DDS CALORIMETERS

Scientific Analytical Calorimeter Solutions

CAL3K-S CALORIMETER

Oxygen Bomb Calorimeter

MANUFACTURING SUPERB CALORIMETERS FOR TODAY'S ANALYTICAL NEEDS

www.ddscalorimeters.com

CAL3K-S CALORIMETER

CAL3K-S is the fifth in the range of innovative new oxygen bomb calorimeters from DDA Calorimeters. The new range, from the engineers who designed the CAL2K Oxygen Bomb Calorimeter range, is a totally dry type calorimeter, making it environmentally friendly and energy efficient. The CAL3K-S also boasts the smallest carbon footprint in its class.

The CAL3K-S is an economical system and is typically used in applications where low sample analysis is required, like in Food/Feed Analysis, Alternative Energy, Manufacturing, Coal and Oil Production, Research, Universities, and Quality Assurance. In short: wherever the calorific value of a solid or liquid sample must be determined, the CAL3K-S is the economical calorimeter of choice.

COMPLETE SYSTEM

The CAL3K-S system includes a calorimeter, 1 x standard thread bomb vessel, and oxygen filling station. A spare bomb vessel (3K-5S) can be purchased, however this will not increase the speed of the calorimeter system.
The calorimeter system can complete 1 sample per hour. Part of the CAL3K-S system is the external oxygen filling station (3K-3), standard across all manual filling calorimeter systems.

COMPLETE SYSTEM

FOR USE WITH THE CAL3K-S.

The CAL3K-S is your entry level system suitable for low throughput without compromising on accuracy and repeatability. It is ideal for use in Food and Nutrition, Animal Feed Analysis, Universities and Research Departments, Alternative Energy Research, Waste and Waste Product Analysis.

The following are included:

- 3K-3 Manual Oxygen Filling Station
- 3K-5S Standard Bomb Vessel

The following can be optionally added to the system:

- Analytical Balance (sold separately)
- High Pressure Oxygen Regulator

CAL3k
NEXT GENERATION CALORIMETERS

The complete CAL3K-S oxygen bomb calorimeter system contains all the parts and consumables necessary to set up the system. The installation kits included with the setup of the calorimeter contain consumables for approximately 200 samples, depending on the type of sample being analysed, such as coal, food, or feed samples.
Other samples, such as oil, might use more consumables as they are corrosive and could cause wear and tear.
Additional consumables can be purchased separately from DDS or an authorised agent.

The sample repeat speed is 30 minutes. With Built-In Fan Cooler.

The vessel is manually filled with oxygen via the external manual oxygen filling station (3K-3).

1 Vessel system. Not expandable.

The system can analyse 1 sample per hour; a total of 8 samples per day.

CAL3K-S CALORIMETER

ADVANCED CAL3K-S 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

16 CALIBRATION FIELDS
For different mode and different calorimeters

STANDARD THREAD BOMB VESSEL
Thread bomb vessel

ACCURATE
0.2% RSD accuracy

COMPENSATION*
Compensation for firing energy and sulphur

OPTIONAL BALANCE INTERFACE
Balance interface with baud speed setting

USER FRIENDLY
User Friendly Operation

PRESET FIELDS
One default setting per mode

IMPROVED INITIAL TIMING
Based on drift and time, or time after drift

10 CALIBRATION AVERAGE
For variable amount of calibration average to suit your application

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

FULL LIMS SUPPORT
For the assignment, scheduling, and tracking of samples.

LOW POWER CONSUMPTION
Very low power consumption. No temperature controlling required.

RESTRICT ACCESS
Operating parameter access is password restricted

FILTER DATA ON EVENTS
Extensive testing and detailed data viewing

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

LARGE STORAGE
Up to 1024 results storage

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

INTELLIGENT VESSEL
Intelligent vessel with built-in temperature sensing

EVENT LOGGING
Built-in event logging for ~6000 events

LINEAR SENSORS
Linear temperature sensing with platinum sensors

RESULTS
Results in MJ/Kg, BTU/lb or Cal/g

SAFETY
Safety checks guarantee the safety of the operator.

