visit us: www.estanit.de

HAAGE-Sheet Formers

"Rapid-Köthen" System

**manufacture of test sheets from Cellulose,
Wood-Pulp and other raw materials,
as defined in DIN EN ISO 5269-2 (DIN 54358)**

Hg

ESTANIT

ESTANIT

HAAGE - Tradition & Quality

Starting on June 1st 2003, ESTANIT GmbH took over in official way the complete ERNST HAAGE Paper Test Equipment section and the rights on these.

ERNST HAAGE company was busy since 1932 with the development and manufacturing of several types of Paper Test Equipment. During the following years and up to now the company and the products became a well-known name in the national and international paper industries. The products have been sold successfully in some hundreds worldwide.

Taking over not only the HAAGE Paper Test Equipment line but also the direct involved earlier HAAGE employees, ESTANIT GmbH owned the complete and long based technical knowledge and experience.

We are proud to be able to offer all these to you as one of our customers. Please contact:

Mr. Hans-Peter van de Loo
Phone: +49 208 / 45 038-36
Fax: +49 208 / 45 038-35
eMail: vandeloo@estanit.de

As a successful and traditional name, HAAGE will remain as the trade name for this complete product line also in future.

ISO 9001

The ISO quality control program is recognized world wide as a very high standart of excellence.

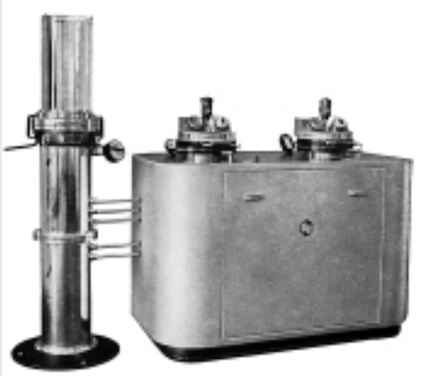
ESTANIT achieved this prestigious award several years ago, and continues efforts to assure that each product leaving our factory is thoroughly tested and certified to be faultless.

Each component of a product as well as the final products itself runs through various quality controls.

All of our suppliers are continously monitored by our quality control system for their reliability and for the right quality of their products.

Application

HAAGE Sheet Formers, which operate according to the Rapid-Köthen System, manufacture test sheets from Cellulose, Wood-Pulp and other raw materials, as defined in DIN EN ISO 5269-2 (DIN 54358)
Sheet Formers are used in the Paper Industry for Quality Control and Research applications and also for Production Control directly at the manufacturing equipment.
The "Rapid-Köthen" sheet forming system provides a fast and reproducible method of manufacturing sheets to test the physical and optical characteristics of the formed sheet and to determine the relevant properties of the fibres in the pulp mixture.
After filling the sheet former column with the fibre cellulose mixture, the test sheet is formed either manually or automatically, depending upon the type of control system ordered with the sheet former.
Now immediately a carrier board, with its smooth side downwards, is placed on to the new formed wet test sheet. Rolling the couch roll once in two directions at right angles to each other over the carrier board and without applying any additional pressure, the test sheet is fixed now. After beating up the test sheet with the carrier sheet from the sheet forming screen, a cover sheet is placed on to the other side of the test sheet. All three sheets are placed into the vacuum dryer, where the test sheet is pressed and dried for a predetermined time.
Immediately after the drying process, or following subsequent conditioning of the test sheet, it is now ready for testing, after first removing the cover sheet and support board.
Because the preparation and manufacture of test sheets by using a Sheet Former is fully described in the applicable standards, a detailed explanation is not necessary in this brochure.



Haage-Sheet Former, 1953

Overview

Advantages
of HAAGE Sheet Formers

- Each vacuum dryer unit operates **independently** and is equipped with its **own** electrical heating, electronic controller and display unit.
  In the unlikely event of a heater failure, therefore the remaining dryer units remain fully operational.
- Special, oil-filled dryer unit for temperatures to +140°C optionally available.
- Stainless steel plate condensors are fitted in the dryers in accordance with the official standards.
- Powerful, instantaneous, water injection and mixture swirling process in the sheet former column through a **special water injection ring**.
- All operating controls are ergonomically positioned.
- Heavy duty water distribution system using industrial grade piping and light proof tubing.
- No glass components are used, therefore **no glass breakage** possible (health and safety).
- Sheet forming column and dryer components are machined from **solid stainless steel**, therefore high corrosion resistance and no problems through paint flaking.
- Easy to clean water injection ring.
- Short term, fast delivery of accessories and spare parts directly from stock.
- Factory-trained service technicans for fast and competent customer service.

