



**Beun . De Ronde**  
Analyse & Chemie

# **ORGANIC SYNTHESIS**

FROM SYNTHESIS...  
TO PURIFICATION

## Foreword...

From synthesis to purification, a four word title of this fairly thin booklet , but the story behind it fills libraries...

As an exclusive distributor of high-end lab equipment, we focus on the organic synthesis market where suppliers as Radleys, Lauda, Thales Nano, CEM and ISCO Teledyne play the leading role.

**Radleys** provides innovative chemistry equipment for safer, cleaner, greener and more productive chemical research. Our areas of expertise are focused on equipment for chemical synthesis, process development, work-up and evaporation.

**Lauda** The complete spectrum of perfect temperature control.

Lauda is the world's leading provider of high-precision temperature control with liquids. Lauda always goes one step further: employees are encouraged to share their ideas and create space for technical innovation and creative solutions, winning over new markets and customer segments.

**Thales Nano** is widely recognized for its expertise in transforming chemical processes to microscale continuous-flow operations. Researchers can perform dangerous and difficult chemistry in a safe and easy way using e.g. the H-Cube family, the Ice-Cube or the Phoenix with the right CatCart.

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The **CEM** Discover microwave reactors have become the industry standard for methodology development and total synthesis assuring faster reaction times, more accurate reaction control and safer setup. The Discover can be used both in batch and flow synthesis mode. The Discover was also the inspiration for the development of the Liberty Blue: the unique standard for Automated Microwave Peptide Synthesizer.

In flow chemistry reactions, a stable and reproducible flow rate is mandatory, in other words the quality of the pump is crucial.

The **Teledyne ISCO Combiflash** and ACCQprep include instruments and accessories for the purification of organic compounds in normal-phase and reversed-phase separations and for bio-purification.

The **Teledyne ISCO** Pumps product line includes syringe and reciprocating pumps for a wide range of challenges. These rugged, do-anything pumps solve your toughest fluid delivery problems, from micro-flow to scale-up and pilot plants. They pump corrosive liquids, supercritical solvents and very viscous solvents safely even in explosive atmospheres.

Once the organic synthesis is done, we have solutions for purification using flash and preparative liquid chromatography.

As a pioneer in Chromatography, Teledyne ISCO developed the **Redisep chromatography columns** providing easy purification and scale-up.

## Who are we?

The **Beun-De Ronde Group** is a supplier of scientific instruments. We find our customers working in the field of analytical chemistry, process industry and life-science laboratories. In these fields we represent a number of international top-suppliers.

Beun-De Ronde introduces new technologies and innovations of existing technologies to its customer's laboratories, in order to help the customers reaching their goals.

Our organization distinguishes itself through our specialisms, flexibility and organizing power, where every employee of the company needs to optimize customer satisfaction, personal results, teamwork and communication skills. These values support us building up our long term relationship with our customers.

Our drive to introduce innovations is applicable to all our products designed to ensure your chemistry. We can deliver ready-made or custom made packages from flow- and batchsynthesis to purification. Beun - De Ronde is committed to deliver the highest level of sales, service & support to you, our customer.

## Beun-De Ronde Service

We ensure a continuous operation of your laboratory equipment by providing a complete package of technical and analytical services, quality products and skilled technical support.

1. Tailor-made installations of new equipment & training
2. Upgrades of existing equipment
3. Preventive maintenances with or without service contract
4. Technical support (hardware & software)
5. IQPQOQ + reporting
6. Validation & Calibration services
7. All types of service contracts
8. Demo lab
9. Remote & application support



The range of benchtop and hotplate lab equipment has a whole host of benefits including high safety standards, productivity and cost effectiveness.

You'll find lab equipment that's suitable for the following applications:

- Refluxing
- Stirring
- Condensing
- Heating
- Cooling
- Distillation
- Parallel synthesis
- Inerting



### Findenser Air Condenser™

**Award-winning alternative to water-cooled condensers**



- Environmentally friendly: it requires no water and helps meet sustainable water reduction targets.
- Safer: prevents laboratory flooding.
- Cheaper than running a water condenser.

