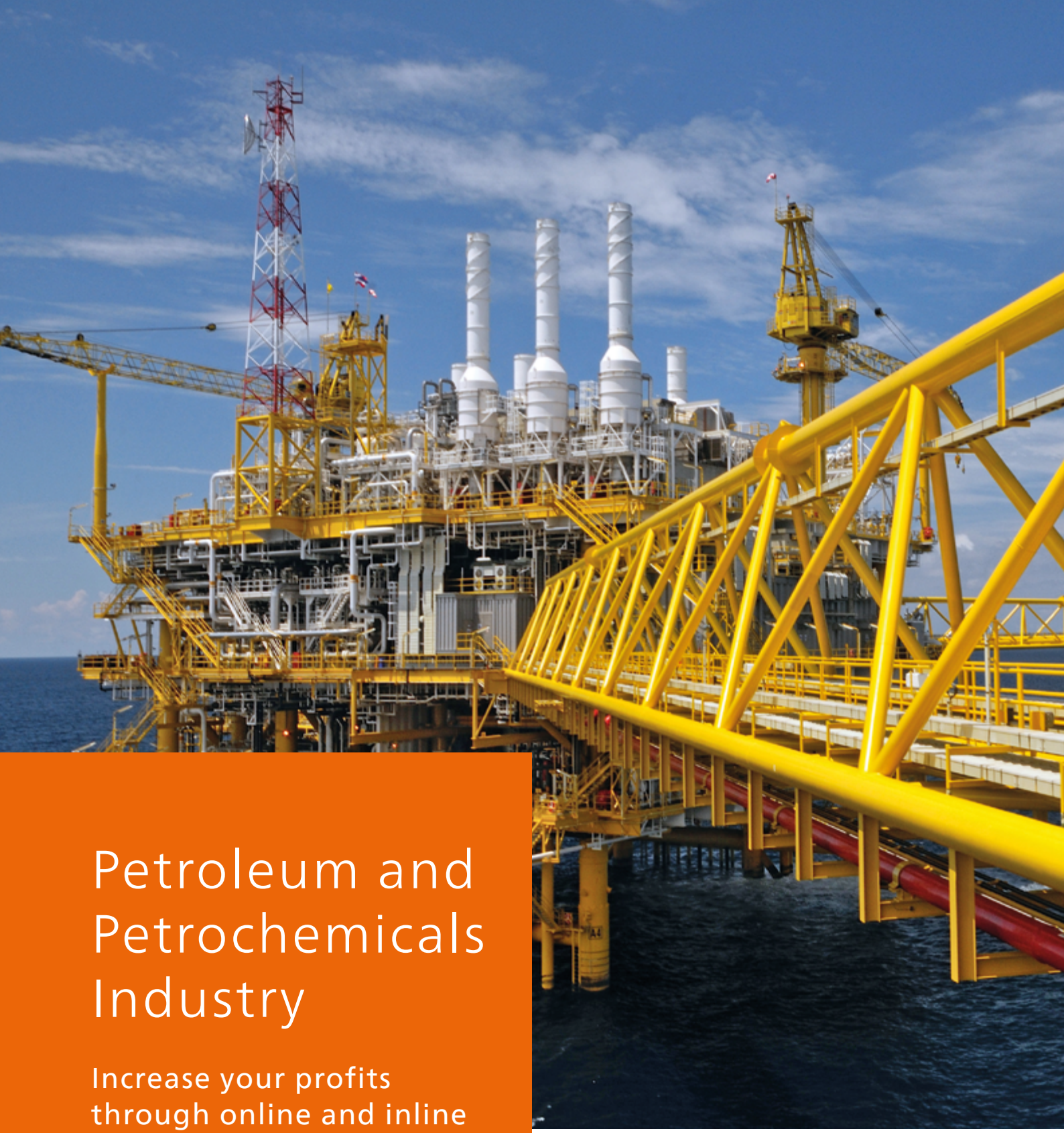


Petroleum and Petrochemicals Industry

Increase your profits through online and inline analyzers

PUSHING THE LIMITS TOGETHER

Metrohm Process Analytics

Monitoring your process 24/7

Maximize profitability, comply with regulations, and stay safer

Oil has been used as an energy source for many thousands of years. It was not until the 20th century when oil replaced most other fuels for motorized transport (e.g., aircrafts, ships). With the exorbitant appearance of more advanced motor vehicles, and consumers (i.e. drivers), the oil industry was in the need to improve and standardize the products in order to obtain the best fuel efficiency.

The petrochemical industry was born in 1940, 80 year after the first drilling of the first commercial oil well. As years have passed, machines and engines are more powerful and this has had an impact on the petrochemical industry. Nowadays, the consumption of products derived from oil and petroleum is extremely high. According to the European Chemical Industry Council, the "Oil and petroleum products" consumption in the European chemical sector was valued at 7.3 million tonnes of oil equivalent in 2017.

