

# Microwave Synthesis

Fourth Generation Systems



# Diverse Exploration and Fast Results

## A Common Goal for Modern Chemistry Labs

Speeding up reactions has never been easier. Biotage microwave synthesizers are the first-choice tools for organic chemists who need to accelerate their production of new compounds.

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Microwave heating is by far the superior choice for synthesizing novel compounds and can offer advantages other than just speed. Working at temperatures and pressures not attainable through traditional heating, it allows chemists to perform reactions previously not possible.

### Discover the Advantages of Microwave Synthesis

#### Why Wait Hours, or Even Days, for Results?

Simply by increasing temperature, microwave synthesis can complete reactions up to a thousand times faster than traditional reflux conditions.

#### Why Limit the Range of Experiments?

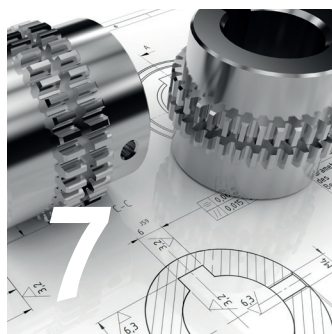
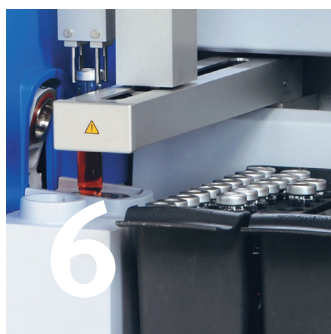
Quickly test your creative synthetic ideas and rapidly synthesize compounds of interest to fill gaps in your structure activity relationship (SAR). Reduce the iterative SAR cycle-time and increase productivity for the entire project team.

#### Don't Waste Time Supervising the Synthesis Process

Biotage microwave systems are predictable, reliable and safe. Each instrument has precise control of time, temperature and pressure to ensure that methods are reproducible and easily transferred or scaled up. Systems are also available with reliable automation and will run an entire sequence without manual intervention.

#### Will the Microwave Fit Into Your Process, Hood Space and Budget?

Chemical synthesis has never been easier. Simply put the reaction mixture into the vial, cap it, insert the vial into the microwave, key in the reaction parameter, and run. The latest generation of microwave synthesis systems are compact, easy to use and very affordable.





Biotage's microwave vials are available in four sizes: 0.2–0.5 mL; 0.5–2.0 mL; 2.0–5.0 mL and 10–20 mL.

## Microwave Vials

### High Precision Glass Vials

Durable and safe reactions at all times. Our high precision microwave vials are designed and tested to withstand pressures beyond 30 bar in a wide range of conditions.

Simplicity is one of the benefits of modern microwave equipment. Reactions are performed in glass vials sealed with caps and heated in the microwave cavity.

#### Magnetic Stir Bars

The reaction mixture is continuously blended by magnetic stirring promoting homogenous heating throughout.

#### Optimum Vial Sizes

Migrate directly to multi-gram scale without re-optimization\* using the 10–20 mL vials. These larger vials can also be used for preparation of scaffolds and intermediates or for generating larger quantities of active compounds for testing.

Each Biotage microwave vial has been designed for safe and efficient heating within its specified volume range. Together, the four vial types provide full scalability within the volume range 0.2–20 mL. Methods that are run at a lower volume are directly transferrable across the entire volume range of 0.2–20 mL.

#### Features and Advantages

- » Reseal™ design allows the septum to be resealed after it has been penetrated for repeated additions of reagents or in-situ sampling.
- » Manufactured from contaminant free microwave-safe glass.
- » Magnetic stirring promotes homogenous temperature distribution.
- » Available sizes: 0.2–0.5 mL, 0.5–2.0 mL, 2.0–5.0 mL and 10–20 mL.

\*Biotage Microwave Vials 10–20 mL, cannot be used with temperatures above 250 °C and/or pressures above 20 bar.



Largest screen on the market, with intuitive user interface and touch control.

USB port for quick transfer of results and methods.

High grade aluminum casing for maximum robustness.

Additional communications ports allows for remote control and monitoring.

The reaction vessel is secured with a triple-tier safety lock to ensure maximum operator safety at all times.

