



Choosing the Best Stretch Film For the Application

A B2B Industrial Packaging White Paper

What You'll Learn

- How to make a logical price comparison
- Whether to choose standard or high performance stretch film
- How to choose the correct gauge for the application
- Whether to opt for hand or machine application
- Whether to go with blown or cast film
- Which is better—standard or pre-stretched film
- How 3 different companies solved very different needs with the correct stretch wrap

Assembling products into a single unit—usually on a pallet makes packaging and shipping both efficient and cost-effective. Unitizing products reduces handling costs and saves time. It ensures a safer, more efficient distribution process, while protecting products from damage and theft. Applying stretch film is one of the most common and most secure methods of accomplishing this.

The goal for choosing the best stretch film is to find one that fits your company's specific need without paying for unneeded properties. For example, loads that will spend most of their days in a warehouse or shipping container, don't need film with UV light protection. On the other hand, loads with lightweight film that don't fit snugly to the pallet corners are subject to punctured film and shifting loads. But if you've never used stretch film before or aren't happy with the film you're using, how do you know which one is right? Following are 6 considerations for choosing the best stretch film for the job.

Primary Cost Comparisons: Price/lb. vs. Price/ft. vs. Price/load

When talking to a stretch film salesperson, trying to figure out how their product compares to the product the consumer is currently using can be confusing. All film is sold by the pound. Traditional films that typically have higher gauges are actually less expensive per pound because they use less expensive plastic resins to make the film. The high performance films are more expensive because they are manufactured with better quality resins and can be layered. This is a more expensive manufacturing process. The high performance films generally end up costing less overall because the film's light weight offsets the more expensive price per pound

However, what really matters to the consumer is how much the film costs per foot. Even more important than the cost per foot is the cost per load wrapped. The argument for the newer high performance films is that even though they are expensive to make (cost more per pound) they are much lighter in gauge and therefore lighter in weight. For example, high performance film designed to replace an 80-gauge traditional film might be 20% more expensive to make, but it might require 50% less film to hold the load because it works just as well as the material that is 50% thicker. The end result in this example is that the user saves 30% on film costs by switching to the thinner high-performance film.

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To precisely analyze price savings, wrap two loads. Then cut the film off of both loads and weigh it on a small sensitive scale. This will indicate the amount of film used for each load. Then multiply the weight of the film by the price per pound (ask your sales person for the weight of the roll or the weight of the case if it is not clearly marked) and divide by the roll or case price. This will yield the price per load. Multiply the price per load by the number of loads typical for each day, each week and so on.

Because there are so many variables with film, users must be very cautious to understand and confirm the math themselves and not to rely on the salesperson's math. Part of the process should always be to adequately sample the new material before accepting any change. The bottom line is that the new material must contain the load as safely and effectively as the old material. Following are four additional considerations for choosing stretch film.

1. Standard or High Performance

This is by far the most important decision. Much of the decision will be based on price, but it needs to be tempered by the requirements of the job. Not that long ago, before the advent of highly innovative stretch films, gauge (thickness) was just about the only thing that mattered. Now it is just one of many considerations.

[Standard/true-gauged stretch film](#) offers a great amount of stretch, tear resistance, and strength. The main drawback is waste, because it's not possible for the average worker to apply enough force to reach the maximum stretch potential of the film.

[Economy/micron stretch film](#) is a step down from true-gauged stretch film and often comes in a 57, 60, or 63 gauge. The main difference is the thickness and the amount of stretch potential. It is often stiffer and will not stretch as much as a true-gauged film. On the other hand, it is strong, more affordable, and can produce less waste.

[Hybrid/multilayer stretch film](#) is commonly used in place of lighter gauge film. It is manufactured in 47, 51, and 53 gauges. It has more layers, is stiffer and has less tear resistance than micron stretch film. Benefits include: lower cost, lighter rolls, and the need for less physical force during application.

USERS MUST BE VERY CAUTIOUS TO UNDERSTAND AND CONFIRM THE MATH ON PRICE SAVINGS THEMSELVES AND NOT TO RELY ON A SALESPERSON'S MATH.

The latest and greatest lighter-gauged (less expensive) high performance films are ideal for light to moderate, regular-shaped loads that won't encounter challenging transit or storage conditions. High performance stretch film offers excellent load retention, highly elastic film recovery, high-strength formulation and reduced film *neck-down*.

In the high performance category, even light film gauges have elevated tear and puncture resistance, and excellent cling properties.

