

# Reactor-Ready™ Pilot Lab Reactor

Innovative reaction  
work station for  
glass reaction  
vessels from  
5 to 20 litres



# Reactor-Ready Pilot Lab Reactor

Replace multiple reactor set-ups with a single, universal, pilot scale system that accepts vessels from 5 to 20 litres

Accepts single jacketed vessels of 5, 10, 15 and 20 litres and vacuum jacketed vessels of 5 and 10 litres



A choice of popular stirrer paddles



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



## Simple Stirrer Alignment

- 4 axis stirrer adjustment
  - slide and glide
  - set and lock

## Unique PTFE Vessel Clamp

- self centering
- quick release
- change vessels in minutes

## Hose Couplings

- chemical resistant PEEK
  - quick release
- connect in seconds
- 20mm ID for good heat exchange

## Thermofluid Manifolds

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



Reactor-Ready Pilot with 10 litre Vacuum Jacketed Vessel



# Change to Reactor-Ready Pilot

It saves space, time, money and improves your chemistry



### Universal Stirrer Support

- accepts all leading brands of overhead stirrer

### Patented Stirrer Coupling

- drop in
- no tools
- no fuss

### Jacketed Vessels

- single jacketed 5, 10, 15 and 20 litres
  - vacuum jacketed 5 and 10 litres
    - zero dead space drain
    - ratio 1.25 to 1

### Custom Vessels

- to your specific size and style
  - in-house manufacturing
  - mimic plant scale geometry

### Compact, Mobile Framework

- corrosion resistant stainless steel, anodised aluminium or powder coated steel
  - both castors and feet supplied with all units

Reactor-Ready Pilot includes all of the features of the popular benchtop Reactor-Ready (100 ml to 5 litres)



Optional AVA Lab Control Software allows you to log and control ancillary devices



Data Hub



Compatible with all leading brands of circulator and thermoregulator



Compatible with leading brands of overhead stirrer



# Reactor-Ready Pilot

## Swap reaction vessels in minutes, NOT hours

Reactor-Ready Pilot is designed as a universal reactor work station that can be used for different vessel sizes and different projects. Reactor-Ready Pilot is ideal for process development, scale-up, pilot and kilo labs.

The beauty of Reactor-Ready Pilot 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 wide bore hose couplings.
- Range of single jacketed vessels - 5, 10, 15 and 20 litres.
- Range of vacuum jacketed vessels - 5 and 10 litres.
- Vessels manufactured at 1.25 to 1 ratio of internal height to diameter to mimic plant scale reactors.
- DN200 vessel flange.
- Accepts all leading brands of overhead stirrer and allows easy, tool free adjustment.
- Compact stainless steel framework accepts all vessel sizes.
- Self aligning stirrer coupling engages without the need for tools.
- Temperature range: -70 °C to +230 °C (thermofluid 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 3<sup>rd</sup> party 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 Pilot uses a robust support collar, which securely locates into a dedicated 'step' on the neck of each vessel, which then allows vessels to be changed like a cartridge.
- Vessel exchange is tool free and can be undertaken by one person.
- The solid aluminium collar locks securely into the support plate on the framework and allows the vessel to remain supported, even when not clamped.

### 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.
- The non-slip design ensures powerful stirring



Anodised aluminium vessel support collar with PTFE liner



## Choice of PTFE stirring shafts

- Reactor-Ready Pilot is offered with a choice of PTFE Stirring Shafts: Anchor, Retreat Curve and Turbine or Propeller styles.
- A PTFE Turbine Stirring Shaft is included as standard with all 'Reaction Vessel Kits'.
- Custom stirrer design available on request.



PTFE Anchor Stirrer

PTFE Retreat Curve Stirrer

PTFE Turbine or Propeller Stirrer

## I-beam Support allows the Stirring Motor to be positioned with ease

- I-beam allows the stirrer drive 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 Pilot accepts all leading brands of motor or air-powered overhead stirrer with support rods up to 16mm in diameter.



## Whip-free stirrer guide

- The Reactor-Ready Pilot's PTFE stirrer guide screws directly on to the glass lid and features a unique extended support to reduce stirrer whip.
- The stirrer guide is chemically inert, gas tight and suitable for work under vacuum.



PTFE Stirrer Guide reduces stirrer shaft whip



## Quick Release wide bore PEEK Hose Couplings

- Operates over the temperature range -70 °C to +230 °C (thermofluid 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.
- Insulated hoses have a 20mm ID, maximising flow and heating/cooling performance.
- Low thermal conductivity of PEEK reduces frosting when cooling.



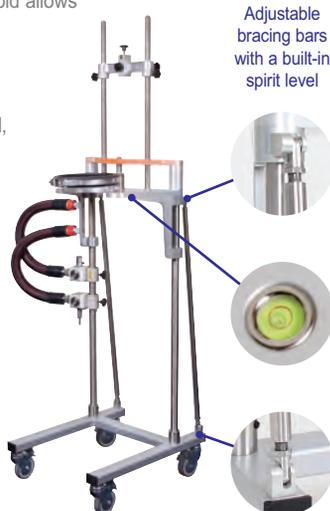
## Hose Manifolds allow easy Thermofluid drain down

- The inlet and outlet hoses from the Reactor-Ready Pilot vessel connect to manifolds attached to the framework. These manifolds serve two important functions:
  1. Support the hose running from the vessel, thereby eliminating stress on the glass sidearm.
  2. Allow 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 (where there is adequate space).
- Also opening the drain tap on the (lower) inlet manifold allows drainage to an external reservoir.



## Compact, mobile framework

- Manufactured from chemically resistant stainless steel, anodised aluminium with a powder coated steel base.
- One framework fits all vessels sizes.
- Fits in a standard walk-in fumehood.
- Comes as standard with locking wheels and adjustable feet allowing the system to be fixed or mobile.
- Adjustable bracing bars on the rear of the framework, combine with a built-in spirit level in the top of the support plate to allow precise levelling.
- A range of suitable clamps and supports are available to hold accessory glassware and probes.
- Height reduction kits available for locations where fume hood height may be restricted.



