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BPIF labels

Cutting matrix and edge trim waste – What are the key factors?

Dieter Finna

Capturing, conveying, cutting, collecting and compacting are the essential steps for the disposal of edge trim and matrix waste in the pressroom. What seems simple at first glance requires expertise and a high level of precision for the trouble-free disposal of self-adhesive materials in the pressroom. NarrowWebTech introduces quality features, set up by the Danish supplier Lundberg Tech A/S.

Customized equipment for the automated disposal of production waste is characterized by high draw-off speeds, which increases the productivity of the printing presses.

Equally important is the well-being of the employees in the pressroom, who should not be affected by the ambient noise level. The extraction and cutting systems also need to be low maintenance in terms of wear on the granulators, pipe joints, filters and overall waste handling.

For complex systems, the devil is often in the detail. In order to give an overview in this whole topic Lundberg Tech, headquartered in

Copenhagen/Denmark, has summarized the quality features that are relevant in plant design to achieve full performance. These will be explained in detail.

Matrix-capturing funnel

This starts with the design of the matrix capturing funnels of central systems. With an optimized air flow, waste matrix can be easily captured. The anti-adhesive coating on the funnel inner walls contributes considerably to their trouble-free operation.

The piping, fan and separator also have a highly wear-resistant coating, which is comparatively

maintenance free and ensures the trouble-free operation of the system.

Granulator

The quality of the granulator (trim cutter) is determined by the quality of the extraction system. High quality granulators have a stable housing, an optimized cutting geometry and blade quality. A housing made of solid cast iron avoids the exposure to faults with temperature variations.

Smooth running and stability are achieved with a cutting device

“The number of rotor blades must be matched to the material which is to be cut and the desired cutting length.”

in which the stabilizing central axis and rotor are made in one piece. By tapering the housing towards the centre, an increased air velocity can be generated in the cutting module.

This ensures that the extracted material is always held taut in the air flow. All these are essential factors for low noise level granulators with an optimal cutting result. This is indispensable when cutting materials of 5 to 10 microns thickness.

Rotor and cutting blades

The number of rotor blades must be matched to the material which is to be cut and the desired cutting length. Depending on the material to be cut, the speed of the system and the required target length, 2–12 blades are used in granulators; the rotors are equipped with three blades as standard. The correct placement of the blades indicates the cutting know-how that can be found in a granulator plant.

The alignment of the blade angles ensures a very silent and efficient cutting process using the scissor-cut principle. Durable carbide metal blades with a thickness of 4 mm (0.157”) provide a suitable solution.

For abrasive materials, special coatings are able to extend the working life of the blades. Slots in the rotor side are set to ensure per-

| Matrix capturing funnel



Source: Lundberg Tech

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manent self-cleaning, whereby the material is returned to the cutting chamber. This prevents material deposits in the bearings and avoids bearing damage caused by very thin materials.

Adjusting the cutting length is possible via the rotation speed control and, if required, the size of the material to be cut from non-adhesive materials can be determined using a perforated screen. This is an important criterion for valuable raw materials, where cutting takes place up to a certain target size so that the materials used in recycling have an optimal initial size.

Last but not least, in the definition of the capacity of the granulators, this can be designed for a volume of 500–5000 kg of cutting material per hour.

An oil lubrication system makes the cutting of even self-adhesive materials possible. A dosing valve allows easy adjustment of the oil flow rate and allows the oil metering to occur where it is needed, in

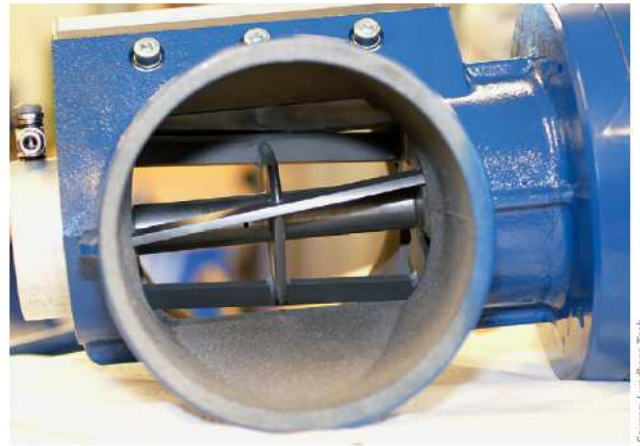
the rotor axis. So the blade surfaces can be supplied with a constant lubricating film. This solution allows a very low oil consumption, which can be controlled via an integrated sight glass. The rotor axis is powered by gravity and rotation of the rotor with oil, without the need for compressed air.