### Heat-On™ Block System - Safer alternative to oil baths.



- Avoids oil spitting, spilling or causing a fire.
- Cost effective and environmentally friendly: no oil waste.
- Stays cool for longer than a glass dewar or plastic bowl.

### Cool-It™ Insulated Bowls - Safer and more efficient way of cooling.

- Stays cool for longer than a glass dewar or plastic bowl.
- Virtually unbreakable compared to fragile glass dewars.
- Safer and easier solvent disposal because of the unique non-drip spout and ergonomically designed handle.



### StarFish™ Work Station - Space saving multi-tasker that increases productivity and cuts costs.

- Improved productivity with multiple positions to allow you to heat, stir and reflux in parallel.
- Safer and cleaner: no oil baths needed.
- Eliminates the energy cost involved in multiple setups.
- Easy to use and quick to assemble.



The parallel reaction stations are designed to help you increase your productivity, save space and keep costs down, among many other benefits. Radleys has parallel reaction stations for applications such as heating, cooling, condensing, work up, evaporation, inerting, filtration, heating, parallel synthesis, polymer research, process development, refluxing and stirring.

### **Carousel 12 Plus Reaction Station™ - Simultaneous heating, stirring and reflux of multiple samples.**

- Up to 12 tubes, in sizes ranging from 1 to 20 ml.
- Removable Fluoropolymer insulation plate, saving up to 36% energy and preventing burn.
- Integrated gas/vacuum manifold in the head to enable working under an inert atmosphere.
- Integrated reflux head replaces the need for multiple condensers so refluxing in multiple positions is easy.



### **Carousel 6 Plus Reaction Stations™ - Simultaneous heating, stirring and reflux of multiple samples.**

- Powerful, even stirring in all positions
- Can use up to six vessels simultaneously: 5 to 250 ml.
- Round bottom flasks fit straight onto a Rotary evaporator to evaporate your samples directly.
- Option for overhead stirring for viscous materials



### **Tornado™ Overhead Stirring System™ - Stirring productivity increased by up to 600%.**

- Integrates with Carousel 6 Plus to enable overhead mechanical stirring in all positions using a single overhead stirrer motor.
- Compatible with all leading brands of overhead stirrer.



### Reactor-Ready™ Lab Reactor - 100 ml to 5 litres

The Reactor-Ready Lab Reactor - swap reaction vessels in minutes, not hours. Reactor-Ready is designed as a universal reactor work station with a range of easily interchangeable vessels from 100 ml to 5 litres which can be configured to suit the chemistry and scale needed for each project. Easy to use, this one unique framework can replace many, saving money and fumehood space.

#### Reactor-Ready Lab Reactor Features

- Rapid, tool-free vessel exchange with quick-release vessel clamp and hose couplings.
- Accepts all leading brands of overhead stirrer and allows easy, tool-free adjustment.
- Triple support stand features heavy duty stainless steel support rods for stability.
- Self-aligning stirrer coupling engages without the need for tools.
- Innovative hose manifolds allow easy thermofluid drain down.
- Temperature range: -70 °C to +230 °C.
- Wide range of accessory glassware including condensers, dropping funnels
- Optional software allows you to log and control stirrers, circulators, balances, pumps, temperature sensors and other devices.

#### Reaction Vessel Features

- Range of single and vacuum jacketed vessels from 100 ml to 5 litres.
- Process vessels to mimic larger scale plant or manufacturing reactors.
- Precision engineered borosilicate glass vessels.
- DN100 5 neck Glass Lid fits all Vessel sizes.
- Vessels feature V4 Zero Dead Space Drain Stopcock which prevents over-tightening which can cause glass breakage.



