



HS 4 Universal Steamer

*The best steamer
for all fixation processes*

Stork Prints



STORK HS4



Faster, better and more efficient

The demands of the pre-print process are ever-increasing. Process times are constantly becoming shorter. Decisions on design and colourway selection have to be taken as early as possible. The final quality must match the samples on which the decisions were taken. Furthermore, everything has to be of a high quality, with minimal rejects and seconds.

Stork is fully aware of all this. We also appreciate that optimal fixation is vital for the success of the printing process. That is why we developed the HS 4 universal steamer. The HS 4 enables fast, flexible and accurate operation, and guarantees excellent fixation results. And that's not all. It incorporates a number of facilities that reduce environmental pollution and cut back energy consumption. All in all, the HS 4 is a highly effective fixation system that gives you rapid and repeated return on investment.

Universal

The HS 4 offers normal steaming, high-temperature steaming and hot air fixation, making it suitable for any type of dyestuff fixation.

It can also be used in two-phase fixation processes and is - together with the Eco Foam Package - ideal for steaming with preliminary moistening of the cloth.

Optimum fixation

Stork has carried out extensive research into fixation processes, and has used the results as the basis of the HS 4 design. You therefore have the benefit of a steamer that creates the optimum process conditions for each fixation process, so your end product is always of the highest quality.

Reproducibility

An advanced control system ensures that your fixation process is extremely efficient and easily reproducible.

Low energy consumption

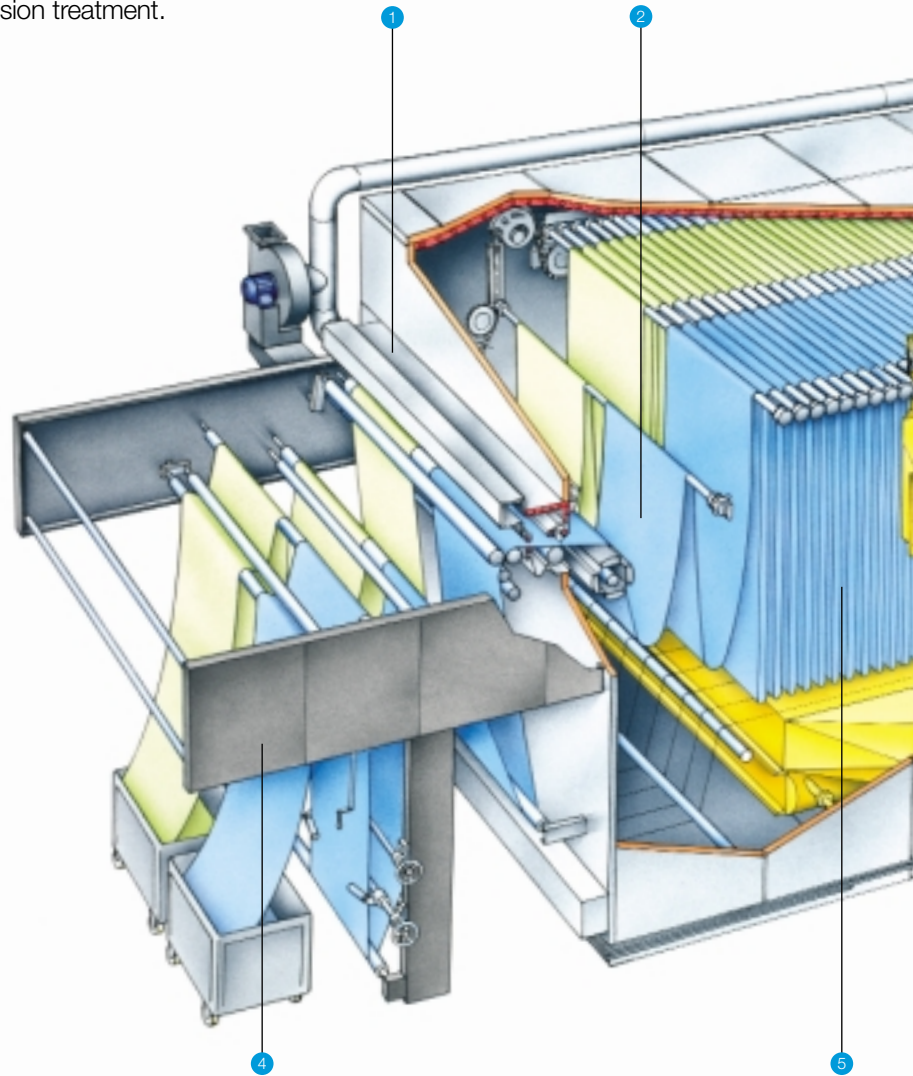
Through effective reconditioning (cooling or heating) and excellent insulation, a minimum amount of steam or hot air is required for all fixation processes. This obviously reduces energy consumption and therefore lowers your operating costs.

