



Parr Instrument Company

Bulletin 1341

Series 1341 Plain Jacket Oxygen Combustion Calorimeters



1341

Designing and Building High Precision Combustion Calorimeters for 120 Years

Series 1341 Plain Jacket Oxygen Combustion Calorimeters



1341 Plain Jacket Calorimeter with 6775 Digital Thermometer & 2901 Ignition Unit

Bomb Calorimetry

A fundamental test of great significance to anyone concerned with the production or utilization of solid or liquid fuels.

One of the most important tests in the evaluation of materials which are burned as fuels is the determination of the heat of combustion, or calorific value. These measurements can be made quickly and accurately in Parr oxygen bomb calorimeters, utilizing either the latest in automatic calorimetric equipment or in simple calorimeters in which all elements have been reduced to their fundamental forms. Uses for these calorimeters extend into any chemical, physical, or physiological process in which heat generation or burning is an important factor. Principal applications include calorific measurements for:

- Coal and coke, all varieties and types
- Fuel oil, both heavy and light varieties

- Gasoline, all motor fuel and aviation types
- Jet fuels, all varieties
- Combustible wastes and refuse disposal
- Foodstuffs and supplements for human nutrition
- Forage crops and supplements for animal nutrition
- Building materials
- Explosives and heat powders
- Rocket fuels and related propellants
- Thermodynamic studies of combustible materials
- Energy balance studies in ecology

Ideal for Laboratory Instruction

The 1341 is ideal for teaching the fundamentals of calorimetry.

Using the Parr 6775 Digital Thermometer included with the 1341, temperature points are manually recorded and plotted. Students perform the calculations to determine the energy released from the sample.

With the addition of the optional Parr 6772 Calorimetric Thermometer students or faculty can automate the temperature acquisition and calculations in cases where manual calculations are not desirable.

For occasional calorific tests

The 1341 Calorimeter is an improved version of a plain, static jacket calorimeter that has been made by Parr for nearly 100 years. It is a reliable calorimeter that can be used for a full range of solid and liquid samples, but it is recommended primarily for users who make only an occasional calorific test, or whose work load does not justify the purchase of an automatic model. Its modest cost and simple design make it well suited for intermittent use. The calorimeter requires no permanent connections. It can be set-up and ready to operate in a few minutes, and, when not in use, it is easily disassembled and stored on a shelf.

Many Applications

The 1341 Calorimeter can be used to determine the calorific value of coal, oil, foodstuffs and any other materials which can be burned safely in an oxygen bomb. Calorific tests for coal and solid fuels are made in accordance with ASTM Standard Test Method D5865, "Standard Test Method for Gross Calorific Value of Coal and Coke." The 1341 Calorimeter is also an excellent instrument for teaching calorimetry and heat measurement techniques in a student laboratory since it provides all of the instrumentation needed for such tests, but with each element in the system reduced to fundamental forms.

Although commonly called a "plain" calorimeter because of its simple design, technically this is a static jacket instrument which operates at or near room temperature with no provision for temperature adjustment or control. Compensation for any heat loss (or gain) during a test is made by applying a correction computed from heat leak measurements taken immediately before and after each test. Because of the additional time required for these measurements, the speed with which a test can be performed in this calorimeter is slower than in a microprocessor controlled, automatic model. Ten or twelve tests can be completed in an eight hour day, whereas approximately five times this number can be run in the same period using a Parr Automatic Calorimeter.

Good Repeatability

Good repeatability can be obtained with the 1341 Calorimeter provided that

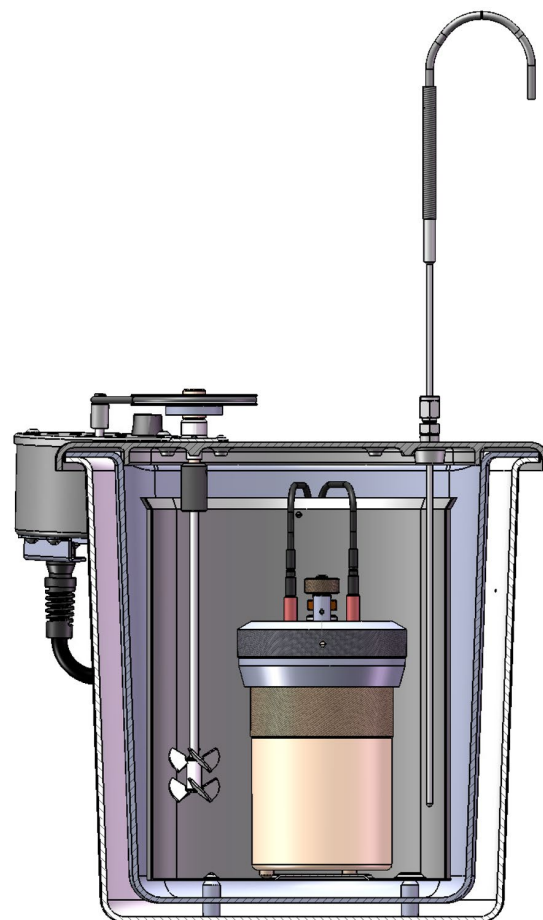
the temperature rise and the heat leak correction are measured and applied carefully. When operated with the standard 6775 Digital Thermometer supplied with the instrument, standard deviations in a series of tests with a uniform sample, such as benzoic acid, should not exceed 0.3%. This repeatability can be improved by using a Parr 6772 Calorimetric Thermometer. Users requiring better precision should consider one of the other Parr calorimeters. Values obtained when testing a non-homogeneous material, such as coal, may show a wider spread than when testing a uniform material.