Service and Spare Parts

We are always at your disposal – not only before your purchase! HAAGE as manufacturer offers direct support and advice at any time. Our qualified service technicans or our agents offer quick support in case of problems or for maintenance.

Because of the continuous development and improvement of HAAGE Sheet Formers and their spare parts also a continuous training of our service-technicans is provided concerning new technologies and features.

Therefore: Ordering an ESTANIT-technican for maintenance and repair work grants a service, based on the newest level of technical knowledge.

Equipment Design

The compact design of the HAAGE Sheet Former and its minimal size make it ideal in situations where only limited space is available in the laboratory or production area. The construction of the Sheet Formers is stylished through the use of Aluminium profiles and easily removable, light-weight doors and panels. These also permit easy access to the internal system components whenever required. Height-adjustable support feet are provided and enable the equipment console to be positioned and accurately levelled on the floor, should this be necessary. The upper work surface of the equipment is covered with a hard-wearing material and accomodates from 1 to maximum 4 Vacuum Dryers, depending upon the number of dryers ordered.
The graduated sheet forming column, which pivots backward to enable removal of the formed sheet is made of acrylic.
A powerful Pump, which is made of tin-bronze, is provided in the Sheet Former to generate the required vacuum and also for air and water. In addition, a Return Water Filter is provided. This filter has 2 manometers fitted to the inlet and outlet manifolds to monitor filter contamination and prevent blockages. A large pressure differential between the manometers indicates filter contamination, in which case the filter core can be simply removed and cleaned or replaced. The acrylic cylinder of the sheet forming column can also be simply removed for cleaning.

The excellent performance of the latest HAAGE sheet former generation shown in this brochure as well as their results in sheet-forming and sheet-drying were repeatedly analysed and confirmed by the Technical University Darmstadt, Institute of Paper Fabrication, Darmstadt / Germany

Power Supply

400 Volts AC, 50/60 Hz., with neutral (other voltages on request)

Dimensions

Sheet Former with 1 vacuum dryer
approx. 172 (w) x 74 (d) x 86 (h) cm

Sheet Former with 2 vacuum dryers
approx. 172 (w) x 74 (d) x 86 (h) cm

Sheet Former with 3 vacuum dryers
approx. 214 (w) x 74 (d) x 86 (h) cm

Sheet Former with 4 vacuum dryers
approx. 256 (w) x 74 (d) x 86 (h) cm

Special Constructions

- Single sheet forming columns for manual and/or automatic operation
- Separate vacuum dryer apparatus for manual and/or automatic operation

Types

Type BB

Sheet Former for Manual Operation

- The low-cost alternative with 1 to 4 Vacuum Dryer units.
- Provides manual control of the sheet forming and drying processes using individual programme switches.
- Each Dryer is provided with its own heater and control unit.
- Individually adjustable, electronic temperature controllers, each with a digital display are provided for each dryer.
- Separate, analogue vacuum gauge for each dryer.
- Acoustic signal following expiry of the preset drying time.

BBS-Operation Controls and Panel with Display of the Sheet Forming Column

BBS-Operation Controls and Vacuur

Type BBS

Sheet Former with SIEMENS™ PLC-Controller

Provided with 2 operating modes, selectively, either automatic control of the sheet forming and drying processes, or manual operation when this mode is required. This offers high flexibility for sheet forming tests and guarantees a high level of operation availability: because the sheet former could be operated even in case of an electronic - control failure.

Automatic Mode

- Fully-automatic sheet forming process.
- Reproducible forming of test sheets, free of subjective, external influences.
- User-friendly control panel to sequentially enter the sheet forming input parameters.
- Provided with pre-stored, control parameters for sheet forming and drying as per official standards.
- Memory to store up to 10 separate sheet forming/drying programmes.
- Display to indicate the actual process status and the pre-programmed sheet forming parameters.
- Process display provides information on the status of the individual sheet forming stages.
- Control inputs for dryer temperatures, vacuum distribution (pump/vacuum buffer / dryer) and drying time pre-selection.
- Sheet forming column and dryers each provided with individual START / STOP keys
- Acoustic and optical signals to indicate completion of drying cycle.