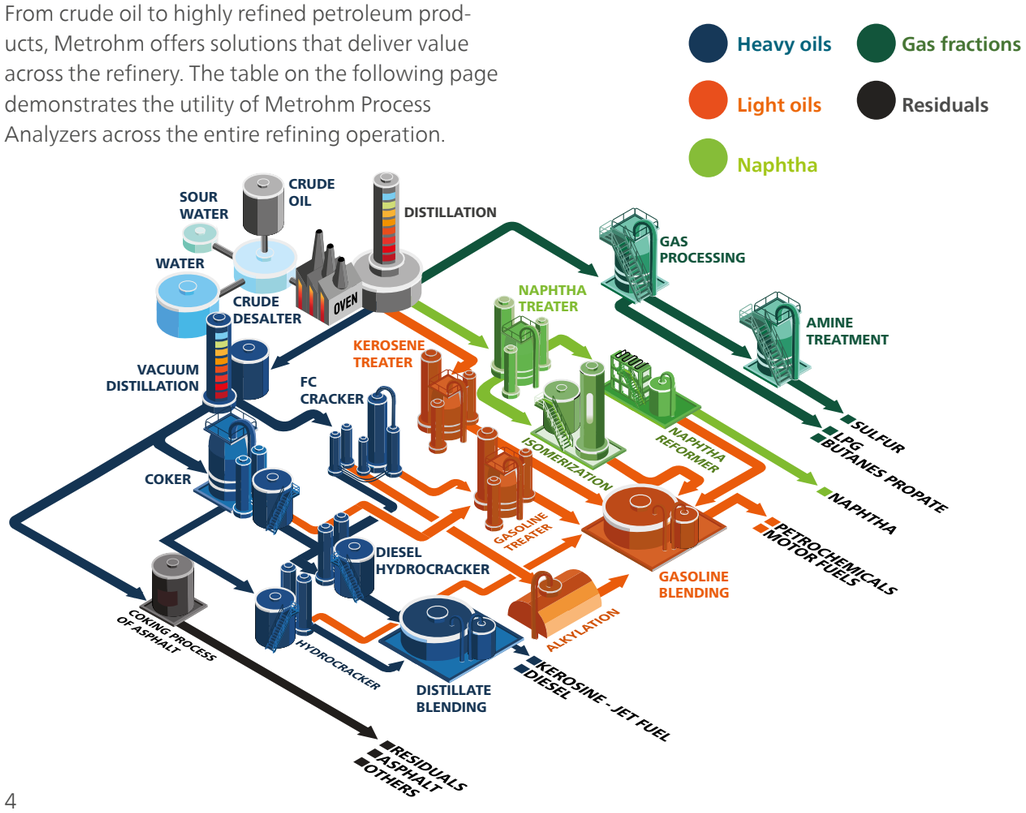
Nowadays, oil and gas are produced everywhere, from private to public oil wells. Metrohm Process Analytics understands the challenges of this industry and creates tailored solutions to obtain the most accurate and reliable results. With our more than 45 years of experience, we connect the regulatory needs of this industry to our quality titration, ion chromatography, and near-infrared process analyzers.

A demanding industry requires high standard analyzers

Crude oil is a highly complex mixture of hydrocarbons and other compounds that through desalting, distillation, and conversion, it is transformed into higher quality hydrocarbons. Different ratios of some of these compounds are blended to yield a range of fuel and lubricant type products. This refining process is demanding and requires precise and reliable analysis to control the many production steps.

As a leading manufacturer of instruments for chemical analysis, we are quite aware of these challenges. Metrohm Process Analytics offers you state-of-the-art analyzers and systems for monitoring and optimizing the quality of a wide variety of petrochemical products with the required accuracy not only in your laboratory but also in your challenging process environment.

From crude oil to highly refined petroleum products, Metrohm offers solutions that deliver value across the refinery. The table on the following page demonstrates the utility of Metrohm Process Analyzers across the entire refining operation.



IMPORTANT PARAMETERS IN A REFINERY

Process segment	Process Analysis Technology	Key parameters
ALKYLATION		**Alkylation**
	Titration	– Sulfuric acid Concentration – Moisture in HF based Process – Caustic Concentration – Halides in Olefin & Isobutane
AMINE TREATMENT		**Amine treatment**
	Titration	– Amine Strength – Sulfide Content – Residual Amines in Condensate
	Ion Chromatography	– Heat Stable Salts (HSS) – Sulfur Species
GASOLINE BLENDING		**Blending Processes**
	Spectroscopy	– Cetane number – Density – FAME – API gravity – Alcohol & ether (MTBE, etc.) – Boiling point – Flash, pour, and cloud point – Viscosity – Aromatic content – Research and Motor octane number (RON and MON) – Many more ...
	Titration	– pH value – Water content – Total Acid number and acidity
	Ion Chromatography	– Inorganic Chloride content & Total and potential sulfate content
FLUID CATALYTIC CRACKER		**Fluid catalytic cracking unit**
	Spectroscopy	– Ethylene cracking: Gases (Carbon dioxide, ethylene, propane, butane, acetylene)
CRUDE DESALTER		**Crude desalter**
	Titration	– Acidity – Water content – Organic Chlorides & Halides – Chloride in crude oil – Mercaptans & Hydrogen sulfide
SOUR WATER		**Sour water**
	Titration	– Sulfide – Ammonia – Phenol – Cyanide
	Ion Chromatography	– Anions – Sulfide – Ammonium
NAPHTHA REFORMER		**Nathpha Reformer**
	Spectroscopy	– RON – Benzene – Reid vapor pressure – API gravity – Distillation analysis – PIANO
DISTILLATION		**Distillation**
	Spectroscopy	– API gravity – Density – Distillation of crude oil (TBP) – PIANO – Reid vapor pressure (RVP)

