

**NEW**  
PTFE Blaze  
Probe Lid



# Reactor-Ready™

## Lab Reactors



Innovative, patented, low cost, reaction work stations for glass vessels from 100 ml to 5 litres

# Reactor-Ready Lab Reactor

Replace multiple reaction set-ups with a single universal system that accepts vessels from 100 ml to 5 litres

A single reaction system that accepts a range of different vessel sizes



A choice of popular stirrer paddles



Convenient vessel kits make buying vessels and accessories easy and cost effective

## Unique vessel clamp

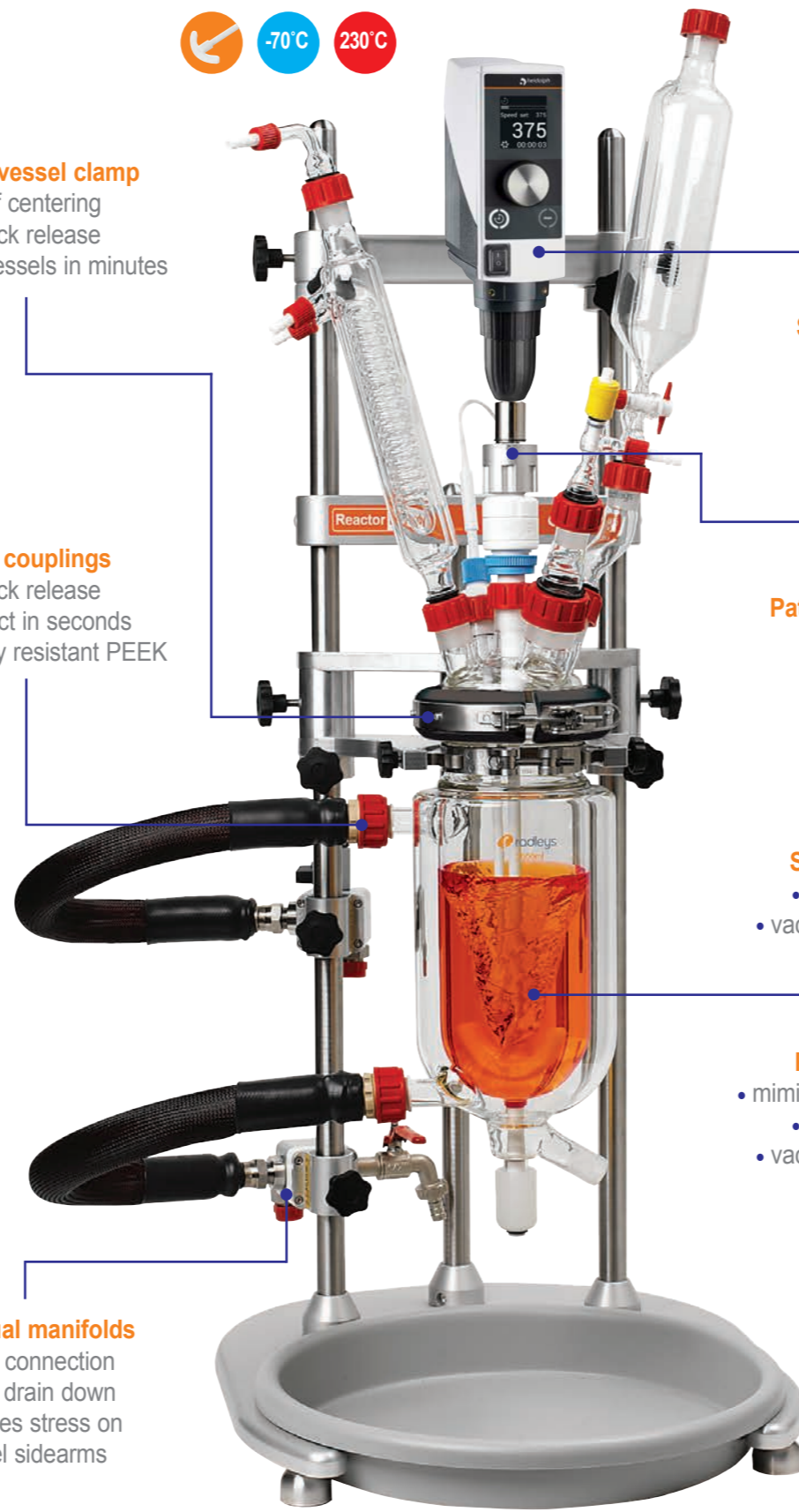
- self centering
- quick release
- change vessels in minutes

