



DDS CALORIMETERS

Scientific Analytical Calorimeter Solutions



CAL3K-A CALORIMETER

Oxygen Bomb Calorimeter

MANUFACTURING SUPERB CALORIMETERS FOR TODAY'S ANALYTICAL NEEDS

www.ddscalorimeters.com

CAL3K-A CALORIMETER

The CAL3K-A is the second in the range of innovative new oxygen bomb calorimeters from DDS. It is the companion product to the CAL3K-AP, but with external oxygen filling. The new range, from the engineers who designed the CAL2K oxygen bomb calorimeter range, features higher speeds and improved accuracy with a small carbon footprint (uses less resources; no water required, lower power consumption). The new 4K-4 quick thread type vessel with the option of the adiabatic, isothermal or dynamic calorimetry methods results in optimized speed and accuracy. This can be tailored to your laboratory needs by parameter settings via the USB port. The CAL3K-A conforms to ASTM D5865-12, ASTM D4809-13, ISO 1928-2009, and DIN 51900-2 international standards. The traditional CAL2K-4 bomb vessel has been replaced with a quick thread vessel with built-in temperature sensors. The vessel is completely removable for easy sample management, cooling, cleaning and maintenance.

COMPLETE SYSTEM

The oxygen bomb calorimeter, filling station and air cooler are operated together for effective routine sample determination, using two or more bomb vessels. Use the air cooler for optimum results and faster throughput.



COMPLETE SYSTEM

FOR USE WITH THE CAL3K-A.

The CAL3K-A is best suited for a production environment with shared oxygen supply (to other users) and robust handling.

The following accessories can be added to the calorimeter:

- Analytical Sartorius Balance Scale (sold separately)
- High Pressure Oxygen Regulator (sold separately)
- RS232 Printer (sold separately)
- Pellet Die Set (sold separately)

CAL³K
NEXT GENERATION CALORIMETERS

The complete CAL3K-A oxygen bomb calorimeter system contains all the parts and consumables necessary to set up the unit. The installation kits included with the setup of the calorimeter contains consumables for approximately 200 samples, depending on the type of sample being analyzed (coal analysis, animal feed analysis). Other samples like oil, might use more consumables as they are corrosive and could cause wear and tear. Additional consumables can be purchased separately from our authorized agents.

The complete calorimeter system is delivered with installation kits for the calorimeter, filling station, air cooler and vessels (for approx. 200 firings). The CAL3K-A uses a combination of the Isothermal and Adiabatic and Dynamic (Isoperibol) calorimetry methods, while still using the dry method, i.e. it's waterless. The sample repeat speed is between 4-5 minutes.

The vessel is manually filled with oxygen via the external oxygen bomb filling station.

An average of 10 or more tests per hour can be achieved with 2 vessels.

CAL3K-A CALORIMETER

ADVANCED CAL3K-A FEATURES



TEMPERATURE CONTROL

No temperature control of room/lab required



FAULT FINDING

Extensive fault finding and testing



STEP-BY-STEP HELP

Screen prompts assist with step-by-step instructions to operate the calorimeter



15 CALIBRATION FIELDS PER VESSEL

For different modes



TEMPERATURE ACCURACY

Temperature accuracy of 10ppm (parts per million)(0.00001°C)



4K-4 QUICK THREAD BOMB VESSEL

Self-Locking and Self-Sealing manual quick thread bomb vessel



HIGH SPEED DETERMINATIONS

Choose between faster or more accurate determinations



RESULTS

Results in KJ/g, KBTU/lb or KCal/g



AIR COOLER

No water required to cool the bomb vessel



EXTREMELY ACCURATE

Extremely accurate (%RSD - 0.1%) determination eliminates multiple sample repeats



COMPENSATION

Compensation for firing energy and cotton, sulphur, moisture & fibre



BALANCE INTERFACE

Balance interface with baud speed setting



MULTIPLE COMM CHANNELS

1 Wired (USB) and 2 RS232



PRESET FIELDS

One default setting per mode



PRINTING

8 Print Formula



USER FRIENDLY

User Friendly Operation



OPERATING PARAMETERS

Operating parameters can be changed via USB interface in experimental mode



REAL TIME PRINTING

Real time print out facility



UP TO 15 CALIBRATION AVERAGE

For variable amount of calibration average to suit your application



RESTRICT ACCESS

Operating parameter access is password restricted



REMOTE ACCESS



LOW POWER CONSUMPTION

Very low power consumption. No temperature controlling required.



LARGE STORAGE

Up to 700 results storage



ECO FRIENDLY

Eco Friendly - small carbon footprint. No water, low power consumption.