A demanding industry requires high standard analyzers

DRIVING GLOBAL STANDARDS

Standard methods are more important than ever before because these industry validated solutions streamline testing, making it consistent all over the world. ASTM, UOP, ISO, IP and other global standards are commonly used for product quality control testing as they facilitate global commerce and are the basis of sound economies.

The testing of crude and refined oil products is demanding and requires precise and reliable analysis to meet regulatory demands. Metrohm Process Analytics is actively involved with international standard bodies to help drive method development. We take on these challenges and deliver solutions that improve accuracy and efficiency.

Table of some international standards

Parameter	Standard	Matrix	Method
Acid & base number	ASTM D974	Petroleum products	Colorimetric titration
Mercaptan sulfur	ASTM D3227	Automotive fuel, kerosene	Potentiometric titration
	ISO 3012	Highly volatile distillates Moderately volatile distillates	Potentiometric titration
H_2S	ASTM D2420	Liquefied petroleum gas (LPG)	Potentiometric titration
H_2S, mercaptan sulfur	UOP163	Petroleum products	Potenciometric titration
Bromine number and bromine index	UOP304	Hydrocarbons	Potentiometric titration
Bromine index	ASTM D2710	Petroleum hydrocarbons	Potentiometric titration
	ASTM D1492	Aromatic Hydrocarbons	Coulometric Titration
	ASTM E1899	Aliphatic and cyclic hydrocarbons	Potentiometric titration

MATCH A

On the other hand, additional considerations must be taken into account when handling crude oils. First, heavy crude oil is extremetaly flammable and viscuos, thus, their transportation is not an easy task since a lot of energy need to be invested (Slow flow rate, i.e, more energy consumption). Therefore, these oils need some sort of viscosity reduction in order to be transported. This usually results in adding water and/or emulsifiers to the crude to reduce their viscosity.

MATCH ANALYTICAL AND SAFETY STANDARDS

Refineries are complex operations that convert crude oil into a range of products. Optimizing the production process to improve yield and maximize profitability is a key objective of any refinery. A recent study by the World Corrosion Organization found that the global cost of corrosion is estimated to be $2.5 trillion USD per year. Metrohm Process Analytics offers innovative analytical methodologies to improve process efficiency, protect against corrosion, and maximize profitability. Whether it is simply running a standard method or implementing a customized process system, we are ready to partner with you to help drive productivity and profitability in your operation.

Second, certain constituents of crude oil need to be monitor before transportation to comply with gubernamental regulations. Some of the most important parameter that need to be constantly monitor are total acid number (TAN), hydrogen sulfide (H_2S), flammability, and reid vapour pressure (RVP). With the online process analyzers from Metrohm Process Analytics, continuous control of the extraction process, the quality of the product and the composition of any waste streams is possible 24 hours a day, 7 days a week.

Safe operation in hazardous areas

ANALYZER SOLUTIONS FOR ONLINE AND INLINE ANALYSIS IN HAZARDOUS ENVIRONMENTS

Eliminate exposure to hazardous environments
Where high concentrations of flammable gases, harmful vapors, or dust occur, it is vital that instruments be safe to operate and do not initiate an explosion. Explosion-proof process analyzers are configured to comply with explosion-proof electrical area classifications. (ATEX, ClassI Div2/ ClassI Div1…) For such environments, Metrohm Process Analytics offers fully automated (inline or online) solutions for realtime and near-real time measurements (e.g. Near-infrared spectroscopy, «NIRS»).

Metrohm Process Analytics – we are there for you
Metrohm Process Analytics stands for more than just the implementation of process analyzers. We provide tailored solutions to your needs, by offering multiple services from application feasibility and consultation to commissioning and preventive maintenance of your analyzers. This brochure presents how Metrohm Process Analytics successfully implements process projects in hazardous environments.

- *Consulting*
- *Decision making*
- *Ex-proof certification*
- *Installation& Start-up*
- *Service and maintenance*

Project flow to implement online/inline explosion proof analyzer systems from Metrohm Process Analytics

Explosion-proof systems

Refineries are in general huge complexes with a lot of potential explosion dangerous areas. Raw oil contains several percent by weight of sulfur compounds. These compounds not only have an unpleasant smell, they are also environmentally harmful and corrosive which is why they must be largely removed during refining. Therefore, refinery operators are reluctant to transport samples from the different processes to the laboratory. For obvious reasons, inline and online measurements are preferred.