## Hose couplings

- quick release
- connect in seconds
- chemically resistant PEEK

## Individual manifolds

- easy connection
- easy drain down
- reduces stress on vessel sidearms



## Simple stirrer alignment

- slide and glide
- set and lock

## Patented stirrer coupling

- drop in
- no tools
- no fuss

## Standard vessels

- 250 ml to 5 litres
- vacuum jacketed option

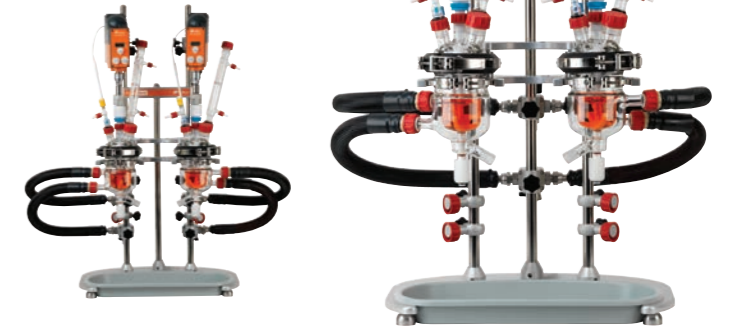
## Process vessels

- mimic plant scale geometry
- 100 ml to 5 litres
- vacuum jacketed option

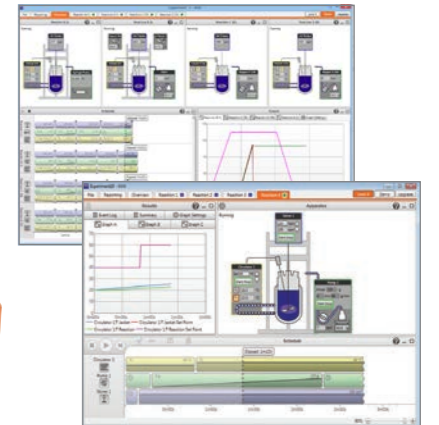
# Change to Reactor-Ready

It improves your chemistry by saving space, time and money

Reactor-Ready Duo accepts two vessels and allows reactions in parallel or series



Optional AVA Control Software allows you to log and control stirrers, circulators, balances, pumps, temperature sensors and other devices



Accepts all leading brands of overhead stirrer



Compatible with all leading brands of circulator or thermoregulator

# Reactor-Ready

## Swap reaction vessels in minutes, NOT hours

Reactor-Ready is designed as a universal reactor work station that can be used for different vessel sizes and different experiments. Reactor-Ready can easily and quickly be configured to suit the chemistry and scale you need for each project.

The beauty of Reactor-Ready is that this one reactor work station can replace many, saving you money and fumehood space.

### Features include

- Rapid vessel exchange with quick-release vessel clamp and hose couplings.
- Range of single and vacuum jacketed vessels from 100 ml to 5 litres.
- Range of process vessels to mimic larger scale plant or manufacturing reactors.
- Accepts all leading brands of overhead stirrer and allows easy, tool-free adjustment.
- Triple support stand features heavy duty stainless steel support rods for strength and stability.
- Self aligning stirrer coupling engages without the need for tools.
- Temperature range: -70 °C to +230 °C (jacket temperature)
- Innovative hose manifolds allow easy thermofluid drain down.
- Wide range of accessory glassware including condensers, dropping funnels etc.
- Optional software allows you to log and control stirrers, circulators, balances, pumps, temperature sensors and other devices.

### Patented vessel clamp allows rapid vessel exchange without tools

- Unique clamp design allows vessel to be supported and clamped by a single operator in less than a minute.
- Use the same clamp to hold all vessel sizes; plus the vessels remain supported even when the clamp is unlocked.

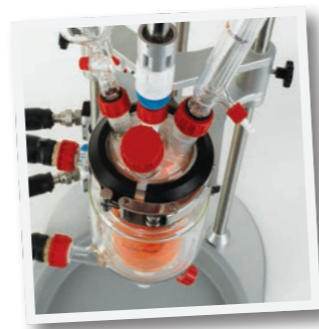


### Vessel support collar aids vessel loading

- Reactor-Ready uses an innovative support collar fitted to the neck of each vessel, which allows the vessels to be swapped in and out of the Reactor-Ready core like a cartridge.
- The stainless steel collar locks securely into the support plate on the framework and allows the vessel to remain supported, even when not clamped.
- Vessel exchange is tool free and can easily be undertaken by one person.

### Unique self aligning stirrer coupling saves time when changing vessels

- Patented drop-in stirrer coupling engages easily without the need for tools.
- Simply lower the stirrer coupling to engage with the stirrer guide below.
- The stainless steel stirrer coupling will fit in any standard stirrer chuck (for 10mm diameter)
- Powerful stirring up to 500 rpm, or 800 rpm for short periods (subject to motor selected).



### Choice of PTFE stirring shafts

- Reactor-Ready is offered with a choice of PTFE stirring shafts: anchor, retreat curve and turbine/propeller styles.
- PTFE anchor stirring shaft is included with all standard reaction vessel kits
- PTFE turbine stirring shaft is included with all process reaction vessel kits.

### I-beam support allows the stirring motor to be positioned with ease

- I-beam allows the stirrer motor to be raised or lowered without needing to remount the stirrer.
- Adjustable safety stop collars located below the I-beam allow the user to lower the stirrer motor to a set position for ease of operation and safety.
- Reactor-Ready accepts all leading brands of motor or air-powered overhead stirrer with support rods up to 16 mm in diameter.



### PTFE Stirrer Guide

- The Reactor-Ready's PTFE stirrer guide screws directly on to the glass lid and features a unique extended support which minimises wobble even at high speeds.
- The stirrer guide is chemically inert, gas-tight and suitable for work under vacuum.