All-in-one systems

All-in-one systems are characterized by easy installation, mobility and easy accessibility. They can be configured according to individual needs and create space and clarity in the pressroom. They can accommodate the matrix and edge trim from one or more production machines via one system. The design of the pipe diameter and air flows is matched to the number of machines disposing of waste matrix.

Cutting dust and dust from the die-cutting process on the production machines is detected by the vacuum system and the exhaust air is filtered to ensure that defects caused by dust no longer affect the printing process.

All-in-one systems can be individually adapted to the needs of the operator through a variety of options. This ranges from a possible anti-static device to the automatic waste press for 24/7 non-stop production.



Source: Lundberg Tech

Central exhaust systems

This solution covers all previously mentioned aspects of handling waste and is configurable for an unlimited number of machines. When planning the systems, it should be noted that they are designed for expandability to cover future increases in production. As part of a central system, in addition to special piping components such as gate valves and switch points, an automatic air filter system with recirculation of the air into the building or the ionization of the air can also be provided.

Granulator housing made of solid cast iron

Automatic control

An essential aspect of central systems is their automatic control,



Source: Lundberg Tech

Quality features of a granulator and their arrangement in the system. Bottom right the oil lubrication system with dosing valve



Source: Lundberg Tech



Source: Rosina Obermayer

which regulates the extraction capacity depending on the equipment in operation. Frequency converters can reduce power consumption and set the system to an optimized operating point of energy efficiency, depending on the number of machines in operation at any one time.

“An automatic filter system removes dust and particles from the exhaust airflow and filtered air flows back into the building.”

By using pipe silencers, the noise level of the system can be reduced. These are located in front of the granulators and the ventilation fan, and are located outside the building, which ensures a very silent operation.

An automatic filter system removes dust and particles from the

exhaust airflow and filtered air flows back into the building. The return of the room air can save energy costs. The clean air is introduced into the building via a downstream Hepa filter, which prevents a draught in the production hall.

Reduced volume of the waste

With a stationary compactor, the waste can be compressed in a closed system and the disposal site can be placed outside the building. The cutting and compacting of the waste also has the advantage that the volume of waste is significantly reduced, thereby reducing the transport costs for disposal.

By eliminating manual handling, the staffing levels required for waste handling are reduced. Overall, lower costs for the operation and maintenance of the waste

handling system are achieved. The continuous waste disposal reduces downtime on the presses.

Often, automation is accompanied by an increase in speed and an increase in productivity in the production machines, since the extraction of edge trim and matrix grids no longer limits their speed.

Summary

With the large number of variants and possibilities, the question arises as to what system is the best choice for the size of the company. This question depends on the respective conditions and cannot be answered on the spot. A central waste handling system in label production can have a range of advantages. However, there are several suppliers of vacuum waste handling systems, that have different solutions on the market.

Left: Central systems are suitable for an unlimited number of machines and have central control

Right: How to handle label production waste? Different systems are on the market

Advantages of central waste handling systems in label production*:

- 24/7 nonstop production: no stops necessary to change rewind trim rolls
- Higher production speeds and productivity: no bottleneck for rewinding odd shaped labels, maximum speed of the label press achievable
- No matrix breaks: constant tension with less matrix breaks as tension problems during rewinding do not occur
- Reduction of waste: Cutting the waste from process machines reduces the waste volume. The density of the chopped material is many times higher than of endless trimmed material. Minimum web width possible, since no wider matrix trimming is necessary as in rewinding
- More space available: No extra space around the process machine is needed for waste collection
- Cost reduction: Automated waste removal, this means that employees do not have to worry about waste disposal
- Improved outward appearance: No waste around the machines. The environment around process equipment stays clean and increase employee commitment
- Quality improvement: Operators can spend their time establishing and controlling the printing processes instead of taking care of waste disposal
- No dust: around the machines as the dust generated by the converting process during printing is captured by a vacuum extraction system
- Better work environment: With continuous vacuum transport of crushed waste, operators will no longer suffer from handling trims
- Can cover an unlimited number of machines

*List by Lundberg Tech