Reliability

The HS 4 is characterised by high operational reliability, largely due to its solid construction and the high quality of materials used. This means maintenance is restricted to an absolute minimum, which boosts machine uptime and therefore productivity.

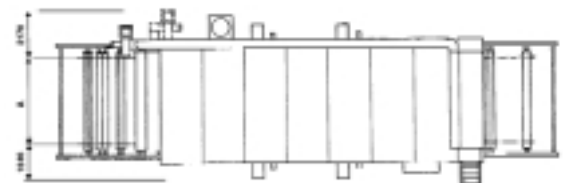
Corrosion resistance

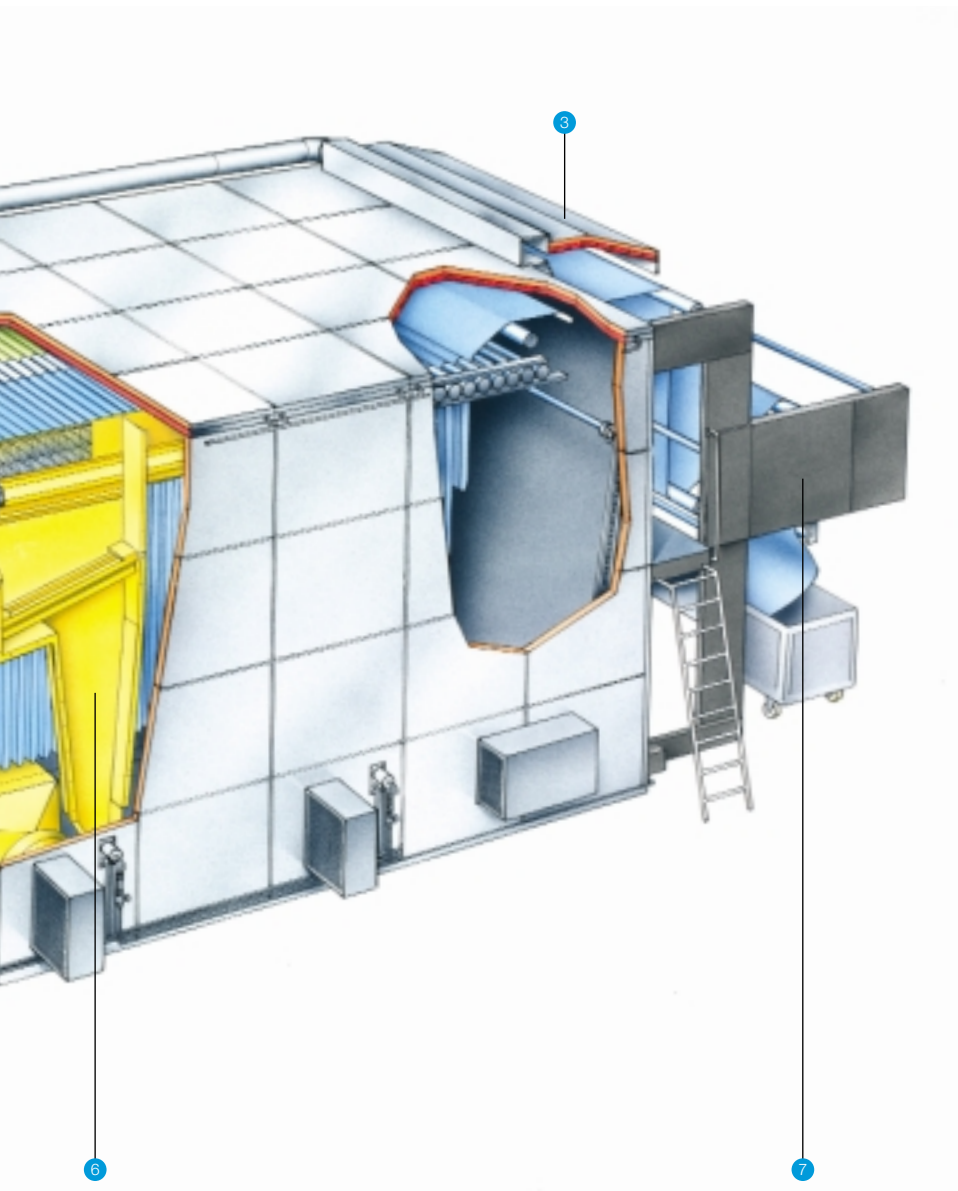
All parts of the HS 4 that come into contact with steam or cloth are made from chromium-nickel steel, a highly corrosion-resistant material. This naturally extends the lifetime of your steamer, and also eliminates the need for additional anti-corrosion treatment.



