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**Axon LLC**

**How to Specify  
Application Equipment for  
Heat Shrink Labels**

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Heat shrink sleeve labels are one of the most dynamic, innovative, and cost effective means of differentiating products on retail shelves.

Understanding key facts about the heat shrink label application when specifying new equipment will help brand owners achieve the lowest total cost of ownership over the life of the solution. The variables and considerations of the heat shrink label application include:

- Size, shape, and material composition of the package
- Line speed
- Film composition
- Heat tunnel type
- Expertise and reputation of the system's manufacturer

There are two major components to a shrinkable sleeve solution — the applicator and the heat tunnel. Both are important. A properly functioning heat tunnel, however, is the key to successful long-term operations. Heat tunnels are not simply caverns with a conveyor where heat is applied. Heat tunnels are highly engineered machines — with every heat tunnel specifically designed to meet the unique conditions of the packaging line on which it is installed. Complete systems, applicator and heat tunnel, range from \$30,000 to \$300,000, depending on the size and shape of the package and the line speed.

It is virtually impossible to create an apples-to-apples comparison of heat tunnels from different manufacturers based solely on specification because the heat shrink process is too complex. Look instead at throughput. Axon advises that packagers require a written commitment for the throughput

efficiency of the system. When one manufacturer provides a written commitment of 99.5 percent, for example, while another commits to a far lower rate, perhaps 85 percent, the brand owner has a much better idea of the relative merits of each supplier's proposal. Specify that the throughput commitment is to be confirmed prior to placement of the order.

### **Package size, shape, and material composition**

Package size and shape are two critical production variables for specifying heat shrink label equipment. For example, the shrink characteristics of a film label for a straight side walled container will be different compared to an hourglass shaped package. The equipment supplier must take shape and size into consideration when designing the system.

To achieve lowest total cost of ownership, the brand owner should determine whether the size and shape of the package may change in the next three to five years. If change is likely, then provide the equipment supplier with that future looking information as well. This will ensure that the system designed for today will have the flexibility of accommodating a changing tomorrow.

The material composition of the package also affects the design considerations of the shrink label solution. For example, a glass jar can absorb more heat than a PET jar and various compositions of PET handle heat differently. With all the effort to make packaging more sustainable, brand owners are light weighting and using materials with greater recycled content. These changes may affect the shrink label process. Axon's advice is to look ahead three to five years and envision potential changes to the composition

of the package. Work with the equipment manufacturer to design in the flexibility needed to accommodate a range of materials.

### **Speed**

The speed of the line impacts the configuration of the applicator and heat tunnel. Packagers need to identify the fastest output machine upstream of the sleeve applicator and heat tunnel and determine tunnel throughput based on that speed. Axon advises engineering a 20 percent higher throughput in the shrink label process as a buffer. Scenario planning for speed increases in the next three to five years needs to be done in order to achieve lowest total cost of ownership.

### **Film choice**

Today the most common shrink films are PET-G, PLA, and PVC. Each film type and formulation has its own unique shrink characteristics. Do not simply select a film based on its performance specifications and cost. A film's specifications are only a starting point. How that film will conform to the size and shape of the package at the line speeds required is a function of actual conditions in the heat tunnel. For example, dark colors on a label absorb heat more quickly than light colors. Simply assuming that the label will shrink uniformly may not be correct. Certainly start out with a first choice for a film. However, work with the equipment manufacturer and film supplier for package lab testing prior to making a final decision on film choice.

## **Types of heat tunnels**

There are three types of heat tunnels: steam, hot air, and radiant heat.

- Steam tunnels offer the most uniform heat — 360° around the package — which means overall even shrinkage of the film. Steam is also the least aggressive heat of the three tunnels. Steam tunnels are ideal for round, hourglass, and other non-straight sided packages for this reason — gentle, even, shrinkage. PET packaging does extremely well in steam tunnels. Steam tunnels, however, are not suitable for every application. For example, if the packaging line is in a cold environment, steam will not be applicable. Packaging powders and certain other products are also not suitable for steam. Environment and product assessments are necessary before specifying a steam tunnel. Steam tunnels can also require a separate steam source and equipment to remove excess moisture and condensation from the area near the tunnel.
- Hot air tunnels (also known as convective tunnels) are an option when the environment is not conducive to steam. Hot air can be directed to specific areas of the film, which places the heat where and when it is needed in the shrink process. Hot air offers a more aggressive heat than steam, requiring a careful assessment of the packaging material's heat resistance. Hot air tunnels may have a larger footprint than steam tunnels, depending on the application.

- Radiant heat tunnels (also known as infrared tunnels) are the most aggressive in terms of shrink. These tunnels are ideal for neck bands on containers such as wine bottles. Radiant heat tunnels are used for fast shrink on packaging not affected by more robust heat.

### **Expertise and reputation of the system's manufacturer**

Looking at the interrelated factors in this process, it is clear that brand owners must take into account the longevity and expertise of suppliers under consideration in order to ensure a successful conclusion to the project. Brand owners must also ascertain the professionalism of the supplier's application engineers and technical support personnel as well as the rapid availability of replacement parts. Suppliers without this wherewithal cannot provide a solution that offers lowest total cost of ownership advantages.

Furthermore, once the ideal system is installed, Axon recommends that packagers buy a service contract. Shrink labeling is a process that needs to be maintained within precise parameters. Having a service technician visit the plant on a regular basic to adjust the process, replace worn components, and provide ongoing training for operators pays dividends in terms of less downtime and waste as well as high throughput.

There needs to be a close partnership between package designers, plant operations personnel, film provider, and equipment manufacturer. Brand owners can be assured that the closer the collaboration between the partners at the beginning of the project, the higher the quality and throughput later on. Look for an equipment supplier that offers the required expertise and willingness to partner as well as the resources to support the system over its

life cycle. Be sure to request a throughput commitment in writing. Heat shrink equipment is one packaging solution that should never be purchased simply on specification and cost.

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Axon is a leading designer and manufacturer of heat shrinkable sleeve labeling systems, as well as other integrated packaging products and solutions for both Fortune 500 companies and smaller, privately held businesses that specialize in the production of food, beverage, health and beauty aids, household goods, and pharmaceuticals. George Albrecht has more than 35 years experience in the packaging industry. George welcomes your comments, [gealb@axoncorp.com](mailto:gealb@axoncorp.com).

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