

# Tufting Solutions



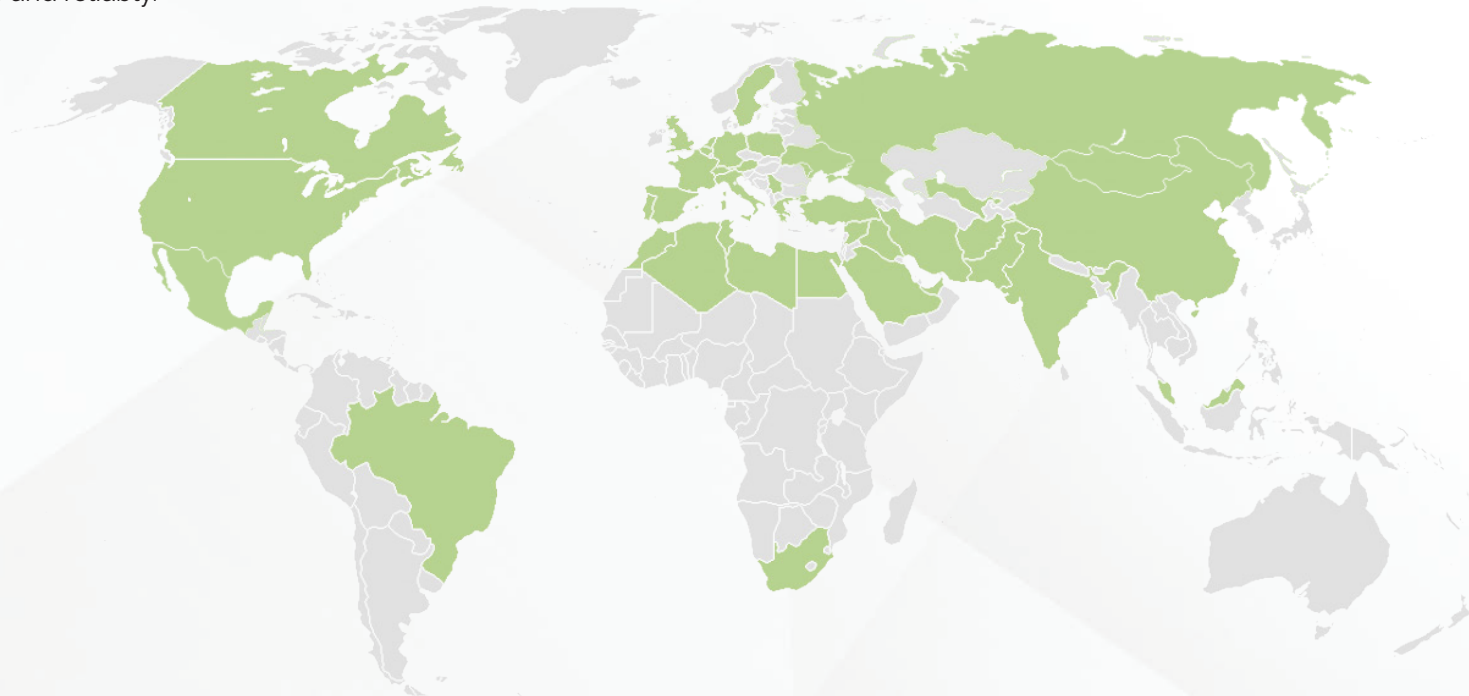
# About

**EFAB GmbH** is a high-tech company focusing on hand-tuft carpet robots and on design software for carpets & rugs.

Our expertise in industrial automation and CAD/CAM software development provides the competitive edge that our customers require for their carpet & rug production. For this reason, we continuously innovate and develop our know-how, services and products.

We offer our customers both innovative and high-quality products. 100% made in Germany serves as a guarantee for best quality standards – all components for our eTuft robots are sourced, built and assembled in Germany.

Our production facility and engineering department lay close to Düsseldorf, at the heart of Europe. From there we serve our worldwide customer base flexible and reliably.



# eSolutions

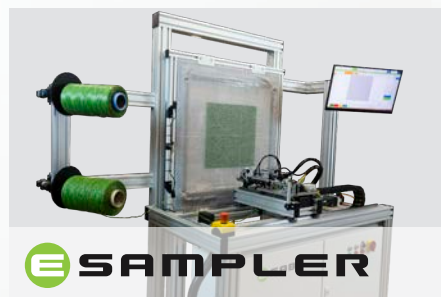
Continuously innovate and develop

With eSolutions, EFAB provides leading tufting solutions to the carpet & rug industry – innovative hand-tuft robots, pneumatic tufting guns or custom-made shearing machines and more belong to our comprehensive portfolio.

In combination with eDesigner carpet designing CAD/CAM software you will find with our tufting solution the perfect combination for creative and cost-effective carpet & rug production.

eSolutions are well-recognized in the market but still we are striving for improvement. New innovative features are launched by EFAB regularly bringing technological impulse to the industry.

Based on your demand we are engineering and developing the perfect solution for your carpet production.





eTufT Pro 3x4  
with aluminum structure



**eTuft** (Hand-tuft Robot) is an advanced robotic tufting machine for the production of fashionable tufted carpets and area rugs. This state-of-the-art robot is ideal to handle your single orders or ongoing mass production as well as sampling.

### General information

- Interchangeable tufting-gun mechanism
- Cut pile height 9-75mm (U-tuft or J-tuft)
- Loop pile height 4-55mm
- Production throughput: 1~6 Sqm/Hour
- Variable pile height (3D) tufting effects
- Nonstop cut-loop changeover
- Works with wide range of yarns: Wool, Viscose, Bamboo, Polyester, Fancy yarns, Nylon, Linen, Polypropylene, Cotton or their blends
- Rigid mechanical structure for high speed and accurate production
- Laser Pointer, synchronized with controller for precise positioning of the tufting head
- Camera on tufting head for easy repairing by machine
- Wireless Remote Control, improving the machine operator's efficiency, as eTuft can be operated from different spots
- Seamlessly integrated with eDesigner carpet design software
- Minimum ROI (Return on Investment) within one year (subject to the customer's production requirements and design complexities)



eTuft ECO Tower 4x6  
with Aluminum Structure



eTuft ECM-A 3x4  
with Aluminum Structure



eTuft MK-II 4x6  
with Steel Structure

## Interchangeable Tufting-Gun Mechanism

eTuft robots are equipped with an innovative Interchangeable Tufting-gun Mechanism.

EFAB's latest development – the unique interchangeable tufting head – combines the advantages of both mechanisms:

- Mechanical tufting gun can tuft on a variety of backing fabrics and produce very detailed or over-tufted designs with high densities in short pile height.
- The pneumatic gun can compensate for the supposed disadvantages by switching between cut and loop pile automatically (nonstop changeover), tufting with different pile heights (3D effects) or J-tuft.

