REACTOR THERMOMETRY
CatTracker® Catalyst Tracking System
UNLEASH YOUR REACTOR’S
with the CatTracker® Catalyst Temper

MOST ADVANCED TRACKING TECHNOLOGY

The CatTracker® CATALYST TEMPERATURE TRACKING SYSTEM, patented by Daily Thermetrics and first introduced commercially in 2001, is a proven technology with superior operational service over five continents profiling hundreds of reactors, regenerators, and fractionating columns.

The CatTracker®, employing patented aerospace thermocouple technology, offers the process industry the most rugged yet flexible temperature probes designed to be in direct contact with the process. CatTracker® temperature sensors are engineered to withstand the harshest environments and the most strenuous temperature demands.

Each CatTracker® probe consists of a mineral insulated (MI) cable which can sense temperature along its length at various predetermined locations. The CatTracker®’s multiple temperature sensing points are each independent and isolated from one another, while remaining ungrounded from the sheath. The CatTracker®’s patented design eliminates any possibility of signal interference (due to the fact that there is no common leg) and provides unsurpassed reliability for the most demanding applications.

No currently available system can equal the CatTracker®’s performance record.

CATALYST MANUFACTURERS/PROVIDERS

ALBEMARLE                     AXENS                     CRITERION
EXXONMOBIL                     HALDOR TOPSOE         JOHNSON MATTHEY

Identified as a Catalyst Complementary Technology by all leading catalyst manufacturers, the CatTracker® precisely identifies acceptable and unacceptable temperature trends in relation to catalyst activity.

In optimizing performance, it is highly important to accurately monitor catalyst utilization and condition. Reliance on inadequate or poor temperature instrumentation can have a severe adverse effect on the bottom line. Today’s high activity catalysts require temperature operating tolerances that simply cannot be met with out-dated reactor profiling systems.

Only with the most advanced, up-to-date equipment can a refiner expect to get the most from the processing unit. Employing advanced techniques and technologies give the modern refiner an edge on productivity as margins become an increasing concern for profitability.

Regardless of the type of catalyst used, the CatTracker® serves to protect the end user’s investment by notifying operators of dangerous or undesired process phenomena such as hot-spots, maldistribution, and channeling.
CATTRACKER® FEATURES:
- Certified SIL 3 Capable
- 10 Year Warranty*
- Patented Aerospace Technology
- Ultra High Accuracy™
- Ultra High Precision™
- True Redundancy™
- Limited Space™ Design

Secondary Containment Chamber
Designed and Installed by Experienced Engineers

CATTRACKER® ADVANTAGES:
- Tightest Control of Reactor Performance
- Highest Reliability Rating
- Achieve Maximum Point Density
- Eliminate "Second-Guessing" of Bed Temperatures
- Optimize Inlet and Outlet Bed Temperatures
- Maximize Catalyst Utilization
- Maximize Catalyst Volume
- Fastest Installation**

CATTRACKER® BENEFITS:
- Highest Return on Investment
- Maximize Profitability
- Maximize Safety
- Minimize Costs
- Peace of Mind

*Terms and Conditions Apply
**Typically 1/3 the time of traditional flexible reactor thermocouples

CatTracker® is a registered trademark of Daily Instruments Corporation.

PLEASE NOTE THAT DAILY THERMETRICS’ CATTRACKER® IS PATENT-PROTECTED BY U.S. PATENT #s 6,550,963 AND 6,599,011, AND CANADA PATENT #5 2449074.
CatTracker® Catalyst Temperature Tracking System

**BLOCK VALVE**
PURPOSE: TO ALLOW FOR REMOVABILITY/REPLACEMENT OF PRESSURE INDICATOR
- Rated to design pressure and temperature of reactor vessel

**SECONDARY/SAFETY CONTAINMENT CHAMBER**
PURPOSE: TO CONTAIN PROCESS IN THE EVENT OF BREACH IN PRIMARY SEAL(S) AND ALLOW CONTINUED NORMAL OPERATION
- Rated to design pressure and temperature of reactor vessel
- Pressure Equipment Certifications Available (e.g., “U” Stamp, CE/PED, etc...)

**BLEED VALVE**
PURPOSE: IN THE EVENT OF PRESSURIZATION OF THE SECONDARY/SAFETY CONTAINMENT CHAMBER, THIS VALVE CAN BE OPENED TO ANALYZE THE CONTENTS

**PRIMARY SEAL WELD(S)**
PURPOSE: TO MAINTAIN PRESSURE BOUNDARY AT FLANGE FACE

**EXTERNAL WELD BEADS**
PURPOSE: PERMANENT VISUAL AND TACTILE IDENTIFICATION OF CATTRACKER® TEMPERATURE SENSOR LOCATION.
NOTE: Temperature Sensor is located internally between Weld Beads.