### Quick release PEEK hose couplings

- Operates over the temperature range -70 °C to +230 °C (jacket temperature).
- Quick-release, screwthread design allows rapid exchange of vessels without the use of tools.
- Simply tighten by hand for a leak-tight seal.
- PEEK with Viton O-rings ensures all wetted parts are chemically resistant.
- Lightweight, metal-free design prevents chipping and minimises strain on the glass fitting.
- All hoses have a 12 mm ID, maximising thermofluid flow and heating/cooling performance.
- Low thermal conductivity of PEEK reduces frosting when cooling.

### Hose manifolds allow easy thermofluid drain down

- The inlet and outlet hoses from the Reactor-Ready vessel connect to manifolds attached to the support rod. These manifolds serve two important functions:
  1. Support the hoses running from the vessel, thereby eliminating stress on the glass sidearms.
  2. Allows thermofluid drain-down, which provides a quick and clean method of removing the thermofluid from the vessel jacket when changing vessels.
- By opening the venting valve on the (upper) outlet manifold, thermofluid drains from the vessel back to the thermoregulator under gravity.
- Opening the drain tap on the (lower) inlet manifold allows drainage to an external reservoir.



PTFE anchor stirrer

PTFE retreat curve stirrer

PTFE turbine/propeller stirrer



PTFE stirrer guide provides whip-free agitation



Stainless steel vessel support collar



## Case study: Accelerating process optimisation in a busy chemical development lab

Researchers at a leading US pharmaceutical company invested in Reactor-Ready for use in their chemical development lab. The process R&D group, specialising in small molecule research, are using Reactor-Ready for optimising new or existing chemistry, identifying and eliminating impurities, and screening process variables for transfer to kilo-labs, pilot plant and manufacturing sites.

Commenting on their existing methods the Lead Scientist said, "We use round bottom flasks, but temperature control via mantles or oil baths is poor. Alternatively, when we use traditional jacketed reactor vessels, we need a different set up for every scale change. Even changing a reactor of the same size takes ages."

"So I liked Reactor-Ready the minute I saw how easy it was to change reactors. Reactor-Ready does it all. I get one stand which fits all sizes up to 5 litres. I get overhead stirring on all scales. I get vacuum jacketed vessels, which provide excellent temperature control with minimum heat loss, which is a real advantage at low temperatures, and I get the ability to rapidly change out my reactors."

"The first time I changed vessels, it took about 5 minutes but now I can change in less than 2 minutes. That includes removing and attaching the heating fluid hoses. Occasionally I lose a drop or two of heat transfer fluid but most times I lose none. The thing I like about the system is the control and speed. I get better control of my reactions and I can vary my work or scale immediately".

## How to order Reactor-Ready...

1. Select the Reactor-Ready core.



2. Choose the vessel kit or kits you require by selecting the vessel volume and style.



3. Select the overhead stirrer you need.



4. If you need a thermoregulator, hoses, hose adapters, thermofluid or accessory glassware, then select from the accessory list.



5. If you need automation add the AVA Control Software and data hub.



## Reactor-Ready in detail

It is the attention to detail and wealth of innovative features that makes Reactor-Ready so much better



Precision ground lid and vessel flanges combine with PTFE collar and FEP-encapsulated O-ring to offer superior sealing performance.

Vessel clamp support allows easy vertical repositioning of the vessel whilst maintaining the stirrer coupling alignment.



Venting stopcock on the outlet manifold allows quick and easy draining of the thermofluid during vessel exchange.

Vessel-to-manifold hoses are supported by the manifolds and frame, eliminating stress on the vessel.

Quick-release PEEK coupling allows rapid exchange of vessels without the use of tools. Operates over the temperature range -70 °C to +230 °C (jacket temperature).



Thermofluid may be drained back to the thermoregulator or decanted via a fluid drain tap on the inlet manifold.



Heavy-duty base plate with levelling feet ensures that the Reactor-Ready support stand is secure and stable.

Stirrer support I-beam allows the stirrer motor to be easily raised and lowered.

Support system accepts all leading brands of overhead stirrer and allows easy, tool-free adjustment.



Wide range of accessory glassware including condensers, dropping funnels, adapters, powder addition funnels, gas purge adapters and liquid inlet adapters etc.



Patented drop-in stirrer coupling engages easily without the need for tools.

PTFE stirrer guide provides excellent stirring and sealing performance. An extended stirrer shaft support minimises wobble even at high speeds.

Reaction vessels are held by a novel quick-release clamp. No tools are required to exchange vessels.



Chemically resistant PTFE stirrers.

Accepts single jacketed and vacuum jacketed vessels of 100 ml, 250 ml, 500 ml, 1 litre, 2 litre, 3 litre and 5 litre.

Innovative triple support stand features heavy duty stainless steel support rods for maximum strength, stability and to minimise vibration.

Zero dead space PTFE bottom outlet valve is designed to minimise leaking or weeping across the full temperature range (-70 °C to +230 °C). Large 15 mm bore minimises sample hold-up and is ideal for slurries.

HDPE drip tray will catch any spills and can accommodate the contents of a 5 litre vessel and jacket.