INTELLIGENT VESSEL

Intelligent vessel with built-in temperature sensing



TEMPERATURE RANGE

Extensive temperature range from 0°C to 70°C.



LINEAR SENSORS

Linear temperature sensing with platinum sensors



SAFETY

Safety checks guarantee the safety of the operator.

Lorem ipsum



NO WATER REQUIRED

No Water Bucket. No Spillage. No Measuring.



THREE OPERATING MODES

Isothermal, Adiabatic and ISOBTIC (and experimental)



MANUAL OXYGEN FILLING

Makes use of an external oxygen filling station

CAL3K-A CALORIMETER

The CAL3K Bomb Calorimeter Installation Kit includes :

- Power Supply (External 12V/3A) (3K-1-062)
- Mains Cable with plug and kettle connector (1.8m) (3K-1-122)
- Balance Cable (3K-1-117)
- PC Keyboard PS2 (3K-1-061)
- USB Communication Cable (3K-1-084)
- Preparation Stand (3K-4-049)
- Tweezers (3K-1-081)
- Certified Benzoic Acid Tablets (150 x 0.5g tablets per bottle) (3K-4-084)
- Printed Installation Manual (INSTALLATION-MANUAL)
- RS232 Printer Cable (3K-1-098)
- Wire Brush (3K-4-106)
- Deflate Cap (3K-3-18)
- USB 32Gb Green Memory Flash Drive (3K-1-043)

CAL3K-A KIT AND CONSUMABLES

The CAL3K Air Cooler Installation Kit includes :

- Power Supply (External 12V/1.25A) (3K-1-055)

The CAL3K Vessel Installation Kit includes :

- Centre Electrode (3K-4-096)
- Outside Electrode (3K-4-037)
- Single Crucibles (3K-4-047)
- Deflector Plate (3K-4-092)
- Firing Cotton (Bundle of 100 threads) (3K-4-065)
- Firing Wire (1 packet of 5 wires) (3K-4-093)
- Large Lid O-Ring (3K-4-094)
- Top and Bottom O-Ring in Vessel Lid (3K-4-022)

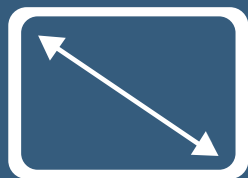
The CAL3K Filling Station Installation Kit includes :

- Nozzle O-Ring for Defiller Cap and Filling Station (3K-3-29)
- Oxygen Regulator Connection Kit (3K-3-21)
- Defiller Cap (3K-3-22)
- High Pressure Pipe 4mm (White) (PIPE-4MM-CLEAR)
- Allen Key (3K-3-32)
- O-Ring Lubrication grease tube (3K-1-086)



CAL4K-4 Quick Thread Bomb Vessel & Air Cooler

TECHNICAL SPECIFICATIONS



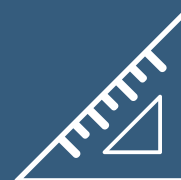
LCD Display

Large display for easy viewing.

x3

Easy to Use

With 3 different operating modes



Compact Size

Approximately 350mm x 280mm x 240mm



Lightweight

Light weight for easy moving.
Approximately 12kg.



TUV CE Certification

Complies with ASTM, DIN and ISO International Standards.

| Specification | Information |
|------------------------------------|---|
| Working (Operating) Temperature | 15-50°C |
| Storage Temperature | 0-70°C |
| Temperature Resolution | 0.000001°C |
| Reproducibility/Repeatability | 0.1% RSD |
| Resolution | 0.0001 MJ/Kg |
| Results per hour | 12 samples per hour using 3 oxygen bomb vessels |
| Measuring range max. | 99MJ, 99000J, 99KJ/g |
| Working temperature min. | 0°C |
| Working temperature max. | 50°C |
| Temperature Measurement Resolution | 10ppm (parts per million) |
| Cooling Medium | Air |

TECHNICAL SPECIFICATIONS

| Specification | Information |
|---------------------------------------|---------------------------------|
| Type of Cooling | Airflow |
| Filling Oxygen Operating Pressure Max | 40 bar |
| Balance/Scale Interface | RS232 |
| Printer Interface | RS232 |
| PC Interface | USB or RS232 |
| Power Input | 12W |
| Interface External Keyboard | PS2 |
| Oxygen Filling | Manual |
| De gasification | Manual |
| Halogen (Decomposition) Vessel | Yes, optional |
| Analysis according to DIN 51900 | Yes |
| Analysis according to ASTM D240 | Yes |
| Analysis according to ASTM D4809 | Yes |
| Analysis according to ASTM D5865 | Yes |
| Analysis according to ASTM E711 | Yes |
| Analysis according to ISO 1928 | Yes |
| Dimensions | 350mm x 280mm x 240mm |
| Weight | ~ 12.000kg |
| Permissible Ambient Temperature | 0-35°C |
| Permissible Relative Humidity | 80% |
| RS232 Interface | Yes |
| USB Interface | Yes |
| Voltage | 220-240 / 100-120V, 12VDC, 3Amp |
| Frequency | 50/60 Hz |

Please Note: Technical Specifications subject to change without prior notice.

