

## **IN-LINE QUALITY MANAGEMENT : TOPNIR TECHNOLOGY**

### **ETHYLENE PLANTS**

**Application :** Use of Near Infrared Spectroscopy (NIR) as an in-line real time laboratory to provide optimization systems with timely and accurate quality information.

**Strategy :**

- Analysis of naphtha feeds to the furnaces, computing every 30 seconds : specific gravity, molecular weight, PIONA per Carbon atom number, distillation curve, potential yields C1 to C4 and coking index.
- Analysis of feed to hydrogenation units : PIONA, dienes, BTX
- Analysis of pyrolysis gasoline : RON, MON, RVP

**Economics :**

- Real time assessment of feed qualities variations for feed-forward adjustment of furnaces severity control and plant optimization
- Optimization of dienes hydrogenation
- Safe naphtha quality swings
- Optimal evaluation of pyrolysis gasoline selling price.

**Commercial installations :** BP Lavera steam cracker, France,  
BP Grangemouth (UK), COPENE Camaçari (Brazil) and a  
number of undisclosed plants.

**Licensors :** TECHNIP on behalf of EUTECH. Contact ASE Department, Paris and Rome.

## **IN-LINE QUALITY MANAGEMENT : TOPNIR TECHNOLOGY**

### **GASOLINE BLENDER**

**Application :** Use of Near Infrared Spectroscopy (NIR) as an in-line real time laboratory to deliver real time quality information to the multi-variable control and optimization systems of gasoline blenders.

**Strategy :**

- Analysis of blend components and commercial gasoline.
- Quality determinations include RON, MON, RVP, VLI, % dist at 70°C, 100°C, 125°C, 150 °C, 180°C, 210°C, , % benzene, % MTBE, % aromatics, % oxygenates, % olefins, % gums, % sulfur, specific gravity.
- Blend indices for non linear properties of blend components.

**Economics :**

- In-line certification by high frequency analysis of blend components for feedforward control of the blenders
- Minimal quality give-away on commercial gasoline
- Tuning of blend optimization LP models

**Commercial installations :** TOPNIR is used to monitor/control gasoline blends in 21 refineries worldwide.

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## **IN-LINE QUALITY MANAGEMENT : TOPNIR TECHNOLOGY**

### **MIDDLE DISTILLATE BLENDER**

**Application :** Use of Near Infrared Spectroscopy (NIR) as an in-line real time laboratory to deliver real-time quality information to the multi-variable control and optimization systems of middle distillate blenders.

**Strategy :**

- Analysis of blend components and of commercial gas oil and heating oil.
- Quality determinations include cetane number, cetane index, % dist. at 300°C, 350°C, 370°C, flash point, pour point, cloud point, CFPP, specific gravity, viscosity at 40°C, % polyaromatics.
- Blend indices for non linear properties of blend components.

**Economics :**

- High frequency analysis of blend components for feedforward control of the blenders
- Minimal quality give-away on commercial motor gas oil and heating oil
- Minimization of cetane booster and CFPP additive
- Tuning of blend optimization LP models

**Commercial installations :** TOPNIR is used to monitor control middle distillation blending in 5 refineries

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## **IN-LINE QUALITY MANAGEMENT : TOPNIR TECHNOLOGY**

### **FCC UNIT**

**Application :** Use of Near Infrared Spectroscopy (NIR) as an in-line real time laboratory to deliver real-time quality information to the multi-variable control and optimization systems of FCC Units.

#### **Strategy :**

- Analysis of feed and FCC gasoline.
- Quality determinations include distillation curve, specific gravity, % sulfur, viscosity, refractive index, aniline point,  $K_{UOP}$ , total nitrogen content.
- Computation of crackability and cokability indices.
- Blend indices for non linear properties of FCC gasoline.

#### **Economics :**

- High frequency analysis of feed qualities for real-time tuning of FCC optimization systems
- Optimization of gasoline pool.

**Commercial installations :** BP Lavera (France), BP Castellon (Spain)

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## **IN-LINE QUALITY MANAGEMENT : TOPNIR TECHNOLOGY**

### **CRUDE DISTILLATION UNIT**

**Application :** Use of Near Infrared Spectroscopy (NIR) as an in-line real time laboratory to deliver real time quality information to the multi-variable control and optimization systems of crude units.

**Strategy :**

- Analysis of crude feed at desalter and side streams (except residues).
- Crude quality determinations include TBP curve and specific gravity

**Economics :**

- High frequency analysis of crude mix qualities variations and feed forward adjustment of cut points
- Reduced transient time, typically 30 minutes for crude swings
- Higher crude throughput

**Commercial installations :** TOPNIR is used in 6 refineries to control the crude distillation unit

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