Adjustable bracing bars with a built-in spirit level

### Technical Specifications

Frame Height	1900mm with wheels (1800mm with feet)
Frame Height RR210070 200mm Height Reduction Kit	1700mm with wheels (1600mm with feet)
Frame Height RR210072 300mm Height Reduction Kit	1600mm with wheels (1500mm with feet)
Frame Width	540mm (approx. 880mm with hoses)
Frame Depth	650mm
Vessel sizes	5L, 10L, 15L, 20L
Thermofluid temperature range	-70°C to +230°C
Hose Size and Bore	M30, 20mm ID
Flange Size	DN200 flange
Lid Ports	6 or 7 ports
Max. Vacuum	10 mbar
Max. Pressure	0.5 Bar

## How to order Reactor-Ready Pilot

1. Select the Reactor-Ready Pilot Core.



2. Choose the lid you require (custom options available).



3. Choose the Vessel Kits you need.



4. Select the overhead stirrer you need.



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 Lab Control Software and Data Hub.



## Reactor-Ready Pilot in detail

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



Choice of 6 and 7 port glass and 8 port PTFE DN200 lids

FEP encapsulated O-ring and unique, self centering PTFE collar to offer a leak-tight seal between the vessel and lid.



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

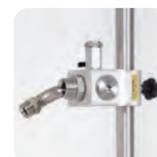
Hose Ties allow the insulated hoses to be conveniently sealed and secured when not in use.

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



Insulated, 20mm bore vessel-to-manifold hoses are supported by the manifold and frame; minimising stress on the glass sidearms.

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



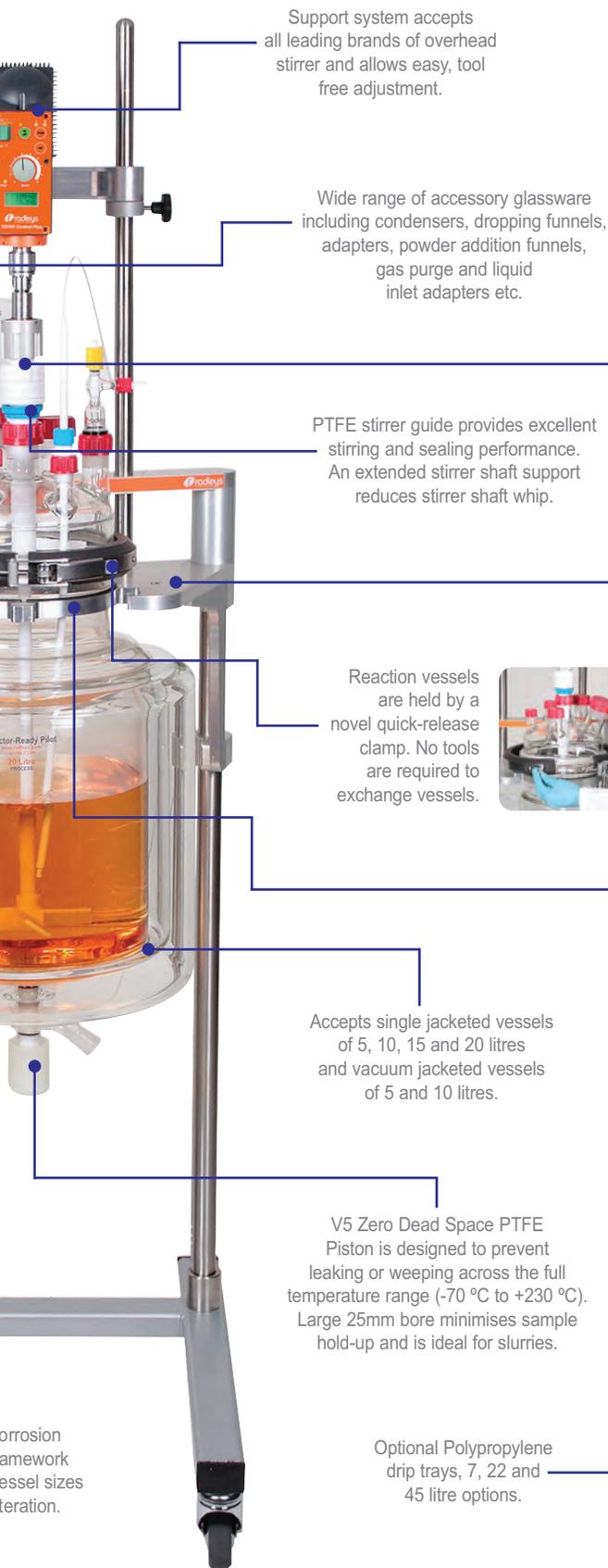
Comes as standard with both locking wheels and feet, allowing the system to be fixed or mobile.



Robust, corrosion resistant framework accepts all vessel without alteration

Stirrer support I-beam allows the stirrer drive to be raised and lowered with ease.





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 and liquid inlet adapters etc.

PTFE stirrer guide provides excellent stirring and sealing performance. An extended stirrer shaft support reduces stirrer shaft whip.

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

Accepts single jacketed vessels of 5, 10, 15 and 20 litres and vacuum jacketed vessels of 5 and 10 litres.

V5 Zero Dead Space PTFE Piston is designed to prevent leaking or weeping across the full temperature range (-70 °C to +230 °C). Large 25mm bore minimises sample hold-up and is ideal for slurries.

Optional Polypropylene drip trays, 7, 22 and 45 litre options.



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



Built-in spirit level for precise levelling.



Aluminium vessel support collar allows vessels to sit securely in the support plate even when not clamped. Matching 'step' on vessel neck ensures collar sits in correct position.



## Reactor-Ready Pilot Core System includes

- Base frame, support rods, vessel clamp, i-beam and stirrer support bosses.
- Vessel to manifold insulated hoses with quick-release connections.
- Lower inlet manifold with drain.
- Upper outlet manifold with vent.
- PTFE Stirrer guide.
- Stainless steel stirrer drive coupling.
- One aluminium vessel support collar.
- FEP flange O-ring and PTFE centering collar.



