CAL3K-F CALORIMETER

Oxygen Bomb Calorimeter

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The CAL3K-F is the fourth in the range of innovative new oxygen bomb calorimeters from DDS Calorimeters. The new range, from the engineers who designed the CAL2K Oxygen Bomb Calorimeter range, features higher speeds, improved accuracy and a small footprint with the now legendary resource reduction (no water required, lower power consumption, low maintenance).

The CAL3K-F Oxygen Bomb Calorimeter is highly expandable to cater for increasing laboratory work. Start off with the most economical single vessel system and expand it as the need arises to a system of 9 samples per hour. The system uses the proven bayonet vessel common to all CAL3K systems, and works in the dynamic (Isothermal) calorimetry mode. It has three communication ports with a host of outstanding features that caters for every application. The CAL3K interfaces with different devices, including PC, Balance, and Printer.

COMPLETE SYSTEM

The oxygen bomb calorimeter, filling station and air cooler are operated together for effective routine sample determination, using 2 or more bomb vessels. It is recommended to use the air cooler for optimum results and faster throughput.

COMPLETE SYSTEM
FOR USE WITH THE CAL3K-F.

The CAL3K-F is a flexible system for low to high throughput without compromising accuracy and repeatability. It is used in Food/Feed Analysis, Alternative Energy, Scientific Determination, Coal and Oil Production and Research and Quality Assurance. In short : wherever the calorific value of a solid/liquid sample must be determined.

The following accessories can be added to the calorimeter :

• Sartorius Balance (sold separately)
• RS232 Serial Printer (sold seperately)
• Laptop / Stand-Alone PC (sold seperately)
• High Pressure Oxygen Regulator (Requirement)

The complete CAL3K-F 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-F uses Dynamic (Isothermal) calorimetry method, while still using the dry method, i.e. it's waterless. The sample repeat speed is between 5-10 minutes.

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

An average of 2-9 tests per hour can be achieved depending on system option purchased.

CAL3K-F CALORIMETER

ADVANCED CAL3K-F FEATURES

TEMPERATURE CONTROL
No temperature control of room/lab required

7 CALIBRATION FIELDS
For different mode and different calorimeters

FAULT FINDING
Extensive fault finding and testing

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

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

BAYONET BOMB VESSEL
Self-Locking and Self-Sealing manual bayonet bomb vessel

EXTREMELY ACCURATE
Extremely accurate (%RSD - 0.05%) determination eliminates multiple sample repeats

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

USER FRIENDLY
User Friendly Operation

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

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

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

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

EVENT LOGGING
Built-in event logging for ~6000 events

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

COMPENSATION*
Compensation for firing energy and sulphur

PRESET FIELDS
One default setting per mode

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

RESTRICT ACCESS
Operating parameter access is password restricted

LARGE STORAGE
Up to 1024 results storage

INTELLIGENT VESSEL
Intelligent vessel with built-in temperature sensing

LINEAR SENSORS
Linear temperature sensing with platinum sensors

SAFETY
Safety checks guarantee the safety of the operator.

AIR COOLER
No water required to cool the bomb vessel

BALANCE INTERFACE
Balance interface with baud speed setting

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

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

FILTER DATA ON EVENTS
Extensive testing and detailed data viewing

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

MANUAL OXYGEN FILLING
Makes use of an external oxygen filling station

CAL3K-F CALORIMETER

CAL3K-F KIT AND CONSUMABLES

The CAL3K-F Bomb Calorimeter Installation Kit includes :

- Power Supply 12V/1.25A (3K-1-055)
- Balance Cable (3K-1-117)
- PC Cable USB (3K-1-084)
- PC Keyboard PS2 (3K-1-061)
- Preparation Stand (3K-4-49)
- Stainless Steel Tweezers (3K-1-081)
- Certified Benzoic Acid Tablets (150 x 0.5g tablets per bottle)(3K-4-71)
- Vessl Spanner for 3K-5) (3K-4-72)
- Printed Installation Guide (INSTALLATION-MANUAL)
- USB Memory Stick (including manuals, software, application notes etc) (3K-1-043)

**The CAL3K Air Cooler Installation Kit includes :**

- Power Supply (3K-1-055)

The CAL3K Bayonet Vessel Installation Kit includes :

- 2 x Center Electrode Bottom Only (3K-4-36)
- 1 x Centre Electrode Top Only (3K-4-46)
- 2 x Nozzle O-Ring (3K-4-23)
- 2 x Outside Electrode (3K-4-37)
- 2 x Stainless Steel Crucibles (3K-4-47)
- 2 x Deflector Plate (3K-4-05)
- 1 x Packet Firing Cotton (100 threads) 3K-4-65
- 1 x Packet Firing Wire (5 wires) 3K-4-32
- 5 x Large Lid O-ring (3K-4-16)
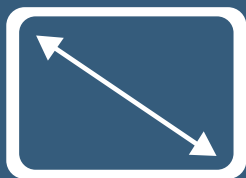- 10 x Top & Bottom O-ring (3k-4-22)

The CAL3K Filling Station Installation Kit includes :

- 5 x Nozzle O-ring (3K-3-29)
- 2 x Nozzle Piston O-ring (3K-1-080)
- 1 x Oxygen Regulator Kit (3K-3-21)
- 1 x Defiller Cap (3K-3-22)
- 1 x Emergency Deflate Cap (3K-3-18)
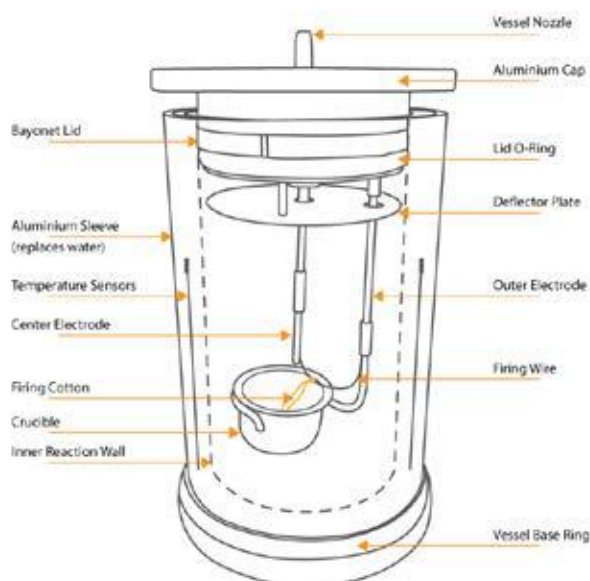
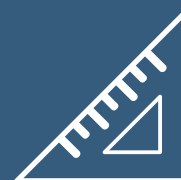**CAL3K Bayonet Bomb Vessel & Air Cooler**

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	15-70˚C
Storage Temperature	0-70˚C
Temperature Resolution	0.000001˚C
Reproducibility/Repeatability	<0.01% RSD
Resolution	0.0001 MJ/Kg
Results per hour	Up to 8-9 samples per hour using 3 bayonet bomb vessels and 2 Air Coolers
Measuring range max.	99MJ, 99000J
Working temperature min.	1˚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	40 bar
Balance/Scale Interface	RS232, 1200 to 38400 Baud (settable)
Printer Interface	RS232, 1.2Kb to 115.2Kb
PC Interface	USB
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
Dimensions	350mm x 280mm x 240mm
Weight	~ 12.000kg
Permissible Ambient Temperature	1-35˚C
Permissible Relative Humidity	80%
RS232 Interface	Yes
USB 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 16 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	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	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	Fully Automatic	Semi-Automatic	Semi-Automatic	Semi-Automatic
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-F 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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