

Shrink expands

Flora Feng-Ting Chen reviews the global trends in collation shrink packaging films

The global market for collation shrink packaging films in 2020 was 2.63 million tonnes, with Europe (925,000t) accounting for about one-third of that total. Europe is a mature market with an average annual growth rate (AAGR) of only 1.3 per cent, mainly driven by demand for high performance films and changing regulations that require recycled content to be included in film formulations.

Asia used 629,000t of collation shrink films and has an AAGR of 6.8 per cent. Within that total, China used 217,000t. But the country represents the major growth market globally with an AAGR of 7 per cent. Growth in Asia and China is being driven by cardboard replacement, thinner films required by leading brand owners, and the rapid growth of colour printed display film for retail brand promotion.

North America used 463,000t and has an AAGR of 2 per cent characterised by a high percentage of bundling films and by brand owners requiring thinner films. South and Central America used 386,000t and has an AAGR of 2.3 per cent with increased demand for high optical display films on the Pacific Coast, and growth in Brazil and Argentina from growing bundling pack use. The Middle East/Africa used 225,000t and has an AAGR of 6.0 per cent.

Collation shrink development trends

Generally, collation shrink film developments are driven by value chain demands for lower costs, increased sales stimulation, and solutions with sustainability benefits. As a result, collation shrink film solutions need to help address the following market needs: cardboard replacement (significant cost savings, lighter weight, and more visible brand identity); downgauging (source reduction and doing more with less); multipack and larger size (sales channel switch, super/hypermarkets, e-commerce, and institutional consumption); packaging efficiency (faster packing speed, lower shrink temperatures, and energy cost savings); high optical display film (clarity and glossy printing); and recycled content inclusion (increased use of post-consumer/post-industrial content while retaining performance).

While these trends and developments are largely global, there are a few regional

characteristics. Cardboard replacement is largely occurring in developing regions as this step has already taken place in much of the developed world. Multipack and larger pack sizes are predominant in North America and Asia, as the popularity of e-commerce increases. While the inclusion of recycled material in film formulations is global, it is being led by changing regulations in Europe.

Collation shrink film sub-segments

The collation shrink film market is complex with varying requirements from different pack types and sizes. Tailor-made solutions need to offer a range of properties to satisfy brand owners' needs. Usually, collation shrink film can be classified for two major purposes: bundling film for shipping and handling, focusing on mechanical properties, including high holding force with snug-fit shrinkage, good film toughness and puncture resistance; and display film for branding and promotion.

With collation shrink film developments trending to thinner, higher packaging quality and solutions with sustainability benefits, the market is demanding high performance PE to help achieve differentiated, cost-effective products.

Recently, several innovative collation shrink films have been developed in response to evolving market needs. This has been facilitated by a broad range of performance PE products, as well as collaborative efforts with the value chain. These solutions include: thin yet enhanced large pack bundling films that maintain or reinforce performance, low temperature shrink films with faster packaging speeds and lower energy costs, tough 'repulsive' shrink films that do not stick to inner packaging films, and collation shrink films that include recycled content while maintaining performance.

To meet value chain requirements for thinner films than those currently in use, requiring less material while maintaining performance, three-layer large pack bundling films have been developed using performance PE polymers. Significant downgauging can be achieved while mechanical properties are maintained or improved thanks to the use of performance PE polymers in the formulation. Optical properties can also be enhanced, if required.



Low temperature shrink films

Low temperature shrink films are developed to supplement conventional shrink films for applications requiring lower shrink tunnel temperatures, such as certain beverage packaging, rice bags and edible oil bundling to replace cardboard, as well as other thermosensitive product packaging. Fig.1 illustrates the performance requirements and key benefits we hear requested most often.

Very low density performance PE polymers help converters achieve a decrease in shrink temperature for each application.

Repulsive shrink films

Although regarded as a niche market, repulsive shrink films are considered a premium product due to the technical barrier required to balance the shrink performance and the repulsiveness (so, for example, it does not stick to other packaging films when unpacked). They are often used as the outer bundling films to wrap multiple smaller packs, for example, wrapping a larger package of 24 cans comprising four packs of six cans, hence being called 'shrink film in shrink film'. They are also used for shrink hoods to wrap palletised PE form-fill-seal (FFS) bags as secondary packaging and prevent adhesion to the PE FFS bag when being unloaded.

Field tests for a 4x6 PET bottle package without cardboard tray, with an inner conventional shrink film and an outer repulsive shrink film, at normal shrink tunnel operating conditions demonstrate smooth and



Fig.1: Performance requirements most often requested for low temperature shrink films

Beverages:

- Enhanced aesthetics by reducing wrinkle and stickiness to the label
- Consistent shrinkage with different shrink tunnels
- Reduced risk of hole formation due to overheating
- Faster packaging speeds
- Energy cost savings

Rice bag bundling:

- No stickiness to primary packaging
- Eliminate any effect on flavour
- Faster packaging speeds
- Enhanced packaging integrity

Thermo-sensitive products (for example, cable coils and pharmaceuticals):

- Prevent product quality defects after shrink tunnel
- Snug-fit shrinkage
- Operational efficiency
- Enhanced packaging integrity

labels Recyplast 50. Full traceability between collection, recycling, extrusion, and printing provides a guarantee to the company's customers.

What's next?

Over the years, collation shrink films have evolved from monolayer to three-layer and now even five-layer high-performance film structures in order to satisfy growing market requirements. For example, 4x6 PET bottled water packaging in China initially used standard monolayer film solutions that were typically 100 microns thick and made with commodity PE products.

As the value chain pushed for even higher toughness and enhanced optical properties, three-layer film formulations started to emerge. Today, five-layer polyolefin dedicated film structures are starting to be developed to meet the demand for high-end collation shrink films. Providing more flexibility in formulation design to meet specific functionality, they are being used to deliver films with an optimised performance/cost balance. It's possible to add rPE in the core with performance PE polymers in the outer layers to maintain required performance levels.

Overall, the combination of performance PE polymers and advances in film extrusion technology enables the creation of tailored collation shrink films for specific applications, which deliver differentiated value when compared with the market reference collation shrink films tested.

AAGR percentages are based on Euromonitor (2018), AMI (2018) and ExxonMobil estimates

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Collation shrink sub-segments

		Shipping & Handling		Bundling & Display	
Mechanical Properties	Puncture Resistance			 Cans/Bricks display High puncture resistance Medium/high end optics	
	Holding Force	Bottles bundling High holding force Low end optics 	Large pack bundling High holding force medium end optics 	Bottles display High holding force High end optics 	
	General Purpose	Cardboard tray package Machine-ability limits and Low/medium end optics 			
Improved Optics					

consistent packaging operation, balanced repulsive and shrink performance, maintained film strength and toughness, and easy peel-off.

Collation shrink films containing recycled content

The total shrink film market in the EU is expected to have an AAGR of 1.12 per cent between 2017-2030. This growth will almost completely be attributed to increased penetration of rPE, from 7 per cent in 2017 to 19 per cent in 2030, according to market intelligence firm AMI. The increased use of recycled content is being driven by brand owner

responses to consumer sentiment and regulatory changes.

PE film converter and recycler The Barbier Group co-developed a collation shrink film incorporating 50 per cent rPE that tests showed did not compromise performance, film thickness or processability. The recycled content is sourced from plastics film waste collected in France (logistics centres, retailers, and industrial companies). Typically, the recycled content comes from packaging waste generated at supermarkets, via a stream of transparent shrink and stretch films.

Barbier then uses the rPE to produce new with 50 per cent recycled content, which it