

**Single Stage  
Sandwich Nonwoven**

**GRILON<sup>®</sup>**  
**EMS**

# Single Stage Sandwich Nonwoven

The durable nonwovens market continuously demands new products that can be produced more economically yet offering new features and higher performance. Increasing importance, therefore, will be given to multi-layered constructions called sandwich nonwovens.

With such multi-layered nonwovens, it becomes possible to optimize characteristics such as tenacity, volume, softness and color to meet individual market and application needs. For example, a sandwich nonwoven having a different fiber type on the top, in the middle and on the bottom can be produced in one step.

The following explanation presents a single stage production process which can be implemented on most carding lines equipped with a crosslapper. This process is ideal in cases where sandwich nonwovens are only occasionally manufactured.

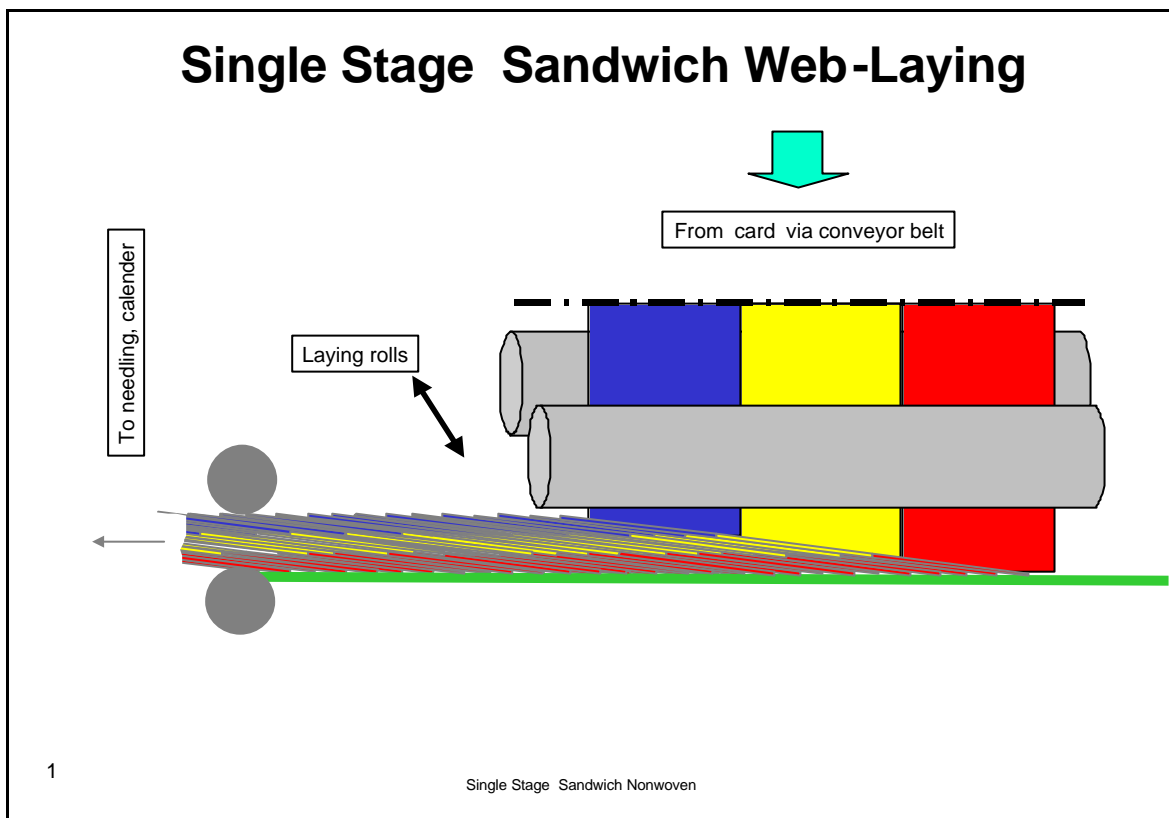


Figure 1

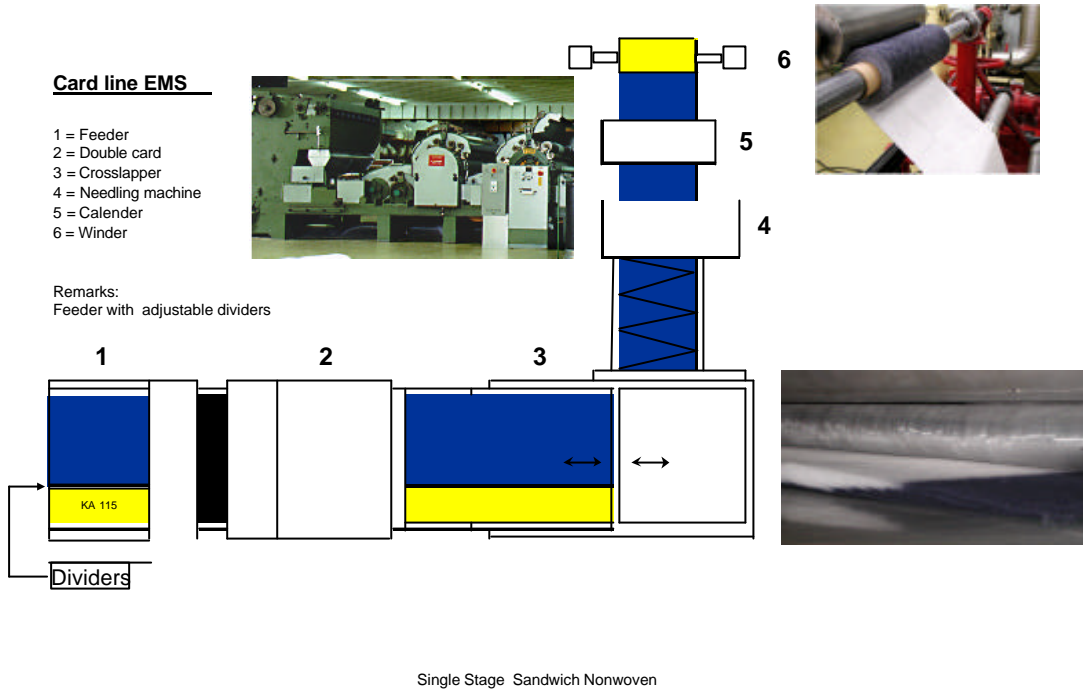