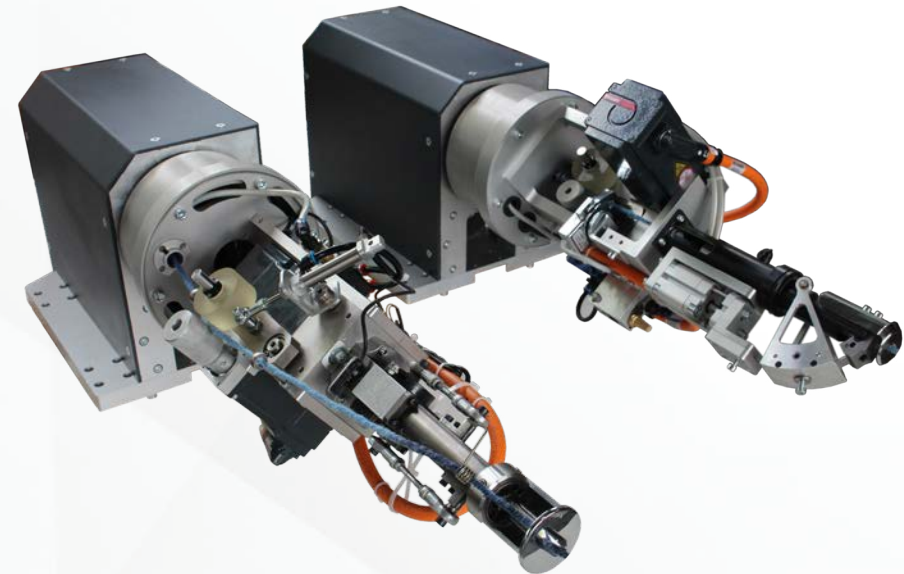
To benefit from both mechanisms, EFAB has invented an Easy Docking System: the operator can change the tufting gun to switch from mechanic to pneumatic easily by opening just 6 screws and without any electrical hassle.

### Pneumatic tufting gun

- Guillotine principle for cutting a wide range of yarns
- Loop pile: 5mm–70 mm
- U-tuft Cut Pile: 12-60mm
- J-tuft Cut pile: 15-100mm
- Various tufting needles: Ø4.8mm, Ø6mm, Ø8mm or Ø11mm
- Variable pile height accessories for 3D effects
- Nonstop Cut/Loop changeover

### Mechanical tufting gun

- Nonstop Cut/Loop changeover
- Y-Scissor cutting principle
- Loop pile: 4mm–15 mm
- U-tuft Cut Pile: 9-18mm
- Deliberate Over-tufting
- Tufting on a variety of backing fabrics



### Mechanical structure

- Carefully designed and built with German components.
- Rigid mechanical structure for high speed tufting without harmful vibrations.
- No floor preparation needed. eTuft robots can be relocated easily to meet your production needs.
- Over-engineered for excellent tufting quality and machine reliability (e.g. 4x linear units and 6x servo motors).
- Optimal penetration of tufting gun into the backing fabric by using high accuracy linear units which are driven by servo motors. (Versus other relatively primitive methods of pneumatic cylinder or manual adjustments.)

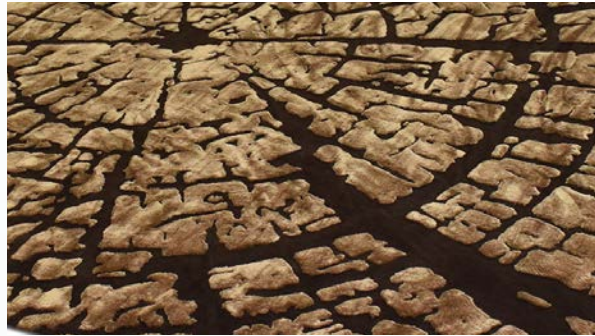
### Control Unit

- Electrical cabinet and control panel with eHMI (Human Machine Interface) software in German, English, French, Italian, Turkish, Chinese, Spanish, Portuguese, Russian, Persian or in any other languages upon request
- Dynamic Pressure Control Mechanism ensuring optimal penetration of the tufting gun into the backing fabric
- Laser Pointer, synchronized with controller for precise positioning of the tufting head
- Camera on tufting head for easy repairing by machine
- Touchscreen monitor
- Windows 10 Operating System



Mechanical tufting head with nonstop cut/loop changeover







## Comparison Chart



ECO Tower 4x6



ECM-A 3x4



MK-III 4x6

Construction	Tower	Gate	Gate
Structure	Aluminum	Aluminum	Steel
Rigidity	Medium	High	Very high
Vibration	Medium	Low	Very low
Dimension (LxHxW)	896 x 532 x 131 cm	730 x 440 x 230 cm	842 x 550 x 145 cm
Weight	~900 kg	~1250 kg	~2000 kg
Tufting Head	Pneumatic	Mecahnical	Pneumatic or Mechanical
Variable pile height effect (3D)	✓	✗	✓
Nonstop Cut/Loop Changeover	✓	✓	✓
Dynamic Pressure Control Mechanism	✗	✓	✓
Laser Pointer & Camera	✗	✗	✓
Wireless Remote Control	✗	✗	✓
Creel	Movable	Movable and Rotating	Fixed or Movable



