DANI

A SCENT OF FUTURE

REFINING GAS ANALYSIS

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Единый адрес для всех регионов: drs@nt-rt.ru || www.danimaster.nt-rt.ru

REFINING GAS ANALYSIS

> *Time is Money.*
>
> Benjamin Franklin

Time is always a key factor in today's laboratories productivity.

Master your Time with the DANI Gas Analyzers.

The ability to provide the proper configuration to meet the most challenging analytical demands comes from a long and proven experience and a deep industry knowledge. As requirements are constantly changing, even a highly reliable instrumentation could not be enough to succeed in getting trustworthy results: complete and guaranteed solutions are essential to comply with the latest industry standards and specifications.
After a long working relationship with its customers to know and to best match their real needs, DANI Instruments has developed key analytical solutions that cover a broad array of applications, requirements and protocols in the environmental industry.
Master DANI Air Analyzers are **PRE-CONFIGURED, PRE-ASSEMBLED AND FACTORY-TESTED SYSTEMS** specifically designed for peculiar analyses. The analyzers include the **HARDWARE**, the **SOFTWARE**, **COLUMNS AND CONSUMABLES**, the **OPTIMIZED ANALYSIS METHOD**, the **ANALYTICAL CONDITIONS**, and the **DOCUMENTATION** to run up your analysis from day one.

PRE-CONFIGURED, PRE-ASSEMBLED AND FACTORY-TESTED SYSTEMS

The installation process is faster than ever before and all the startup procedure is oversimplified ensuring immediate analytical performance and results.

HARDWARE AND SOFTWARE

DAA Analyzers are pre-engineered systems based on the versatility, flexibility and robustness of the proven Master GC hardware. All the Master GC parameters are set prior the shipment.

COLUMNS AND CONSUMABLES

No more doubts about the proper column, parts and supplies. DAA Analyzers are delivered with all you may need for your analysis.*

OPTIMIZED ANALYSIS METHOD

Analytical methods are pre-loaded to be immediately used for the determination of pollutants in air. Whenever possible, reduction of analysis time and amounts of toxic solvents are considered. Method development time and costs are thus dramatically reduced.

ANALYTICAL CONDITIONS

DAA Analyzers are designed to perfectly accomplish the analytical conditions of interest.

DOCUMENTATION

A getting started manual, calibration and method files, and all the information for a quick startup are included .

* Chemicals are not supplied

DANI

A Scent Of Future

DANI Master GC

- **Intuitive ad easy-to-use touchscreen interface.**
- **Complete range of injectors:**
  - Split/Splitless Injector
  - Programmable Temperature Vaporizer (PTV)
  - Packed Injector
- **Wide selection of detectors:**
  - Flame Ionization Detector (FID)
  - Electron Capture Detector (ECD)
  - Nitrogen-Phosphorus Detector (NPD)
  - Flame Photometric Detector (FPD)
  - Thermal Conductivity Detector (TCD)
  - Pulse Discharge Detector (PDD)
  - Master TOF-MS Time of Flight Mass Spectrometer
- **Extensive Choice of Dedicated Devices:**
  - Auxiliary ovens
  - Gas sampling and switching valves
  - Liquid sampling valves
  - GC oven cryogenic cooling device
  - Methanizer

DANI Master AUX

Auxiliary Ovens for Isothermal Temperature

- Up to 7 valves (5 gas + 2 liquids)
- Up to 250° C
- Up to 2 auxiliary gas valves
- Up to 6 needle valves
- Extremely compact design
- Two models available with different capacities to house valves and columns for dedicated analyses

DANI Master SHS

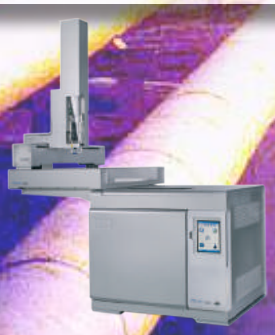
Static Headspace Sampler

- A robust and flexible system to meet complex and versatile needs
- Reliable results and exceptional reproducibility
- Intuitive, powerful, and straightforward user interface
- Highest sample capacity with a 120-position vial tray
- Unlimited priority sample position
- Unmatched oven capacity: 18 vials simultaneously

DANI Master AS

Liquid Autosampler

- Superior flexibility, repeatability, and performance
- Easy-to-use
- 160 samples capacity
- No sample degradation or solvent evaporation
- up to 7 syringe capacity types
- unmatche injection capabilities



REFINING GAS ANALYSIS

TABLE OF CONTENTS

Configuration	Typical Detected Compounds		Official Methods Met	Sample Type
DGA-003 Refining Gas Analyzer for Permanent Gas, H_2, and Hydrocarbons				
Three channels with FID, dual µTCD, micro-packed columns, three valves, and auxiliary oven.	hydrogen helium nitrogen carbon dioxide methane ethane	propane butane *iso*-butane pentane C_6+ (hexane and higher hydrocarbons)	ASTM 1945 ASTM 1946 GPA 2177 ASTM 2163 UOP 539 ISO 6874	Gas Liquid
DGA-010 Refining Gas Analyzer for Hydrogen and Helium				
Dual channels with µTCD, micro-packed columns, two valves, auxiliary oven.	hydrogen helium		ASTM 2504	Gas
DGA-014 Refining Gas Analyzer for Natural Gas with Permanent Gas separation - H_2 and He				
Dual channels with dual µTCD, three valves, auxiliary oven.			ASTM 1945 ASTM 1946 GPA 2177 ASTM 2504	
DGA-021 Refining Gas Analyzer for Gas and Liquefied Hydrocarbons				
Dual channels with FID, two gas valves and one liquid valve, capillary columns, auxiliary oven.	methane ethane propane *iso*-butane	*n*-butane *iso*-pentane *n*-pentane hexane	ASTM 2163	Gas Liquid
DGA-028 Refining Gas Analyzer for Permanent Gas, Hydrocarbons, H_2, and CO_2				
Three channels with µTCD, FID, three valves, auxiliary oven.	nitrogen carbon dioxide hydrogen methane ethane	propane *i*-butane *n*-butane *i*-pentane *n*-pentane *n*-hexane	ASTM 1945 ASTM 1946 GPA 2177	Gas
DGA-033 Refining Gas Analyzer for Permanent Gas, CO_2, Hydrocarbons, COS, H_2S, CS_2				
Dual channels with FID, µTCD, FPD, three valves, and auxiliary oven.	oxygen nitrogen carbon dioxide carbonyl sulfide hydrogen sulfide carbon disulfide methane	ethane propane *i*-butane *n*-butane *i*-pentane *n*-pentane *n*-hexan		Gas
DGA-034 Refining Gas Analyzer for Permanent Gas and Hydrocarbons				
Two channels with TCD, packed columns, two valves, and auxiliary oven.	oxygen nitrogen methane carbon dioxide ethane	propane butane hexane	ASTM 1945 ASTM 1946 GPA 2177	Gas
DGA-035 Refining Gas Analyzer for Permanent Gas, H_2, and Hydrocarbons				
Two channels with FID, µTCD, micro-packed and capillary columns, two valves for gas and one valve for liquids, auxiliary oven.	hydrogen oxygen nitrogen carbon dioxide methane carbon monoxide	ethane propane butane pentane C_6+ (hexane and higher hydrocarbons)	ASTM 1945 ASTM 1946 GPA 2177	Gas Liquid

Configuration	Typical Detected Compounds		Official Methods Met	Sample Type
DGA-036 Refining Gas Analyzer for Permanent Gas, H_2, and Hydrocarbons				
Three channels with µTCD, micro-packed columns, three valves, auxiliary oven.	hydrogen oxygen nitrogen carbon dioxide methane carbon monoxide	ethane propane butane pentane C_6+ (hexane and higher hydrocarbons)	ASTM 1945 ASTM 1946 GPA 2177	Gas

REFINING GAS ANALYSIS

DGA-003
Natural Gas Analyzer for Permanent Gas, H_2 and Hydrocarbons Determination

DGA-003 is a three-channels system that allows the accurate determination of permanent gases, H_2, and hydrocarbons through the two channels equipped with the µTCD detectors and the channel equipped with the FID detector.
The proper sepration of permanent gases and hydrocarbons is possible thnaks to the presence of a micro-packed Hayesep column for each TCD channel.

DANI DGA-003 is the ready-to-go solution to attain the maximum performance in the shortest time for your analysis of Permanent Gas, H_2 and Hydrocarbons.

