



**cYnch**<sup>®</sup>

THE PACKAGING INCORPORATED

# Guide to Strapping

Thank you for downloading the Packaging Incorporated Guide to Strapping! We hope you find it useful as you examine your current strapping process, tools and products to determine if it needs a revamp, or if you're going to be using strapping for the first time, or if you just want to know what's out there.

Please let us know if you have any questions about strapping - our strapping experts are always here to help!

# Strapping Types

Strapping comes in several different materials: steel, polyester, polypropylene, and woven cord. The best type for your application will vary based on several factors, such as weight, size and shape. Learn more about each type:

## **STEEL STRAPPING**

Steel strapping is the strongest variety of strapping and is therefore used for the most demanding, heavy-duty applications. Good elongation and recovery are not key characteristics of steel strap, however high break strength provides reliability. Think of strap in terms of a rubber band. If steel strap were a rubber band it would be a very strong, rigid rubber band that does not stretch. This characteristic is good because it is tough to break. However, when it is stressed to the point of breaking, it just breaks instead of elongating and recovering. Steel strapping is widely used across the industry today, but recent advances in plastic strapping technologies have made many people switch from steel to plastic.

## **PLASTIC STRAPPING**

Unlike steel strap, elongation and recovery are characteristics shared by all plastic strapping types. However, these characteristics vary greatly between types of plastic. It is important that you select the right plastic and tooling for the job.

How do you know what's right for your job? Safety should be your first consideration and we recommend you call one of our experts for a free consultation to choose what best fits your needs. Below, we will describe the main types of plastic straps. Each type of plastic strap has many options dictated by the demands of the application. One size does not fit all.

### **Polyester**

By far the most common replacement for steel strap is polyester strapping. Polyester can achieve high break strengths, handle high tension and has great elongation and recovery. Due to these qualities, polyester works well on heavy, shrinking and/or settling loads. Polyester by far has the best tooling options available. Another important detail is that polyester is made mostly from pop bottles; it is both made with recycled material and can be recycled.

### **Polypropylene**

Polypropylene is another popular strapping option. You will often see polypropylene used in automated strappers and light duty applications because it is known for low break strengths, high elongation and low recovery. Polypropylene either stretches out easily and does not recover or simply breaks.

## **WOVEN CORD AND NYLON STRAPPING**

These are a couple of less common straps. These are used in specialized applications, and one of our strapping consultants can help you determine if they are an option.

# Strapping Resources

## What's the difference between plastic and steel strapping?

### THE INTRODUCTION OF PLASTIC STRAPPING

When plastic strapping was introduced, it was only natural that it was looked upon as a substitute for steel strapping. In one respect, it was – especially in those applications where steel had been used only because there was nothing available. Often, the steel was over specification in the first case. The existence of plastic strapping widens the range of strapping and offers new opportunities. But to take advantage of those opportunities, you have to know how it differs from steel.



### THE KEY DIFFERENCE BETWEEN PLASTIC AND STEEL STRAP

With steel, elongation is not a key characteristic. It is a consideration with plastic strap, as long as you stay within its working range. A more important plastic strapping consideration is elongation recovery. Once tension has been applied and the strap has elongated, how hard will the strap try to return to its original length?

Loads of lumber are a good example of a good conversion from steel to polyester application that shows how all the strapping factors work in a real world application. While the polyester often has a lower shear break strength than steel, its ability to elongate and recover often still make it more effective than steel for loads of lumber. Let's go back to our rubber band analogy. Lumber is heavy, it gets jarred in transport, it shrinks as it dries and the load often settles during transport.

With all that considered, a strong yet flexible rubber band (referred to as #1 from now on) will perform better than a rigid rubber band (#2) that lacks the ability to elongate and recover. On impact, rubber band #1 stretches and recovers while rubber band #2 may break. If the load shrinks or settles, rubber band #1 will recover while holding the load tight, while rigid rubber band #2 may end up getting loose, leaving our load unprotected.

When converting from steel to polyester strapping, people often get too focused on break strength. Break strength is an important factor, but lower-strength polyester can often hold a load better than higher-break-strength steel because of its ability to elongate and recover (like a rubber band).

# Strapping Resources

## **CONVERTING FROM STEEL STRAPPING TO PLASTIC STRAPPING**

Production of high quality, high strength plastic strapping has not been much of an issue for quite some time. Traditionally, the only thing holding back conversions from the heaviest of steel strapping to plastic was the technology available when it came to the tooling used to apply plastic strapping. In the last few years, we have seen the introduction of tools capable of handling the largest and heaviest plastic strapping. Not only does this tooling work, but it often works better than what is available for the steel strap it is replacing. Most of the leading tool manufacturers recognize that steel strapping is becoming a thing of the past. With that realization in mind, most major tooling manufacturers are directing their resources to developing new plastic strapping tools instead of steel strapping tools. The result is that steel tools are often older designs, because plastic strapping tools are stealing all the engineering resources.