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

MANUAL OXYGEN FILLING
Makes use of an external oxygen filling station

CAL3K-S CALORIMETER

The CAL3K Bomb Calorimeter Installation 3K-S-Kit includes :

- Power Supply (External 12V/1.25A)(3K-1-055)
- PC Keyboard PS2 (3K-1-061)
- Preparation Stand (3K-4-49)
- Tweezers (3K-1-081)
- Certified Benzoic Acid Tablets (150 x 0.5g tablets per bottle)(3K-4-71)
- Wire Brush (3K-4-106)
- Printed Installation Manual (INSTALLATION-MANUAL)
- USB 32Gb Green Memory Flash Drive (3K-1-043)

CAL3K-S KIT AND CONSUMABLES

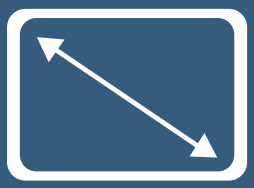
The CAL3K Standard Thread Vessel Installation 3K-5S-Kit includes :

- Complete Top and Bottom Centre Electrode (3K-4-96)
- Outside Electrode (3K-4-37)
- Single Crucibles (3K-4-47)
- Deflector Plate (3K-4-92)
- Firing Cotton (Bundle of 100 threads)(3K-4-65)
- Firing Wire (5 per packet)(3K-4-93)
- Lid O-Ring (3K-4-94)
- Top and Bottom O-Ring in Vessel Lid (3K-4-22)

The CAL3K Filling Station Installation 3K-3-Kit includes :

- Nozzle O-Ring for Defiller Cap and Filling Station (3K-3-29)
- Nozzle O-Ring Used in 3K-3 Jet Assembly (3K-1-080)
- Oxygen Regulator Connection Kit (3K-3-21)
- Defiller Cap (3K-3-22)
- Emergency Deflate Cap (3K-3-18)
- High Pressure Pipe 4mm (Clear/White) (PIPE-4MM-CLEAR)

TECHNICAL SPECIFICATIONS



LCD Display

Large display for easy viewing.

Compact Size

Lightweight

Light weight for easy moving.

TUV CE Certification

Complies with ASTM, DIN and ISO International Standards.

Specification	Information
Working (Operating) Temperature	15-70˚C
Storage Temperature	0-70˚C
Temperature Resolution	0.000001˚C
Reproducibility/Repeatability	0.2% RSD
Resolution	0.0001 MJ/Kg
Results per hour	1 Sample per hour
Measuring range max.	99MJ, 99000J
Working temperature min.	1˚C
Working temperature max.	50˚C
Temperature Measurement Resolution	10ppm (parts per million)
Cooling Medium	Fan Air

TECHNICAL SPECIFICATIONS

Specification	Information
Type of Cooling	Built-in cooling
Oxygen Operating Pressure Max	40 bar
Balance/Scale Interface	RS232, 1200 to 38400 Baud (settable)
Printer Interface	RS232, 1.2Kb to 115.2Kb
Power Input	2.4W
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
Permissible Ambient Temperature	1-35˚C
Permissible Relative Humidity	80%
RS232 Interface	Yes
Voltage	220-240 / 100-120V, 12VDC, 1Amp
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-AP	CAL3K-A	CAL3K-S	CAL3K-F
LIMS	2 x via RS232, or Bluetooth	Yes	Yes	Yes
MASS HEAP	No	No	No	No
BALANCE INTERFACE	Yes, from 1.2 to 38.4KB	Yes, from 1.2 to 38.4KB	Yes, from 1.2 to 38.4KB	Yes, from 1.2 to 38.4KB
RESULT MEMORY	1024 records, 262KB	1024 records	300 records	300 records
TEMPERATURE RESOLUTION	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	2 x 20 character LCD	4 x 40 character LCD
KEYBOARD	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
GROUP ID	16 characters	16 characters	-	16 characters
VESSEL RECORD	Yes, unlimited	Yes, unlimited	Limited	Limited
REAL TIME	Yes	Yes	Yes	Yes
CHASSIS IDENTIFICATION	Yes, number	Yes, number	Yes	Yes
CALIBRATION	Normal average & PC	Normal average & PC	Normal average & PC	Normal average & PC
HISTORY CALIBRATION	Yes, up to 10 runs	Yes, up to 10 runs	Yes, up to 16 runs	Yes, up to 10 runs
UNITS	KJ, BTU, CAL	KJ, BTU, CAL	KJ, BTU, CAL	KJ, BTU, CAL
RESULT COMPENSATION	Via PC (IntelCal), Default	Via PC (IntelCal), Default	Yes	Yes
RESULT VALIDATION	Yes	Yes	Yes	Yes
VESSEL PRESS. MONITOR	Up to 100 bar	No	No	No
OXYGEN FILLING	Internal, automatic filling	External manual filling station	External manual filling station	External manual filling station
DE-FILLING	Automatic	Manual	Manual	Manual
MAX CHASSIS RECORDING	Yes	Yes	Yes	Yes
CHASSIS NAME	20 characters, Bluetooth name	20 characters, Bluetooth name	-	-
PASSWORD	CAL3K & PC Password	CAL3K & PC Password	CAL3K & PC Password	CAL3K & PC Password
NETWORK MULTIPLE CALORIMETERS	No	No	No	No
VESSEL LEAK MONITOR	Yes, flags result and warning	No	No	No
EVENT STORAGE	~6000 events	~6000 events	-	~3000 events
EVENT TYPES	~70 different events	~70 different events	-	~80 different events
EVENT CLASSIFICATION	Operational & Technical	Operational & Technical	-	Yes