Master DGA-003

SAMPLE TYPE:

Gas Liquid

TYPICAL DETECTED COMPOUNDS:

H_2, He, O_2, N2, CO_2, CH_4, ethane, propane, butane, *iso*-butane, pentane, and C6+ (hexane and higher hydrocarbons)

OFFICIAL METHODS MET:

ASTM 1945, ASTM 1946, GPA2177, ASTM 2163, UOP 539

KEY FEATURES & BENEFITS:

5 micro-packed columns installed for a complete and accurate separation;

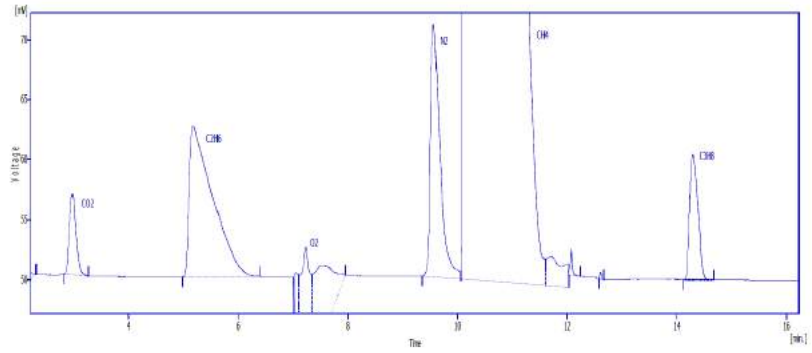
Gas sample is introduced simultaneously into each analytical channel by the 10-port valve;

The external valve gives the possibility to introduce liquid samples into the third channel;

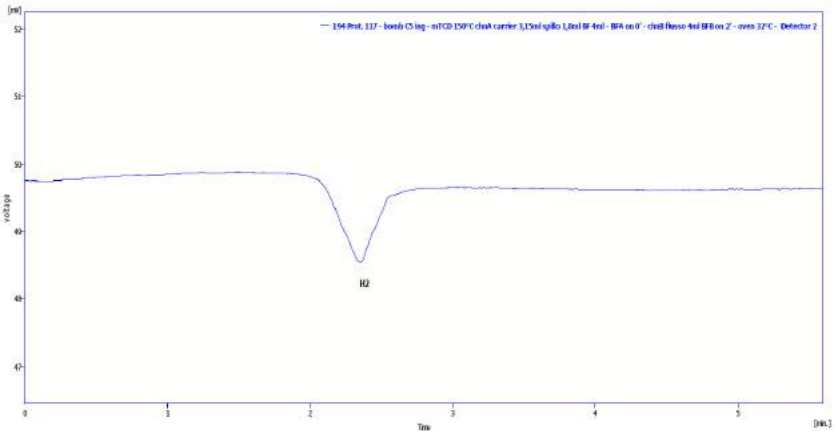
The TCD detector has advantages for speed, accuracy and reduced dead volumes for permanent gases and H_2;

The FID detector is very sensitive to the hydrocarbons components with an excellent linearity across a wide range of concentrations;

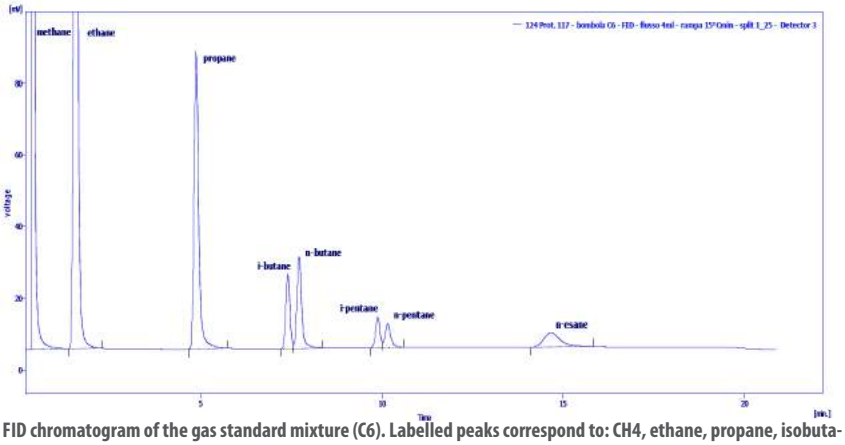
DGA 003



uTCD chromatogram of the gas standard mixture. It is possible to recognize the peaks of CO2, C2H6 , O2 , N2 , CH4, C3H8



µTCD (channel B) chromatogram of the gas standard mixture (C5). Labelled peak correspond to: H_2. All the other compounds of the standard mix are back flushed through Hayasep Q since they are not of interest for this channel and to avoid that they enter in the Molesieve column.



FID chromatogram of the gas standard mixture (C6). Labelled peaks correspond to: CH4, ethane, propane, isobutane, *n*-butane, isopentane, *n*-pentane, and *n*-hexane.

EXPERIMENTAL PARAMETERS		
Master GC Analyzer		
Columns	Channel 1	Hayesep Q (2m,1/16",80/100 mesh) Molsieve 5A (2m,1/16",80/100 mesh)
	Channel 2	Hayesep Q (2m,1/16",80/100 mesh) Molsieve 5A (2m,1/16",80/100 mesh)
	Channel 3	Alumina (1m,1/16",80/100 mesh)
GC Oven		
Temperature	32°C (for 10 min), 50°C/min to 150° C (for 20 min)	
Injector A: PK		
Temperature	40°C	
Carrier Gas	Helium	
Maximum Pressure	n/a	
Flow	6 ml/min	
Injector B : PK		
Temperature	40°C	
Carrier Gas	Nitrogen	
Maximum Pressure	n/a	
Flow	8 ml/min	
Injector C: SL/IN		
Temperature	250°C	
Carrier Gas	Helium	
Spli Ratio	1:10	
Flow	12 ml/min	
Detector A : TCD Channel 1		
Temperature	150°C	
Main filament temp.	220°C	
Main filament safety	Injector A	
Min Half-Peak Width	1s	
Digital Acquisition Rate	10 Hz	
Signal zeroing	50 mV	
Detector B : TCD Channel 2		
Temperature	150°C	
Main Filament Temp.	220°C	
Main FIlament Safety	Injector B	
Min. Half-Peak Width	1s	
Digital Acquisition Rate	10 Hz	
Signal Zeroing	50 mV	
Detector C: FID		
Temperature	150°C	
AUX Flow	25 ml/min	
H_2 Flow	40 ml/min	
Air Flow	280 ml/min	
Auxiliary Pressure		
AUX 1 Pressure	1.5 bar	
AUX 2 Pressure	2.2 bar	
Auxiliary Temperature		
Aux temp - Aux oven temp	80°C	

REFINING GAS ANALYSIS

DGA-010
Natural Gas Analyzer for Hydrogen and Helium

The DGA-010 Analyzer enables the analysis of hydrogen and helium in a gas mixture which is performed using a Packed (PK) injector, micro-packed columns and a µTCD detector.
The instrument is equipped with two identical channels with this same configuration.
Moreover, the gas chromatograph is configured with two 8-port valves located in the GC auxiliary oven and a backflush system.

DANI DGA-010 is the ready-to-go solution to attain the maximum performance in the shortest time for your analysis of Hydrogen and Helium

Master DGA-010

SAMPLE TYPE:
Gas

TYPICAL DETECTED COMPOUNDS:
H_2 and He

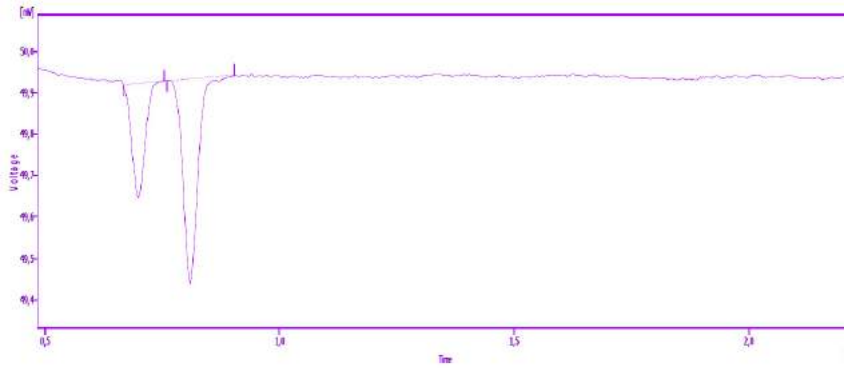
OFFICIAL METHODS MET:
ASTM 2504

KEY FEATURES & BENEFITS:
With the DGA-010 Analyzer it is possible to determine Hydrogen and Helium in a hydrocarbon mixture and separate them from the hydrocarbons using a backflush;

Valve system configuration and thei default positions of switching are factory set up;

All the analytical parameters can be controlled by the DDS Clarity™ Chromatography Station Software;

DGA 010



µTCD channel A chromatogram of the Gas standard mixture. It is possible to see the peaks of Helium and H2.