**CATTRACKER® PROBE/SHEATH**
PURPOSE: ENCLOSE AND PROTECT TEMPERATURE SENSORS
- Argon purged & Thermocouple Clean sheath
- Typical material to match or complement vessel internals (Wide variety of materials available)
- T/C sheath length to be determined by Daily Thermetrics such that requested temperature profile is achieved

**SPECIFICATIONS FOR CATTRACKER® PROBES:**
- **Specifications for 16-POINT CatTracker®**
  - Number of Sensors: Up to Sixteen (16) sensing points per probe
  - Sensing Points: Isolated, Independent
  - Junction Type: Ungrounded Junctions
  - Sheath Diameter: 0.500” (12.7mm) OD
  - Wall Thickness: HEAVY (.077 or 1.778mm - minimum)

- **Specifications for 9-POINT CatTracker®**
  - Number of Sensors: Up to Nine (9) sensing points per probe
  - Sensing Points: Isolated, Independent
  - Junction Type: Ungrounded Junctions
  - Sheath Diameter: 0.500” (12.7mm) OD
  - Wall Thickness: HEAVY (.077 or 1.778mm - minimum)

- **Specifications for 4-POINT CatTracker®**
  - Number of Sensors: Up to Four (4) sensing points per probe
  - Sensing Points: Isolated, Independent
  - Junction Type: Ungrounded Junctions
  - Sheath Diameter: 0.375” (9.525mm) OD
  - Wall Thickness: HEAVY (.077 or 1.778mm - minimum)

**NON DESTRUCTIVE TESTING (NDT)**
- **Insulation Resistance (IR):** Pass/fail criteria for IR moisture content is 10 GΩ minimum at ambient temperature (10x Industry Standards)
- **T/C Calibration Test:**
  - Per ASTM E 220
- **T/C Insulation Resistance Test:**
  - Calibrated at 2ƒC (00ƒ)) per $6TM E 220
- **T/C Continuity Test:**
  - Per $6TM E 608/E 608M
- **T/C Compaction Density Test:**
  - Per $6ME 6ection 9, $rticle  $6TM E 1
- **T/C Insulation Resistance Test:**
  - Per $6ME 6ection II, 3arts $ 	 % $6TM E 10
  - Per ASME Section VIII, Division 1
- **Positive Material Identification (PMI):** Positive Material Identification (PMI) per ASME Section II, Parts A & B; ASTM E 1085 & E 1086
- **Hydrostatic Pressure Test:**
  - Per ASME Section VIII, Division 1
  - Note: Internal hydrostatic pressure test of secondary containment chamber tests all primary and all secondary seal welds.
- **Radiographic Examination (RT):**
  - To be performed on all CatTracker® probe tip welds, junction welds, and transition housings, per ASME Section V, Article 2; ASTM E 94; ASTM E 839
- **Helium Leak Test:**
  - Asme Section V, Article 10

**PROCESS CONNECTION**
- Typically RTJ or RF (Shown) flange
- Other Process Connection types available
- All pressure ratings available (150# - 2500#)
- Wide variety of materials available
- Pressure boundary at flange face
PROVEN CATTRACKER® APPLICATIONS

Alkylation Reactors
Aromatic Saturation Units
Butadiene Hydrogenation Units
BTL Reactors
CTL Reactors
GTL Reactors
CCR Catalyst Regenerators
Cumene Reactors
Deisobutenizer Vessels
Ethylene Reformers
EO Reactors
Fixed Bed Reformers
Flexicoker Scrubbers
Fluid Cat Cracking Units
Fractionator Columns
Hydrocrackers
Hydrotreaters, Cat Feed
Hydrotreaters, Dewaxing
Hydrotreaters, Distillate
Hydrotreaters, Gas Oil
Hydrotreaters, Gasoline
Hydrotreaters, Kerosene
Hydrotreaters, Naphtha
Hydro Naphtha Splitters
Isomerization Reactors
Iso-octene Reactors
Methanol Convertors
Oxidizers
Polishing Reactors
Steam Methane Reformers
Sulfur Recovery Units

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PROPERTIES FOR CATTRACKER® TEMPERATURE SENSORS:
- Thermocouple (T/C) Type: Customer to specify (e.g., Type K, Type J, etc.)
- T/C Accuracy: Per IEC 60584-2 or JIS C 1602, IEC Tolerance Class 1 or better
- T/C Compaction Density: 88% minimum compaction density (vs. Industry Std. 70%)
- T/C Lead Wire: 20 AWG

PROPRIETARY TECHNOLOGIES DESIGNED INTO EACH CATTRACKER® SENSOR:
- Patented, Aerospace-Derived Technology
- Ultra High Precision™ Technology

Every CatTracker® Temperature Sensor is engineered and manufactured such that the temperature readings are within 1°F of each other at reference temperature (427°F).

