Parr Condensed Catalog

Designing and Building High Precision Scientific Equipment for Over 100 Years








Bomb Calorimeters
High Pressure Stirred Reactors
Glass Reactors
Sample Prep...and more.

The PDF version of this catalog contains bookmarks for your convenience and many hyperlinks which will take you to our website.
If your cursor changes when hovering over text or photos it indicates there is a hyperlink.

Welcome

Founded more than 100 years ago by University of Illinois Professor S.W. Parr, Parr Instrument Company has consistently strived to provide for its customers the very best in product, service and support.

Since the founding of Parr Instrument Company more than 100 years ago we have been engaged exclusively in the manufacture and sales of combustion bombs, oxygen bomb calorimeters, high pressure-stirred reactors, pressure vessels, sample preparation vessels and related equipment developed specifically for laboratory use. Throughout this history, the primary emphasis has been to provide our customers with the highest quality apparatus, carefully designed for each application and backed by a competent technical support staff with many years of experience in these specialized fields. During the past one-hundred years, many talented and dedicated men and women have worked to apply the technologies and material of their day to the fundamental problems of the laboratory market. The current team of professionals has continued to provide the product innovation and quality that has made the words "Parr Bomb" synonymous with performance and safety. While we believe that we have met that goal and are happy to celebrate a century of progress, we realize that we are just at the beginning of our second century.

The principal products now included in the Parr line are described briefly in this catalog, with references to more detailed catalogs that provide additional details and ordering information. To obtain any of these specific product bulletins, please phone, e-mail, fax, or see our web site.

Parr is proud to offer these products as a part of our continuing effort to be of service to scientists and technicians everywhere who understand the need for top quality equipment when working with chemical reactions, laboratory tests and procedures which must be conducted under heat and pressure.

There are a number of other things we would like to share with you, which do not lend themselves well to catalog descriptions. We have installed world-class production equipment and procedures to ensure that quality products will be produced on reliable schedules. We have also developed unique design and engineering capabilities, which let us customize our basic designs to our customer's unique research needs and schedules. Our goal is to deliver any of the items in this catalog within two weeks, when customization is not required, and ship standard service parts within two days of the receipt of an order.

Finally, we are investing in a process of continuous improvement for our existing products to bring significant breakthroughs to our customers.

Mike Steffenson, President
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International Customers

The world grows smaller everyday. To serve the information needs of all our clients, we have developed a network of distributors, dealers and agents to serve your needs. We have agents and distributors in most countries worldwide. Each of these agents and distributors receives training at our factory for our complete product line and are an excellent source for assistance and solutions for your product requirements. They are listed on our website with the latest address, telephone, telefax and e-mail information.

At www.parrinst.com you will find detailed information about the products highlighted in this catalog. The information on our website is constantly updated.

World Wide Standards

Parr Instrument Company has designed, installed and operates under a Quality Assurance Program, which ensures that all aspects of the design, materials selection, procurement, manufacture, testing and certification of its calorimeters and pressure vessels are performed in accordance with accepted codes and practices.

ISO 9001-2000 Certification

Parr Instrument Company's overall Quality System has been certified to comply with ISO 9001-2000 by TÜV Industrie Service GmbH Sud Gruppe. ISO 9001-2000 covers the design, production, inspection, testing and customer service aspects of Parr's activities as opposed to the certification of an individual product.

ASME

All Parr Reactors and Pressure Vessels are built to comply with the ASME Boiler and Pressure Vessel Code, Section VIII. ASME certificates and National Board Registrations can be furnished for a modest fee.

CE PED

Pressure Vessels built for customers within the European community are designed to the Pressure Equipment Directive and Parr is authorized to apply the CE mark to these vessels where permitted and required.

CE Certification

Where appropriate, Parr products will carry the CE mark certifying compliance with the E.C. Directives for EMC compliance, low voltage electrical and mechanical safety.

CSA Certification

Where appropriate, Parr products are manufactured and certified to the electrical code standards established by the Canadian Standards Association (IEC 1010). The CSA logo is shown on the nameplate of each CSA unit.