In many cases, the highly conformed IP66-NEMA4 rated housings of process analyzers is sufficient when installed outside the hazardous area. But in locations classified as a hazardous area, certified explosion-proof systems are required. For those circumstances, the ADI 2045TI Ex Proof Analyzer is available in a stainless-steel explosion-proof version for titration applications, and the NIRS XDS Process Analyzer for spectroscopic applications.

Both analyzers with a customized and modular sample treatment system are found in a very wide variety of refinery applications. The ADI 2045TI Ex Proof Analyzer can monitor mercaptans and H_2S content in accordance with ASTM D3227 and UOP163, and can also be used for the determination of ammonia, hydrogen sulfide and phenol content as well as for the bromide index, saponification and acid number.

The NIRS XDS Process Analyzer is a robust and extremely versatile analyzer, which enables simultaneous, real-time monitoring of diverse process parameters (e.g., water content, flash point, or cold filter plugging point) with a single measurement. Fiber-optic data transfer means that the measuring instrument and measuring cell can be spatially separated – even by hundreds of meters if required. This is a huge advantage, especially in environments with high explosion protection requirements, such as petrochemistry.

Prevent problems before they arise

Refineries are complex systems of multiple operations that depend on the type of crude refined and the desired products. They constantly optimize the production process to improve the high value products yield that maximizes profitability. Refineries lose company profits due to corrosion alone to the level of $1 billion per year. Protecting refinery plants against corrosion due to the sulfur, chloride and other organic acids is important in regard to safety and profitability.

Closely monitoring certain processes in the petrochemical industry is vital to avoid corrosion problems throughout the process and avoid a downward spiral effect. Metrohm Applikon, with the brand of Metrohm Process Analytics instruments, is able to offer several applications solutions for the petrochemical industry to avoid corrosion.

PROTECT AGAINST CORROSION

Monitoring of the **chloride** in raw crude oil and after desalting is needed to check the desalting process efficiency and to overcome corrosion problems in downstream processes. This process is carried out in a hazardous process environment, therefore, manual sampling of the process stream is highly dangerous. The ADI 2045 Ex Proof Process Analyzeris is the perfect solution for this application, it is designed and equipped to meet directives 94/9EC (ATEX95) and in accordance with ASTM D3230 to monitor the salt content by conductivity measurements.

Additionally, **sulfur** compounds in oil and oil products cause corrosion and pose an environmental hazard. Determination of H_2S as well as mercaptans can be done by titration with silver nitrate using a sulfide-coated silver electrode serving as the indicator electrode. The 2045TI Ex Proof Analyzer can monitor mercaptans and H_2S content in accordance with ASTM D3227 and UOP163.

Last but not least, corrosion can also occur in the gas streams. Sour water for example is condensed waste water produced during any downstream refining processes containing hydrogen sulfide, ammonia, and other contaminating compounds. It is often acidic in nature and can cause corrosion problems within the refinery's pipework so it must be treated before it can be reused or disposed to the waste water treatment plant.

Effectively stripping and monitoring H_2S and NH_3 is an essential operation in the overall pollution reduction program of refineries. The 2060 Process Analyzer can analyze H_2S and NH_3 simultaneously with automatic cleaning and calibration using absolute wet chemical techniques.

«Process analyzers from Metrohm are designed to offer fast, reliable, accurate measurements in a rugged housing, 24/7 to ensure processes are always running within specifications»

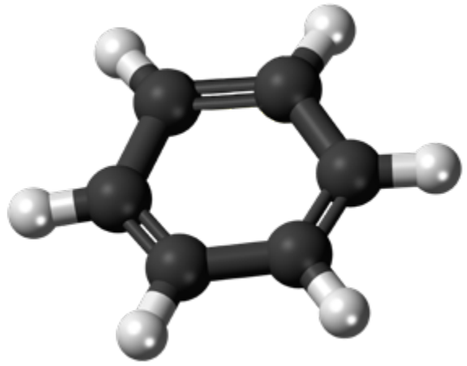
Optimization of petrochemical products

HIGH QUALITY PETROLEUM PRODUCTS

Petrochemical intermediate feedstocks (e.g., olefins, aromatics, and synthesis gas «syngas») are an essential part of today's chemical industry. They are the building blocks for a wide range of materials:

- **Olefins** such as ethylene and propylene are the main sources of plastics, industrial chemicals, and synthetic rubber. Propylene oxide, for example, is derived from propylene, and is used in several industrial applications, mainly as the building block for polyols, propylene glycol, and propylene glycol ethers production.
- **Aromatics** such as benzene, toluene, and xylene (BTX) are the main source of plastics (e.g., polyurethane, acrylates, nylon), as well as for synthetic detergents and dyes.
- **Syngas** is mainly made of a mixture of carbon monoxide and hydrogen, and it is mainly used to produce ammonia and methanol for fertilizers and solvents respectively.

Since such intermediates are used in a massive variety of applications, their purity and quality have to be closely monitored to meet international standards and obtain high quality end-products (e.g., polyurethanes, rubbers, and fertilizers). Delays in sampling, analytical measurement, and data sharing due to offline measurement strategies can have serious detrimental effects on production efficiency and overhead costs. Time-consuming manual sampling and long distances to the laboratory are eliminated by utilizing **online**, **inline,** or **atline** process analyzers.



