HAVER & BOECKER

DIE DRAHTWEBER

PHOTO-OPTICAL PARTICLE ANALYSIS.
ACCURATE MEASUREMENT OF MATERIAL QUALITY.

PHOTO-OPTICAL PARTICLE ANALYSIS – HAVER CPA.

In the field of conventional particle analysis, Haver & Boecker has been the market-leading manufacturer of test sieve shakers for many years. In the early 90s, this head start in terms of expertise provided the ideal conditions for taking new steps as a pioneer in particle analysis with the integration of powerful computer technology. Then as now, Haver & Boecker photo-optical analysis systems represent the latest state of technology.

Our wide product range consisting of future-oriented, expandable modular units and systems guarantees flexible solutions for all applications. Our photo-optical systems have proved their worth with hundreds of materials in various sectors, whether in the form of standardised laboratory/online units or customised industrial units, from pharmaceuticals, food and non-metallic minerals to the plastics and fertiliser industries.

We develop the future.
Our own design departments, an in-house tool making and mechanical engineering facility and our own electronics and control specialists ensure that every HAVER CPA system fully meets the requirements imposed upon it. Our engineering specialists will develop customised equipment, special design solutions and individual control systems especially for you. If required, we will take care of the connection to the PLC.

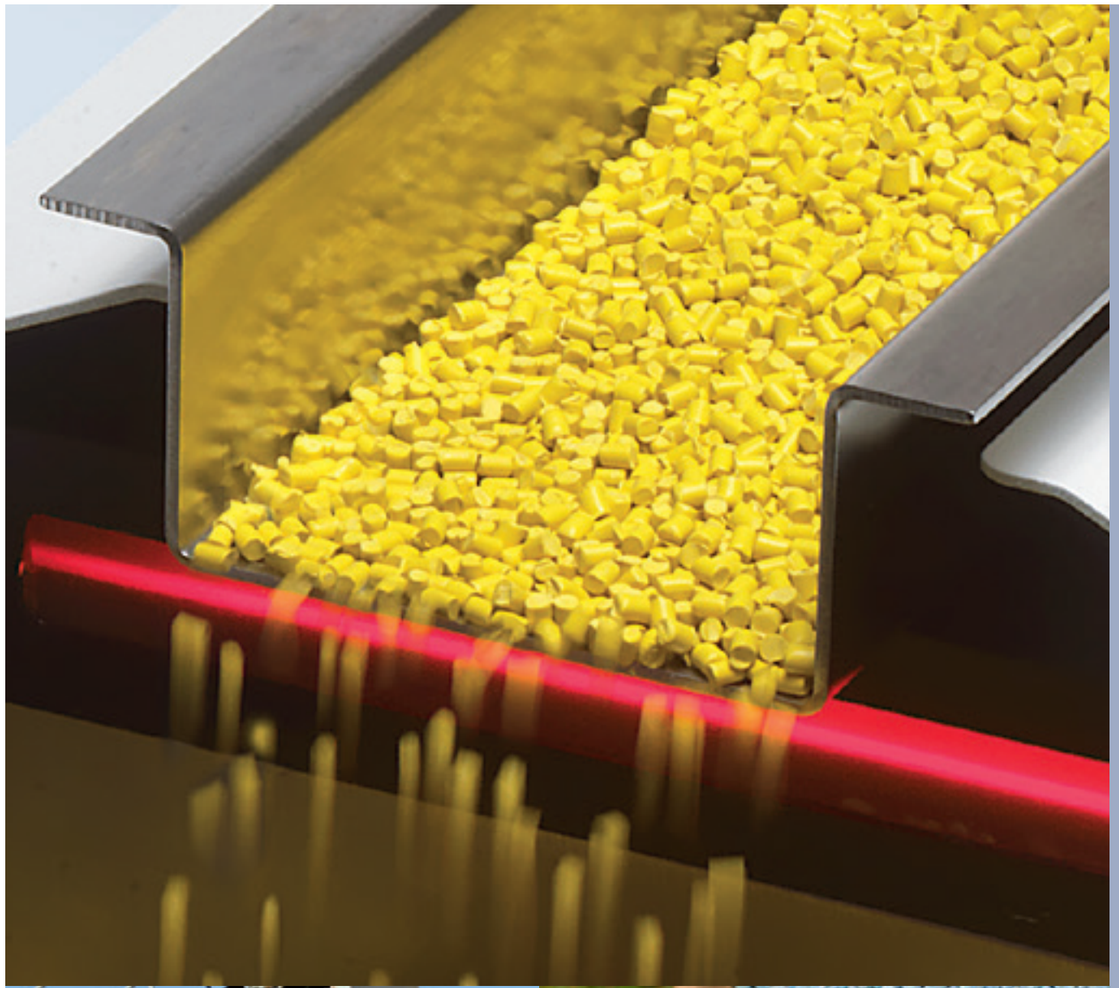
We work with partners from the Haver & Boecker Group in the development and improvement of our CPA technology. These include the Machinery Divisions in Münster and Oelde as well as Haver Engineering GmbH in Freiberg, which is recognised as an affiliated institute of the Technical University Mining Academy of Freiberg.
Up to the present day, these collaborations have not only given rise to innovative products but also to numerous national and international patents. Time and again, methods that we have developed have become compulsory norms throughout the industry. Haver & Boecker is also represented on DIN und ISO national and international standardisation committees as a permanent member.

