



# AC Reformulyzer<sup>®</sup> M4

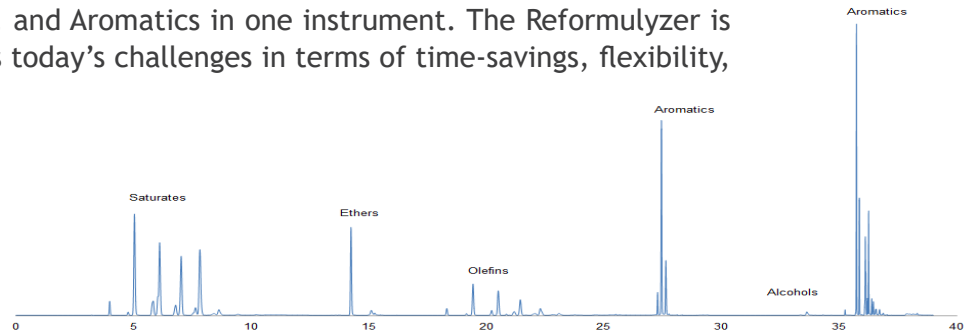
Fast group type analysis of gasoline and gasoline blend streams using multi-dimensional gas chromatography

- 🌐 State-of-the-art Solution for Hydrocarbon Group Type Analysis meeting Today's Industry Needs
- 🌐 Robust and Intelligent Design contributes to Maximum Instrument Uptime
- 🌐 Increases Profits with Fast and Accurate Analysis
- 🌐 In Compliance with Leading Standards - EN ISO 22854, ASTM D6839, GB/T 28768

# Reformulyzer<sup>®</sup> M4

## STATE-OF-THE-ART SOLUTION FOR GASOLINE GROUP TYPE ANALYSIS IN 39 MINUTES

The Reformulyzer M4 is the most significant advancement in full group type analysis of gasoline and gasoline blend streams using multi-dimensional gas chromatography. It is the fastest and most flexible analyzer on the market to combine analysis for Paraffins, Olefins, Naphthenes, Oxygenates, and Aromatics in one instrument. The Reformulyzer is the only solution that truly meets today's challenges in terms of time-savings, flexibility, and product value optimization.



## KEY ADVANTAGES

### EXCELLENT PERFORMANCE FOR HIGH RETURN ON INVESTMENT

#### Increases Profits with Fast and Accurate Analysis

- Analysis results in 39 minutes for fast decision-making on product specification
- Robust design reduces operational cost per sample
- Excellent precision and accuracy contribute to higher profitability
- Extensive analysis scope from one single instrument

### IMPROVED EASE OF USE AND MORE FLEXIBILITY

#### Meets Today's Industry Needs

- Standard olefin method covers entire concentration upto 75%
- Intuitive Reformulyzer software includes extensive range of methods and pre-programmed modes
- Unique Reformulyzer User Group with interlaboratory comparison contributes to high confidence level and a strong QC program

### MAXIMUM INSTRUMENT UPTIME

#### Robust and Intelligent Design contributes to Maximum Instrument Availability

- Excellent olefin trap robustness for superior trap lifetime
- Nitrogen carrier saves cost and avoids helium supply chain risks
- Diagnostic Tool™ and certified AC quality control samples for system performance verification

### PROVEN COMPLIANCY

#### M4 is the worldwide leading standard EN ISO 22854 & ASTM D6839

- Fully compliant with leading standard test methods ASTM D6839, EN ISO 22854, ASTM D5443, IP 566, SH/T 0741, GB/T 28768-2012
- EN 228 includes the EN ISO 22854 (Multidimensional GC, Reformulyzer) as Referee Method for Hydrocarbon content (Olefins & Aromatics), Benzene, Oxygenates and Oxygen content. Reformulyzer replaced EN15553 (FIA) for Hydrocarbon content and EN1601 for Oxygenates

# ROI STUDY

## INCREASE REVENUE

The Reformulyzer M4's short analysis time allows to run up to 100% more samples per day and it enables labs to comply to the significant in-tank and in-ship blending time constraints related to key-point analysis.

