

Specifying an Adiabatic Safety Calorimeter?

Specify the best with ...

ENHANCED SPECIFICATION = 'es'

esARC EV-ARC and BPC

uniquely offering

- Sensitivity to 0.002C/min
- All new Labview software
- Exotherms and endotherms, 0-600C range
- Data analysis for phi correction
- Conversion of data to Enthalpy and Power

- No-Reflux pressure line (no tube heater)
- Virtual technician unattended run operation
- Remote User for worldwide control
- LARGE CALORIMETERS EV-ARC and BPC
- TRIPLE SYSTEM standard, EV-ARC and BPC

Only from Thermal Hazard Technology

World Leader in Safety & Battery Calorimetry





For your specification, tick the boxes

Firstly, demand a system that conforms to STANDARDS

- The esARC instrument fully conforms to American National Standards Institute E1981 (all revisions)
- The esARC Calorimeter conforms to Dow Chemical US Patent No 4439048

Hardware

- Calorimeter Assembly; 10cm diameter by 12 cm depth; 2.5cm thick copper (Ni plated), 8 Heaters, 6 thermocouples (Three Zones, Bomb, Safety, Auxiliary), and FTC tracking to 150°C/min
- Sensitivity 0.003°C/min detection to 200C, 0.01°C/min to 500°C
- Temperature Range 0-600°C
- Thermocouples; Resolution 0.001°C, Precision <0.2%, Accuracy 0.7%
- Pressure Range 0-200bar (or specify range, to1000 bar), Resolution 0.005bar, Precision 0.02%, Accuracy 0.05%
- Sample Holders: Titanium, Hastelloy, Steel, Aluminum, glass, specials for battery, oil & explosives
- ARC bombs 9cm³, tube bombs 1cm³, low phi bombs 65cm³
- Containment Vessel 1Cubic Meter Blast Box - to allow working space
- Safety; 3mm reinforced Steel, Proximity Switch, Door Interlock; Burst Disk Assembly
- Automated Fume Extraction facility
- Modes of Operation: Adiabatic; Quasi-Isothermal, True Isothermal, Iso-peribolic, Ramp
- Tracking of Exotherms and Detection of Endotherms
- Performance (DTBP testing) Accuracy 3%, Repeatability 2% (Temp) Pressure (3%)

Software & Computing Power

- Controller: Dell Xeon Workstation; 19" Flat Screen Monitor, Keyboard and Mouse
- Software: Microsoft Windows Vista, National Instruments Labview
- Control Software ES-ARC Version
- Labview V8.5; ARCS V1.4 Release Sept 08 (or later)
- Full on-the fly operation
- Remote User facilities
- Worldwide Remote Command & Operation of ARC using Terminal Services and
- Worldwide Broadcast of Data and Status with WebBrowser software
- Virtual Technician facility
- Set up unlimited runs and delay, sequence, perform all in one program
- Data Analysis ARCCAL+ V 1.3 released October 08 (or later)
- Allowing: Raw Data graphs, Time to Max Rate, Thermokinetic Modeling, Time to Explosion; SADT, TNR
- Data Conversion to units of Enthalpy, Power, Gas Generation
- Automatic Phi Correction based upon kinetic model –of all data sets
- Multiple dataset analysis; 9 datasets in 1 Project; 3 Analyses, multiple merge data sets
- Report generation in Microsoft Word, or Microsoft Excel or html
- Tutorials for instruction of analysis

CUSTOMER SUPPORT

- Installation & Training – 1 week, acceptance test
- Support – guarantee 1 year, free of charge phone and email support over lifetime of instrument
- Part Supply; 10 years guaranteed
- Manuals – Full Operations and Data Analysis Manuals with Tutorials

Operation, Ambient Environment

- Temperature 5-45C, Humidity 0-95%, Pressure 0.8-1.2bar
- 100-250V 2.7kW Single Phase Electrical Supply, Air supply (Optional for fast cooling), Water (needed only for CSU)