We will of course also assist in the commissioning of CPA systems and can provide you with a comprehensive after-sales service from professional maintenance to subsequent modifications and software updates – directly without the need to go through a distributor.

Haver & Boecker began producing wire cloth in Hohenlimburg, Germany, in 1887. Today, we are one of the world's leading wire weaving companies with a global network of branches and manufacturing facilities.

Our work is based upon experience, continuous research and development of our products and manufacturing processes, along with the knowledge and ability of our staff. This combination of tradition and innovation allows us to meet and exceed the high expectations of our customers.

WE HAVE A SHARP EYE FOR QUALITY.



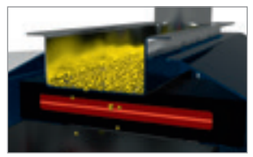
FOCUS ON MAXIMUM PRECISION.

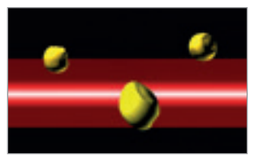
The patented HAVER CPA measuring process is used to analyse grain sizes and grain shapes of dry and non-agglomerating particles of bulk materials in the measuring range from 10 µm to 400 mm. When fitted with the appropriate HAVER peripherals, this process can be used as a laboratory, technical centre or online version in many different fields. The robust technology is virtually maintenance-free and is therefore absolutely fail-safe and works reliably even under extreme conditions.
The CPA technology can be used to analyse coarse and fine materials such as gravel, sand, coke, coal, plastic granules, wood chippings, chemical and pharmaceutical products, fertilizers, foodstuffs and many more.