Technical specifications

Cloth capacity	150-215-350-480-610 m
Web width	A-2000-2600-3400 mm
Loop length	2-3 m
Fixation time	4-40 min





- Modular construction
- Cloth capacity ranging from 150 up to 610 m
- Roof heating prevents condensation
- One, two or three circulation units, depending on size
- Effective circulation leads to intensive contact between substrate and medium
- Proportionally controlled cooling for better results
- Uniform temperature throughout the steamer

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1. Inlet
2. Loop formation
3. Outlet
4. Infeed
5. Cloth transport
6. Circulation shaft
7. Cloth exit



Length of standard machine

150 m cloth capacity	5420 mm
215 m cloth capacity	6720 mm
350 m cloth capacity	9330 mm
480 m cloth capacity	11930 mm
610 m cloth capacity	14540 mm

Three different fixation processes

The importance of a proper fixation process is often underestimated, as is the complexity. Yet proper dyestuff fixation is essential for a quality end product, and it is extremely important to maintain temperatures at exactly the right level. The Stork HS 4 is ideal for the following fixation processes:

- Normal steaming
- High-temperature steaming
- Hot air fixation

Circulation helps create the ideal fixation conditions

In order to create the optimum fixation conditions, the HS 4 is equipped with one or more circulation units. This brings a number of advantages:

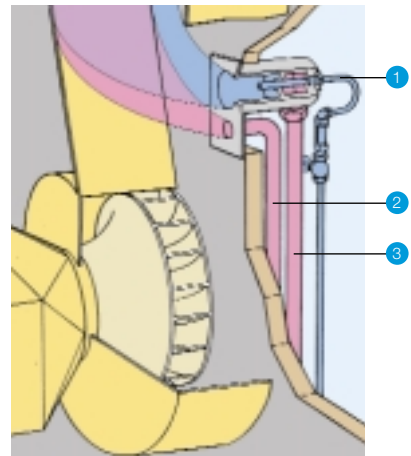
- Circulation leads to uniform heat distribution within the steamer, so the substrate reaches the required temperature quicker
- The temperature is kept much closer to the target value

- Temperature differences that influence fixation are kept to a minimum, resulting in a uniform and high colour yield.

