



Cracking Furnace Workshop

Sept 6-8, 2017

Omni Hotel-Houston

PRACTICAL INSIGHT WITH CASE STUDIES & CRACKING HEATER MODEL DEMO

Cracking Furnace Workshop

by Kinetics Process Improvements

OBJECTIVE: 3-days of comprehensive workshop provides practical insight with an improved understanding of the fundamentals, operations and performance monitoring of Cracking furnaces which will assist attendees to effectively apply them in making better decisions in regular operations & maintenance

Kinetics Process Improvements, Inc.

16000 Park Ten Pl.,
Suite 903, Houston, TX 77084
Phone: 281 773 1629
Fax: 832 565 9360
Email: process@kpieng.com
Web: kpieng.com, kpieng.net



PRACTICAL INSIGHTS*

- Ethylene Process Overview
- Cracking Chemistry & Thermo
- Feedstock- design & operation
- Critical Design Features
- Coil & TLE Systems
- Coking & Mitigation
- Run-length improvements
- Firebox/Convection Sections
- Key Operating Variables
- Burners, Draft & Combustion
- Refractory/insulation
- Controls & Safety Systems
- NOx mitigation
- Startup & Shut down
- Yield model
- Cracking heater model
- Coking model
- Economic model
- Capacity Improvement options
- Efficiency Improvements
- New Developments

*See Training outline on next page

TARGET GROUP

- Operations Engineers
- Production Sup'dt/Supervisors
- Process/Tech Service Engineers
- Mechanical Engineers
- Project Engineers
- Maintenance/Inspection Engineers
- Planning Engineers
- Plant Management

Workshop Includes

- Training material, B/Fast & Lunch

SPECIAL WORKSHOP FEATURES

- Cracking Heater & Coking models demo for better understanding of operating variables with feed flexibility
- Practical Case Studies- Failures & Improvements
- Simple Practical techniques for Furnace monitoring
- Interactive discussion of plant troubleshooting
- Economic model to demo operating economics

TRAINING OUTLINE

Ethylene Process Overview

- ✓ Key historical technology developments
- ✓ Ethylene Production Process Schemes
- ✓ Feedstock Flexibility Considerations
- ✓ Ethylene Plant Capacity trends
- ✓ Environmental Challenges?

Cracking Chemistry & Thermo

- ✓ Cracking fundamentals
- ✓ Key differences in liquid & gas cracking
- ✓ Key variables affecting yields

Feedstock- Design & Operation

- ✓ Feedstock considerations
- ✓ Impact of Feedstock on design and operation
- ✓ Key Feedstock contaminants

Critical Design Features

- ✓ Coils types & their arrangements
- ✓ Firing arrangements (floor/wall)
- ✓ APH or Economizer

Coil & TLE Systems

- ✓ Short/Medium & Long Residence time coils
- ✓ Coil type- impact on Yield, TMT and R/length
- ✓ Coil selection considerations
- ✓ TLE types & design considerations for different feedstock
- ✓ Coil & TLE Metallurgies
- ✓ Coil Supports & Transfer line valves

Coking & Mitigation

- ✓ Coke Formation Mechanism
- ✓ Key Coking Variables
- ✓ Coking & Run-length
- ✓ Coking Inhibitors, products, economics
- ✓ De-coking Options & Techniques

Firebox/Convection Systems

- ✓ Coil Arrangements
- ✓ Burners & Firing Arrangements
- ✓ COT Considerations
- ✓ Convection Coil Configurations

Burners & Combustion Controls

- ✓ Burner design considerations
- ✓ Burner arrangements (Floor & Wall)
- ✓ Burner performance for NOx
- ✓ Burner controls requirements

Refractory/Insulation

- ✓ Design & Selection Criteria
- ✓ Heat loss Estimate

Furnace Operations & Maintenance

- ✓ Key controls for safe operation
- ✓ Burner management
- ✓ Safe Start-up & Shut down considerations
- ✓ Emergency shut down considerations

NOx Mitigation

- ✓ Factors affecting NOx formation
- ✓ Ultra-Low NOx Burners
- ✓ Post NOx mitigation options (*SNCR* & *SCR*)

Simulation Model Demo

- ✓ Yield estimates model to demonstrate sensitivity of different variables
- ✓ Firebox modeling demo
- ✓ Coke laydown estimate to demonstrate TMT, ΔP & Run length

Economic Model

- ✓ Maximize profit for market conditions
- ✓ Economics of cracking coil upgrade

Retrofit Options

- ✓ For Capacity & Efficiency Improvements
- ✓ Economic determination of retrofits

New Developments

- ✓ Alternate routes for olefins production
- ✓ Trend towards Mega Ethylene plants
- ✓ Improvements in Coil arrangements
- ✓ Improved Inspection/ Maintenance

IMPORTANT INFORMATION

COURSE VENUE*

Omni Houston Hotel at Westside
13210 Katy Fwy, Houston, TX 77079
Phone: (281) 558-8338