But where any or a combination of those conditions are present, heavier (more expensive) traditional films will be the better option and will save money in the long run (less risk of worker injury and damage to loads). Traditional films are considered foolproof and often result in fewer complaints from the warehouse. The precision with which they are applied is not as critical because the weight of the film may help offset a poor application by the worker.

Carefully consider the type of load and even the skill level of warehouse staff. Generally speaking, in a well-controlled environment with nicely cubed loads, the less expensive high-performance films will save money.

Following are some considerations for choosing gauge (note that 20” machine grade has the same strength as 12”-20” hand stretch wrap; machines promote more efficient wrapping and reduce waste):

Choosing the Correct Gauge for the Application¹

Thickness	2"-5" Bundling Film	12"-20" Hand Grade/ 20" Machine Grade
60 Gauge	Ideal for lighter smaller objects, small boxes, and banding light items together. Many moving companies use light gauge banding stretch film in place of tape.	Ideal for loads up to approx. 800 lbs.; 12", 15", and 18" widths are ideal for shorter loads or loads where only the bottom and top need to be wrapped.
70 Gauge	Same uses as the 60 gauge, but enables slightly stronger holding strength.	Ideal for loads up to approx. 1100 lbs.; 12", 15", and 18" widths are ideal for shorter loads or loads where only the bottom and top need to be wrapped.
80 Gauge	The most common gauge of all stretch wrap. It's very versatile and handles a variety of applications.	Ideal for loads up to approx. 1500 lbs.; 80 gauge is the most common stretch film thickness and ideal for a variety of applications.
90 Gauge	Uses are comparable to 80 gauge stretch film, but it has increased strength.	Ideal for loads up to approx. 1750 lbs.; 90 gauge is a starting thickness for heavier film.; 18" and 20" 90 gauge and above are ideal for taller or heavier loads.
100 Gauge	Commonly used for heavier boxes and bundling products. Medium heavy boxes and medium heavy items such as light lumber are ideal.	Ideal for loads up to approx 1870 lbs. The 18" and 20" 100 gauge and above are ideal for taller or heavier loads.
115 Gauge	Used for smaller heavy objects, commonly used for banding lumber.	Ideal for loads up to approx. 1950 lbs. The 18" and 20" 115 gauge and above are ideal for taller or heavier loads.
120 Gauge	Greater strength and puncture resistance, great for regular and irregular shaped boxes. Ideal for securing heavier loads.	Ideal for loads up to approx 2000 lbs. The 18" and 20" 90 gauge and above are ideal for taller or heavier loads.

2. Hand Film or Machine Film

Hand-held dispensers can be as inexpensive as a few dollars while fully-automatic wrappers run well into the 1,000s of dollars. The general rule is that if the consumer is wrapping 15 or more loads per day, it's more cost-effective to use a machine than to wrap by hand. At that level machines justify their costs by reducing manual labor expense and the possibility of injuries. In addition to the productivity and liability issues, most machines pull the stretch wrap at least 200% before applying it to the load. This results in legitimate savings of up to 50% of film costs. A company that historically used a full pallet of hand film each month might reduce their usage to 6 pallets per year. This savings on film can pay for the equipment very quickly. Also, a machine-wrapped load is generally more secure than a hand-wrapped load.



When stretch film is applied by machine:

- Production rates increase & labor costs decrease
- Injuries decrease
- Wrapping is consistent
- There is better quality control
- Considerably less film is used because film is stretched properly

So for companies that handle 15 or more loads per day, a stretch wrap machine will more than pay for itself. Following is a summary of hand and machine options.

¹ Courtesy of U.S. Packaging & Wrapping LLC

Manual/Hand Wrappers

- *Extended Core:* An extension of the film's core creates a natural handle for wrapping. It's an especially economical option since it doesn't require any equipment. The downside is that it provides little control over stretch and is hard on workers' hands.
- *Mechanical Brake/Pole Wrapper:* A rigid structure supports the film core while a mechanical brake system provides the resistance needed to stretch the film. A pole wrapper is similar, except that the roll sits at the end of an extended pole. This reduces the need for workers to bend and reach during application.