An Effective Thermal Jacket

The 1341 Calorimeter has a high strength, molded fiberglass jacket formed with double walls and a double cover to provide an oval chamber for the calorimeter bucket which is completely surrounded by sealed, dead air space. This simple yet effective insulating system allows very little heat transfer between the calorimeter and its surroundings. A stirring shaft and thermister are attached to the cover and are removed with the cover when the calorimeter is opened. Stirring is provided by a small motor attached to the jacket but sufficiently removed so that it does not add heat to the system. A pair of wires with banana plugs carry the firing circuit to terminals on the bomb head. Outside dimensions of the cylindrical jacket are 10-7/8" dia. X 10-3/4" high.

Calorimetric Thermometers

Each 1341 Calorimeter is equipped with a Parr 6775 Digital Thermometer.



1341 Calorimeter Cross Section

Parr test certificates are furnished for each thermometer.

For easier measurements and automatic calculation of results, Parr offers the 6772 Calorimetric Thermometer.

Ignition Unit

The Parr 2901 Ignition Unit is included with the 1341. The 2901 unit operates from a 115 volt line and has a push switch, indicator light and output terminals on its top panel. Ignition units for 230 volt operation are available also.

1341 Ordering Guide

1341 Plain Jacket Calorimeter

Model No.	Voltage	Description
1341EB	115V 50/60 Hz	Bomb Calorimeter with 1108 Oxygen Bomb and 2901EB Ignition Unit
1341EE	230V 50/60 Hz	Bomb Calorimeter with 1108 Oxygen Bomb and 2901EE Ignition Unit
1349B	NA	Spare Parts Kit for 1341 Calorimeter

The Parr Limited Warranty

Parr Instrument Company (Parr) combustion bombs, calorimeters, reactors, pressure vessels and associated products are designed and manufactured only for use by or under the direct supervision of trained professionals in accordance with specifications and instructions for use supplied with the products. For that reason, Parr sells only to professional users or distributors to such users. Parr produces precision equipment and associated products which are **not intended for general commercial use**.

EXCLUSIVE WARRANTY

To the extent allowed by law, the express and limited warranties herein are the sole warranties. **Any implied warranties are expressly excluded**, including but not limited to implied warranties of merchantability or fitness for a particular purpose.

WARRANTY CONDITIONS:

- 1. Non-assignable.** The warranties herein extend only to the original purchaser-user and to the distributors to such users. These warranties or any action or claims based thereon are **not assignable or transferable**.
- 2. Use of product.** The warranties herein are applicable and enforceable only when the Parr product:
 - a. Is installed and operated in strict accordance with the written instructions for its use provided by Parr.
 - b. Is being used in a lawful manner.
 - c. Has not been modified by any entity other than Parr Instrument Company.
 - d. Has been stored or maintained in accordance with written instructions provided by Parr, or if none were provided, has been stored and maintained in a professionally reasonable manner.
- 3. The user's responsibility.** Parr engineers and sales personnel will gladly discuss available equipment and material options with prospective users, but the final responsibility for selecting a reactor, pressure vessel or combustion bomb which has the capacity, pressure rating, chemical compatibility, corrosion resistance and design features required to perform safely and to the user's satisfaction in any particular application or test must rest entirely with the user – not with Parr. It is also the user's responsibility to install the equipment in a safe operating environment and to train all operating personnel in appropriate safety, operational and maintenance procedures.

- 4. Warranty period.** Unless otherwise provided in writing by Parr, the warranties herein are applicable for a period of one year from date of delivery of the product to the original purchaser/user. Note, however, that there is no guarantee of a service life of one year after delivery.
- 5. Notification.** To enforce any express warranty created herein, the purchaser/user must notify Parr in writing within thirty (30) days of the date any defect is detected. Upon request of Parr, the part or product involved must be returned to Parr in the manner specified by Parr for analysis and non-destructive testing.

EXPRESS WARRANTIES

Subject to the above Conditions, Parr expressly warrants that its products:

1. Are as described in the applicable Parr sales literature, or as specified in Parr shipping documents.
2. Will function as described in corresponding Parr sales bulletins or, for specially engineered assemblies, as stated in the sales proposal and purchase agreement.
3. Will remain free from defects in materials and workmanship for the Warranty Period.

LIMITATIONS ON THE PARR WARRANTY

As to the original purchaser/user and to the distributors to such users, Parr limits its liability for claims other than personal injury as follows:

- 1. Replacement or repair.** With respect to express warranties herein, Parr's only obligation is to replace or repair any parts, assemblies or products not conforming to the warranties provided herein.
- 2. Disclaimer of consequential damages.** In no event shall Parr be liable for consequential commercial damages, including but not limited to: damages for loss of use, damages for lost profits, and damages for resulting harm to property other than the Parr product and its component parts.

INDEMNITY AND HOLD HARMLESS

Original purchaser-user agrees to indemnify and hold Parr harmless for any personal injuries to original purchaser-user, its employees and all third parties where said injuries arise from misuse of Parr products or use not in accordance with specifications and instructions for use supplied with the Parr products.



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