## 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 turbine stirrer included in each kit are matched to the vessel size. Each Vessel Kit includes:

- Reaction Vessel with PTFE Piston.
- Sidearm Couplings.
- Pt100 PTFE Temperature Probe with Lemo Connector.
- PTFE Temperature Probe Adapter.
- PTFE Turbine Stirrer.



# Reaction Vessels

Jacketed and vacuum jacketed from 5 litres to 20 litres

## Features include

- Precision engineered borosilicate glass vessels with DN200 flange.
- Double or vacuum jacketed vessels provide superior performance for heating and especially cooling.
- Process or dish shaped vessels feature a 1.25 to 1 ratio to mimic geometry of plant scale reactors.
- DN200 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 with adapter and side-arm couplings.

## Vessels feature V5 Zero Dead Space Drain Piston

- Exclusive piston 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 pistons.
- Glass filled PTFE pistons operate across the full thermofluid temperature range -70 °C to +230 °C.
- Pistons are interchangeable between vessels with a full range of replacement parts and FEP O-rings.
- We recommend using Chemraz O-rings for temperatures above +150 °C.
- The large 25mm bore pistons minimise sample hold-up and are ideal for slurries.

Glass filled PTFE piston with FEP encapsulated O-rings



FEP encapsulated O-ring with self centering PTFE collar

# Glass Vessel Lids

Precision ground lids. Choose from two standard configurations or request a custom design

## DN200 Glass Lids fit all Vessel sizes

- DN200 lid with either 6 or 7, Rodaviss conical ground glass joints. Custom lid designs are available on request.
- Rodaviss joints are grease free, will not jam and are interchangeable with ordinary 1-in-10 B and A length tapered conical joints.

### RR236000 - 6 Neck DN200 Lid

- 1 x B34 central vertical - stirrer
- 1 x B19 side vertical - probe
- 1 x B24 side vertical - gas purge
- 1 x B29 side vertical - dropping funnel, bubbler
- 1 x B34 side vertical - condenser and reflux
- 1 x B45 side angled - solid additions



### RR236002 - 7 Neck DN200 Lid

- 1 x B34 central vertical - stirrer
- 1 x B19 side vertical - probe
- 1 x B24 side vertical - gas purge
- 1 x B29 side vertical - dropping funnel, bubbler
- 2 x B34 side vertical - condenser and reflux
- 1 x B45 side angled - solid additions



# PTFE Vessel Lids

Ideal for use with PAT and test probes

## The benefits of PTFE lids are:

- Removable PTFE sockets and compression fittings allow for maximum flexibility, simply unscrew and change the fitting to suit your set-up.
- More suitable for PAT and test probes than equivalent glass lids.
- Allows for more ports in a smaller space (8 rather than 6 or 7)
- More robust and less likely to break than glass.
- Less dead space at top of vessel.

## Wide range of removable sockets and compression fittings

- Rodaviss style 1:10 tapered sockets, allow for better sealing and less need for supports - sizes include: B19, B24, B29, B34 and B45
- Compression fittings include: 8, 12, 14, 16 and 19mm bore

### RR136200 - 8 port with PTFE sockets

- 1 x B19
- 1 x B24
- 2 x B29
- 3 x B34
- 1 x B45



### RR136210 - 8 port without sockets

- 1 x Central 1½" NPT
- 1 x Side 15° angled 1½" NPT
- 1 x Side 10°x10° compound 1½" NPT
- 2 x Side vertical 1½" NPT
- 2 x Side vertical ¾" NPT
- 1 x Side vertical 1" NPT



# Reaction Vessel Specifications

Jacketed and vacuum jacketed vessels with dish shaped bottom, feature a 1.25 to 1 ratio of internal height to diameter to mimic the geometry of plant scale reactors

## Single jacketed

Popular choice, best suited for heating only applications.

## Vacuum jacketed

Vacuum jacket provides transparent insulation for reduced frosting and improved contents visibility.



	5 litre Single Jacketed Vessel	10 litre Single Jacketed Vessel	15 litre Single Jacketed Vessel	20 litre Single Jacketed Vessel	5 litre Vacuum Jacketed Vessel	10 litre Vacuum Jacketed Vessel
Cat No. (Reaction Vessel Only)	RR235050	RR235100	RR235150	RR235200	RR235052	RR235102
Cat No. (Reaction Vessel Kit)	RR220005	RR220015	RR220025	RR220035	RR220010	RR220020
Nominal Capacity	5 Litres	10 Litres	15 Litres	20 Litres	5 Litres	10 Litres
Internal Diameter	180mm	240mm	260mm	290mm	180mm	240mm
External Diameter	250mm	300mm	315mm	350mm	300mm	350mm
Jacketed Height	230mm	300mm	325mm	363mm	225mm	300mm
External Height (piston open)	526mm	606mm	640mm	674mm	541mm	623mm
Thermofluid Jacket Volume	4.6 Litres	6.7 Litres	5.7 Litres	10.3 Litres	3.9 Litres	5.4 Litres
Heat Transfer Area	0.16m <sup>2</sup>	0.27m <sup>2</sup>	0.31m <sup>2</sup>	0.38m <sup>2</sup>	0.16m <sup>2</sup>	0.27m <sup>2</sup>
Flange	DN200					
Sidearm	20mm ID Reactor-Ready					
Piston	V5 Zero Dead Space 25mm Glass Filled PTFE					
Piston Run-off	B24 Rodaviss Socket					

# Reaction Vessel Kits

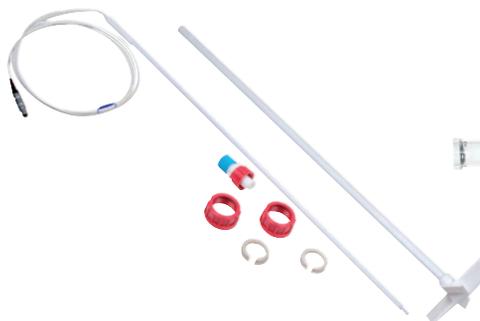
Reaction Vessel Kits make ordering vessels and popular accessories simple and more cost effective



## Reaction Vessel Kits

These cost effective vessel kits include the vessel and accessories you need to get started. The Pt100 probe and turbine stirrer are matched to the vessel size. Kit includes:

- Reaction Vessel
- PTFE Turbine Stirrer
- Sidearm Couplings
- Pt100 PTFE Temperature Probe with Lemo Connector
- PTFE Temperature Probe Adapter



# Accessory Glassware

We have been manufacturing scientific glassware for over 50 years. If you don't see what you want, please let us know and we will be happy to quote for a custom option



\* Indicates an item is available in other sizes or styles.