Vacuum Dryer Systems

drying of test sheets up to 200 mm ∅ DIN EN ISO 5269-2 (DIN 54358)

Advantages:

- short drying times
- high drying temperatures directly on the formed sheet
- excellent drying results

Single Vacuum Dryer System for mounting on a bench

Scope of delivery:

- vacuum dryer device with integrated electrical heating (1.200 W) and plate condenser, all major parts made of stainless steel
- free programmable electronic temperature controller with PT 100
- digital temperature display
- vacuum gauge
- mechanical alarm clock (60 minutes)
- all components are completely wired
- optional: separate water ejection pump for vacuum

The necessary vacuum could be provided by a separate water ejection pump or by an electrical vacuum pump.

acuum Meter for the Dryer

Manual Mode

- Manual sheet forming and drying process control using individual, programme switches.
- Each dryer fitted with its own heater and control.
- Each dryer provided with a separately adjustable, electronic temperature controller with digital display.
- Individual, analogue vacuum gauges for each dryer unit.
- Acoustic signal to indicate completion of the drying cycle.

Complete Vacuum Dryer Module with 1 – 4 dryers

The following components are mounted on a light weight frame made out of Aluminium profiles with easy-to-remove blue coloured side doors:

- 1 – 4 vacuum dryer devices, each with an integrated electrical heating (1.200 W) and plate condenser, all major parts made of stainless steel
- free programmable electronic temperature controller with PT 100 (for each dryer)
- digital temperature display (for each dryer)
- vacuum gauge (for each dryer)
- mechanical alarm clock, 60 minutes (for each dryer)
- built in water ejection pump for vacuum (in case of 1 dryer, electrical tin bronze pump in case of 2 – 4 dryers)
- all components are completely hosed and wired

Both models are ready for operation after connection to the water line and power supply without need of any other additional control devices.

For more details see the section "Vacuum Dryer" on the next page.

Sheet Forming Column

Sheet Forming Column

The sheet forming column is comprised of the suction chamber with integral sheet support sieve, together with the sieve frame and a graduated, acrylic sheet forming cylinder which contains the pulp/cellulose mixture required to form the finished sheet. The cylinder is hinged at the rear, enabling it to be tilted backwards to extract the sheet. The cylinder baseplate contains a metal flange which contains the special water injection ring. Two eccentric locking units are provided, one at each side of the cylinder, to secure and seal the cylinder in its vertical operating position.

Special Features

- The sheet forming cylinder is constructed of robust stainless steel (standard supply)
- No protective paint is required.
- Newly-developed water injection system for extremely precise and evenly distributed water injection, provides optimum filling and mixture swirling within the cylinder.
- Instantly activated and powerful mixture swirling process provided using an external compressed air supply.
- Easy disassembly of the sheet forming cylinder for cleaning purposes when required.
- Newly-designed injector ring ensures quick and simple removal for cleaning.
- Analogue vacuum gauge with easy-to read dial for the suction chamber.
- Depending on the type of Sheet Former ordered, the following operating controls and indicators are installed next to the sheet forming column:

Type BB : Programme switch
Type BBS : Programme switch and START / STOP keys

Options

- Water-recirculation system with additional tin-bronze pump.
- Heater/cooler unit for the water recirculation system.
- Sampling cocks
- Oil-filled vacuum dryer for temperatures up to +140°C.
- Sensor control of the water level in the sheet forming column.

The optional **Water Recirculation System** enables test sheets to be formed using recycled water and provides major savings by utilising recycled water. A secondary liquid container, made of acrylic glass, is provided for the intermediate storage of the return water, which can be recycled as often as required.
By repeatedly recycling the water from the sheet forming column and secondary liquid container, the water contains suspension and fibre materials, retention media,

Vacuum Dryer

The results of dryer tests gained in independent Institutes speak for themselves:

- Short drying times.
- Higher temperatures directly on the formed sheet.
- Excellent drying results.
- When operated correctly, the design of the dryers negates the formation of moisture, caused by the build-up of codensation on the plate condensers!