## Reactor-Ready™ Pilot Lab Reactor - 5 to 20 litres

Replace multiple reactor set-ups with a single, universal pilot scale system with interchangeable vessels that can be swapped in minutes

### Reactor-Ready Pilot Features

- Rapid vessel exchange with quick-release vessel clamp and wide bore hose couplings.
- Vessels have 1.25 to 1 ratio of internal height to diameter to mimic plant scale reactors.
- Choose from two precision ground lids with 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.
- Innovative hose manifolds allow easy thermofluid drain down

### Pilot Reaction Vessel Features

- Range of single vessels from 5 to 20 litres.
- Range of vacuum jacketed vessels from 5 to 10 litres
- Process vessels to mimic larger scale plant or manufacturing reactors.
- Precision engineered borosilicate glass vessels.
- Choice of DN200 6 or 7 neck Glass Lids that fit all vessel sizes (custom options available).
- Vessels feature V4 Zero Dead Space Drain Stopcock which prevents over-tightening which can cause glass breakage.





### PRO Circulation thermostats

#### Compact circulation thermostats for professional temperature control

- Thermostating from  $-90$  to  $250^{\circ}\text{C}$  @  $0.05 \pm \text{C}$
- Small liquid volumes for quick temperature changes.
- Hybrid cooling of the refrigerating machine permits cooling using ambient air or, in addition, using cooling water.



### Variocool

#### Versatile for dissipating process heat in laboratories, mini plants and production facilities.

- 1200 W to 10kW circulation chillers
- Used between  $-20$  and  $80^{\circ}\text{C}$  @  $0.05 \pm \text{C}$
- Space-saving construction
- Versatile: wide variety of options
- Simple and convenient: color TFT display
- Standard USB interface and alarm contact
- Optional heating and sound insulation



### Integral XT

#### High-performance process thermostats

- From 1.5 to 18 kW for temperature control thermostating
- Broad temperature range of  $-90$  to  $320^{\circ}\text{C}$  @  $0.05 \pm \text{C}$
- Operate according to the flow principle with a cold oil blanket that allows the utilization of the entire temperature range through the use of a heat transfer medium.
- Electronically controlled, magnetic coupled pump can alter the pressure to adapt the flow rate to the relevant process requirements.



## H-Cube MINI Plus

Safe and affordable hydrogenation for academia

- Hydrogenation without cylinders
- Fast catalysed reactions
- Easy to use
- Academia budget compatible



## H-Cube PRO®

Continuous-flow Benchtop Hydrogenation Reactor

- Flow rate: 0.1-3 mL/min
- New heater/cooler control from 10°C to 150°C
- Pressure: 1-100 bar
- 2 hydrogen cells for hydrogen production: 0-60 mL/min
- Auto Inlet/Outlet valve control
- New software



## The H-Cube Gas Module

Gaseous Reagent Organic Chemistry made easy

- 13 gases in one device
- Fast reactions - chemistry in minutes
- High pressure reactions to 100 bar
- Intuitive User Interface
- Works seamlessly with any existing H-Cube® or the H-Cube Pro™



## Phoenix Flow Reactor

Multifunctional Module compatible with H-cube Pro™

- Fast: reactions in seconds
- Simple: 2 buttons and automated touchscreen
- Innovative: performs chemistry till 450°C not possible in standard lab reactors
- Versatile: perform reactions in a loop homogeneously or use a range of different catalyst cartridges



