



AC Reformulyzer[®] M4

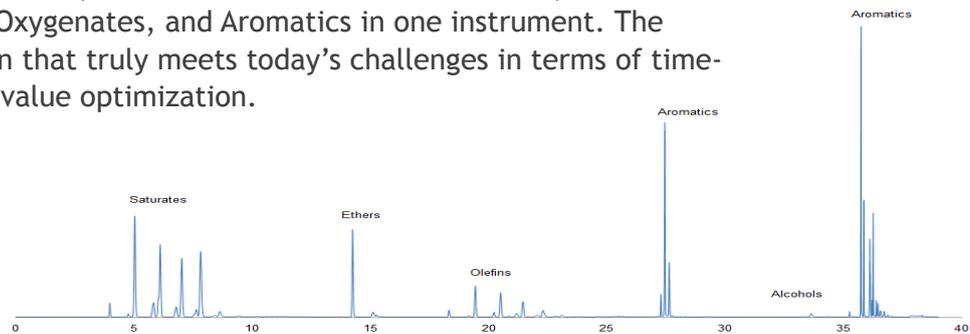
Fast group type analysis of gasoline and gasoline blend streams using multi-dimensional gas chromatography

- ⊗ 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[®] 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 up to 75%
- User-friendly design allows easy preventive maintenance by operator
- 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

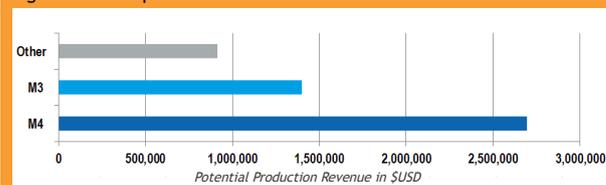
REDUCE OPERATIONAL COST

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%.

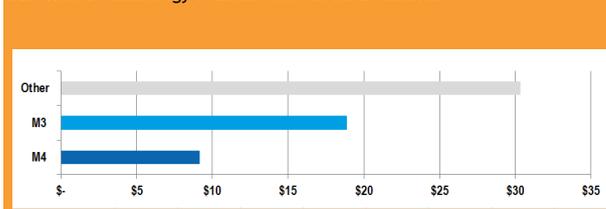
Case study Assumptions

- 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

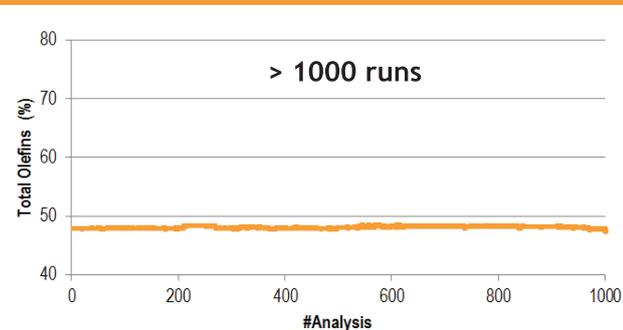


Robust design reduces operational cost per sample with ~50%
Advanced technology reduces cost on maintenance



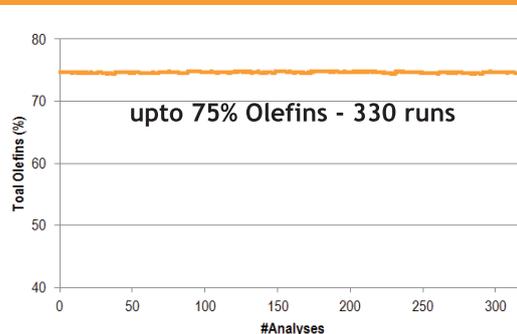
M4 ANALYSIS

SUPERIOR OLEFIN TRAP LIFETIME



>1000 injections of FCC Naphtha:
Total Olefins 47.98% +/- 0.38% RSD

EXCELLENT OLEFIN TRAP ROBUSTNESS



330 injections of high olefenic FCC Naphtha
Total Olefins 74.60% +/- 0.20% RSD

MEETING TODAY'S CHALLENGES

MORE TIME SAVINGS

- M4 is capillary/micropacked, M3 is partially packed
- M4 is 2x faster in every mode (Winterspec/Gasoline mode is 39 minutes for M4, M3 is 75 minutes)

EASIER TO USE

- M4 has dedicated modes to report the same components sets as ASTM D4815, D5580 and D3606
- M4: easy accessible integrated modular electronics, M3: ACI
- M4 has no needle valves and less connections than M3

IMPROVED PERFORMANCE

- M4 has Split inlet, M3 has TPI
- M4 has next generation trap technology with integrated heating
- M4 Olefin Trap Lifetime is significantly improved
- M4 has an extended range for various component groups and can analyze olefins up to 75%. M3 has separate modes for high olefins in combination with dilution
- M4 has new E85 mode, OPIONA and Fast group Type modes

COST-SAVINGS

- M4 has Nitrogen carrier, M3 uses Helium



SPECIFICATIONS

Ordering Information										
CCG3500A	Reformulyzer M4 110V									
CCG3500B	Reformulyzer M4 200V									
CCG3500C	Reformulyzer M4 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"> Finished gasoline reformer feed Reformate Straight Naphtha FCC Naphtha Olefins Isomerates Alkylate E20+/E85 	<ul style="list-style-type: none"> n-Paraffins C4-C11 Isoparaffins C4-C11 Olefins C4-C11 Naphthenes C5-C11 Aromatics C6-C11 Oxygenates C1-C6, includes: <ul style="list-style-type: none"> Methanol Ethanol n-Propanol i-Propanol t-Butanol i-Butanol 2-Butanol tert-amylalcohol MTBE, ETBE, DIPE, TAME 				<ul style="list-style-type: none"> Total Aromatics 0.03 - >95% Benzene 0.01 - 70% Individual Aromatics 0.01 - 70% Total Olefins 0.03 - 75% Ethanol 0.01 - >95% All Ethers 0.01 - 30% All Alcohols (Except ethanol) 0.01 - 20% 					
Typical Modes Used	PNA	OPNA	PIPNA	PONA	PIONA	PIANO	OPIONA	GASOLINE	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	39	15
PAC IRIS Software										
<p>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:</p> <ul style="list-style-type: none"> Improved laboratory efficiency Simplified knowledge sharing and decision making Designed to promote Good Laboratory Practices 					<p>PAC Iris Functionalities for Reformulyzer M4 are:</p> <ul style="list-style-type: none"> Method Definition Results Management Results Evaluation Instrument 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, PSPI, and PetroSpec. We are committed to delivering superior and local customer service worldwide with 16 office locations and a network of over 50 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

PAC LP | 8824 Fallbrook Drive | Houston, Texas 77064 | USA
T: +1 800.444.8378 | F: +1 281.580.0719



Contact us for more details.

Visit our website to find the PAC representative closest to you.