

Frequently Asked Questions

[top](#) Vragen met betrekking tot:

- [1. Production capacity](#)
- [2. Steam generation](#)
- [3. Steam and heat distribution](#)
- [4. Droplet formation](#)
- [5. Smearing](#)
- [6. Durability](#)
- [7. Emission](#)
- [8. Connections](#)
- [9. Applications](#)
- [10. Fabric lead-in / lead-out / drive](#)
- [11. Steam reconditioning](#)
- [12. Maintenance](#)
- [13. Dimensions](#)

[download FAQ in Acrobat PDF format](#)

[top](#) Questions regarding the production capacity

? How many meters of fabric can be processed in one hour?

The production capacity of the several models is given in the table below in linear meters/hour.

Type	Fabric contents [m]	Dwell time [min.]									[min.]
		2	3	4	5	6	8	10	20	30	
PU3	3	90	45	45	36	30	22,5	18	9	6	[m]
PU6	6	180	90	90	72	60	45	36	18	12	[m]
PU9	9	270	135	135	108	90	67,5	54	27	18	[m]
PU11	11	330	165	165	132	110	82,5	66	33	22	[m]

? Does steam generator capacity suffice to obtain satisfactory fixation results for fabrics, such as silk and wool, that require large quantities of moisture?

The steam capacity of the Portafix Universal is more than sufficient even for dyes and fabrics demanding large steam quantities (of the right temperature) for the fixation. The Portafix steam generator produces approximately 15 kg of steam per hour. The steam generator is, however, not the dominant source. By far the largest contribution comes from the water that is injected into the steam in the circulation shaft. The steam temperature increases due to the huge amounts of energy released by the adsorption of the steam onto the hydrophile fabric. The excess heat is removed by controlled injection of water into the steam that passes through the circulation shaft. The reconditioning implies that the total amount of steam with the right temperature entering the steam chamber is between 300 (smallest model PU3-1850) and 1000 (largest model PU11-3400) kg per hour. To obtain this quantity without any steam recondition, would require a steam generator power between 220 kW and 730 kW to produce the 300-1000 kg steam per hour. The steam circulation and the reconditioning by the water injection lead to a significant reduction in energy consumption: only 1.5 to 5% of the steam blown into the fixation chamber comes directly from the steam generator, the remaining 95% till 98.5% consists of reconditioned steam.

[top](#) Questions regarding the steam generator

? Does the Portafix Universal steam generator require water of a particular quality? Does the water have to be completely free of the calcium, magnesium, iron, and chloride ions? And, if not, what are the potential dangers of using water containing such minerals?

Broadly speaking it is highly recommendable to use a water softener for the steam generator. This will give the most reliable situation and an in-line water softener is a commodity with a low price level. One can, however, also use normal (potable) tap water. In that case one has to decalcify the steam generator regularly with citric acid, one has to reckon on a shorter life of the heater elements. The biggest risk is the burn-out of the heater elements as a result of over-heating caused by a thick layer of deposits on the heater elements. Deposits will also influence the correct functioning of the

level detection sensors.

The presence of iron ions does not lead to any particular corrosion hazards. The Portafix heater elements are made of "Incoloy 800", a very corrosion-resistant metal. Quite regularly one comes across steamers with heater elements made of zinc-coated galvanized steel. The latter material is however not resistant to iron ions. The concentration of chloride ions in tap water is too low to cause any real damage. That is, Incoloy 800 easily withstands normal chloride concentration. Anyway, to decalcify the steam generator is straightforward and not very labor-intensive. It can for instance most easily be done right after the aging when the water in the steam generator is still hot.

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In what way is the reused steam conditioned to guarantee a moisture content as is required for the fixation?

The steam generator constantly generates fresh steam. The steam rises through the shaft and enters the steam chamber at the top. The huge steam circulation capacity is dependant of the width and contents of the steamer and varies between 475 m³ and 2200 m³ per hour and makes that the content of the complete steam chamber is replaced with fresh steam in a matter of seconds. The circulated steam is reconditioned (regenerated), cooled to the required temperature, by means of water injection in the shaft, or heated by means of heating elements .

[top](#) Questions regarding the steam and heat distribution

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What precautions are taken to ensure stable and uniform steam and temperature conditions over the entire steam chamber. The stability and uniformity are prerequisites for consistent high quality fixation results?