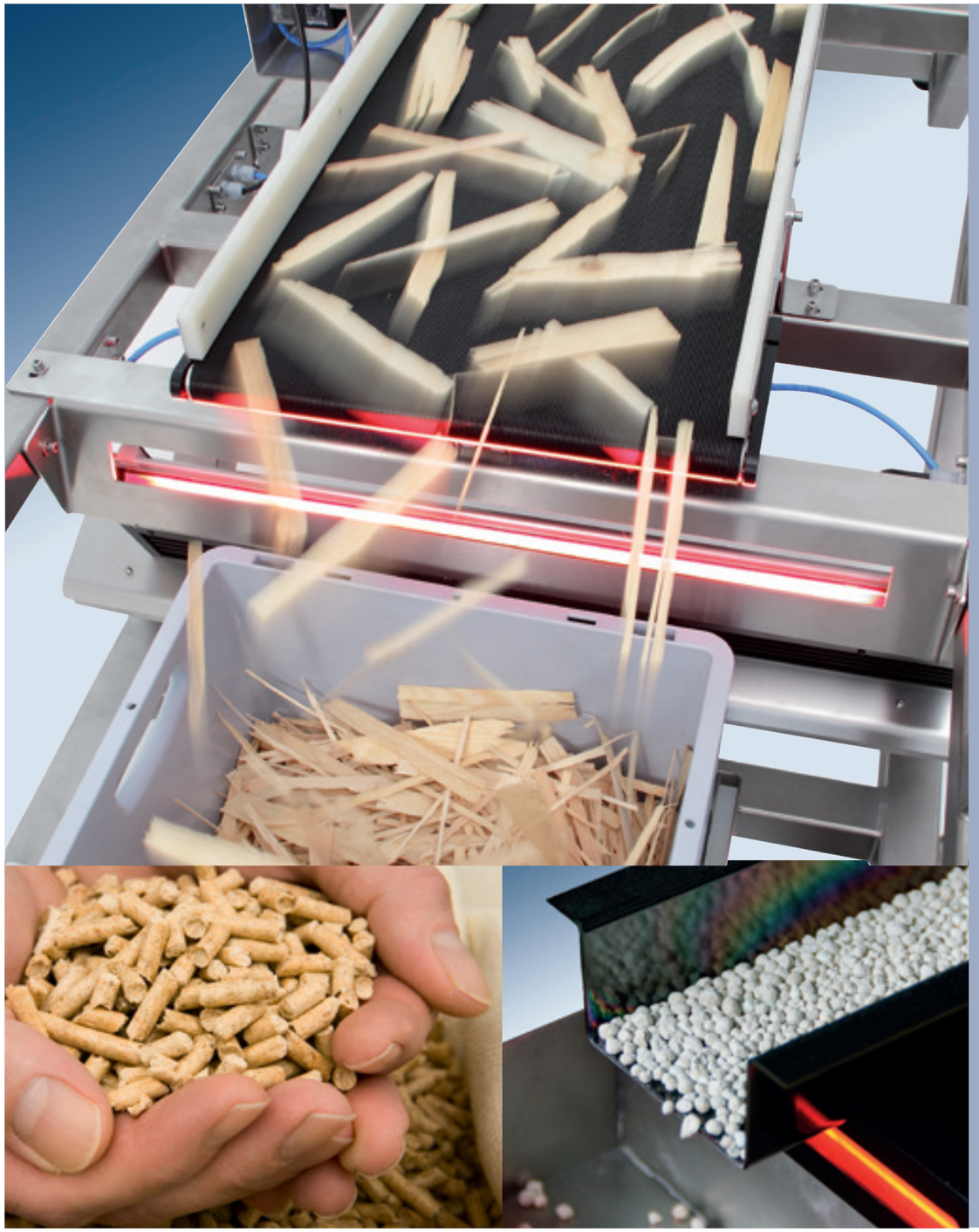
HAVER CPA systems are based upon an energy-saving and a low-maintenance technology that causes low operating costs. They are ready to connect to a PLC control system as standard and can also be integrated into online processes at a later date – without modification.
The results produced by the HAVER CPA are comparable with a conventional sieve analysis but offer a range of decisive advantages. These include high reproducibility of the measuring results, enormous time saving, additional information relating to grain shapes and the number of particles.

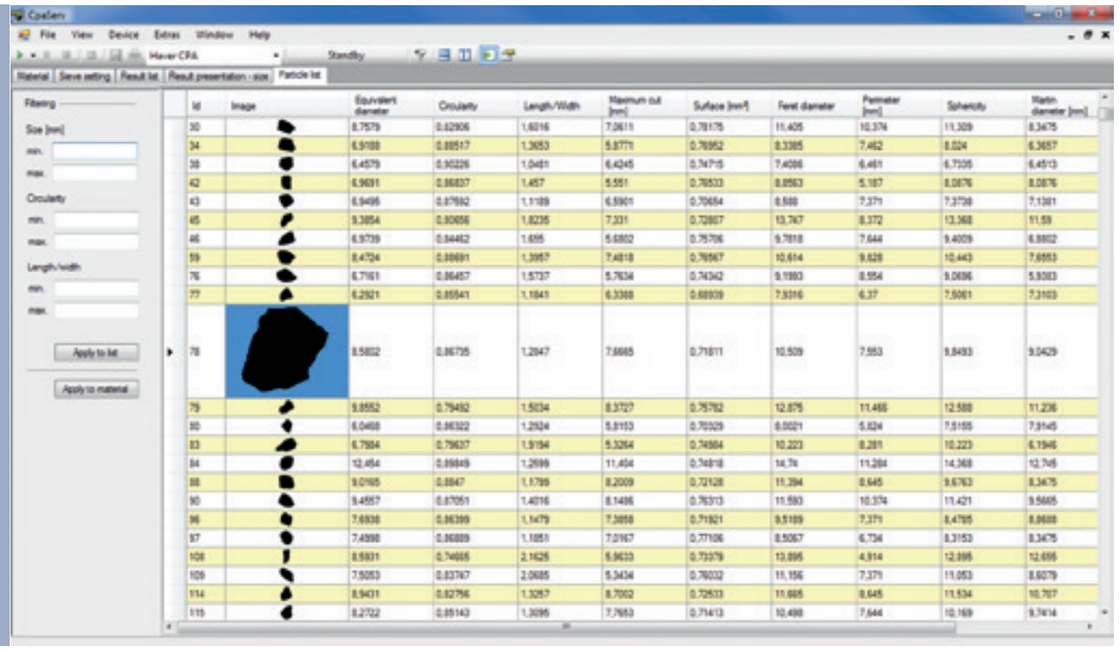
The principle of CPA measurement: State-of-the-art innovation.
HAVER CPA measuring instruments are based on digital image processing. A high-resolution digital line scan camera scans the particles in free-falling bulk materials against the background of an LED lighting array with a recording frequency of up to 51,000 line scans per second. The scanned lines are combined by the CPA to form an endless data record and the shadow projections of the particles are evaluated in real time (HAVER REAL TIME) in parallel with the measuring process. Up to 10,000 particles can be detected and analy sed every second. Due to a GigE camera interface the CPA devices can be operated using a notebook without additional hardware module (camera card). The GigE technology has a high transfer rate of up to 1,000 Mbit/s.

