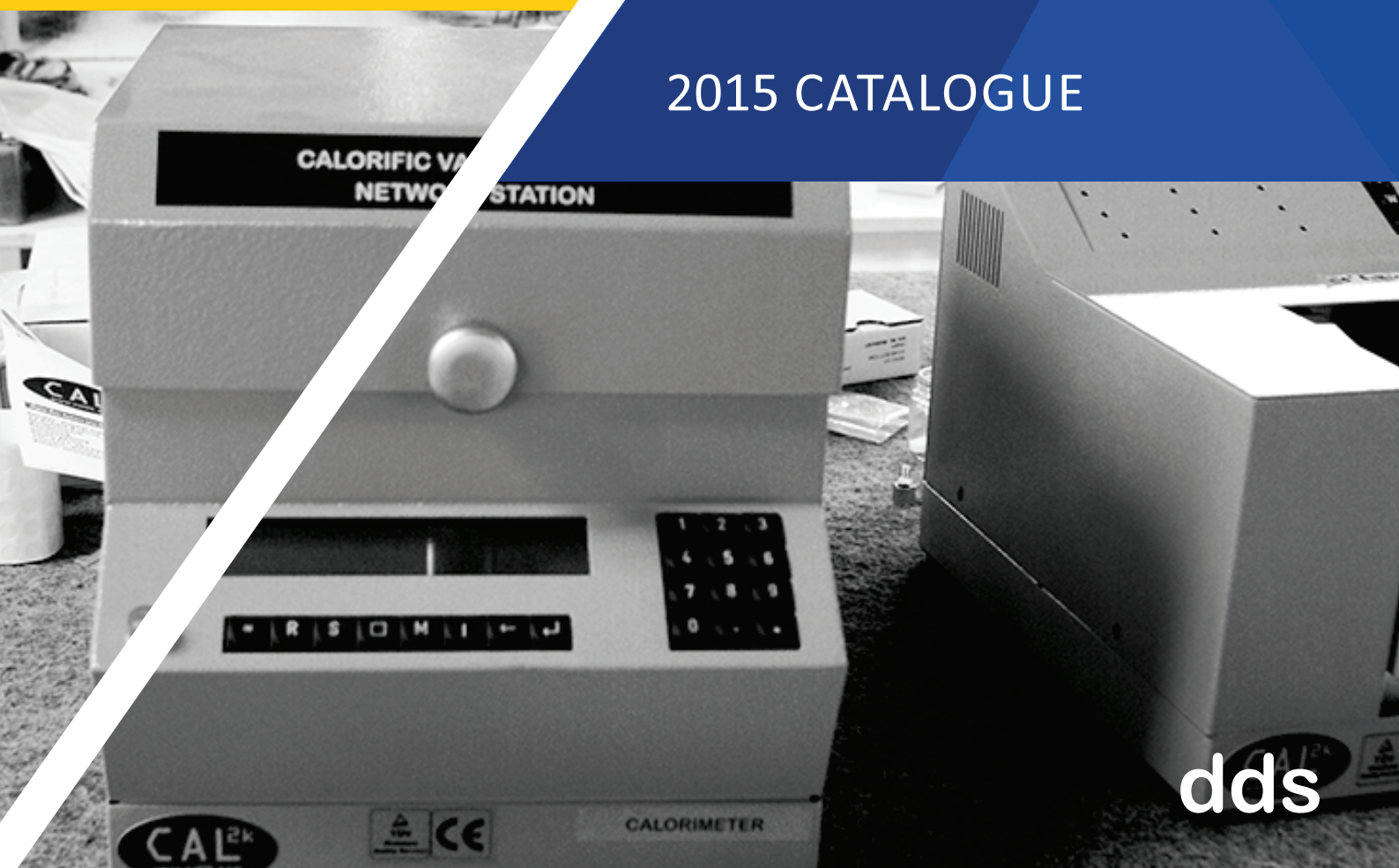




## 2015 CATALOGUE



dds

# DDS Product Catalogue

- Cal2K (Isothermal Bomb Calorimeter)
- Cal2K - System Features
- Cal2K - Technical Specifications
- Cal2K - Complete System
  
- ECO (Bomb Calorimeter System)
- ECO - System Features
- ECO - Technical Specifications
- ECO - Complete System
  
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- Quality Assurance
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## Isothermal Bomb Calorimeter

The CAL2k system is the most advanced, fully automatic calorimeter system available today. The result of years of research with dedicated engineers employing the latest state-of-the-art technology and the highest quality materials.

