

A boost in efficiency with narrow-slit spooling technology

Manufacturer Nicely from Taiwan discusses customer requirements and the benefits of its narrow-slit spooling technology with a focus on the EG-9000 series spool slitter rewinder.



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Pictures: Nicely

In the pursuit of advanced slitter rewinders, innovation has taken two extreme directions. One approach focuses on achieving maximum technical specifications emphasizing the widest width and highest speed possible. Slitter rewinders with these higher specifications are commonly employed in the production lines for films and nonwoven fabrics. Nicely's model EG-8003 series, for instance, boasts an impressive 8 meter web width, making it the slitter rewinder with the widest width in Taiwan for BOPP film production.

The other extreme pursues fine narrow-slitting, often referred to as ultra-fine narrow-slitting. This precise slitting technique, enhanced by spool slitting machines, finds applications in manufacturing precision components for packaging circuit boards, micro-chip carriers, anti-counterfeit security threads and electrical insulation materials. Customer requirements have

steadily shifted from 4 mm and 2 mm narrow slitting to even finer widths, reaching 1 mm or below. There are two major winding techniques for narrow-slits:

Pancake roll: Flat-wound rolls, also known as pancake rolls, are a common form of the final product after slitting. This winding technique is suitable for 99% of slitting specifications and, if appropriate tension properties are maintained in the material, achieving excellent winding results with good roll density and a smooth surface is easily achievable.

Spool roll: When the slit width is 4 mm or below, the pancake technique often encounters several challenges, even with excellent tension control. A limited rewind diameter becomes a constraint, directly impacting the total length of the product. To address this issue, the solution lies in adopting a transverse winding approach. The basic specifications for spooled end products include:

- Min. slit width: 2 mm
- Max. traverse length: 300 mm
- Max. rewind diameter: 450 mm

By configuring the spooling mode and setting the traverse width, the total length of spooled products is more than 20 times greater than that of pancake winding under the same outer diameter requirement. This not only significantly enhances length output capacity, but also reduces downtime. Basically, any process that utilizes a narrow width tape in a continuous manner will gain advantages from using a spooled product.

Nicely's spool slitter rewinder, exemplified by the EG-9000 series, can cater to a diverse array of customer applications. It finds extensive application across various industries. Four examples:

Packaging materials: Common materials include OPP, CPP, BOPP, PET or metallic foils with surface treatment as attention grabbing label. In the application of security labels as an added layer of protection against counterfeiting, holographic film with slit width of 1 mm or 2 mm is integrated into tobacco packaging, banknotes or security documents. It plays a supporting role in providing security and authentication.

Electrical insulation utilizes composite materials like mica tape backed with adhesive glass fiber or PE. Mica tape, known for its high dielectric strength, is crucial for withstanding high voltage and temperature, serving as insulation coil material in electric motors and generators within the electrical industry. For low voltage applications, materials such as PI, PE or other thin films with low dielectric constants are used as effective insulation mediums.

Textile applications: Nonwoven fabrics are undergoing a surge in innovation, not only for medical, hygienic personal care, acting as moisture barrier in textiles, but also serving as lightweight alternatives to various insulating materials in the thriving aeronautics and automotive industries.

Diverse configurations: With over 40 years of experience in the industry, Nicely has developed in-house expertise in all aspects of unwinding, slitting and rewinding. To address the customers' demand for more flexibility regarding the range of materials and flexibility in production, Nicely has developed a modular spooling winder that can integrate with other slitter models to produce pancake rolls and spools in one package.

Tension control is crucial

Several critical factors must be considered during the delicate process of spooling, including material thickness, tensile strength and whether the material is a composite with a backing. All these factors can impact the tension matching of the equipment.

As layers of material are stacked during the winding process, precise tension adjustment becomes crucial, especially for fragile materials.

Therefore, the winding and spooling process generally adopts a decreasing tension configuration, which differs from the fixed tension configuration used in pancake rolls. Excessive tension can lead to product deformation or material breakage.

To achieve accurate tension control, Nicely calculates the appropriate torque range to allow the winding end to provide optimal feedback based on the actual material performance. Finally, through contact with the finished product by contact rollers, precise tension control is achieved, ensuring stable production.

While spooling may not be the sole solution to every challenge associated with narrow-width winding, it can bring the following advantages:



Terry Chen, Managing Director and Owner of Nicely: "We consistently evolve alongside our customers, which is why we define ourselves as solutions providers."

• **Increase productivity:** One of the major benefits of spooling is its ability to significantly increase the length of the final product. For many narrow-width materials, achieving the required material length without adopting this technology is nearly impossible.

• **Reduce machine downtime:** Additionally, spooling helps minimize downtime, effectively improving overall efficiency.

• **Enhance roll durability:** When unloading the final product, spooled configurations offer higher density compared to flat-wound rolls. This eliminates concerns about material falling off from the core, providing greater convenience for downstream processes.

• **Easy use:** The spooled form of the final product proves to be more user-friendly for subsequent manufacturing processes.

Versatility and efficiency

The narrow-slitting technology of Nicely's slitter rewinder is widely applied across various fields, including precision packaging, anti-counterfeit labels, electrical insulation, aerospace textiles and more. The EG-9000 series of spooling machines not only demonstrates maturity in fine slitting, but also offers flexibility by integrating with different types of unwinding units. This capability allows it to meet the demands of both pancake roll slitting and fine-slit spooling, achieving higher production efficiency and increased equipment versatility.

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