Semi-Automatic Wrappers

- *Turntable Wrappers:* The load rests on a turntable that spins the load. The film roll automatically moves up and down as it applies the wrap. Stretch is controlled by the speed of the load's rotation and/or the attached pre-stretch feature.
- *Orbital Wrappers:* The film rests in a carriage housed on a vertical ring. The load feeds horizontally (or vertically in the case of a horizontal ring system) through the center of the rotating ring as the film is applied.
- *Rotary Arm Wrappers:* The load remains stationary as a rotating arm revolves around it, wrapping the load. These types of wrappers are best for lightweight loads or those requiring high rotation speeds which could otherwise cause the load to destabilize.



Automatic Wrappers

Automatic wrappers are similar to semi-automatic wrappers except that they include a conveyor system for automatic loading. The equipment also applies, seals, and cuts the film.

Considerations for Choosing Hand vs. Machine Wrap

Consideration	Reality	Solution
Existence of a Central Packaging Area	Yes	Could use wrapping equipment
	No	Hand-applied wrap
Production Volume	Low (less than 30 pallets in 6 hours)	Hand-applied wrap
	Medium (30 to 100 pallets in 8 hours)	Semi-automatic machine-applied wrap
	High (more than 100 pallets in 8 hours)	Automatic machine-applied wrap
Load Weight	Low (under 1200 pounds)	70 gauge or below hand or machine-applied wrap
	Medium (1200-2000 pounds)	70-85 gauge hand or machine-applied wrap
	High (over 2000 pounds)	90 gauge or above hand or machine-applied wrap
The Load Type	Regular-shaped load fitting close to pallet edges	70 gauge or below hand or machine-applied wrap
	Slightly irregular load and/or fitting within 3 inches of pallet edges	70-85 gauge hand or machine-applied wrap
	Highly irregular load and/or fitting more than 3 inches from pallet edges	90 gauge or above hand or machine-applied wrap
Film Application Speed	Low (hand applied or less than 15 RPM)	Any hand wrap or machine grade wrap
	Medium (machine applied 16 RPMs to 25 RPM)	Any machine grade wrap
	High (machine applied great than 25 RPM)	Heavy duty single-sided cling

3. Blown Film or Cast Film

There are two basic methods of manufacturing stretch film—blown and cast. The manufacturing process determines the film properties.

Blown film is manufactured using the blown film extrusion process. The resin is melted, blown out in a giant bubble and air-cooled. This is a slower (more costly) process but results in higher quality. Characteristics are: superior strength, stretch, film memory, and puncture resistance; but poor clarity and very noisy during unwind. It has the superior strength to accommodate irregular loads.

Cast film is manufactured using the cast extrusion process. Instead of being air-cooled, the film is passed over cooling rollers. This makes the cooling process quicker and the product less expensive, but also inferior to blown in important regards, including strength and stretch. Typical characteristics of cast stretch films are: clarity, high gloss, quiet unwind, consistent cling and consistent film thickness.

So what are the differences between blown and cast stretch film?

- **Strength:** Blown is slightly stronger than cast and less likely to tear on a sharp edge.
- **Film Yield:** Blown films often top out at 200% stretch capacity because the manufacturing process is less controlled and precise. Some of the newer high performance cast films can be stretched to 300%.
- **Film Memory:** Blown has better film memory (shrinks back to its original size better after it has been stretched). Cast has less memory (this causes loads to shift).
- **Load Retention:** Blown holds better and won't stretch after it has been applied. While cast retains loads well, it will stretch after it has been applied to the pallet (this also causes load shifting).
- **Puncture Resistance:** Blown resists puncturing much better than cast, which will generally tear when over-stressed. Blown is more forgiving around sharp edges.
- **Visual Clarity:** Blown is not crystal clear. This can make reading and scanning harder, but it helps reduce distracting glare. Cast is clear; making reading and scanning under typical warehouse lighting easy.
- **Rewind Noise:** Blown tends to be very loud when it's unwound from the roll. Cast makes almost no noise.
- **Film Cling:** Blown has one-sided cling—this creates higher load retention. Cast has a natural cling on both sides. This can make pallets stick together. However, cast film can be manufactured with one-sided cling.

Because of inferior strength and film memory, cast is best for lighter loads with standard shapes. It also tends to be less expensive than blown—which makes it a good choice for less demanding high production applications.

4. Standard or Pre-Stretched

Pre-stretched film is stretched close to its ultimate breakpoint at the factory and then wound onto rolls. This means the film doesn't require nearly as much physical energy to apply as standard stretch film. This is the main reason that pre-stretched films are popular for hand wrapping. In fact, pre-stretched film applied by hand can create the same load stability as machine applications. The rolls are also light and easy to handle and can be applied with a walk-forward wrapping technique, which helps prevent slip and fall incidents. Basically, users get the same (or better) load stability with less product, less physical energy, and greater control.