The CAL2k is easy to use and has special features which places it in a league of its own. Accuracy is guaranteed with microprocessors that use self-correcting processes, exceeding the standard requirements of DIN, ASTM and ISO. Its ability to interface with a personal computer, ensure preferred results with displays, data printouts and connectivity across a network.

The CAL2k has been designed for the high volume market and is most suitable for customers running 10 or more CV samples per day.



## System Features

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- Easy to maintain, self-system test for technicians.
- Compact Size - able to fit more systems into a standard laboratory.
- Fully automatic operation - temperature readings and calculations are done for you.
- Possible to network up to 7 calorimeters.
- Rapid and accurate determinations.
- 10 samples per hour using the CAL2K2 Water Cooler and 2 Vessels.
- Isothermal design using a waterless patented vessel (no water bucket, spillage or measuring)
- Large memory for storing more than 2000 determinations, including operating conditions and user statistics.
- Manual or automatic mass entry through the front panel, balance interface or PC.
- Automatic correction for firing wire, cotton, spikes, etc.
- Fully automatic calibration, with 10 stored calibration curves per vessel for standard deviation.
- Calibrated sensors built into vessel wall.
- Vessel is intelligent "SMART" with fault diagnostics and microprocessor.
- Adjustable firing limits set per vessel.
- High and low mass limits.
- Determination cycle adjustment
- Other features include User, Group and Sample ID.
- CE Certified, TÜV Certified.
- Precise and reproducible determination of gross calorific values according to ISO 1928, DIN 51900 and BS 1016:105.



## Software Features

- User controlled access for vital or routine operations
- Automatic result retrieval for selected and formatted data
- Weigh station operation
- Calorimeter and vessel setup
- Calibration management
- Service and maintenance routines
- Filing, printing and other operator functions, including data export and common faults
- Real time graphical temperature display
- Network status display
- Grouped sample determinations and analysis



## Enhanced Features

- Computer, balance and calorimeter interface.
- Adjustable firing voltages for different firing wire.
- Real-time clock with one-week backup.
- 1-Watt consumption.
- Manufacturer and history information stored on each vessel



## Technical Specifications

- Power

50/60 Hz      90 - 260 VAC

- Temperature Resolution

0.000001 °C

- Operating Temperature

0 - 60°C

- Calibration

Calibration Details per Calibration Curve. 10 Stored Calibration and Deviation Curves. Automatic Standard Deviation Calculations.

- Repeatability

0.1° (%RSD)

- Results per hour

10 samples (with two vessels)

- Resolution

0.001 (MJ/Kg)

# CAL2K System

# 01

## The Calorimeter

The CAL2k - 1 Calorimeter can operate as either a stand-alone unit or via PC. When operating as a stand-alone unit it is operated via the keyboard and all relevant information is displayed on the LCD Display. Up to 7 Calorimeters can be connected as a network with or without a PC.



## The Vessel

The CAL2k-4 vessel is the first of its kind and is the heart of the CAL2k System. Its sophisticated design allows the temperature to be measured to five decimal places in degrees Celsius. The vessel is an intelligent (SMART) vessel with a microprocessor built into its base. The vessel is capable of : firing counts, identification, memory and reconditioning data.

The vessel is the combustion chamber. It is made of stainless steel and tested up to a pressure of 300 atmospheres (4200psi).



## The Filling Station

The Filling Station is designed to fill the vessel with oxygen to 3Mpa. The filling rate is controlled so as not to disrupt the sample in the crucible. The Filling Station is extremely easy to operate and requires minimal adjustments and maintenance.