Please contact our team for accurate technical specifications at the time.



SYSTEM COMPARISON

| FEATURE | CAL3K-A | CAL3K-AP | CAL3K-F | CAL3K-S | CAL3K-ST |
|--------------------------------|---------------------------------|-------------------------------|---------------------------------|---------------------------------|---------------------------------|
| BALANCE INTERFACE | Yes, from 2.4 to 38.4KB | Yes, from 2.4 to 38.4KB | Yes, from 2.4 to 38.4KB | Yes, from 2.4 to 38.4KB | Yes, from 2.4 to 38.4KB |
| RESULT MEMORY | 700 records | 700 records, 262KB | 900 records | 480 records | 430 records |
| TEMPERATURE RESOLUTION | 0.000'001°C | 0.000'001°C | 0.000'001°C | 0.000'001°C | 0.000'001°C |
| DISPLAY | 4 x 40 character LCD | 4 x 40 character LCD | 4 x 40 character LCD | 2 x 20 character LCD | 4 x 40 character LCD |
| KEYBOARD | QWERTY, External, PS2 | QWERTY, External, PS2 | QWERTY, External, PS2 | QWERTY, External, PS2 | QWERTY, External, PS2 |
| SAMPLE ID | 16 characters, auto-increment | 16 characters, auto-increment | 16 characters, auto-increment | 16 characters, auto-increment | 16 characters, auto-increment |
| GROUP ID | 16 characters | 16 characters | 16 characters | 16 characters | 16 characters |
| REAL TIME | Yes | Yes | Yes | Yes | Yes |
| CALIBRATION | 15 | 15 | 15 | 15 | 15 |
| UNITS | KJ, KBTU, KCAL | KJ, KBTU, KCAL | KJ, KBTU, KCAL | KJ, KBTU, KCAL | KJ, KBTU, KCAL |
| RESULT COMPENSATION | Automatically applied | Automatically applied | Automatically applied | Automatically applied | Automatically applied |
| VESSEL PRESS. MONITOR | No | Up to 100 bar | No | No | No |
| OXYGEN FILLING | External manual filling station | Internal, automatic filling | External manual filling station | External manual filling station | External manual filling station |
| DE-FILLING | Manual | Automatic | Manual | Manual | Manual |
| MAX CHASSIS RECORDING | Yes | Yes | Yes | Yes | Yes |
| CHASSIS NAME | 16 characters, Bluetooth name | 16 characters, Bluetooth name | 16 characters, Bluetooth name | 16 characters, Bluetooth name | 16 characters, Bluetooth name |
| KEYBOARD PASSWORD | CAL3K | CAL3K | CAL3K | CAL3K | CAL3K |
| VESSEL LEAK MONITOR | No | Yes, flags result and warning | No | No | No |
| EXTERNAL COOLER | Yes | Yes | Yes | No, Built-tin | Yes |
| ACCEPT CAL2K VESSEL | No | No | No | No | Yes |
| VESSEL LOCKOUT, LOCK-IN | Yes, 2500 firings | Yes, 2500 firings | Yes, 2500 firings | Yes, 5000 firings | Yes, 5000 firings |
| SAMPLE REPEAT SPEED | 4-5 min | 6 min | 7-8 min | 20 min | 20 min |
| OPERATOR TIME PER TEST | +/- 3 min | +/- 3 min | +/- 3 min | +/- 3 min | +/- 3 min |
| COOLING | Air | Air | Air | Built-in | Built-in |
| COOLING MODES | Ambient/Fixed | Ambient/Fixed | Ambient/Fixed | Ambient/Fixed | Ambient/Fixed |
| RSD | 0.1 | 0.1 | 0.1 | <0.1 | 0.1 |
| POWER CONSUMPTION | 12W | 12W | 6W | 6W | 6W |
| POWER SUPPLY | External 12V | External 12V | External 12V | External 12V | External 12V |
| WATER CONSUMPTION | None | None | None | None | None |
| REPEATABILITY | 0.10% | 0.10% | 0.10% | 0.10% | 0.10% |