COMPANIES THAT POSITION THEMSELVES AS GREEN CAN MAKE A GOOD CASE FOR USING PRE-STRETCHED FILM SINCE IT REQUIRES LESS PRODUCT

While pre-stretched film is more expensive per foot than traditional film, it requires about half the amount of film, which can create a net cost savings (the film is much lighter and therefore less expensive per pound). Another plus is that pre-stretched film will naturally tighten after application. This unique film memory and its tendency to tighten after application are the most important reasons for pre-stretching film.

Jobs that make the most sense for pre-stretched film are those that require hand application—especially where workers don't have the strength to handle or tighten traditional film and/or where workers are handling irregularly shaped loads. Pre-stretched film should be used for loads no heavier than 1,200 pounds, since it is usually stretched too thin to hold a heavier load. It can be applied either by hand or with automatic machinery. Companies that position themselves as green can make a good case for using pre-stretched film since it requires less product.

Specialty Wrap

In addition to the 4 considerations mentioned above, there are specialty qualities that are very beneficial for some applications:

- **Ventilated:** Common applications include anything that needs heat and moisture to vent in order to avoid spoilage, such as produce and other food products.
- **Colored/Printed:** Using stretch film in a variety of colors or that is printed, makes it easier to identify products and spot tampering. It's also great for product coding and dating.
- **Bundling Film:** This comes in 2", 3", and 5" widths and replaces tape and string. It has the advantage of not leaving sticky residue or string marks. It's best for packaging small items together.
- **VCI:** Vapor-corrosion-inhibiting stretch film blocks moisture and contaminants, thus preventing rust and corrosion. It's excellent for products that come into contact with water and other rust/corrosion promoting substances—including rain and salt water vapor typical near seaside docks.
- **UVI:** Users that store loaded pallets outside for any length of time will need an ultraviolet inhibiting film. However, UVI films vary in how long they will provide protection before the UV properties begin to diminish (usually 3-12 months).

Three Users with Different Needs

The above considerations should make stretch film selection straightforward. To illustrate, here are three examples of different users with very different needs.

Stretch Film User #1

The first user is a heavy-duty equipment parts supplier that has a high volume of irregular-shaped, heavy loads that tend to shift during shipping. The loads often sit in hot and cold warehouses and outside for extended periods of time. He needs film that:

- Can be machine applied
- Is puncture resistant
- Is heavy duty
- Deflects UV light
- Retains its properties in a variety of temperatures
- Only clings on one side
- Is pre-stretched

[B2B Industrial Packaging's Expert Recommendation:](#)

A Traditional Blown Machine Film

Stretch Film User #2

The second user runs a small publishing house. She has a relatively low volume of lightweight regular-shaped loads, and no stationary packaging area. In addition, she promotes her company as Green. She needs film that:

- Can be hand applied
- Comes on lightweight rolls
- Is eco-friendly
- Has only the minimum amount of other properties

[B2B Industrial Packaging's Expert Recommendation:](#)

A High Performance Cast Hand Film

Stretch Film User #3

The third user is a furniture manufacturer with both regular and irregular-shaped loads, a high shipping volume of fragile products, and a stationary packaging area. He needs film that:

- Can be machine applied
- Is puncture resistant
- Is heavy duty
- Retains its properties in a variety of temperatures
- Is pre-stretched

B2B Industrial Packaging's Expert Recommendation:

Heavy Gauge Traditional Cast Machine Film

By now you should be fairly certain as to what you need, but probably need a little confirmation. Where can you go for unbiased advice? Look for an industrial packaging supplier that's been in the business for many years and has a stake in your satisfaction. A good packaging supplier, like [B2B Industrial Packaging](#) will want to establish a long-term relationship based on trust, not a quick sale. So call us now for expert advice that will lead to immediate and long-term cost savings.

Takeaways

- Knowing that stretch film is sold by weight makes price comparisons much simpler.
- Don't just focus on price; the requirements of the application are much more important.
- A primary consideration is whether the load is irregular and how much tear and puncture resistance is needed.
- In some circumstances, pre-stretched film can eliminate the need for a machine.
- Special qualities, such as UV protection, allow customized protection.
- The bottom line is that you need to know the best type of film for the application and explore the most economical solutions.

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