Calorimetry Standards

The basic requirements in each of the current ASTM, ISO, BS and DIN international standards for repeatability and reproducibility are met or exceeded by all Parr Isoperibol Calorimeters.

PED ISO 9001-2000 TÜV

Table of Contents

Oxygen Bomb Calorimeters

6300 Automatic Isoperibol Calorimeter

6200 Isoperibol Calorimeter

6100 Compensated Jacket Calorimeter

1341 Plain Jacket Calorimeter

6755 Solution Calorimeter

Parr offers a family of calorimeters from which the user can select an instrument well matched to the laboratory's requirements for precision, testing load, automation, operating environment, sample size, existing equipment and specialty preferences.

Model 6300

The Model 6300 Isoperibol Calorimeter offers the highest degree of automation and precision of any calorimeter on the market today. It utilizes proven fixed bomb and bucket technology. This design concept makes it possible to offer automation of the full calorimetric determination. Instead of removing the entire combustion bomb, opening it, washing it, recharging it and reinstalling it in the calorimeter, the operator simply removes the head of the vessel, replaces the fuel capsule with the next sample, installs the cotton fuse and reinserts it in the cylinder.

Model 6200

Model 6200 is also a microprocessor controlled, isoperibol, oxygen bomb calorimeter, but differs from the 6300 Model in that the bomb and bucket are removed from the calorimeter and refilled manually for each test. It uses the Parr 1108 Oxygen Bomb and oval bucket, with a semi-automatic system for charging the bomb with oxygen. Thermal jacketing is provided by a circulating water system that holds the jacket temperature constant for isoperibol operation.

Model 6100

The 6100 Compensated Jacket Calorimeter is intended for the user with less stringent precision requirements. The controller in the 6100 Calorimeter monitors but does not control the temperature of the jacket. Heat leak corrections are based upon the actual jacket temperature and are determined and applied in real time. This eliminates all water and water connections, resulting in a significant saving in cost.

Model 1341

The 1341 Calorimeter is a static jacket instrument. Compensation for any heat loss (or gain) during a test is made by applying a correction computed from heat leak measurements taken before and after each test. The calorimeter requires no permanent connections and is widely used for teaching calorimeter principals.

The 6772 Precision Thermometer can be used to add automation and digital thermometry to this calorimeter.

Model 6725

The 6725 Semimicro Calorimeter is a compact combustion calorimeter designed for measuring the heat of combustion of small samples. The 22 mL, 1107 Bomb used in this calorimeter will handle samples ranging from 25 to 200 milligrams and liberating up to 1200 calories when burned in oxygen. Effective static thermal insulation is provided by using a silvered glass Dewar as the calorimeter vessel. The 6725 Semimicro Calorimeter provides all of the precise temperature measurement and data handling capabilities of the larger calorimeters.

Model 6755

The Parr 6755 Solution Calorimeter provides an easily operated instrument for measuring enthalpy changes produced by chemical reactions in solution. Measurements are made at ambient temperature and at atmospheric pressure in either liquid-liquid or liquid-solid systems. This system will handle energy changes ranging from 2 to 1000 calories. All operations are straightforward and simple, using a menu driven touch screen display.

Guide to Parr Calorimeters

Model No.	*Description*	*Precision (RSD)*	*Tests/Hour (As Equipped)*	*Operator*	*Bomb / Bucket Style*	*Catalog*
6300	Automatic Isoperibol Calorimeter	0.10%	6-8	1 minute	Fixed Head / Fixed Bucket	6000
6200	Isoperibol Calorimeter	0.10%	4-9	6 minutes	Removable Bomb & Bucket	6000
6100	Compensated Jacket Calorimeter	0.20%	4-8	6-7 minutes	Removable Bomb & Bucket	6000
1341	Plain Jacket Calorimeter	0.30%	2	25 minutes	Removable Bomb & Bucket	6000
6725	Semimicro Calorimeter	0.40%	3	6-7 minutes	Semimicro Removable Bomb / Dewar Flask	6000
6755	Solution Calorimeter	0.40% (Rise of 1.5 to 5 °C) 1.00% (Rise of <0.5 °C or >6 °C)	3	6-7 minutes	Dewar Flask	6000