Reactor-Ready Video  
Visit [www.radleys.com](http://www.radleys.com) to watch the demo

## Reactor-Ready core system includes

- Stand with base, support rods, bosses and all clamps
- Glass reaction vessel lid
- Vessel FEP O-ring seal and PTFE collar
- HDPE drip tray
- Vessel-to-manifold insulated hoses with quick-release connections
- Lower inlet manifold + drain
- Upper outlet manifold + vent
- PTFE stirrer guide
- Stainless steel drop-in stirrer guide coupling
- Two stainless steel vessel support collars
- Locking rod for support rod bosses



## Reaction vessel kits make ordering vessels simple and more cost effective

These cost effective vessel kits include the vessel and accessories you need to get started. The Pt100 probe and PTFE stirrer included in each kit are matched to the vessel size. Each vessel kit includes:

- Reaction vessel with PTFE stopcock
- Sidearm couplings
- Pt100 PTFE temperature probe with LEMO connector
- PTFE temperature Probe adapter
- PTFE stirrer



# Reactor-Ready Duo

Supports two glass reaction vessels of different or same volume from 100 ml to 5 litres

Reactor-Ready Duo shares the same unique features as Reactor-Ready, except that it supports two separate jacketed glass reaction vessels. The system can be configured to operate with a single thermoregulator controlling the temperature of both vessels simultaneously, or with two thermoregulators controlling the temperature of each vessel independently.



- Unique vessel clamp**
- supports two vessels
  - change vessels independently
  - change vessels in minutes

- Vessels**
- 100 ml to 5 litres
  - combine different volumes
  - vacuum jacketed option
  - process and standard geometry

- Thermofluid manifolds**
- choice of two manifold kits
  - single circulator manifolds
  - double circulator manifolds

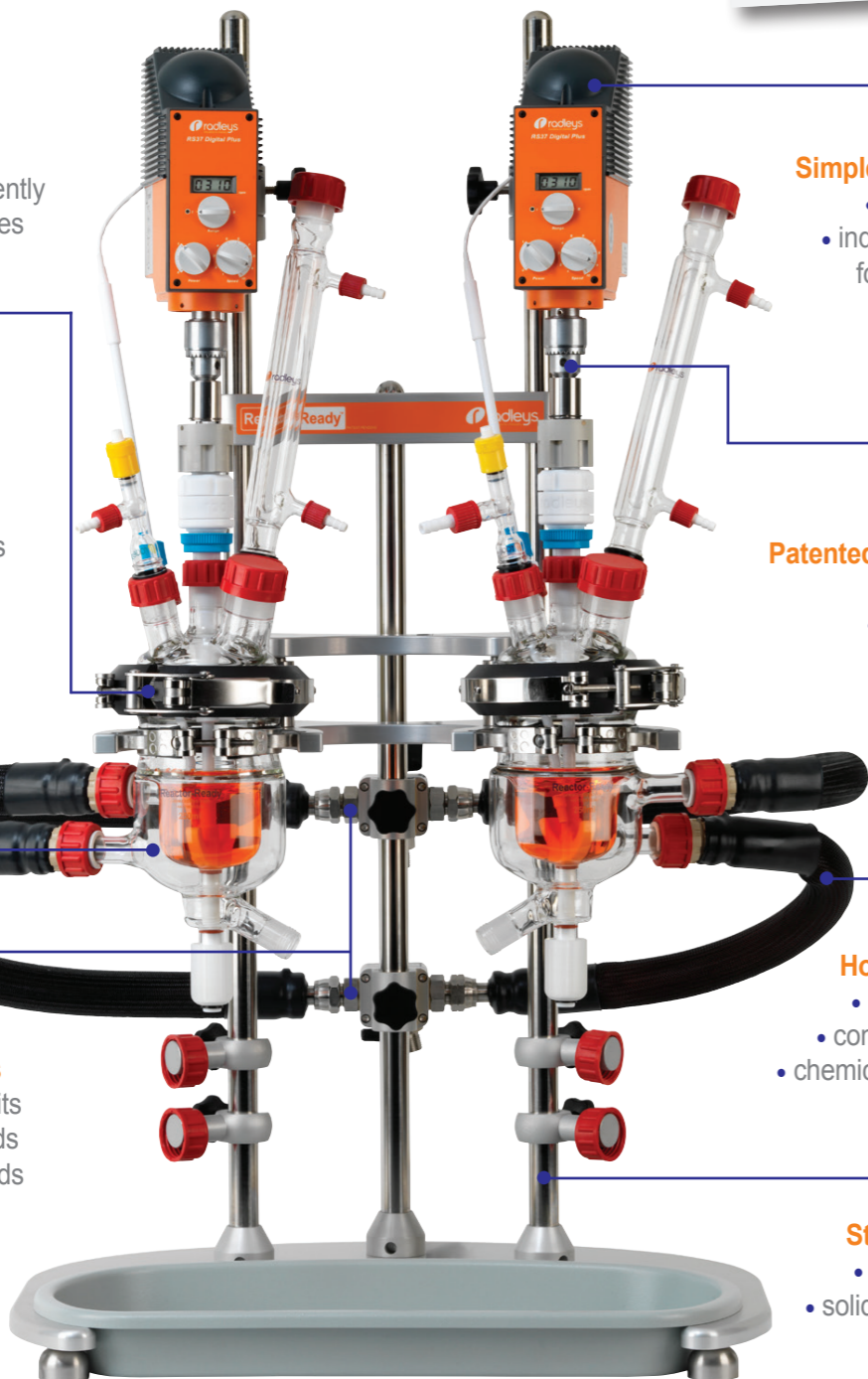


- Simple stirrer alignment**
- set and lock
  - independent stirring for each vessel