The steam is fed into the steamchamber through a number of slits in the roof. The position and geometry of the slits are accurately calculated per steamer model and guarantee a uniform steam distribution. The roof is covered with a special material which prevents the development of droplets. The steam streams down along the walls of the chamber and is exhausted at the bottom. The circulated steam is reconditioned in the shaft by means of water injection and/or heated and after the reconditioning the steam is fed into the chamber again. The ventilator capacity ensures that the contents of the complete steam chamber is refreshed within seconds. The temperature is controlled with an electronic PID regulator and 3 adjustable parameters: the forced circulation, the electrical heating and water injection cooling. With these the temperature can be regulated within an accuracy of a few tenths of a degree Centigrade.

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Why exactly does one need such huge quantities of (reconditioned) steam?

1. Steaming with saturated steam (for reactive, acid or basic colorants): The steam process is a physical process in which the fabric has a steam vapor equilibrium which is inversely proportional to the fabric temperature. The moisture density at the cloth surface is highest at 100°C and it declines at rising temperatures. For temperatures higher than 150°C the cloth surface is completely dry.

Since the colorant transport in the fiber requires the presence of water, a high moisture concentration is desirable. The adsorption, the condensation of steam onto the fabric, is an exothermal process. The temperature of the fabric is raised by the adsorption to a level higher than the ambient steam temperature. (This might sound rather odd, but is in fact a quite normal phenomenon for adsorption processes.) The adsorption heat is removed by a constant supply of fresh steam. To lower the temperature of the cloth, to the level of the ambient steam temperature, via steam flow heat exchanges requires a huge steam flux: to cool a few kg of cloth requires several hundredths kg of steam. In case the cooling would have to be achieved with generator steam only, the process would require considerable amounts of energy. A much more energetically economical manner would be, as it is done in the Portafix, to use the adsorption released heat for the production of steam via water injection, which can save up to 98% of fresh steam energy. Without these huge quantities of steam one can not achieve high quality fixation since the temperature cannot be controlled in a defined way.

2. HT-fixation (for disperse colorants): The fixation of disperse colorants is relatively easy. In general one can state that the steam fixation of disperse colorants leads to better color results than the fixation by means of hot air and calander (contact heat).

[top](#) Questions regarding the forming of droplets

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How are the negative effects of droplets formation prevented?

In the first place, the roof is not flat but tapered. This shape makes that a significant part of the droplets leaves the chamber via the walls. In addition to this, a special type of material is used to cover the roof. In case droplets do develop, the capillary activity of the cover ensures these droplets do not fall onto the textile cloth inside the steam chamber.

[top](#) Questions regarding smearing

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How is the smearing of colors prevented that might occur when the printed area of the fabric comes in contact with the rolls?

The smearing occurs only when the fabric and the roll travel at different speeds. The chain drives all the rolls ensuring that the velocity of the fabric and the rolls are the same. Moreover, when dealing with problematic fabric-dye combinations, it is possible to use a special teflon coating of the rolls contacting the printed side of the fabric.

? Is it possible that colors smear when different parts of the fabric come in touch as a consequence of flapping or rubbing of the fabric?

Not really. The input speed can be adjusted and set to a value that guarantees the right amount tension in the cloth to prevent any wrapping. The distance between the ascending and descending fabric paths suffices to prevent any rubbing.

[top](#) Questions regarding the durability

? What is the expected service life?

In this one has to distinguish between corrosion and other factors that can affect the life. The impact of corrosion heavily depends on the chemicals occurring in the dyestuff and fabrics and the way in which the periodic maintenance is carried out. Extremely high halogen concentrations, e.g. chloride, will promote corrosion. Due to the fact that the Portafix Universal is made of stainless steel 316, there will hardly be any corrosion at all; even after years of operation under normal working conditions.

[top](#) Questions regarding the emission

? What type of emission are produced and how are these exhausted?

The exhaust can be placed in either a wall or the roof going to the outside. A steam extraction fan is an integral part of the Portafix Universal series and can be placed in the most convenient place. The majority of the fixation processes do not produce harmful gasses, but at high temperature (HT) steaming (160-180°C) the glycols that are a part of all ink formulations will be evaporized. A part of the glycol will condensate together with steam but a part will remain vapour. Due to the harmful characteristics of vaporised glycols, the exhaust of the Portafix Universal is an essential part to comply with local legislation.

[top](#) Questions regarding the connections

? What are the required connections?

The required connections are: power- and (soft) water-supply, steamexhaust and condensate waste water. A connection with an external steam net is optional. The Portafix Universal can be used in laboratory and small industrial environments.

? How is the steam exhausted?

The steam is exhausted using a fan. The exhaust fan forms a standard part of the Portafix Universal delivery and can be placed in the most convenient place with roof or wall connection.

