



Hoekstra Trading LLC
November 1, 2017

Release of Hoekstra Research Report 8 FCC gasoline desulfurization for Tier 3 sulfur compliance

Hoekstra Trading has released our eighth annual report, Hoekstra Research Report 8.

- We have done field tests on nine commercial FCC gasoline desulfurizers
- We have done detailed chemical analyses on 70 gasoline samples
- We have quantified the wide range of feed quality in North America
- We have proven that octane loss is high in North American refineries
- We have quantified how feed quality and heavy tails affect unit performance
- We have developed a kinetic model for FCC gasoline desulfurization
- We have enhanced our FCC gasoline process model
- We have made accurate process estimates for design, revamps, and optimization
- We have done a detailed study of Tier 3 regulations and industry response
- We have analyzed the under-investment in North American desulfurization capacity
- We have done an up-to-date analysis of the sulfur credit market
- We have done an up-to-date analysis of the octane market
- We forecast a coming gasoline octane/sulfur squeeze
- We recommend profitable Tier 3 gasoline strategies

All our results are backed by hard data and sound, objective analysis not available anywhere else.

The report includes 15 attachments which are selected publications on the process and the economics of gasoline desulfurization and octane.

Like our seven previous reports, it contains surprising and valuable information you should have.

The attached offer letter contains the Table of Contents plus everything you need to issue a purchase order and get immediate delivery.

This is a shared-cost, multi-client program, your cost is a small fraction of the total program cost.

Join our client group, which now includes 32 clients representing 74 refineries.

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Hoekstra Trading LLC
November 1, 2017

Hoekstra Research Report 8

FCC gasoline desulfurization for Tier 3 sulfur compliance
Offer letter and Table of Contents

Hoekstra Trading LLC is pleased to offer *Hoekstra Research Report 8* to refiners under 1 million barrels per day for a price of \$50,000:

The report includes the following:

1. Hoekstra Research Report 8 Section 1 – Field tests and process model
2. Hoekstra Research Report 8 Section 2 – Competitive analysis
3. Attachments
4. Excel spreadsheet – Hoekstra octane market model
5. PowerPoint presentation for client meeting.

Items 1-3 will be delivered immediately upon receipt of a purchase order. Items 4 and 5 will be delivered in a face-to-face meeting or remote web conference to last at least one hour at a time that is convenient for you.

In addition, your purchase of this report will include six months of unlimited phone and E-mail consultation on your use of the information in the report.

Attached are the Table of Contents and a sample invoice showing the information needed to issue a purchase order.

There will be no restrictions on how you may use the information you receive in these reports. This offer is valid until October 31, 2023.

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Hoekstra Research Report 8

FCC gasoline desulfurization for Tier 3 sulfur compliance

Table of Contents

Summary

Section 1 Field tests and process model development

- Performance curve
- Light naphtha splitting
- Octane selectivity
- Olefin reactivity
- Ten key reaction paths
- Desulfurization reactions
- Heavy tail reactions
- Desulfurization model
- Field tests confirm high octane loss in North American refineries
- Field tests confirm high aromaticity of North American feeds
- Field tests confirm heavy tails in North American feeds
- Conclusions from Section 1

Section 2 Competitive analysis

- Higher-than-expected octane loss
- Underinvestment in desulfurization capacity
- \$Billions of octane destruction
- Octane market model
- Progress toward 10 ppm
- Tier 2 sulfur credits
- Transition to Tier 3 credits
- Tier 3 sulfur credits and credit futures
- Octane cost
- Octane value
- The new octane market
- The coming octane/sulfur squeeze
- Sulfur credit strategy
- Conclusions from Section 2

Attachments

Excel spreadsheet-Hoekstra Performance Curve Model



SAMPLE INVOICE

Hoekstra Trading LLC

DATE: SAMPLE
INVOICE NUMBER: SAMPLE

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Phone +1 630 330 8159
George.hoekstra@hoekstratrading.com
PNC Bank of Ohio ABA number 071921891 account number
4669778568
swift code pnccus33
EIN 26-3221486

PAYMENT TERMS	DUE DATE
30 days from invoice	

quantity	description	unit price USD	line total USD
	Reference PO Number _____		
1	Report, Hoekstra Research Report 8 consisting of: 1. Section 1 – Field tests and process model 2. Section 2 – Competitive analysis 3. Attachments 4. Excel spreadsheet – Hoekstra Performance Curve Model	\$50,000	\$50,000
1	Client presentation delivered in remote web conference	No charge	
1	Unlimited phone and E-mail consultation for 6 months on matters related to use of the report	No charge	
Total			\$50,000