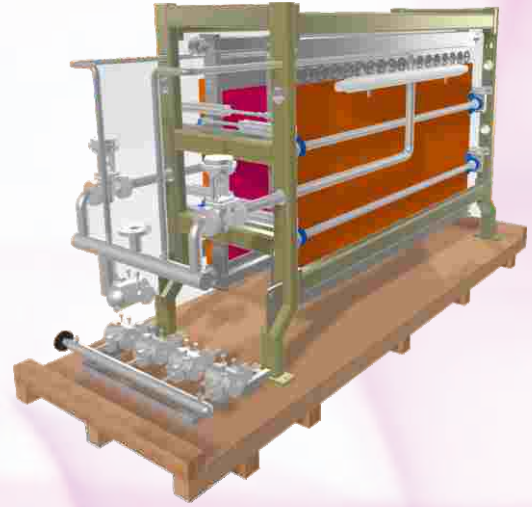


*“Engineered, efficient, reliable, economic and user friendly solutions to your specific processes”*

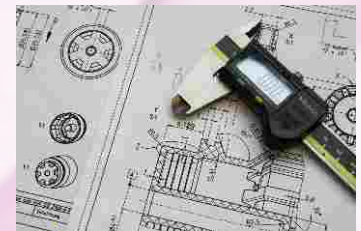
Pien Process has been supplying products, services and consultancy to different industries especially coating & converting, labelling and textile. Our core supply range includes steam humidification units, packaged process control equipment (pressure, temperature, flow, weight, mixture, moisture, etc.), packaged silicone preparation and dosing systems, packaged liquid transfer units, indirect clean steam generators and packaged heat transfer units.

With the motivation of 30 years of experience on engineered system solutions, we are ready to offer you custom-made, efficient and economic solutions. We make all the engineering calculations, system designs and productions with an excellent team.

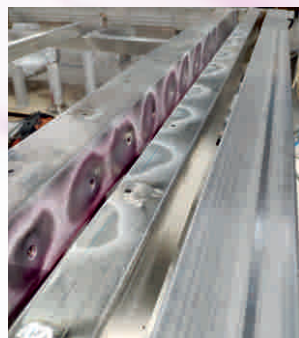


Besides our production capabilities we have been carrying out plant surveys and consultancy services to discover energy recovery options in your plant, to improve end product quality and to increase product out-put. Valid processes, irreproachable production, less energy and better out-put. These are all for to reduce specific product energy.

Our team has expertise on metal frame work design, piping design, steam and condensate system design, sizing and selection of valves, pumps and heat exchangers besides production capabilities. We have been using different special softwares to carry out our engineering works.

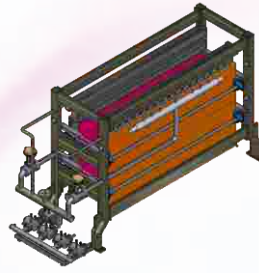


We manufacture and assemble packaged units in a very modern work-shop with experienced workers under the guidance of ISO9001:2018 quality improvement system. Each steps of manufacturing processes are to be controlled by quality assurance team members. We strictly follow Labours health and safety regulations.



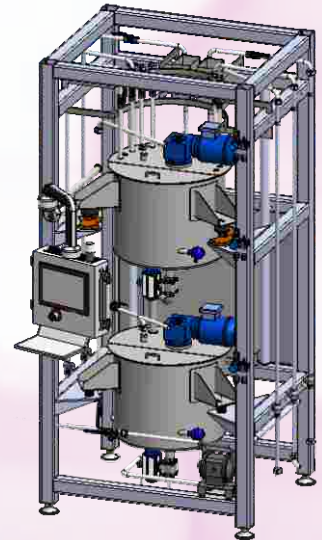
## Design & Production Spectrum

- Steam humidification units
- Liquid storage and transfer skids
- Silicone preparation and dosing systems
- Reactors, condensers, storage vessels, agitators
- Packaged heat transfer units
- Clean steam generators and accessories
- Custom made skids for specific applications



## Sales Spectrum

- Steam boilers/generators
- Steam systems' equipment and ancillaries
- Shut-off and control valves
- Cooling systems and chilled water units
- Water treatment packages
- Pumps and liquid transfer packages



## Consultancy Services

- Steam and condensate system design
- Cooling process system design
- Plant audits to discover energy recovery options
- Engineering support at the process design stage
- Quality improvement applications

## STEAM HUMIDIFICATION UNITS

### Proven technic, perfect performance

We are able to design steam humidification units depending on your product spectrum and process details. Moisturizing paper and fabrics by steam is a proven application for decades. Even it's a well-known proven technic, there are several minute details should be taken into consideration during the system design stage.

Depending on the process details given by the end users, we design the system with fluid dynamics and steam systems' major rules and formulas. Some design headlines listed here-below;

- Main carrier frame
- Steam distribution network
- Steam flow control valves
- Steam spray head and orifices
- Heating plates
- Condensate drainage system and steam traps
- Stainless steel frames and pipe-work
- Pneumatic and electric control systems



After an engineered design done by our team and approval of the layout drawings by the end user, we start to manufacture the complete system in our workshop.