EXPERIMENTAL PARAMETERS FOR H_2 AND HE ANALYSIS CHANNEL A		
Master GC Analyzer		
Columns	Channel A	Hayesep Q (1m, 1mm ID, 1/16", 100/120 mesh) Molsieve (2m, 1mm ID, 1/16", 80/100 mesh)
GC Oven		
Temperature	at 3 min -33°C to 60°C at 20°C/min for 5 min	
Injector A: PK		
Temperature	200°C	
Carrier Gas	Helium	
Maximum Pressure	n/a	
Flow	15 ml/min	
Detector A : µTCD		
Temperature	150°C	
Filament Temperature	210°C	
Signal Zeroing	50 mV	
Filament Safety	Injector A	
Auxiliary Pressure		
AUX 1 Pressure	2.7 bar	
Auxiliary Temperature		
Aux temp 1 - Aux oven temp	80°C	

uTCD channel B chromatogram of the Gas standard mixture. It is possible to see the peaks of Helium and H2.

EXPERIMENTAL PARAMETERS FOR H_2 AND HE ANALYSIS CHANNEL B		
Master GC Analyzer		
Columns	Channel B	Hayesep Q (1m, 1mm ID, 1/16", 100/120 mesh) Molsieve (2m, 1mm ID, 1/16", 80/100 mesh)
GC Oven		
Temperature	at 3 min -33°C to 60°C at 20°C/min for 5 min	
Injector B: PK		
Temperature	200°C	
Carrier Gas	Helium	
Maximum Pressure	n/a	
Flow	15 ml/min	
Detector B : µTCD		
Temperature	150°C	
Filament Temperature	210°C	
Signal Zeroing	50 mV	
Filament Safety	Injector B	
Auxiliary Pressure		
AUX 1 Pressure	4 bar	
Auxiliary Temperature		
Aux temp 1 - Aux oven temp	80°C	

REFINING GAS ANALYSIS

DGA-014
Natural Gas Analyzer for NGA with Permanent Gas Separation - H_2 and He

The the DGA-014 Analyzer is a dual-channel system for the analysis of Permanent Gases, Hydrogen and Helium.
The first one, for permanent gas analysis, is configured with a packed injector (PK), micro-packed columns and a Micro Thermal Conductivity Detector (µTCD).
The analysis of Hydrogen in a gas mixture, on the second channel, is performed by a Packed Injector (PK), micro-packed column and the Micro Thermal Conductivity Detector (µTCD).

DANI DGA-014 is the ready-to-go solution to attain the maximum performance in the shortest time for your analysis of Permanent Gaas, H_2 and He.

Master DGA-014

SAMPLE TYPE:

TYPICAL DETECTED COMPOUNDS:

OFFICIAL METHODS MET:

ASTM 1945, ASTM 1946, GPA 2177, ASTM 2504

KEY FEATURES & BENEFITS:

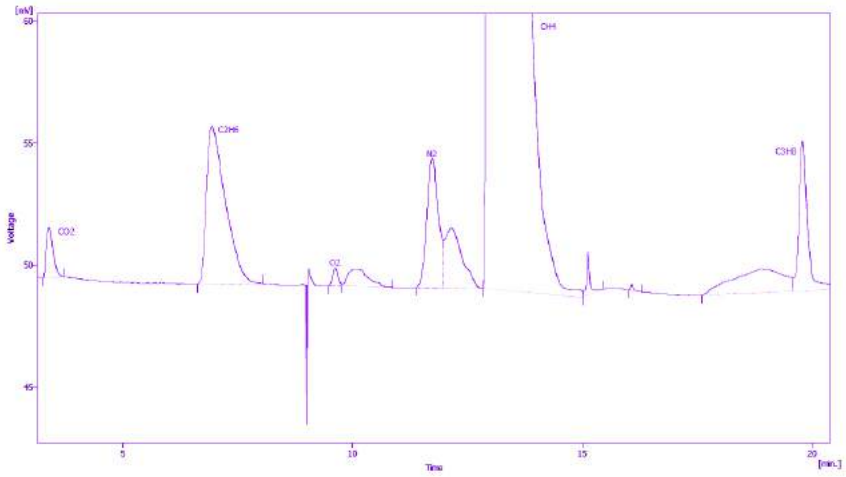
With the DGA-014 it is possible to determine O_2, CH_4, N_2, CO_2, C_2 and higher hydrocarbons in Natural Gas Samples and separate the components above C_3 using a backflush;

The use of an optimized combination of columns allows the excellent separation of all the components and more reproducible characteristics;

The µTCD detector guarantees linear dynamic range, speed, reduced dead volumes and precision;

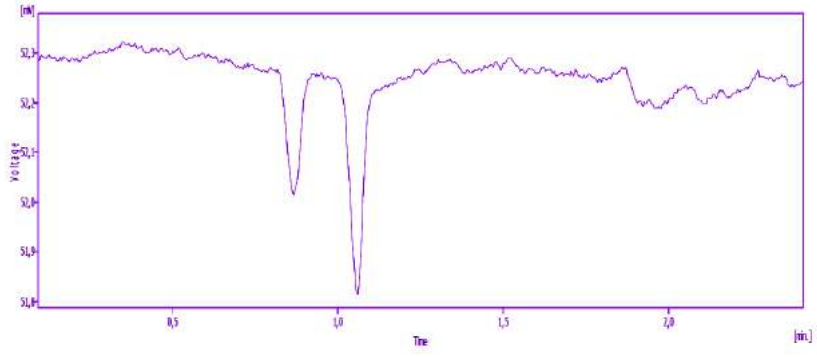
All the analytical parameters can be controlled by the DDS Clarity™ Chromatography Station Software;

DGA 014



uTCD A chromatogram of the Hydrocarbons standard mixture. It is possible to recognize the peaks of CO2, C2H6 , O2 , N2 , CH4, C3H8

EXPERIMENTAL PARAMETERS FOR NATURAL GAS ANALYSIS CHANNEL A		
Master GC Analyzer		
Columns	Channel A	Hayesep T (1m, 1/16", 80/100 mesh) Hayesep Q (1m, 1/16", 100/120 mesh) Molsieve 5A (2m, 1/16, 80/100 mesh)
GC Oven		
Temperature	at 15 min 33°C to 150°C at 20°C/min for 10 min	
Injector A: PK		
Temperature	200°C	
Carrier Gas	Helium	
Maximum Pressure	n/a	
Flow	15 ml/min	
Detector A : µTCD		
Temperature	150°C	
Filament Temp	210°C	
Signal Zeroing	50 mV	
Filament Safety	Injector A	
Auxiliary Temperature		
Aux Temp 1 - Aux Oven Temp	80°C	
Auxiliary Pressure		
AUX Gas 1	3.2 bar	



uTCD channel B chromatogram of the Hydrogen and Hydrocarbons standard mixture. It is possible to see the peaks of Helium and H2

EXPERIMENTAL PARAMETERS FOR H_2 AND HE ANALYSIS CHANNEL B		
Master GC Analyzer		
Columns	Channel B	Hayesep Q (1m, 1mm ID, 1/16", 100/120 mesh) Molsieve (2m, 1mm ID 1/16", 80/100 mesh)
GC Oven		
Temperature	at 4 min 33°C to 150°C at 20°C/min for 10 min	
Injector B: PK		
Temperature	200°C	
Carrier Gas	Helium	
Maximum Pressure	n/a	
Flow	17.2 ml/min	
Detector B : µTCD		
Temperature	150°C	
Filament Temperature	210°C	
Signal Zeroing	50mV	
Filament Safety	Injector B	
Auxiliary Temperature		
Aux temp 1 - Aux oven temp	80°C	
Auxiliary Pressure		
AUX 3 Pressure	3 bar	

REFINING GAS ANALYSIS

DGA-021
Refining Gas Analyzer for Gas and Liquefied Hydrocarbons

The analysis of hydrocarbons in a gas or liquid phase is performed using a split/splitless injector, capillary column and a Flame Ionization Detector.
The GC is configured with two valves for gas sampling and equilibrating with atmosphere pressure: two 6-port valves are located in the GC auxiliary oven. Moreover, a 4-port valve for liquid sampling is available.