- Patented stirrer coupling**
- drop in
  - no tools
  - no fuss

- Hose couplings**
- quick release
  - connect in seconds
  - chemically resistant PEEK

- Strong framework**
- heavy duty base
  - solid s/steel support rods
  - large drip tray



# Why Reactor-Ready Duo?

All the benefits of Reactor-Ready with two vessels in parallel or series

## Features include

- Rapid exchange of both vessels independently, with quick-release vessel clamp and hose couplings.
- Choice of manifold kits allow two vessels to run from a single thermoregulator or two separate thermoregulators.
- System accepts two overhead stirrers which can be operated and moved independently.

## Applications

- Parallel synthesis or reaction optimisation: use the same or different size vessels and vary stirring speed, stirrer shape and temperature between vessels as appropriate.
- Two stage reaction: transfer reactant from one vessel to the other using vacuum or a pump.
- Single reaction vessel: using the second vessel as either a receiving or feed vessel (where reagents can be pre-heated or pre-cooled prior to addition).
- Use optional AVA Software to control fluid transfer between vessels.



Similar vessels with double circulator manifold kit



Different vessels with double circulator manifold kit



Single vessel with double circulator manifold kit



Similar vessels with single circulator manifold Kit



Different vessels with single circulator manifold Kit



Single vessel with Single circulator manifold Kit



## How to order Reactor-Ready Duo...

1. Select the Reactor-Ready Duo core.



2. Choose manifold & hose kit for one or two circulators.



3. Choose the vessel kits you need.



4. Select the overhead stirrers.



5. If you need a thermoregulator, hoses, hose adapters, thermofluid or accessory glassware, then select from the accessory list.



6. If you need automation, add the AVA Software and data hub.



## Reactor-Ready Duo core system

Easy-to-order Reactor-Ready Duo core system includes all the framework components required for operation

### Features include

- Robust heavy-duty framework features solid stainless steel support rods.
- Two separate quick release clamps support each of the vessels independently.
- Large drip tray will retain vessel contents.
- Manifold and hose kits must be ordered separately.

### Core system (RR121300) includes

- Stand with base, support rods, bosses and all clamps
- 2 x glass reaction vessel lids
- 2 x vessel FEP O-ring seals and PTFE centering collars
- 2 x PTFE stirrer guides and couplings
- HDPE drip tray
- 2 x stainless steel stirrer drop-in couplings
- 2 x stainless steel vessel support collars
- locking rod for support rod bosses



## Reactor-Ready Duo manifolds and hoses

A choice of manifold kits for use with one or two thermoregulators

### Double thermoregulator manifold and hose kit (RR121310)

This double thermoregulator kit is designed to work with two separate thermoregulators controlling the temperature of each vessel independently. With this set-up both vessels can operate at different temperatures. This is the recommended kit.

- R/H upper return manifold with vent valve
- L/H upper return manifold with vent valve
- R/H lower supply manifold with drain valve
- L/H lower supply manifold with drain valve
- 4 x quick-release insulated hoses, 60 cm
- 4 x sealing caps for hoses



### Single circulator manifold and hose kit (RR121305)

This single circulator kit is designed to work with one thermoregulator controlling the temperature of both vessels simultaneously. With this set-up both vessels would operate at the same temperature. The manifolds are supplied with blanking plugs should you wish to run only one vessel.

- central upper return manifold with vent valve
- central lower supply manifold with drain valve
- 4 x quick-release insulated hoses, 70 cm
- 4 x sealing caps for hoses
- 2 x stainless steel blanking plugs



## Hei-Torque overhead stirrers

The powerful Hei-Torque range can accomplish the most demanding mixing tasks whilst providing the highest safety

Includes 3 YEAR warranty



### Stirrer models include

- Powerful stirring from 10 to 2000 rpm (Max. recommended speed with Reactor-Ready is 500 rpm).
- Available with basic (Expert) or advanced (Ultimate) features, and a choice of up to 40, 200 or 400 Ncm torque.
- Intuitive control panel for easy operation, safe start and stop to avoid accidental start-up.
- Ultimate range features: set speed limit, adjustable acceleration, set a torque limit.
- Unique Quick-chuck for immediate and convenient 'one-hand' impeller changes, without tools.