During the lay-down process of a production line equipped with a card and a crosslapper, one side of the carded nonwoven will always be on the top and the other side on the bottom after cross laying (Figure 1). This fact led to the idea to parallel feed two or three different fiber types into the card. One can therefore simply produce a multi-layered nonwoven construction in a single step.

# Principle Trials at EMS

## Card line EMS

- 1 = Feeder
- 2 = Double card
- 3 = Crosslapper
- 4 = Needling machine
- 5 = Calender
- 6 = Winder

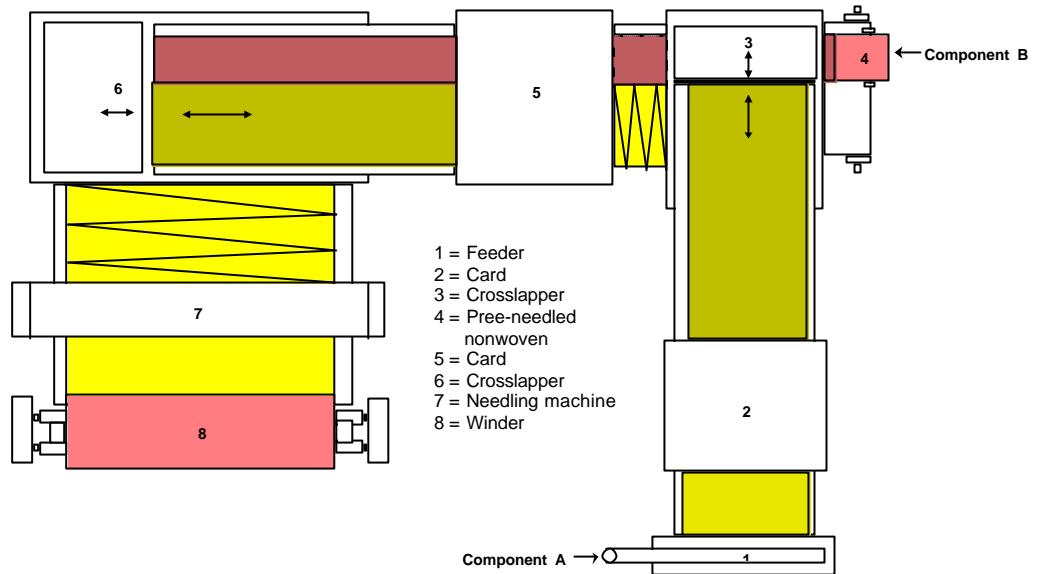
Remarks:  
Feeder with adjustable dividers



**Figure 2**

Figure 2 shows the Fibers Technical Service Center of EMS-GRILTECH in Domat/Ems, Switzerland where principal trials of the sandwich nonwoven process were conducted. A divider was used to separate the card line feeder into sections. This allowed two different colored fibers to be carded side by side. After the cross-laying process was completed, the multi-layered nonwoven was needled and thermally bonded.

