

RC HP-1000AE

Reaction Calorimeter



Advanced Technology



High Efficiency



Safety



The RC HP-1000AE simulates factory batch or semi-batch chemical reactions on a liter scale under laboratory conditions. It measures real-time exothermic heat flow in the reactor to obtain thermal behavior data, including total and specific exothermic heat, real-time thermal conversion rate, and material accumulation. It calculates adiabatic temperature rise and maximum temperature after reaction runaway (MTSR). This data is used to assess reaction runaway severity and process hazard level, providing a basis for optimizing and scaling up the target reaction.

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Product Features

- Offers three calorimetric methods: heat flow, power compensation, and reflux, for users to choose from based on their requirements.
- Supports various operating modes, including isothermal, constant temperature, and scanning.
- Optional glass atmospheric pressure reactor, glass medium-pressure reactor, and metal high-pressure reactor.
- Features an external device database, enabling one system to support the interchange of multiple reactors.
- High-power heating and cooling units ensure fast temperature control response and high heat measurement accuracy.
- Automatic feeding control, available in mass or volume measurement.
- It can precisely measure and obtain process safety-related data, including reaction heat flow, reaction enthalpy, conversion rate, specific heat capacity of the sample, adiabatic temperature rise, and the maximum temperature that the runaway system can reach.
- The software platform allows flexible creation of experimental procedures, real-time monitoring of key reaction process data, and online modification of experimental procedures and parameters.
- Real-time display of reactor temperature, jacket temperature, feed mass, and other experimental states.
- Critical operational parameters and state-specific safety thresholds are configurable, supporting anomaly detection alarms and automatic shutdown sequences, while initiating immediate rapid cooling protocols upon reaction runaway.
- Automatically generate and save charts and data, and export experimental analysis reports.

Application Fields



Fine Chemicals

Test Parameters

- Reaction Heat Release
- Specific Heat of Reaction
- Maximum Temperature of Runaway System
- ...

Technical Specifications

| | |
|--------------------------------------|-------------------------------------------------------------|
| Calorimetric Methods | Heat Flow, Power Compensation (Optional), Reflux (Optional) |
| Temperature Control | |
| Vessel Temperature Range | -25–200 °C |
| Oil Bath Temperature Range | -45–250 °C |
| Control Modes | Isothermal, Constant Temperature, Scanning |
| Temperature Resolution | 1.0 mK |
| Sample Temperature Control Precision | ± 0.1 K |
| Silicone Oil Circulation Rate | 35–76 L/min |
| Power Control | |
| Driver Voltage Range | 0–50 VDC |
| Maximum Driver Current | 3.0 A |
| Maximum Heater Power | 120 W |

Technical Specifications

Atmospheric Pressure Glass Reactor (Optional)

| | |
|------------------|-----------------------------------------------|
| Reactor Volume | 1000 mL, other volumes available upon request |
| Working Pressure | Atmospheric Pressure |
| Reactor Material | Glass |

Medium-Pressure Glass Reactor (Optional)

| | |
|-----------------------|-----------------------------------------------|
| Reactor Volume | 1000 mL, other volumes available upon request |
| Working Pressure | 0.6 MPa or 1.2 MPa |
| Reactor Body Material | Glass |
| Reactor Lid Material | 316L Stainless Steel or Hastelloy |

High-Pressure Metal Reactor (Optional)

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|-----------------------|-----------------------------------------------|
| Reactor Volume | 1000 mL, other volumes available upon request |
| Working Pressure | 10 MPa |
| Reactor Body Material | 316L Stainless Steel or Hastelloy |

Agitator

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|-------------------|---------------------------------|
| Maximum Speed | 2000 r/min, optional 3000 r/min |
| Maximum Torque | 75 N·cm, optional 300 N·cm |
| Agitator Type | Anchor or Blade |
| Agitator Material | PTFE, 316L, or Hastelloy |

Injection System

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|--------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|
| Injection Channels | 1 liquid injection, 1 solid injection port, 1 gas injection port; expandable to 4 |
| Precision Balance | Capacity 3100 g, accuracy 0.01 g |
| Injection Pumps | Medium-Pressure Pump: Electromagnetic diaphragm pump, maximum flow rate 2 L/h High-Pressure Pump: Precision plunger pump, maximum flow rate 2.4 L/h |

Other Parameters

| | |
|----------------------|------------------------------|
| Power Supply | 3*400 V / 50Hz (±10%) / 20 A |
| Power | 7000 VA |
| Test Area Dimensions | 1200 mm × 600 mm × 1850 mm |
| Oil Bath Dimensions | 600 mm × 700 mm × 1300 mm |
| Oil Bath Weight | 210 kg |
| Total Machine Weight | 300 kg |