Stirred Reactors


Series 4590


Series 4560


Series 4520


Series 4530


Series 4540


Series 4550

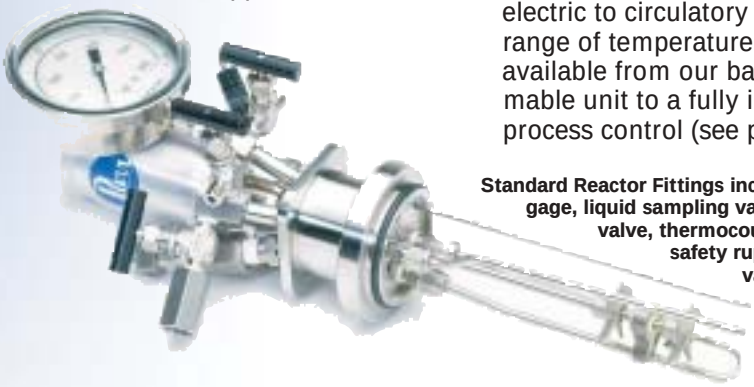

Series 4555


Series 4570/80

Parr Instrument Company offers a wide selection of stirred reactors with volumes ranging from 25 ml to 5 gallons (18.75 liters). Designs are offered for operating pressures to 5000 psi (350 bar) and for operating temperatures to 500 °C.

Applications

These reactors are used in many branches of chemical technology. Catalytic hydrogenation with its associated catalyst development and testing is certainly one of the principle applications of these reactors with their excellent three phase mixing designs. Polymer development is another major area of application. Additionally, the vessels have been used extensively in hydrometallurgical applications.



Standard Reactor Fittings include: pressure gage, liquid sampling valve, gas release valve, thermocouple or thermowell, safety rupture disc, gas inlet valve, dip tube, cooling coil, and an internal stirring system.

Design Features

Parr offers a wide choice of design options to meet the users' individual installation or operating requirements. For users with multiple feed, vent and instrumentation needs, we offer a fixed head design. The movable vessel is offered to users who wish to charge or recover reactants and products away from the operating area. We offer quick-opening, O-ring sealed vessels for users looking for convenience at moderate operating temperatures and PTFE or Graphoil gaskets for users requiring higher operating temperatures.

Magnetically coupled stirrer drives are offered in high and low speed designs in four operating torque ranges. Heaters range from electric to circulatory jackets. A wide range of temperature controllers are available from our basic programmable unit to a fully integrated process control (see pages 10-11).

Many accessories are available such as internal cooling coils, bottom drain valves, condensers, custom stirrers, explosion proof components, liquid or gas charging systems and electrical glands to highlight a few.

Materials of Construction

To meet the wide range of corrosive environments encountered in the many chemical and mining applications for which reactors are used, Parr offers stirred reactors constructed from the following alloys:

- T316 Stainless Steel
- Alloy 400
- Carbon Steel
- Alloy 600
- Alloy C-276
- Alloy B-3
- Alloy 20Cb-3
- Titanium
- Nickel
- Zirconium

Pressure Vessel Catalog

These reactors, temperature controllers and their related accessories are described in detail in the Tenth Edition of the Parr Stirred Reactors and Pressure Vessels Catalog as well as on our website.

