Ethylene Middle East Technology Conference

EMET CONFERENCE

Temperature Measurements repeatability for Ethylene Crackers Optimization

DAILY THERMETRICS

Presented By:
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CORPORATE IDENTITY

Daily Thermetrics Corporation Mission:

Engineering, Manufacturing & Installation of temperature measurement solutions for the Petroleum Refining & Petrochemical Industries

DAILY THERMETRICS

Global Experience

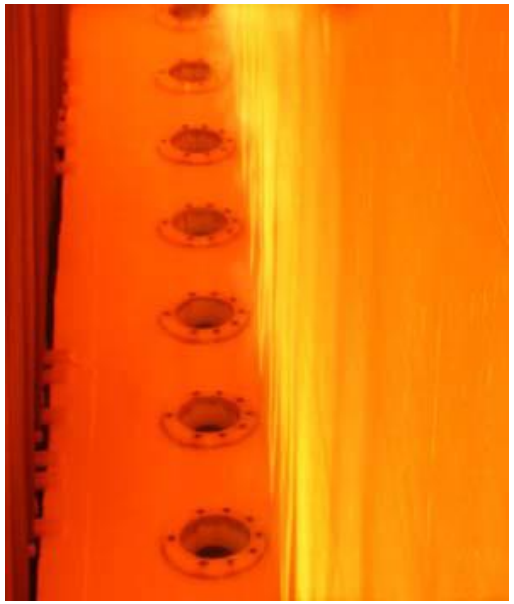
Global Operators

Technology Licensors

EPCs & Fabricators

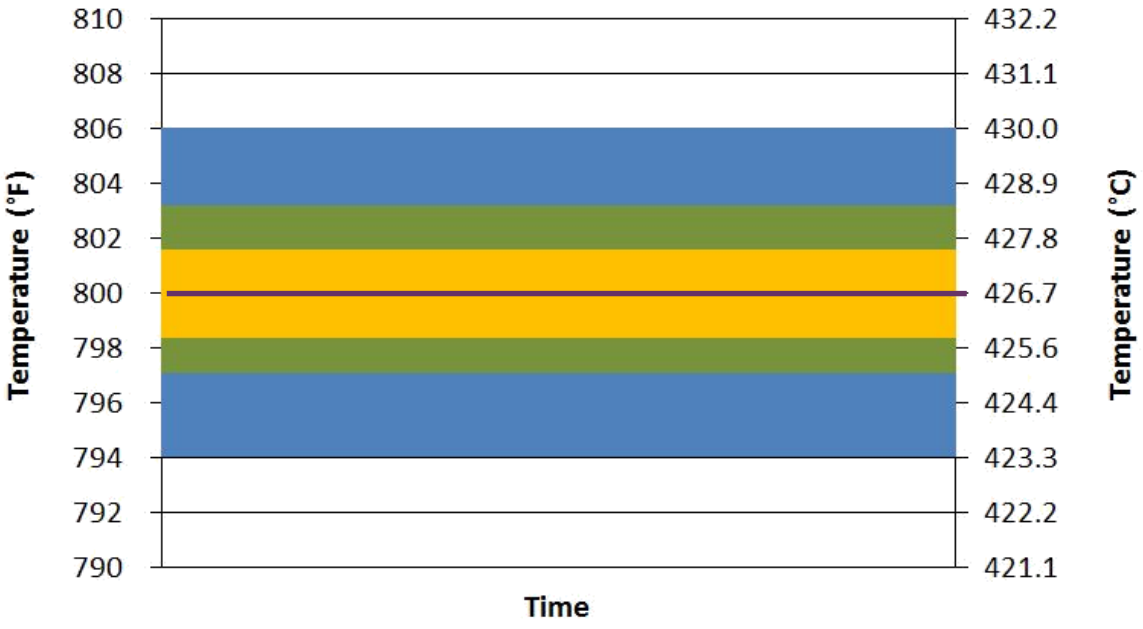
The Significance of Temperature Measurements for Ethylene Crackers

