speedwave® two

Vessel overview

Vessel type	Volume	Operating pressure	Test pressure	Temperature continuous	Temperature maximal	Sample capacity vessels/rotor
DAP-60K	60 ml	40 bar	60 bar	230 °C	260 °C	10
DAQ-10	10 ml	75 bar	110 bar	230 °C	260 °C	24

Appilcations

Active temperature monitoring in all vessels enables even high-boiling acids (sulfuric acid, phosphoric acid) to be used in any desired concentrations and combinations with other chemicals.

DAP-60K
Standard vessels with a broad range of applications: Inorganic samples such as oxides, metals and alloys < 200 mg, polymers, food <500 mg and samples from the environment such as different types of soil, sludge and effluents.

DAQ-10
Digestion vessel for a high sample throughput with routine samples for food, environmental and medical analyses.

Technical Specifications for the speedwave® two

Power supply	230V / 50Hz / 1,350 W
Microwave output	1000 W
Frequency	2450 MHz
Weight / dimensions (W x D x H)	Standard device: approx. 14 kg / 520 x 460 x 330 mm Control unit: approx. 0.5 kg / 188 x 35 x 114 mm
Oven chamber	approx.. 27 Liter / 350 x 340 x 215 mm (W x D x H)
Noise level	< 60 dB
Ambient conditions	15 - 35 °C / 85 % relative air humidity
Touch-screen	7“ (17,78 cm) TFT-LCD panel, 800 x 400 pixels
Memory	64 MB Flash, 148 MB SDRAM, 1 GB SD card
Interfaces	USB, RS-232, Ethernet
Languages	German, Englich, French, Italian, Spanish ...
Temperature measurement	Measurement range 50 – 260 °C, accuracy 1°C at 200 °C
Turntable function	Continuous clockwise rotation at approx. 4 rpm
Safety tests	conform to CE; satisfy EN 335-25, and DIN EN 61010-1, DIN EN 61326-1, DIN EN 61326-2
Warranty	12 months, including digestion vessels

BERGHOF realizing your ideas.

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Microwave Digestion System

speedwave® two

The ideal microwave digestion system for samples from the environmental, agricultural, medical, biological, animal feed and food sectors.

Extremely easy operation and innovative sensor technology guarantee maximum safety and minimum running costs.

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Microwave Digestion

speedwave® two

Routine solutions for routine tasks

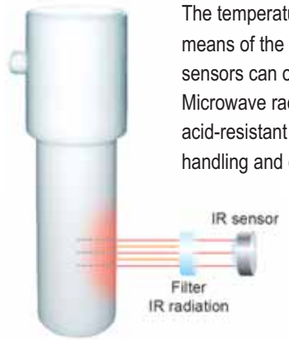
Routine laboratories must be in a position to process the highest possible number of samples efficiently in the shortest possible time. During microwave digestions there is a risk of spontaneous reactions caused by fast heating rates. Such reactions must be intercepted reliably by a fast reaction check by means of intelligent sensors. The **speedwave® two** offers this reliability coupled with ease of operation and extremely low operating costs. It is therefore eminently suitable for the digestion of samples from the environment, agriculture, medicine, biology, animal feed and food.

- Beverages
- Cereals
- Fish, Seafood
- Filter
- Food
- Fruits
- Juices
- Meat, Animal Tissue
- Medicin, Blood, Hair
- Milk, Cheese, Milk Products
- Nutrient
- Plant Material
- Soil,Sediments
- Sludge
- Vegetable, Vegetable Oil
- Water, Effluents

Lightweight, compact stainless steel oven

Its space-saving dimensions and low weight of only 14 kg make the **speedwave® two** appropriate for varied uses in laboratories. State-of-the-art inverter microwave technology facilitates unpulsed, continuous power control between 40 and 100 percent and ensures the long service life of the magnetron.

Sample digestion with active reaction control - speedwave® DIRC



The temperature of every single sample is measured contact-free and directly in real time by means of the integrated **speedwave® DIRC** thermometer, whereas customary IR temperature sensors can only detect the surface temperatures of the digestion vessels.
Microwave radiation does not interfere with this type of temperature measurement; it is absolutely acid-resistant and it is not necessary to connect the otherwise customary sensors. This makes handling and cleaning the vessels considerably simpler. The accuracy of the measurement method for the measurement range between 50 and 260°C is 1°C at 200°C.

Output control is subject to sample temperatures. Each time the turntable rotates, all of the sample temperatures are recorded separately and the microwave output is adjusted accordingly. This graduated control concept results in reproducible heating curves and hence in reproducible digestion results. But still more important: it guarantees maximum safety throughout the entire digestion process.

Extremely simple control in just 2 steps

The 14 pre-installed applications meet a multitude of requirements (EPA 3051, EPA 3052, and EPA 3015). These programs can be modified by the user or extended to include other freely-programmable programs. To start a program only two buttons need to be pressed.

The separate control unit in the form of a touch-screen PC (400 MHz CPU) with 7" touch screen and Windows CE makes work a pleasure owing to the great operating convenience and flexibility combined with optimal corrosion protection for the control electronics. Thanks to its clear structure, the software can be operated intuitively. The temperature and output data of all samples can be represented in real-time and saved. For the documentation of the digestion the data can be transmitted via the integrated USB interface in compliance with the relevant quality standards. An additional external PC is not required.

Maximum safety

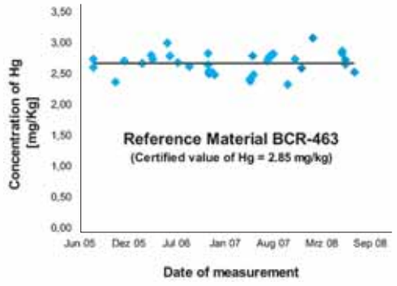
Reactions which have gone out of control are the primary safety hazard during microwave digestion. The innovative sensor technology of the **speedwave® two**, coupled with its microwave adjustment control, reduces this hazard to a minimum.

- 2 safety switches monitor the oven door
- 2 excess temperature cut-outs protect the oven chamber and the magnetron
- Real-time temperature monitoring of all samples
- Shut-down in critical operating states (e.g. excess temperature, burst disk rupture etc.)
- Overpressure safety control by reliable burst safety control
- Integrated gas collection system to prevent emissions
- Residual pressure is blown off under control when the digestion vessels are opened

Gas collection system prevents emissions

All the digestion vessels are connected to a gas collection system. It enables gases that are released, e.g. when a burst disk ruptures, to be reliably caught and dissipated safely. Emissions into the oven chamber or even into the ambient air are prevented.

Durable vessels and simplified handling reduce operating costs



For over 15 years Berghof has been successfully manufacturing durable, solid TFM™ PTFE pressure vessels for microwave digestion applications. Depending on the field of application and frequency of use, Berghof vessels have a 3 to 5-year service life. Therefore, for the first time ever, pressure vessels are no longer to be regarded as consumables. They enable you to save several thousand euros each year previously spent on replacement vessels.

The digestion vessels comprise very few individual parts and are simple to lock and open by hand, without any tools. The existing residual pressure is checked and blown-off without endangering the user. Thanks to the design of the vessels which have no dead volume, they are easy to clean.