## Sandwich Nonwoven with PMC Manufacturing Process




3

Single Stage Sandwich Nonwoven

**Figure 3**

On two stage carding lines, as normally used in the paper machine clothing industry, a second or possible third component can be fed to the second (finisher) card as a pre-needled nonwoven. A major advantage of this technique is that sandwich nonwovens can be manufactured in widths up to 14 m.

## 2 & 3 - layer Sandwich Nonwoven



			Function
20%	80%		Needled nonwoven for laminating to base fabric
KA115 11 dtex	70%: TM 5000 100 dtex 30%: BA 140 30 dtex		
30%	70%		Nonwoven for laminating to yarn or monofilament
KA115 4.2 dtex	60%: TM 5040 44 dtex 40%: BA 140 30 dtex		
70%	30%		Calendered nonwoven for laminating to a membrane.
70%: TM 5000 67 dtex 30%: BA 140 30 dtex	BA 140 8dtex		
20%	60%	20%	Needled nonwoven with for laminating to base fabric.
KA 115 11 dtex	TM5000 100 dtex	TM 5000 17 dtex	

4

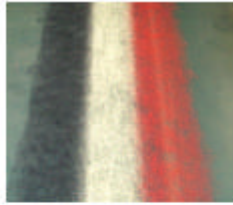
Single Stage Sandwich Nonwoven

**Figure 4**

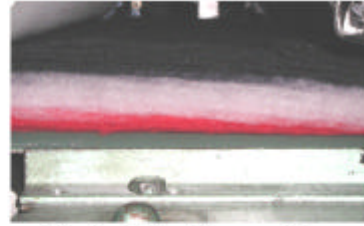
Under the trade name GRILON, EMS-GRILTECH offers a wide range of polyamide, copolyamide, and copolyester fibers available in mono- and bi-component constructions. These fibers are available in counts from 1.7 dtex up to 100 dtex.

Examples of how GRILON fibers can be used in high performance sandwich nonwovens are illustrated in Figure 4.

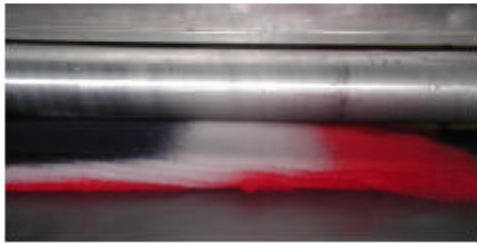
## 3 - layer Sandwich Nonwoven



Feed crosslapper



Feed needling machine



Laying carriage and delivery belt



Needled Nonwoven

5

Single Stage Sandwich Nonwoven

**Figure 5**

To illustrate the process to produce a single stage sandwich nonwoven, a three-layered construction was produced by using black, red and white fibers. The individual steps, from feeding of the cross-layer to the finished good, are shown in Figure 5.

EMS-GRILTECH, an innovative partner for the paper machine clothing, apparel interlining, durable consumer and automotive industries, has discovered a new method for the production of multi-layered nonwovens. Our active research and development in fibers and application techniques continues to create new products with the promise of opening new markets. First class service for customers is our main goal.

Alfred Weiss  
Josef Freitag  
EMS-GRILTECH  
AWT / F+E  
[www.emsgriltech.com](http://www.emsgriltech.com)

# EMS-GRILTECH world-wide

www.emsgriltech.com

info@emsgriltech.com

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## Switzerland

EMS-GRILTECH

a unit of EMS-CHEMIE AG

Via Innovativa 1

CH-7013 Domat/Ems

Phone: +41 81 632 72 02

Fax: +41 81 632 74 02

E-Mail: info@emsgriltech.com

## North America

EMS-GRILTECH

a unit of EMS-CHEMIE (North America) Inc.

2060 Corporate Way

P.O. Box 1717

Sumter, SC 29151-1717

Toll free: + 1 877 367 83 23

Phone: +1 803 481 61 90

Fax: +1 803 481 61 29

E-Mail: info@us.emsgriltech.com

## Taiwan

EMS-CHEMIE (Asia) Ltd.

36, Kwang Fu South Road

Hsin Chu Industrial Park

Fu Kou Hsiang, Hsin Chu Hsien

Taiwan, R.O.C.

Phone: +886 35 985 335

Fax: +886 35 985 345

E-Mail: info@tw.emsgriltech.com

## Japan

EMS-GRILTECH

a unit of EC-SHOWA DENKO K.K.

Umeda Shinmichi Building, 3rd Fl.

1-5, Doujima

1-chome, Kita-ku

Osaka 530-0003, Japan

Phone: +81 6 63 48 16 55

Fax: +81 6 63 48 17 02

E-Mail: info@jp.emsgriltech.com