

The background of the entire page is a photograph of an industrial refinery at dusk or dawn. Several tall distillation columns are visible, illuminated by site lights. Overlaid on this image are various digital graphics: a grid of glowing squares in the upper right, binary code (0s and 1s) running diagonally across the lower half, and a schematic diagram of a pump and piping in the bottom left corner.

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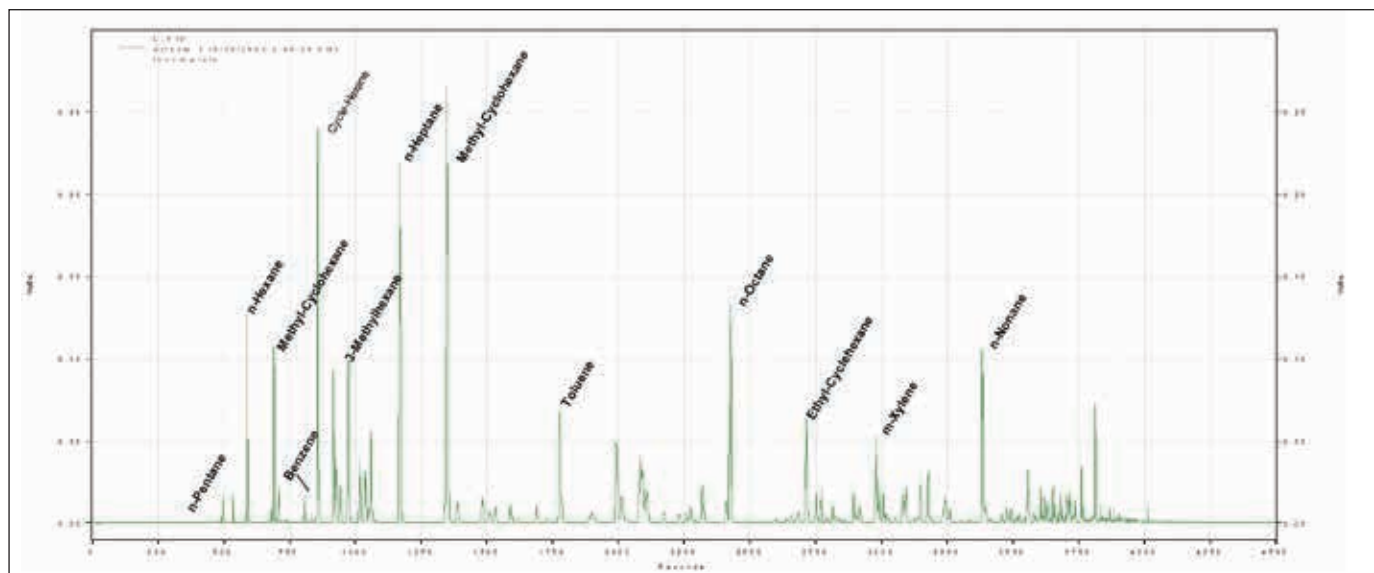
Analytical Products and Solutions

## Detailed Hydrocarbon Analysis

n-Paraffin, i-Paraffin, Naphthenes, Aromatics

One of the most complex analytical tasks in the refinery industry is the detailed hydrocarbon analysis of Naphtha, Reformate or Alkylate. It involves the characterization and quantification of several hundred individual components. Often done in the lab with associated time delay, the MAXUM process gas chromatograph provide that long term repeatable separation and reliable categorization faster and continuous. Providing quantitative results on-line permits tighter process control and therefore improved intermediate and final product quality with potentially very high economic benefits.

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Chromatogram of Naphtha ranging from C3-C10 hydrocarbons and with an analysis time of 80 minutes.

PINA is the analytical determination of the carbon number distribution of n-Paraffin, i-Paraffin, Naphthenes and Aromatics concentration in Naphtha, Reformate and Alkylate. The Olefins content has to be less than 3%. The analysis is performed according ASTM method D-5134.

Because the number of individual constituents to be separated and quantified between C3 and C10 is a few hundred, a very stable and repeatable analytical system is required.

A defined sample volume is injected with an on-line liquid injection valve. Separation is achieved by a narrow bore capillary column and detection by Flame Ionization Detector. The detector is independently heated to eliminate possible temperature programming impact on the quantification. Retention time stability and therefore correct identification over an analysis time of 80 minutes is continuously monitored and if needed minute carrier gas flow adjustment are done automatically. A "gold standard" chromatogram is stored and utilized as reference. MAXUM process gas chromatograph with dual airbath oven ensures long term repeatable characterization. Categorizing the various components to the molecule groups is automatically done after every analysis.

The turn-key system solution for installation in electrical hazardous plant locations consist of MAXUM with sample system and if needed analyzer cabinet or shelter.

On-line measurement provides continuous and repeatable results with minimum time delay therefore permitting to improve desired composition with higher consistency.

#### For more information, please contact:

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Carbon Number	n-Paraffin	i-Paraffine	Naphthene	Aromatic
1	0			
2	0			
3	0.09			
4	0.84	0.23		
5	2.12	1.66	0.29	
6	3.14	4.22	5.3	0.76
7	4.03	3.9	11.78	3.42
8	4.18	4.97	7.46	5.53
9	5.03	5.94	2.98	
C10+	22.13			
Unknowns	0.01			

Summary of constituents according carbon number and molecule category

- ASTM method D-5134
- C3 to C10 hydrocarbons
- Cycle time approximately 80 minutes
- Repeatability 0.1-0.5% RSD per C- number and category
- MAXUM II Process Gas Chromatograph
- Dual oven temperature programmable
- Sample system with fast and analytical loop

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