Easy access cover enables quick maintenance.

## Biotage® Initiator+

### Fourth Generation Microwave Synthesizer

Press the large touch-screen and heat your organic reagents to 300 °C in just a few seconds. The Initiator+ does just that, and adds intelligent features that make innovation fast, reliable and safe.

The Biotage Initiator+ represents a new generation of synthesizer instruments for organic, medicinal, materials, nano and polymer chemistry professionals. It is an upgradeable and reliable platform allowing chemists to make great discoveries in less time.

#### Easy to Operate

Initiator+ facilitates the transition from traditional methods to microwave enhanced techniques. Learning microwave synthesis is fast and pleasant with the Initiator+. The large touch screen display makes the experience user friendly from set-up to results. The built-in wizard guides the user through experiment set-up step by step and helps converting conventional conditions to microwave synthesis parameters.

Results can be emailed directly to the user after a run, or downloaded through the USB port at the front of the instrument.

#### Flexible

Controlled temperatures and pressures up to 300 °C and 30 bar open new possibilities to complete difficult reactions. Even low boiling point solvents can now be run at higher temperatures. The system automatically senses and performs reactions at their highest possible temperatures.

The Initiator+ supports all Biotage vials from 0.2 to 20 mL, delivering greater flexibility and direct scale-up from milligrams to grams. The four different vial sizes can be used in any order or combination without system modifications.

The single-mode applicator and the Dynamic Field Tuning™ features offer faster and more powerful heating (400 W) of a broader range of solvents. The setting for low microwave absorbing solvents enhances the heating for e.g. toluene and 1, 4-dioxane.

## Specifications

### Heating Process

Temperature range	40–300 °C
Heating rate	Typically 2–5 °C/s depending on solvent and power applied
Reaction time	Up to 96 hours. Typically, most reactions require 2–15 minutes of irradiation.
Pressure range	0–30 bar (3 MPa; 435 psi)
Power range	0–400 W from magnetron at 2.45 GHz
Reaction volumes	0.2–20 mL
Agitation	Variable magnetic stirrer (300–900 RPM)

### Upgrades

Upgradable with	Robot Eight and Robot Sixty
Processing capacity	8 or 60 vials (with robot upgrade)
Rack capacity	2 x 2 or 2 x 12 vials (large); 2 x 4 or 2 x 30 vials (small)

### Technical specs.

Electrical supply	100–240V~, 50/60Hz
Max. power consumed	1100 VA
Cooling	Pressurized air supply: >60 L/min (2.1 cubic feet/min), 2.5–4.0 bar (0.25–0.40 MPa; 36–58 psi)
Weight	21 kg (46.2 lbs)
Dimensions (WxDxH)	365 x 422 x 421 mm (14.4"x 16.6" x 16.6")
Max sound level	70 dB(A)

### Interfaces

Touch screen	10.4"
Ethernet LAN	Complies with IEEE 802.3 (ANSI 8802-3)
USB	USB 3.0
Archiving/back-up	Via USB
Printing	Via LAN
Certifications	CE, CSA certified

## Features and Advantages

- » 300 °C controlled reaction temperature
- » 30 bar controlled reaction pressure
- » Large 10" touchscreen
- » Modular automation solutions
- » Guided step-by-step wizard
- » In situ temperature measurement
- » Upgradable to run peptide synthesis
- » Safe and simple
- » Utilizes all Biotage vials, from 0.2 to 20 mL
- » Remote monitoring

## Accessories

- » Modules for automation (p. 6)
- » Vials (p. 3)
- » Peptide liquid handlers

### Upgradable

Each compound synthesis has unique demands. A range of accessories are available to increase automation for higher throughput.

Connecting the SP Wave module and the Robot Eight kit will transform this instrument into a microwave assisted peptide synthesizer, extending the scope of discoveries beyond small molecules.

The novel vortex mixing unit ensures gentle but thorough homogeneous heat distribution. With the optional fiber optic probe, reaction temperature can be monitored inside the vial for even better visibility.

### Best-in-Class Safety

In the early days of microwave synthesis, bursting vials were a menace. All Biotage microwave synthesizers are designed with a triple-tier safety lock for safe operation at elevated temperatures and pressures.