[top](#) Questions regarding the application

? For which fixation processes can the Portafix Universal be used?

The Portafix Universal can be used for all dyes and fabrics. With temperatures between 100 and 180°C and dwell times from 2 to 30 minutes, the Portafix Universal is suitable for all textile dyes. The Portafix Universal allows for aging with saturated steam conditions, with temperatures in the range 100 - 105°C, for the fixation of reactive dyes and also for acid, and basic colorants. The Portafix is also suitable for HT fixation (high temperature 165 - 180°C) as required for the fixation of disperse dyes. It can furthermore be used for the hot air fixation of pigment dyes.

? How long does it take before the Portafix Universal is operational?

The heating up and filling the steam chamber completely with steam takes about 45 minutes for normal temperature or 75 minutes for HT steaming. Making use of the optional autostart/ standby allows for completely automatic control of the startup procedure on a pre-set time. The switch from HT fixation to saturated steam fixation or vice versa takes between 30 and 45 minutes.

? What about the quality of the fixation?

The fixation results achieved by the Portafix Universal can be compared with the results obtained by the best conventional production agers that are used in the textile industry. The fixation results at customers has proven to be in most cases even better showing darker and brighter colours.

Comparison tests between Portafix Universal steamers at different locations show colour differences smaller than CMC (1:2) = 1.2

Both results makes the Portafix Universal ideally suited for applications which require a perfect day to day reproducibility with the highest possible fixation and colour yield.

[top](#) Question regarding to fabric lead-in / lead-out / drive

? Is it also possible to work from lorry to lorry or is it only possible to work from roll to roll?

The Portafix Universal has modular fabric infeed and outfeed frames for more flexibility in fabric handling. Working from and to lorry is one of the possible options and is preferred for conventional sampling where the fabric is usually not on roll.

The Portafix is standard equipped with the so called roll-to-roll frames for rolls with a diameter up to 55 cm and a weight of 60kg which complies with the most digital printing equipment. The roll-to-roll system is functioning without insertion of support axis. Fabric rolls can simply be placed on movable support cones. This not only lead to a weight reduction, but also the handling area can be kept small what is a big advantage especially for the wider units.

With the modular infeed and discharge frame one can have a range of combinable possibilities.

? How is fabric transport accomplished without lead-in and lead-out?

The fabric is attached to a cloth-bar. The cloth-bar is attached to the drive chains on the right and left sides. The drive chain carries the bar through the steam chamber. A cloth-bar thus renders the lead-in redundant. At the end of the roll one again attaches the fabric to a cloth-bar to ensure that the last part of the fabric travels through the steam chamber in a controlled way. A sensor at the cloth output will stop the transport to prevent the bar wrapping onto the roll. After the bar is removed the transport through the steamer can be resumed.

? How is the end of the roll detected?

The end of the roll is detected with a sensor. When the last section of the fabric leaves the roll, the fabric transport is halted such to allow the attaching of a cloth-bar.

[top](#) Questions regarding the cooling

? How does the steam cooling work (steam reconditioning)?

In the forced circulation in the shaft one injects an fine spray of water when the temperature is higher than the selected temperature. The evaporation of the water lowers the temperature of the steam. The water injection is already activated for temperature that are slightly (tenths of a degree) too high. The user selected temperature is compared with the temperature as measured at the place where the steam enters the steam chamber. The injection of the water just before the heater elements and the overheated steam make that the water immediately evaporates.

? How is the rapid cooling possible upon switching from HT to saturated fixation?

The temperature can be lowered very quickly due to the water injection. The energy required for the evaporation of the water lowers the temperature of the steam.

[top](#) **Questions regarding the maintenance**

? How much maintenance does the Portafix Universal require?

The maintenance is limited to a regular (weekly) cleaning of the condensate waste water collection and emptying the steamgenerator to avoid a build-up of salts. Depended on the use, the watersoftener should be regenerated in average each 500h (at 10 °dH. The steaming process can be continued during the regeneration.

A regular cleaning of the inside of the Portafix Universal is not necessary in normal circumstances.

The drive chains are completely maintenance free and do not use any greasing.

The bearings inside and outside the Portafix Universal are also maintenance free.

[top](#) **Questions regarding the dimension**

? What are the dimensions of the Portafix Universal?

The Portafix Universal has been designed for use in laboratory and small industrial environments. The installed height is only 2.60m. The Portafix Universal is shipped in one part or, if necessary, in two pre-assembled parts. Both pre-assembled shipped parts pass through any standard door. The Portafix Universal is mounted on wheels which make it very easy to move it from one position to another.