Reduce giveaways by € 2.3 M/month

by implementing inline analysis in a refinery producing @100,000 bpd

PETROCHEMISTRY

AVOID REVENUE LOSSES

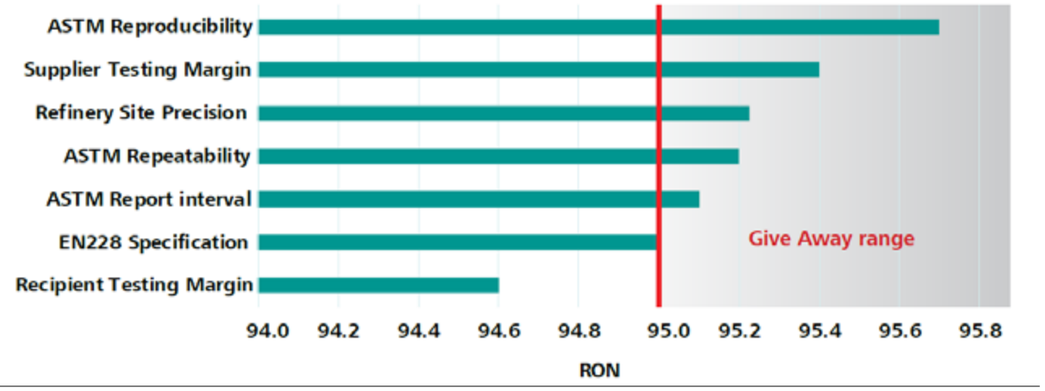
Gasoline is one of several end products resulting from a complex production chain starting with the refinement of crude oil. This fuel product requires intensive checks on several quality parameters which need to be within specification before commercialization.

These parameters, which can also be controlled by NIRS analysis include the Research Octane Number (RON) and Motor Octane Number (MON), olefin, oxygen, aromatic content, and density measurements. The importance of measuring these values precisely is not just related to regulations, but this also offers manufacturers further potential to **save costs.**

As an example, RON values exceeding the requirement will still be accepted by the market, but these products include a higher amount of lucrative long-chain organic molecules. This so-called «RON give away» is estimated at approximately 0.5 RON per barrel, resulting in 2.25 million USD/month in lost revenue for a production of 100,000 barrels per day.

Process Application Notes for the Petrochemical Industry

Online process monitoring of octane number during catalytic reforming by NIRS following ASTM D2699 and ASTM D2700s. AN-PAN-1052



Overview of typical RON give aways in relation to different methods

Applications

Multiple analytical choices for refinery processes

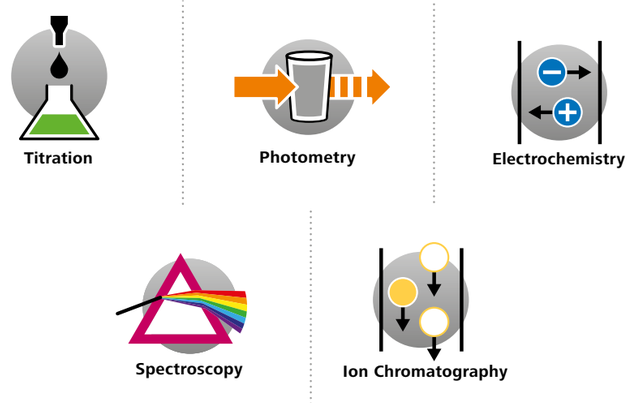
CUSTOMIZED SOLUTION DEPENDING ON YOUR NEEDS

Petroleum refineries are large and complex production facilities. Once the crude oil price is fixed, the profitability can only be improved through process optimization. In plant operation, plant integrity and safety, production rate, product quality, and costs are primary considerations. These all depend on comprehensive process control through online and real-time monitoring of key process variables, often in explosive, dusty, corrosive, and hostile environments.

In refineries, continuous control of the various downstream production processes, product quality and the composition levels of waste streams and sour water is of utmost importance. With the online process analyzers from Metrohm Process Analytics, this is possible 24 hours a day, 7 days a week. The analyzers are used directly on-site, as close as possible to the process, and run completely stand-alone without operator intervention. Analyzers are available for single method, single-stream purposes as well as for complex multiple methods and multiple streams. Following, a portfolio of possible analyzer solutions is presented for the refinery industry using Metrohm Process Analytics.

Benefits of Metrohm Process Analyzers in a refinery:

- **Cost reductions** (control chloride salts concentration in crude oil)
- **«Real-time» feedback** to the process to avoid overfeeding of chemicals (e.g., Blending process)
- **Avoid hazardous sampling** and laboratory analyses (e.g., Raw crude oil is corrosive and harmful)



WET CHEMISTRY

Determination of acid and base numbers

The determination of the acid and base numbers is of essential importance for the quality control of petroleum products. The acid number records components that react acidically as a sum parameter and yields firm indication regarding the corrosion of plant infastruture. Over the longer term, petroleum products with high base numbers offer protection from the corrosive influence of any generated acids. By measuring sum parameters, product alterations can also be quickly and directly recorded during use.