The steam or hot air is removed at the bottom and is blown in again at the top after having been reconditioned (cooled or heated). In this way only a very small amount of new steam or hot air is needed, which significantly reduces energy usage. Additionally, the geometry of the circulation shafts results in a flow of steam or air from back to front. This so-called counterflow principle increases heat transfer between the substrate and the process medium.

Optimum process control

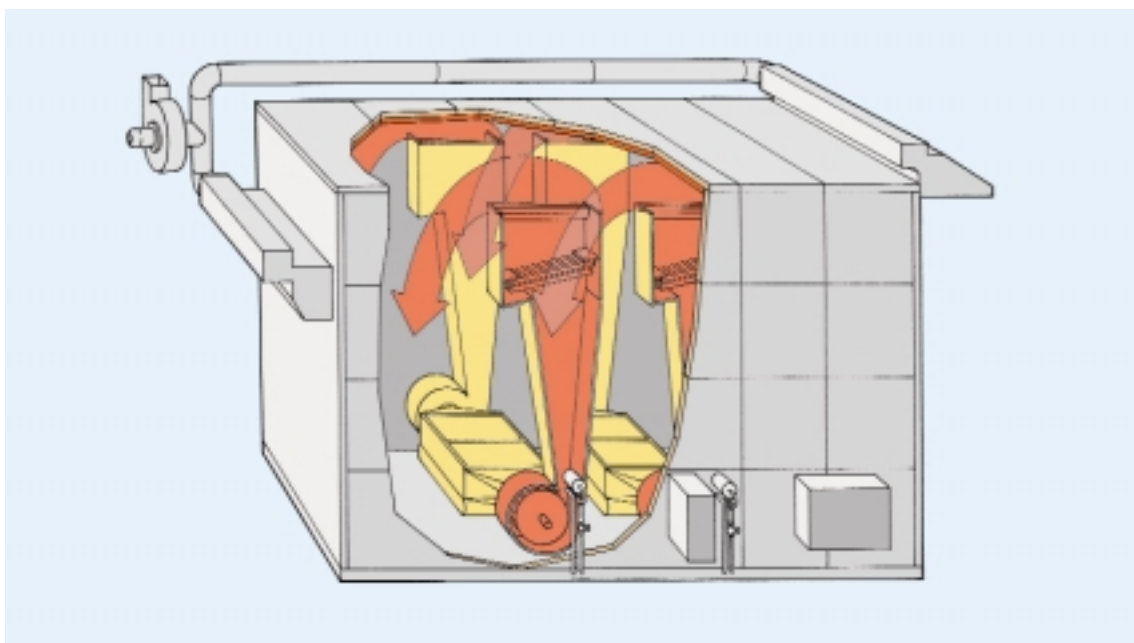
Optimum temperature control is crucial, especially during normal steaming. The HS 4 therefore has a number of built-in facilities to realise this. Generated steam is cooled by a proportionally-controlled steam conditioning system, which consists of:

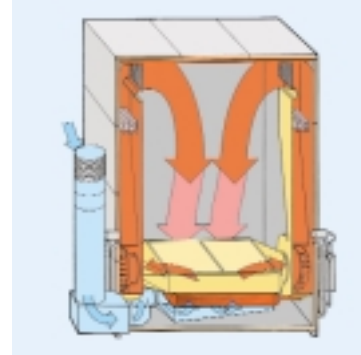
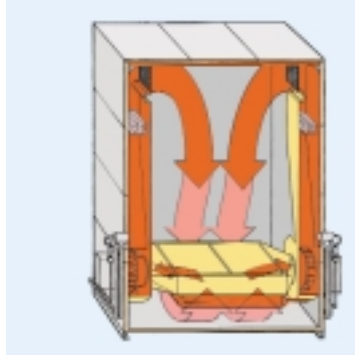
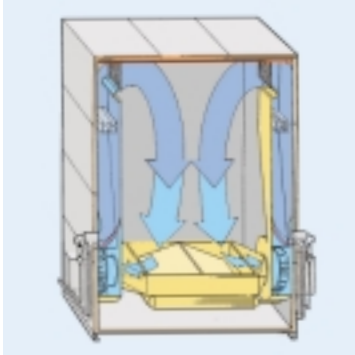