1. The Nature of the Reaction
2. Modeling and Optimization
3. Coke Formation
4. Carburization
5. Safety



Consideration for the Temperature Measurements

- The Mass production of Thermocouples
- Accuracy
- Reliability
- Installation



Thermocouple Design Improvements

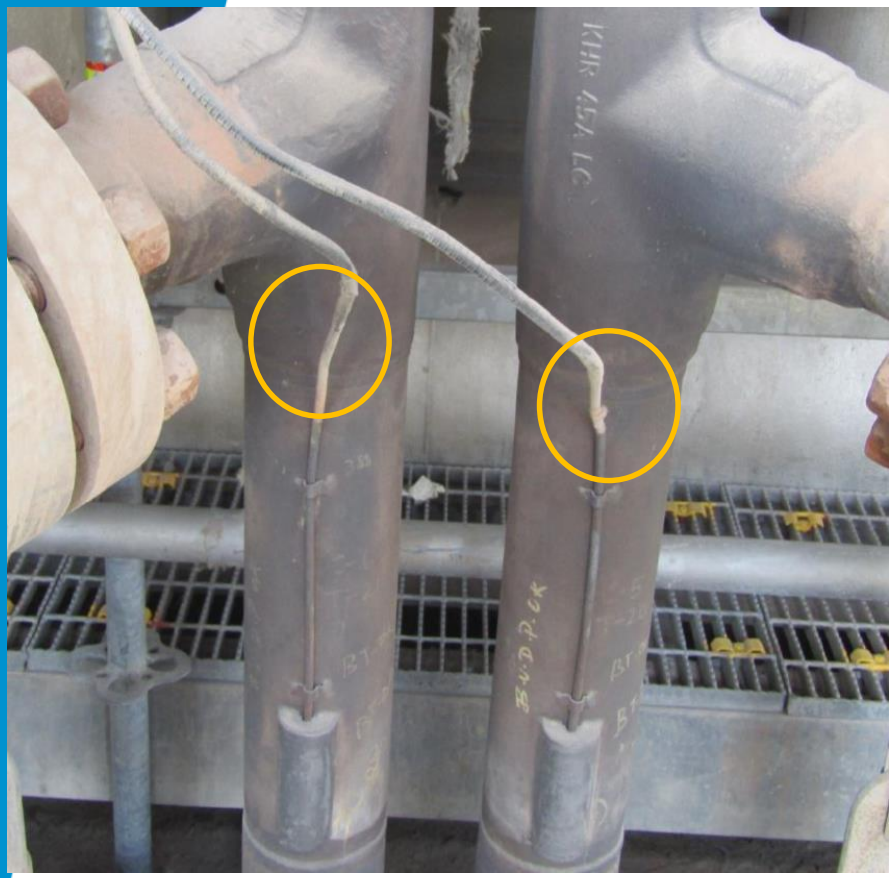
Daily Premium Line Thermocouples

Up to 4x more accurate than standard limit of error (Ultra-Limits™)

