

# CHROMOCTANE ON LINE ANALYZER

## *ASTM D6733 DHA and RON and MON on line GC for Reformer unit*



Automatic Chromatographic system for analysis of naphtha feeds and reforming gasolines in accordance with ASTM DHA method D6733.

In addition to simulated distillation data and chemical individual and group hydrocarbon characterization, various physical properties are generated such as RON, MON, RVP, SG Etc. Originally based on the HP5890 Plus GC at the introduction of Chromoctane, it now includes the latest generation HP6890 GC and Chemstation software.



### **Technical Hardware specifications of CHROMOCTANE**

- HP 6890N GC with FID EPC detector, Split injector with EPC, automatic liquid injection valve, automatic gas injection valve, pre-vaporization chamber for liquid samples and auxiliary valves for selection of sample lines.
- PC Chemstation Workstation with CARBURANE automatic labelling software and databases
- The above can be installed in an existing Explosion proof shelter or in an Ex HPGC6890 Cabinet

## Main Functions

The analytical system is based on the combination of gas chromatographic analysis and original software and databases developed by IFP. Only a very small sample is required and testing time does not exceed 90 minutes. The method is very stable and efficient to give excellent accuracy of the results. Typically calibration is done every 12 months in spite of feedstock variation specifications.

### Typical applications in Reforming operations are for example :

- Reformer Feed ( Naphtha Feedstock )
- Reformer inter reactor effluents
- Reformate after stabilization

### The software package provides several features for operating staff :

- Selection of Feeds and effluents
- Calibration , Identification and Quantification of chromatograms
- Determination of physical properties

### The final report automatically generated by Chromoctane can include all of the following data on the sample analysis :

- DHA report, Detailed Hydrocarbons Analysis
- Hydrocarbon group report
- Carbon number group report
- Carbon and Hydrogen content
- Simulated distillation report
- Physical properties such as specific gravity , molecular weight , RON , MON , Etc...

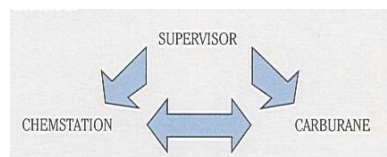
## Software Specifications

Chromoctane on line analyzer is using state of the art GC integration and control software, Chemstation , along with the well known Carburane DHA software from IFP . All above are compatible with the latest version of Windows such as 2000 Pro , NT , or XP Pro. The supervisor software allows the operator to perform the following :

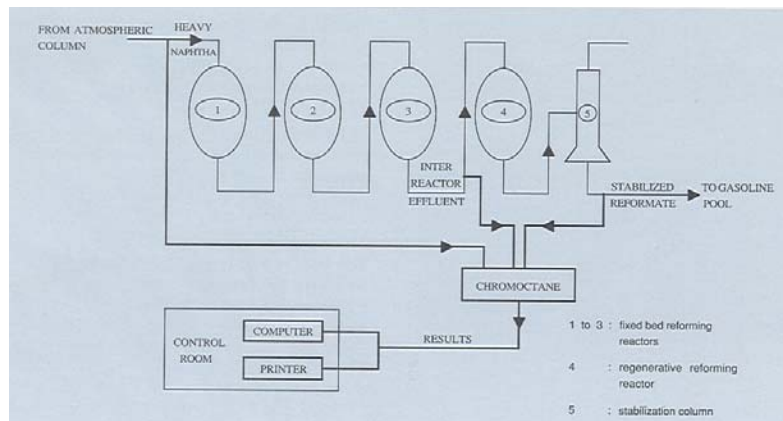
- Select the sample line(s)
- Assign a GC Method for Each line
- Define the sequence of operation ( with a purge period) for effluent injection at preset times and by priority
- Access in real time the chromatographic data during an analysis
- Automatically link the integration software to Carburane to generate direct final report .

The Carburane identification software can :

- Carry out automatically the identification of all components in the sample and labeling each of them.
- Control automatically the calibration of the GC and adjust the experimental retention times to properly identify the components . If out of range the system will send a warning
- Introduce new calibration data
- Process report in post run mode or automatically .
- Modify databases by advance analytical specialist



### Example of installation on semi-regenerative reforming



## GC Hardware detail specifications

### Inlet Auto injector

**Split capillary inlet installed with EPC** Electronic pressure/flow control , 400°C maximum operating temperature ,  
Pressure setting range: 0-100 psi  
(0-150 psi optional).  
Total flow setting range: 0 to 1,000 mL/min He

**Detector** includes electronic pneumatics control and electronic on/off for all detector gases.

**One detector installed with EPC : Flame ionization detector (FID)** with electronic pressure/flow control optimized for capillary columns, 450°C maximum operating temperature ,  
Flame-out detection ,  
MDL: <5 pg carbon/sec as propane using N2 carrier and 0.29-mm id jet,  
Linear dynamic range:  $\leq \pm 10\%$ , 107 with N2 carrier and 0.29-mm id jet, Data rate: up to 200 Hz

### Electronic Pneumatics Control (EPC)

Channels for inlets, detectors, or auxiliary gases  
Pressure adjustable by increments of 0.01 psi  
Atmospheric pressure sensor to compensate for altitude and ambient temperature variation  
Flow or pressure setpoints on each inlet or detector parameter screen  
EPC settings included in Agilent 6890 and Carburane Workstation

### Data Communications :

LAN , RS-232-C (maximum,baud rate setting of 57,600) , Two analog output channels (1-mV, 1-V, and 10-V output available) as standard , Remote start/stop

### Other Specifications

Clock time programming- Run deviation log (notes any changes to setpoints or expected values during a run, saved with run file ) - Control of eight external events (valves, on/off, or low-level contact) - Four internal 24-volt connections(up to 150 mA) - Two external 24-volt connections (up to 75 mA) - Two on/off contact closures (48 V, 250 mA max)  
- Storage of nine methods- Storage of five sequences- Binary-coded decimal input for a stream selection valve- Context-sensitive online help.

