



CARPET.BACK COATING SYSTEMS SECONDARY BACKING ACTION BAC, JUTE - EMBOSSED GEL FOAM BACKING

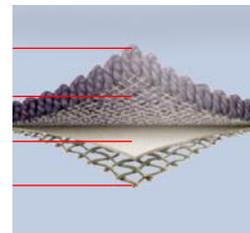


SECONDARY BACKING SYSTEMS FOR ...

ACTIONBAC JUTE or FELT

1. Direct application of a "pre-coat" onto the back of the carpet
 - The pre-coat is needed for a good tuft lock and also determines the stiffness of the carpet.
2. Latex foam with lower level of filler is applied on top of the pre-coat
3. Layer of secondary backing is joined together with lamination rollers.

face yarn
 primary backing
 SBR latex coat
 secondary ActionBac



SBR LATEX PRE-COATING UNIT

- roller over roller
- adjustable pressure or gap
- rubbing function
- level control



LATEX FOAM APPLICATION

- roller over table
- adjustable pressure or gap with digital read-out
- rubbing function for excellent penetration
- automatic level control of foam
- automatic control of the application width



LAMINATION UNIT

- for secondary backing with pneumatic pressure control

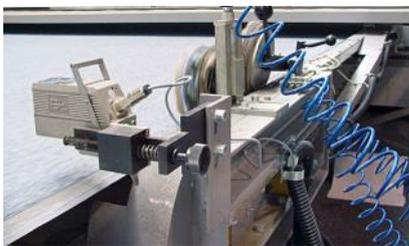


FEEDING UNIT

- for secondary backing with width control

DRYER

- Individual temperature setting between top and bottom
- Filters can be cleaned from outside
- MAXON gas burners or steam heat exchanger
- Round or slot type nozzles
- Frequency controlled fans
- Moisture control of exhaust air
- Scanning pyrometer for carpet temperature measurement



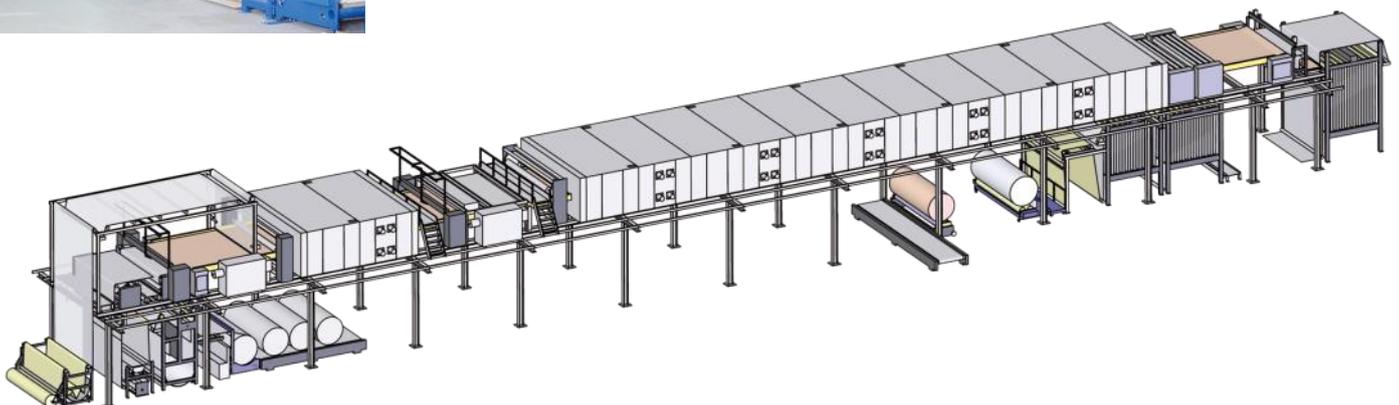
STENTER.KENYON or BRUECKNER

- Individual width control for each compartment
- Carpet floor detection



EXIT and ROLL-UP

- Accumulator with electrical weight compensation
- Space for shearing heads
- Inspection area



GEL FOAM BACKING SYSTEMS

Ammonium Acetate Gel Foam (AAG) together with a gelling agent and a vulcanization agent is used as secondary backing.