## The Cooler

The unit is designed to reduce the temperature of a recently fired vessel, obtained from the calorimeter, to ambient temperature in 2-3 minutes. Solid state cooling is used and the hot junction of the peltier elements is cooled by a continuous trickle of water from the mains water supply.



## High Pressure Oxygen Regulator

A supply of oxygen at a pressure of 3Mpa (30 bar) (3000Kpa) within 10 meters of the calorimeter system is required. A suitable high pressure regulator MUST be supplied to allow for this pressure. DDS can supply a suitable regulator at an additional cost or this item should be sourced locally by the agent or customer. However it is important to note that this item is VITAL and MUST be supplied before installation of the system.



## Bomb Calorimeter System

The ECO Bomb Calorimeter is the most affordable of the DDS Scientific product range. The ECO is the most Compact and Cost-Effective of all the models on offer. The ECO can handle 1 determination in an hour. It has been designed with the academic User in mind. It is ideal for low volume sample requirements typically found in Educational Institutions. The ECO Bomb Calorimeter System is packaged complete with : Calorimeter, Filling Station and Two Vessels.



## System Features

The ECO Bomb Calorimeter is the most affordable of the DDS Scientific product range. The ECO is the most Compact and Cost-Effective of all the models on offer. The ECO can handle 1 determination in an hour. It has been designed with the academic User in mind. It is ideal for low volume sample requirements typically found in Educational Institutions.

The ECO Bomb Calorimeter System is packaged complete with :  
Calorimeter, Filling Station and Two Vessels.

- Upload results from ECO
  - Interaction between the ECO and software
  - View Vessel Data
  - View real time graphical temperature display
  - High speed data communication
  - Allows for on-site firmware upgrades
  - Grouped sample determination and analysis
- 
- Conforms to ISO, DIN and ASTM International Standards
  - Ideal for low volume applications up to 1 sample per hour with one vessel.
  - Max. 8 samples per day.
  - 20 minutes per determination and a further 20 minutes to cool the vessel naturally, total 40 minutes per determination resulting in 1 sample per hour.
  - No Water Required
  - INEXPENSIVE. Breaks all price/performance norms due to mass production.
  - No operator attention required during analysis, the LCD display prompts the operator and displays faults in progress.
  - Uses the proven CAL2k "SMART VESSEL"
  - Small and compact
  - Uses standard PC keyboard (PS2)
  - Result retrieval connected to a PC, using the supplied WINDOWS XP software.
  - Factory calibrated, but can be calibrated in the field.
  - Stores 1000 results and other variables
  - Sample identification is settable and self-incrementing
  - Vessel temperatures can "stream" to a PC for user spreadsheet analysis.
  - Factory setup for standard operation, however some values can be changed via the keyboard to suit specific applications.



## System Features

- Default setup, which can be invoked from the keyboard
- Can use multiple vessels
- Can use "SPIKING" for hard to combust samples
- Can connect directly to a balance for MASS entry, or the mass can be entered via the keyboard.
- Built-in user diagnostic, which is ideal for first hand diagnostic
- Vessels are pre-programmed for 5000 determination cycles before inspection.
- Factory guaranteed for 3 years
- External power supply for 9 Volts, 100mA is supplied
- Works in BTU/lb, CAL/g, or MJ/Kg

## Technical Specifications

- Power

50/60 Hz

90 - 260 VAC

- Temperature Resolution

0.000001 °C

- Operating Temperature

0 - 60°C

- Repeatability

0.1° (%RSD)

- Calibration

Calibration Details per Calibration Curve. 10 Stored Calibration and Deviation Curves. Automatic Standard Deviation Calculations.

- Resolution

0.001 (MJ/Kg)

- Results per hour

10 samples (with two vessels)



## The Calorimeter

A small, desktop apparatus, in a warm buttercup yellow. It performs the temperature analysis of a sample. The operator, balance, vessel and PC interface together. It is insulated against ambient temperature changes via an "air barrier" and polystyrene. The ambient temperature is measured. It "fires" the sample by heating the firing wire inside the vessel.

The ECO has been designed for the low volume market and is most suitable for customers running less than 8 CV samples per day.