## Biotage® Initiator Robot Eight & Robot Sixty

### Intelligent Automation

The Initiator+ can be upgraded from a single-sample manual format to an automated 8- or 60-position system. The modular design allows a user to add on different automated sample processors dependent on throughput requirements.

The 8-position sample bed gives the user a compact automation solution to start scale-up process and library build-up. The 8-position system is useful in a multi-user environment or for queuing multiple reactions. Flexible operation enables the use of both large and small vials in combination at any time and in any order without manual intervention.

The 60-position sample bed supports the production of focused libraries, multi-user environments and scale-out, and use of both large and small vials in any order without manual intervention.

#### Specifications

Sample processor	Robot Eight/Robot Sixty
Processing capacity	8 vials/60 vials
Rack capacity (large)	2x2 vials/2x12 vials
Rack capacity (small)	2x4 vials/2x30 vials
Vial sizes	0.2–0.5; 0.5–2; 2–5; 10–20 mL,
Operating temperature	18–32 °C
Storage temperature	-25 °C to 60 °C
Humidity	20–95% at room temperature
Electrical supply	Supplied by Initiator
Certifications	CE, CSA certified

#### Weight & Dimensions (WxDxH)

Initiator+ Eight	28 kg (61.7 lbs)
Initiator+ Sixty	34 kg (75 lbs)
Initiator+ Eight	400 x 500 x 580 mm (15.7" x 19.7" x 22.8")
Initiator+ Sixty	625 x 422 x 470 mm (24.6" x 16.6" x 18.5")

# Ordering Information

Product	Part number
<b>Instruments</b>	
Initiator+ Microwave System	356700
Initiator+ Microwave System with Robot Eight	356702
Initiator+ Microwave System with Robot Sixty	356703
<b>Robots</b>	
Robot Eight	355380
Robot Sixty	355381
<b>Microwave Vials*</b>	
0.2–0.5 mL, qty. 100	355458
0.2–0.5 mL, qty. 300	355627
0.2–0.5 mL, qty. 500	355628
0.5–2 mL, qty. 100	352016
0.5–2 mL, qty. 300	354625
0.5–2 mL, qty. 500	355629
2–5 mL, qty. 100	351521
2–5 mL, qty. 300	354624
2–5 mL, qty. 500	355630
10–20 mL, qty. 50	354833
10–20 mL, qty. 100	355631
10–20 mL, qty. 250	355632

\*Microwave vial caps and stir bars are included with vial order

Product	Part number
<b>Accessories</b>	
SP Wave Module	356013
Vial caps included reseal septa, qty. 100	352298
Manual cap crimper	353671
Manual cap remover	353913
Vial adapter 0.2–0.5 mL, qty. 10	355459
Vial adapter 10–20 mL, qty. 12	355367
O-rings 10–20 mL adapter, qty. 10	354838
Vial rack Initiator 8, holds (4) 0.2–5 mL vials	355391
Vial rack Initiator 8, holds (2) 10–20 mL vials	355390
Vial rack Initiator 60, holds (30) 0.2–5 mL vials	353478
Vial rack Initiator 60, holds (12) 10–20 mL vials	354798
Stir bars 0.2–0.5 mL, qty. 25	355545
Stir bars 0.5–2 mL, qty. 25	355544
Stir bars 2–5 mL, qty. 25	355543
Stir bars 10–20 mL, qty. 5	353930
Waste Tray	355366

## Biotage® Initiator+ SP Wave

### Further Upgrading

Upgrade from an Initiator+ by connecting the SP Wave peptide synthesis module and the Robot Eight kit to perform microwave assisted peptide synthesis with vortex mixing.



For more information, please refer to the Peptide Synthesis Workflow brochure (PPS446), available at [biotage.com](http://biotage.com).

# Your Complete Partner for Effective Chemistry

Biotage is a worldwide supplier of instruments and accessories designed to facilitate the work of laboratory chemists. With our deep knowledge of the industry, academic contacts and in-house R&D teams, we can deliver the best solutions to your challenges. We take great pride in our flexibility and ability to meet our customer's individual needs. With strong foundations in both analytical and organic chemistry, we can offer the widest range of solutions available on the market.

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