Tailor-made solution off the peg: CPA CONVEYOR.
The CPA CONVEYOR measuring process has been especially developed for analysing elongated materials, the measuring results of which tend to be falsified due to overlaying and rotation of particles while the image is being analysed. In this process, the material sample is fed via a metering channel from where it passes onto a faster running conveyor belt.
The resulting difference in speed separates the particles and brings them into a stable orientation (maximum length to maximum width) before the digital image analysis takes place.
The HAVER CPA CONVEYOR measuring principle virtually rules out random rotation of the particles at the moment they are measured.



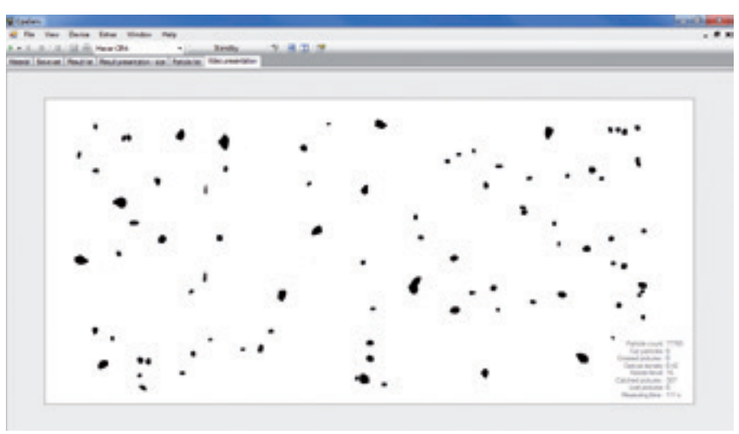






Unique features: HAVER REAL TIME.
All HAVER CPA units feature the HAVER REAL TIME function and work with only one line scan camera. Every particle in the grain size measuring range can thus be measured and the result used in the size and shape analysis. Double detection due to individual images overlapping is ruled out, as are partial range detection and mis-measurement of truncated particles. In addition, the HAVER REAL TIME function also enables all CPA units to be used as particle counting devices.

Each particle at a glance.
The HAVER CpaServ software deployed in HAVER CPA systems is easy to use and runs under the most Windows operating systems. Thanks to this software a wide range of particle specifications can be analysed. HAVER individual particle memory enables different grain shape values to be evaluated for every particle measured and for statistical means to be determined in freely selectable grain size classes.
Each particle is fully-scaled presented in the particle list. The details about the particular grain sizes and grain shapes are stored and can also be used for further analyses. Input data errors can be minimised thanks to "copy and paste" into documents or tables (e.g. in Excel). Multifarious options for filtration furthermore enable a customised presentation of results.