RR139037\* Enlarging Adapter, B29 to B34

RR139065\* PTFE Hose Adapter, B24 to 15mm ID

RR139340 Vertical Run-Off Adapter B24 to Plain Stem

RR139091\* Adapter Rodaviss, B24 to GL14

RR139041\* Reducing Adapter, B29 to B19

RR139011\* Right Angle Adapter, B29

RR139326\* 1000ml Receiver Flask, 3 x B24 Socket

RR139316\* Solid Additions Funnel, B45 with extended tube

RR139300\* Large Double Coil Rodaviss Condenser, B34

RR139031\* Glass Cone Stopper, B29

RR139304\* Graduated Dropping Funnel, Equalising Arm, 2000ml, B29

RR139137 Run-Off Secondary Valve, B24 to Stopcock

RR139025\* Gas Purge Adapter, B24

RR139057\* Valved Right Angled Liquid Inlet Adapter, B24

RR139320 Reflux Divider Head, B34

RR139322 Reflux Divider Head, B34, Temp Probe Port

RR139314\* Oil Bubbler, Type 1, B29

RR139310\* Swan Neck Adapter, B29

RR139081\* PTFE Flexible Bellows, B29

RR139372 4-Prong Large Clamp

RR139366\* Chain Clamp

RR139364 Rubber Belt Clamp

RR139360 Pilot Boss Head

RR139362 Rod Extender

RR139374 Universal Clamp Cork Jaws

RR139376 Lower Support Ring

# Reflux Divider Kits

Reflux divider kits allow condensed vapours to be either refluxed back into the reactor or diverted into a separate receiving vessel

- Choice of receiving flasks 500ml, 1, 2 and 5 litre. All receiver flasks feature three necks, decanting stopcock and are suitable for stacking. Receiver flasks must be ordered separately.
- Reflux divider kits are available with optional vapour temperature sensor.



Reactor-Ready Pilot with RR239202 Reflux Divider Kit and two RR139326 1000ml Receiver Flasks

## RR239200 - Pilot Reflux Divider Kit

- RR139320 - Reflux Divider Head, B34 + GL18 fittings
- RR139300 - Large Double Coil Rodaviss Condenser 60mm B34 + GL18 + fittings
- RR139012 - Right Angle Adapter B34 + GL14 + PTFE fittings
- RR139332 - Adapter Rodaviss B24 to GL25
- RR139350 - GL25 HT Compression Fitting for 12mm OD Tubing
- RR139354 - PTFE Tubing 10mm ID x 12mm OD - 1m length
- RR139360 - 3 x Pilot Boss Head - 22-35mm, 8-12mm
- RR139372 - 4-Prong Large Clamp - 10mm rod, 30-80mm
- RR139376 - Lower Support Ring - 10m rod, 76mm ID
- RR139374 - Universal Clamp Cork Jaws - 10mm rod, 0-80mm



Note: A suitable receiver flask/s RR139324/6/8/30 is required to complete this kit.

## RR239202 - Pilot Reflux Divider Kit with Vapour Temperature Probe

- RR139322 - Reflux Divider Head, B34 + GL18 fittings + B14 temp port
- RR139300 - Large Double Coil Rodaviss Condenser 60mm B34 + GL18 + fittings
- RR139012 - Right Angle Adapter B34 + GL14 + PTFE fittings
- RR139332 - Adapter Rodaviss B24 to GL25
- RR139350 - GL25 HT Compression Fitting for 12mm OD Tubing
- RR139354 - PTFE Tubing 10mm ID x 12mm OD - 1m length
- RR139133 - Pt100 PTFE Temp. Probe (Reflux Divider Head) + 2m Cable
- RR139135 - PTFE Temperature Probe Adapter (B14 for Reflux Divider Head)
- RR139360 - 3 x Pilot Boss Head - 22-35mm, 8-12mm
- RR139372 - 4-Prong Large Clamp - 10mm rod, 30-80mm
- RR139374 - Universal Clamp Cork Jaws - 10mm rod, 0-80mm
- RR139376 - Lower Support Ring - 10m rod, 76mm ID



Note: A suitable receiver flask/s R139324/6/8/30 is required to complete this kit.

# Other Accessories

## PTFE Stirring Shafts

- Chemically inert PTFE rotors moulded onto a 16mm  $\varnothing$  PTFE shaft with metal core.
- Available in Anchor, Retreat Curve and Turbine or Propeller styles.

## PTFE Adjustable Secondary Rotors

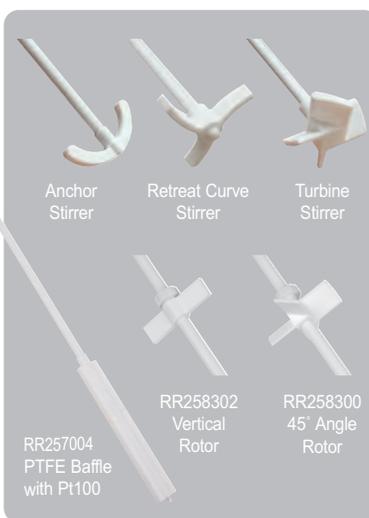
- Fit 16mm shafts and can be positioned anywhere along shaft.
- Chemically inert PTFE with glass filled PTFE locking nut.
- RR258300 - 4 blade 45° Angle Rotor.
- RR258302 - 2 Blade Vertical Rotor.

## PTFE Baffle Probes

- Designed to improve agitation and promote thorough mixing.
- Fully encapsulated in PTFE with a stainless steel core for rigidity.
- Available with built-in Pt100 temperature probe.
- Available in 600mm and 700mm lengths.

## Polypropylene Drip Trays

- Chemically resistant polypropylene designed to catch any spills and vessel contents in case of breakage.
- Available in 7, 22 and 45 litre capacities.
- Slide easily onto the Reactor-Ready Pilot base.



