



The perfect fit
in stretch hood



Stretch Hood

Resin Solutions

Plastics — North America



Whether you're wrapping a pallet of empty water bottles or two tons of cement bags, stretch hood technology offers the most comprehensive benefits when compared to other types of pallet unitization methods. The Dow Chemical Company, with its long, successful history in film, offers much more than a single solution. We use our broad portfolio of plastics resins and technology to deliver formulations tailored to meet specific pallet load requirements.

The stretch hood advantage

Through advancements in resin and film technology, today's multilayer film structures provide improved properties and performance in stretch hood applications.

The process

The film is fed into a stretch hood machine, which gathers the film; cuts and seals the top side; stretches it beyond the size of the load to be wrapped; then pulls the hood over the load. When the mechanical arms release the film at the bottom of the pallet, the film snaps back – conforming to the shape of the load and partially wrapping under the pallet for added stability.

This efficient, fully automated process offers manufacturers, logistics companies, and retailers a range of benefits over other pallet wrapping methods – from potential cost savings and material handling conveniences to product display opportunities and other value-adding benefits.

Logistics management and weatherability

Stretch hood machines can churn out more than 100 pallet loads per hour – versus approximately 60 loads per hour for stretch wrap. In addition, one roll of stretch hood film is good for 800 to 1200 pallets, with a roll change every 5 to 12 hours. By way of comparison, one roll of stretch wrap is typically good for roughly 150 pallets, with a roll change every several hours. **Higher throughput** and less downtime equals the potential for increased productivity.

Another key advantage of stretch hoods is **five-sided protection**, which greatly reduces the risk of damage to products due to weather. With excellent seal strength, the top side of each stretch hood is closed to ensure products stay dry and to provide protection against ultra-violet radiation. This gives retailers the ability to create more in-store floor space by keeping more products outside – even moisture-sensitive products like cement bags.

In addition, because of excellent package integrity (which will be discussed in the next section), pallets using stretch hood wrap offer improved transport stability and stackability.

Package integrity

The most important requirement for any pallet wrapping method is that the load stay securely on the pallet, especially when in motion. For stretch hoods, **load stability** is largely determined by finding the right balance of holding force and elasticity. Typically, a hood structure sacrifices one for the other, and the property balance depends on the pallet load requirements. A load of empty PET bottles, for example, would require low holding force (high elasticity) to avoid crushing the bottles, compared to a load of concrete blocks that would require very high holding force (low elasticity).

Conventional stretch hood films offer good holding force with acceptable elasticity. Today, through advances in polymer science, there are stretch hood films available that offer a differentiated set of performance attributes, including giving users independent control over elasticity and holding force.



Because they conform tightly to loads and because of the sealed top side, stretch hoods help protect palletized products from water, dirt, and even insect and rodent infestation. However, that protection is only as good as the film's **abuse resistance**, especially resistance to punctures. Good puncture resistance is particularly important for pallets of products with sharp edges and corners, such as concrete blocks and wood fencing.

Of course, most sharp objects won't be deterred and can eventually break through a film with even the best puncture resistance. This is why tear resistance is also an important stretch hood attribute – so that the film surrounding any hole resists tear propagation and that the film structure maintains good overall holding force in spite of the puncture.

Display properties

The stretch wrap process applies multiple layers of film to the cargo, obscuring a person's view of the products being shipped or stored, especially when wet or dusty. The stretch hood process applies a single layer of film that envelops the load. This, along with the film's **clarity** enable the products to be clearly seen, which helps the logistics function identify inventory errors, tampering, or product damage.

Stretch hood display properties also enable constant **brand exposure**. Whether transported on the back of open trucks or prominently displayed on retail warehouse floors, stretch hoods provide a crystal clear view of product names and logos – allowing companies to seize branding opportunities and a larger share of voice in the highly competitive marketplace. Some stretch hood films also offer good **printability**, allowing further branding opportunities.

Value creation

All of these benefits of stretch hood combine to create value for retailers, brand owners, and logistics companies who need a total pallet unitization solution. Stretch hoods also offer potential cost savings per load when compared to other pallet packaging methods. For example, stretch wrap requires the addition of a top sheet to achieve five-sided protection, and shrink wrap is associated with high energy costs because of the heat used in the packaging process (see Tables 1 and 2).

Table 1: Comparison of the primary pallet packaging methods

	Pallet Packaging Methods			
	Stretch Hood	Stretch Wrap	Shrink Hood	Corrugated
Load protection	+	○	+	-
Load stability	+	+	○	○
Load visibility	+	○	+	-
Irregular loads	+	+	○	○
Line speeds	+	-	○	-
Cost per pallet	○	+	○	-
Labor costs	+	-	+	○
Energy cost	+	+	-	+
Capital cost	-	+	-	○

+ excellent ○ good - acceptable

Table 2: Matching film characteristics to load type

	Building Materials		Heavy Duty Shipping Sacks		Consumer Products		Appliances	Food & Beverages	
	Brick	Insulation	Cement	Resin	Paper Products	Storage Bags	Refrigerators, Washers, etc.	Dry Goods	Empty PE Bottles
Holding force	4	1	5	5	1	4	1	4	1
Elasticity	2	4	2	2	4	2	5	2	5
Abuse resistance	5	5	4	4	5	5	3	5	3
Optics (clarity)	1	2	1	1	3	3	4	3	4
Print capability	3	3	3	3	2	1	2	1	2

5 = most important 1 = least important

Choose stretch hood solutions from Dow

With an extensive line of proven and innovative elastomers, Dow can help stretch hood film converters create differentiated film structures – structures that yield better performance and that can be tailored to achieve performance specific to individual load requirements.