The determination of acid and base numbers is carried out automatically in the 2060 Process Analyzer by potentiometric titration in nonaqueous solvents. Because of its proximity to the process, the analytical results are available within minutes

2060 Process Analyzer

Production of standard mixtures with a defined octane rating

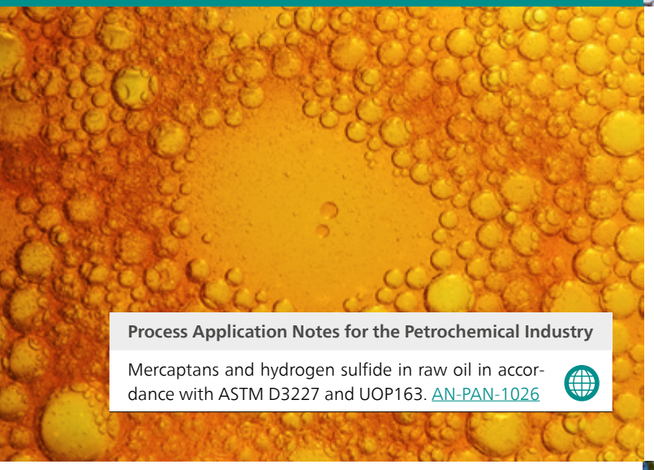
The octane rating is a measure of a gasoline's resistance to engine knock. In order to assess the octane rating, the resistance to engine knock of a gasoline sample is determined in comparison with standard mixtures showing a predefined octane rating. The standard mixtures, consisting of n-heptane, isooctane (2,2,4-trimethylpentane), and toluene, must be prepared with the highest accuracy and precision.

2060 Process Analyzer is ideal for this thanks to its range of options for liquid handling. The automatic production of dilutions and dilution ranges as well as the doping of additives can be carried out easily. The production of test mixtures is precisely documented and the report can be used as a certificate. In the same way, standard mixtures can also be prepared for measuring cetane numbers with diesel fuels.

ADI 2045TI Ex proof Analyzer

Applications

Multiple analytical choices for refinery processes

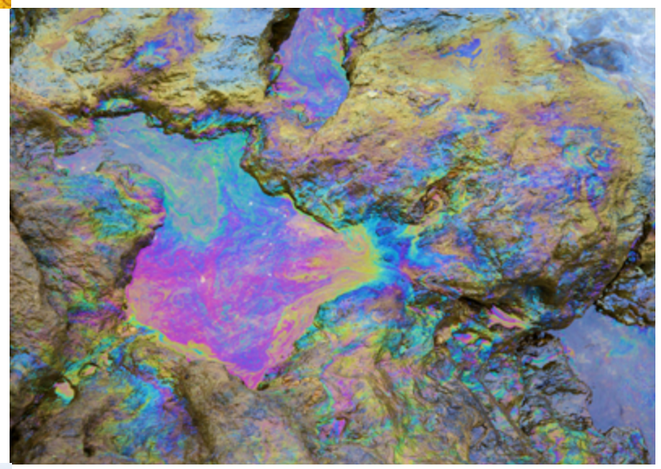


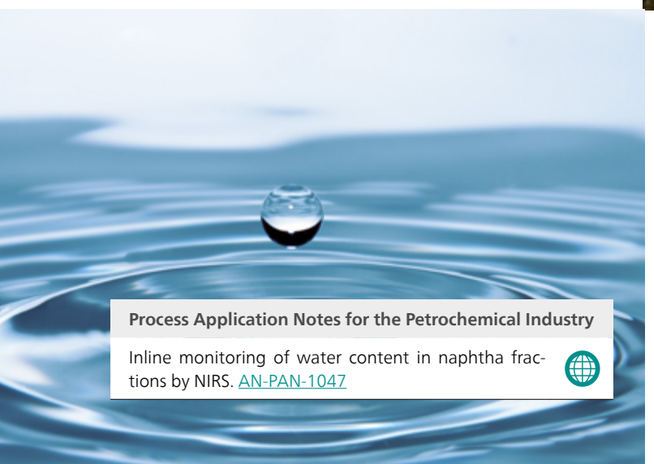
Process Application Notes for the Petrochemical Industry

Mercaptans and hydrogen sulfide in raw oil in accordance with ASTM D3227 and UOP163. AN-PAN-1026

Hydrogen sulfide and mercaptans determination
Raw oil contains several percent by weight of sulfur compounds. These compounds not only have an unpleasant smell, they are also environmentally harmful and corrosive which is why they must be largely removed during refining. The 2045TI Ex Proof Analyzer with a flexible sample pretreatment system is found in a very wide variety of refinery applications. It monitors mercaptan and H_2S content in accordance with ASTM D3227 and UOP163 and can also be used for the determination of ammonia, halogen and phenol content as well as for the bromide index, saponification and acid number.

Bromine number and bromine index
The bromine index is an important parameter for the determination of aliphatic C=C double bonds in petroleum hydrocarbons. The bromine index (BI) refers to the number of mg bromine (Br2) bound by 100 g sample. Normally, this method is relevant to olefin-free hydrocarbons with a bromine index lower than 1000. Samples with a bromine index greater than 1000 are usually determined through potentiometric titration as the bromine number. Conversely, if longer titration times are acceptable, then coulometric analysis can also be carried out.