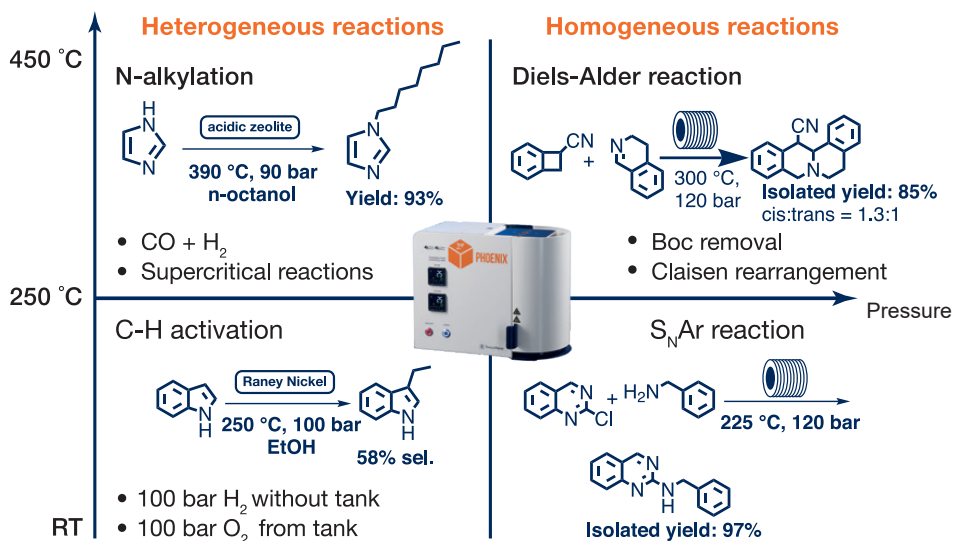
## NEW - H-Genie

Safe and powerful hydrogen generator specifically for chemists!

- Expand chemistry in batch and flow with up to 100 Bar  $H_2$ , generated from water
- Accurately log how much hydrogen is used in your reaction
- Up to 1 L/min
- Simple and safe: click & go



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### Mars 6 Multimode Microwave

- Suitable for running from a single vessel up to 40 in parallel
- Fully customizable: can be dedicated for synthesis or serve as an all-in-one microwave reactor for a variety of applications
- Dual magnetrons provide ample power (1800 W) for high-throughput synthesis
- Strategically designed waveguides disperse microwave energy uniformly throughout the cavity, providing even heating
- Standard temperature control, cooling and stirring



### PETwave Microwave-Assisted Radiosynthesis

- High Yield Labeling In Minutes
- For radiolabeling in the hot cell
- Improved  $C_{11}$ ,  $F_{18}$  and  $Ga_{64}$  labeling chemistries



### Liberty Blue: Automatic Peptide Synthesis

- 4 minutes cycle time
- 90% waste reduction (HE-SPPS)
- Flex-add™ critical reagent delivery system (patented)
- True Internal fiber-optic temperature control
- 0.005 - 5 mmol scale range



## Discover SP Single Mode Microwave Synthesis

- Vessels 10, 35, 80 ml and open vessel
- Self-tuning cavity
- Multispeed magnetic stirring
- Automated power control based on temperature feedback up to 300 Watt
- With the patented PowerMax™ technology (simultaneously cooling while heating)
- Upgradable with coolmate, gas addition kit and flow reactor



## CoolMate Low temperature option



Performs reactions at sub-ambient temperatures. Reactions such as lithiation, carbohydrate synthesis, and other temperature-sensitive chemistries can benefit from the use of microwave energy.

Use the power of microwave energy to accelerate reactions even at temperatures as low as -80 °C

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## Gas Addition Kit



Specially designed for reactions involving gaseous reagents. Perform hydrogenations, carbonylations, or other reactions with gaseous reagents or use the vessel to ensure an inert atmosphere during microwave irradiation.

Allows you to purge the reaction vessel and back-fill with a gas.

During the reaction, the gas source is completely shut off from the microwave, ensuring your safety at all times.

## CombiFlash® NEXTGEN 300+

RFID technology ensures the automated detection of your columns and racks, adjusting the flow rates to provide the best results everytime.

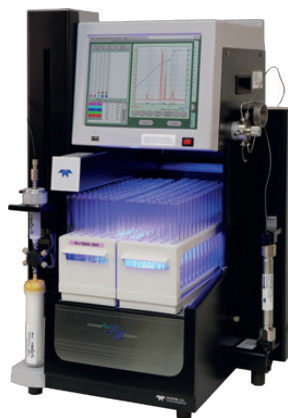
- Active solvent and waste level monitoring is standard
- Flow rates from 1 to 300 mL/min
- Operating pressure up to 300 psi (20 bar)
- UV, UV-VIS, ELSD and MS detection options available
- Designed to take up minimal lab space
- New default methods speed up the flow without sacrificing performance
- Greener: Conserve solvent with optimized gradients



## CombiFlash® EZ Prep

Streamline Flash and Preparative HPLC

- Up to 3500 psi (240 bar) and 200 mL/min
- Run Prep HPLC columns up to 50 mm in diameter
- Flash purification for 10 mg to 33 g
- UV, UV-VIS, ELSD and MS detection options available
- Switch between normal and reverse phase solvents automatically, without user interaction