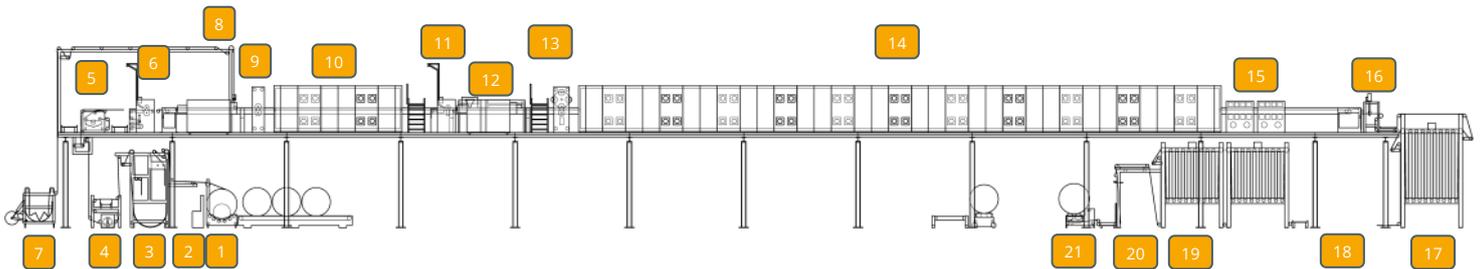
Between the pre-dryer and the main vulcanization dryer there is the embossing station which gives a structure to the backing.

Embossed gel foam has:

- a very good mechanical quality
- good water resistance
- a no-slip effect



An **infrared gelling unit** (gas or electrically heated) and a pre-dryer are used to create a skin on the gellified backing.



- | | | | | | |
|---|-----------------------------|----|-----------------------------|----|-----------------|
| 1 | Carpet unrolling | 9 | Lamination | 16 | Edge cutting |
| 2 | Sewing machine | 10 | Pre-dryer | 17 | Accumulator |
| 3 | U-Box | 11 | Latex applicator / Gel foam | 18 | Inspection area |
| 4 | Steamer | 12 | Infrared zone | 19 | Accumulator |
| 5 | Kiss coater | 13 | Embossing station | 20 | Guiding frame |
| 6 | Latex pre-coat | 14 | Dryer | 21 | Winder |
| 7 | Unrolling secondary backing | 15 | Cooling zone | | |
| 8 | Guiding secondary backing | | | | |





**Infrared Curing -
The smart Way of PVC Backing**

- **Carpet Tiles**
- **Entrance Mats**
- **Runners and 2 m/6 ft wide
Broadloom Carpet**

CARPET.TILE & MAT BACK COATING SYSTEMS

PVC.BACK COATING LINE ...

ZIMMER's Tile Back Coating Line (TBCL) with its infrared curing oven is the most efficient and revolutionary PVC coating line for carpet tiles, mats and runners available in the market.

Infrared with the matching wavelength is a highly effective method to jellify PVC plastisol. Almost the complete energy is absorbed by the PVC and the curing time is much shorter in comparison to ovens with oil or gas heated plates. One major advantage is that IR emitters heat-up and cool-down very fast and therefore the process is much more flexible for short runs.

Due to its modular concept the line can be built for runners and mats (using a single layer of PVC) or a line for carpet tiles using 2 layers of PVC and a glass scrim in the center.

Latest technology and control systems makes the line reliable and productive.



TBLC.PROCESS

Carpet Tiles

A first layer of PVC paste is applied on a Teflon conveyor belt.

Onto this PVC layer a scrim of glass fiber is laminated (enforcement). A second layer of PVC (top layer) is added onto the scrim.

Mats

A layer of PVC paste is applied onto the Teflon conveyor belt.

Mats are manually positioned onto a conveyor belt which gently positions the mats onto the PVC layer.

The whole construction is moving into the infrared curing oven followed by a cooling zone and a roll-up unit.

Runners

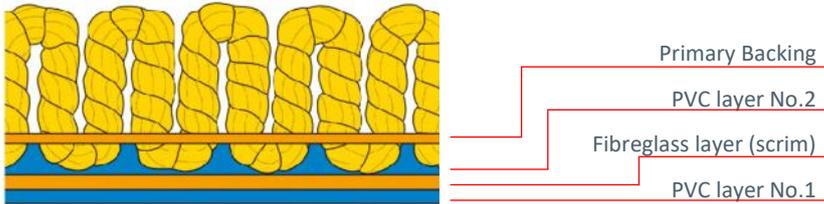
A layer of PVC paste is applied onto the Teflon conveyor belt.

The carpet is put onto the layer of PVC and merged together by a nip roller.



