



The Science of Strap Selection

Executive Summary

Selling a great product is just the start of running a successful product-based business. You also need to get that product to your buyer in perfect condition.

Delivering a damaged product is costly – it increases expenses for your business, and it can lose you customers – which is why it's so important to find a partner who can deliver a perfect product, every time.

That's where Samuel Packaging comes in. With top-of-the line strapping specifically designed to secure packaging, and pallet loads in a cost-effective way, we eliminate the risk of damage during transit.

But we also understand that finding the right strap can be confusing – they all come with their own material types, gauges and recommended applications – which is why we designed this guide. All the information you need to make the best packaging decision for your business is right here.



Strapping Explained

Strapping is a flat, flexible material that minimizes product damage by keeping the load under constant tension. This tension prevents the load from shifting or slipping out of place, particularly during transit.

Additional edge protection can be added to protect corners and further stabilize the load.

There are five ways to use strapping during the packaging process:



1. CREATING UNITS (UNITIZING)

Bundles of product are assembled into a stack or block. Strapping is then used to compress the stack and create a unit of product.

Useful For: Metals, Forestry

2. PALLET PROTECTION

The right strapping can help keep your pallet of products in place during transportation and handling.

Useful For: Metals, Distribution, Cotton, Forestry and General Packaging

3. BUNDLING LOOSE MATERIALS (BALING)

Large volumes of loose materials are gathered into a bundle. Multiple straps are then used to compress the bundle into a bale.

Useful For: Cotton, Hay, Corrugated

4. PACKAGING REINFORCEMENT

Strapping can add additional security to pallets and units that have already been packaged with other materials, particularly stretch wrapping.

Useful For: Bottle & Can, Consumer Product

5. SEALED FOR SHIPMENT

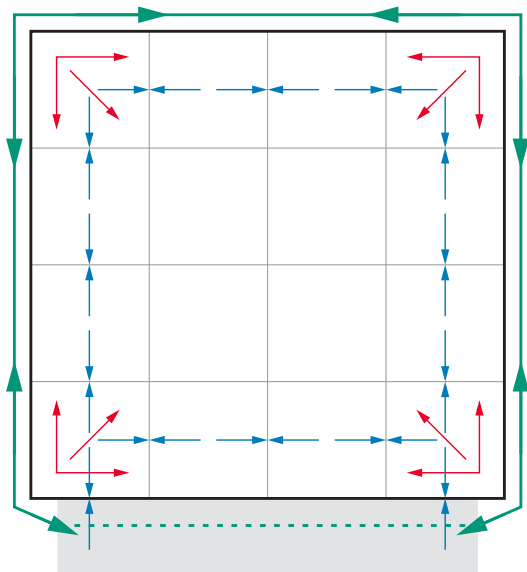
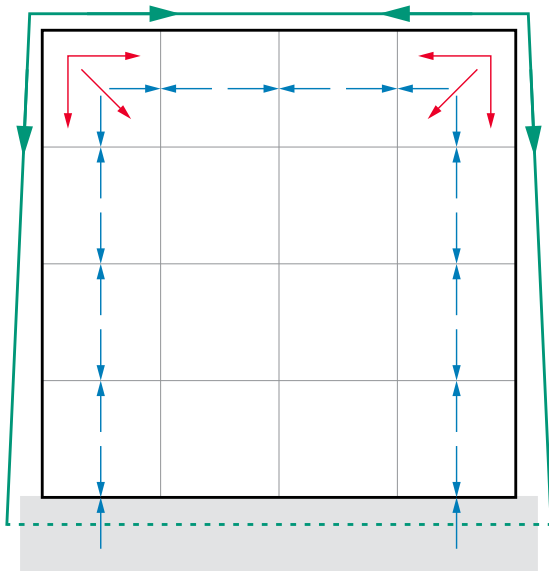
Strapping can be used to securely close and seal product containers, such as boxes and crates, prior to transportation.

Useful For: Metals and Distribution



How Strapping Works

All strapping is applied under tension, which applies a compressive force to a stack of items or packages. This compressive force pushes the individual items together and has to be properly balanced so that it keeps the load secure without damaging the product.



STRAPPING TERMS

Break Strength/Load

The amount of force required to break a strap. An applied tension's working range is normally far below this limit.

Creep

Permanent deformation of the strap due to extended amounts of stress.

Elongation

How much a strap will stretch when under tension.

Elongation Recovery

How much tension the strap will recover after being stretched.

Retained Tension

How much tension a strap can consistently apply over an extended amount of time.

Shear

Amount of stress applied to a curved surface.

Stress Relaxation

How much strap is under constant strain stretch to accommodate stress.

Tensile Strength

The break strength, expressed in LBS rather than PSI.

Steel Strapping

Still the primary strap in the packaging industry, steel is the most used strapping material in the world. It's high tension rating, temperature resistance, and column strength make ideal for medium to heavy loads. Steel strapping is painted and waxed to provide smooth machine feeding and operator safety.