DANI DGA-021 is the ready-to-go solution to attain the maximum performance in the shortest time for your analysis of Gas andLiquefied Hydrocarbons.

Master DGA-021

SAMPLE TYPE:

Gas Liquid

TYPICAL DETECTED COMPOUNDS:

CH4 , ethane, propane , iso- and n-butane , iso- and n-pentane , hexane;

OFFICIAL METHODS MET:

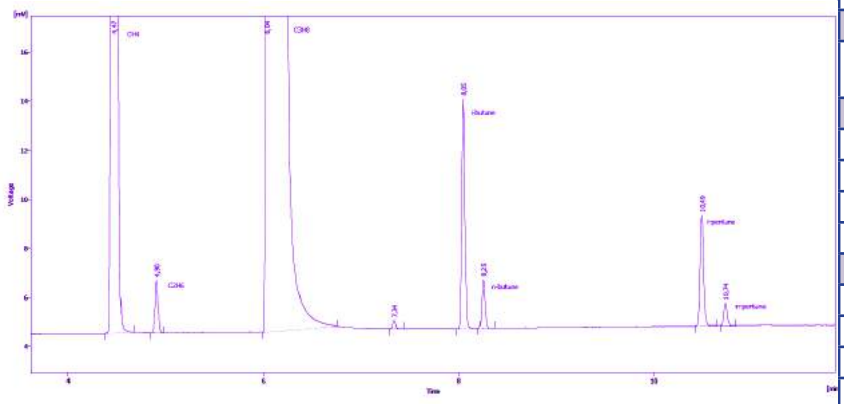
ASTM 2163

KEY FEATURES & BENEFITS:

Hydrocarbons analysis is performed using the two 6-port valves system, a capillary column and an FID detector;

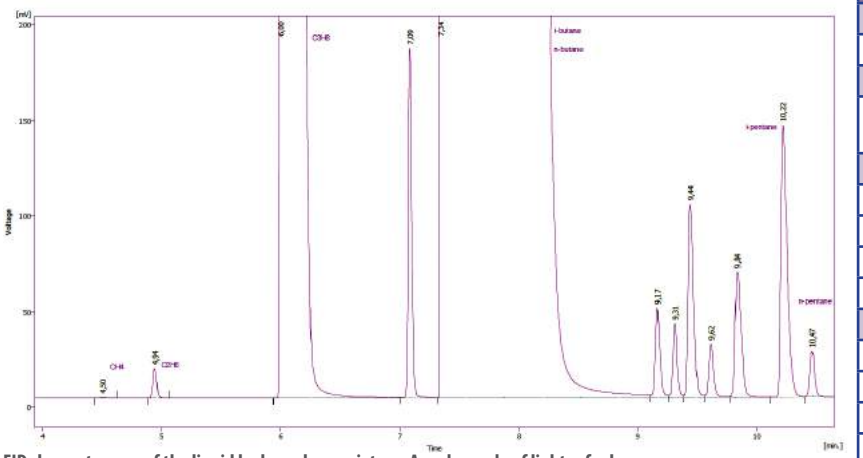
All the analytical parameters can be controlled by the DDS Clarity™ Chromatography Station Software;

DGA 021



FID chromatogram of the gas standard mixture. It is possible to recognize the peaks of CH4, C2H6, C3H8, i-butane, n-butane, i-pentane , n-pentane

EXPERIMENTAL PARAMETERS FOR HYDROCARBONS DETERMINATION	
Master GC Analyzer	
Columns	Al_2O_3/Na_2SO_4 (50 m, 0.25 mm ID, 4µm)
GC Oven	
Temperature	At 0.00 min from 35°C to 180°C at 20°C/min - for 7 min
Injector B: SL/IN	
Temperature	20°C
Carrier Gas	Helium
Split Ratio	1:50
Flow	1 ml/min
Detector B: FID	
Temperature	300°C
Aux Flow (N_2)	25 ml/min
H_2 Flow	40 ml/min
Air Flow	280 ml/min
Aux Temperature	
Aux Temp 1 (°C) - Aux Oven Temp	80°C



FID chromatogram of the liquid hydrocarbons mixture. A real sample of lighter fuel was analyzed. It was possible to identify the peaks of CH4, C2H6, C3H8 , iso and n-butane, iso and npentane.

EXPERIMENTAL PARAMETERS FOR LIQUID HYDROCARBONS DETERMINATION	
Master GC Analyzer	
Columns	Al_2O_3/Na_2SO_4 (50 m, 0.25 mm ID, 4µm)
GC Oven	
Temperature	At 0.00 min from 35°C to 200°C at 20°C/min - for 7 min
Injector B: SL/IN	
Temperature	20°C
Carrier Gas	Helium
Split Ratio	1:20
Flow	1 ml/min
Detector B: FID	
Temperature	300°C
Aux Flow (N_2)	25 ml/min
H_2 Flow	40 ml/min
Air Flow	280 ml/min
Aux Temperature	
Aux Temp 1 (°C) - Aux Oven Temp	80°C

REFINING GAS ANALYSIS

DGA-028
Refining Gas Analyzer for Permanent Gas, Hydrocarbons, H_2 and CO_2

The DGS-028 Analyzer enables the analysis of permanent gas, CO_2 and hydrocarbons up to C_6 using three different pathways, channel 1, channel 2 and channel 3 equipped as follows:
Channel 1 is composed by a flow control module injector, a 10-port valve for sampling and switching, a 6-port valve for switching, two types of columns: Plot Q and Molsieve 5A and a thermal conductivity detector (TCD). This channel fullfills the need of an accurate determination of permanent gas, CO_2 and CH_4.
Channel 2 is composed by a flow control module injector, a 10-port valve for sampling and switching, two types of columns: Plot Q and Molsieve 5A and a thermal conductivity detector (TCD). This channel fullfills the need of an accurate determination of H_2.
Channel 3 is composed by a SL/IN injector, a 6-port valve for switching, an Alumina column and a flame ionized detector (FID).
Sampling is made by a single "sample in" for all channels.

DANI DGA-028 is the ready-to-go solution to attain the maximum performance in the shortest time for your analysis of Permanent Gas, Hydrocarbons, H_2 and CO_2

Master DGA-028

SAMPLE TYPE:

Gas

TYPICAL DETECTED COMPOUNDS:

O_2, N_2, CO_2, H_2, methane, ethane, propane, *i*-butane, *n*-butane, *i*-pentane, *n*-pentane, *n*-hexane

OFFICIAL METHODS MET:

ASTM 1945, ASTM 1946, GPA 2177

KEY FEATURES & BENEFITS:

Three channel system for a comprehensive, ast, and accurate analysis of permanent gases, hydrocarbons, CO_2, H_2, and CH_4;

Higher sensitivity and precision are obtained through the use of the µTCD and FID detectors;

All the analytical parameters can be controlled by the DDS Clarity™ Chromatography Station Software;