In order to design a proper steam humidification unit, there are some information should be supplied by our customers. Some main information is listed below. We collect additional information during our site visits and plant audits.



- Product details
- Max. product weight (kg/m<sup>2</sup>)
- Relative humidity prior to the humidification unit
- Targeted humidity levels
- Max. speed of your main machine
- Min. and max width of your product spectrum
- Single or double sided spray
- Steam system information (if there is any steam source available)
- Available space that the unit would be installed

To secure the system performance there are supplementary processes have to be properly controlled. These are;

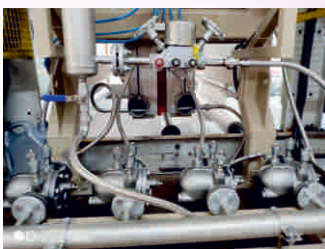
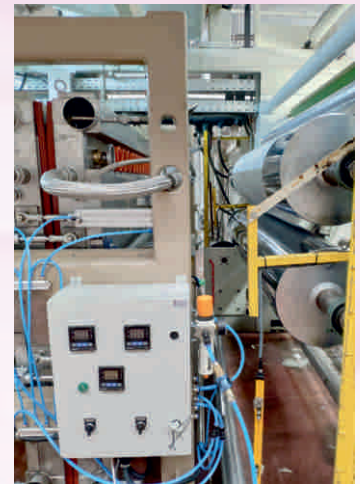
- Drying process and accurate temperature control
- Cooling/chilled water process
- Steam supply chain
- Condensate removal
- Relative humidity of the manufacturing place
- Automation

Poor quality on drier control and fluctuations of the temperatures at the product cut-away have negative effect on moisturizing back the process media.

Cooling cylinders should work properly. Cooling system capacity has to cover required heat load. Process media has to be cooled down before and after the steam humidification unit.

Dry and clean industrial steam has to be supplied to the system. Any condensate or boiler water in the steam space causes quality problems, even manufacturing lost.

Water hammer should defect valves and ancillaries. Solids carried by boiler water should block heating plates, orifices, strainers, steam traps, hoses and small holes. They should also stick on the process media and cause quality problems.



A proper condensate drainage system is essential to have a satisfied operation. Improper steam trapping should extend start-up period and should cause water hammer. Condensate flooded inside the heating plates would reduce heat transfer rate which would have negative effect on humidification efficiency.



Steam flowrate should be controlled manually or digitally. Best optimistic control option should be decided. Travel of steam flow rate control valve's trim should be controlled by a basic PID or driven by the main machine's PLC system depending on the machine speed.

Inline humidity measurement sensors should be added to the system to provide accurate steam flow rate. Sophisticated control options increase the investment costs. On the other hand, automation options bring advantages to eliminate labour mistakes and provide stability.

Relative humidity of the manufacturing and storage halls is another parameter to be controlled for a satisfactory operation. During the coating process, temperature of the plant air tends to increase. This causes relative humidity to decrease. Low relative humidity of the working and storage environments should create quality problems at the final product. Paper should shrink, curl and/or lose dimensional stability.



Working environment air has to recover its relative humidity by water or steam injection to the ambient. Provision of some amount of fresh air to the working environment should also help to improve productivity and to have a healthy ambient. Recommended humidity level for working environment is around 55%rh.

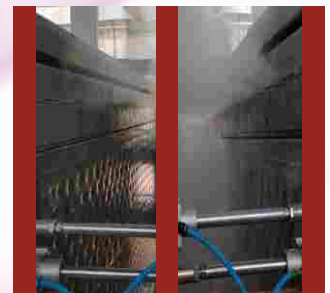
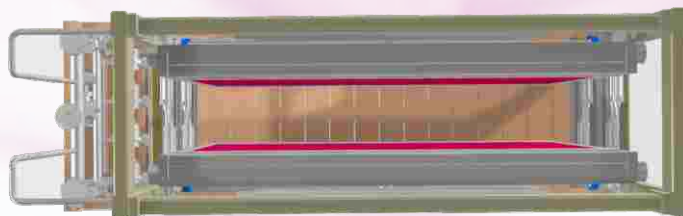
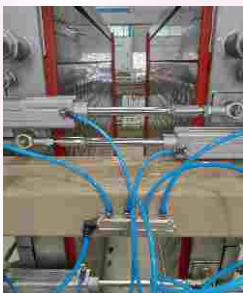
### ***Benefits of PienPro Humidifiers;***

#### **- Fully symmetric design**

In case of need you can use each of spraying frames at both sides.

#### **- Stainless steel frame work**

All of the wet metal construction where steam distribution, spraying and condensation takes place are made of stainless steel to obtain trouble free, long term service life.



#### **- Special heat exchanger at the steam supply**

We designed a special pipe in pipe heat exchanger to provide dry saturated steam to the steam spray chamber.