## The Vessel

The CAL2k-4 vessel is the first of its kind and is the heart of the CAL2k system. Its sophisticated design allows the temperature to be measured to five decimal places in degrees Celsius. The vessel is an intelligent (SMART) vessel with a microprocessor built into its base. The vessel is capable of : firing counts, identification, memory and reconditioning data.

The vessel is the combustion chamber. It is made of stainless steel and tested up to a pressure of 300 atmospheres (4200psi).



## The Filling Station

The filling station is designed to fill the vessel with oxygen to 3Mpa. The filling rate is controlled so as not to disrupt the sample in the crucible. The Filling Station is extremely easy to operate and requires minimal adjustments and maintenance.



## High Pressure Oxygen Regulator

A supply of oxygen at a pressure of 3Mpa (30 bar) (3000Kpa) within 10 meters of the calorimeter system is required. A suitable high pressure regulator MUST be supplied to allow for this pressure. DDS can supply a suitable regulator at an additional cost or this item should be sourced locally by the agent or customer. However it is important to note that this item is VITAL and MUST be supplied before installation of the system.



## Combustion Bomb Calorimeter

The CAL3K-AP uses a mixture of the Isothermal and Adiabatic methods - while still requiring no water. It features a new air cooler as well as a new bayonet bomb vessel and can achieve unsurpassed accuracy and repeatability. The maximum determination speed is 3 minutes, reducing the time to complete a sample determination. The CAL3K-AP makes use of the new bayonet vessel with the latest CAL3K technology.



The vessel is automatically filled with oxygen and features pressure monitoring. The oxygen filling pressure can be changed (programmed). The vessel pressure is recorded during the firing and the pressure curve is optionally monitored and analysed. This gives insight to the burning process.



**VARIABLE FILLING PRESSURE**  
Allows for variable filling pressure



**10 CALIBRATION OPENINGS**  
10 Calibration openings for different applications



**HIGH SPEED DETERMINATIONS**  
Choose between faster or more accurate determinations



**EXTREMELY ACCURATE**  
Extremely accurate (%RSD - 0.01%) determination eliminates multiple sample repeats



**MULTIPLE COMM CHANNELS\***  
2 Wired and 1 wireless communication channels. 3 Simultaneous channels. (RS232/USB/Bluetooth)



**USER FRIENDLY\***  
User Friendly Operation



**2 OPTIONAL SYSTEM LANGUAGES\***  
English and one alternative language



**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 50°C



**EVENT LOGGING\***  
Built-in event logging for ~6000 events (CAL3K-E ~3000 events)



**FAULT FINDING\***  
Extensive fault finding and testing



**TEMPERATURE ACCURACY**  
Temperature accuracy of 20ppm (parts per million) (0.00002°C)



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



**COMPENSATION\***  
Compensation for firing energy and sulphur



**APPLICATION SETUP**  
10 Default parameter fields for different applications.



**OPERATING PARAMETERS\***  
All operating parameters can be changed from the calorimeter



**RESTRICT ACCESS\***  
Operating parameter access can be restricted



**LARGE STORAGE\***  
Up to 1024 results storage (CAL3K-E up to 256 results)



**INTELLIGENT VESSEL**  
Intelligent vessel with built-in temperature sensing



**LINEAR SENSORS**  
Linear temperature sensing with improved sensors



**SAFETY**  
Safety checks guarantee the safety of the operator.



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



**BAYONET BOMB VESSEL**  
Self-locking and self-sealing bayonet bomb vessel



**AIR COOLER**  
No water required to cool the bomb vessel



**BALANCE INTERFACE\***  
Balance interface with baud speed setting



**IMPROVED INITIAL TIMING**  
Based on drift, stability, time, or any of the above.



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



**MOBILE APP VIA BLUETOOTH\***  
Mobile application compatible with Apple and Android devices



**FILTER DATA ON EVENTS\***  
Extensive testing and detailed data viewing



**CONSUMABLE COUNTING**  
Consumable firing wire and o-ring counting and warning



**TEMPERATURE CONTROL**  
No temperature control of room/lab required



**LEAK DETECTION**  
Detects leaks through the o-rings and stops the firing in the event of a leak



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



**THREE OPERATING MODES**  
Isothermal, Adiabatic and ISOBATIC



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

## Air Cooler

The new air cooler takes a step towards a greener future!