Process Application Notes for the Petrochemical Industry

Inline monitoring of water content in naphtha fractions by NIRS. AN-PAN-1047

Water content
A very important factor in quality control of the petrochemical industry is the determination of the water content in oil. A water content that is too high has a negative impact on the oil quality. As in the laboratory, Karl Fischer titration (coulometry) is the method of choice for the online determination of the water content in any oil product.

Salt in crude oil
Excessive amounts of chloride salts in crude oil result in higher corrosion rates in refining units and have a detrimental effect on the catalysts used. Desalting techniques are well established, but continuous monitoring of the salt content is needed for process control and cost reduction. With the 2060 Process Analyzer equipped with special heavy duty sample valves, the salt content can be monitored by measuring the conductivity or by titration.

Process Application Notes for the Petrochemical Industry

Determination of salt in crude oil. AN-PAN-1014

ION CHROMATOGRAPHY (IC)

Anions and cations in «produced water»
During oil and gas production, large quantities of «produced water» are transported to the surface. In addition to oil drops and dissolved organic components, «produced water» contains large amounts of inorganic cations such as calcium, magnesium, barium, and strontium as well as anions such as carbonate, bromide, and sulfate. The resulting salts can cause scaling and ultimately block plant piping. For this reason, the determination of inorganic components is of essential importance, not least for the correct dosing of scale inhibitors.

2060 IC Process Analyzer

Anions in gasoline-ethanol blends
Contaminants in the form of inorganic salts, however, impair engine performance, which is why international standards now specify the chloride and sulfate content of gasoline-ethanol blends in particular.

The anions to be determined are freed from the interfering fuel matrix with the use of Metrohm's Inline Matrix Elimination device. For this purpose, the fuel is injected directly onto a high capacity preconcentration column. While the anions are retained on the column, the fuel matrix is removed from the preconcentration column using a rinsing solution. Then, the anions are eluted onto the analytical column. This method allows the additional determination of acetate and formate.

Other applications for IC
- Amines in various matrices from refineries and petrochemical operations
- Anions, cations, and amines in process and waste water samples and absorption solutions
- Alkali, alkaline earth and transition metals as well as anions in cooling liquids, e.g., monoethyleneglycol «MEG» (ASTM E2469)
- Anions in emulsions from drilling oils
- Anions and cations in biofuels and fuel blends
- Anions, cations, and organic acids in water which is used for the fracking process

Applications

Multiple analytical choices for refinery processes

NEAR-INFRARED SPECTROSCOPY (NIRS)

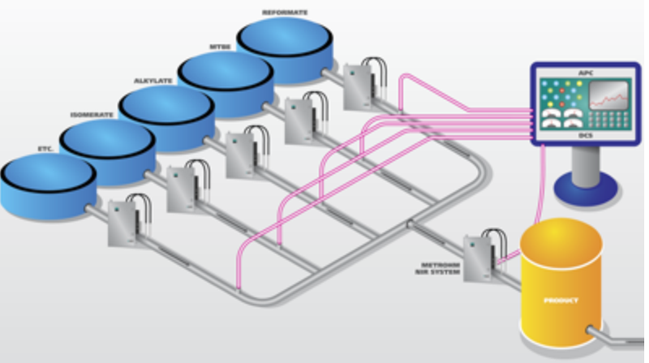
Real-time monitoring with NIRS process analyzer during catalytic reforming (naphtha reformer)

In refineries, high octane products are desired since they are used to produce premium gasoline. Catalytic reforming converts heavy naphtha into a high octane liquid product called reformate (a mixture of aromatics and iso-paraffins C_7 to C_{10}). The reformate must be constantly monitored to ensure high throughput along the refining process, which traditional analysis techniques cannot do.

«Real-time» analysis of the octane number in fuels can be performed online via near-infrared spectroscopy (NIRS) technology, which fits well within the international standards (ASTM). Utilization of a Metrohm Process Analytics NIRS XDS Process Analyzer (ATEX version) in conjunction with a sample preconditioning system makes analysis of the octane number simple, fast, and reliable, allowing quick adjustments to the process for a better quality product and higher profitability.

Process Application Notes for the Petrochemical Industry

Online process monitoring of octane number during catalytic reforming by NIRS following ASTM D2699 and ASTM D2700. AN-PAN-1052



Process Application Notes for the Petrochemical Industry

Online process monitoring of octane number during catalytic reforming by NIRS following ASTM D2699 and ASTM D2700s. AN-PAN-1052

Blending process

During the blending process, different fractions of the crude oil distillation are mixed together so as to produce the ready-to-sell diesel or gasoline grades. This is most economical when it is carried out in process systems that work online and can be automated. The endpoint of the blending process is reached when the required fuel specifications are achieved. Key characteristics which indicate the progress of the blending process are the **cetane** number for diesel blends and one of the **octane ratings** for gasoline blends.