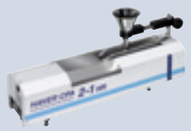


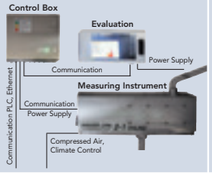
ALL CPA-SYSTEMS AT A GLANCE.

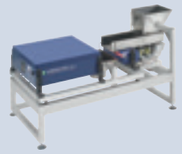
PHOTO-OPTICAL PARTICLE MEASURING INSTRUMENTS

HAVER CPA LABORATORY UNITS

HAVER CPA INDUSTRIAL UNITS







DESIGNATION		HAVER CPA 2-1 HR	HAVER CPA 2-1	HAVER CPA 2 CONVEYOR	HAVER CPA 2-1 ONLINE	HAVER CPA 4-1	HAVER CPA 4-2	HAVER CPA 4 CONVEYOR	HAVER CPA 4 GRAVIOPT
Number of measuring ranges	[-]	1	1	1	1	1	2	1	1
Measuring range	[mm]	0,010 - 4	0,020 - 30	0,036 - 45	0,020 - 30	0,063 - 50	0,035 - 15 / 0,091 - 90	0,096 - 220	0 - 50
Feeder width / Scanning width	[mm]	18	55	65	55	200	100 / 300	320	200
Conveyor width	[mm]	-	-	75	-	-	-	360	-
Hopper volume (approx.)	[l]	0,35	1,5	4	1,5	14	3,6 / 18	14	-
Application	[-]	Laboratory	Laboratory	Online / Laboratory	Online	Online / Laboratory	Online / Laboratory	Online / Laboratory	Online / Laboratoire
Light source	[-]	LED	LED	LED	LED	LED	LED	LED	LED
Dimensions (appr.) (LxWxH)	[mm]	730 x 260 x 360	800 x 200 x 350	940 x 260 x 580	850 x 300 x 500 (CPA)	1500 x 790 x 940	1770 x 810 x 1050	2230 x 830 x 1390	3000 x 790 x 2010
Weight (approx.)	[kg]	17	16	27	80	120	152	205	450
Operating voltage	[V]	230 or 115	230 or 115	230 or 115	230 or 115	230 or 115	230 or 115	230 or 115	230 or 115
Type of protection (standard)	[-]	IP 54	IP 54	IP 54	IP 65	IP 54	IP 54	IP 54	IP 54
Interfaces	[-]	BUS-Ext., GigE, USB	BUS-Ext., GigE Vision, USB	BUS-Ext., GigE, USB	RS 485, RS 232, USB, GigE Vision, Profibus (optional)	digital IO-Ports, GigE, RS 232	digital IO-Ports, GigE, RS 232	digital IO-Ports, GigE, RS 232	digital IO-Ports, GigE, RS 232
Horizontal resolution	[Pixel]	2048	2927	2048	2927	4096	4096	4096	4096
Pixel frequency	[MHz]	60	100	60	100	60	60	50	60

