

Reaction Calorimeters



RC1su™

Better

Faster

Safe



RC1su™ Process Development Workstation

Get Your Process Right – First Time

METTLER TOLEDO

Know Your Process

Get It Right – First Time

METTLER TOLEDO's Reaction Calorimeter RC1™ is the industry "Gold Standard" for measuring heat profiles, enthalpies, chemical conversion and heat transfer under process-like conditions.

With the RC1su™ Process Development Workstation, METTLER TOLEDO provides a modern solution in which the RC1™ is the centerpiece. It allows chemical engineers in process development to optimize processes under safe conditions while determining all critical process parameters and reducing the risk of failures on a large scale.

Better



Understanding the process in detail enables the engineer to minimize the risk of unexpected events. The RC1su™ Process Development Workstation makes it easier to accurately determine and reproduce important scaling parameters, such as:

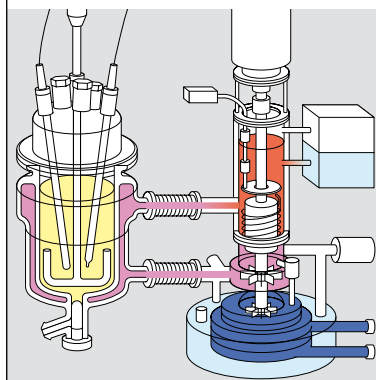
- Heat release
- Reaction enthalpy
- Thermal conversion
- Heat transfer coefficient
- Specific heat capacity
- ΔT_{ad} and MTSR

Faster



Measuring the heat release in real time lets the engineer optimize the process instantly. Unlike standard technologies which generally necessitate a series of experiments to define the ideal dosing profile, the RTCal™ technology accomplishes this task much faster. Together with iControl™ software, the real-time heat release measurement RTCal™ permits the dosing rate of a reagent to be continuously adjusted, ensuring that the heat release stays below a predefined value.

Safe



Using the RC1™ High Performance Thermostat is one of the safest ways to investigate chemical processes. The thermostat is equipped with a split oil circuit, with which approximately 6 L of pre-cooled oil can be instantaneously injected into the cooling circuit, rapidly cooling the reactor contents in case of an unexpected thermal event or runaway. The intrinsic safety system detects irregularities instantly and triggers the appropriate measures immediately.



Expand your Productivity with a Fully Integrated Workstation

Process development requires a profound and comprehensive knowledge of the processes involved and is governed by a triangular relationship between economy, safety and the environment.



To ensure that the process is designed right the first time, the thermodynamics and kinetics of the entire chemical reaction must be understood completely, and there must be detailed knowledge of the physical behavior and mass-transfer characteristics of the system. This can only be achieved with a seamlessly integrated workstation that provides calorimetric information along with analytical data.

Seamless Integration

The ReactIR™ reaction analysis system provides compositional information in real time, allowing key reaction species to be monitored in-situ without sampling. As a result, processes are studied faster with better understanding.

FBRM® and PVM® technologies enable scientists and engineers to use real-time particle and droplet distribution measurements to make more informed decisions, and to do so faster.

Since the analytical tools are fully integrated and information is constantly transferred between the various components, errors which can occur during sampling or data transfer are eliminated and the necessary information is available without delay.



The iC software suite integrates the complete experimental workflow, making it simple to visualize, interpret and report results. It controls all METTLER TOLEDO process development instrumentation, such as Reaction Calorimeters, ReactIR™ (Reaction Monitoring) and FBRM® (Particle Characterization) and creates a consistent look-and-feel, greatly shortening training time.

Multiple components in the same experiment automatically share data and coordinate tasks, which enables closed-loop process control of the RC1su™ workstation based on the reaction progress.



Additional software modules, such as iC Safety™, iC Kinetics™ or iC Quant™ enable quick and secure transformation of data into relevant process information.

The RC1su™ Process Development Workstation combined with the reaction analysis system ReactIR™, the video monitoring system PVM® or the particle characterization tool FBRM® provides the means to quickly develop better and safer processes.

RC1su™ Process Development Workstation

Get Your Process Right – First Time

Packages

ME-51162211	RC1™ thermostat, AP00-0.5-RTC-3w reactor set, UCB, iControl software
ME-51162212	RC1™ thermostat, AP01-2-RTC reactor set, UCB, iControl software
ME-51162213	RC1™ thermostat, MP10-1-RTC-SS reactor set, UCB, iControl software
ME-51162214	RC1™ thermostat, MP10-1-RTC-HC reactor set, UCB, iControl software

Specifications

RC1™ Thermostat	Jacket temperature (Tj): -50 °C to +230 °C Control modes: isothermal and isoperibolic constant or ramp, adiabatic, reflux/distillation, crystallization Accuracy: ±0.5 K (-20 °C to +100 °C) ±1 K (100 °C to +200 °C) ±2 K (>200 °C) Resolution: Tr = 0.2 mK; Tj = 10 mK at T<100 °C Tr = 1 mK; Tj = 10 mK at T>100 °C Stirring: 30 to 2500 rpm
AP00-0.5-RTC-3w Reactor	Temperature range: -50 °C to +165 °C Nominal volume: 500 mL Pressure: 50 mbar to ambient Working volume: 70 mL to 400 mL Material: Duran® glass
AP01-2-RTC Reactor	Temperature range: -50 °C to +165 °C Nominal volume: 2.5 L Pressure: 50 mbar to ambient Working volume: 500 mL to 2 L Material: Duran® glass
MP10-1-RTC-SS Reactor	Temperature range: -50 °C to +165 °C Nominal volume: 1.1 L Pressure: 50 mbar to 10 bar Working volume: 300 mL to 1 L Material: Duran® glass reactor, AISI316 cover and inserts
MP10-1-RTC-HC Reactor	Temperature range: -50 °C to +165 °C Nominal volume: 1.1 L Pressure: 50 mbar to 10 bar Working volume: 300 mL to 1 L Material: Duran® glass reactor, HC-22 cover and inserts
Universal Control Box, UCB	Provides numerous standardized input and output signals to receive signals from sensors and control external devices.
iControl RC1e™ Software	Software interface for a precise control of the reactor and its peripherals, and the evaluation of the experimental data. iControl RC1e™ integrates seamlessly with any iC Suite software, such as iC IR™ or iC FBRM™ and supports bi-directional communication between the various packages including instrument control.

www.mt.com/RC1

For more information

Mettler-Toledo AG, AutoChem

Sonnenbergstrasse 74
CH-8603 Schwerzenbach, Switzerland
Phone +41-44 806 77 11
Fax +41-44 806 72 90

Internet www.mt.com/autochem
E-Mail autochem@mt.com

Subject to technical changes.
© 07/2010 Mettler-Toledo AG, MarCom RXE