Guide to Parr Stirred Reactors

Model Number	*Reactor Type*	*Nominal Size*	*Maximum Pressure psi (bar)*	*Maximum Temperature °C*	*Catalog*
4591-4598	Micro, Bench Top	25 - 100 mL	3000 (200)	225 to 350	4500
4561-4568	Mini, Bench Top	100 - 600 mL	3000 (200)	225 to 350	4500
4523-4526	Mid-Size, Bench Top & Floor Stand	1000 & 2000 mL	1900 (130)	225 to 350	4500
4531-4536	Mid-Size, Floor Stand or Cart	1000 & 2000 mL	1900 (130)	225 to 350	4500
4544-4547	High Press. / Moderate Temp., Bench Top, Floor Stand or Cart	600 & 1200 mL	5000 (345)	350	4500
4551-4554	General Purpose, Floor Stand or Cart	1 & 2 gallon (3.75 & 7.5L)	1900 (130)	225 to 350	4500
4555-4556	General Purpose, Floor Stand	5 & 2.6 gallon (18.75 & 10L)	1900 (130)	350	4500
4571-4572, 4577-4578	High Press. / High Temp., Floor Stand or Cart	1000 & 1800 mL	5000 (345)	500	4500
4575-4576, 4575A-4576A	High Press. / High Temp., Bench Top	500 & 250 mL	5000 (345)	500	4500
4581-4584	High Press. / High Temp., Floor Stand or Cart	1 & 1.5 gallon (3.75 & 5.5L)	3000 (200)	500	4500

Specialty/Custom Reactors

5100 Glass Reactor with Cover Off

5500 Compact Reactor & 4836 Controller

5000 Multi Reactor System (MRS) with 4870 Controller

Custom Multiple Reactor Configuration

Parr offers both specialty reactors and custom modifications to our line of stirred reactors and pressure vessels. See the Tenth Edition of the Parr Stirred Reactors and Pressure Vessels Catalog as well as our website for more details on these vessels.

Glass Reactors

Parr Series 5100 Low-Pressure Reactors feature transparent glass vessels designed for operating pressures to 150 psi (10 bar) and temperatures to 225 °C. These reactors are offered in six different sizes ranging from 160 to 1500 mL. Interchangeable metal vessels are available which will raise the operating pressure limit to 1000 psi (69 bar).

These reactors are equipped with magnetically driven internal stirrers, inlet and sampling valves, circulating jackets and controllers as well as safety relief devices and protective shielding.

Compact Reactors

Parr Series 5500 High Pressure Compact Reactors are available in seven sizes ranging from 25 to 600 mL. They are designed for operating pressures to 3000 psi (200 bar) and temperatures to 350 °C. The vessels are available in a variety of materials of construction.

The reactors feature an aluminum block heater, which also serves as the vessel support system. This heater system and the included 4836 Temperature Controller each take up less than one square foot of bench space. They can easily be set up or stored away when not in use.

The vessels are available with either a flat PTFE gasket for temperatures to 350 °C or a self-sealing O-ring for temperatures up to 225 °C. A compact magnetic drive and a directly coupled motor provide vigorous stirring at speeds up to 1800 rpm. The 4836 Temperature Controller provides PID control with ramp and soak programming and digital communication to any connected PC.

Multiple Reactor System

The 5000 Multiple Reactor System has been designed for rapid screening of catalyst and similar parallel or combinatorial studies. Six individual reactors are provided for operating pressures to 3000 psi and temperatures to either 225 °C with a self-sealing O-ring or 300 °C with a PTFE gasket.

The control system is based on the Parr 4870 Process Controller. This system provides individual temperature monitoring, individual pressure monitoring, constant stirring speeds, computer control, display, logging, and data reduction.

Vessels are available with volumes designed for heterogeneous catalysis: 75 or 45 mL. A magnetic stirrer bar provides sample mixing. The vessels can be furnished in special materials if unusual corrosive conditions are expected.

The manifold system permits the rapid purging and filling of all vessels to the same starting pressure. Alternately, these vessels can be filled with varying initial starting pressures.

A variety of custom modifications are available for this system. The valves can be mounted either directly on the vessel head or remotely on the manifold panel. Sample valves with dip tubes are available for sampling liquids during the reaction.

Parr also offers parallel systems which can incorporate any of our stirred reactors.

Custom Reactors

Each year the Parr Technical Sales and Engineering Departments design hundreds of custom vessels for our customers. These may be simple modifications of standard vessels such as adding or changing valves, adjusting volumes, or adding windows, condensers or gas or liquid charging systems. At the other end of the development spectrum are completely new vessel designs within our manufacturing range for systems involving automatic control and measurement of gas inlet, liquid feeds, and product recovery.