1. Water injection
2. Steam refreshment pipe
3. Steam reconditioning pipe

Automatic compensation

Meteorological variations and/or the height above sea level may cause fluctuations in the boiling point, and consequently in the steaming process. The HS 4 is the first steamer with a built-in control system that automatically compensates for such fluctuations. This guarantees excellent fixation, time after time, in all kinds of conditions.





Normal Steaming

In the normal steaming process, three important factors influence the fixation quality: temperature, cloth moisture content and fixation time. The temperature, has to be just above the boiling point of water, taking into consideration that heat is released during the fixation process due to condensation and absorption. For proper fixation of the dyestuff the fibre must contain the required amount of moisture. In addition, any heat released must be dissipated as quickly as possible.

The HS 4 achieves this by circulating and cooling the steam as much as possible. Cooling is achieved both by supplying a restricted (adjustable) amount of fresh steam and by an effective cooling of the circulated steam. To this end, water is finely atomised with the aid of a venturi system. These minuscule droplets enable effective evaporation and

ultimately efficient cooling of the steam. An accurate proportional control system continuously measures the temperature inside the steamer and controls the water supply. The steam temperature can therefore be kept at a constant level, with minimum steam consumption.

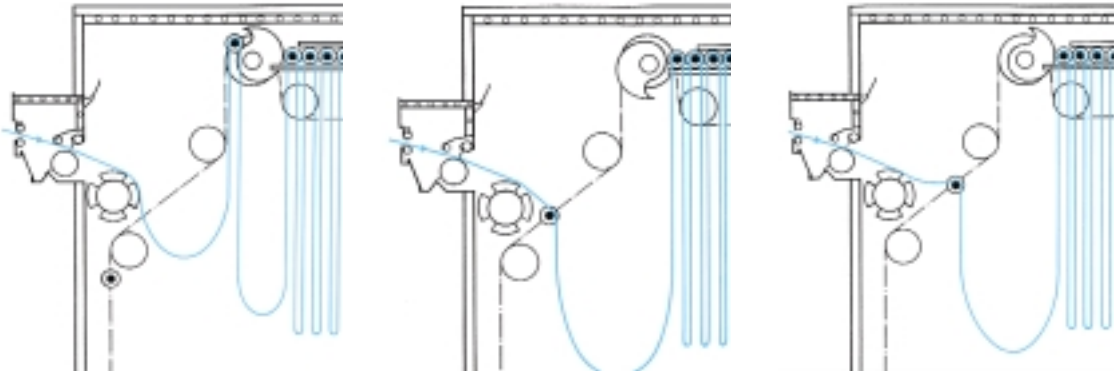
High-temperature steaming

Superheated steam is the process medium in the high-temperature steaming process. The steam is fed through a heater at the bottom of the steamer, which raises the temperature to a maximum of 185 °C. The steam is then driven by fans back to the top side of the steamer via the shafts, and then moves across the cloth to the bottom of the steamer. Steam that escapes through the inlet and outlet openings is compensated for by fresh steam fed into the shafts. Temperature control is realised by varying the heater temperature.

Hot-air fixation

For fixation by hot air, the air is heated inside the steamer. The same circulation system is used as for steam. Fresh air is sucked in by a fan on the exterior and blown through a filter into the steamer. It enters at the bottom, underneath the heaters, and is consequently warmed before being mixed with the circulation air. The process air is removed at the front of the steamer.

