EFFECTIVE ATMOSPHERIC DISTILLATION IN LIQUID SAMPLES OF FUEL BLENDINGS IN REFINERIES AND TERMINALS

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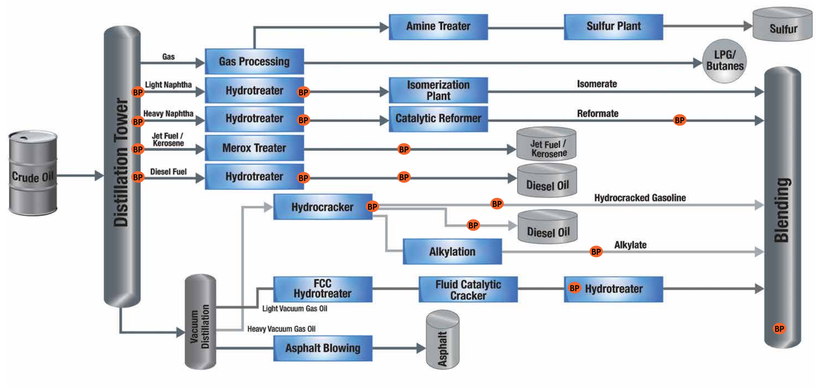
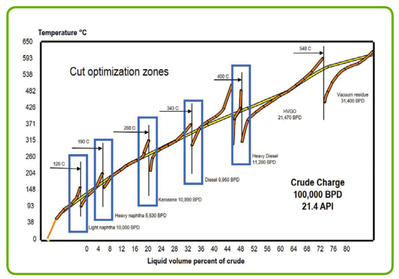
Introduction

Demand for energy continues to rise along with pressures on producers to streamline and speed production, increase yield and operate more efficiently. Atmospheric Distillation is one on the most critical measures of product quality for virtually every refinery product. New developments in distillation measurement are enabling refineries significant improvements in production quality, reduce giveaway by cut point optimization and achieve blending to specification.

Distillation Applications



Distillation Cut Points



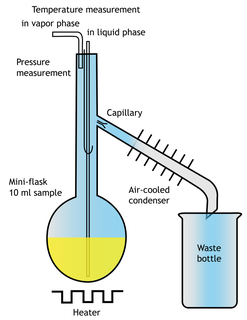
Key Applications

- Cut point Optimization
- Cetane Index
- Drivability Index
- Density
- Blending to Specification

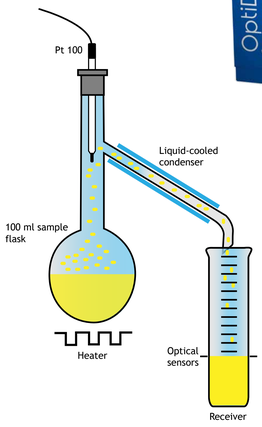
Key Benefits

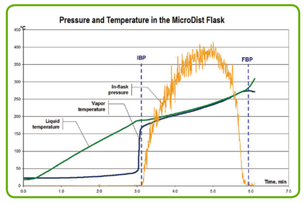
- Correlation to primary test method ASTM D86
- Robust technology
- Fast response time

ASTM D7345



ASTM D86





Analytical Principle: Changes in Temperature and Pressure During an Average 7-minute Distillation Time for Jet Fuel

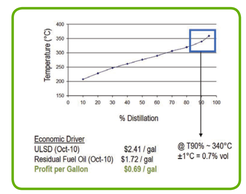
ASTM D86 Alternative

In 2017, ASTM D4814 Standard Specification for Automotive Spark-Ignition Engine Fuel, listed ASTM D7345 Standard Test Method for Distillation of Petroleum Products and Liquid Fuels at Atmospheric Pressure as an approved alternative method for distillation of gasoline, jet fuel and diesel.

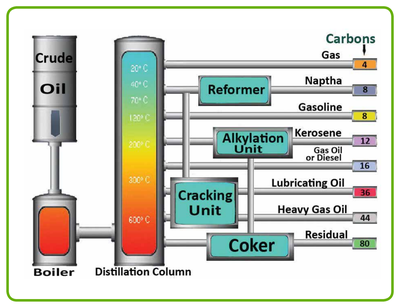
Economic Impact

- HDT Diesel Capacity: 22,000 bpd
- 1˚C Optimization impact:
  - 0.5% - 1.0% volume
  - 110 – 220 bpd
- Residual Fuel to ULSD upgrade: $0.69 per gal.

Over $1M yearly benefits from tightening T90% target by 1˚C

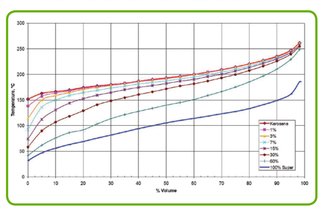


"This analyzer surpassed by far our expectations… confronted with other technologies that have been used for 14 years, as online chromatography and infrared techniques… we recommend the analyzer implementation in direct distillation plants for monitoring and controlling of tower fraction cuts, in cracking plants, hydrotreating units…"
PETROBRAS

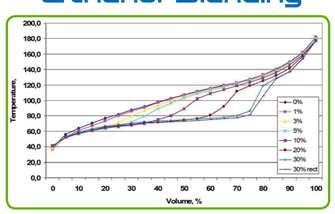


Contamination Detection

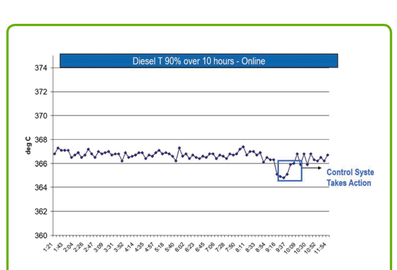
Kerosene-Gasoline

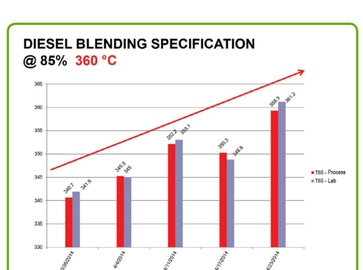


Ethanol Blending

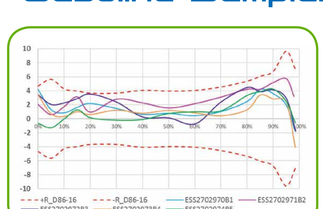


Process Monitoring & Control

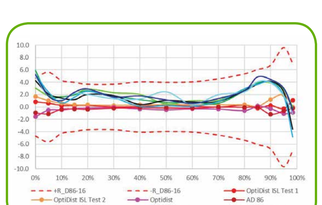




Gasoline Samples without Ethanol

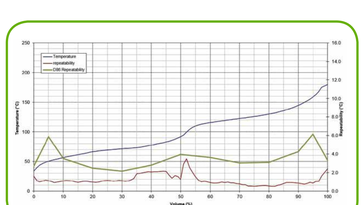


Reproducibility for five gasoline samples using PMD-110 compared to ASTM D86



Reproducibility for a single gasoline sample using five lab and process analyzers

Gasoline With Ethanol



Repeatability for a single gasoline with 10% Ethanol using MicroDist compared to ASTM D86

Conclusions

- Maximize production reducing product downgrade due to poor cut point optimization
- Prevent product giveaway by measuring online "real" distillation curve on your final product
- Optimize product blends to improve quality with a fast analytical technique
- MicroDist provides the means for this optimization at the same time that specs are met