Inquiries for custom vessels or systems are always welcome and they will receive our prompt and detailed response.

Guide to Parr Specialty / Custom Reactors

Model No.	*Vessel Style*	*Nominal Size*	*Maximum Pressure psi (bar)*	*Maximum Temperature °C*	*Catalog*
5101-5112	Low Pressure, Glass & Metal	160 - 1500 mL	150 (10) or 1000 (69)	225	4500
5511-5525	High Pressure Compact Vessels	25 - 600 mL	3000 (200)	225 - 350	4500
5000	Multiple Reactor System (Six Vessels)	45 - 75 mL	3000 (200)	225 - 300	4500
4600-4700	Non-Stirred Pressure Vessels	22 - 18.75 L	Range up to 5000 (350)	Range up to 500	4500
Custom	Design to User's Specifications	25 - 18.75 L	Range up to 5000 (350)	Range up to 500	4500

Controllers

4843 Controller

4856 Controller

4870 Controller with multiple reactors

Parr Instrument Company offers a wide selection of controllers for use with our Stirred Reactors and Pressure Vessels.

4836 Controllers

These controllers are intended for reactors and vessels with heating loads not exceeding 1000 watts. Each unit provides PID control and ramp and soak profiling. An RS-232C digital communications port with software for PC's is provided. This allows the user to configure the controller, establish temperature set points and heating profiles, and to log temperatures to the computer from the reactor. The motor speed control potentiometer for setting stirrer speeds is included in these controllers. A single expansion module can be added to this controller. The Series 4830 Controllers are furnished as standard on the Series 5500 Compact Reactors and the Series 5100 Low Pressure Reactors.

Series 4840 Controllers

The 4840 Controllers are the standard controllers for all Series 4500 Stirred Reactors. They include the PID, Ramp and Soak Controller with bidirectional communications and software for temperature setup, control and data logging described above for the 4830 Controllers. The Series 4840 Controllers also include the motor speed controller and a load relay suitable for heating loads to 5000 watts.

Five expansion modules are available to enhance these controllers. These include the following:

- Tachometer Display Module for stirrer speeds
- Pressure Display Module for reaction pressures
- High Temperature Module for redundant high temperature safety cut-off or secondary temperature monitoring
- Motor Current Monitor for relating motor load to reactant viscosity
- Solenoid Valve Module for automatic control of cooling water

These modules (except the SVM) are available with an analog output for data transmission.

4856 Reactor Controller

The Parr Model 4856 Reactor Controller has been designed to provide measurement, display, control and data logging of the principle operating parameters of a high-pressure reactor. This controller connects directly to a PC, which serves as the user interface as well as the memory and storage for both operating profiles and recorded data. While the PC is used for all communications to and from the controller, all control functions are performed by the controller for maximum reliability and safety.

The 4856 Reactor Controller is normally furnished with modules for programming temperature control, pressure monitoring and logging as well as stirrer speed display and logging. An additional parameter, usually a second temperature or motor load can be added if desired. Custom features such as cascade temperature control, closed loop stirring speed control and vessel pressure control can be incorporated into these controllers. Multiple 4856 Controllers and three to four reactors can be controlled from a single PC.

4870 Process Controller

The 4870 Process Controller has been developed to provide an integrated, stand-alone control system for controlling either a single reactor with multiple feed and product controls or multiple reactors operating independently or in parallel. These controllers can be configured with nearly unlimited analog and digital inputs and outputs to control not only heating, cooling, pressure, and stirring speed but also feed pumps, automatic valves, flow meters and similar accessories. A PC serves as the user interface and software with a graphical user interface is provided.