REGISTER TO CONFIRM

Send your completed registration form to confirm

COURSE SCHEDULE

Training dates: **Sept 6, 7 & 8, 2017**

Registration Opens: 7:30 am on Sept 6 (Wednesday)

Course Timing: 8 am until 4 pm on days# 1 & 2; Day# 3: 8 am until 1:30 pm

CANCELLATION & REFUND POLICY*

Cancellation by Aug 1, 2017	-	100% refund
Cancellation after Aug 2, 2017	-	90% refund (10% Processing Fee)
Cancellation after Aug 25, 2017	-	(No refund)- may enroll a substitute before course starts



*KPI reserves the right to change venue or cancel this workshop with insufficient registration & Registrants will be notified in this unlikely scenario

KPI Inc., 16000 Park Ten Place, Suite 903, Houston, TX 77084
281.773.1629 | process@kpieng.com | www.kpieng.com

COURSE INSTRUCTORS

VK Arora, a registered professional Chemical Engineer in Texas with degree from IIT and 35 years of diversified hands-on practical experience in Olefins and Syngas technologies including strategic planning and execution of major Petrochemicals projects.

He holds two patents- one for NO_x reactor system in furnaces and other for Ammonia process improvement. He led the design, start-up and performance test of the first world scale CATOFIN PDH plant for Saudi location.

He worked in operating Ethylene & Dehydro plants of Shell JV-NOCIL and SABIC. He also worked with various Licensors including KTI, KBR, CB&I/Lummus. He has been deeply involved in design, engineering, start-up & troubleshooting of Refinery and Petrochemicals Furnaces including Reformers and Cracking Heaters with experience in gas & liquid cracking.

Since 2006, he has been with KPI where he spearheaded the development and execution of a world-scale Propylene derivatives complex to produce Acrylic Acid, Oxo-Alcohols and Acrylic Esters for Saudi location. As part of KPI, he has led more than two dozen project feasibilities and revamps for major Petrochemicals and Chemicals projects globally.

Published & presented more than a dozen Technical Papers including a Chapter on 'Propane Dehydrogenation to produce Propylene' in McGraw-Hill "Handbook of Petrochemicals Production Processes".

Dr. Sam Narayanan, a Chemical Engineer, with more than forty years of hands-on experience and an industry specialist in Olefin Pyrolysis Furnaces including modeling yields, Process design, Troubleshooting and Operations management in Europe, North America and South-East Asia.

He is a Ph.D. in Chemical Engineering from IIT followed by Post-Doctoral work at Technical University of Delft. He made significant contributions in the development of coil designs with improved olefins yields using the Pilot plant work for Industrial applications at Gent University. He holds five patents related to process improvements in Cracking Furnaces and several publications including Co-cracking.

He worked as specialist in Ethylene Furnace design groups at KTI, Stone & Webster, KBR and Westlake Ethylene Plants. He has been conducting many training courses in Cracking furnaces.

REFERENCES

The Companies who attended our Training workshops and several of them attended multiple times:

- | | |
|------------|----------|
| • SABIC | RELIANCE |
| • PETRONAS | WESTLAKE |
| • IEPL | ENIP |
| • ELEME | METHANEX |
| • MHTL | CFI |
| • PCS | CNC |
| • AUM | PLNL |
| • AMPCO | |

**We have conducted many 'on-site' custom training*



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Registration Form

Cracking Furnace Workshop Sept 6-8, 2017 | Omni Hotel, Houston

Welcome at a special rate

EARLY BIRD- \$1499 (before July 14)

SAVE- \$100 WITH A COLLEAGUE

Registration Fee: is per attendee and includes Breakfast, Lunch, Coffee breaks and training material

BEFORE JULY 14TH

REGULAR

\$1499

\$1699

ATTENDEE DETAILS

Last Name* _____ First Name* _____ Mi _____
 Title _____ Company* _____
 Address _____
 Town/City _____ State _____ Zip code _____
 Phone* _____ Fax _____ E-mail* _____
 Your Job Function: Engineering Operations Maintenance Environmental Other (specify)
 Your Interest: Process Troubleshooting Operation Furnace selection Other (specify)

MY CRACKING FURNACE

Type & Configuration _____
 Feed Mix _____
 Feed rate _____
 Any plant issues- you may want to discuss _____

PAYMENT METHODS

Please check appropriate box: Check Money Order PO Bill Company (Pay to "Kinetics Process Improvements")

Credit Card VISA MasterCard AMEX Expiration Date: _____ CVV: _____

Card #: _____ Cardholder Name: _____ Amount: _____

Billing Address: _____

Signature* _____ Date* _____

Please send the completed form via e-mail (process@kpieng.com), or Fax (832.565.9360), or check payment by mail (KPI Inc., 16000 Park Ten Pl, Suite# 903, Houston, Texas 77084)

All fields marked (*) must be filled out.



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