Dow offers multiple formulations, consisting of trusted and proven names like:

- AFFINITY™ Polyolefin Plastomers
- DOW™ Low Density Polyethylene Resins
- DOWLEX™ Polyethylene Resins
- ELITE™ Enhanced Polyethylene Resins
- VERSIFY™ Plastomers & Elastomers

Film formulations based on VERSIFY Plastomers & Elastomers and AFFINITY Polyolefin Plastomers compete on cost with existing alternatives, while delivering opportunities for downgauging and excellent toughness and puncture resistance. And, combining these products with DOWLEX Resins, ELITE Resins, or DOW Low Density Polyethylene Resins gives the final stretch hood film structure the holding force it needs depending on the application (see Figure 1).

In addition, because of its broad range of products and a focus on constant innovation, Dow is able to help build a higher value, higher performing stretch hood film. The lower density of Dow's offerings, compared to EVA-based (ethylene vinyl acetate) structures, means that stretch hood film made with Dow resins is cost competitive, even at equal thicknesses. And, compared to traditional alternatives, film structures containing Dow elastomers can be stretched to higher ratios and/or downgauged, resulting in cost advantages without a loss in performance (see Table 3).

Figure 1: Three-layer stretch hood structure composition



Table 3: Cost/benefit comparison – Dow offering vs. competitive products

Inputs	VERSIFY™ Plastomers & Elastomers	VERSIFY™ Plastomers & Elastomers	AFFINITY™ Polyolefin Plastomers	Competitive	Competitive
	Holding Force/Elasticity	High Elasticity	High Holding Force	(High VA EVA)	(Low VA EVA)
Thickness (mil)	4	4	4	4	4
Overall film density (g/cc)	0.904	0.896	0.912	0.933	0.925
Inner layer ratio (%)	20%	20%	20%	20%	20%
Core layer ratio (%)	60%	60%	60%	60%	60%
Outer layer ratio (%)	20%	20%	20%	20%	20%
Relative film cost (per msi basis)	0.91	0.93	1.00	0.95	0.93



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Dow's suggested stretch hood structures can be formulated for excellent elasticity, resulting in a film that conforms tightly to the contours of the packaged goods. And, Dow's resin solutions help achieve excellent holding force at lower densities (compared to EVA-based films). That means more film per pound of resin and potentially lower raw material costs. (See Figures 2 and 3.)

Tailored solutions. Unique advantages.

When you choose Dow resins for your stretch hood film, you get all of the advantages a stretch hood structure should offer, including these key benefits:

- Greater independent control over elasticity and holding force (no longer a need to sacrifice one for the other) to meet the requirements of a wide range of pallet load types
- Optics (clarity) better than or equal to EVA-based structures
- Excellent puncture/tear/dart resistance
- Excellent water and UV resistance
- Comparable in economics to EVA-based structures
- Downgauging potential without sacrificing performance

Figure 2: Product performance comparison – elasticity vs. holding force

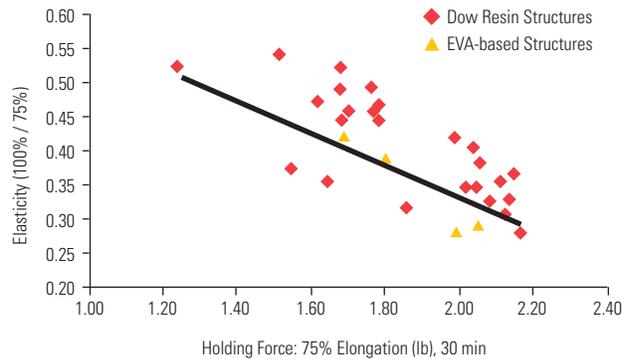
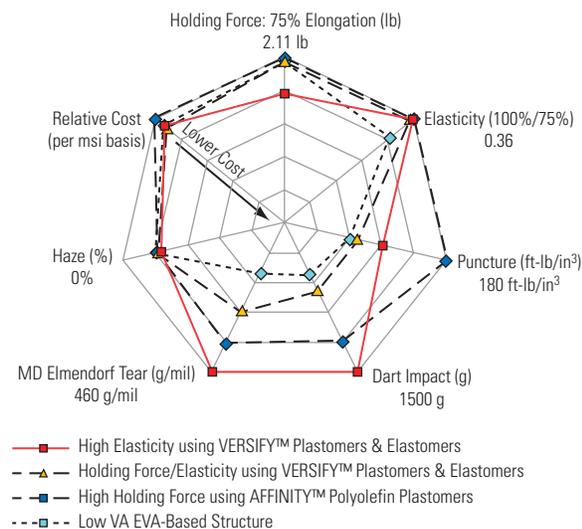


Figure 3: Product performance comparison – various attributes



For more information on what's happening in stretch hood technology, the broad range of resin solutions from Dow, or to consult with a Dow technical representative to determine the best formulation for a particular pallet load type, call 1.800.441.4369 or go to www.dowplastics.com. And, check out our full product offerings for shrink hood and stretch wrap film as well.



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- use in cardiac prosthetic devices regardless of the length of time involved; (Cardiac prosthetic devices include, but are not limited to, pacemaker leads and devices, artificial hearts, heart valves, intra-aortic balloons and control systems, and ventricular bypass assisted devices);
- use as a critical component in medical devices that support or sustain human life; or
- use specifically by pregnant women or in applications designed specifically to promote or interfere with human reproduction.

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