CARPET TILE MANUFACTURING

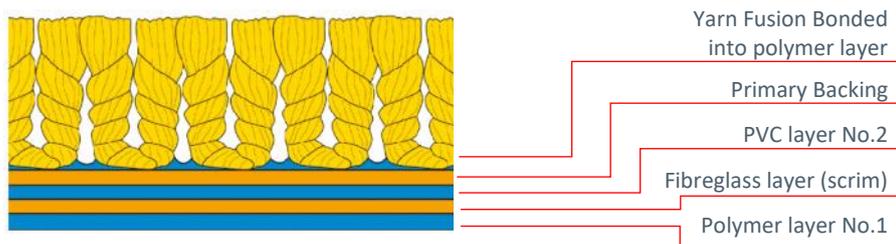
STARTING FROM TUFTED CARPETS



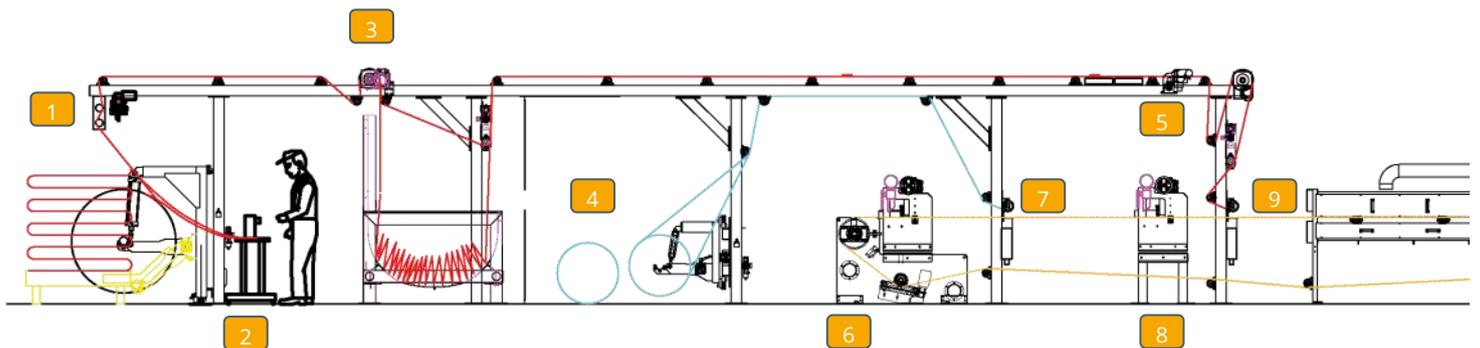
- Tufting of a carpet
- Pre-coating the tufted carpet with a special emulsion of EVA or NBR pre-coat
- Back coating on a tile back coating line
- Tile punching



STARTING FROM FUSION BONDED CARPETS



- Bonding of a carpet
- Back-coating on TBCL
- Tile punching

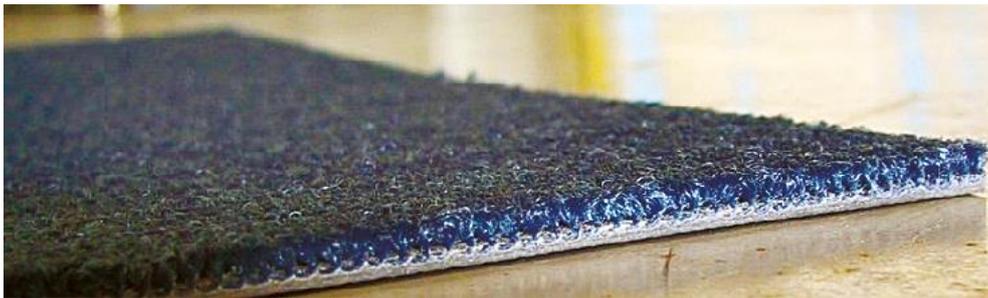


BACK.COATING with PVC

A PVC plastisol is a plastic, consisting of a polymer resin in homogeneous solution in a plasticizer oil. It can be compared with a solution of salt in water. The plastisol paste does not contain any water!