### Case study Assumptions

- 100% system utilization: ~36 samples per day
- Revenue per sample is 200 USD
- 2 QC samples per day

## REDUCE OPERATIONAL COST

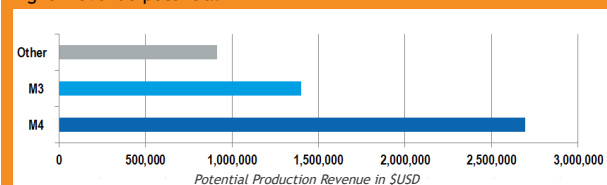
The Reformulyzer M4's advanced technology significantly reduces maintenance and system down-time. In combination with the improved sample capacity the total operational cost per sample is reduced with 50%.

### Case study Assumptions

- 90% system utilization ~32 samples per day
- Operational cost: spares, consumables, service visits, technician cost, cost on down-time

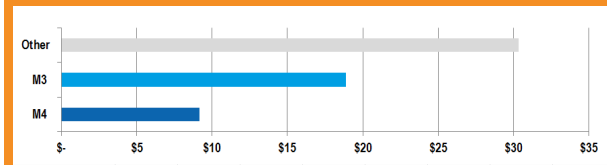
### Fast analysis increases revenue with ~90%

Up to 100% increase of daily sample capacity leads to significantly higher revenue potential



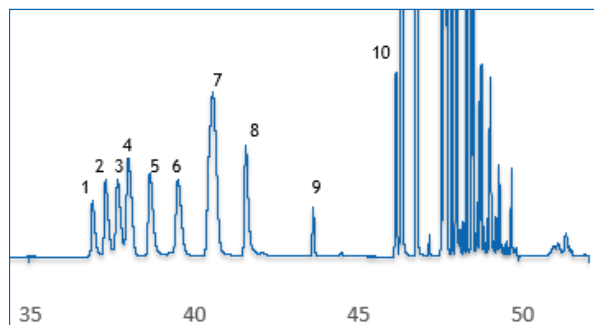
### Robust design reduces operational cost per sample with ~50%

Advanced technology reduces cost on maintenance



# ENHANCED ANALYSIS OF OXYGENATES

In today's dynamic gasoline market, an increased diversity of ethers and alcohols is used in the gasoline blending pool. Accurate and reliable determination of oxygenates in gasoline is of prime importance, as to ensure product quality and compliance with local legislation. Reformulyzer M4 is following gasoline blending developments with the introduction of a new Gasoline method with a greatly enhanced separation power for oxygenated components.



Separation of a gasoline zoomed in the 8 Alcohols region

1. Methanol
2. Ethanol
3. iso-Propanol
4. tert-Butanol
5. n-Propanol
6. ETBE
7. 2-Butanol
8. TAME
9. Toluene
10. C8-aromatics

NEW

## INTELLIGENT HARDWARE

The AC Reformulyzer M4 is now available on the new Agilent 8890 GC Platform.

Intelligent capabilities built into the Agilent 8890 GC give you the freedom to work with your GC... not on it. These capabilities can also grow over time as your analytical needs change—so you can keep your lab moving toward a successful future.



### Intuitive touch screen interface

This new and intelligent GC platform simplifies life inside the lab by giving you real-time access to instrument status and information. The home screen provides updates on the system at-a-glance and allows you to customize frequently used setpoints for quick accessibility



### Check your lab anytime, from anywhere!

Now you don't have to be in your lab to make sure that things are running smoothly. Mobile access features let you view setup information, troubleshoot problems, pause and start sample runs among other controls!

