

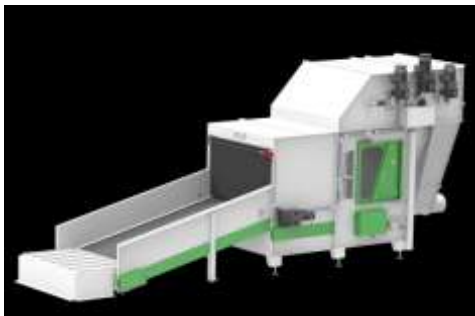
GRAUTE - The Graute GmbH was founded in 1997 in Coesfeld by Horst Graute, former head of development for Air-Lay machines at Hergeth Hollingsworth. Graute started their first production line (Air Lay line) in 2001. The company now owned by Norbert Höltker and an expert in extensive theoretical and practical knowledge in the field of nonwoven engineering then developed new mixing system CMO-W2 for the continuous, precise mixing of several fibre components along with development of the carding opener CO for the opening of heavily solidified materials.

Now Graute is manufacturing complete range of machines for fiber opening, blending, carding, web forming, recycling along with air lay production lines. Their one of the strength is manufacturing the special machines as per specific customer applications as well as reconstructions and modernizations of existing production lines.

#### Graute Range of Machines:

##### 1. Opening and Blending –

- ✓ Bale Opener (BO / WBO) -



The Bale Opener ensures a gentle opening of strongly pressed fiber bales as well as a thorough mixing and equalization of the fibers. If required, the Bale Opener can be equipped with a weighing unit, mixing belt and Continuous Mixing Opener (CMO) for metering and mixing several fibre types.

- ✓ Continuous Mixing Opener (CMO-W2) - The Continuous Mixing Opener guarantees uniform mixing of the different fibers as well as a gentle dissolution of the fiber flakes by continuously feeding of different types of fibres. With this newly developed continuous mixer, the production capacity can be significantly increased and the uniformity of fibre mixing can be significantly improved. The use of large, space-consuming mixing boxes is no longer necessary.
- ✓ Large Volume Blender (LVB) - The Large Volume Blender is used to buffer already opened fibers to compensate for fluctuations in the production process. During buffering, the fibers are also mixed and homogenized again.
- ✓ Micro Tuft Opener (MTO / MTO-M) –



The Micro Tuft Opener ensures optimal quality of the end product through a gentle dissolution of the fiber flake down to the individual fiber and a thorough mixing of the fiber. For large working widths ( $\geq 2$  m), a retractable version (MTO-M) was developed to considerably simplify maintenance, cleaning and minimize downtimes.

- ✓ Pre Opener (PO) - The Pre Opener ensures a continuous feeding to the following machines and compensates for any fluctuations in delivery in the opening line.

## 2. Carding --

- ✓ Card Feeding Unit (CFA) -

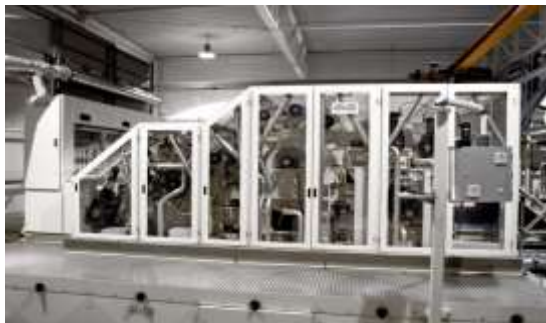


The Card Feeding Unit provide uniform fiber mat from the injected fiber flakes for feeding it to carding machine. The adjustable profile forming device of the CFA ensures uniform fibre feeding throught the machine working width.

- ✓ Cutting Device (CD) - The Cutting Device limits the width of fiber mat before the web formation by a double-sided adjustable edge cut. The web width can be adjusted individually and the edge trimming is fed back to the process without fiber damage.

- ✓ Weighing Plate System (WPS) - The Weighing Plate System monitors the throughput and ensures automatic weight stabilisation in the production.