	Hei-Torque Core	Hei-Torque Expert 200	Hei-Torque Expert 400	Hei-Torque Ultimate 200	Hei-Torque Ultimate 400
Power rating, motor input/output (W)	105/75	120/80	150/90	120/80	150/90
Number of gears	1	1	2	1	2
Speed range (rpm)	20 to 2000	10 to 2000	10 to 400 and 200 to 2000	10 to 2000	10 to 400 and 200 to 2000
Speed indicator	digital monochrome 2"	digital monochrome 2.4"	digital monochrome 2.4"	digital colour 3.2"	digital colour 3.2"
Speed control	electronic	electronic	electronic	electronic	electronic
Torque, maximum (Ncm)	40	200	400	200	400
Torque indicator (Ncm)	symbol	symbol	symbol	precise value	precise value
Overheat protection	automatic cut-out	automatic cut-out	automatic cut-out	automatic cut-out	automatic cut-out
Viscosity up to (mPa s)	10,000	100,000	250,000	100,000	250,000
Stirring cap. H-O max. (L)	25	50	100	50	100
Shaft diameter, max. (mm)	10.5	10.5	10.5	10.5	10.5
Dimensions (W x H x D) (mm)	70 x 281.5 x 195	86 x 350 x 247	93 x 350 x 247	86 x 350 x 247	93 x 350 x 247
Weight (kg)	2.3	5.1	5.3	5.1	5.3
Set speed limit, Torque limit, Adjustable acceleration	-	-	-	Yes	Yes
Analogue/digital interface	-	-	-	USB and RS232	USB and RS232

For Reactor-Ready the maximum speed is 500 rpm for continuous use for 800 rpm for short periods.

## Thermoregulators/circulators

Which thermoregulator should you choose?

- Radleys are a Huber distribution and service partner, so we recommend the Huber range of thermoregulators, circulators, chillers and waterbaths. However, Reactor-Ready is compatible with all leading brands of thermoregulator including Julabo, Lauda, Polyscience, Haake and many others.
- Also available are a range of hoses, adapters, temperature probes and thermofluid for all applications.

Description	Temperature range °C	Heating power (kW)	Cooling power at 0 °C (kW)	Application Examples	
Huber Ministat 230	-45 °C to 200 °C	2.0	0.38	250 ml	Cool to -10 °C in <1 hr, then heat to 130 °C in <30 mins
				1 litre	Control at 0 °C, then heat to 100 °C in 20 mins
Huber Petite Fleur	-40 °C to 200 °C	1.5	0.45	500 ml	Cool to -20 °C in approx 30 mins, then heat to 150 °C in <30 mins
				1 litre	Heat to 150 °C, then cool to 0 °C at > 2.5 K/min
Huber Unistat Tango	-45 °C to 250 °C	3.0	0.7	1 litre	Cool to -30 °C in <1 hr, then heat to 180 °C in <1 hr
				2 litre	Heat to 180 °C, then cool to 20 °C in approx 1 hr
Huber Unistat 405	-45 °C to 250 °C	3.0	1.0	2 litre	Cool to -20 °C in <30 mins, then heat to 100 °C in <30 mins
				5 litre	Control at 20 °C, then cool to -20 °C in approx 70 mins

The above applications are intended as a guide to the relative performance of each Huber thermoregulator with a range of vessel sizes and are not a prediction of actual performance. To achieve optimum performance the use of vacuum jacketed vessels is recommended for below ambient temperature applications. For comprehensive advice on thermoregulator selection please contact your local Radleys distributor.



Huber Unistat 405



Huber Petite Fleur

# Reaction vessels

## Single jacketed, vacuum jacketed and process styles

### Features include

- Precision engineered borosilicate glass vessels can be used with Reactor-Ready and Reactor-Ready Duo.
- DN100 ground and polished flat flange combines with the FEP-encapsulated O-ring and our unique self centering PTFE collar to offer a leak-tight seal between the vessel and lid.
- Convenient and cost-effective vessel kits include stirrer, temperature probe and adapter.

### Vessels feature zero dead space PTFE bottom outlet valve

- Exclusive stopcock design prevents over-tightening that can cause glass breakage.
- Piston design allows quick and safe removal, eliminating the cleaning and assembly problems associated with other stopcock styles.
- Glass-filled PTFE piston minimises leaking or weeping across the full temperature range (-70 °C to +230 °C)
- Interchangeable between vessels with a full range of replacement parts and FEP O-rings.
- The large 15 mm bore minimises sample hold-up and is ideal for slurries (25 mm available on request).

### Glass vessel lids

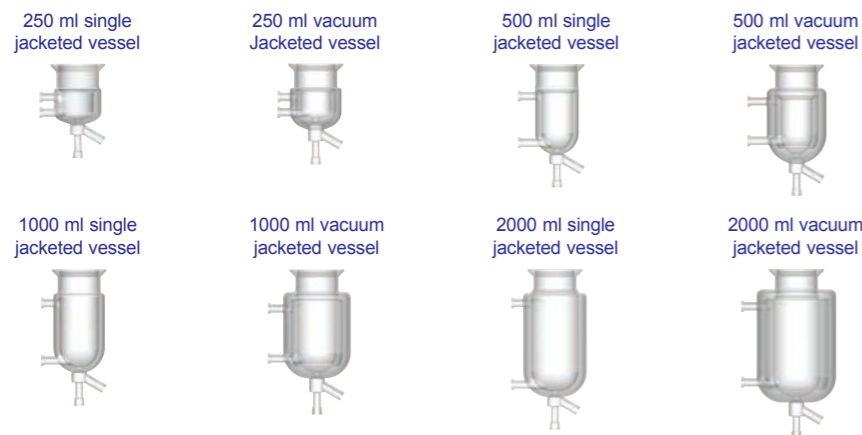
- DN100 5 neck glass lid fits all vessel sizes.
- DN100 lid with 5 x Rodaviss, grease-free, safety joints. B24 centre, B34, B29, B24 and B19 side joints.
- Rodaviss glass sockets will accept any glassware with traditional A, B or C length conical cones.