The EV-ARC and BPC



The Unique THT Large Volume Calorimeter Systems for Batteries

Hardware

- ❑ EV STANDARD CALORIMETER; 25cm diameter; 50cm depth; 1.5cm aluminium, 8 Heaters 6 thermocouples (Three Zones, Bomb, Safety auxiliary)
- ❑ BATTERY PERFORMANCE CALORIMETER (BPC) 45CM DIAMETER 45CM DEEP
- ❑ Sensitivity 0.02°C/min detection
- ❑ Temperature Range 0-450°C
- ❑ Thermocouples; Resolution 0.001°C, Precision <0.2%, Accuracy 0.7%
- ❑ Pressure Range 0-200 (or request to 1000 bar), Resolution 0.005bar, Precision 0.02%, Accuracy 0.05%
- ❑ Sample Holders: Titanium, Hastelloy, Steel, Aluminum, glass & Specific if EV system
ARC bombs 9cm³, tube bombs 1cm³, low phi bombs 65cm³
- ❑ Containment Vessel 2 Cubic Meter Blast Box - to allow working space
- ❑ Safety; 3mm reinforced Steel, Proximity Switch; Burst Disk Assembly
- ❑ Automated Fume Extraction facility
- ❑ Modes of Operation: Adiabatic; Quasi-Isothermal, True Isothermal, Isoperibolic, Ramp
- ❑ Tracking of Exotherms and Detection of Endotherms
- ❑
- ❑ MULTIPOINT, SPATIAL TEMPERATURE OF EV BATTERIES – AND CRYOCOOL (-60C)
- ❑ IN SITU MULTIPOINT, SPATIAL TEMPERATURE OF EV BATTERIES – AND CRYOCOOL



Double / Triple System

save money, increase potential, double versatility – ONLY FROM THT

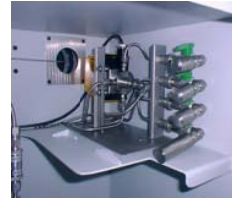
- ❑ Double system – System with both Standard & EV calorimeters
- ❑ EV-Ready System – EV Blast Box with Standard Calorimeter

Later can simply add EV calorimeter or BPC for Double or Triple System,

And for all these Systems.....

Software & Computing Power Customer Support Operation & Environment
EV & Double/Triple System – Same Specification as the es System

Options



Want or Need to do More?

THT offers an unrivalled choice of options. These are either available for all systems with the same Specification or are not available with EV System. Those not available for the EV ARC and BPC are noted below with... **≠EV**

Tick the Boxes!

- FTC Option Fast Tracking Calorimeter; Tracking to 150°C/min
- CSU Option Extend the Temperature range, the Cryogenic option -40-500°C **≠EV**
- ASU Option Stirring and Agitation 0-500rpm, 0-200cps
- GSS Option Safe Gas release during or after test through Scrubber tank, software controlled
- SSS Option Gas collection during or after test into 50cm³ collection vessel,
- SSU Option Gas collection (4 samples -at any time-temp or pressure during test, software controlled
- VSU Option Vent Size testing; Tempering, Blow Down and Hydrodynamic tests, software controlled **≠EV**
- ADU Option High Pressure Dosing, Steel syringe, dosing to 60bar, 0-10ml, software controlled
- PRU Option Automated pneumatic lid lifting **≠EV**
- MDU Option Low cost Manual Dosing Unit (0-10ml at ambient pressure)
- FCU Option Ultimate fume extraction (30 cubic meters per minute), to meet all Pharmspecific regulations **≠EV**
- CPU Option Specific Heat Measurement
- KSU Option Single Channel Battery Cycler – Specify Voltage and Current Range
- BSU Option Abuse testing (Shorting, Over voltage charging discharging application)
- NCU Option Automated Mechanical Abuse testing
- BAP Option Manual Abuse testing (Shorting, Over voltage charging discharging application)
- ORU option Ambient pressure flow and control for EOR Oilfield sample studies
- ORU option High Pressure flow and control for EOR Oilfield sample studies

KITS..... low cost add-ons designed to facilitate testing in specific fields

- Low Phi kit – for those working in Reaction Mixtures and low energy samples
- Explosives Testing Kit – for those working with energetic materials
- Battery Safety Kit – for those working with own cycler and abuse tester
- Battery Abuse and Pressure Kit – hardware add-ons to allow simulation of abuse tests

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The Accelerating Rate Calorimeter Systems from

thermal hazard technology

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