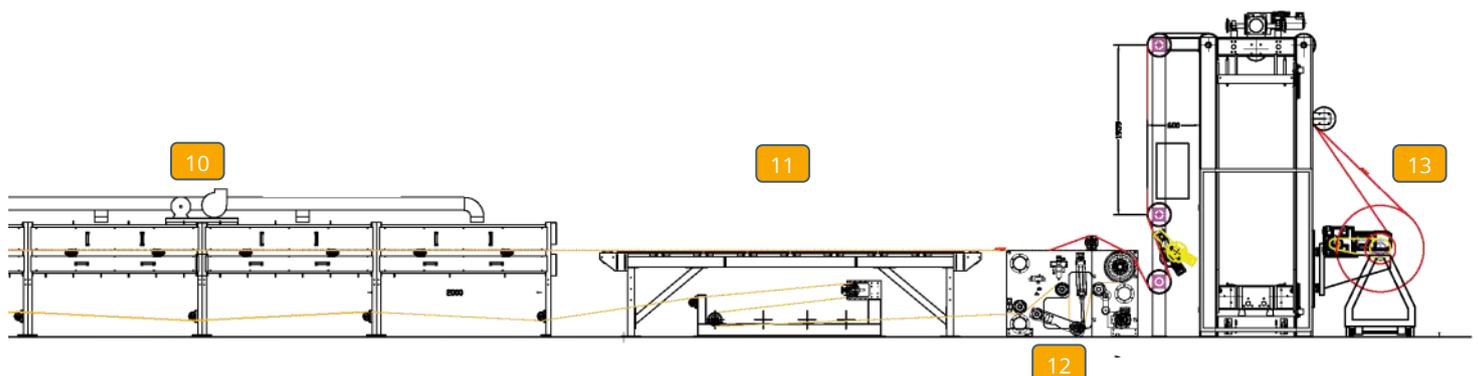
In “wet” state it appears itself as a paste. It can be spread out easily, and scraped into a layer on the backside of the carpet.

In “dry” state it appears a firm plastic film or layer, tightly bonded to the carpet. It gives the carpet a mechanical strength, a dimensional stability, a flat-lying capacity and a certain weight.

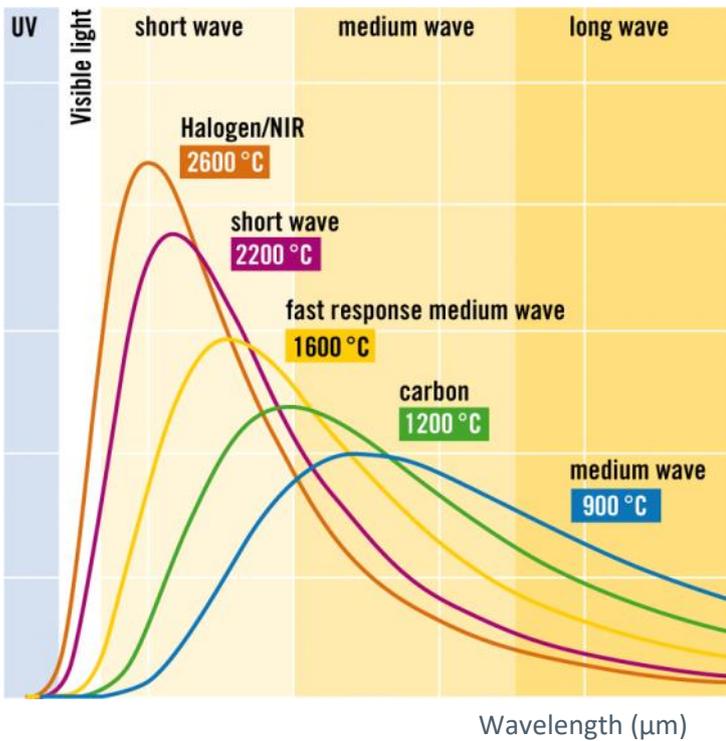


LINE LAYOUT and COMPONENTS

- 1 Carpet unroll unit with synchronized drive and edge guiding
- 2 Sewing machine
- 3 Pull roller with servo drive for carpet for a tension free „lay-on“ of the carpet onto the PVC layer
- 4 Scrim unroll unit with pneumatic lifting and manual side adjustment
- 5 Relaxing Infrared zone
- 6 Applicator for PVC layer 1
- 7 Nip roller for scrim
- 8 Applicator for PVC layer 2
- 9 Nip roller for carpet with precision gap adjustment
- 10 Infrared curing oven with Pyrometers for temperature control
- 11 Cooling panels for contact cooling
- 12 Conveyor belt assembly with master drive, belt tensioning and belt guiding unit
- 13 Winder for pile out winding - max. diameter 1,200 mm



INFRARED. TECHNOLOGY



RADIATION. OVEN

Jellification is the physical process of enhancing the complete solution of resin molecules absorbed within the oil molecules into a solid jel-like state under influence of heat. The result is an irreversibly solidified plastic material.