RR210062 7L Capacity



RR210064 22L Capacity



RR210066 45L Capacity



Value 200



Value 400



Precision 200



Precision 400

## Hei-Torque Overhead Stirrers - *powerful stirring*

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



### Stirrer models include

- Powerful stirring from 10 to 2000 rpm.
- Available with basic (Value) or advanced (Precision) features, and a choice of 200 or 400 Ncm torque.
- Intuitive touch panel for easy operation, safe start and stop to avoid accidental start-up.
- **New** features for Precision range: set speed limit, adjustable acceleration, set a torque limit.
- **New** unique Quick-chuck for immediate and convenient 'one-hand' impellor changes, without tools.

	Hei-Torque Value 200	Hei-Torque Value 400	Hei-Torque Precision 200	Hei-Torque Precision 400
Power rating, motor input/output (W)	120/80	150/90	120/80	150/90
Number of gears	1	2	1	2
Speed range (rpm)	10 to 2000	10 to 400 and 200 to 2000	10 to 2000	10 to 400 and 200 to 2000
Speed indicator	digital monochrome 2.4"	digital monochrome 2.4"	digital colour 3.2"	digital colour 3.2"
Speed control	electronic	electronic	electronic	electronic
Torque, maximum (Ncm)	200	400	200	400
Torque indicator (Ncm)	symbol	symbol	precise value	precise value
Viscosity up to (mPa s)	100,000	250,000	100,000	250,000
Stirring cap. H:0 max. (L)	50	100	50	100
Shaft diameter, max. (mm)	2.5 - 10.5	2.5 - 10.5	2.5 - 10.5	2.5 - 10.5
Dimensions (W x H x D) (mm)	86 x 350 x 247	93 x 350 x 247	86 x 350 x 247	93 x 350 x 247
Weight (kg)	5.1	5.3	5.1	5.3
Set speed limit, Torque limit, Adjustable acceleration			Yes	Yes
Analogue/digital interface			USB & RS232	USB & RS232



Huber Unistat 610

## Thermoregulators and 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 Pilot 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	Temp Range °C	Heating Power (kW)	Cooling Power 0°C (kW)	Application Examples		
				Vessel Size	Cooling	Heating
Unistat Tango	-45 to +250	1.5	0.7	5 Litre	Cool 20°C to 0°C in < 30 minutes	Heat 20°C to 120°C < 1hr
Unistat 405	-45 to +250	1.5	1.0	5 Litre	Cool 20°C to 0°C in < 20 minutes	Heat 20°C to 60°C < 25 minutes
				10 Litre	Cool 20°C to 0°C in < 35 minutes	Heat 20°C to 60°C < 70 minutes
Unistat 425	-40 to +250	2.0	2.5	5 Litre	Cool 20°C to -20°C in < 20 minutes	Heat 20°C to 180°C < 30 minutes
				20 Litre	Cool +60°C to 20°C in < 30 minutes	Heat 20°C to 60°C < 20 minutes
Unistat 510w	-40 to +250	6.0	5.3	20 Litre	Cool 20°C to -40°C in < 80 minutes	Heat -30°C to 20°C < 20 minutes
Unistat 610w	-60 to +200	6.0	7.0	20 Litre	Cool 180°C to 20°C in < 40 minutes	Heat 20°C to 180°C < 60 minutes
Unistat 825w	-60 to +200	3.0	2.4	10 Litre	Cool 20°C to -60°C in < 60 minutes	Heat 20°C to 60°C < 30 minutes
				10 Litre	Cool 20°C to -75°C in < 120 minutes	Heat 20°C to 180°C < 100 minutes

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. For comprehensive advice on thermoregulator selection please contact your local Radleys distributor.

# AVA Software - take control of your chemistry

## AVA Level 4 controls multi-device jacketed reaction systems

- Unattended chemistry for improved productivity
- Automatically log your process data
- Improve safety and reduce manual errors
- Control any reactor



### Control 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 recipes, 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 addition
- Define safety overrides and cut-off conditions
- Configure audio and visual alarms

## Download & try AVA Software for FREE

### Learn how AVA Lab Control 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



### AVA Care Support

- Free support for 1st year
- Free set-up and application support
- Free software updates during support period

### Data Hub - integrate RS232 devices

The versatile Data Hub enables 3rd party equipment with an RS232 interface to be connected, controlled and logged via the AVA Software.



### Level 4



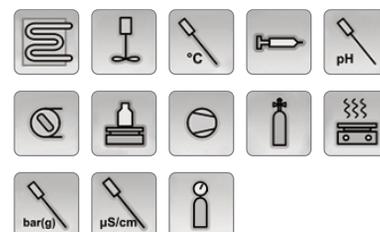
Control and log reaction systems with multiple devices



### 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.



# How to order Reactor-Ready Pilot

Need help with ordering?  
Call +44 1799 513320 to discuss your application with one of our technical specialists

## Order in six simple steps

1. Select the Reactor-Ready Pilot Core: RR210000.
2. Choose the lid you require, glass or PTFE.
3. Choose the Vessel Kit or Kits you require by selecting the vessel volume and style.
4. Select the overhead stirrer you require.
5. If you need a thermoregulator, hoses, hose adapters, thermofluid or accessory glassware, then select from the accessory list opposite.
6. If you need automation, add the AVA Lab Control Software and Data Hub.

### Reactor-Ready Pilot Core System

- RR210000 Reactor-Ready Pilot Core System includes:
- Base frame, support rods, vessel clamp, i-beam and stirrer support bosses.
  - Vessel to manifold insulated hoses with quick-release connections.
  - Lower inlet manifold with drain.
  - Upper outlet manifold with vent.
  - PTFE Stirrer guide.
  - Stainless steel stirrer drive coupling.
  - One aluminium vessel support collar.
  - FEP flange O-ring and PTFE centering collar.



**Important:** Hoses to connect the Reactor-Ready Pilot framework to your thermoregulator are NOT included. You will require hoses with an M30x1.5 female connection or appropriate adapters. See below for hoses, adapters and suitable thermoregulators.

