	5.91	1.13	0.59	1.87		0.18	10.86	
C10	1.11	3.40	0.50	0.47	5.34			10.84	
C11	1.18				1.52			2.69	
C12	1.08				1.97			3.05	
C12+	3.24						0.01	3.25	
Total	20.36	32.03	6.79	11.62	18.68	3.40	2.14	100.00	
Composition report (vol %) Filter: PIONAX									
Carbon	n-Paraffins	iso-Paraffins	Olefins	Naphthenes	Aromatics	Oxygenates	Unknowns	Total	
C1						0.21		0.21	
C2						4.38		4.38	
C3	0.04						0.03	0.07	
C4	1.43	0.44					0.05	1.93	
C5	4.06	3.23	1.54			1.81	1.41	12.04	
C6	4.19	7.63	2.03	2.54	1.35	1.53		19.27	
C7	2.75	8.23	1.41	4.93	2.54		0.05	19.92	
C8	1.61	5.18	0.56	2.57	2.80		0.66	13.37	
C9	1.20	6.04	1.13	0.57	1.58		0.18	10.70	
C10	1.11	3.40	0.48	0.41	4.50			9.92	
C11	1.16				1.29			2.45	
C12	1.05				1.57			2.62	
C12+	3.11						0.01	3.12	
Total	21.71	34.16	7.15	11.03	15.63	3.34	2.39	100.00	

Figure 3 DHA report

Specification

Standardised methods: ASTM D5134, D6729, D6730, D6733, D7900, IP601, IP PM DL, Fast DHA

GC Instrument:

Configuration: 1-channel instrument based on Thermo Trace 1600 GC with InstantConnect SSL and FID, Triplus RSH or AS/AI-1610 liquid autosamplers

Optional: InstantConnect PTV module with backflush option for DHA-front end analysis
Cryogenic oven cooling (CO₂ or LN₂)
Hydrogen safety system in case of hydrogen carrier gas

Application: Detailed analysis of petroleum products in the range of gasoline blending feedstocks. Separation of as many as possible components using a long high resolution capillary column with optional pre-column for polarity tuning. Dedicated DHA software for analysis of the individual component concentrations; grouping on carbon number; grouping on component type (PIONAX); and calculation of the various physical properties of the sample.

Software merge of DHA and Simdist data in case of DHA of crudes

Sample requirements: Undiluted sample injection

Analysis Time: Typical 80 minutes for Fast DHA using H₂ carrier gas; 140 minutes in case of the classical method

Calibration standards: GAS supplies all needed calibration standards and reference samples

DHA Calculator

GAS DHA Calculator: integrated calculation module in Chromeleon.

No need for data export to external software

Reporting of:

- Individual components (mass% and volume%)
- O-PIONA group type data (mass% and volume%)
- Physical properties: Specific Gravity, True Boiling Point, MON, RON,
- Reid Vapour Pressure (RVP), Bromine number, Gross heat combustion (Btu/lb;kJ/kg)
- Nett heat combustion (Btu/lb), Molecular Weight
- Custom calculations on request
- Database filters for selective identification (PNA, PIONA, PIONAX)
- DHA/Simdist merge according to ASTM D7900/D7169

 powered by **interscience**



Turnkey customised
GC & GC/MS solutions



Expert & education centre
Learn from the Xperts!



Fully automated solutions
for sample preparation

GAS, IS-X & SampleQ are Interscience brands

Find out more on www.gassite.com