

TEMPERATURE EXCURSION MITIGATION SYSTEM (TEMS) FOR HYDROCRACKING UNITS

Improving safety and reliability while increasing your hydrocracking units onstream factor

Temperature excursions in hydrocracking units can have serious consequences if appropriate, immediate, and specific steps are not taken in response.

To minimize these consequences, Honeywell UOP has developed a Temperature Excursion Mitigation System (TEMS) which is available for new and existing hydrocracking units.

WHAT IS A TEMPERATURE EXCURSION?

A temperature excursion in hydrocracking is a rapid, uncontrolled increase in reactor temperature that exceeds a specified limit. The limit may be the metallurgical design temperature of the reactor.

Hydrocracking units are susceptible to temperature excursions because the reactions are exothermic. If not controlled, the heat of reaction results in higher reactor temperature. The high temperature increases the rate of reaction, which causes temperature to increase more rapidly.

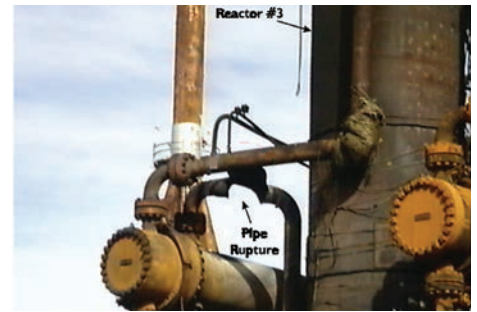
Serious consequences may result from a temperature excursion, including:

- Damage to catalyst and equipment
- Loss of containment – resulting in explosion and fire
- Environmental release of hydrocarbons and sulfur compounds
- Potential injury and death
- Prolonged downtime and loss of production

TEMPERATURE EXCURSION MITIGATION SYSTEM (TEMS)

Most hydrocracking units have emergency shutdown systems which depressure the reactors in the event of an excursion. However it is preferable to address such a situation before a temperature excursion actually takes place and depressuring is required.

TEMS is designed to limit the progression of a temperature excursion in its early stages by recognizing certain conditions which increase the likelihood of an excursion and automating the actions taken in response. The supplied system is customized to each specific unit and has the potential to save millions of dollars in lost production time alone if a single shutdown due to temperature excursion is prevented



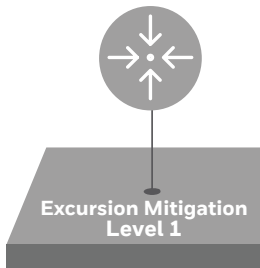
Source: EPA Chemical Accident Investigation Report EPA550-R-98-009

FEATURES AND BENEFITS

- Safer operation
- Automated control
- Higher on-stream factor
- Honeywell control applications and emergency interlock systems
- Easy to maintain
- Compatibility with Honeywell UOP Connected Plant Services (CPS)
- Part of UOP Hydroprocessing Solution Portfolio
- Over 50 years in Hydrocracking experience in design and operation

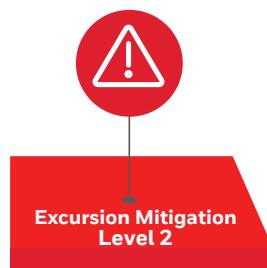
TEMS CORRECTIVE ACTIONS

TEMS has two levels of automated corrective action as shown in the figure below. TEMS is designed to work in a staged approach detecting a temperature excursion in the early stages and automatically taking steps to mitigate it, while simultaneously maintaining production.



Level 1 - Excursion Mitigation:

If significant risk of an excursion is detected, the system automatically adjusts operating variables to re-establish control of the reactor temperatures while maintaining unit operation.



Level 2 - Safe Park:

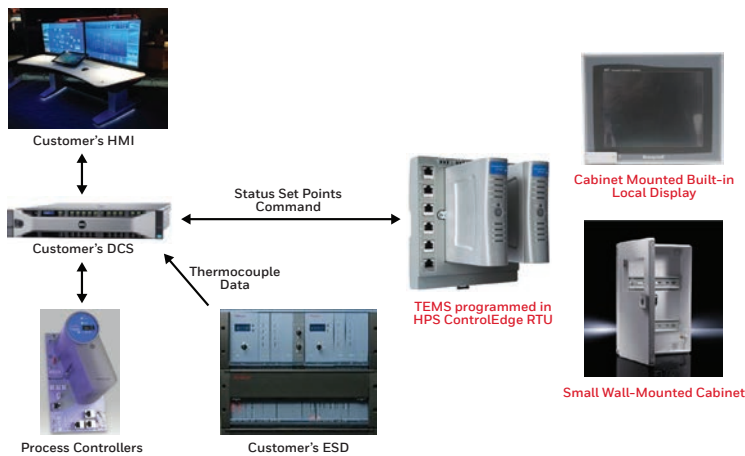
If the risk of an excursion progresses, eventually the unit will automatically be placed in a "safe park" state that permits a safe, quick restart of the process after the event is resolved and avoids depressuring.

TEMS improves the safety of your hydrocracking unit operation with automated control to mitigate temperature excursions and minimise loss of inventory. It reduces the risk of serious consequences, such as loss of containment, injury or death.

With a higher onstream factor and increased production it is estimated TEMS can save over \$2 million per year.

WHERE DOES TEMS FIT INTO YOUR EXISTING SYSTEM

TEMS will be installed into a standard wall mounted enclosure with a built in local display. TEMS is seamlessly linked into the existing DCS system taking data from the operating unit. During installation TEMS will be commissioned and monitored by Honeywell UOP to ensure a flawless start-up of TEMS.



EXPERIENCE

UOPs has over 50 years of experience in hydrocracking technology and has licensed more than 230 units worldwide.

UOP is the world leader in licensing, engineering and revamping distillate hydrocracking units. Our technologies are delivered to customers with a focus on quality and consistency, and backed up with world-class support services.

For more information

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