Guide to Parr Controllers

Model Number	*Controller Type*	*Expandability*	*Intended Applications*	*Catalog*
4836	PID, Ramp & Soak	Tachometer or Pressure Transducer	Compact, Micro and Mini Reactors	4500
4843-4844	PID, Ramp & Soak	Pressure, Tachometer, Motor Current, Temperature	All Parr Reactors	4500
4856	PID, Ramp & Soak, PC User Interface	Interchangeable Modules (4 maximum)	Full PC Interface for all parameters with data logging	4856
4870-4871	Process Control, PC User Interface	Multiple Inputs, Multiple Reactors	Full process monitoring and control	4500

Non-Stirred Reactors


4651


4740, 4742


4761


4712, 4702


4751


4750, 4763

Parr offers non-stirred pressure vessels in convenient styles, sizes and pressure ranges for many laboratory uses. See the Tenth Edition of the Parr Stirred Reactors and Pressure Vessels Catalog as well as on our website for more details on these vessels.

Non-Stirred Pressure Vessels

Parr Vessels have unlimited applications. These general purpose pressure vessels are offered in various designs ranging in size from 21 mL to 5 gallons for use in a wide range of working temperatures and pressures. Applications for these vessels extend to all types of laboratory work wherever a chemical reaction or physical test must be performed under pressure at elevated temperature.

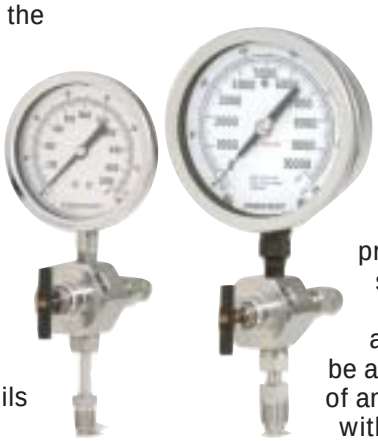
All Parr General Purpose Vessels have full opening heads with convenient closures for easy access to the interior of the vessel. All but the smallest sizes use the unique Parr Split Ring Closure, which leaves ample space on the head for attaching various fittings and allows the vessel to be opened and closed without disturbing any of the attachments.

Custom built heads can be provided for any of these vessels. These can include provisions for attaching a large variety of fittings, including: thermowells, gas connections, valves, dip tubes, electrical feedthroughs, power leads for internal heaters, safety rupture discs, reflux coils and other attachments.

The vessels are available in all of the materials of construction listed in the Tenth Edition of the Parr Stirred Reactors and Pressure Vessels Catalog.

Vessel Heaters

Electric heaters and automatic temperature controllers can be furnished for all non-stirred pressure vessels.



Gage Block Assemblies

Parr Gage Block Assemblies combine the function of an inlet / outlet valve, pressure gage, and safety rupture disc into a compact assembly, which can be attached to the head of any pressure vessel with a single connecting tube. There is a threaded socket in the block for a gas connection with a pressure hose or tubing.

Guide to Parr Non-Stirred Reactors

Model Numbers	*Vessel Style*	*Vessel Size*	*Maximum Pressure psi (bar)*	*Maximum Temperature °C*	*Catalog*
4701-4714	Screw Cap	22 & 45 mL	1000 (69)	300	4500
4740-4742	High Pressure	25 & 75 mL	8500 (575)	540	4500
4791-4793	Split Ring	25 - 100 mL	3000 (200)	350	4500
4750-4755	Split Ring	125 & 200 mL	3000 (200)	350	4500
4760-4774	Split Ring	100 - 600 mL	3000 (200)	350	4500
4651-4653	High Pressure	250 - 1000 mL	5000 (345)	500	4500
4605-4626	High Pressure	600 & 1200 mL	5000 (345)	350	4500
4601-4622	Split Ring	1000 & 2000 mL	1900 (130)	350	4500
4661-4666	Split Ring	1 & 2 gallon	1900 (130)	350	4500
4680-4683	High Pressure	1000 & 1800 mL	5000 (345)	500	4500
4671-4674	High Pressure	1 & 1.5 gallon	3000 (200)	500	4500
4676-4679	Split Ring	2.6 & 5 gallon	1900 (130)	350	4500

Sample Preparation / Shakers

1108 Oxygen Bomb

Acid Digestion Bombs

Microwave Digestion Bombs

Cell Disruption Bombs

Shaker Type Hydrogenation Apparatus

Oxygen Combustion Bombs

Parr offers oxygen bomb combustion apparatus for burning organic samples in preparation for analytical analysis of a wide variety of anions and cations. These are available with general purpose, large capacity and lined vessels.

