



**DDS CALORIMETERS**

Scientific Analytical Calorimeter Solutions



# CAL3K-ST CALORIMETER

## Oxygen Bomb Calorimeter

MANUFACTURING SUPERB CALORIMETERS FOR TODAY'S ANALYTICAL NEEDS



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# CAL3K-ST CALORIMETER

The CAL3K-ST is the latest in the range of innovative new oxygen bomb calorimeters from DDS Calorimeters. The new range, from the engineers with over 40 years of experience who designed the CAL2K Oxygen Bomb Calorimeter range, is a totally dry type calorimeter, making it environmentally friendly and energy efficient. The CAL3K-S and CAL3K-ST also boasts the smallest carbon footprint in its class.

The CAL3K-ST 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-ST is the economical calorimeter of choice.

## COMPLETE SYSTEM

FOR USE WITH THE CAL3K-ST.

The CAL3K-ST is your intermediate 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 can be optionally added to the system:

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

**CAL<sup>3</sup>K**  
NEXT GENERATION CALORIMETERS

## COMPLETE SYSTEM

The CAL3K-ST system includes a calorimeter, 2 x standard quick thread bomb vessel, and an oxygen filling station. A spare bomb vessel can be purchased.

The calorimeter system can complete 3+ samples per hour. Part of the CAL3K-ST system is the external oxygen filling station (3K-3), standard across all manual filling calorimeter systems.



The complete CAL3K-ST 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.

First sample results within 5 minutes, repeat samples within 20 minutes using the built-in fan cooler.

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

The CAL3K-ST is a 2 Vessel system.

The system can analyse 3 samples per hour; a total of 16-21 samples per day.



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# CAL3K-ST CALORIMETER

## ADVANCED CAL3K-ST 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 400 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



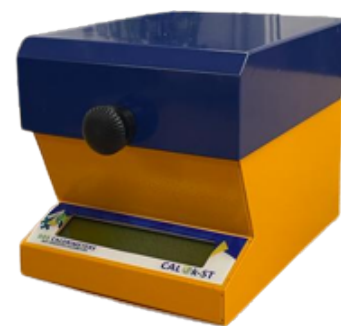
### RESULTS

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



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# CAL3K-ST CALORIMETER

## The CAL3K Bomb Calorimeter Installation Kit includes:

- Power Supply (External 12V/1.25A) (3K-1-055)
- 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)
- Wire Brush (3K-4-106)
- Deflate Cap (3K-3-18)
- RS232 PC Cable (3K-1-131)
- Printed Installation Manual (INSTALLATION-MANUAL)
- USB 32Gb Green Memory Flash Drive (3K-1-043)

## CAL3K-ST KIT AND CONSUMABLES

### The CAL3K Thread Vessel Installation 4K-4-Kit includes:

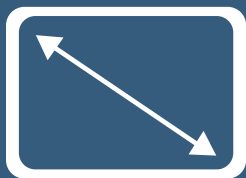
- Complete Top and Bottom Centre Electrode (3K-4-122)
- Outside Electrode (3K-4-124)
- Single Crucibles (3K-4-047)
- Deflector Plate (3K-4-092)
- Firing Cotton (Bundle of 100 threads) (3K-4-065)
- Firing Wire (5 per packet) (3K-4-093)
- Lid O-Ring (3K-4-094)
- Top and Bottom O-Ring in Vessel Lid (3K-4-022)

### 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 (3K-3-21)
- Defiller Cap (3K-3-22)
- Allen Key (3K-3-32)
- O-ring Lubrication Grease tube (3K-1-086)
- High Pressure Pipe 4mm (Clear/White) (3K-3-27)

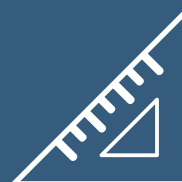


# TECHNICAL SPECIFICATIONS



## 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	5-50°C
Effective Temperature	0-70°C
Temperature Resolution	0.000001°C
Reproducibility/Repeatability	0.1% RSD
Resolution	0.0001 MJ/Kg
Results per hour	3 Samples per hour
Measuring range max.	99MJ, 99000J
Working temperature min.	5°C
Working temperature max.	50°C
Temperature Measurement Resolution	10ppm (parts per million)
Cooling Medium	Built-in Fan Air



# TECHNICAL SPECIFICATIONS

Specification	Information
Type of Cooling	Built-in cooling, Fan
Filling Oxygen Operating Pressure Max	40 bar max
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
Power Supply	220-240 / 100-120V, 12VDC, 1Amp
Frequency	50/60 Hz



# SYSTEM COMPARISON

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



# SYSTEM COMPARISON

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

The CAL3K-ST 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.



# 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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