### Optional Pilot Core Height Reduction Kits

- RR210070 Reactor-Ready Pilot Core - 200mm Height Reduction Kit  
RR210072 Reactor-Ready Pilot Core - 300mm Height Reduction Kit

**Important:** Designed to reduce the overall height of the Pilot Core by 200 or 300mm.

### Jacketed and Vacuum Jacketed Reaction Vessel Kits

- Kits include; process vessel, turbine stirrer paddle, PTFE Pt100 temp. probe with Lemo plug and PTFE temperature probe adapter.
- Custom vessel designs are available on request.

- RR220005 5L Single Jacketed Pilot Process Vessel Kit  
RR220015 10L Single Jacketed Pilot Process Vessel Kit  
RR220025 15L Single Jacketed Pilot Process Vessel Kit  
RR220035 20L Single Jacketed Pilot Process Vessel Kit  
RR220010 5L Vacuum Jacketed Pilot Process Vessel Kit  
RR220020 10L Vacuum Jacketed Pilot Process Vessel Kit



### Jacketed and Vacuum Jacketed Reaction Vessels Only

- RR235050 5L Single Jacketed Pilot Vessel  
RR235100 10L Single Jacketed Pilot Vessel  
RR235150 15L Single Jacketed Pilot Vessel  
RR235200 20L Single Jacketed Pilot Vessel  
RR235052 5L Vacuum Jacketed Pilot Vessel  
RR235102 10L Vacuum Jacketed Pilot Vessel

### Reaction Vessel Support Collar

- RR210018 Pilot Vessel Support Collar

**Important:** One support collar is supplied with each Reactor-Ready Pilot Core. We recommend one support collar per vessel.

### Hei-Torque Overhead Stirrers

- 501-62010-00 Hei-Torque 200 Value  
501-62020-00 Hei-Torque 200 Precision - RS232 & USB  
501-64010-00 Hei-Torque 400 Value  
501-64020-00 Hei-Torque 400 Precision - RS232 & USB  
14-007-040-72 RS232 Interface Cable - 9 pin to 9 pin



### AVA Lab Control Software

- RR20308 AVA Level 4 Software Kit: Comprising of: AVA Software Level 4, Laptop Controller, 4 Port Data Hub and 1 Year AVA Care Support

### Huber Thermoregulators (others available)

- HB1000.0016.01 Unistat Tango Pilot ONE Controller (230v or 400v)  
HB1002.0021.01 Unistat 405 Pilot ONE Controller (230v or 400v)  
HB1005.0057.01 Unistat 425 Pilot ONE Controller  
HB1005.0061.01 Unistat 510w Pilot ONE Controller  
HB1007.0031.01 Unistat 610w Pilot ONE Controller  
HB1014.0051.01 Unistat 825 Pilot ONE Controller  
HB1014.0052.01 Unistat 825w Pilot ONE Controller



### Thermoregulator Hoses and Adapters

- M24 Insulated Hose with PTFE Inner (12mm ID x 37mm OD)**
- HB9325 M24x1.5 x 1m Insulated PTFE Hose -60° C to +260° C  
HB9326 M24x1.5 x 1.5m Insulated PTFE Hose -60° C to +260° C  
HB9327 M24x1.5 x 2m Insulated PTFE Hose -60° C to +260° C  
HB9328 M24x1.5 x 3m Insulated PTFE Hose -60° C to +260° C
- M30 Insulated Hose with PTFE Inner (20mm ID x 44mm OD)**
- HB9612 M30x1.5 x 1m Insulated PTFE Hose -60° C to +260° C  
HB9613 M30x1.5 x 1.5m Insulated PTFE Hose -60° C to +260° C  
HB9614 M30x1.5 x 2m Insulated PTFE Hose -60° C to +260° C  
HB9615 M30x1.5 x 3m Insulated PTFE Hose -60° C to +260° C
- M24 Insulated Hose with Metal Inner (12mm ID x 44mm OD)**
- HB9274 M24x1.5 x 1m Insulated Metal Hose -100° C to +350° C  
HB9275 M24x1.5 x 1.5m Insulated Metal Hose -100° C to +350° C  
HB9276 M24x1.5 x 2m Insulated Metal Hose -100° C to +350° C  
HB9277 M24x1.5 x 3m Insulated Metal Hose -100° C to +350° C
- M30 Insulated Hose with Metal Inner (20mm ID x 56mm OD)**
- HB6426 M30x1.5 x 1m Insulated Metal Hose -100° C to +350° C  
HB6386 M30x1.5 x 1.5m Insulated Metal Hose -100° C to +350° C  
HB6427 M30x1.5 x 2m Insulated Metal Hose -100° C to +350° C  
HB6428 M30x1.5 x 3m Insulated Metal Hose -100° C to +350° C
- M24 Adapters**
- HB9268 M24x1.5 Male to M30x1.5 Female Adapter  
HB6723 M24x1.5 Female to M30x1.5 Male Adapter  
HB9256 M24x1.5 90 degree Adapter  
HB12634 M24x1.5 Nut  
HB9471 M24x1.5 Hose Connector NW12  
HB9236 M24x1.5 Isolating Ball Valve
- Thermofluid**
- HB6161 SiOil M20.195/235.20, 5 Litre -20° C to +235° C\*  
HB6162 SiOil M20.195/235.20, 10 Litre -20° C to +235° C\*  
HB6163 SiOil M40.165/220.10, 5 Litre -40° C to +220° C\*  
HB6164 SiOil M40.165/220.10, 10 Litre -40° C to +220° C\*  
HB6165 SiOil M60.115/200.05, 5 Litre -60° C to +200° C\*  
HB6166 SiOil M60.115/200.05, 10 Litre -60° C to +200° C\*  
HB6479 DW-Therm M90.200.02, 10 Litre -90° C to +200° C\*

**Important:** \* Indicates maximum thermofluid temperature in sealed Unistat system only. Furthermore DW-Therm can only be used above 170 °C with inert gas.