### **-Steam header with compact steam trap and air vent**

We equipped our unit with a steam header including a condensate removal pocket and a compact steam trap. There is also an air vent fitted to remove air and non-condensable gasses in the steam space.

### **-Vacuum breakers to secure system under vacuum conditions**

At the end of a routine production step, after closing the steam supply to the unit, steam inside the frame condenses because of the radiation losses. This triggers a vacuum. In such cases, vacuum deforms heating plates, steam distribution hoses or any other sensitive ancillary. Vacuum breakers eliminate such deformations.

### **-Special spray chamber with spring loaded variable area**

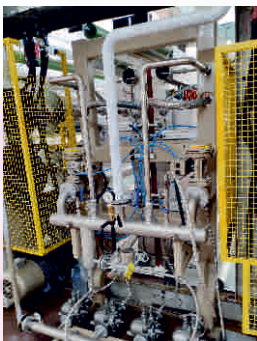
Steam has to be sprayed equally throughout the process media. If not, re-moisturizing performance should not be the same at the media cut-away. We design and manufacture the spray orifices. Spray control is very easy with spring loaded area control.

### **-Dead space drainage to eliminate water splash**

At the beginning of steam spraying, some amount of residual water should splash over the process media and should damage it. We designed dead space drainage system to eliminate such an undesired operation.

### **-Spray zone control**

You can control the spray zone depending on the media width. Standard zone control should be done by manual wheels provided on the skid. Automatic control is an option that we can provide.



### **-Perfect control of steam flow rate**

We size and select the best suitable control valves to precisely arrange the steam flow rate. Since we supply our control valves with SMART positioners, you can also run the valves from your DCS available. Standard input signal to positioners is 4-20 mA. An option for 0/10 V is possible.

### **-All in one steam trap modules for perfect condensate removal**

Condensate removal is very important for a satisfactory operation. By means of compact steam traps and a perfect mechanical design of the system, condensate removal is very easy and fast. Warm-up period is very short compared with the traditional steam traps. They have a very small foot-print and allow us to make maintenance without stopping the production.

### **-Compact design of the skid to fit in very tight spaces**

Mechanical design of the steel/stainless steel frame work carried out in accordance with your available space in the plant. We can design a unit where the clean width is only 1(one) meter and clear height is just 2(two) meters. Length of the unit depends on the maximum width of the process media. Approximately the frame length is 1 meter longer than your maximum product width. (Excluding steam header and steam trap set)

## OTHER PACKAGED UNITS TO SUPPLY

### *Silicone preparation and dosing systems*

In the coating industry, quality and stability of the silicone preparation is very critical. We design skid systems to produce silicone depending on your formulas. You would get the same mixture accuracy for each different formulae and create stability.

We provide PLC control unit with our skid. It's very easy to add/remove new formulas and to create new scenarios. It is also possible to change formulas and modify existing scenarios. Accuracy is less than 0,05%.

### *Liquid storage and transfer units,*

Glue, hot-melt, silicone or any other liquid. We can design, manufacture and provide skid systems to store and transfer liquids. We can control flow rate, weight and/or temperature depending on your requirements.

### *Clean Steam Generators,*

If you have an industrial steam boiler in your plant and you need clean steam for any of your special process, we are able to design and manufacture kettle type clean steam generators. We would deliver the unit with its' condensate tank, control panel and all the necessary accessories fitted over a skid.

### *Packaged Heat Transfer Units,*

Steam/Liquid or Liquid/Liquid. We can design heat exchanger packages and ship as a skid, ready to use. Depending on the media and thermal process details, plated or shell&tube type heat exchangers should be used.



### *Reactors, condensers and pressurized vessels,*

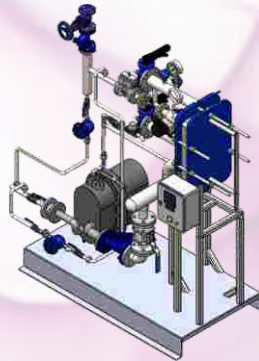
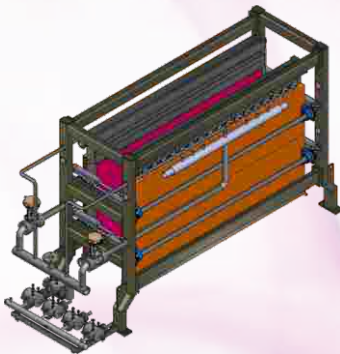
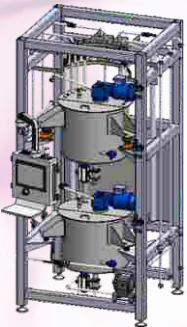
From 20 litres to 50.000 litres, we are capable to design and manufacture reactors, condensers, mixers, pressurised or non-pressurised vessels made of stainless steel and/or exotic metals.

### *Tailor-made design and production*

Our spectrum on skid-mounted process control units are not limited with a/m products.

Just call us for your specific needs to let us find an optimistic solution for you.

*Solutions..... Just one click away*



**Local Partner**

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