SYSTEM COMPARISON

FEATURE	CAL3K-AP	CAL3K-A	CAL3K-S	CAL3K-F
VESSEL LOCKOUT, LOCK-IN	Yes, Manual/Auto Linking	Yes, Manual/Auto Linking	Yes, Manual/Auto Linking	Yes, Manual/Auto Linking
SAMPLE REPEAT SPEED (FIRST 2 SAMPLES)	6 min	4-5 min	30 min	7-8 min
OPERATOR TIME PER TEST	+/- 3 min	+/- 3 min	+/- 3 min	+/- 3 min
COOLING	Air	Air	Built-in	Air
COOLING MODES	Ambient/Fixed	Ambient/Fixed	Ambient/Fixed	Ambient/Fixed
RSD	<0.1	0.1	0.2	0.1
POWER CONSUMPTION	0-264 VAC 12W	0-264 VAC 12W	12 VAC 6W	12 VAC 6W
POWER SUPPLY	External 12V	External 12V	External 12V	External 12V
WATER CONSUMPTION	None	None	None	None
REPEATABILITY	<0.1%	0.1%	0.2%	0.1%
CALORIMETER TYPE	Dynamic, Isothermal, Adiabatic	Dynamic, Isothermal, Adiabatic	Dynamic	Dynamic
NUMBER OF VESSELS	Unlimited	Unlimited	Limited (1)	Unlimited
CLOSURE TYPE	Bayonet Lid	Bayonet Lid	Screw Cap (thread)	Bayonet Lid
TESTS P/H WITH 2 VESSELS	10+	10+	1-2 Sample with 1 Vessel Only	8+
BOMB VESSEL TYPE	Removable	Removable	Removable	Removable
OXYGEN FILLING	Automatic	Manual	Manual	Manual
BOMB VESSEL WASHING	Manual	Manual	Manual	Manual
PRINTER CONNECTION	RS232	RS232	RS232	RS232
BALANCE CONNECTION	RS232	RS232	RS232	RS232
ENVIRONMENTAL	5-40°C	5-40°C	5-40°C	5-40°C
PRINTING OF RESULTS	Via PC Software	Via PC Software	Via PC or RS2232	Via PC or RS2232
PC SOFTWARE	Advanced	Advanced	Advanced	Advanced
CORRECTION FACTORS	8	8	4	8
MASS ENTRY	Auto & Manual	Auto & Manual	Auto & Manual	Auto & Manual
CE/TUV CERTIFICATE	Yes (Pending)	Yes (Pending)	Yes (Pending)	Yes (Pending)
VESSEL DETERMINATIONS	Unlimited	Unlimited	5000	Unlimited
SPIKING	Yes	Yes	Yes	Yes
SELF TESTING	Yes	Yes	Yes	Yes

SYSTEM COMPARISON

FEATURE	CAL3K-AP	CAL3K-A	CAL3K-S	CAL3K-F
CONNECTIVITY	USB 2.0, 2 x RS232 at 115.2KB for Bluetooth	USB 2.0, 2 x RS232 at 115.2KB for Bluetooth	USB 2.0, 2 x RS232 at 115.2KB	USB 2.0, 2 x RS232 at 115.2KB
STATS	Yes	Yes	Yes	Yes
PRINTING	Yes, D1 port, 1.2 to 115.2KB	Yes, D1 port, 1.2 to 115.2KB	Yes	Yes
MOISTURE COMPENSATION	Yes	Yes	Yes	Yes
FOOD FIBRE COMPENSATION	Yes	Yes	Yes	Yes
LIMS	Yes	Yes	Yes	Yes
RESULT APPROVAL	Yes, keyboard or PC	Yes, keyboard or PC	Yes, keyboard or PC	Yes, keyboard or PC
REAL TIME PRINTOUT	Yes, optional customer and parameter header	Yes, optional customer and parameter header	-	Yes, optional customer and parameter header
GELATINE CAPSULE	Yes	Yes	Yes	Yes








The CAL3K-S 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.

In 2014 work began on the new CAL3K range. The CAL3k-A the first of the range, the CAL3k-F and CAL3K-AP shortly thereafter. In 2018 work began on the new CAL3K-S.

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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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