Special Features

- Each vacuum dryer is equipped with its own freely-programmable, electronic temperature controller with digital display and separate heater unit, which provides a continuous temperature range up to +94°C.
- Optional, oil-filled vacuum dryer, for temperatures up to +140° C, also available.
- All major components made of stainless steel.
- No protective paint is required.
- Plate condensers made of solid stainless steel in accordance with DIN EN ISO 5269-2 (DIN 54358)
- The vacuum dryers can be alternatively supplied with cooling tube condensors at no extra cost if required.
- Dryer membranes made of Teflon™ (standard) or other materials (option).
- Depending on the type of Sheet Former ordered, the following operating controls are installed next to the vacuum dryer:
  Type BB : Programme switch
  Type BBS : Programme switch and START/STOP keys.

additives and colour pigmentations, thus closely simulating the liquid content at actual operating conditions of industrial paper making equipment.
By equipping the water recirculation system with the electrical **Heater/Cooler Unit** option, it is possible to simulate problems encountered in the industrial manufacture of paper, for example, bacterial growth, waste water content, etc.
With this option, the recycled water container is fitted with an electrical water heater unit with a temperature range of +25°C to +85°C.
An integral fresh water cooling coil ensures that the required temperature is accurately controlled and maintained without overshoot and also provides rapid cooling.
When fitted with the optional **Sampling Cocks**, liquid samples can be taken from the suction chamber in the sheet forming column or from the secondary liquid container of the water recirculation system.

Sampling Cocks

Water-Recirculation System with Heating/Cooler Unit

Electrical supply: 230 Volt, single-phase.
Dimensions: approx. 30 x 91 x 50 cm (W x H x D)
Empty weight: approx. 40 kg

Pulp Disintegrator Apparatus

For the standardised disintegration of pulp prior to testing without significantly changing its physical characteristics. This method is in accordance with the ISO 5263 standard and technical paper V/4/61 issued by the German Association of Pulp and Paper Chemists and Engineers.
The Pulp Disintegrator is a modern design utilising aluminium profiles and consists of a bench-mounting stand, a robust ,acrylic glass cylinder (a metal cylinder is optionally available) and the integral drive motor with propeller shaft and three-bladed propeller. Four rectangular, spiralled vanes are diagonally mounted on the inner wall of the cylinder which contains the pulp suspension. Each of the spiral vanes has a length which extends over half of the inner circumference of the cylinder.
The transparent, acrylic glass cylinder enables the suspension to be viewed during the disintegration process and can be simply removed or replaced. The 3-bladed propeller rotates in the geometric axis of the pulp cylinder and all components fulfil the requirements of the applicable standards.

Operating the Pulp Disintegrator

First place the cylinder containing the pulp into position. The operation is now begun by depressing both safety Start keys at the same time.
At this time, the complete stirring-assembly is automatically raised into its operating position.
The pulp cylinder is automatically closed, a special safety contact closes, and the disintegration process begins. During operation, the countdown of the preselected number of propeller revolutions (or the preset time) is displayed on the digital indicator. Under typical operation, 75000 propeller revolutions are preselected. When the countdown is completed, the propeller stops and the pulp container is opened by an automatic Lift-up of the stirring-assembly.

Advantages

- Light weight, modern design
- Low noise, powerfull drive
- Programmable, electronical counter (preselection of total revolutions or total Time)
- Digital, two-lines display
- Two-hands safety operation
- Additional STOP key for operation break
- Optical operation indicator

Electrical supply: 230 Volt, Single-phase.
Dimensions: approx. 28 x 125 x 46 cm (W x H x D)
Empty weight: approx. 20 kg

Pulp Dispersing Apparatus

This laboratory equipment has been specially designed for the mixing and distribution of pulp and cellulose suspensions for Freeness tests and Sheet Forming Equipment in accordance with technical paper V/6/61, issued by the German Association of Pulp and Paper Chemists and Engineers.
The Dispersing Apparatus consists essentially of a bench-mounting stand, to which the graduated, acrylic glass mixing cylinder is attached, and the drive motor which powers the mixer shaft and the twin-bladed impeller. The standard dimensions of the mixing cylinder normally supplied with this unit are 180 x 180 x 360 mm. Other sizes are available upon request.
In accordance with the technical paper, the cylinder is positioned with its front corner tilted down at an angle of 10°, thus forming the lowest point. This ensures that the cylinder can be completely emptied through the robust stop tap, which is positioned below the front corner of the cylinder.
The mixer shaft and twin-bladed impeller are geometrically aligned with the mixing cylinder. The shaft and impeller rotate at approximately 150 rpm.

Advantages

- Light-weight, modern design using aluminium profiles.
- Integrated water connection with stop tap for easy filling with water.
- Flexible filler pipe with storage holder for quick and easy cleaning of the mixing cylinder.
- On request: space-saving wall mounting frame

ESTANIT GmbH • Zinkhüttenstraße 17 • D-45473 Mülheim an der Ruhr • Germany
Phone: +49208 / 4503833 • Fax: +49208 / 4503833 • eMail: estanit@estanit.de • visit us: www.estanit.de