Precision between points limited to half of accuracy band

20x the moisture content restrictions

CASE STUDY #1- Welded Design

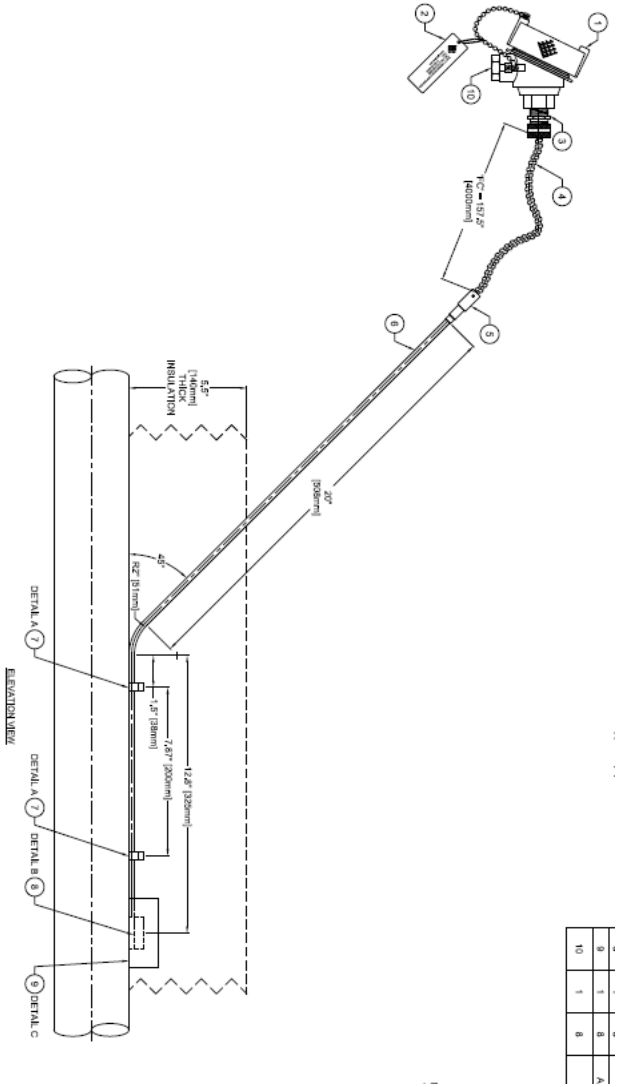


Client experiencing instability and failure within months of startup

Field walk identified installation issues as main contributor

All thermocouples installed with transition housing 2-4'' from hot tube, melting transition seal

CASE STUDY #1- Welded Design



Solution: Application Specific Design

Thermocouples replaced with additional length

Installation detail and guidance provided

All Instability issues resolved

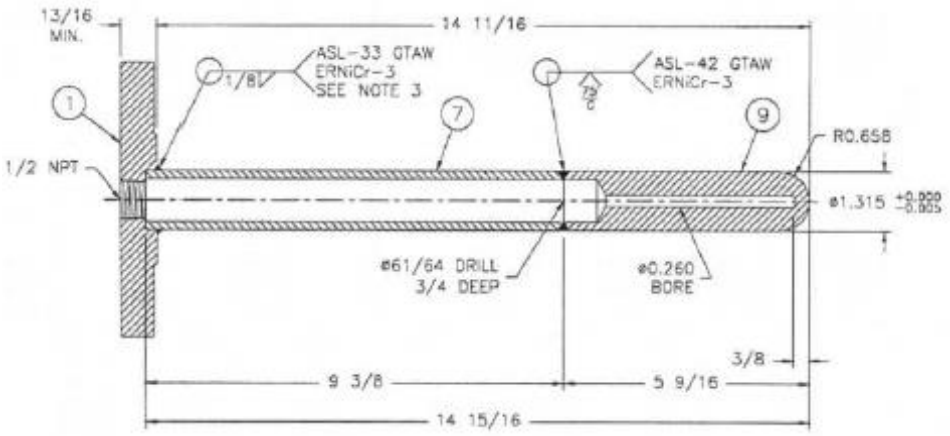
CASE STUDY #2- Guide Tube Design

Client experiencing accuracy issues and failure within months of startup

Analysis Performed on 14 assemblies

All within tolerance at 212F, all beyond tolerance at 1550F

Moisture in thermocouples attributed as major cause of drift



CASE STUDY #2- Guide Tube Design

Item #	Metallurgy	"@212F"	"@1550F"	IR @500V	X-Ray
1	INC601	211.6	1524.3	10.4m	P
2	INC601	211.2	1479.8	2.7m	P
3	INC601	212.4	1536.4	14g	F
4	INC601	212.3	1429.8	429m	n/a
5	INC601	212.5	1508.4	25g	n/a
6	INC601	210.2	1529.2	11g	P
7	INC601	212	1530.4	inf	n/a
8	INC601	212.1	1525.6	220.6m	F
9	INC601	211.2	1528	37g	n/a
10	INC601	211.5	1526.3	59m	n/a
11	INC601	212.5	1524.2	3.5m	P
12	INC601	212.3	1524.7	22g	n/a
13	INC601	212.5	1514.1	537m	F
14	INC601	212.1	1498.8	3.7g	n/a

CASE STUDY #2- Guide Tube Design

Solution: Manufacturing Technique & Testing

Vacuum seal and silver braze transition housings to improve moisture barrier

Lower minimum moisture content criteria

Calibrate all TCs @212F and validate operational temperature

Results: Issues Alleviated

Stable Operation

Zero Failures since 2013

Implemented in Furnaces in Baytown, Deer Park and others

Adopted as standard practice at these facilities

Conclusions

The Importance of Temperature Measurements

Re-visiting Temperature Instrumentation Specification

Mass Produced Thermocouples Vs. Tailored Made

Commodity Vs. Engineered Products

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THANK YOU!

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