## CombiFlash® Rf+ PurIon

- Enhance your detection capabilities with the PurIon Mass Spectrometer
- 50 - 1200 Dalton (2000 Dalton as option)
- 1 Dalton Resolution
- ESI or APCI Positive or Negative Ionization Mode



## Purification : Flash & Prep chromatography

### ACCQprep HP 125 Preparative HPLC

- Up to 6000 psi (413 bar) and from 1 to 125 mL/min
- UV, UV-VIS, ELSD and MS detection options available
- Compatible with automation modules: auto injector, autosampler and column selector module
- Switch between normal and reversed phase solvents automatic, without user interaction

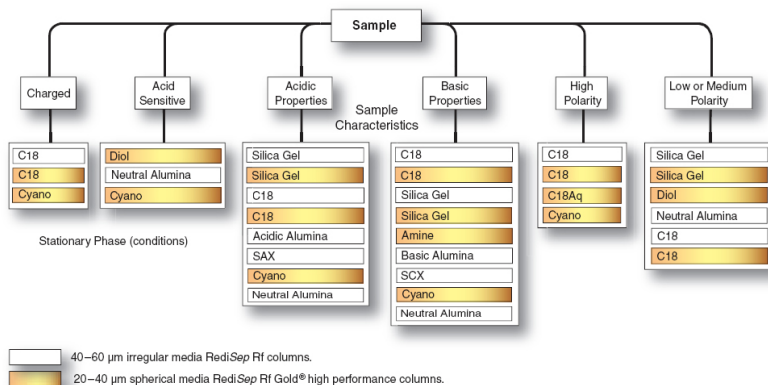


### REDISEP FLASH Chromatography Columns

Are designed to consistently produce high purity compounds.  
Easy purification and scale-up from milligram to kilogram.



- Patented packing technique providing reliable and reproducible columns
- Extra thick walls for safe and robust columns
- Easy to use luer lock fittings
- A broad versatility on column phases for each type of purification





## D-Series Syringe Pumps

When reliability & accuracy are critical

- Flow and pressure control throughout a broad operating range
- No pulsation or flow anomalies typically associated with other pump types

They can handle a wide variety of fluids including:

- Aqueous and organic liquids
- Corrosive solutions
- Heated fluids
- Liquified gases
- Viscous fluids
- Slurries and pastes
- Precision fluid delivery



30D Pump



Four Pump System

Pump Modules	1000D	500D	260D	100DX	65DM	65D	30D
Capacity	1015 mL	507 mL	266 mL	103 mL	68 mL	68 mL	30 mL
Flow Range* (mL/min)	0.001–408	0.001–204	0.001–107	0.00001–50	0.00001–25	0.00001–25	0.00001–22
Flow Accuracy**	0.5% of Setpoint			0.3% of Setpoint			.0.5%
Pressure Range (psi) (bar)	10–2,000 0.7–137.9	10–3,750 0.7–258.6	10–7,500 0.7–517.1	10–10,000 0.7–689.5	10–10,000 0.7–689	10–20,000 0.7–1379	30–30,000 0.7–2068.4
Standard Pressure Accuracy	0.5% FS					0.1% FS	0.2% FS
Standard Plumbing Ports	1/4" NPT	1/8" NPT	1/8" Valco®			1/4" F250C	
Power	100 Vac, 117 Vac, 234 Vac, 50/60 Hz						
Dimensions H x W x D	40.3 x 10.7 x 18.4 in 102 x 27 x 47 cm		39.8 x 10.7 x 18.4 in 101 x 27 x 47 cm		40.6 x 10.7 x 18.4 in 103 x 27 x 47 cm	39.8 x 10.7 x 18.4 in 101 x 27 x 47 cm	39.4 x 10.7 x 18.4 in 100 x 27 x 47 cm
Continuous Flow Range* (mL/min)	0.001–265	0.001–132	0.001–70	0.00001–32	0.00001–16	0.00001–16	0.00001–14
External Interfacing	RS-232, analog voltage inputs, digital contact closure for RUN/STOP, REFILL/DELIVER 4–20 mA In/Out, and analog voltage output options available RS485, USB, Ethernet						