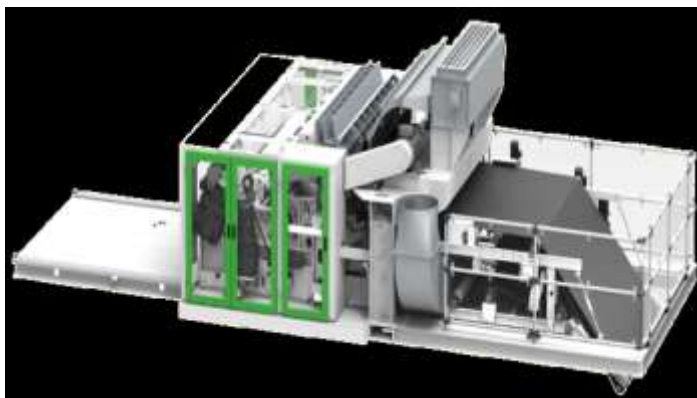
- ✓ High Performance Card (HPC) - The High Performance Card can be configured individually



according to your needs. The modular construction and the different delivery technologies (parallel web, randomized web, condensed fleece, randomized condensed web) guarantee the optimal solution for any type of end product. Folding trays and retractable individual sections simplify maintenance work, cleaning and minimize downtime. Production speeds of the card is up

to 250 m/min.

- ✓ Air Lay Card (ALC) -



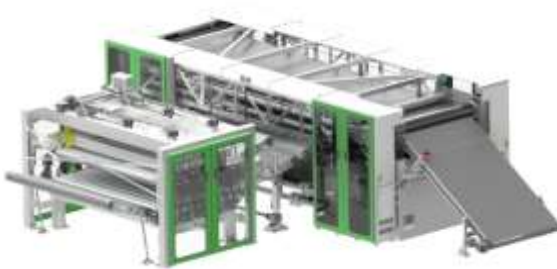
The Air Lay Card creates a very good MD - CD ratio due to the aerodynamic fleece formation. Almost all types of natural and chemical fibers can be processed into non-woven fabrics with a weight up to 300 g /mm<sup>2</sup>. Folding trays and the ability to retract the individual sections simplify maintenance, cleaning and

minimize downtime.

- ✓ Random Card (RC) - The Random Card combines the advantages of aerodynamic web formation with mechanical web removal by rollers. In addition to synthetic fibers it can also process 100% natural fibers such as cotton. The isotropic arrangement of the fibers allows for improved strength in the final product. Folding trays and the ability to retract the individual sections simplify maintenance, cleaning and minimize downtime.
- ✓ Air Web Former (AWF) - The Air Web Former is a machine for the production of voluminous thick nonwovens weighing up to 5,000 g/mm<sup>2</sup>. Almost all types of natural and synthetic fibers can process. The maintenance-friendly design and the ability to retract the individual sections simplify maintenance, cleaning and minimize downtime.

### 3. Web Formation --

- ✓ Cross Lapper (CLB) -



The Cross Lapper is with high smoothness of all parts in contact with the fibres and highly stiff construction - for example, by using rollers made of glass fiber reinforced plastics allows very short accelerating and braking times. The profile forming system ensures precise control of the web weight over the entire laying width.

- ✓ Web Drafter (WD) - The Web Drafter has the task to reorient the fibers and to stretch the entire web. Multiple stretching points allow to pull the material apart very gently so that the line speed and the throughput can significantly be increased.

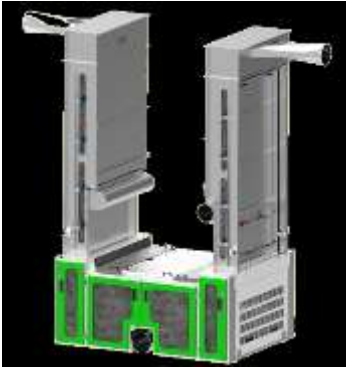
- ✓ Condensing Roll System (CRS) -



The Condensing Roll System was specially designed for an extension to a Rieter C60 / C70 cards. It increases the grammage and improves the MD - CD ratio by reorienting the fibers. The Condensing Roll System with a Rieter Card is often used in conjunction with an Air Lay Card, in order to be able to produce cost-effective multilayer webs. A particular advantage of this is that with a 3-layer fleece, such as in the production of cotton pads, the middle layer can be equipped with up to 70% recycled fiber with

the help of the Air Lay Card.

✓ Recycling –



✓ Continuous Mixing Opener (CMO) -

The Continuous Mixing Opener has the task to open already solidified nonwoven residues and edge stripes and to feed them back into the process.

✓ Edge Stripe Opener (ESO) - The Edge Stripe Opener has the task to open already solidified nonwoven residues and edge stripes and to feed them back into the process.

✓ Carding Opener (CO) -



The Carding Opener can be used to re-open very strong solidified materials (edge stripe, deposit rolls, etc.) which previously had to be disposed of at a cost. These materials can then be feed back into the process. This results in a considerable savings potential since no disposal costs are incurred and fewer new fibers have to be used to produce the product. As a result, the payback period of the carding opener is usually well below one year. Folding trays and the ability to retract the individual sections simplify maintenance, cleaning and minimize downtime.