To enable danger-free use of printing pastes containing white spirit, which can form an explosive mixture, the HS 4 has a number of sensors and safety mechanisms. There are also safeguards to prevent spark formation in the fan motors.



Infeed

The inlet is located high on the steamer wall, so there is only a short distance to the loop formation system. In this way, low tension cloth transport is achieved, so the steamer is suitable for processing sensitive substrates. This low tension and short distance prevents curling of the selvages. The cloth draw-in roller is located directly behind the cloth inlet in the steamer housing. The size of the infeed nip can be adjusted to suit the thickness of the substrate.

is guided along the cloth draw-in roller. The supporting rod picks up the cloth, which forms a freely hanging loop.

The supporting rod, with its transport rods and loops of cloth, is placed on a rail. It then moves slowly through the steamer, with the rods turning to avoid any marking of the cloth. The loop length is adjustable from 2 to 3 metres. So loop formation is not affected by the cloth being drawn in, but occurs in a natural, tension-free way.

Outlet

The outlet is constructed in such a way that contact between the printed side of the cloth and any part of the steamer is impossible. Various constructions are available for trouble-free plaiting or rewinding of the fixed cloth. These include cloth return, over or underneath the steamer, to enable operation from one side.

Loop formation

The system forms loops by using the weight of the cloth without any extra mechanical devices or bellows systems. Marking off is eliminated as there is no contact with the printed side of the cloth. At regular intervals a supporting rod is brought up by the transport chain from the bottom of the steamer and

Monitoring of cloth content

Synchronisation between infeed and discharge is determined by the degree to which the cloth shrinks or stretches. This carries with it the inherent danger that the steamer is either pulled empty or overfilled. To prevent this, the HS 4 is equipped with a filling safety feature.



HS 4 Steamer

- Universal steamer for all fixation processes
- Number one in normal temperature steaming
- Minimal energy consumption
- Extremely low maintenance costs
- Standard machine is complete

Operation and the control system

The control panel is located on the switchbox as standard, but is also available as an optional stand-alone unit.

The advanced electronic control system is based on a PLC, and offers the following advantages:

- very accurate temperature control
- automatic adjustment of overpressure and steam consumption
- automatic setting of web speed, based on the set dwell time and the loop length
- automatic switching to a selected process
- storage and retrieval of process parameters, which enhances the reproducibility of the fixation process
- process monitoring with failure analysis

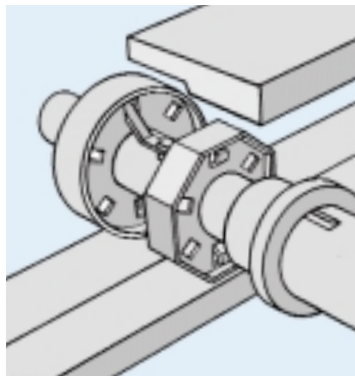


Options

Switchable transport rods.

With certain cloth qualities, creasing of the cloth or curling selvages may cause stains at the lower ends of the cloth loops. It is therefore advisable to use switchable rods.

The switchable rods supplied by Stork can be switched to either rolling or sliding position. When set for rolling, the cloth slowly moves along the rods; when set for sliding, the cloth hangs stationary on the rods. Switching of the rods is possible during production, and can be carried out from outside the steamer.



Oxygen-free steaming atmosphere.

During the fixation of vat dyestuffs, it is essential that the oxygen concentration in the steam does not exceed a specified value, as oxygen interferes with the fixation process. The oxygen concentration meter checks the oxygen content and generates a warning the moment it exceeds the permitted value.



Stork Prints

Stork Prints develops and produces (as the only company in the world to do so) rotary screen printing systems and digital systems for all process steps in the textile printing process. In addition the group supplies rotary screen printing systems and digital colour proofing systems for the graphic arts industry.

Stork Prints is part of Stork NV, a global technology group comprising 60 companies, with a total workforce of around 17,000 and a turnover of € 2.3 billion.

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