The new air cooler replaces the traditional (but very fast and expensive) water cooler. It uses less resources (water and electricity) to operate. The air cooler works best when the vessel is above the ambient temperature. This is possible because the Bayonet Vessel, with linear temp. sensing, allows higher vessel temperatures.

The air cooler can cool a vessel in approximately 6 minutes from 14°C to 4°C above ambient temperature. In other words, in a lab with 25°C ambient temp. a warm vessel of 39°C is cooler to 29°C in 6 minutes.

**Used with the new CAL3K Bayonet Vessel.**



## Bayonet Vessel

The new bayonet vessel has a stainless steel body with a reduced mass and a pressed on aluminium sleeve as a heat sink and temperature equalizer. This sleeve performs the task of the traditional water and stirrer.

The sensors are embedded in the vessel walls. The electronics are located in the bottom of the vessel and are vacuum encapsulated to prevent any liquid or dust from entering. The lid has three bayonet claws, and is topped with a low heat conducting plastic handle, which allows for easier handling of warm vessels.



## Combustion Bomb Calorimeter

An all new calorimeter - we've included all the latest gizmos in communication! The CAL3K-E is specially designed for those who already have the CAL2K-4 vessels, but want to make use of the latest CAL3K technology. The CAL3K-E still uses the existing CAL2K Filling Station and Cooler, but with added features.

The LIMS interface can connect via the RS232 port or via Bluetooth (NEW!). Oxygen filling is done manually with the CAL2K-3 Filling Station.

Field testing allows the operator to run a field test with no agent required.



The CAL3K-E is sold as a single unit, catering to those who already have the CAL2K-4 bomb vessel and CAL2K filling station. For more information and features on the CAL3K-E please visit [www.cal3k.com](http://www.cal3k.com).



# System Comparison

Features	CAL2k	ECO	CAL3K-AP	CAL3K-E
Operator Time per test :	2 minutes	5 minutes	2 minutes	2 minutes
Repeatability (%RSD) :	0.1%	0.1%	0.1%	0.1%
Calorimeter Type :	Static Jacket (Isothermal)	Static Jacket	Static Jacket	Static Jacket
Number of Vessels :	Unlimited (10+)	Limited (Up to 4)	Limited (Up to 8)	Limited (Up to 8)
Closure Type :	Screw Cap	Screw Cap	Screw Cap	Screw Cap
Tests p/h with 2 vessels :	10	1	6	6
Bomb Type :	Removable	Removable	Removable	Removable
Oxygen Filling :	Semi-automatic	Semi-Automatic	Semi-Automatic	Semi-Automatic
Bomb Washing :	Manual	Manual	Manual	Manual
Printer Connection :	RS232	RS232	RS232	RS232
Balance Connection :	RS232	RS232	RS232	RS232
Temperature Resolution :	0.00001°C	0.00001°C	0.00001°C	0.00001°C
Environmental :	10-40°C	10-40°C	10-40°C	10-40°C
Printing of Results :	Only via PC Software	Only via PC Software	Print results without PC on Std Printer	Print results without PC on Std Printer
PC Software :	Advanced	Limited	Limited	Limited
Correction Factors :	2	1	2	2
Mass Entry :	Auto or Manual	Auto or Manual	Auto or Manual	Auto or Manual
Keyboard :	Built In	PC Type (Std PS2)	PC Type (Std PS2)	PC Type (Std PS2)
Display :	LCD - English Only	PC Type (Std PS2)	LCD English & one alternative language	LCD English & one alternative language
CE/TÜV Certificate :	Yes	Yes	Yes	Yes
Calibration :	Single or Multiple	Single	Single	Single
Power Supply :	External 9V	External 9V	External 9V	External 9V
Memory :	2000 results	1000 results	+1000 results	+1000 results
Vessel Determinations :	5000	5000	5000	5000
Spiking :	Yes	Yes	Yes	Yes
Units of measure :	BTU/Mj/Cal	BTU/Mj/Cal	BTU/Mj/Cal	BTU/Mj/Cal