DANI
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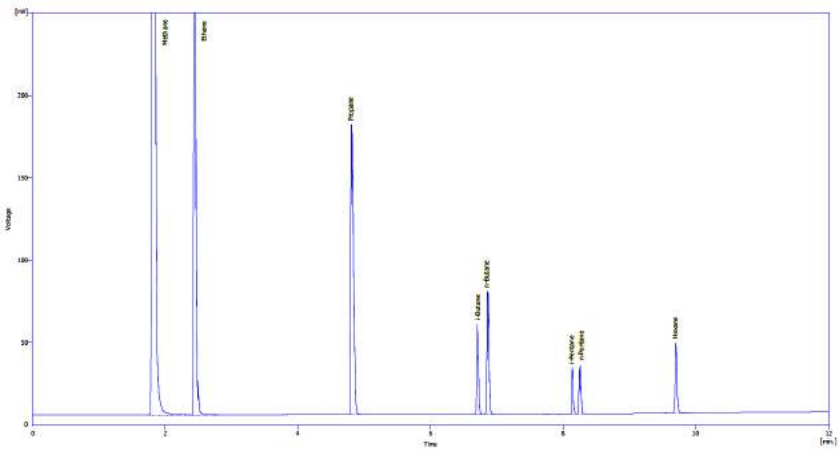
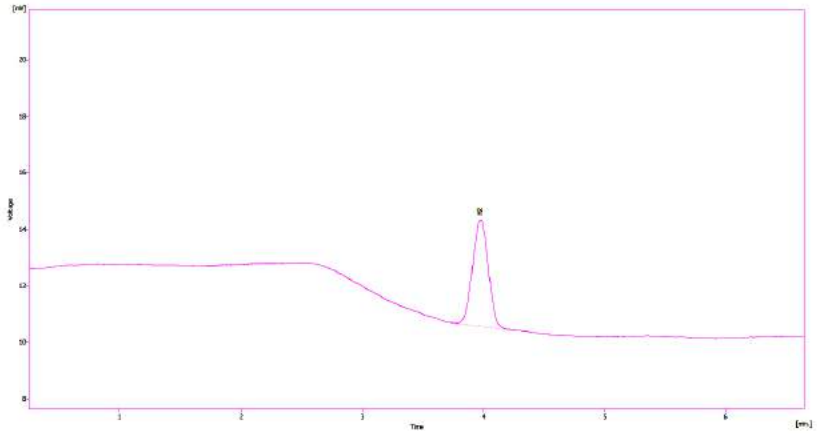
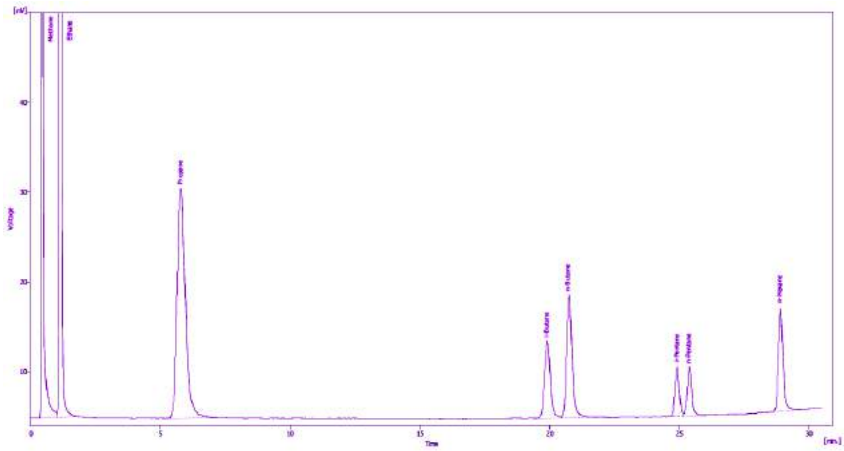
DGA 028



µTCD chromatogram of gas standard mixture of permanent gases and CH4



µTCD chromatogram of gas standard mixture



FID chromatogram of the gas standard mixture

EXPERIMENTAL PARAMETERS FOR PERMANENT GAS, CO_2, H_2 AND HYDROCARBONS		
Master GC Analyzer		
Columns	Channel 1	**Porapak Q** (3m , 80/100 mesh, 1/8") **Molsieve 5A** (3m, 80/100 mesh, 1/8")
	Channel 2	**Porapak Q** (3m , 80/100 mesh, 1/8") **Molsieve 5A** (3m, 80/100 mesh, 1/8")
	Channel 3	**Alumina** (1m, 80/100 mesh, 1/16")
GC Oven		
Temperature	1) T : 40°C, Time: 15 min, Rate: 10°C/min 2) T: 200°C, Time: 4 min	
Injector A: SL/IN		
Temperature	250°C	
Carrier Gas	Helium	
Split Ratio	1:80	
Flow	1 ml/min	
Injector B: SL/IN		
Carrier Gas	Helium	
Flow	8 ml/min	
Injector C: SL/IN		
Carrier Gas	Helium	
Flow	20 ml/min	
Det A: TCD		
Temperature Control	250°C	
Filaments Control	7.40 V	
Polarity	Negative	
Max Current	180 mA	
Filament Safety	Aux Gas 3	
Filament Safety	Aux Gas 1	
Min. Half-Peak Width	0.60 s	
Digital Acquisition Rate	25 Hz	
Signal Zeroing	10 mV	
Det B: TCD		
Temperature Control	250°C	
Filaments Control	7.40 V	
Polarity	Positive	
Max Current	180 mA	
Filament Safety	Inj C	
Filament Safety	Aux Gas 2	
Min. Half-Peak Width	0.60 s	
Digital Acquisition Rate	25 Hz	
Signal Zeroing	10 mV	
Det C: FID		
Temperature	300°C	
AUX flow	25 ml/min	
H_2 flow	40 ml/min	
Air flow	280 ml/min	
Auxiliary Pressure		
AUX 1 pressure	0.70 bar	
AUX 2 pressure	1.10 bar	
AUX 3 pressure	3.00 bar	
Aux Temperature		
Aux Temperature	80°C	

REFINING GAS ANALYSIS

DGA-033
Refinery Gas Analyzer for Permanent Gas, CO_2, Hydrocarbons, COS, H_2S ans CS_2

This MASTER GC Analyzer enables the analysis of permanent gas, CO_2, COS, H_2S, CS_2 and hydrocarbons up to C_6.
The analysis are performed with two different pathway equipped as follows:
Channel 1 is composed by a PK injector, two types of columns (Plot Q and Molesieve), a micro Thermal Conductivity Detector (µTCD), a Flame Photometric Detector (FPD);
Channel 2 is composed by a SL/IN injector, a Plot Q column and a Flame Ionized Detector (FID).
Moreover, the gas chromatograph is configured with a 10-ports valve for sampling, two 6-ports valves for switching and a 8-ports liquid valve all located in the GC auxiliary oven.

DANI DGA-033 is the ready-to-go solution to attain the maximum performance in the shortest time for your analysis of Permanent Gas, CO_2, Hydrocarbons, COS, H_2S, and CS_2

Master DGA-033

SAMPLE TYPE:
Gas

TYPICAL DETECTED COMPOUNDS:
O_2, N_2, CO_2, COS, H_2S, CS_2, methane, ethane, propane, *i*-butane, *n*-butane, *i*-pentane, *n*-pentane, *n*-hexane;

OFFICIAL METHODS MET:

KEY FEATURES & BENEFITS:

Typical components of interest in this type of gas analysis are: O_2 , N_2, CH_4 , CO , COS, H_2S, CS_2 , methane, ethane, propane, i-butane, n-butane, i-pentane, n-pentane and n-hexane.
With this analyzer it is possible to separate and analyze these compounds or part of them.

Higher sensitivity and precision are obtained through the use of the µTCD and FID detectors;

All the analytical parameters can be controlled by the DDS Clarity™ Chromatography Station Software;