HAVER CPA 5 GRAVIOPT

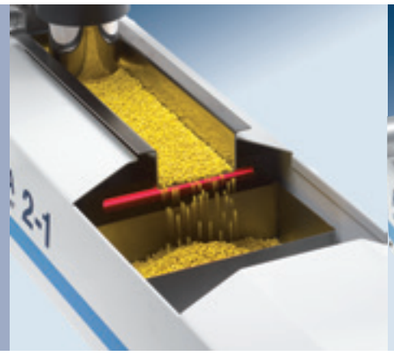
HAVER CPA CONTAINER

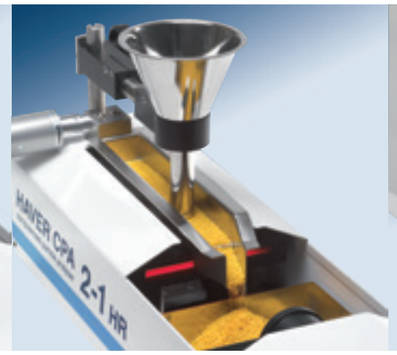
PERIPHERALS FOR HAVER CPA UNITS

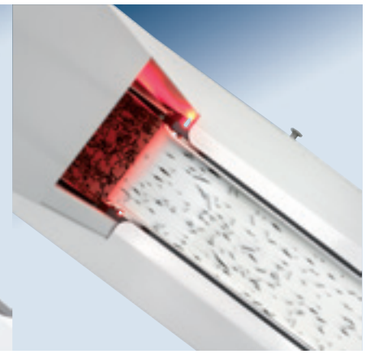
DESIGNATION		HAVER HSD	HAVER HSD-S	HAVER DMS	HAVER EMZ	HAVER DISPERSION SYSTEM	HAVER AS 6	HAVER AS 12	HAVER AS 24
Grain size range	[mm]	2 - 45	0 - 15	0 - 45	0 - 45	-	0 - 30	0 - 30	0 - 30
Hopper volume (approx.)	[l]	23	0.1 (maxi. 100 g)	-	15	-	-	-	-
Application	[-]	for fast drying of moist bulk materials (Online / Laboratory)	for fast drying of moist fine bulk materials (Online / Laboratory) 530 x 330 x 550	for screening out the fine contents of bulk material (Online / Laboratory)	for conveying and dosing bulk materials (Online / Laboratory)	for destruction of agglomerates using ultra-sound before CPA analysis (Online / Laboratory)	for the automatic feeding of CPA units (Online / Laboratory)	for the automatic feeding of CPA units (Online / Laboratory)	for the automatic feeding of CPA units (Online / Laboratory)
Dimensions (appr.) (LxWxH)	[mm]	1500 x 700 x 1500	39.5	1000 x 600 x 1300	860 x 700 x 1700	380 x 245 x 420	1100 x 400 x 880	1760 x 400 x 1300	1760 x 550 x 1300
Weight (approx.)	[kg]	220	230 or 115	127	81	14	70	76	90
Operating voltage	[V]	400	IP 54	230 or 115	230 or 115	230 or 115	230 or 115	230 or 115	230 or 115
Type of protection (standard)	[-]	IP 54		IP 55	IP 55	IP 54	IP 54	IP 54	IP 54
Power	[kW]	18.54	0,5 170	-	-	0,1	-	-	-
max. heating temperature	[°C]	600	-	-	-	-	-	-	-
max. air quantity	[l/min]	3900	-	-	-	-	-	-	-
Number of containers	[pce.]	-	-	-	-	-	6	12	24
Container capacity (standard)	[ml]	-		-	-	-	500	500	500

HAVER CPA 5 CONVEYOR

PRECISION IN EVERY FORMAT.







Laboratory units: CPA 2-1, CPA 2-1 HR, CPA 2 CONVEYOR

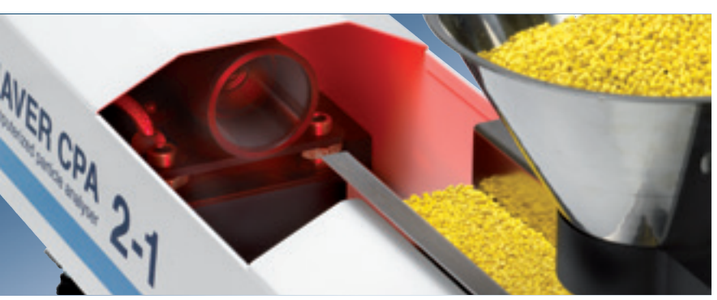
All HAVER CPA laboratory units are equipped with HAVER CPA software that runs under the most versions of Windows operating systems.
It impresses with its convenient installation, user-friendly menu-driven application and clear presentation of results. Thanks to the HAVER line scan camera technology, HAVER CPA laboratory units can also be used as particle counting devices. The consistent modular design enables them to be combined with all HAVER peripherals to suit the application.

The HAVER CPA 2-1 is suitable for analysing the grain sizes and grain shapes of fine sample materials from 20 µm up to 30 mm. By using a GigE camera, the HAVER CPA 2-1 can also be operated with a notebook, which provides a high degree of mobility and flexibility.
Using the technologies described above, the HAVER CPA 2-1 forms an economic base model for the laboratory environment. Easy to use, it represents an alternative to particle size analysis by a conventional sieve analysis with test sieves.

The HAVER CPA 2-1 HR (High Resolution) has been designed for the analysis of material with a particle size from 10 µm. It differs from the HAVER CPA 2-1 in the finer resolution. In combination with the HAVER dispersion system, based on latest ultrasound technology, also agglomerating material can be conveyed evenly.