# Consumables



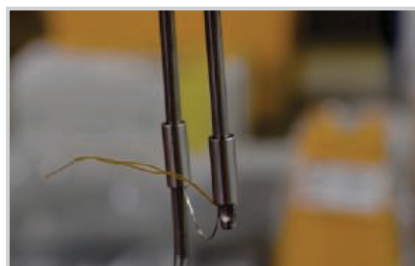
**Firing Cotton**

CAL2K-4-FC



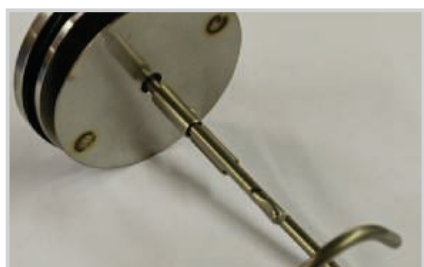
**Lid - O Ring**

CAL2K-4-LR



**Centre Electrode**

CAL2K-4-CE



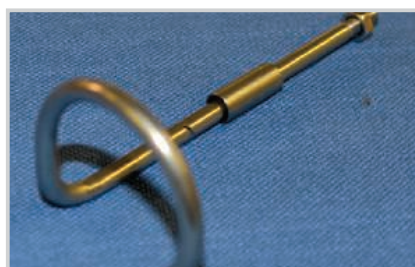
**Complete Lid Assembly**

CAL2K-4-CL



**Defiller Cap**

CAL2K-4-DC



**Outer Electrode**

CAL2K-4-OE



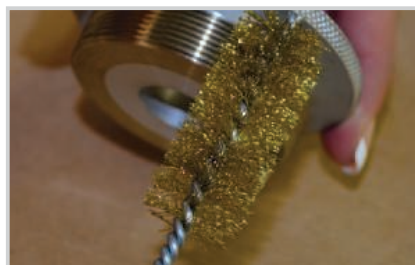
**Top & Bottom O Rings**

CAL2K-4-CR



**Handling Hook**

CAL2K-4-HH



**Wire Brush**

CAL2K-4-WB



**Crucible**

CAL2K-4-CB



**4-hole volatile tray for crucibles**

VOST-4



**8-hole volatile tray for crucibles**

VOST-8

# Consumables



**Gelatine Capsules**

CAL2K-4-GC



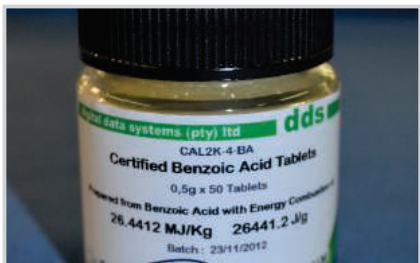
**Firing Wire**

CAL2K-4-FW



**Preparation Stand**

CAL2K-4-PS



**Benzoic Acid Tablets**

CAL2K-4-BA



**Deflector Plate**

CAL2K-4-DP



**Flow Adjustor O-Rings**

CAL2K-3-FR



**Water Pipe 10m**

CAL2K-2-WP



**Nozzle O-Rings**

CAL2K-3-NR



**High Pressure Oxygen Pipe**

CAL2K-3-OP



**Oxygen Regulator Connection**

CAL2K-3-RC



**Water Pipe Hose Clamps**

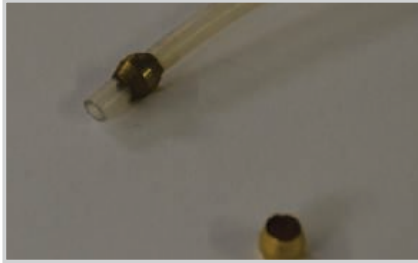
CAL2K-2-HC



**Power Supply**

CAL2K-1-SM

# Consumables



**Ferrule Pipe Nut**

CAL2K-3-COMPRESSION



**Balance Cable**

CAL2K-1-BC



**PC Cable**

CAL2K-PCC



**Ambient Cable**

CAL2K-2-AC



**Mains Cable**

CAL2K-MC



# Traditional Applications

## Fossil Fuels

Producers and users of solid combustible fuels like COAL and OIL use the instrument for quality assurance and exploration. The unit has excellent repeatability and accuracy in accordance with ISO, DIN and ASTM.