SEALS

Used to secure straps after tensioning, we offer a variety of seal options to meet the exact needs of your application or process.



Open

Fast and easy to use, these seals can be placed over strap before or after tensioning.



Thread-On

Used to pre-thread strap prior to tensioning.



Push/Closed

Used to pre-thread strap prior to tensioning.



Open Flange

Ideal for heavy-duty applications, these seals can be placed over strap before or after tensioning.

ADVANTAGES

- High Tensile strength
- Retains tension over time
- Resistant to temperature changes and UV

QUALITY & STANDARDS

- AAR 33 Certified
- ASTM-based product designs

DIFFERENTIATORS

- Capacity to support North America operations
- Capability to offer a variety of finishing options, including; custom paint colors, zinc coating, galvanization and seamless product
- Jumbo coils – ability to produce coils up to 2,000 lbs. with fewer weld joints
- Product offering also includes three different tensile strengths and punching capability



Polyester Strapping

A great alternative to steel, polyester strapping offers good tensile strength, excellent retained tension, and responds well to shock during transit. Its excellent elasticity helps keep loads compressed, making it a great option for many industries and heavy duty applications.



HOW TO SEAL PLASTIC

Friction Seal

This method involves rubbing two sections of strap together at high speed. The friction creates a molten weld pool. The straps are then pressed together and held in place until the pool cools and forms a secure seal.

Heat Seal

An electrically heated blade is inserted between two straps to create a molten weld pool. The blade is quickly removed and the two straps are pressed together, creating a secure seal.

Steel Seals

Steel seals can also be used to secure polyester straps. Seals can be applied in multiple ways, ranging from manual tools to automated machinery.

ADVANTAGES

- High-strength, sustainable strapping for demanding applications
- Mega coils for forestry – extended runs & efficiency
- Conversion opportunity to replace steel for added benefits of safety and high recovery for heavy loads

QUALITY & STANDARDS

- ISO-Certified quality system
- ASTM-based product designs

DIFFERENTIATORS

- Custom strap printing for branding
- AAR-22 Certified – trusted for heavy-duty transport
- Automated line – enhanced capacity & quality

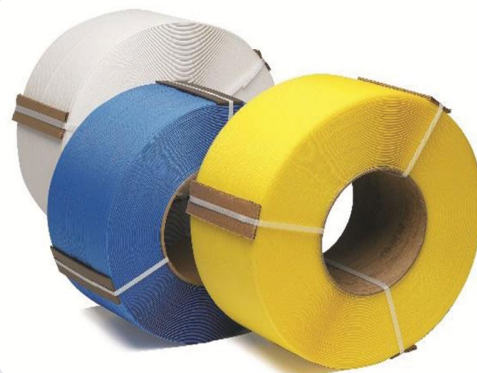
INDUSTRY FOCUS

- Leader in cotton industry – proven expertise



Polypropylene Strapping

The most economical strapping material, polypropylene can be used for light and medium loads. It can absorb shock during transit due to its high elongation rating and is also highly resistant to corrosion and moisture. However, polypropylene will deform if put under tension for long periods of time.



POLYPROPYLENE STRAPPING

Wire Buckle



Metal Seal



Friction Weld



Plastic Buckle



Heat Seal



ADVANTAGES

- Durable & versatile
- Full digital printing on sheet line
- Large sheet line for high-volume production
- New strand line for improved capacity
- Custom strap designs
- ASTM-based product designs

QUALITY & STANDARDS

- ASTM-based designs ensure compliance
- Enhanced strength and consistency

DIFFERENTIATORS

- Advanced strand line technology
- Tailored strap solutions
- ASTM-compliant designs

INDUSTRY FOCUS

- Packaging
- Industrial strapping
- Construction materials
- Automotive components



Appendix

Comparison of Strap Properties

PROPERTY	STEEL	POLYPROPYLENE	POLYESTER
UV	●	●	●
Moisture	●	●	●
High Temperature	●	●	●
Low Temperature	●	●	●
Corrosives	●	●	●
Tensile Strength	●	●	●
Elongation	●	●	●
Elastic Range	●	●	●
Elongation Recovery	●	●	●
Creep Resistance	●	●	●
Retained Tension	●	●	●
Corner Strength	●	●	●
Energy to Break	●	●	●
Notch Sensitivity	●	●	●

Comparison of Package Types and Strap Selection

PROPERTY	STEEL	POLYPROPYLENE	POLYESTER
Rigid	●	●	●
Moderate Expanding	●	●	●
Severe Expanding	●	●	●
Moderate Settling (<2%)	●	●	●
Severe Settling (>2%)	●	●	●

● GOOD ● FAIR ● POOR

FINDING THE RIGHT STRAP FOR YOU

You will need to share answers to the following questions with one of our sales representatives to ensure you're getting the right strap for your needs:

What is your product?

What is the weight load of your product?

What are the load dimensions?

What is your shipping method?

Where will your product be stored, inside or outside?

The amount of stress a strap can take before it reaches critical failure. You will need the load weight of your product to determine this number.