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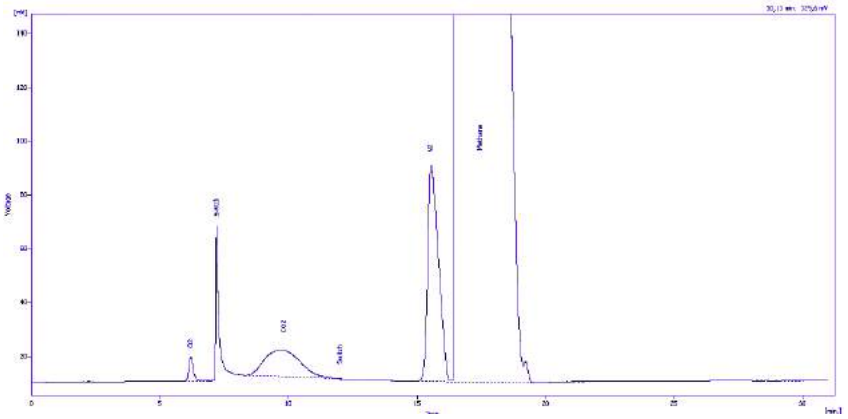
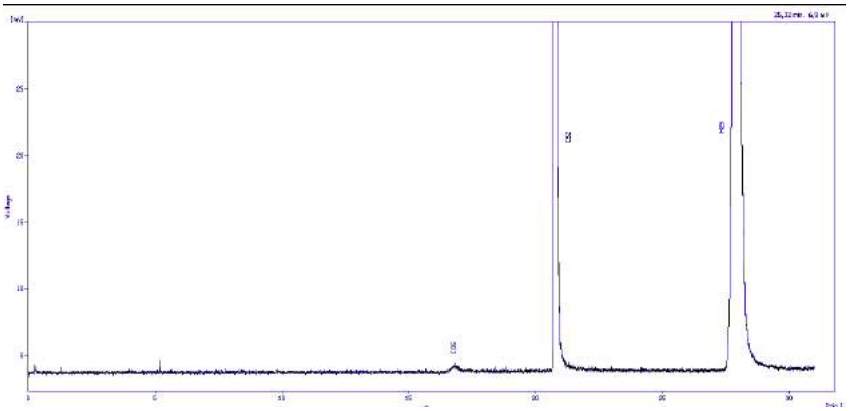
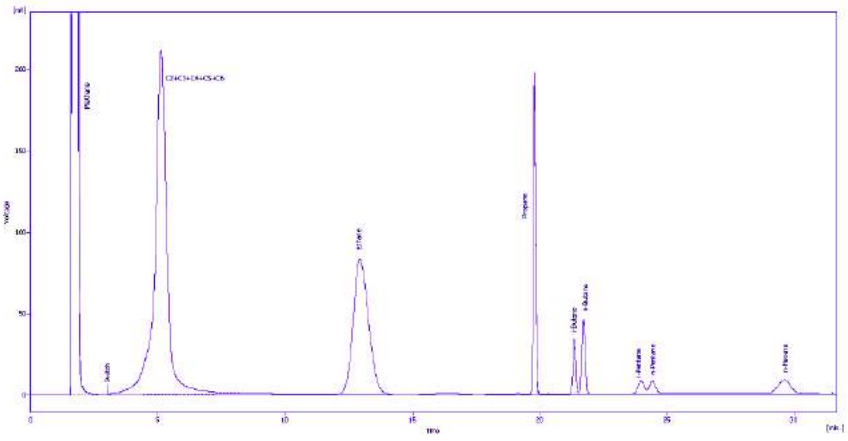
DGA 033



µTCD (Chn 1) chromatogram of the gas standard mixture



FPD (Chn 1) analysis of sulphur compounds mixture



FID (Chn 2) analysis of C6 hydrocarbons mixture

EXPERIMENTAL PARAMETERS FOR PERMANENT GAS, CO_2, HYDROCARBONS AND SULPHUR COMPOUNDS		
Master GC Analyzer		
Columns	Channel 1	**Plot Q** (3m , 1/16 OD) **Molsieve** (3m , 1/16 OD)
	Channel 2	**Plot Q** (3m , 1/16 OD)
GC Oven		
Temperature	1) T : 35°C, Time: 15 min, Rate: 30°C/min 2) T: 200°C, Time: 11 min	
Injector A: PK		
Temperature	250°C	
Carrier Gas	Helium	
Flow	10 ml/min	
Injector B: SL/IN		
Temperature	250°C	
Carrier Gas	Helium	
Split Ratio	1:25	
Flow	8 ml/min	
Det A: FPD		
Temperature Control DBB	250°C	
Detector Head Temperature (Aux Temp 2)	130°C	
H_2 Flow Rate	200 ml/min	
Air 1 Flow Rate	160 ml/min	
Air 2 Flow Rate	160 ml/min	
Aux FLow Rate (N_2)	15 ml/min	
Photomultiplier voltage	0.72 kV	
Range	1	
Min. Half-Peak Width	0.60 s	
Digital Acquisition Rate	25 Hz	
Det B: FID		
Temperature	300°C	
Aux Flow Rate (N_2)	25 ml/min	
H_2 Flow Rate	40 ml/min	
Air Flow Rate	280 ml/min	
Range	10	
Min. Half Peak WIdth	0.60 s	
Digital Acq. Rate	25 Hz	
Det C: µTCD		
Temperature Control	160°C	
Main Filament Temperature	190°C	
Main Filmanet Safety	Injector A	
Min. Half-Peak Width	0.60 s	
Digital Acquisition Rate	25 Hz	
Signal Zeroing	10 mV	
Auxiliaries		
Aux Temp 1- for Aux Oven	80°C	
Aux Temp 2 - For Detector Head temp FPD	130°C	
Aux Gas (N_2) - for Backflush	1.7 bar	

REFINING GAS ANALYSIS

DGA-034
Refinery Gas Analyzer for Permanent Gas and Hydrocarbons

The analysis with the DGA-034 Analyzer is performed using two Packed Column Injectors (PK), three micropacked columns and two Thermal Conductivity Detectors (TCD).
Moreover, the Gas CHromatograph is configured with two valves located in the auxiliary oven: a 10-port valve for injection in the analytical channels and a 6-port valve on Channel 1.

DANI DGA-034 is the ready-to-go solution to attain the maximum performance in the shortest time for your analysis of Permanent Gas, H_2 and Hydrocarbons

Master DGA-034

SAMPLE TYPE:
Gas

TYPICAL DETECTED COMPOUNDS:
O_2, N_2, CH_4, CO_2, ethane, propane, butane, pentane, and hesane;

OFFICIAL METHODS MET:
ASTM 1945, ASTM 1946, GPA 2177;

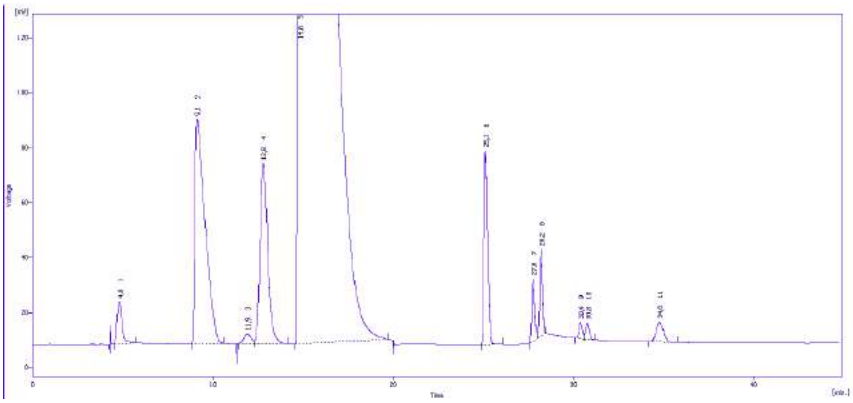
KEY FEATURES & BENEFITS:
Gas analysis is performed using this complete system that allows to determinate permanent gas and hydrocarbons using the channel (channel 1) equipped with TCD, a packed Plot Q column and a packed Molsieve column, a 10-port valve and a 6-port valve;

For the determination of hydrocarbons, Channel 2 is equipped with the TCD, the same 10-port valve for injection and a packed Plot Q column;

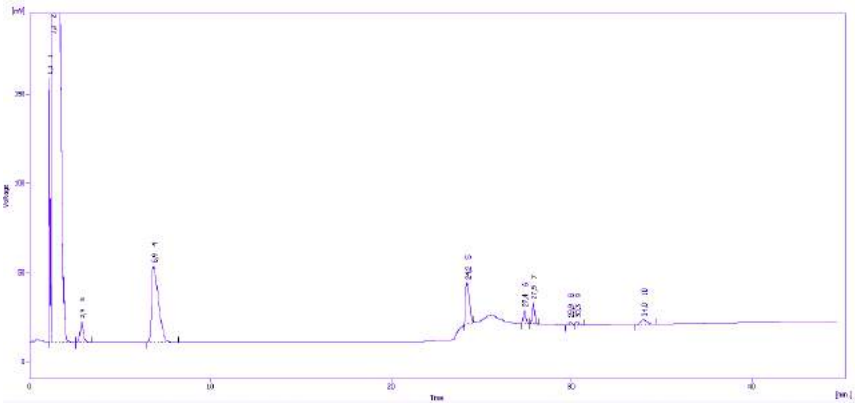
The gas sample is introduced simultaneously to each analytical channel through the 10-port valve equipped with sampling loops:

All the analytical parameters can be controlled by the DDS Clarity™ Chromatography Station Software;

DGA 034



Chromatogram of the gas standard mixture on Channel 1.
The peaks correspond to: C02 , C2 , 02 , N2 , CH4 , C3 , iso-C4 , n-C4 , iso-C5 , n-C5 , C6



Chromatogram of the gas standard mixture on Channel 2.
The peaks correspond to: 02 + N2 , CH4 , C02 , C2 , C3 , iso-C4 , n-C4 , iso-C5 , n-C5 , C6