Parr also offers a variety of special purpose oxygen combustion bombs. The 1104 High Strength Bomb has been designed to handle explosives and other high energy or unknown compounds. The 1105 Bomb includes a complete platinum liner for applications requiring unique corrosion requirements. The 1108CL is intended for samples with high chlorine content. The 1121 Bomb can burn samples up to 10 grams and the 1109 Bomb can burn samples as small as 25 mg.

Acid Digestion Vessels

Parr Acid Digestion Bombs combine the unique chemical inertness of PTFE with the advantages of a sealed pressure vessel. These convenient bombs offer a rapid procedure for sample dissolution or digestion that has several important advantages over more traditional methods of sample preparation. They provide a convenient means for holding strong mineral acids or alkalis at temperatures well above normal boiling points. These sturdy digestion bombs will accelerate digestions, permit the use of strong acids, dissolve analytical samples without losing trace elements and without adding unwanted contaminants, and obtain complete digestion or dissolution of samples that react slowly or incompletely when treated by other methods.

Microwave Digestion Vessels

Polymer Microwavable Acid Digestion Bombs are also available. The aggressive digestion action produced at the higher temperatures and pressures generated in these bombs result in remarkably short digestion times. Many materials require exposures of less than one minute to obtain complete dissolution. Because of their unique, high strength design, they provide a much more vigorous action than can be obtained with open-cup microwave digestion systems that are restricted to lower temperatures and pressures. In addition, there is no loss of volatile matter from these sealed vessels and the sensitive parts of a microwave oven are not subjected to corrosive acid fumes.

Cell Disruption Bombs

Cell disruption by rapid decompression from a pressure vessel has been used for many years by investigators who wanted to overcome the limitations imposed by other cell disruption procedures. The nitrogen decompression method is particularly well suited for treating mammalian and other membrane bound cells. It has also been used successfully for treating plant cells, for releasing virus from fertilized eggs and for treating fragile bacteria.

Shaker Type Hydrogenation Apparatus

Parr Shaker Type Hydrogenators provide compact and easily operated systems for treating chemicals with hydrogen in the presence of a catalyst at pressures up to 5 atmospheres (60 psig) and temperatures to 80 °C. They are used primarily for synthesizing or modifying organic compounds by catalytic hydrogenation, reduction or condensation, but they are equally suitable for any other laboratory procedure in which a liquid and gas must be mixed vigorously in a glass reactor at pressures up to 5 atm.

Guide to Parr Sample Preparation Vessels

Model No.	*Vessel Type*	*Sample Size*	*Maximum Pressure psi*	*Operating Temperature °C*	*Catalog*
1104-1122	Oxygen Combustion Bombs	25 mg - 10 g	1500	NA	4700
4744-4748	Acid Digestion Bombs	1.0 g - 5.0 g Inorganic 0.1 g - 0.5 g Organic	1900	150 - 250	4700
4781-4782	Microwave Digestion Bombs	1.0 g - 2.0 g Inorganic 0.1 g - 0.2 g Organic	1200	250 Maximum	4700
4635-4639	Cell Disruption Bombs	30 mL - 3.75 L	2200	Room Temperature	4635

Guide to Parr Shaker Type Hydrogenation Apparatus

Model No.	*Bottle Size*	*Bottle Heater & Auto. Temp. Controller*	*Maximum Pressure psi*	*Bottle Type*	*Catalog*
3911	250 & 500 mL	No	60	*	3900
3916	250 & 500 mL	Yes	60	*	3900
3921	1L, 2L, 2.25L, 1.7L	No	40, 30, 60, 65	*	3900
3926	1L, 2L, 2.25L, 1.7L	Yes	40, 30, 60, 65	*	3900

**Bottles are available in Borosilicate Glass, Borosilicate Glass Fiberglass covered, Hand Blown, Heavy Wall Borosilicate Glass and Stainless Steel.*

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