## Propellants

Here the instrument is used as a quality assurance tool. The vessel is not charged at all, or charged with an inert gas. A small sample is burned and the energy is displayed.



## Safety Applications

These applications are mainly concerned with the energy of a substance when burned in a domestic or industrial fire. Seat material in cars, paint on furnishings, plastic used in airliners, floor covers etc. Obviously the flashpoint and gas emissions are important, but the energy of the substance is as well.

## Heat Ignitable Explosives (Armaments)

The development and secrecy in the industry prevents us from publishing details. But if the substance can be ignited by heat, then the DDS range of bomb calorimeters can measure it. Typical applications are igniter caps and charges. The vessel is at present used for quality control. The speed of combustion is not measured.

## Scientific Research

These applications are endless. Most refer to methods related to combustible energy. However, the rising cost of traditional energy has resulted in more research. A shroud of mystery surrounds the un-conventional energy research, but we have heard of measuring the energy absorption of leaves during sunshine, measuring the energy contained in production by-products, and measuring the energy in vegetable oils. The unit measures disposable waste in accordance with ASTM D5468-02.

## Volatile Fuel & Oils

With the price of crude oil escalating as it is at present, the energy or calorific value of fuels is becoming more and more critical. The calorific value of fuel determines the amount of energy contained in it - this means that a fuel of high calorific value will give more energy and thus more propulsion to the vehicle than the fuel of lower calorific value. All liquid fuels can be analyzed in a bomb calorimeter unit. The determination is performed in accordance with ASTM D240-02 and D4809-00 standards.





# Non-Traditional Applications

## Animal Feed Production

It is obvious that digestible energy is not equivalent to combustible energy. However, the bomb calorimeter can be used in a comparative fashion in quality control in animal feed production and optimization of feed consumption. The instrument is used in animal and dairy research, Departments of Agriculture, Universities and the private industry.

The aims are to improve the nutritional value of the feed, or optimize the nutritional absorption by animals. The unit has proved to be a fast and reliable tool in comparison to wet digestive methods.

## Production and use of edible oils

The digestive calories of vegetable oils are nearly the same as combustible energy. Therefore the instrument is ideally suited for incoming control of raw products during oil production.

Consequently, any food production, which uses oil in the process, can use the calorimeter to measure the oil content of the final product. Since we are all concerned with the daily intake of calories, the instrument is used to control the use of oil during production of potato chips, canned beef and fish.

## What is Bomb Calorimetry?

Bomb Calorimetry - a procedure which determines the heat of combustion or calorific value of solid and liquid materials which are burned as fuels. It is a primary test of great importance to the following industries : coal production, power stations, fuel analysis, animal feed research, educational institutes, commercial analytical laboratories, by-product analysis, building materials, etc.

## A Brief History

Digital Data Systems (DDS) has more than 40 years 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.

# A Brief History

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.

## “Dry” Static Jacket vs Isoperibol Calorimetry Method

**Difference between the dry isothermal static jacket method and the Isoperibol method :**

**Refer to ISO 1928**

Isothermal covers both static jacket (DDS Bomb Calorimeters) and Isoperibol systems.

Isoperibol calorimeters control the temperature of the surrounding jacket so that it is at a constant temperature.

The static jacket has a thermal capacity such that the temperature of the surrounds remains nearly constant without active control. The variation in the static jacket is measured and compensated for.

**Bomb Vessel Construction :**

DDS - The vessel has a stainless steel body with an aluminium sleeve pressed over it.  
Isoperibol - Stainless Steel

**Temperature measurement of surrounds :**

DDS - The ambient box containing the polystyrene (static jacket) is monitored throughout the determination. Isoperibol - The jacket is water maintained at a constant temperature.

