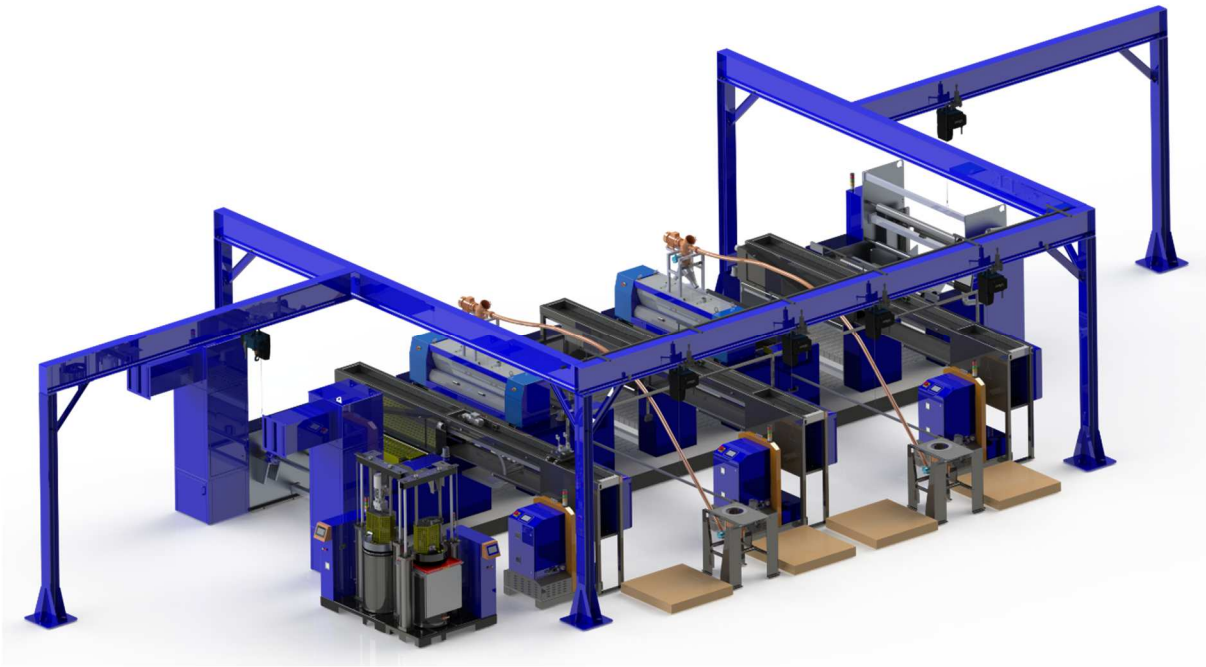
APRO® Technologie GmbH



Machine description

Coating system
for activated carbon/ion exchanger granulate

1. Unwinder and drive unit

Roll core diameter:	76 mm Standard (3“) 152 mm optional (6“) 254 mm optional (10”)
Rewind shaft:	Expansion shaft with scale made of aluminium for max. 500 kg
Roll diameter:	max. 1,200 mm (47“)
Material width:	1,650 mm (65“)
Brake force:	max. 320 Nm (235 ft lb)
Brake regulation:	Diameter regulated
Spreader roller:	Rubber nap roller with centred alignment
Drive unit:	AC drive with feedback system
Drive roller pair:	Aluminium ø120 anti adhesive coating Aluminium ø130 electrically conductive vulcanised
Actuation:	pneumatic, gap can be manually adjusted
Machine speed:	min. 3 m/min. (10 ft/min.) max. 25 m/min. (75 ft/min.)
Protection:	via a safety cover
Module length:	1,600 mm (63“)

The unwinder is combined in one module with the drive unit. Only stretching-insensitive roll media can be used. This is the usual case in the production of activated carbon media.

With the brake force being regulated while the roll diameter is decreasing enables problem-free material unwind from the roll with consistent production parameters.

In the event that stretch-sensitive substrates are to be used, the unwinder must be equipped with a servo drive and web tension control. This is available on request.

The substrate is drawn over a spreader roller directly after being pulled off the roll to ensure flatness of the material.

The material roll are handled by a crane system that belongs to the machine. Substrates can be changed quickly within 3 minutes and machine downtime is reduced to a minimum.

2. Spraying unit for dosing unit 1

Application width:	max. 1,625 mm (63“)
Application weight:	8-15 gsm standard version
Applicator distribution:	variable, the standard is designed to control 5 hotmelt applicators 1,625: 325 – 325 – 325 – 325 – 325 mm 1,600: 325 – 325 – 300 – 325 – 325 mm 1,550: 325 – 300 – 300 – 300 – 325 mm 1,525: 300 – 300 – 325 – 300 – 300 mm 1,500: 300 - 300 – 300 – 300 – 300 mm 1.300/1.525: 225 - 325 – 325 – 325 – 325 mm 650/1.000/1.300: 325 – 175 – 300 – 175 – 325 mm
Air consumption:	approx. 25 litres/min. for 25 mm application width
Module length:	800 mm (31.5“)

The spraying unit is screwed directly to the unwinder. The hotmelt applicators are mounted on a pull-out unit that can remain either in the production position or in the service position. The service position is located next to the machine and enables the daily necessary cleaning and maintenance of the hotmelt applicators. The pull-out unit is driven by motor. The production position can be modified by the operator (during production) depending on the position of the substrate. In principle, the substrate should be run centered through the machine, so correction is only necessary if this was not observed when inserting the unwind shaft or if the substrate is not wound properly.