NIRS Process Analyzers located directly in the process enable the entire process to be controlled and ensure a high-quality end product. Additional parameters can also be monitored in parallel and inline depending on the application.

NIRS XDS Process Analyzer

Industrial gases monitoring with NIRS

Approaching 150 million tons per year, ethylene is the largest volume industrially produced organic material, so it seeks to maximize its production through process optimization.

Typically, a Process Gas Chromatograph is utilized for monitoring the cracking process. However, these measurements are time-consuming and maintenance-heavy. NIRS process analysis is a key component of process optimization, because it provides process control with real-time gas concentrations at various points in the process. The use of fiber optics enables real-time sequential measurements of up to 9 positions (e.g., feed, recycle streams, product streams) with a single instrument. This allows for rapid adjustments of the process to account for changes such as differences in feed or temperature. The net results of incorporating NIRS into the process are increased capacity, improved process reproducibility and product quality.

Additional NIRS applications for petrochemistry

Process segment	Parameters		
Crude oil distillation	– API gravity[1] – Density – Distillation of crude oil (TBP[2])	– PIANO[3] – Reid vapor pressure (RVP)	
Cracking and reforming	– API gravity – Distillation analysis4	– PIANO – Reid vapor pressure	
Lubricating oil	– Aromatic content – Density – Distillation analysis – Flash point – Nitrogen	– Oil content – PAH[5] – Pour point – Viscosity	
Gasoline blends	– API gravity – Alcohols & ether (MTBE, etc.) – Alkene content – Aromatic content	– Benzene content – Density – Motor octane number (MON) – Octane index number	– Research octane number (RON) – Reid vapor pressure
Diesel blends	– Boiling point – Cetane number – Cloud point – Color	– Cold filter plugging point (CFPP) – Density – FAME[6] content	– Flash point – Pour point – Specific weight – Viscosity
Mobile fuel analysis «on-site testing»	**Diesel**		**Gasoline**
	– Cetane number – Density – Distillation analysis	– FAME content – Flash point – Viscosity	– Alcohols & ether – Aromates – Alkenes – BTX[7] – Density – Octane rating

[1]Degree of density according to the American Petroleum Institute (API)
[2]True Boiling Point distillation
[3]Paraffins, Isoparaffins, Aromatics, Naphthenes, or Olefins (alkenes)
[4]Boiling behavior according to ASTM D86: verification by NIRS
[5]Polycyclic Aromatic Hydrocarbons
[6]Fatty Acid Methyl Ester (FAME)
[7]Benzene, Toluene, Xylene

Simplify your process with automation and digitalization

The petroleum and petrochemicals industry is progressing through industry 4.0, integrating digital and physical worlds, in an advanced effort to make a digital transformation. Creating rigs and refineries of the future requires bringing data from the physical to the digital world. This data must be turned into information by performing real-time visualizations and analytics. The information must be translated into decisions and actions, and back into movements in the physical world. A complete digital transformation requires advanced automation, such as that offered by process analyzers.

From upstream to midstream to downstream, gigabytes of data are used daily to optimize various processes across the entire petroleum industry, but if the data quality is poor then poor decisions will be made. Manual data collection adds even more challenges and can reduce yield, affect product quality, and expose personnel to hazardous areas.

Process analyzers offer several distinct advantages over manual data collection because they give real-time results that allow for optimization. These analyzers turn data into practical information that can be used to improve safety, efficiency and profitability.

No challenge is difficult enough for us

BEST SOLUTIONS FOR CHALLENGING SAMPLE STREAMS

Besides the chemical analysis, sample preparation, preconditioning, and location of the analyzer are deciding factors for the success of inline, online, and atline analysis. Metrohm Process Analytics can provide a comprehensive solution for almost any application, allowing seamless startup and integration of your instrument on site. We can provide any sample preconditioning system, such as cooling or heating, pressure reduction and degassing, filtration, and many more.

RELIABLE PRECONDITIONING BEFORE ANALYSIS

In online and inline analysis, where the most representative analytical data is collected right at the process point, sampling and sample preparation are at least as important as the analyzer itself. Metrohm Process Analytics has vast experience in this area, capable of offering custom-made sampling systems from pressure reduction and filtering to degassing and cooling.

Benefits of sampling preconditioning panels:

- IP66 enclosure for harsh environments and in plant operation
- Ability to monitor multiple sample streams from any part along the process
- Automatic temperature control to avoid fluctuations in the results and maintain safe temperatures on the sample stream
- Closed system for added safety
- Stainless steel materials to ensure chemical resistance to harsh sample streams

We are here for you worldwide

Metrohm Process Analytics is present in more than 50 countries. Every subsidiary has its own service organization, spare parts warehouse, and trained Service Engineers. Distributors are either equipped with the same infrastructure or receive service and repair support from our Regional Support Centers (RSC), or directly at our headquarters in the Netherlands.

The high standards we maintain are also a promise to you. Regardless of when or where in the world you rely on our services, these services are performed to the same exacting standards.

Wherever you need us, we're there to help.

Local service and support – worldwide

- Subsidiaries
- Exclusive distributor

Metrohm
Repair Service

Subject to change without prior notice
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