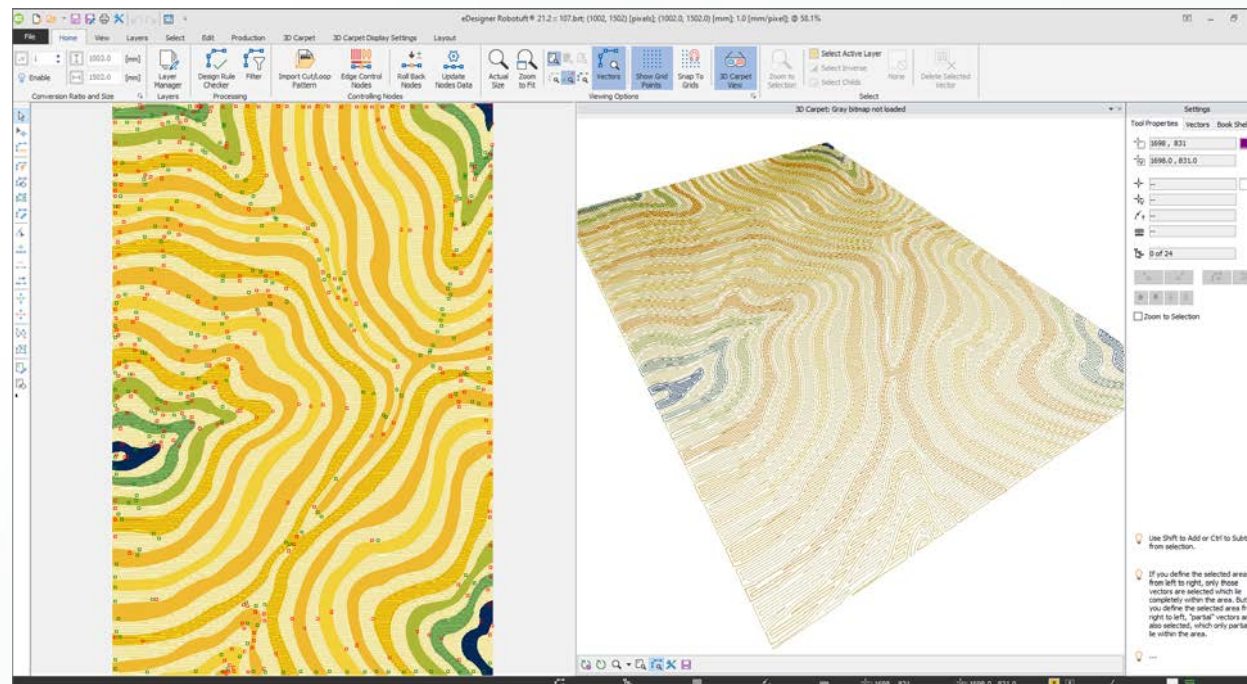
# eDesigner

## Carpet Design Software for robotic tufting

**eDesigner** - the most advanced carpet designing software in the market - meets all demands of professional carpet & rug designers. This comprehensive solution includes a flexible set of drawing tools and a great range of features that make designing easy and efficient.

Rug designers are free to prepare pixel-based designs which can then be converted to vector-based formats for robotic production. Vector and raster designs can be imported easily, and even digital images can be used: Color reduction functions and various drawing tools make it quick and easy to prepare a design.

All the difficulties for hand-tuft carpet design creation are eliminated and variety comes to your production.



eDesigner with Robotuft Add-on



# eDesigner

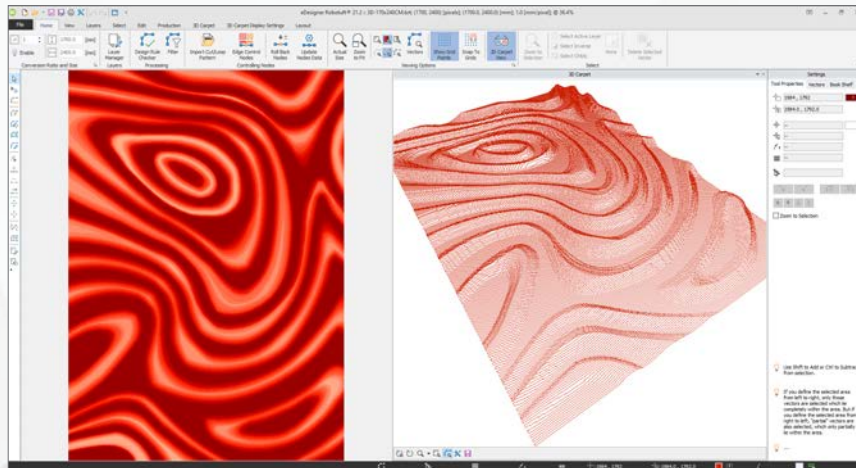
## Robotuft™ Add-on

The Robotuft™ Add-on of eDesigner is developed to increase the speed of designing as well as the accuracy and productivity of robotic tufting machines.

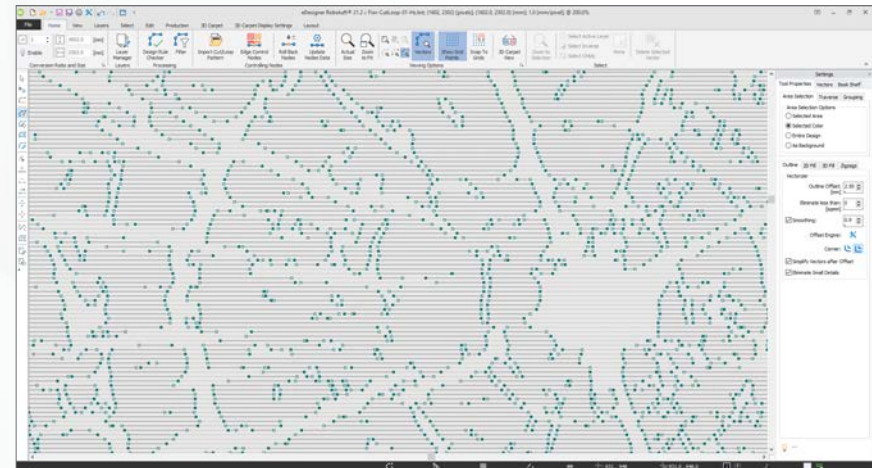
Accompanied with useful and handy functions, this revolutionary raster to vector conversion solution enables designers to create various designs for robotic tufting. With the unique 3D Plug-in, 3D effects can be designed which are tufted easily on the eTuft robot with various pile heights.

The software calculates and optimizes the paths for robotic moves, thus, speeding the tufting process significantly. Consequently, production time and its cost will sink.

The unique combination of eTuft (Robotic Tufting Machine), eHMI (HMI software for robotic tufting machine) and eDesigner (Carpet Designing CAD Software) brings maximum flexibility to custom made carpet & rug production.



3D Carpet Add-on



Smart Cut/Loop Add-on

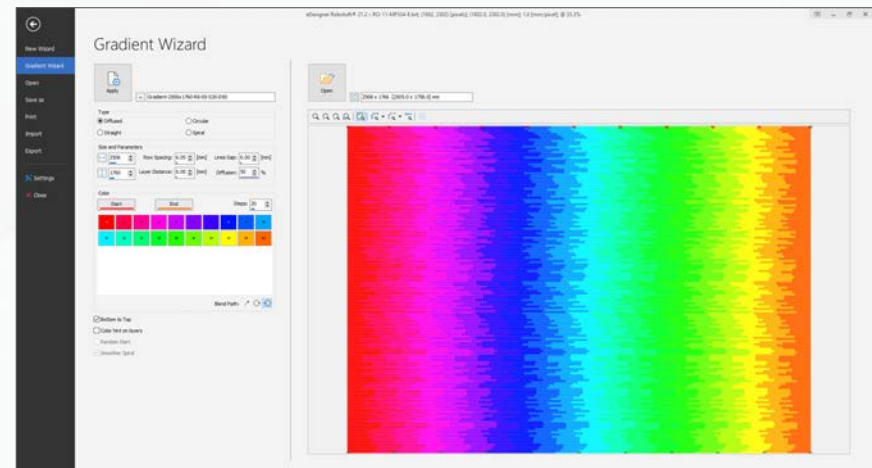
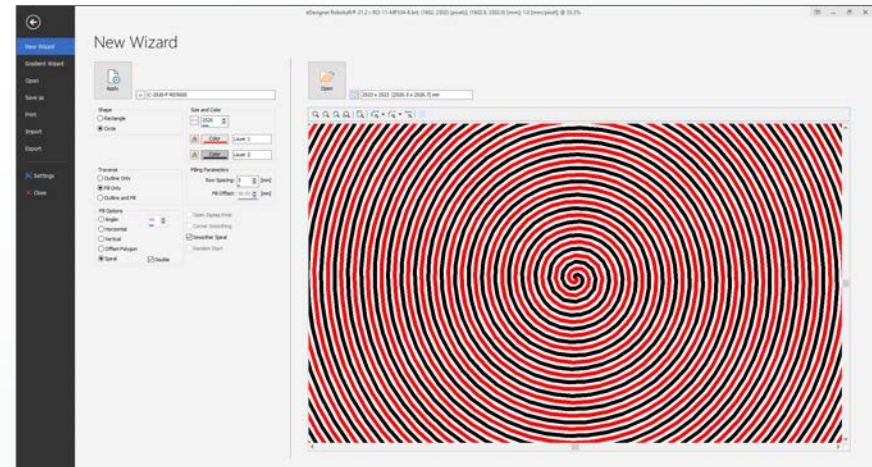
# eDesigner