EXPERIMENTAL PARAMETERS FOR PERMANENT GAS, CO_2, HYDROCARBONS AND SULPHUR COMPOUNDS		
Master GC Analyzer		
Columns	Channel 1	**Hayesep Q** (2,5m, 1/8", 80/100 mesh) **Molsieve 5A** (2.5m , 1/8", 80/100mesh)
	Channel 2	**Hayesep Q** (2m , 1/16", 80/100mesh)
GC Oven		
Temperature	1) T : 40°C, Time: 20 min, Rate: 20°C/min 2) T: 200°C, Time: 8 min	
Injector A: PK		
Temperature	250°C	
Carrier Gas	Helium	
Column Type	Packed - Max Pressure: 3 bar	
Flow	10 ml/min	
Injector B: PK		
Temperature	250°C	
Carrier Gas	Helium	
Column Type	Packed - Max pressure: 2 bar	
Flow	12 ml/min	
Channel 1 - Det A: TCD		
Temperature	250°C	
Voltage	7.20 V	
Polarity	Negative	
Max Current	180 mA	
Filament Safety	Inj A	
Filament Safety	Aux Gas 1	
Range	1	
Min. Half-Peak Width	0.60 s	
Digital Acq. Rate	25 Hz	
Signal Target	10 mV	
Channel 1 - Det B: TCD		
Temperature	250°C	
Voltage	7.30 V	
Polarity	Negative	
Max Current	180 mA	
Filament Safety	Inj B	
Filament Safety	Aux Gas 2	
Range	1	
Min. Half-Peak Width	0.60 s	
Digital Acq. Rate	25 Hz	
Signal Target	10 mV	
Auxiliary Temperature		
Aux Temp (°C) - Aux Oven Temp	120°C	
Auxiliary Pressure		
Aux Press 1	0.65 bar	
Aux Press 2	0.50 bar	

REFINING GAS ANALYSIS

DGA-035
Refinery Gas Analyzer for Permanent Gas, H_2 and Hydrocarbons

The analysis with the DGA-035 Analyzer is performed using two injector flow controls, a split/splitless injector, micro-packed columns, a micro Thermal Conductivity Detector (µTCD) and a Flame Ionization Detector (FID). Moreover, the gas chromatograph is configured with three valves: an external 4-ports valve (for introduce liquid samples in the system) plus a 10-ports valve and a 6-ports valve located in the auxiliary oven.

DANI DGA-035 is the ready-to-go solution to attain the maximum performance in the shortest time for your analysis of Permanent Gas, H_2 and Hydrocarbons

Master DGA-035

SAMPLE TYPE:

Gas Liquid

TYPICAL DETECTED COMPOUNDS:

H_2, O_2, N_2, CO_2, CH_4, CO, ethane, propane, butane, pentane and C_6+ (hexane and higher hydrocarbons)

OFFICIAL METHODS MET:

ASTM 1945, ASTM 1946, GPA 2177;

KEY FEATURES & BENEFITS:

Gas analysis is performed using this complete system that allows to determinate permanent gases, H_2 and hydrocarbons using the channel equipped with µTCD detector and the channel equipped with FID detector.

The separation of permanent gases and hydrocarbons is made possible by the presence of a micro-packed Hayesep Q column and a micro-packed Molsieve column for each channel with µTCD.

The gas sample is introduced simultaneously to each analytical channel (Chn 1 and 2) by the 10-ports valve equipped with two sample loops. Moreover the external valve gives the possibility to introduce liquid samples in Channel 3.

All the analytical parameters can be controlled by the DDS Clarity™ Chromatography Station Software;

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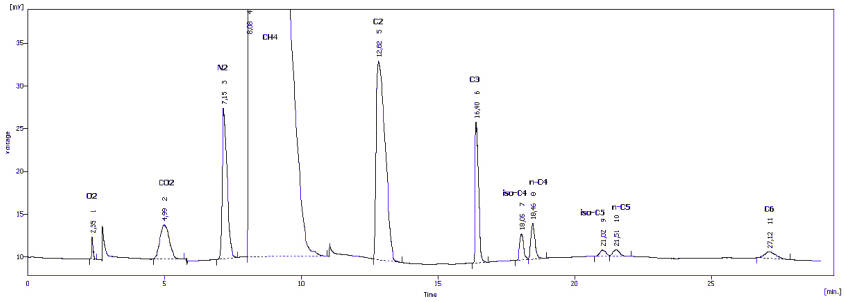
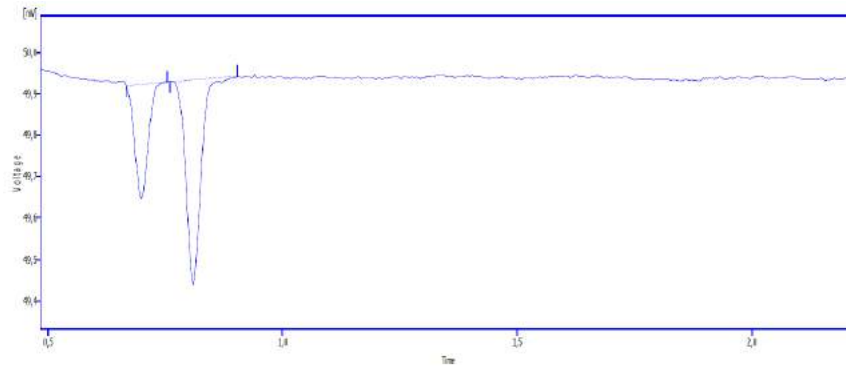
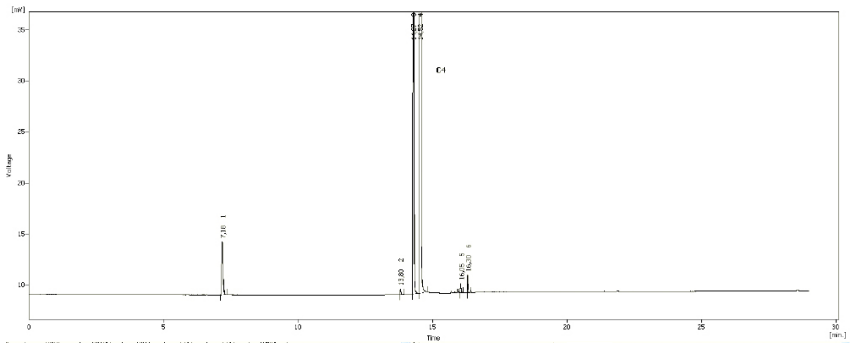
DGA 035



mTCD (Channel 1) chromatogram of the gas standard mixture.
Labelled peaks correspond to: O_2 , CO_2 , N_2 , CH_4 , C_2 , C_3 , iso-C_4 , n-C_4 , iso-C_5 , n-C_5 , C_6



mTCD (Channel 2) chromatogram of the gas standard mixture.
Labelled peaks correspond to: H_2 and CH_4



FID chromatogram of the real sample of Butane

EXPERIMENTAL PARAMETERS FOR PERMANENT GAS, CO_2, HYDROCARBONS AND SULPHUR COMPOUNDS		
Master GC Analyzer		
Columns	Channel 1	**Hayesep Q** (3m, 1/16", 80/100 mesh) **Molsieve 5A** (3m , 1/16", 80/100mesh)
	Channel 2	**Hayesep Q** (3m , 1/16", 80/100mesh) **Molsieve 5A** (3m , 1/16", 80/100mesh)
	Channel 2	**Alumina** (50m, 0.32mm)
GC Oven		
Temperature	35°C (for 11 min) at 30°C/min to 200°C (for 13 min)	
Injector A: PK		
Temperature	OFF	
Carrier Gas	Helium	
Column Type	Capillary - 200m, 0.53mm	
Flow	20 ml/min	
Injector B: PK		
Temperature	OFF	
Carrier Gas	Nitrogen	
Column Type	Capillary . 200m, 0.53mm	
Flow	10 ml/min	
Inj C : SL/IN		
Temperature	200°C	
Carrier Gas	Helium	
Split Ratio	1:50	
Flow	4ml/min	
Det A : µTCD Channel 1		
Temperature	200°C	
Main Filament Temperature	190°C	
Filament Safety	Injector A	
Min. Half-Peak Width	1s	
Digital Acquisition Rate	10 Hz	
Signal Zeroing	10 mV	
Det B : µTCD Channel 2		
Temperature	160°C	
Main Filament Temperature	190°C	
Filament Safety	Injector B	
Min Half-Peak Width	1 s	
Digital Acquisition Rate	10 Hz	
Signal Zeroing	10 mV	
Det C : FID		
Temperature	300°C	
AUX Flow	25ml/min	
H2 Flow	40ml/min	
Air Flow	280ml/min	
Auxiliary Pressure		
Aux Press 1	2.6 bar	
Aux Press 2	1.45 bar	
Auxiliary Temperature		
Aux Temp (°C) - AUx Oven Temp	120°C	

REFINING GAS ANALYSIS

DGA-036
Refinery Gas Analyzer for Permanent Gas, H_2 and Hydrocarbons

The analysis with MASTER GC Analyzer is performed using three injector flow controls, micro-packed columns and two micro Thermal Conductivity Detectors (mTCD).
Moreover, the gas chromatograph is configured with a solenoid valve and three valves located in the auxiliary oven: a 8-ports valve for Channel 1, plus a 10-ports valve and a 6-ports valve for Channel 2.