SYSTEM COMPARISON

| FEATURE | CAL3K-A | CAL3K-AP | CAL3K-F | CAL3K-S | CAL3K-ST |
|---------------------------------|---|---|-------------------------|-------------------------|-------------------------|
| OPERATING MODES | Dynamic, Isothermal, Adiabatic | Dynamic, Isothermal, Adiabatic | Dynamic | Dynamic | Dynamic |
| NUMBER OF VESSELS | 4 | 4 | 4 | 1 | 2 |
| CLOSURE TYPE | Screw (Thread) Cap | Screw (Thread) Cap | Screw (Thread) Cap | Screw (Thread) Cap | Screw (Thread) Cap |
| TESTS P/H WITH 2 VESSELS | 10+ | 8+ | 4-6+ | 2 | 3+ |
| BOMB VESSEL TYPE | Removable | Removable | Removable | Removable | Removable |
| OXYGEN FILLING | Semi-Automatic | Fully Automatic | Semi-Automatic | Semi-Automatic | Semi-Automatic |
| BOMB VESSEL WASHING | Manual | Manual | Manual | Manual | Manual |
| PRINTER CONNECTION | RS232 | RS232 | RS232 | RS232 | RS232 |
| BALANCE CONNECTION | RS232 | RS232 | RS232 | RS232 | RS232 |
| ENVIRONMENTAL | 5-40°C | 5-40°C | 5-40°C | 5-40°C | 5-40°C |
| PRINTING OF RESULTS | Via PC or RS232 Printer | Via PC or RS232 Printer | Via PC or RS232 Printer | Via PC or RS232 Printer | Via PC or RS232 Printer |
| PC SOFTWARE | Advanced | Advanced | Advanced | Advanced | Advanced |
| CORRECTION FACTORS | 4 | 4 | 4 | 4 | 4 |
| MASS ENTRY | Auto & Manual | Auto & Manual | Auto & Manual | Auto & Manual | Auto & Manual |
| CE/TUV CERTIFICATE | Yes (Pending) | Yes (Pending) | Yes | Yes | Yes (Pending) |
| SPIKING | Yes | Yes | Yes | Yes | Yes |
| SELF TESTING | Yes | Yes | Yes | Yes | Yes |
| AI COMPENSATION | Yes | Yes | Yes | Yes | Yes |
| CONNECTIVITY | USB 2.0, 2 x RS232 at 115.2KB for bluetooth | USB 2.0, 2 x RS232 at 115.2KB for bluetooth | 2 x RS232 at 115.2KB | 2 x RS232 at 115.2KB | 2 x RS232 at 115.2KB |
| PRINTING | Yes | Yes | Yes | Yes | Yes |
| MOISTURE COMPENSATION | Yes | Yes | Yes | Yes | Yes |
| FOOD FIBRE COMPENSATION | Yes | Yes | Yes | Yes | Yes |
| REAL TIME PRINTOUT | Yes | Yes | Yes | No | No |
| GELATIN CAPSULE COMP. | Yes | Yes | Yes | Yes | Yes |

The CAL3K-A Oxygen Bomb Calorimeter System can be used with most applications including, but not limited to: Animal Feed Research, University Research, Food/Nutrition Analysis, Explosives Analysis, Coal Analysis, Oil Analysis, and other traditional and non-traditional applications.

For more details and application notes visit our website at www.ddscalorimeters.com

CONTACT US

COMPANY HISTORY

Digital Data Systems (DDS has more than 40 years of experience in calorimetry.

In 1972, DDS produced their first calorimeter, the AMPC (Automatic Micro Processor Calorimeter). The AMPC was a dual water isothermal unit controlled by a microprocessor.

In 1980 work began on a new revolutionary design of vessel, namely the DRY vessel or CP510, which meant that there was no surrounding water jacket. A copper sleeve pressed over the vessel replaced the water jacket and the temperature sensors were placed inside the vessel resulting in the heat transfer being extremely fast. Determination time was significantly reduced, increasing the unit efficiency by 4 times. With the processing power of the microprocessors available at the time, the CP500 Calorimeter was born. The striking "buttercup yellow" colour gave a splash of brightness to the then drab laboratories.

In 2002 work began on the CAL2K. The tried and tested DRY system was retained and only the very latest electronic technology was used, including the surface mount devices.

In 2005, DDS came to realize the need for smaller, low volume, inexpensive calorimeter systems, with the same accuracy and reliability of the CAL2K. The ECO was then created as an alternative system to the CAL2K. The ECO is suitable for the following markets: Universities, Research Facilities, Brick Manufacturers, Animal Feed Industries, Food Quality, and Food Production.

In 2007 the new E2K system was developed. Should you require more information on our superb range of bomb calorimeters please contact your nearest dealer or visit our website.



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**DDS Calorimeters are proudly manufactured by :
Digital Data Systems (Pty) Ltd.**

For more information about any of our products visit our website at www.ddscalorimeters.com.

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