DDS CALORIMETERS

Scientific Analytical Calorimeter Solutions

CAL3K-AP CALORIMETER

Oxygen Bomb Calorimeter

MANUFACTURING SUPERB CALORIMETERS FOR TODAY'S ANALYTICAL NEEDS

www.ddscalorimeters.com

CAL3K-AP CALORIMETER

The CAL3K-AP is the first in the range of innovative new oxygen bomb calorimeters from DDS. 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 quick thread bomb 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-AP 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 bomb 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 and air cooler are operated together for effective routine sample determination, using 1 or more bomb vessels. Use the air cooler for optimum results and faster throughput.

COMPLETE SYSTEM

FOR USE WITH THE CAL3K-AP.

The CAL3K-AP is best suited for a clean and well maintained laboratory with a requirement for very fast and accurate results.

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-AP 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, air cooler and vessels (for approx. 200 firings). The CAL3K-AP uses a combination of the Isothermal and Adiabatic calorimetry methods, while still using the dry method, i.e. it's waterless. The sample repeat speed is between 5-8 minutes.

The vessel is automatically filled with oxygen inside the calorimeter, and defilled on completion of a determination.

An average of 8 or more tests per hour can be achieved with 2 vessels.

CAL3K-AP CALORIMETER

ADVANCED CAL3K-AP FEATURES

VARIABLE FILLING PRESSURE
Allows for variable filling pressure

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
For different mode and different calorimeters

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

4K-4 QUICK THREAD BOMB VESSEL
Self-Locking and Self-Sealing thread type 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, sulphur, moisture, fibres

BALANCE INTERFACE
Balance interface with baud speed setting

MULTIPLE COMM CHANNELS
1 Wired (USB) and 2 optional wireless channels

PRESET FIELDS
One default setting per mode

TEMPERATURE CONTROL
No temperature control of room/lab required

USER FRIENDLY
User Friendly Operation

OPERATING PARAMETERS
Operating parameters can be changed via USB interface in experimental mode

LEAK DETECTION
Detects leaks and aborts the firing in the vent of a leak

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.

NO WATER REQUIRED
No Water Bucket. No Spillage. No Measuring.

THREE OPERATING MODES
Isothermal, Adiabatic and ISOBATIC (and experimental)

AUTOMATIC OXYGEN FILLING
Automatic oxygen filling and de-filling of the reaction vessel

CAL3K-AP 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)
- USB Communication Cable (3K-1-084)
- PC Keyboard (PS2) (3K-1-061)
- Preparation Stand (3K-4-049)
- Stainless Steel Tweezers (3k-1-081)
- Certified Benzoic Acid Tablets (150 x 0.5g tablets per bottle) (3K-4-084)
- PVC Flexible Exhaust Tubing (6.4mm) (3K-6-012)
- Exhaust O-ring (3K-6-031)
- Oxygen Regulator Connection (3K-3-21)
- High Pressure Pipe (4mm) (Clear) (3K-3-27)
- Nozzle O-Ring using in 3K-3 Jet Assembly (3K-1-080)
- Filling Nut (3K-6-018)
- O-Ring Lubrication Grease Tube (3K-1-086)
- RS232 Printer Cable (3K-1-098)
- 3K-AP Exhaust O-ring (3K-6-005)
- 3K-AP Nozzle O-ring Green (3K-4-107)
- Deflate cap (3K-3-18)
- Printed Installation Manual (INSTALLATION-MANUAL)
- Fill Head O-Ring (3K-6-025)
- USB 32Gb Green Memory Flash Drive (3K-1-043)
- Pressure Leak Test Jig (3K-1-115)
- Compression Pipe fitting double ferrule 4mm (3K-6-033)
- Wire Brush (3K-4-107)
- Temperature Calibration Harness Kit (3K-1-134)

CAL3K-AP KIT AND CONSUMABLES

The CAL3K Air Cooler Installation Kit includes :

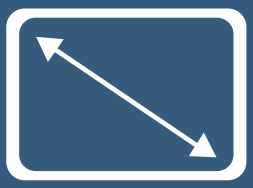
- Power Supply (External 12V/1.25A direct 2 PIN) (3K-1-055)

The CAL3K 4K-4-AP-KIT Vessel Installation Kit includes :

- Outside Electrode (3K-4-124)
- Centre Electrode (3K-4-036)
- Single Crucibles (3K-4-047)
- Deflector Plate (3K-4-092)
- Firing Wire (1 packet of 5 wires) (3K-4-093)
- Firing Cotton (Bundle of 100 threads) (3K-4-065)
- Large Lid O-Ring (3K-4-094)
- Nozzle Base O-ring (3K-4-043)
- Inflation Nipple on Cap (3K-4-039)

CAL4K-4 Oucik 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	8 samples per hour using 2 oxygen bomb vessels
Measuring range max.	99MJ, 99 000J, 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
Oxygen Operating Pressure Max	35 bar
Balance/Scale Interface	RS232
Printer Interface	RS232
PC Interface	USB
Power Input	36W
Interface External Keyboard	PS2
Oxygen Filling	Automatic
De gasification	Automatic
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-AP 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.

DDS CALORIMETERS
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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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