The process of jellification requires the addition of heat energy for a certain period of time.



INFRARED. CURING THE SMART WAY

4 times more energy efficient than the classical hot-air oven, resulting in a lower energy bill.

IR waves are heating up the medium and not the air and housing of the oven.

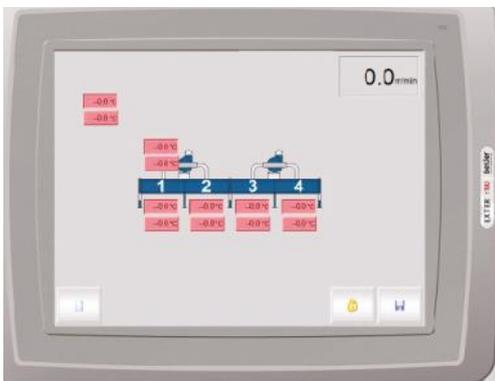
A shorter line is sufficient at a given production capacity.

No investment in boiler, thermal oil and piping.

No waiting time during start-up and shut-down
- the line is ready within minutes rather than hours.

It allows unlimited stops and restarts without affecting the quality of jellification.

Pyrometers, Thyristors and servo drives in combination with latest PLC technology are used to control temperature speed and the process.



PVC.BASICS

PVC is an environmentally friendly material. PVC production and processing require comparatively few fossil fuels and resources (57 % of PVC consists of native rock salt available in virtually unlimited amounts, oil comprises the other 43 %). PVC construction products are light, low-maintenance, long-lasting, recyclable and are thus environmentally friendly.

PVC is a high-quality, versatile material. Products made of PVC are resistant to weather, oil and UV radiation. Finished products are flexible or resistant to mechanical shock and can be pigmented in any color. The material has absolutely no adverse effects on health. The versatility of PVC allows it to be used for a wide range of products.

PVC is a crucial material. PVC constitutes some 30 % of all plastics processed world wide. It is thus among the essential materials for industry and trade. The main PVC consumers by industry: construction, packaging, electronics, cables, automotive, transport, furniture, office and others. PVC sales are increasing world wide.

PVC is a safe material. PVC is less flammable than most other materials and thus is a factor in fire prevention.

PVC has no adverse effects on health. Today, PVC production and processing is not a health hazard to workers or consumers, according to the German Federal Ministry of Environment. PVC is used for medical equipment and engineering, food packaging and transport piping for drinking water. PVC is a crucial factor in modern medicine (blood pumps, blood bags, intravenous tubes, etc. consist of PVC). PVC is the only material authorized for use as blood bags.

PVC paste production generally comprises the following stages:

- Dosing of the individual components
- Stirring, dispersing/homogenizing PVC and plasticizers
- De-aerating and screening (filtering)

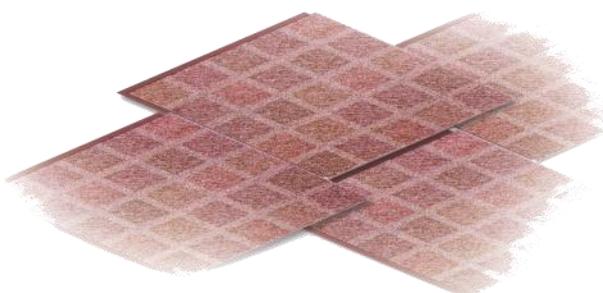
Depending on the available equipment, some of these stages may be performed simultaneously. For example, pastes can be readily de-aerated during the homogenization stage, or pastes can be screened on in-line filters during pumping.



PVC BACK COATING LINE FOR MATS, RUNNERS AND CARPET TILES

Technical Data

Carpet and scrim width max	2,100 mm
Production speed	2 - 6 m/min. with 12 m woven
Mechanical speed range	0.5 - 10 m/min.
Application system	Doctor knives
Type of backing	PVC paste (plastisol)
Curing system	IR - Elements for a temperature range of 50° - 220° C (belt temp.)
Cooling system	Water chilled plates
Electrical connected load	450 kW
Power consumption per kg PVC	~ 0.2 kWh/kg of PVC compound





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