The spray air is adjusted and monitored separately for each hotmelt applicator by means of a regulator and flow sensor. The hotmelt applicators and the spray air control are controlled in a separate pneumatic cabinet in which all controllers, sensors and solenoid valves are mounted. The air lines are safely and gently routed together with the heated hoses and electrical lines in an energy chain that connects the hotmelt applicators to the pneumatic cabinet and pump station.

The spraying unit is supplied with molten adhesive by a pump station. Each hotmelt applicator has its own pump volume flow. This achieves a unique uniformity in application weight.

The pump station, in turn, is supplied with adhesive by a drum melter. For continuous use, you need 2 drum melters that can supply up to 3 spraying units with sufficient adhesive at max. 1,625 mm, 25 m/min and 15 gsm.

3. Transition 1

The transition is 800 mm (31.5") wide and serves to observe the glued web before the granulate is spread. The passage is also necessary for operating the dosing unit, as it is permanently mounted in the machine and cannot - like the pull-out unit - be moved to a service position outside the machine.

When changing the granulate, both the dosing unit itself and the collecting trough and vibrating chute must be cleaned of the material to be changed before another granulate can be used. This can be done quickly and easily due to the passageway,

4. Dosing unit 1

Dosing unit:	Pin roller scattering unit
Dosing width:	max. 1,600 mm
Dosing weight:	max. 250 gsm activated carbon max. 350 gsm ion exchanger depending on the granulate A guarantee is only given after a sample production
Drive unit:	AC drive with feedback system
Drive roller:	Aluminium ø170 electrically conductive
Web tension measuring roller:	Aluminium ø160 mm anti adhesive coating equipped with load cells
free-running roller:	Aluminium ø120 mm (4.7") anti adhesive coating
Module length:	1,600 mm (63“)

We use this scattering unit design in our machines since 2016. They are running continuously at high performance.

The granulate is filled and the overload is returned via a supply system that has been used in other areas of industry for decades. At the same time, this supply system protects the granulate against unintentional breakage. No additional fine dust is caused by the delivery system.

The granulate is processed directly from its packaging – usually it is a big bag. The big bag is lifted and moved by a crane system above the entering funnel of the supply system. 2 hoists make a continuous production possible when one big bag gets empty.
A big bag closing unit allows to change grade or product even when the big bag is still full. You just close the big bag and change over to the new product you want to use. Before starting with the new grade you just have to empty and clean the supply system and the scattering unit from the former granulate.

Another feature is the pre-dedusting of the granulate. Due to the production, filling and transport, the granulate is exposed to permanent friction. This creates fine dust within the packaging units.
In addition, there are the different granulate qualities on the market. There are cheap products with a high fine dust load and more expensive products with a lower fine dust load. Due to the supplier/manufacturer and the availability of granulate this will cause major quality issues to the filter media. Because of this fact we dedust the granulate within our supply system to reduce the amount of fine dust entering the scattering unit.

5. Transition 2

The transition is 800 mm (31.5") wide and serves to observe the glued web after the granulate is spread. The passage is also necessary for operating and cleaning the dosing unit.

6. Spraying unit for dosing unit 2 (option)

(optional unit for the predominant production of products with 320 gsm granulate weight and more)

The description is identical to the spraying unit for dosing unit 1.

If you want to run continuously you need 2 drum melters that are brought together via a glue distributor and then, in turn, supply all spraying units with adhesive.

Once a drum is empty, the control system automatically switches to the 2nd drum melter without having to stop production for this. You can now change the empty drum at ease and prepare the system for the next change cycle.

The so-called tandem drum melter system supplies sufficient adhesive for up to 3 spraying units.

7. Transition 3 (option)

(optional unit for the predominant production of products with 320 gsm granulate weight and more)

Transition 3 is required between spraying unit 2 and dosing station 2, is also 800 mm (31.5") wide and has the same function as transition 1.

8. Dosing unit 2 (option)

(optional unit for the predominant production of products with 320 gsm granulate weight and more)

Dosing unit 2 is identical in construction to dosing unit 1.

9. Transition 4 (option)

The transition is 800 mm (31.5") wide and serves to observe the glued web after the granulate is spread. The passage is also necessary for operating and cleaning the dosing unit.

10. Spraying unit for dosing unit 3 (option)

(optional unit for the predominant production of products with 480 gsm granulate weight and more)

The description is identical to the PUR spraying unit for dosing unit 1.

11. Transition 5 (option)

(optional unit for the predominant production of products with 480 gsm granulate weight and more)

Transition 5 is required between spraying unit 3 and dosing unit 3, is also 800 mm (31.5") wide and has the same function as transition 1/3.