## Features and Functions

Apart from its many designing tools and functions, eDesigner also optimizes the performance of the eTuft robot.

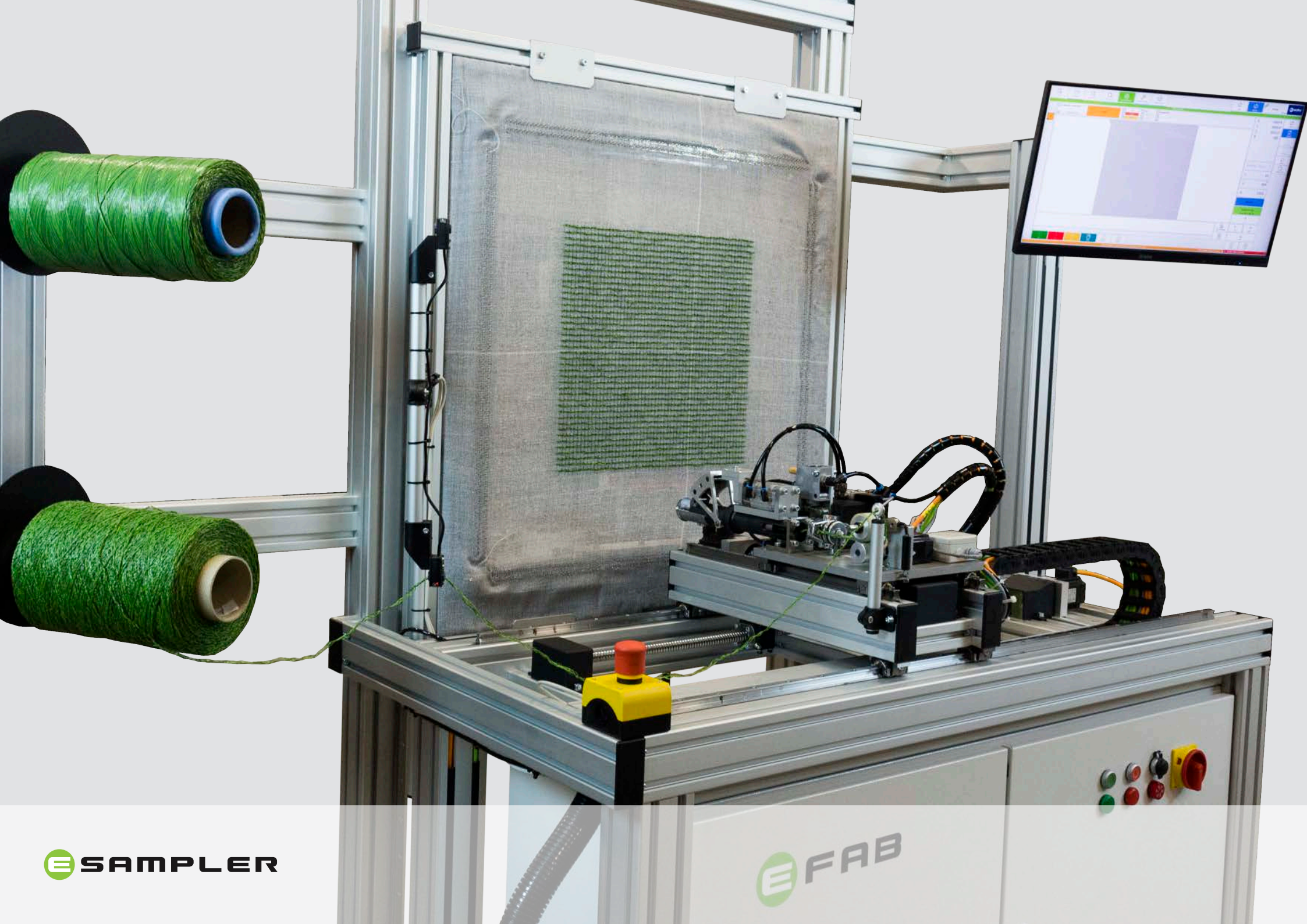
- Vectorizer tool with smoothing function (converting raster to vector designs)
- 3D Carpet designing Add-on
- Smart Cut/Loop Add-on
- Path Optimizer to optimize up to 60% of un-tufted moves
- Vector editing tools: Move, Join, Split, Reverse Direction, Extend, Fill, Offset, Measure, Pen, etc.
- Various filling algorithms: Zigzag in different angles, Offset Polygon and Spiral for optimized production
- Filtering functions for optimized production
- Yarn and material consumption calculations
- Production time calculation
- Preview of production process
- Import and Export to major Raster and Vector files: DXF, DWG, PLT, SVG, HIT, BMP, PCX, GIF, TIF, PNG etc.
- Export to machine coded files
- View raster and vector layers of the same design file at one place, with many viewing options
- Color-coded vectors with respect to the original design files
- Adding or replacing vector management rules
- Windows 10, 8.1, 7, Vista and XP compatible (32-bit and 64-bit)

For more information, please refer to our eDesigner brochure.



"New Wizard" and "Gradient Wizard" functions





**E**SAMPLER

**E**FAB



# eSampler

**eSampler** (Sample Tufting Machine) is a flexible sample tufting machine designed for preparing tufted samples in a few minutes from a single bobbin of yarn.

