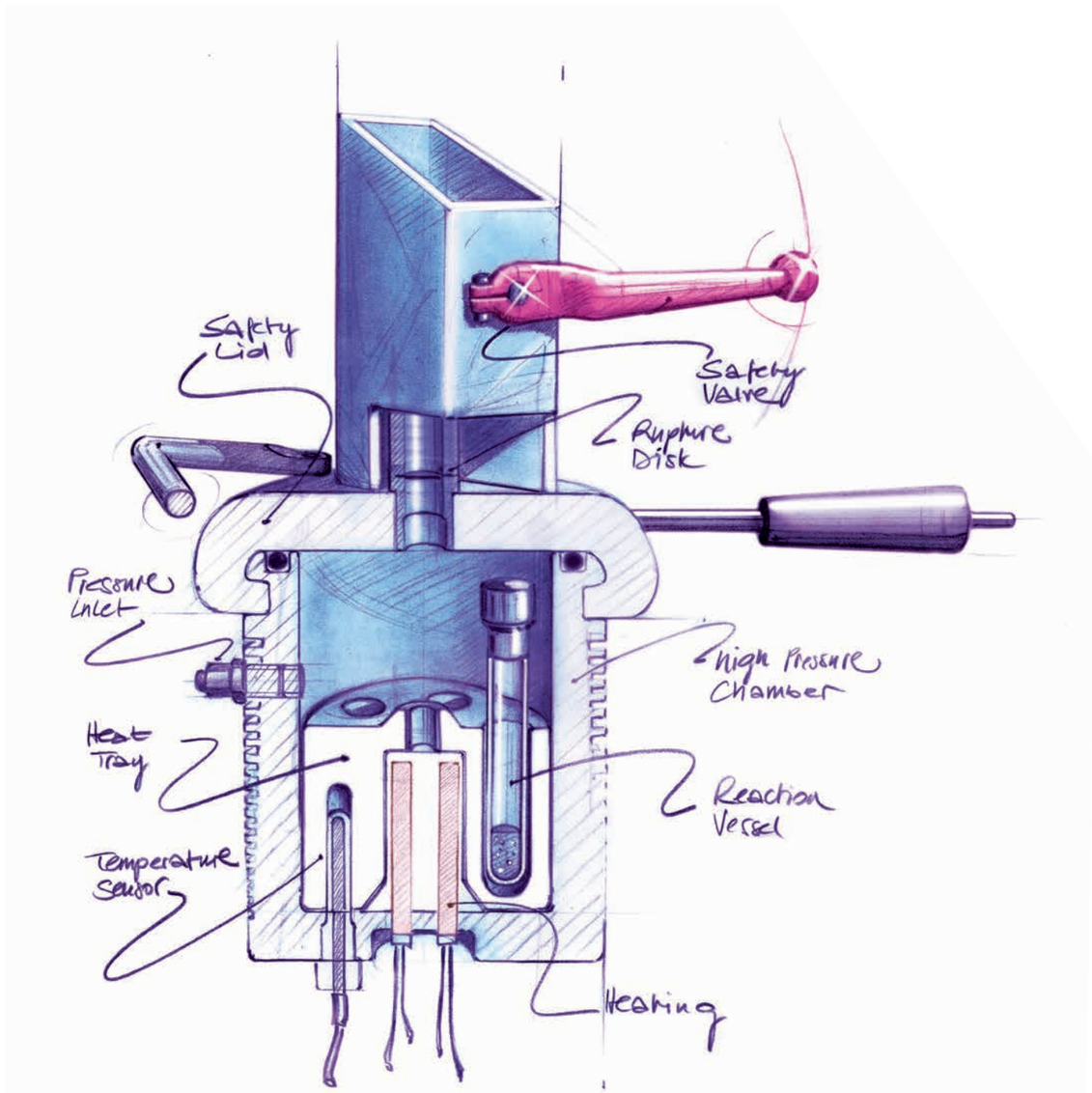
High Pressure Asher

HPA-S
An ingenious concept

Anton Paar – Pioneer and leading developer in the field of sample preparation

Anton Paar has developed and produced sample preparation instruments to the highest standards for over 30 years. In 1973, the introduction of the "VAO", the world's first automatic wet decomposition device, marked the beginning of a successful cooperation between Anton Paar GmbH and Prof. Günter Knapp at the University of Technology in Graz. Since then, professional, high-performance instruments have been developed for plasma ashing, oxygen combustion, high pressure digestion and for microwave-supported decomposition.

Anton Paar GmbH is ISO 9001 certified. Products such as the HPA-S High Pressure Asher are additionally verified in design and monitored in production.



The principle

Wet chemical pressure decomposition has established itself as a versatile, high-performance method for sample preparation for element determination using AAS, ICP-OES, ICP-MS or voltammetry. It can be used for a variety of applications.

The basic principles of successful acid digestion were recognized as early as 1865 by Carius: suitable reagents, high temperatures and appropriate vessels.

The idea

The high pressure asher HPA-S according to Knapp is the logical, practical application of this concept. The HPA-S is not an "asher" like a muffle oven, it is the number one instrument for wet chemical sample preparation at high temperatures under high pressure.

The instrument

The samples and acids are placed in closed vessels inside a pressure vessel. This pressure vessel is filled with nitrogen up to 130 bar pressure and heated up to a maximum of 320 °C using a preselected temperature program.

The surrounding nitrogen pressure compensates the reaction pressure which arises in the vessels and prevents the vessels opening or bursting. After the reaction, the pressure vessel is cooled down, ventilated and the vessels can be removed without pressure.