### Ordering Information

GCG3500A	Reformulyzer M4 on 8890 GC, 110V
GCG3500C	Reformulyzer M4 on 8890 GC, 230V

### Standard Methods

EN ISO 22854, ASTM D6839, ASTM D5443, IP566, SH/T 0741, GB/T 28768-2012

### Analysis Range

Sample Scope	Sample Range	Concentration Range
<ul style="list-style-type: none"> <li>Finished gasoline</li> <li>Reformer feed</li> <li>Reformate</li> <li>Straight Naphtha</li> <li>FCC Naphtha Olefins</li> <li>Isomerates</li> <li>Alkylate</li> <li>E20+/E85</li> </ul>	<ul style="list-style-type: none"> <li>n-Paraffins C4-C11</li> <li>Isoparaffins C4-C11</li> <li>Olefins C4-C11</li> <li>Naphthenes C5-C11</li> <li>Aromatics C6-C11</li> <li>Oxygenates C1-C6, includes:                             <ul style="list-style-type: none"> <li>Methanol</li> <li>Ethanol</li> <li>n-Propanol</li> <li>i-Propanol</li> <li>t-Butanol</li> <li>i-Butanol</li> <li>2-Butanol</li> <li>tert-amylalcohol</li> <li>MTBE, ETBE, DIPE, TAME</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Total Aromatics</li> <li>Benzene</li> <li>Individual Aromatics</li> <li>Total Olefins</li> <li>Ethanol</li> <li>All Ethers</li> <li>All Alcohols (Except ethanol)</li> </ul>
		<ul style="list-style-type: none"> <li>0.03 - &gt;95%</li> <li>0.01 - 70%</li> <li>0.01 - 70%</li> <li>0.03 - 75%</li> <li>0.01 - &gt;95%</li> <li>0.01 - 30%</li> <li>0.01 - 20%</li> </ul>

Typical Modes Used	PNA	OPNA	PIPNA	PONA	PIONA	PIANO	OPIONA	GASOLINE	GASOLINE OXY	E85	Fast Group Type
Light Straight run Naphtha	•		•			•					
Heavy Straight run Naphtha	•		•			•					
Depentanized Bottom	•		•			•					
Reformate	•		•			•					
FCC Light/Medium/Heavy				•	•						
Visbreaker				•	•						
Alkylate / Isomerate			•								
Gasoline Blend							•	•			•
Gasoline with Oxygenates		•					•	•	•		
E85, E20+										•	
Analysis time in Minutes	25	30	30	30	55	40	60	39	52	39	15

### PAC IRIS Software

Users can choose to have the Reformulyzer M4 operate as a stand-alone unit or benefit from using it in a PC-controlled network with PAC IRIS Software. This advanced lab instrument data integration software is designed specifically for PAC instruments to gather and analyze test data and communicate results so customers can make informed decisions. PAC IRIS offers:

- Improved laboratory efficiency
- Simplified knowledge sharing and decision making
- Designed to promote Good Laboratory Practices

PAC IRIS Functionalities for Reformulyzer M4 are:

- Method Definition
- Results Management
- Results Evaluation
- Instruments Parameters
- Reporting
- Quality Control
- Run Control
- Diagnostics

Continuing research and development may result in specifications or appearance changes at any time

## ABOUT PAC

PAC develops advanced instrumentation for lab and process applications based on strong **Analytical Expertise** that ensures **Optimal Performance** for our clients. Our analyzers help our clients meet complex industry challenges by providing a low cost of ownership, safe operation, high performance with fast, accurate, and actionable results, high uptime through reliable instrumentation, and compliance with standard methods.

Our solutions are from industry-leading brands: AC Analytical Controls, Advanced Sensors, Alcor, Antek, Herzog, ISL, Cambridge Viscosity, Phase Technologies, PSPI, and PetroSpec. We are committed to delivering superior and local customer service worldwide with 16 office locations and a network of over 140 distributors. PAC operates as a unit of Roper Technologies, Inc., a diversified technology company and a constituent of S&P 500, Fortune 1000, and Russell 1000 indices.

## HEADQUARTERS

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Contact us for more details.  
 Visit our website to find the PAC representative closest to you.