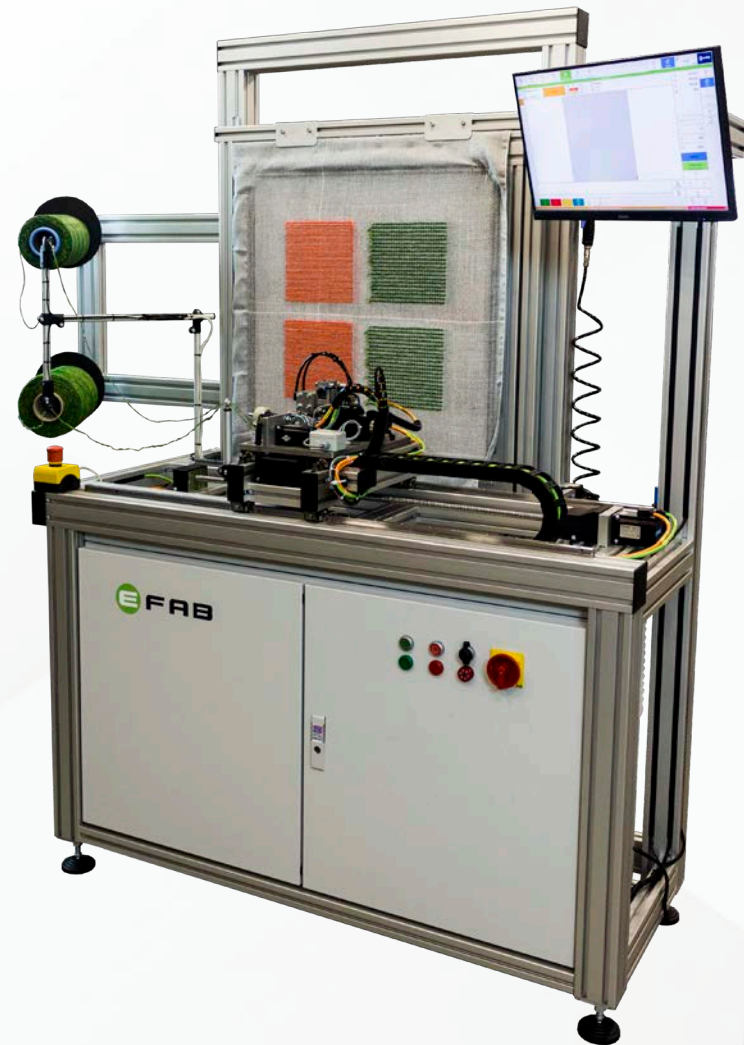
It is a flexible tool for preparing artificial grass or tufted carpets samples in any desired qualities. eSampler is an unique tool for yarn producers.

eSampler is equipped with our legendary pneumatic tufting head with guillotine cutting principle which is perfect for a wide range of yarns including Wool, Viscose, Polyester, Fancy yarns, Nylon, Linen, Cotton, Polypropylene, Polyethylene, Polyamide or their blends.

Changing the tufting parameters like stitch rate, gauge or cut/loop pile can be done in a few seconds through the eHMI software. Also there is no time consuming mechanical adjustments required for changing the pile height.

Samples will be tufted on the removable vertical frame. It means that the backing fabric of tufted samples will be kept under the tension for finishing and back coating.

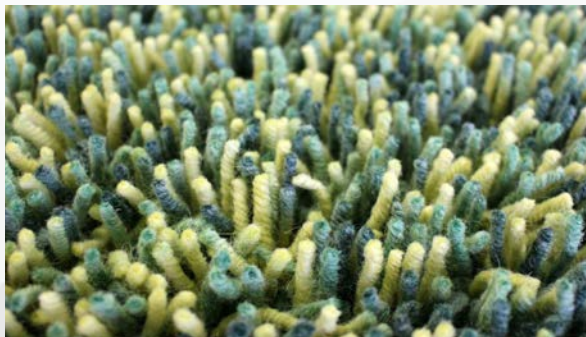
## Sample Tufting Machine





# eSampler

Samples tufted by eSampler





# eSampler

## Features

### General

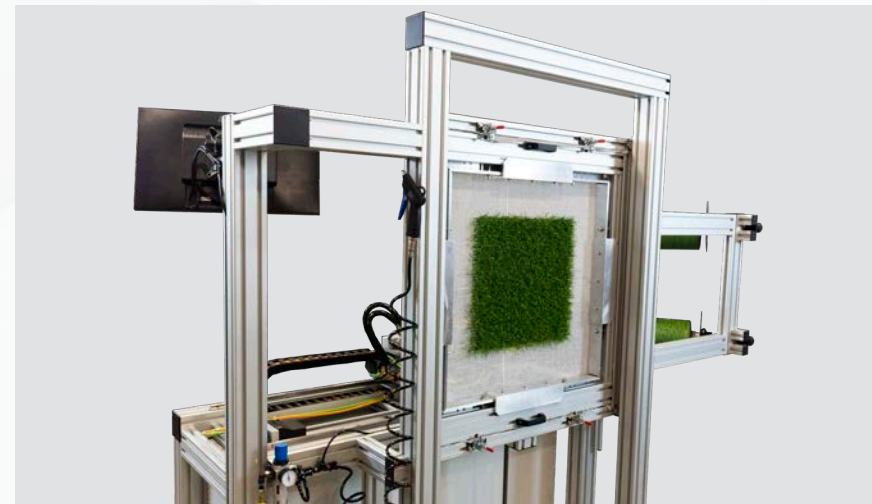
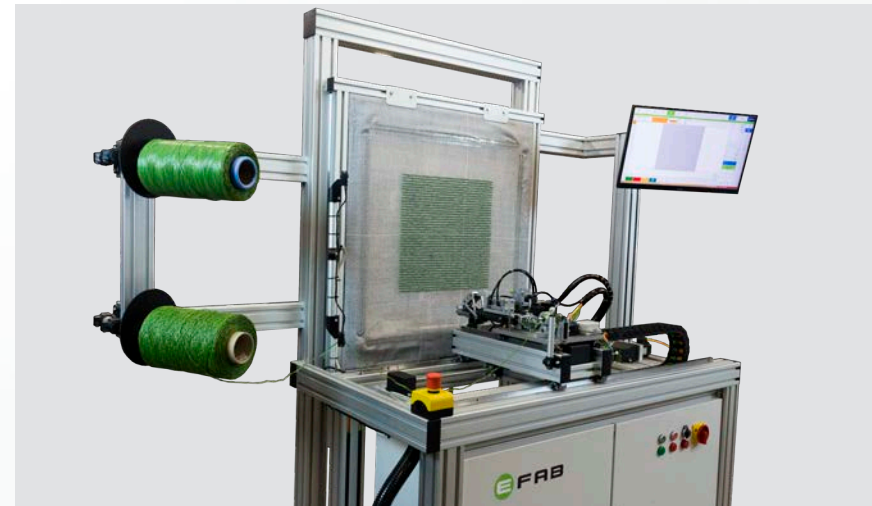
- Fast and Flexible
- Working with wide range of yarns (from very thin to very thick yarns)
- Any size of samples up to 50x50cm
- Removable tufting frame for easy finishing while the tufted sample is still stretched

### Tufting

- Up to 1200 stitches/minute
- Any gauge from 3 up to 30mm
- Any stitch rate from 100 up to 500 stitches/meter
- U-tuft Cut Pile: 12-60mm
- J-tuft Cut pile: 15-100mm
- Loop pile: 5mm-70 mm
- Various tufting needles: Ø4.8mm, Ø6mm, Ø8mm or Ø11mm
- Variable pile height accessories for 3D effects
- Nonstop Cut/Loop changeover