We have developed the HAVER CPA 2 CONVEYOR to be also able to measure materials that represent a particular challenge due to their elongated shape. Sample material from 36 µm to 45 mm is separated and measured. The unit is also suitable for wood fibres, catalysts, pellets and extruded synthetic granulates.

All devices as well as the software are prepared for online connection to a PLC system. Standard interfaces enable them to be incorporated into the running production process.



Industrial units: CPA 2-1 ONLINE, CPA 4-1, CPA 4-2, CPA 4 CONVEYOR

HAVER CPA industrial units for production facilities, laboratories and technical centres also work with the proven HAVER CpaServ software and can also be used as particle counting devices with the HAVER line scan camera technology. In combination with HAVER peripherals, the modular design enables individual online solutions.

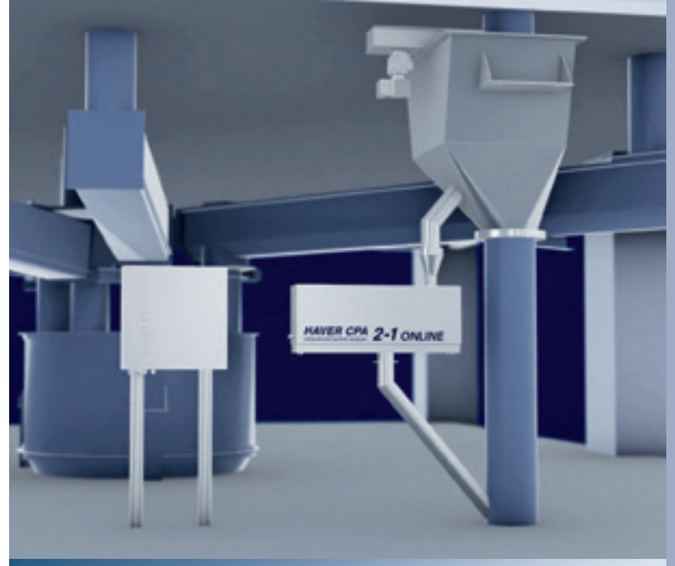
The HAVER CPA 2-1 ONLINE for the analysis of bulk material in the measuring range from 20 µm up to 30 mm has been designed for the continuous quality control during production.

In a permanent measuring standby modus the HAVER CPA 2-1 ONLINE analyses regularly fed samples without production interruption. Due to the robust construction it is resistant against surrounding conditions like heat, dust or humidity.

The HAVER CPA 4-1 analyses grain sizes and shapes in the measuring range from 63 µm to 50 mm. Its robust design makes it particularly suitable for large sample quantities.

The HAVER CPA 4-2 with two measuring ranges measures grain sizes and shapes of fine and coarse fractions separately in one unit. Examples include sand and grit in the measuring range from 35 µm to 15 mm or gravel and crushed stone in the measuring range from 91 µm to 90 mm.

The HAVER CPA 4 CONVEYOR works using the CONVEYOR measuring process and has been designed for coarser elongated material up to 220 mm. It has proved valuable particularly in the analysis of the lengths and widths of wood chips.



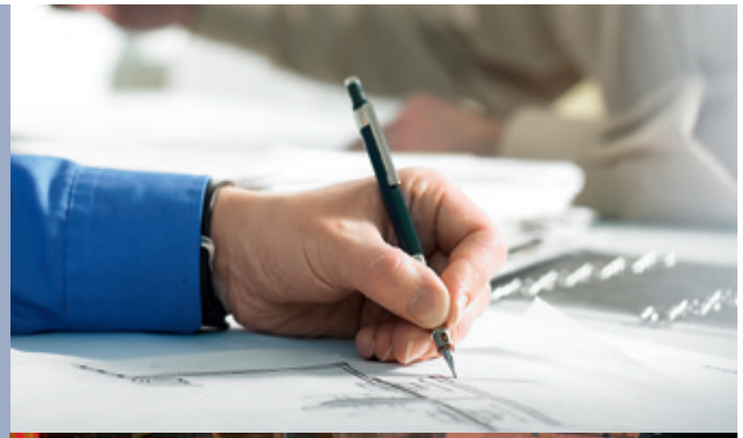
PERFECTION RIGHT DOWN TO THE PERIPHERALS.