## **UNDERSTANDING TENSION, ELONGATION, RECOVERY & WORKING RANGE**

To really understand what we're talking about, let's familiarize ourselves with these terms and how they apply to strap.

Tension is pretty simple: When we put strapping in a tool or use any other form of pulling or pushing a strap tight, we are tensioning the strap. Once we apply enough tension to the strap, it will begin to stretch or elongate. Elongate the strap enough and it will want to come back to its original size, or recover. When we elongate the strap to a point where it wants to recover but not so much that it can't recover, we are in the strap's working range.

### **More on Working Range**

The working range of strapping is the sweet spot when strap will perform to the best of its ability. It is difficult to define exactly what that is here because of the many variations of strap. Generally speaking, the working range is when the strap has been tensioned to the point where elongation has occurred but not elongated to the point that the strap cannot recover. If you are unsure of the working range of the strap you are using, please contact us for a more in depth consultation.

### **More on Recovery and Tension Decay**

The amount of recovery depends on the material, the amount of tension, and the amount of time held at that tension. If the tension is released immediately, plastic will recover a good deal of its elongation. As time increases, the amount of recovery will diminish. Over time, tension will diminish as well. This is known as tension decay. Polyester exhibits the least amount of tension decay, then nylon, then polypropylene which shows the largest amount of tension decay. Nylon and polyester work best when you need higher initial tension. Polypropylene is best when high initial tension is unimportant and only low retained tension is needed.

# Signode's Table

Wondering which strapping type is right for your application? This table, created by Signode, is a pretty good overview of what each type offers in terms of strength, tension and recovery. The right type for you isn't always cut-and-dry, though. We recommend speaking with a strapping expert before making your decision.

|                     | POLYPROPYLENE | POLYESTER | HIGH-STRENGTH<br>POLYESTER | STEEL      |
|---------------------|---------------|-----------|----------------------------|------------|
| BREAK STRENGTH      | Moderate      | Moderate  | High                       | Highest    |
| WORKING RANGE       | Lowest        | Moderate  | High                       | Highest    |
| RETAINED TENSION    | Fair          | Good      | Good                       | Highest    |
| ELONGATION RECOVERY | High          | Fair      | Fair                       | Negligible |
| HEAT RESISTANCE     | Fair          | Good      | Good                       | Excellent  |
| HUMIDITY RESISTANCE | High          | High      | High                       | High       |
| EASE OF DISPOSAL    | Excellent     | Excellent | Excellent                  | Fair       |

# Maintenance & Repair by Packaging Incorporated

## EQUIPMENT AND TOOL REPAIR

Our state-of-the-art service facilities are second to none. We are very proud of our service, and we understand the importance of it for our customer base. We can service your packaging equipment at your facility, and hand tools can be sent to us to be rebuilt at our facility in Eden Prairie, MN.

We are a Paslode Certified Repair Center and the only distributor in the country to be a Polychem Warranty & Service Center.

## EQUIPMENT AND TOOL MODIFICATIONS

We understand that not every packaging tool or machine will work out of the box for your application. We have an experienced staff of technicians that can modify them to fit your needs.

## TOOLS & EQUIPMENT WE REPAIR

Don't see your strapping tool or machine on this list? We might still be able to help. To schedule service or ask a question, give us a call at 800-328-6650.

### STRAPPING TOOLS

- Carolina Strapping
- Cynch
- Fromm
- Gerrard
- Kubinec
- MIP
- Orgapack
- Polychem
- Rapz
- Signode
- Teknika
- Zapak

### POWER STRAPPING MACHINES

- Mosca
- Polychem
- Signode



## Strapping Safety

Testing to make sure your choice in strap is right for your application previous to implementing a change is very important. Potential of injury is often present when loads fail, and of course preventing injury should always be top priority. Beyond making safe choices in conversions, we must consider safety of use. How safe is the steel strap you are using now? No matter how high quality the steel strap you are using may be, it is dangerous to handle, apply and remove.

While cost savings are important to companies today, the number one reason we assist in conversions to plastic is to avoid injury or in response to it. Most often, companies will not receive product secured with steel strap. Every year, we convert more and more companies from steel to plastic. With the tooling technology needed to apply plastic strapping improving at a rapid pace, it is not a matter of if a company will convert from steel to plastic, but when.



## Conclusion

How do you know how all of the strapping factors will come into play with your application? There is no perfect science, since each application is so different.

That's why, at Packaging Incorporated, we work with you to make sure you understand your strapping choices and help you make the decision about what's right for your unique application. Call one of our experts today, and we'll help you determine what's going to work the best for you!