## Analytical Data

### Naphtha Feed Analysis

About 220 peaks separated and identified

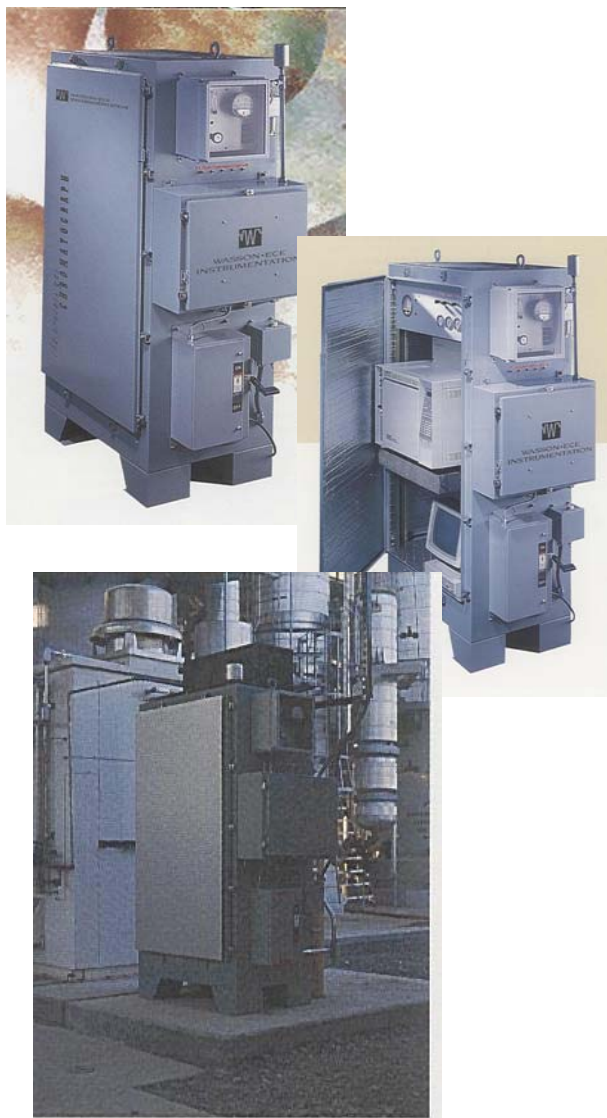
- The optimized method gives a minimum number of coeluted compounds, achieves separation of major compounds which are not easily separated, especially naphthenes and alkanes.
- Quantification in weight % of each component with response factor , by carbon number , by hydrocarbon group PNA analysis
- Quantification in weight % of carbon and hydrogen content , of alkane, naphthene and aromatic carbon content .
- Simulated distillation report in two formats, every 5% ( in wt%, vol%, mole% ) or every 1%( in wt%).

### Reformate Analysis

- About 200 peaks separated and identified up to C10 for saturates and up to C16 for aromatics
- Quantification in weight % of each component with response factor , by carbon number , by hydrocarbon group PIONA analysis
- Simulated distillation report in two formats, every 5% ( in wt%, vol%, mole% ) or every 1%( in wt%).
- Physical properties determination :
  - Specific gravity and molecular weight
  - Octane numbers calculated from linear correlation using blending octane number for each peak, correlation obtained from 200 samples of reforming gasolines
    - Octane number range of these samples  
RON from 85 to 105  
MON from 76 to 85
    - ON accuracy obtained with Carburane  
Bias less than 0.7  
Standard deviation      RON = 0.30  
   MON = 0.34
    - Repeatability      0.1

### Inter Reactor Analysis

- Sample specifications : gaseous at 500 C with pressure of 5 to 10 bar and average composition is 80% hydrogen , 20% C1-C11 hydrocarbons .
- Sampling after depressurization to 1 bar with a sampling line temperature of 160 C.
- Simulation of stabilized effluent with the software by removing C1-C2-C3 and part of C4
- Analysis report same as Reformate



## UTILITIES

- **Gases for analyzer**

- Helium ( for Carrier gas ) Purity : 99.995%  
Consumption 250L / day
- Hydrogen ( for FID) Purity : 99.995%  
Consumption 50L /day
- Air ( for FID) Purity 99.995%  
Consumption 500L /day

- **Additional gases for EX cabinet**

- Instrument air pressure 5 to 10 bars

- **Electrical power**

- for the analyzer 220V 50/60Hz +/- 10%  
3KVA
- For the EX cabinet 220V 50/60Hz +/-10%  
30 Amps

- **Dimensions Ex cabinet**

- 122 cm overall W x 107 cm D x 214 cm H
- Weight approx. 450 Kgs with GC and sampling system

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