### PTFE Pt100 Temperature Probes and Adapters

- RR145000 Pt100 PTFE Temp. Probe 9mm + Lemo Plug - 5L to 10L Vessels  
RR146000 Pt100 PTFE Temp. Probe 9mm + Lemo Plug - 15L to 20L Vessels  
RR140015 PTFE Temperature Probe Adapter - 9mm

### PTFE Baffles + PTFE Probe Baffles

- RR257000 PTFE Baffle, 16mm OD Shaft, 35mm x 600mm long  
RR257002 PTFE Baffle, 16mm OD Shaft, 35mm x 700mm long  
RR257004 Pt100 PTFE Baffle Probe + Lemo, 16mm OD Shaft, 35mm x 600mm long  
RR257006 Pt100 PTFE Baffle Probe + Lemo, 16mm OD Shaft, 35mm x 700mm long  
RR257008 B24 to 16mm PTFE Compression Fitting  
RR257010 B29 to 16mm PTFE Compression Fitting  
RR257012 B34 to 16mm PTFE Compression Fitting

### Glass Lids

- Choice of 6 or 7 Rodaviss glass joints.
- Custom lid designs are available on request.



RR236000	6 Neck Lid DN200 - 1xB19, 1xB24, 1xB29, 2xB34, 1xB45
RR236002	7 Neck Lid DN200 - 1xB19, 1xB24, 1xB29, 3xB34, 1xB45

### Glassware Accessories

RR139300	Large Double Coil Rodaviss Condenser 60mm B34 + GL18 + fittings
RR139302	Large Double Coil Rodaviss Condenser 85mm B34 + GL18 + fittings
RR139011	Right Angle Adapter B29 + GL14 + PTFE fittings
RR139012	Right Angle Adapter B34 + GL14 + PTFE fittings
RR139017	250ml Graduated Dropping Funnel Equalising Arm B24
RR139019	500ml Graduated Dropping Funnel Equalising Arm B24
RR139021	1000ml Graduated Dropping Funnel Equalising Arm B24
RR139304	2000ml Graduated Dropping Funnel Equalising Arm B29 6mm Bore
RR139308	Swan Neck Adapter Vertical B24 to Vertical B24
RR139310	Swan Neck Adapter Vertical B29 to Vertical B29
RR139312	Swan Neck Adapter Vertical B34 to Vertical B34
RR139079	PTFE Flexible Bellows B24
RR139081	PTFE Flexible Bellows B29
RR139083	PTFE Flexible Bellows B34
RR139025	Gas Purge Adapter B24 + GL14 + fittings
RR139027	Glass Cone Stopper B19
RR139029	Glass Cone Stopper B24
RR139031	Glass Cone Stopper B29
RR139033	Glass Cone Stopper B34
RR139378	Glass Cone Stopper B45
RR139034	Enlarging Adapter B19 to B24
RR139035	Enlarging Adapter B24 to B29
RR139036	Enlarging Adapter B19 to B29
RR139037	Enlarging Adapter B29 to B34
RR139038	Enlarging Adapter B19 to B34
RR139039	Reducing Adapter B24 to B19
RR139041	Reducing Adapter B29 to B19
RR139043	Reducing Adapter B29 to B24
RR139045	Reducing Adapter B34 to B19
RR139047	Reducing Adapter B34 to B24
RR139049	Reducing Adapter B34 to B29
RR139051	Oil Bubbler Type 1 B24 + GL14 + fittings
RR139314	Oil Bubbler Type 1 B29 + GL14 + fittings
RR139053	Solid Additions Funnel B34 (with extended tube)
RR139316	Solid Additions Funnel B45 (with extended tube)
RR139057	Valved Right Angled Liquid Inlet Adapter B24 to GL14
RR139318	Valved Right Angled Liquid Inlet Adapter B29 to GL14
RR139320	Reflux Divider Head B34 + GL18 + fitting
RR139322	Reflux Divider Head B34 + GL18 + fitting + B14 temp probe port
RR239200	Pilot Reflux Divider Kit (see page 11)
RR239202	Pilot Reflux Divider with Vapour Temp Kit (see page 11)
RR139133	Pt100 PTFE Temp. Probe (Reflux Divider Head) + 2m Cable + Lemo
RR139135	PTFE Temperature Probe Adapter (B14 for Reflux Divider Head)
RR139063	PTFE Hose Adapter B19 to 12mm ID (NW12)
RR139065	PTFE Hose Adapter B24 to 15mm ID
RR139324	500ml Receiver Flask 3 x B24 Socket, + B24 Cone and Tap
RR139326	1000ml Receiver Flask 3 x B24 Socket, + B24 Cone and Tap
RR139328	2000ml Receiver Flask 3 x B24 Socket, + B24 Cone and Tap
RR139330	5000ml Receiver Flask 3 x B24 Socket, + B24 Cone and Tap
RR139085	Adapter Rodaviss B19 to GL25
RR139332	Adapter Rodaviss B24 to GL25
RR139334	Adapter Rodaviss B29 to GL25
RR139087	Adapter Rodaviss B34 to GL25
RR139089	Adapter Rodaviss B19 to GL14
RR139091	Adapter Rodaviss B24 to GL14
RR139336	Adapter Rodaviss B29 to GL14
RR139093	Adapter Rodaviss B19 to 2 x GL14
RR139095	Adapter Rodaviss B24 to 2 x GL14
RR139338	Adapter Rodaviss B29 to 2 x GL14
RR139340	Vertical Run-Off Adapter B24 to Plain Stem
RR139137	Run-Off Secondary Valve, B24 to Stopcock
RR139111	Screw Cap with Aperture GL14, pk 10
RR139113	Silicone Seal with PTFE Washer GL14, 6mm, pk 10
RR139115	Screw Cap GL14, with PTFE seal, pk 10
RR139119	Screw Cap with Aperture GL25, pk 10
RR139121	Silicone Seal with PTFE Washer GL25, 12mm, pk 10
RR139117	Screw Cap GL25, with PTFE seal, pk 10
RR139342	GL14 HT Compression Fitting for 4mm OD Tubing
RR139344	GL14 HT Compression Fitting for 6mm OD Tubing
RR139346	GL25 HT Compression Fitting for 8mm OD Tubing
RR139348	GL25 HT Compression Fitting for 10mm OD Tubing
RR139350	GL25 HT Compression Fitting for 12mm OD Tubing
RR139352	GL18 PTFE Hose Connector for 10mm ID Tubing
RR139354	PTFE Tubing 10mm ID x 12mm OD - 1m length