### HMI software

- Operating with eHMI multi-lingual software (German, English, French, Italian, Spanish, Portuguese, Russian, Chinese, Persian)
- Compatible with eDesigner software (supporting BRT files) for tufting complex 3D or Cut/Loop samples
- Touchscreen Friendly User Interface



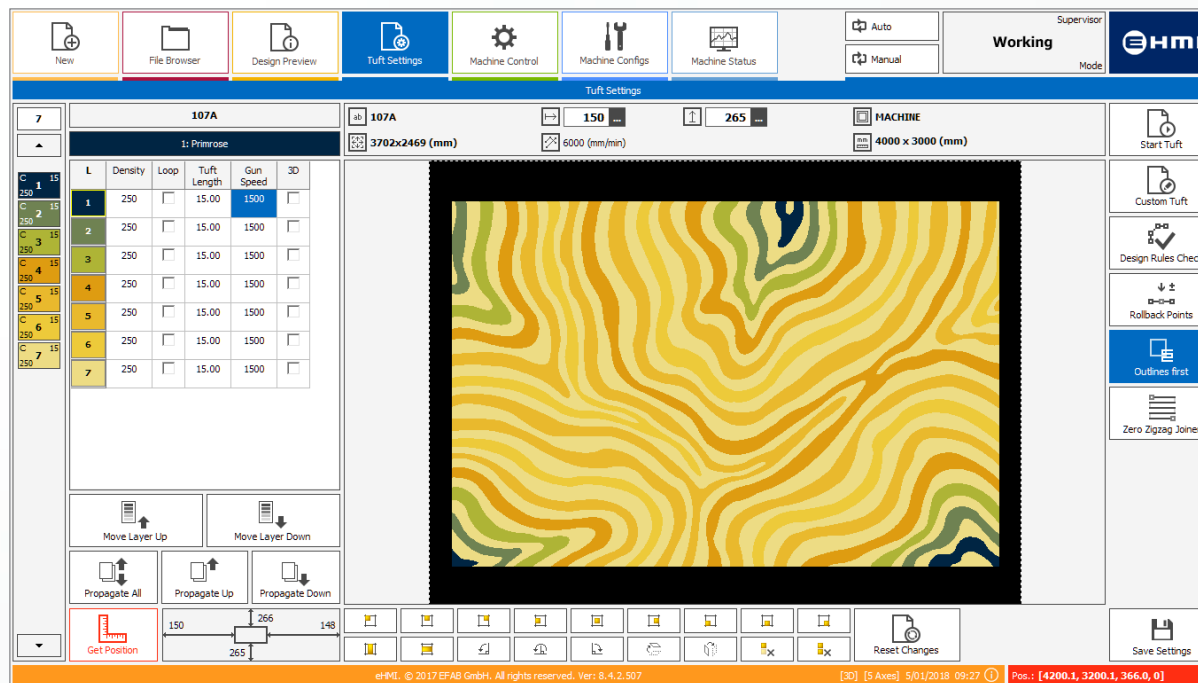




**eHMI** (Human Machine Interface) software is specially developed to ease the robot operator's tasks.

The advanced control unit of eTuft hand-tuft robots is powered by EFAB's own HMI software with a very unique GUI (Graphical User Interface) on a convenient touchscreen monitor.

This user-friendly interface utilizes advanced algorithms to handle the eTuft effectively. It provides special reports and controlling items to make the operator run the robot smoothly and efficiently.

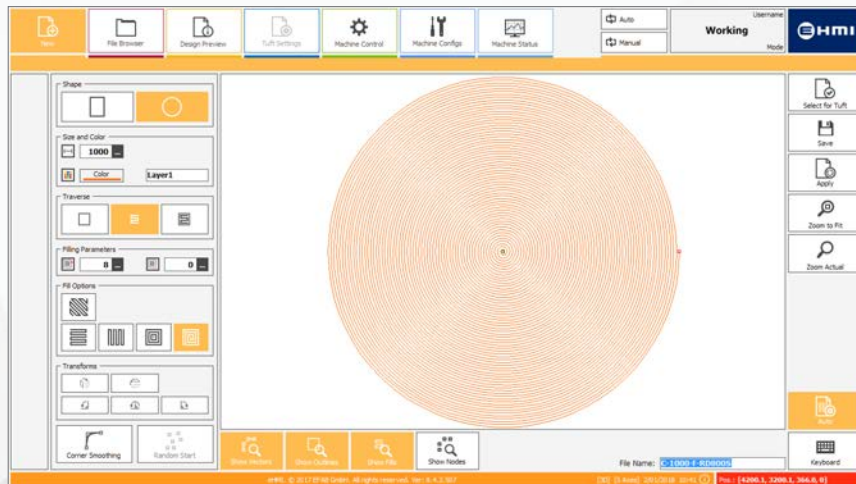


eHMI with unique multilingual Graphical User Interface  
Compatible with Windows 7

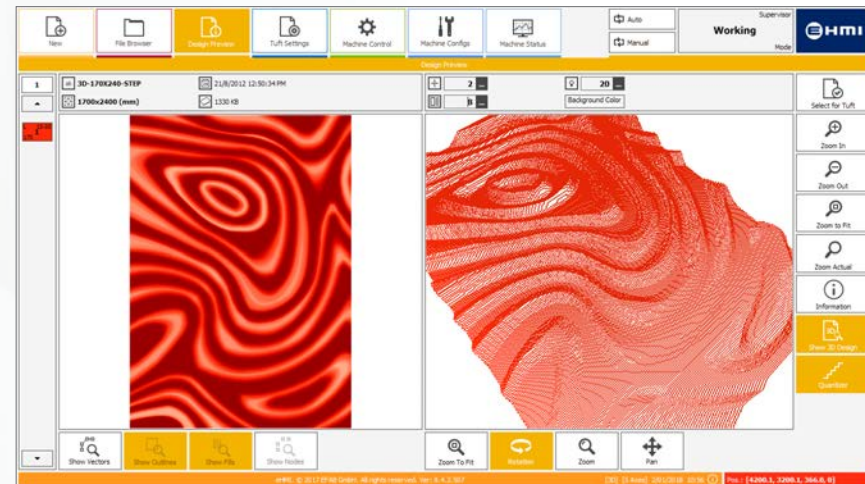
eHMI software has many capabilities and provides various useful functions to the operator:

- Creating simple designs
- File management
- Design previews
- Design selection and defining production schedule
- Preview of the tufting process and changing the order of layers
- Setting production parameters like speed and dimensions
- Ability to view the tufting process on the control unit while the robot is running
- And many more.

eHMI is available in different languages. It can also be adapted to your language requirements on demand.