DANI DGA-036 is the ready-to-go solution to attain the maximum performance in the shortest time for your analysis of Permanent Gas, H_2 and Hydrocarbons

Master DGA-036

SAMPLE TYPE:

Gas

TYPICAL DETECTED COMPOUNDS:

H_2, O_2, N_2, CO_2, CH_4, CO, ethane, propane, butane, pentane and C_6+ (hexane and higher hydrocarbons)

OFFICIAL METHODS MET:

ASTM 1945, ASTM 1946, GPA 2177;

KEY FEATURES & BENEFITS:

Gas analysis is performed using this complete system that allows to determinate H_2 using the channel equipped with a µTCD, a micro-packed column and a micro-packed column, an 8-ports valve and a solenoid valve for cleaning the system by other compounds;

Permanent gases and hydrocarbons analysis is performed using the channel equipped with the µTCD, micropacked columns, a 10-ports valve and a 6-ports valve to bypass the Molsieve column.

The gas sample is introduced separately in the single analytical channels by the 8-ports and 10-ports valves equipped with sampling loops to 1 ml.

All the analytical parameters can be controlled by the DDS Clarity™ Chromatography Station Software;

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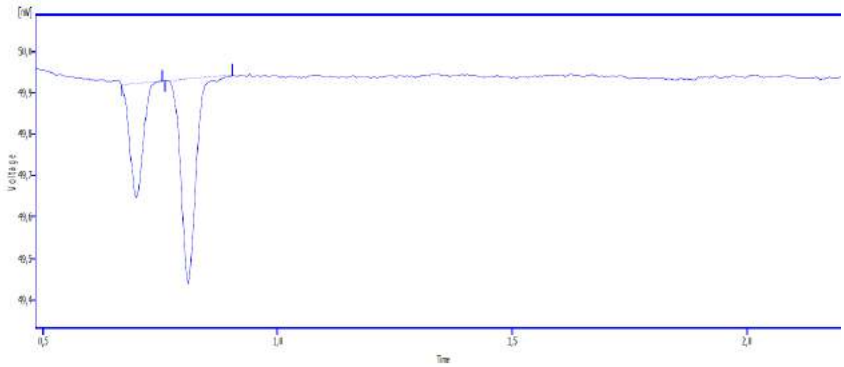
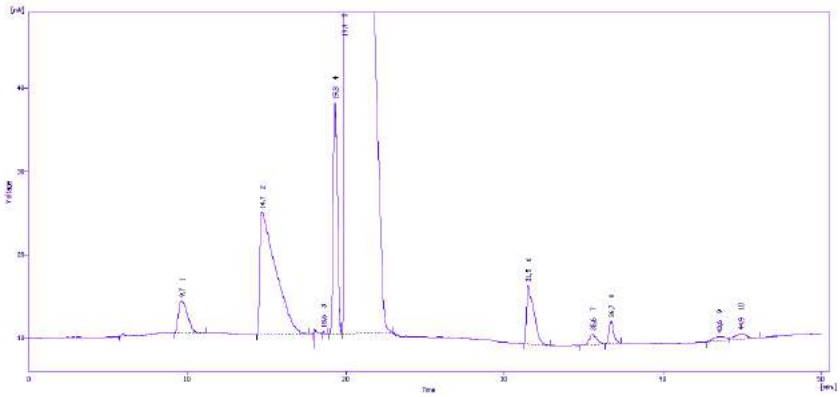
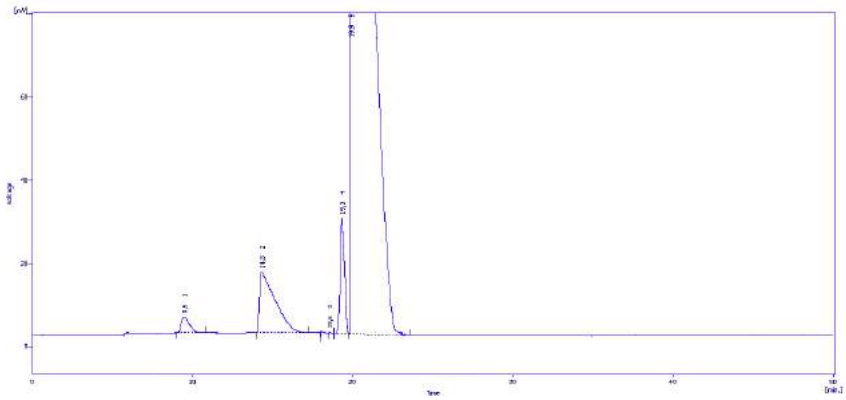
DGA 036



Chromatogram of the gas standard mixture on Channel 1
The peak corresponds to $He+H_2$



Chromatogram of the gas standard mixture on Channel 2.
The peaks correspond to: CO_2 , C_2 , O_2 , N_2 , CH_4 , C_3 , iso-C_4 , n-C_4 , iso-C_5 , n-C_5



Chromatogram of the gas standard mixture on Channel 2.
The peaks correspond to: CO_2 , C_2 , O_2 , N_2 , CH_4

EXPERIMENTAL PARAMETERS FOR PERMANENT GAS, CO_2, HYDROCARBONS AND SULPHUR COMPOUNDS		
Master GC Analyzer		
Columns	Channel 1	**Hayesep Q** (1m, 1/16", 80/100 mesh) **Molsieve 5A** (2m , 1/16", 80/100mesh)
	Channel 2	**Hayesep T** (1m , 1/16", 80/100mesh) **Hayesep Q** (2m , 1/16", 80/100mesh) **Molsieve 13X** (2m , 1/16", 80/100mesh)
GC Oven		
Temperature	Temp: 32°C , Time : 23 min , Rate : 10°C/min Temp: 32°C , Time : 13 min	
Injector A: PK		
Temperature	OFF	
Carrier Gas	Nitrogen	
Column Type	Capillary - 200m, 0.53mm	
Flow	Set: 14 ml/min - Measured at Det C: 5.2 ml/min	
Injector B: PK		
Temperature	OFF	
Carrier Gas	Helium	
Column Type	Capillary . 200m, 0.53mm	
Flow	Set: 15 ml/min - Measured at Det C: 2.8 ml/min	
Inj C : PK		
Temperature	OFF	
Carrier Gas	Helium	
Column Type	Capillary - 200m, 0.53	
Flow	Set: 13 ml/min - Measured at Det C: 2.7 ml/min	
Det A : µTCD Channel 1		
Temperature	160°C	
Main Filament Temperature	190°C	
Filament Safety	Injector A	
Min. Half-Peak Width	0.6 s	
Digital Acquisition Rate	25 Hz	
Signal Zeroing	10 mV	
Det A : µTCD Channel 1		
Temperature	160°C	
Main Filament Temperature	190°C	
Filament Safety	Injector A	
Min Half-Peak Width	0.6 s	
Digital Acquisition Rate	25 Hz	
Signal Zeroing	10 mV	
Det C : µTCD Channel 1		
Temperature	160°C	
Main Filament Temperature	190°C	
Filament Safety	Injector C	
Min. Half-Peak Width	0.6 s	
Digital Acquisition Rate	25 Hz	
Signal Zeroing	10 mV	
Auxiliary Pressure		
Aux Press	2.2 bar	
Auxiliary Temperature		
Aux Temp (°C) - AUx Oven Temp	100°C	

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REFINING GAS ANALYSIS

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