



# ERMES

Energy Release Monitoring System

a runaway preventive early warning criterion

## What is it?

ERMES is an effective system to prevent the coreactant accumulation build up in exothermic semibatch reaction processes.

ERMES is a useful system to monitor the expected energy behavior of an exothermic semibatch reaction system.

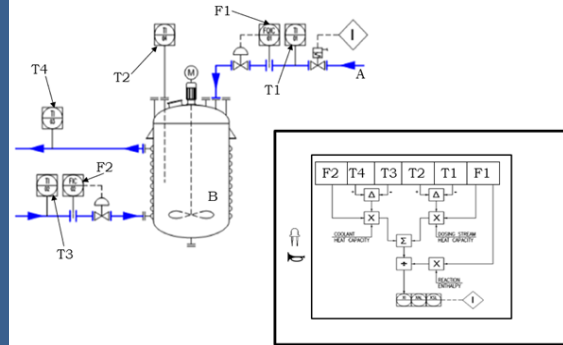
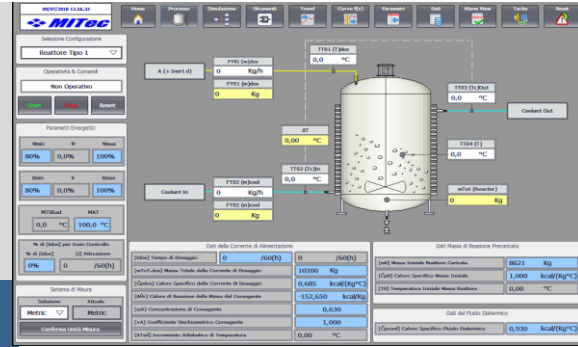
A PCT patent application has been filed by MITec Srl

## How does it work?

On the basis of a general elaboration of the SBR energy balance a set of three easy to measure energy parameters have been defined, through which the target SBR operation can be on-going monitored during each reaction batch. No need of kinetics.

## Why do I need ERMES?

Through ERMES the root causes of an incidental scenario are promptly detected, allowing for **preventive measures** against the incidental scenario. ERMES is a useful device for significantly lowering the frequency of occurrence of runaway phenomena in SBRs.



## Main Features and required input

### The ERMES approach:

- Starting data: available process variables
- Simple mathematical relationships
- No kinetic characterization necessary

### Key PROCESS variables:

- Dosing stream flowrate and temperature
- Reactor temperature
- Coolant flowrate, inlet and outlet temperature

### Key PERFORMANCE indicators:

- $\Psi$  number - ratio between actual and target heat removal rates
- X number - ratio between energy sources and uses within the system

- $\Theta$  number - maximum attainable temperature by adiabatic reaction of the not yet fed reactant

### Runaway prevention criterion:

- Coreactant feed shut-off under dangerous scenario
- Preventing false alarms due to the combined monitoring of the three KPIs

### Advantages:

- Runaway contingency prevention
- Process kinetic characterization not necessary
- No experimental laboratory tests needed
- Suitable for multipurpose units
- Process quality and reliability control

## Contact us

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