### PTFE vessel lids

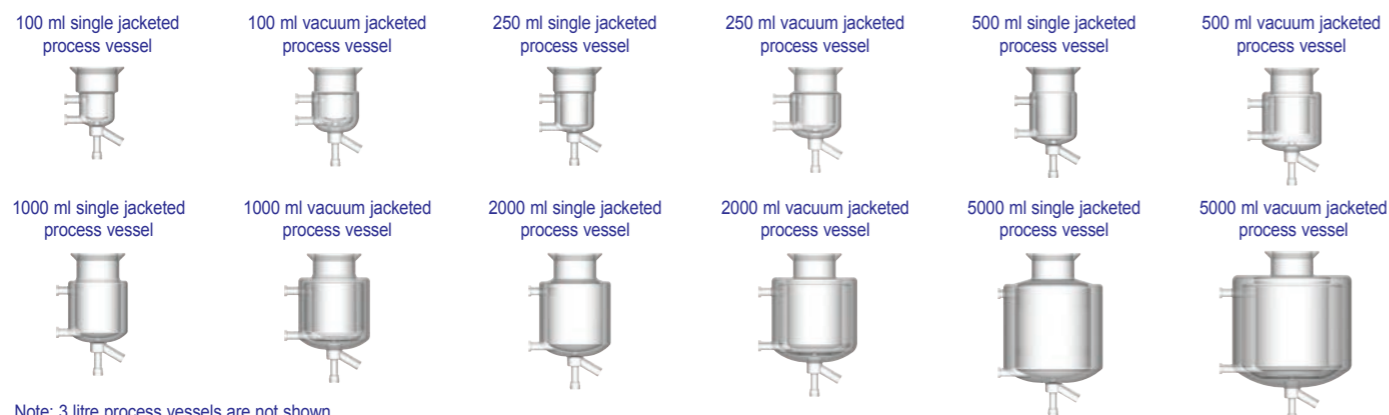
- DN100 5 neck PTFE lids fit all vessel sizes.
- More robust and less likely to break than glass.
- Lids accept a range of removable Rodaviss PTFE sockets and compression fittings.
- Ideal for use with analytical probes including Blaze.
- Rodaviss PTFE sockets will accept any glassware with traditional A, B or C length conical cones.

## Standard Vessels



## Process Vessels - mimic the geometry of plant scale reactors

Feature a 1.25 to 1 ratio of internal height to internal diameter, with dish-shaped bottom.



Note: 3 litre process vessels are not shown

# Reaction vessel kits

Reaction vessel kits make ordering vessels and accessories simple and much more cost effective

### Standard reaction vessel kits

These cost effective vessel kits include the vessel and accessories you need to get started. The Pt100 probe and anchor stirrer included in each kit are matched to the vessel size. Each vessel kit includes:

- Reaction vessel
- PTFE anchor stirrer
- Sidearm couplings
- Pt100 PTFE temperature probe with LEMO Connector
- PTFE temperature probe adapter



### Process reaction vessel kits

Process vessel kits include a Pt100 temperature probe and turbine stirrer matched to the vessel size. Each vessel kit includes:

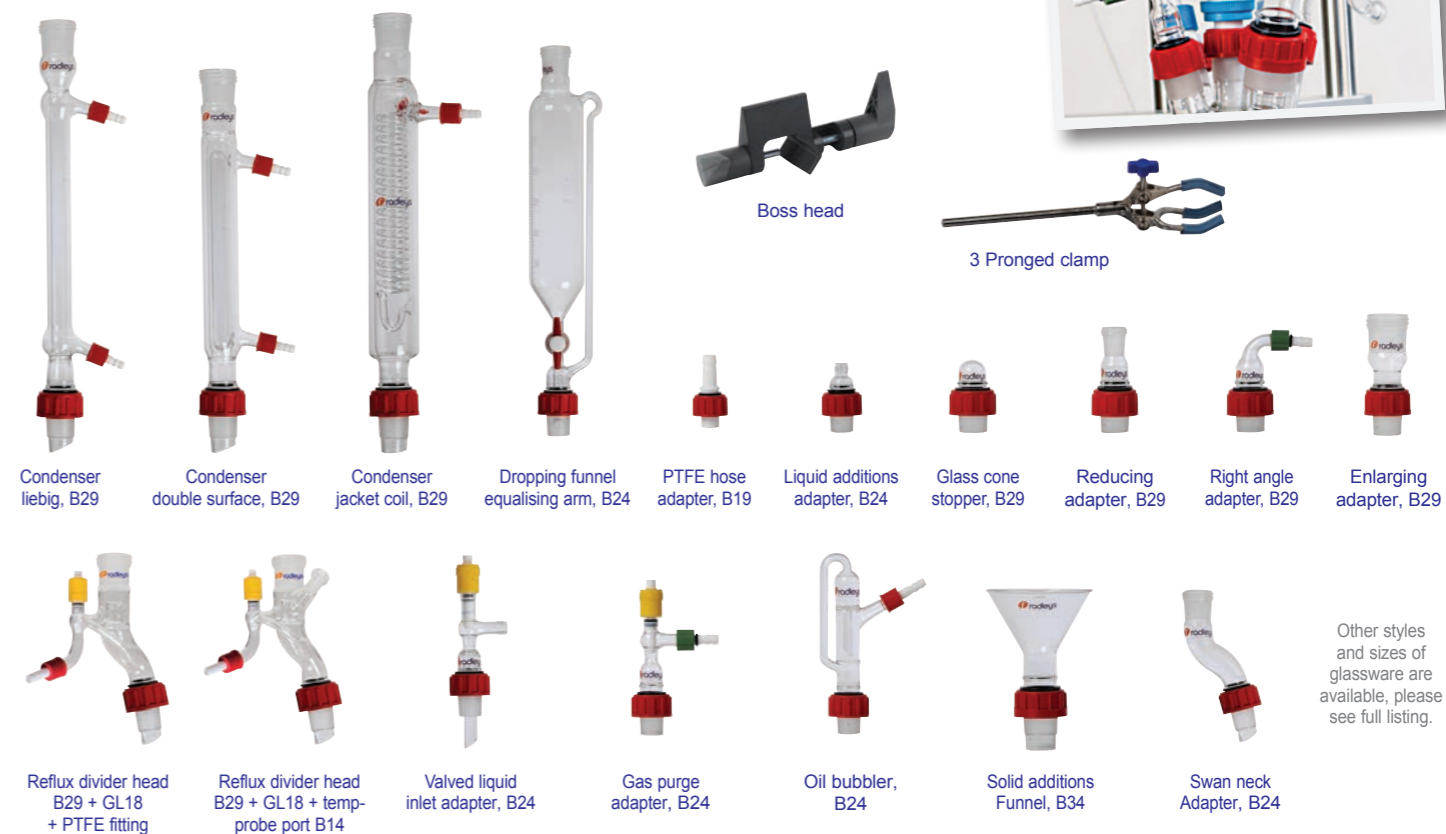
- Reaction vessel
- PTFE turbine stirrer
- Sidearm couplings
- Pt100 PTFE temperature probe with LEMO connector
- PTFE temperature probe adapter



# Glassware and accessories

Wide choice of standard glassware to suit your application

Glassware features Rodaviss joints and is compatible with Reactor-Ready lids







# AVA Lab Control Software - *take control of your chemistry*

## Control multi-device jacketed reaction system

### Multi-device reactions

- Control up to 4 reaction systems with up to 16 devices on one screen
- Create complex experiments with any number of steps in series or in parallel
- Pre-program multi-step recipe, with the flexibility to make and track on-the-fly adjustments
- Interlink devices and set feedback/control loops, end-point conditions and safety limits

### No more manual data logging or manual errors

- Automatically record reaction parameters and log what you do, as you do it
- Repeat experiments accurately for reproducible and consistent results
- Create reports in a few clicks or export data as a CSV file for further analysis
- Share results between users to improve research and collaboration

### Safe unattended chemistry

- Automate cooling during exothermic events
- Link devices such as balances and pumps for controlled, unattended reagent additions
- Define safety overrides and cut-off conditions
- Configure audio and visual alarms

### Data Hub

Using the Data Hub, AVA can control and log multiple 3rd party devices with RS232 serial interface.



### Data Hub Specifications

- 4 x RS232 ports
- 2 x Pt100 temperature sensor ports with LEMO connection
- 1 x Ethernet port
- 2 x Ethernet cables

### AVA Software Kit includes:

- AVA Software
- Laptop controller
- 4 Port data hub
- 1 year AVA Care Support

### AVA Care Support

- Free support for 1st year
- Free priority email and telephone support
- Free set up and application support
- Free software updates during support period, keeping software current

## Download and try the software for FREE

### Learn how AVA software works - try before you buy

- Simulate control of devices
- Set up apparatus and control experimental Schedules
- Share setups and schedules with other AVA users
- Analyse results and create reports for real or simulated data
- Find out more about AVA Level 1-3 on our website



### Level 4

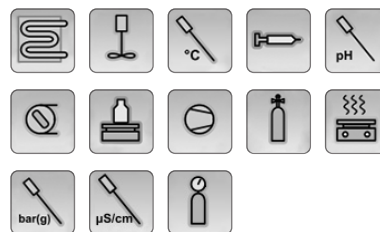


Control and log reaction systems with multiple devices

### Control a variety of devices

AVA software includes a library of pre-configured driver files allowing easy integration with a wide range of 3rd party devices.

Radleys also provide a 'New Driver Configuration Service' if required.



## Accelerating chemistry

Radleys provide innovative chemistry equipment for safer, cleaner, greener and more productive chemical research.

Visit [www.interchim.com](http://www.interchim.com) to see our full range of chemistry productivity tools.

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