## D-Series Custom Syringe Pumps

Pumps made to meet your special situation

- Can be customized to handle special flow rates, pressures, port sizes and software
- Customized pump options include pressure transducers and large-bore valve packages (air or electric)

Available variations:

- Higher viscosity materials (HV-500)
- Higher pressure needs that are above the standard pressure range (HP-260, 500, 65)
- Shorter pumps when space is a constraint (SP-500)
- Pumping emulsions with continuous mixing



Short Pump  
SP-500



SP-500 Short Pump -  
Dual Pump system

# ReaXus Series

## Reciprocating Pumps

Flow Range (ML/MIN)	Flow Accuracy	Pressure Limit (PSI)	Stroke Volume (UL)
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### SINGLE HEAD



#### M1 CLASS

3 MODELS  
Material options:  
Stainless Steel

0.0–10.0	2%	2,000	25.1
0.0–40.0	5%	500	100.5
0.0–100.0	5%	250	226.2



#### MX CLASS

3 MODELS  
Material options:  
Stainless Steel

0.0–10.0	2%	5,000	25.1
0.0–40.0	5%	900	100.5
0.0–200.0	5%	200	339.4



#### LS CLASS

20 MODELS  
Material options:  
Stainless Steel,  
Hastelloy

0.0–10.0	2%	6,000	50.3
0.0–40.0	2%	1,600	201.1
0.0–100.0	4%	600	452.5
0.0–10.0	2%	6,000	50.3
0.0–40.0	2%	1,600	201.1



#### LD CLASS

24 MODELS  
Material options:  
Stainless Steel,  
Hastelloy

0.0–12.0	2%	10,000	30.0
0.0–36.0	2%	6,000	62.7
0.0–100.0	2%	1,000	251.0



#### PR CLASS

2 MODELS  
Material options:  
Stainless Steel

0.0–100.0	3%	4,000	251.0
0.0–300.0	4%	1,000	564.7

### DUAL HEAD

With Temp Jacket	Constant Flow/Pressure	Pressure Monitoring	RS232 Control	Remote Run/stop	Analog input (0-10V; 4-20mA)	Drip Tray And sensor	Dimensions Weight
No	Flow	No	Yes	Yes	No	No	14 x 7.6 x 14.7 cm 1,6 kg
No	Flow						
No	Flow						
No	Flow	Yes	Yes	Yes	Yes	Yes	16.5 x 17.8 x 40.6 cm 6.9 kg
No	Flow						
No	Flow						
No	Flow/Pressure	Yes	Yes	Yes	Yes	Yes	16.5 x 17.8 x 40.6 cm 6,9 kg
No	Flow/Pressure						
No	Flow/Pressure						
Yes	Flow/Pressure						
Yes	Flow/Pressure						
Yes/No	Flow/Pressure	Yes	Yes	Yes	Yes	Yes	16 x 25.4 x 43.2 cm 13,6 kg
Yes/No	Flow/Pressure						
Yes/No	Flow/Pressure						
Yes	Flow	Yes	Yes	Yes	Yes	Yes	16 x 25.4 x 43.2 cm 13.6 kg
Yes	Flow						

# ARE YOU LOOKING FOR A SYNTHESIS AND PURIFICATION BUNDLE?



## CEM DISCOVER

MICROWAVE SYNTHESIS  
MADE EASY

FASTER SYNTHESIS  
HIGHER YIELDS  
IMPROVE PURITY



## TELEDYNE ISCO COMBIFLASH NEXTGEN

SETTING A NEW BAR IN FLASH  
CHROMATOGRAPHY

FLEXIBLE  
300 ML/MIN 300 PSI (20BAR)

**CEM**



**TELEDYNE ISCO**  
Everywhere you look<sup>®</sup>

## YOU MIGHT WANT TO KNOW MORE.

In that case, don't hesitate to contact us to make an appointment for a meeting, a product presentation, or any other question.



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