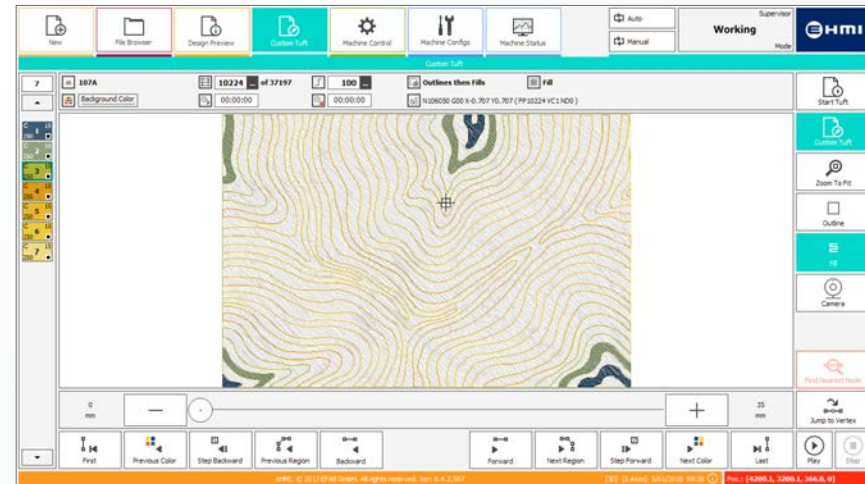
New Design Wizard



Design Preview in 3D



- Touchscreen Friendly User Interface
- Multi-lingual (German, English, French, Spanish, Portuguese, Italian, Turkish, Persian, Chinese, Russian)
- Transfer of designs to eTuft by one single file instead of several files. (The relevant machine codes are generated by the control unit, an automatic process transparent to the operators.)
- New Design Wizard for creating simple designs on the robot (ideal tool for sampling or plain carpets).
- Monitoring reports: progress rate, remaining process time for each color, remaining time for total process, tufting speed, etc.
- Set production parameters: Pile Height, Density, Cut and Loop mode, Min/Max of tufting speed, Overall speed, etc.
- Design preview both in Raster and Vector format
- Production time calculation for production planning
- Ability to change and move design positions
- Ability to rotate or flip designs
- Preview production process
- Synchronized Laser Pointer and Camera for precise positioning
- USB and Network support
- Windows 7 and XP Embedded compatible
- Fully compatible with eDesigner CAD software



Custom Tuft option for start tufting from desired point

**eHMI** software and **eTuft** robot form a seamlessly integrated tufting system which is fully compatible with **eDesigner** Carpet Designer CAD software (supporting 3D and smart cut-loop designs).

With these three innovative developments, EFAB provides you a complete robotic-tufting solution.





# eMonitor

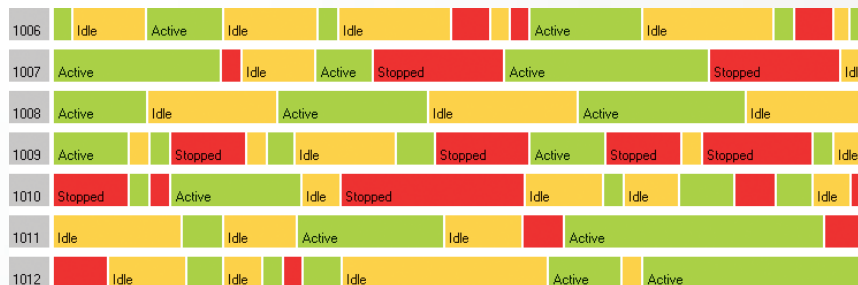
## Monitoring Software for Hand-tuft Robots

**eMonitor** is an advanced software solution which enables managers to monitor production statistics for eTuft machines.

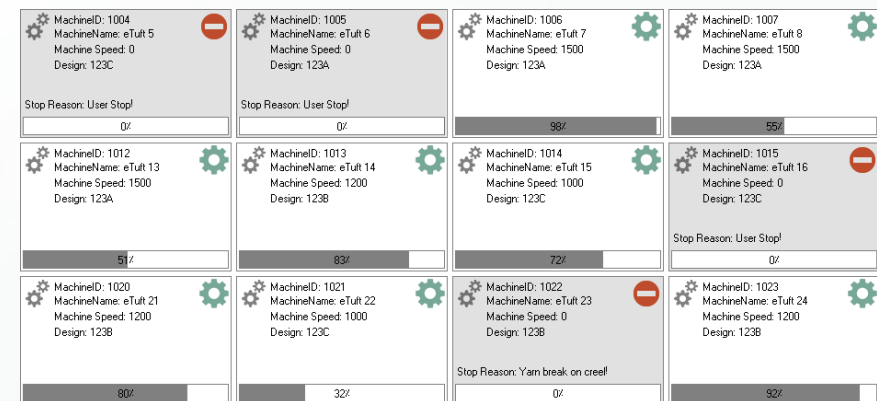
This software not only provides the required data at real time, but also generates technical reports for further analysis and future actions:

- Recording all machine activities
- Analyzing stop times
- Personnel activities and their log-ins to the robots
- Production reports
- Monitoring status of each machine
- Tracking machines' statuses within a period of time
- Calculating production efficiency
- and ...

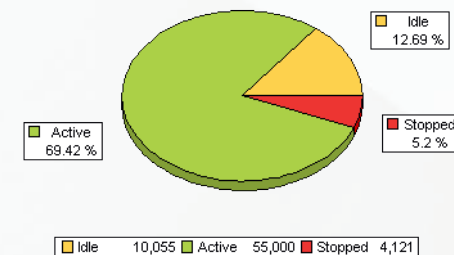
Timeline Report is the result of an automatic machine activity calculation based on user-defined time intervals. This report lets decision makers monitor their whole production line during certain intervals. They can gain important information about their productivity (machine efficiency etc.) for different collections and designs.