12. Dosing unit 3 (option)

(optional unit for the predominant production of products with 480 gsm granulate weight and more)

Dosing unit 3 is identical in construction to dosing unit 1/2.

13. Transition 6 (option)

The transition is 800 mm (31.5") wide and serves to observe the glued web after the granulate is spread. The passage is also necessary for operating and cleaning the dosing unit.

14. Spraying unit for cover layer

Application width:	max. 1,625 mm (63“)
Application weight:	3-12 gsm standard version
Applicator distribution:	variable, the standard is designed to control 5 hotmelt applicators 1,625: 325 – 325 – 325 – 325 – 325 mm 1,600: 325 – 325 – 300 – 325 – 325 mm 1,550: 325 – 300 – 300 – 300 – 325 mm 1,525: 300 – 300 – 325 – 300 – 300 mm 1,500: 300 – 300 – 300 – 300 – 300 mm 1.300/1.525: 225 - 325 – 325 – 325 – 325 mm 650/1.000/1.300: 325 – 175 – 300 – 175 – 325 mm
Air consumption:	approx. 20 litres/min. for 25 mm application width

Module length:	800 mm (31.5“)

The description is identical to the spraying unit for dosing unit 1/2/3.

15. Transition 7 (option)

Transition 7 is required between spraying unit 3 and unwinder 2 and is also 800 mm (31.5") wide. If you have only one dosing unit the transition 2 has this function.

16. Unwinder 2 for cover layer

Roll core diameter:	76 mm standard (3“) 152 mm optional (6“)
Rewind shafts:	Expansion shafts with scale made of aluminium for max. 500 kg
Roll diameter:	max. 800 mm (31.5“)
Material width:	1,650 mm (65“)
Brake force unwinder:	max. 240 Nm (177 ft lb)
Brake regulation:	Diameter regulated
Spreader roller:	Brush roller with centred alignment
Side adjustment unwinder:	manual ±25 mm (sliding flap bearing)
Module length:	800 mm (31.5“)

The unwinder 2 is designed to unwind the cover layer non woven of your filter media and the film required for multiple-layer products. These products pass through the machine more than one time, so they have to be covered with siliconized film. Only stretching-insensitive roll media can be used.

With the brake force being regulated while the roll diameter is decreasing enables problem-free material unwind from the roll with consistent production parameters.

The cover material is pulled directly from the roll over a spreader roller for thin/sensitive substrates to ensure flatness.

In the event that stretch-sensitive substrates are to be used, the unwinder must be equipped with a servo drive and web tension control. This is possible on request.

The material rolls are handled by a crane system that belongs to the machine. Substrates can be changed quickly within 3 minutes and machine downtime is reduced to a minimum

17. Rewinder with master drive

Roll core diameter:	76 mm standard (3“) 152 mm optional (6“) 254 mm optional (10”)
Rewind shafts:	Expansion shafts with longitudinal scale made of aluminium for max. 500 kg
Roll diameter:	max. 1,000 mm (39.5“)
Material width:	1,650 mm (65“)
Drive unit:	AC drive with feedback system
Drive roller:	Aluminium ø170 electrically conductive vulcanised
Rewinder:	AC drive with feedback system
Rewinder control:	torque control
Module length:	1,600 mm (63“)

The control system of the rewinder is made by torque control. A multi level diameter related torque setting allows uniformly winding forces throughout the roll.

As this product may undergo a second pass through this machine, the winding quality is of utmost importance. Only clean and evenly wound rolls can be coated a second time without any problems.

This is absolutely necessary if you have to produce products with more layers than you have dosing levels available.

The material rolls are handled by the same crane system that is handling the unwinder 2 rolls. Substrates can be changed quickly within 3 minutes and machine downtime is reduced to a minimum.

18. Dust extraction unit(s)

The dust extraction units have been optimised for the needs of our machines. The units are highly efficient, reduce fine dust pollution to a minimum and are state-of-the-art in terms of safety. The units are equipped with fire detection and extinguishing equipment.

The basic machine with 1 dosing unit and 2 spraying units is supplied with 1 dust extraction unit. The piping inside the machine is neatly solved and accessible for maintenance work.

The same applies to machines with 2 or 3 dosing units and 3 or 4 spraying units, except that in this case we already deliver 2 dust extraction units.

19. Technical machine data

Voltage:	3x 230 VAC – 400 VAC 3PNPE
Current consumption:	1 dosing unit – 200 A 2 dosing units – 350 A 3 dosing units – 450 A
Frequency:	50/60 Hz
Ambient temperature:	15 – 40 °C (60 – 105 °F)
Air pressure:	6 bar (85 psi) unlubricated compressed air according to class 2 - ISO 8573−1 max. particle size 5 µm max. particle density 1 mg/m³ max. oil concentration 0.1 mg/m³
Amount of air:	1 dosing unit – 3,000 litres/min. 2 dosing units – 4,500 litres/min. 3 dosing units – 6,000 litres/min.
Safety classification:	Performance Level D

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