### PTFE Lids

RRR136200	8 Neck PTFE Lid DN200 - with sockets 1 x B19, 1 x B24, 2 x B29, 3 x B34, 1 x B45
RR136210	8 Neck PTFE Lid DN200 - with 8 Threaded Ports 2 x 3/4" NPT, 1 x 1" NPT, 5 x 1 1/2" NPT



### PTFE Sockets, Compression Fittings & Blanking Plugs for DN200 PTFE Lids

RR136300	Rodaviss B19 Socket Adapter (3/4" NPT)
RR136301	Rodaviss B24 Socket Adapter (3/4" NPT)
RR136302	Rodaviss B29 Socket Adapter (3/4" NPT)
RR136303	Rodaviss B34 Socket Adapter (3/4" NPT)
RR136304	Rodaviss B45 Socket Adapter (3/4" NPT)
RR136305	Rodaviss B24 Socket Adapter (1" NPT)
RR136306	Rodaviss B29 Socket Adapter (1" NPT)
RR136307	Rodaviss B34 Socket Adapter (1" NPT)
RR136308	Rodaviss B45 Socket Adapter (1" NPT)
RR136309	Rodaviss B24 Socket Adapter (1 1/2" NPT)
RR136310	Rodaviss B29 Socket Adapter (1 1/2" NPT)
RR136311	Rodaviss B34 Socket Adapter (1 1/2" NPT)
RR136313	Rodaviss B45 Socket Adapter (1 1/2" NPT)
RR136312	Reactor-Ready Pilot Central B34 Socket Adapter (1 1/2" NPT)
RR136316	8mm Bore Compression Fitting 3/4" NPT
RR136317	12mm Bore Compression Fitting 3/4" NPT
RR136318	14mm Bore Compression Fitting 3/4" NPT
RR136319	16mm Bore Compression Fitting 3/4" NPT
RR136320	19mm Bore Compression Fitting 3/4" NPT
RR136321	8mm Bore Compression Fitting 1" NPT
RR136322	12mm Bore Compression Fitting 1" NPT
RR136323	14mm Bore Compression Fitting 1" NPT
RR136324	16mm Bore Compression Fitting 1" NPT
RR136325	19mm Bore Compression Fitting 1" NPT
RR136326	25mm Bore Compression Fitting 1" NPT
RR136327	PTFE Blanking Plug 3/4" NPT
RR136328	PTFE Blanking Plug 1" NPT
RR136329	PTFE Blanking Plug 1 1/2" NPT
RR136330	PTFE Blanking Plug 1 1/2" NPT

### PTFE Stirrer Shafts

RR258051	Anchor PTFE Stirrer Shaft - 5L Pilot Vessels
RR258052	Retreat Curve PTFE Stirrer Shaft - 5L Pilot Vessels
RR258053	Turbine PTFE Stirrer Shaft - 5L Pilot Vessels
RR258101	Anchor PTFE Stirrer Shaft - 10L Pilot Vessels
RR258102	Retreat Curve PTFE Stirrer Shaft - 10L Pilot Vessels
RR258103	Turbine PTFE Stirrer Shaft - 10L Pilot Vessels
RR258151	Anchor PTFE Stirrer Shaft - 15L Pilot Vessels
RR258152	Retreat Curve PTFE Stirrer Shaft - 15L Pilot Vessels
RR258153	Turbine PTFE Stirrer Shaft - 15L Pilot Vessels
RR258201	Anchor PTFE Stirrer Shaft - 20L Pilot Vessels
RR258202	Retreat Curve PTFE Stirrer Shaft - 20L Pilot Vessels
RR258203	Turbine PTFE Stirrer Shaft - 20L Pilot Vessels
RR258300	Adjustable PTFE 4 Blade 45 Angle Rotor 16mm OD 100mm Rotor
RR258302	Adjustable PTFE 2 Blade Vertical Rotor 16mm OD 100mm Rotor



### Clamps, Bosses and Drip Trays

RR139360	Pilot Boss Head - 22-35mm, 8-12mm
RR139362	Rod Extender - 10mm, 100mm long, for 10mm rods
RR139364	Rubber Belt Clamp - 10mm rod, 60-170mm
RR139366	Chain Clamp - 10mm rod, 40-120mm
RR139368	Chain Clamp - 10mm rod, 80-150mm
RR139370	Chain Clamp - 10mm rod, 100-170mm
RR139372	4-Prong Large Clamp - 10mm rod, 30-80mm
RR139374	Universal Clamp Cork Jaws - 10mm rod, 0-80mm
RR139376	Lower Support Ring - 10m rod, 76mm ID
RR210062	Drip Tray Polypropylene 7L Capacity
RR210064	Drip Tray Polypropylene 22L Capacity
RR210066	Drip Tray Polypropylene 45L Capacity



### General Maintenance Accessories

RRR210100	Reactor-Ready Pilot Maintenance Kit (includes all items listed below) <i>Does not include Chemraz O-rings or 25mm Piston</i>
RR121027	Oil Wipe for Support Rods, pk 10
RR121136	Stirrer Guide Bearing Seal B34, 16mm
RR121138	Stirrer Guide Ferrule and Shaft Seal B34, 16mm
RR121071	23mm Viton O-Rings for Quick Release Hose Coupling, pk 2
RR210050	34mm Viton O-Rings for Quick Release Hose Coupling - NW20, pk 2
RR210025	FEP Encapsulated Silicone Vessel O-ring - 200mm
RR166104	Replacement 25mm Piston Top O-Ring, pk 2
RR166106	Replacement 25mm Piston Middle O-Ring
<b>Important:</b> For temperatures above 150°C we recommend the use of high performance Chemraz piston O-rings to prevent possible weeping. Chemraz O-rings are suitable for temperatures from 0°C to +230°C and should not be used below 0°C.	
RR210074	Replacement 25mm Piston Top O-Ring Chemraz (0°C to 230°C)
RR166070	Piston 25mm for Single and Vacuum Jacketed Vessel

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