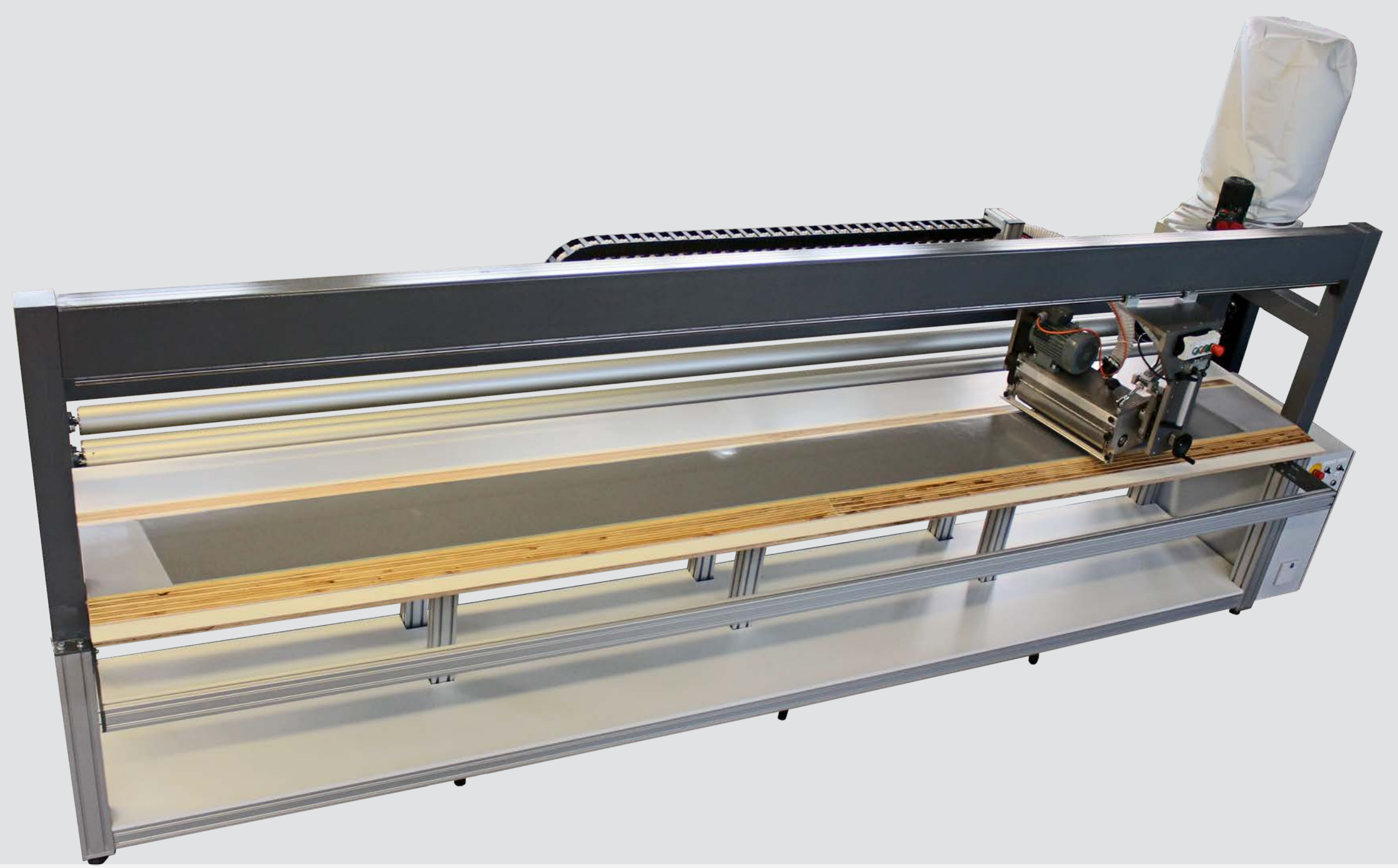
Plant View is a real time analysis tool in eMonitor. In this color-coded layout of the plant, the robots are pictured in specific colors, each color indicates a certain machine status or alarm condition.



So only by viewing the colors you can notify the machine status and take action if needed.



Production planning and pricing can thus be carried out based on valid analysis and performance figures.





# eShear

**eShear** (Stationary Carpet Shearing Machine) is a high quality and heavy duty machine designed for large scale carpet production. With eShear carpet shearing is exponentially faster and more accurate than with small handy shearing machines, while it is easy to operate.

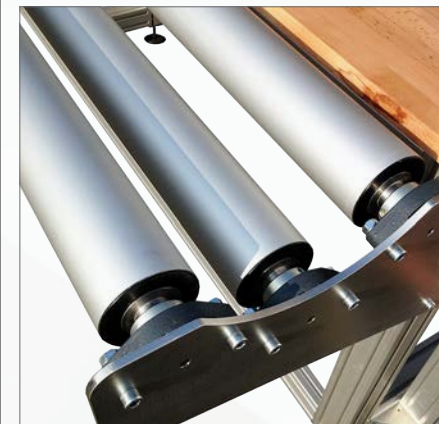
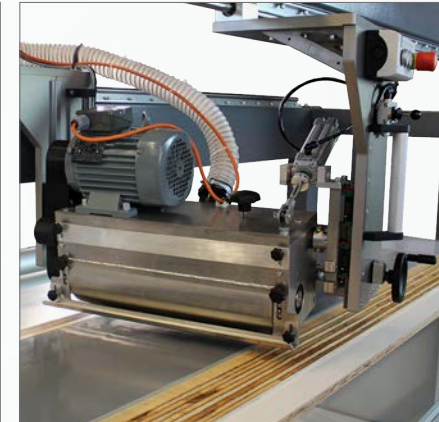
Comparing to other stationary carpet shearing machines, eShear is equipped with:

- Double Slider mechanism for easy and smooth traveling. Avoiding unwanted shearing head's slants caused by operator's hand pressure.
- 12 Spiral blades with 36cm width for higher quality shearing.
- Pneumatic actuator for lifting up the shearing head.
- Anti-grabbing mechanism.

eShear can be customized to your needs by choosing from:

- Different Active Shearing width (300 - 650cm)
- Adjustable shearing depth with 0.1mm accuracy
- Wide shearing spirals (36cm or wider on request)
- Automatic carpet feeder for big and heavy carpets
- Carpet Un-roller on the back for easy un-rolling of small rugs
- Carpet Holder in front
- Carpet Collecting Tray on the bottom
- Adjustable shearing speed for great results with fine yarns
- Powerful Vacuum unit with easy removable collecting bags

## Stationary Carpet Shearing Machine







## Pneumatic Hand-tufting Gun

**eGun** (Pneumatic Hand-tufting Gun) is a pneumatic tufting gun that can change between cut and loop easily in a few seconds. Its guillotine cutting principle is perfect for a wide range of yarns including Wool, Viscose, Polyester, Fancy yarns, Nylon, Linen, Polypropylene, Cotton or their blends.

The heavy duty and long life eGun needs only low maintenance. Thanks to its guillotine cutting principle, the cheap and long-life blades can be sharpened by yourself several times easily.

### Features

- Guillotine cutting principle
- Easy cut-loop changeover in a few seconds
- Cheap and durable blades
- Long-life and heavy duty
- Low maintenance



EG11 Hand-tufting Gun

Three models available for different yarns and pile heights.

### EG06 and EG06s (for short pile heights)

- Needle diameter: Ø6mm
- EG06 Cut pile height: 16–33mm / Loop pile height: 12–50mm
- EG06s Cut pile height: 13–17mm / Loop pile height: 8–13mm
- Speed: 2000 stitches per minute
- Weight: 3.5 Kg
- Air pressure: 7~8bar, 200 lit/min
- Power consumption: 500 Watt

### EG11 for thick or felted yarns

- Needle diameter: Ø8mm or Ø11mm
- Cut pile height: 33–75mm (U-tuft or J-tuft)
- Loop pile height: 25–50mm
- Speed: 1500 stitches per minute
- Weight: 6 Kg
- Air pressure: 8bar, 300 lit/min
- Power consumption: 500 Watt



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