- Anti-Drift™ Technology

Daily Thermetrics employs proprietary techniques to eliminate the known causes of drift and thermocouple error.
Latest CatTracker® Catalyst Tracking System Updates & Upgrades

After well over a decade of successful installations and operation in over 600 reactors, vessels and fractionators, Daily Thermetrics continues to lead the refining and petrochemical industries in **best-in-class reliability, accuracy, and precision** for real-time catalyst and reactor monitoring and control. Every CatTracker® Catalyst Tracking assembly now includes the following features, available only from Daily Thermetrics:

**ULTRA HIGH ACCURACY™**
Along with proprietary mechanical treatment of the thermocouple conductor wires, Daily Thermetrics is now sourcing the highest grade thermocouple conductor wire.

**WHAT THIS MEANS FOR YOU:**
CatTracker® accuracy is up to 4X that of off-the-shelf thermocouple technology.

**BEST-IN-CLASS INSULATION RESISTANCE (IR) STANDARDS**
Daily Thermetrics’ pass/fail criteria for IR (insulation resistance) moisture content is now 10 GΩ minimum at ambient temperature. This is 10x the industry standard of 1 GΩ.

**WHAT THIS MEANS FOR YOU:**
Moisture trapped in the thermocouple sheath negatively impacts thermocouple reliability, accuracy, and operational life. IR measures moisture content in all ungrounded thermocouples. A higher resistance reading indicates lower moisture content, which facilitates better performance and longer life.

**RALEXIAN™ TRANSITION**
Daily Thermetrics’ proprietary Ralexian™ transition design is now being utilized to prevent moisture ingress and improve the integrity of the conductor wire/extension wire connection.

**WHAT THIS MEANS FOR YOU:**
Moisture contributes to errant temperature readings and/or shortened thermocouple life. The Ralexian™ transition design (exclusive to Daily Thermetrics) is now a standard CatTracker® feature which prevents moisture ingress and acts as a true moisture barrier. Another important aspect of this design is to significantly improve the transition from conductor thermocouple wire to extension wire which is embedded in a complex epoxy structure.

**ARGON PURGING**
Daily Thermetrics’ CatTracker® probes are now argon purged prior to final sealing. This standard practice was initiated in 2012 and displaces contaminants that could lead to corrosion.

**WHAT THIS MEANS FOR YOU:**
This contributes to the industry-leading performance and stability of the CatTracker® throughout its service life, resulting in an even more robust and reliable temperature measurement device.

**HIGH PRECISION AUTOMATED WELDING**
The majority of the critical welds are now performed via high precision automated welding stations.

**WHAT THIS MEANS FOR YOU:**
A high integrity instrument with the reliability and ruggedness necessary to withstand all the forces of a hydrocracker requires perfection and consistency throughout the manufacturing process. Incorporating automated welding throughout the production line reduces variances and enhances consistency.
DESIGN & ENGINEERING
Engineering Departments dedicated to:
•  Design  •  Production  •  Troubleshooting  •   
•  Field Installation & Operations Services  •

Daily Thermetrics has established itself over the past 40 years as a global leader in engineering, designing, improving and producing high-performance technologies in temperature instrumentation for hydroprocessing applications. Paired with our manufacturing facility and active R&D group, no other temperature emphasized engineering company has the resources or experience to take temperature measurement to the advanced levels that Daily Thermetrics provides to the process industry.

INSPECTIONS & TESTING
No less important than proper Design & Manufacturing is the verification of quality through extensive inspection.

Daily Thermetrics uses the latest techniques and equipment to guarantee every temperature sensor fabricated has been rigorously inspected to the strictest requirements of Daily Thermetrics, the technology licensor, and your refining facility.

- On-Site State-of-the-Art X-ray Facility
- In-House NDT Level II Inspectors
- Hydrostatic Testing
- Positive Material Identification
- ISO 9001:2008 Certified
- Ultrasonic Testing
- Calibration
- Helium Leak Testing

FIELD ENGINEERING SERVICES
Daily Thermetrics Field Engineering Services offers refiners on-site technical expertise to ensure confidence in the reactor’s performance.

Daily Thermetrics understands that offering the best technology isn’t enough. As experienced refining experts, we have engineered the CatTracker® System to not only provide the most accurate real-time information but also install in a fraction of the time of any previous generation hardware.

GLOBAL SALES & SERVICE
Daily Thermetrics directly employs highly trained, experienced, technical personnel worldwide to provide unparalleled sales and technical support specializing in temperature instrumentation and integration within the process industry.

MANUFACTURING & FABRICATION
Daily Thermetrics’ products are manufactured by Daily Thermetrics, an ISO 9001:2008 Certified company.
Daily Thermetrics, a division of Daily Instruments Corporation, is internationally recognized for its excellence in designing, engineering, manufacturing, and installing superior products to the demanding needs of our customers. The engineering staff and personnel at Daily Thermetrics are highly trained and dedicated to solve the problems and meet the challenges presented by the Refining & Petrochemical Industry. Clients around the world have relied on Daily Thermetrics’ experience and expertise for over 40 years. Daily Thermetrics' world headquarters is in Houston, Texas, USA.