HPA-S
Attention to detail

The high pressure asher HPA-S unites scientific knowledge of modern trace analysis and the practical aspects of daily routine work in the laboratory. The perfect function and excellent analytical performance are the result of many years of cooperation with leading experts, experienced users and highly competent engineers.

The HPA-S system provides maximum safety, comfort and an extensive range of accessories, all helping to meet the requirements of modern laboratories.

Features

- Up to 320 °C at 130 bar
- Hermetically sealed vessels
- Selection of vessels and accessories

The best reaction vessels

Hermetically sealed, long-life reaction vessels made of highly pure, resistant materials guarantee perfect decomposition. Conversion kits with different vessel sizes allow the optimal adaptation to different tasks.

The vessels are sealed with robust lids using PTFE strips. The nitrogen in the autoclave ensures the complete seal.

No	Volume	Material	Sample weight
21	15 mL	Quartz	max. 0.2 g
7	50 mL	Quartz	max. 0.8 g
5	90 mL	Quartz	max. 1.5 g
6	20 mL	Glassy carbon	max. 0.2 g

Economic operation

Due to its simple operation and reliable results, the HPA-S has established itself as an accurate reference and routine instrument in hundreds of laboratories across the world.

The sample throughput, minimum amount of vessel cleaning required and low costs for wearing parts and reagents make the HPA-S an attractive choice from a financial point of view.

Safety without compromise

The robust construction with multiple pressure relief devices take the danger out of spontaneous reactions. Secure locks prevent operating errors.

There are no compromises when it comes to analytical safety either: Complete decomposition without loss or contamination form the basis for accurate analysis.

High quality pressure vessel

The pressure vessel is made of high-tensile, corrosion-resistant stainless steel and corresponds to international norms. It is delivered with comprehensive test certificates. A bayonet lid and valves ensure rapid and easy operation. A built-in fan is used to achieve rapid cooling after decomposition.

High, constant temperature

The concentric, electric heating heats all the vessels in the heating block uniformly, independent of the size, number and content.

The exact temperature regulation up to 320°C is achieved using a program controller and guarantees high, reproducible decomposition quality, even for difficult organic samples. Process times can be as long as required.

pressure vessel

reaction vessels

maximum temperature

User support

The success of the HPA-S high pressure asher is due to its high quality technology in combination with a high level of service. Anton Paar has an international sales network offering user support.

Our sales representatives provide rapid and competent support and qualified technical service. Our experienced chemists develop and improve methods and are available for consultations. They also carry out the installation procedure and provide training courses at Anton Paar's application laboratory and on-site.

Technical data	
Pressure vessel	High-tensile stainless steel, volume: 1.5 L
Lid	Quick seal with safety lock
Max. operating temperature	320 °C
Operating pressure	130 bar / 1900 psi
Maximum pressure	180 bar / 2600 psi
Testing pressure	258 bar / 3740 psi
Power	1700 W at 230V 50 ... 60 Hz
Dimensions (WxDxH)	460 x 420 x 820 mm
Weight	45 kg

HPA-S
Reliability guaranteed

Sample preparation with the high pressure asher HPA-S is the basis for successful, correct analysis. The HPA-S method is an internationally recognized reference procedure.

In many publications, the instrument is given as the standard for complete decomposition with the lowest systematic errors. The HPA-S is therefore in operation as a high-performance routine instrument in numerous industrial, state and private laboratories.

Decomposition methods

Years of operating experience with the HPA-S method exists today as a comprehensive collection of applications which is useful to every user.

The decisive parameters are known for many sample materials: sample volume, vessel size, type and volume of the reagents and temperature program. Some characteristic temperature profiles cover almost all applications.

There are four standard programs stored in the instrument and these can be adapted by the user as required according to the given guidelines.

Benefits

- **Highest decomposition quality**
- **Lowest systematic error**
- **Simple adaptation for different tasks**
- **Comprehensive application support**

Foodstuffs

The HPA-S is well-established in this field because complete mineralization gives precise results for elements such as Hg, As and Se even with fatty samples. The 90 mL quartz glass vessels allow large sample volumes.

Medical analysis

The small 15 mL vessels are ideal for microsamples of a few mg which are decomposed in the lowest volume of acid. This gives low reagent blanks and allows up to 21 samples to be handled at once.

Pharmaceutical analysis

The HPA-S is well-established for demanding applications in this field due to its reproducible results and low systematic error. It is renowned for work with low element concentrations, high purity requirements and applications with compounds which are difficult to decompose.

Material research

The HPA-S is ideal for total decomposition, leaching or gas phase decomposition of metals, alloys, plastics, construction materials, ceramics, etc. The precise temperature regulation is also useful for special applications such as aging and corrosion tests.

Environmental analysis

Here, the HPA-S is used as an alternative or complement to other methods, e.g. microwave decomposition. Its strength lies in ultra-trace analysis. The option of large volumes is advantageous for inhomogeneous samples.

Voltammetric analysis

Samples decomposed by the HPA-S have a very low residual carbon content. This makes them ideal for accurate AAS, ICS-OES and ICP-MS analysis and reliable voltammetric tests.

Geochemistry

As well as standard applications, there are many publications documenting the determination of platinum group elements and rare-earth elements after high temperature leaching with the HPA-S. Even full decomposition with HF is possible in glassy carbon vessels.

Chemical industry

In research and development, production or quality assurance, the flexible use, rapid adaptation to different tasks and a comprehensive collection of methods make the HPA-S the most reliable problem-solver for organic and inorganic matrices.

Petrochemistry

Even difficult to decompose raw oils, fuels, lubricants, coal and combustion residues can be decomposed with standard programs at high temperatures. The safe and economic operation is a recognized benefit of the HPA-S.

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