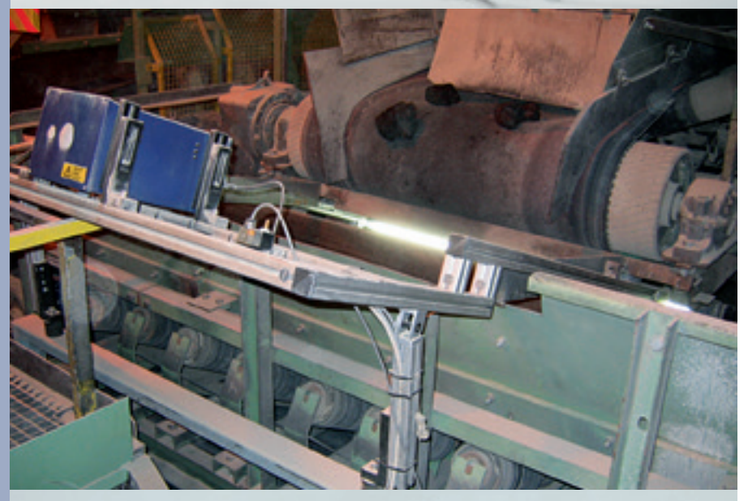
Modular peripherals, containers
The range of HAVER CPA units is complemented in practice by various peripheral devices. Moist materials, for example, must be dried first in order to be able to measure them photo-optically. For this purpose, we have developed the HAVER HSD High Speed Dryer, which dries mineral bulk material within a minimum amount of time. Conveyor speed and heating temperatures can be adjusted to suit the material. The high heating capacity and air quantity guarantee high flow rates. The HAVER HSD is frequently used for pre-drying wet gravel before analysing with the HAVER CPA 4-1. It can be used with all HAVER CPA units as well as separately for the fast drying of bulk material.

The HAVER DMS is a double deck screening machine for pre-screening with two separating cuts. In doing so, the feed material can be divided into three fractions. The two screens can be individually designed and tensioned by the Haver screening service. Rubber balls or special ultrasonic modules can be used to implement even super fine separating cuts and to enable automatic cleaning of the screens to be achieved. The pre-screening function of the HAVER DMS is used in combination with a HAVER CPA particle measuring unit to screen out the fine content of a material sample. This reduces measuring times significantly. To achieve optimum utilisation of the classification area, we recommend additional pre-dosing with the magnetically driven HAVER EMZ feed trough. Its large material hopper makes it the ideal buffer storage for downstream processes. In step mode, it conveys all kinds of bulk material.

We have developed the HAVER AS auto sampler for automatically feeding HAVER CPA devices with material samples. Six, twelve or twenty-four samples (AS 6, AS 12, AS 24) can be automatically measured around the clock without tying up capacity. The HAVER AS is controlled by the HAVER CpaServ software via an interface. It can be used as a laboratory or technical centre unit and also for collecting retain samples.

SPECIAL SOLUTIONS FOR SPECIAL TASKS.





The CPA product range covers an exceptionally wide performance spectrum thanks to the consistent modular design. We develop tailor-made systems for our customers for special applications. This includes gaining an accurate picture of the specific requirements and the installation conditions on site.

Following an intensive planning and consulting, the next step is to produce detailed design drawings as a basis for the calculation and production. The system is put through its paces in several test runs prior to delivery.

Of course, we also support you during the subsequent installation and commissioning of your CPA systems, and are available on site to instruct and train your staff. Competent after-sales service assists you with maintenance, subsequent modifications and software updates for your CPA system.

One of many advantages for our customers is the direct contact to our CPA team at every stage. This saves valuable time and cuts costs considerably, and ensures maximum reliability as a result of the typical Haver & Boecker high product and service quality.

NO SITE IS OUT OF SIGHT.

Haver & Boecker has actively influenced the technology of wire weaving since its beginning. As a result of our successful company history, today we are able to offer our customers the benefit of our unrivalled experience, technology and know-how about wire cloth.

Whether science and research, industry or architecture – wherever Haver & Boecker products are used, our customers benefit from a broad but still unique individual service.

With our worldwide weaving network we offer the comforting certainty to be your competent and reliable partner at any time and any place. So as to continue WEAVING IDEAS in time to come.

Haver & Boecker operates production sites in Germany, Great Britain, Belgium, the USA, Canada, Brazil, India and Belarus.

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