



# Alkylates Are the Gold Standard for Cleaner Burning High Octane Fuel Production

*Real-time corrosion monitoring of the Alkylation process is essential since aggressive acids such as HF and Sulfuric acid are used as catalyst with acid runaway being a very real danger!*

## Alkylates Are the Gold Standard for Producing High Octane Cleaner Burning Fuel

Alkylation bring significant economic value to the refinery operation, enabling production of premium grade gasoline.

Increasing alkylation operating margins by an estimated at 37 \$/bbl alkylate in summer and 15 \$/bbl alkylate in winter. \*

The annual gross margin for an alkylate production capacity of 10,000 BPD is \$95 million, so availability is key. \*

\* [Yee & Lippe 2013]

Alkylation is an essential operation in a modern refinery. It enables the waste light hydrocarbons from the FCC (Fluidized Catalytic Cracker) to be used to produce Alkylates that can then be blended with fuel to produce a higher octane, cleaner burning product. This in turn increases the efficiency and profitability of the refinery.

Maintaining the target acid concentration level is important both from a safety and economic point of view. If the acid level drops too low, there is a danger of running into an acid runaway situation, where the reactions becomes unstable, acid is rapidly consumed, the rate of corrosion is dramatically increased and the plant will have a major shutdown, costing millions.

Alkylates are in demand because they contain no benzene, no other aromatics, no olefins and little to no sulfur, therefore being an extremely clean fuel additive.

## ACID RUNAWAY

Acid runaway is always a very real danger which can cause significant corrosion damage to the Alkylation unit, potentially resulting in an unplanned shutdown of the asset the loss of millions. Realtime corrosion monitoring can enable the necessary insights into the alkylation unit to ensure that an acid runaway event is caught and brought back under control before significant irreparable damage occurs.

## ENTRAINED WATER

Although the feedstock to the Alkylation unit is mostly dried hydrocarbons, some water will make its way through the unit. To minimize the corrosion load this needs to be kept less than 2%. Additional water entry will cause elevated corrosion rates.

## PHASE CHANGE DURING ACID REGENERATION

Acid regeneration is achieved by separating ASO (Acid Soluble Oil) and water from the catalytic acid used in the alkylation process. The acid vaporizers in the unit are vulnerable to increased corrosion rates if acid vapors condensate or change phase in the presence of any remaining water. The overhead lines are particularly susceptible to condensation and acid vapors can accumulate, causing elevated corrosion conditions.



# Permasense Ultrasonic Wall Thickness Sensors & Roxar CorrLog Corrosion Probes

## REALTIME CORROSION MEASUREMENTS

Emerson offers the widest portfolio of best-in-class measurements to combat corrosion in refineries. Real time corrosion measurements that provide greater insight into the performance of your alkylation unit are key to driving the refinery to its maximum capability. The Permasense non-intrusive ultrasonic wall thickness sensors measure plant integrity and the actual metal loss whilst the Roxar inline corrosion probes measure the process corrosivity. This means that the corrosion risk and impact of the risk on the asset itself can be measured and monitored. Combined with the Roxar FSM technology for area coverage and localized corrosion detection in specific high-risk areas, they deliver a complete insight into how the plant is coping with the corrosion demand placed upon it. Class-leading data visualization and analytics enable you to turn these insights into value-add actions.

### Alkylation Asset Integrity

Asset Integrity becomes extremely Important when dealing with aggressive acids such as hydrofluoric and sulfuric as catalysts. The risk of a release to the environment would have catastrophic consequences and needs to be avoided. Having detailed real time wall thickness measurement of key sections enables you to set safety margins on the minimum wall thickness to ensure asset Integrity.

## CORROSION CONTROL AND MITIGATION OPTIMIZATION

The Roxar CorrLog corrosion probes deliver the fastest possible response to ever-changing fluid corrosivity allowing you to take the necessary actions to reduce the corrosion risk of the Alkylation unit. Permasense wall thickness monitoring is used to monitor the effectiveness of the mitigation strategy at protecting the asset integrity. Strategic sections prone to phase change where water may condensate can be conveniently monitored taking full advantage of our WirelessHART Infrastructure.

## MAXIMIZING IN SERVICE LIFE AND PROFITABILITY

Combining data from the wall thickness monitoring sensors and inline corrosion probes, leveraging WirelessHART data retrieval, delivers real time Insights Into the actual condition of strategic sections of the distillation units. This enables enhanced online decision making, to safely maximize the performance and profitability of the Alkylation unit.