# Dry Static Jacket Method

## Temperature measurement of energy :

DDS - Sensors placed between the stainless steel body and the sleeve measure the energy released during a determination. A microprocessor is built into the vessel making the calibration independent of the calorimeter.  
Isoperibol - The vessel is placed in a bucket of water and then the temperature of the water in the bucket is measured.

## Advantages of the Dry Static Jacket DDS Bomb Calorimeters :

- Fast accurate results
- No water used inside the calorimeter
- No water control valves
- Systems are virtually maintenance free
- Can use multiple bomb vessels per calorimeter
- Vessels can be used in any calorimeter

## Warranty

12 Months from date of warranty registration. For the complete Manufactures Warranty, please contact Digital Data Systems or your nearest agent.

## Consumables

Digital Data Systems supplies a complete range of consumables and accessories required to operate your bomb calorimeter system. Complete systems are supplied with kits which are required to get you started, however further consumables required can be ordered directly from DDS or your service agent. Consumables and accessories available for order are :

- |                      |                        |
|----------------------|------------------------|
| • O-Rings            | • Benzoic Acid Tablets |
| • Center Electrodes  | • Crucibles            |
| • Outside Electrodes | • Gelatine Capsules    |
| • Deflector Plates   |                        |
| • Firing Wire        |                        |
| • Firing Cotton      |                        |

# Quality Assurance

Digital Data Systems designs and operated under a strict quality control program which ensures that all our products are of the highest standards and quality. The DDS calorimeters carry the CE mark certifying compliance with the EC Directives 89/336 EEC for EMC compliance and EC Directives 72/23/EEC for low voltage electrical safety and 97/23 EEC for design, manufacturing and conformity evaluation process of Pressure Equipment, as well as Pressure Equipment Assemblies.

## Compliance with Standard Test Methods

The unique isothermal "dry" static jacket method is designed and manufactured in accordance with the following Internationally recognized standards :

### **ISO 1928: 1995**

Solid mineral fuels - Determination of gross calorific value by the bomb calorimeter method, and calculation of net calorific value.

### **DIN 51900**

Determination of calorific value and calculation of heat values with the bomb calorimeter procedure with isothermal jacket.

### **British BS 4791: 1985**

Specification for Calorimeter Bombs

### **British BS 1016:105:1992**

Methods for analysis and testing of coal and coke. Determination of gross calorific value using adiabatic, isothermal or static bomb calorimeter.

### **ASTM D240-02**

Heat of combustion of Liquid Hydro Carbon Fuels by Bomb Calorimeter.

# Standard Test Methods

## ASTM D4809-00

Heat of combustion of Liquid Hydro Carbon Fuels by Bomb Calorimeter (Precise Method).

## ASTM E144-94

Standard Practice for Safe Use of Oxygen Combustion Bombs.

## International Standards

ASTM	Description	Year	Complies
D240-02	Heat of Combustion of Liquid Hydrocarbon Fuels by Bomb Calorimeter	2002	Yes
D4809-00	Heat of Combustion of Liquid Hydrocarbon Fuels by Bomb Calorimeter (Precision Method)	2000	Yes
E144-94	Standard Practice for Safe Use of Oxygen Combustion Bombs	1994	Yes
British	Description	Year	Complies
BS 4791:1985	Specification for Calorimeter Bombs	1985	Yes
BS 1016:105:1992	Methods for analysis and testing of coal and coke. Determination of gross calorific value using adiabatic, isothermal or static bomb calorimeter.	1992	Yes
DIN	Description	Year	Complies
DIN 51900-2	Determining the Gross Calorific value of solid and liquid fuels using isoperibol or static jacket calorimeter and calculation of net CV	2003	Yes
ISO	Description	Year	Complies
ISO 1928	Solid mineral fuels - Determining Gross calorific value by bomb calorimetric methods and calculation of net CV	1995	Yes

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Or contact us direct on email : [calo@ddsystems.co.za](mailto:calo@ddsystems.co.za)  
or contact your nearest agent.