

The Clear Choice for Packaging Excellence

Finding the perfect shrink film for your application is easy with the technologically advanced Clysar® family of polyolefin shrink films from Bemis Clysar. Each high-performance Clysar film is engineered to deliver a specific combination of properties, from strength to visual appeal to machinability. What does that mean for you? A tight, durable, attractive package that runs well under your operating conditions—whether you're packaging software or hardware, coffee filters or cauliflower.

Clysar films are available through a global network of specialized packaging distributors. With dedicated packaging expertise and insight, this elite group provides service you just can't get from general industrial distributors. Add Bemis Clysar's world-class technical support, and it's easy to see why Clysar films are the clear choice for packaging excellence worldwide.

The Clear Choice for Quality

When it comes to creating strong, durable packages, nothing beats Clysar films. You'll get the consistently superior product protection you need for shipping, handling, storage and presentation.

- Shrinks tight, even around odd-shaped items or multi-packs.
- Creates consistent, strong, hermetic seals.
- Stays tough and flexible despite freezing or age.
- Certified by the American Institute of Bakery (AIB).
- Meets FDA, USDA, Canadian and European regulations for direct food contact.
- Quality system certified ISO 9001:2000.

The Clear Choice for Performance

We work closely with the leading equipment manufacturers to continually improve Clysar film's machinability and performance for the most demanding applications. That means faster cycle times, less downtime and meaningful material savings—adding up to a significantly lower overall cost per package.

- Allows for cost savings unmatched by other packaging alternatives.
- Wide sealing window for high quality in less-than-optimum operating conditions.
- Won't corrode equipment like other films, meaning less maintenance.
- Available in roll lengths up to 35,000 feet for fewer changeovers.
- Shrink-wrapping offers virtually instant changeovers between product sizes and shapes.
- Clysar grades available for superior performance on all types of machines, from manual to high-speed, fully automatic equipment.

The Clear Choice for Consumer Appeal

Besides creating a taut, attractive package, high-clarity Clysar films have excellent optical properties to make your product shine. And they can be printed with high-impact graphics to create a bold, colorful presentation at retail. Here are just a few of the qualities you'll find with Clysar films:

- Creates uniform seals with fewer “dog ears,” even around odd shapes.
- Showcases package contents with exceptional film clarity and gloss.
- Provides excellent printability for your marketing message.
- Allows tamper evidence and theft resistance to satisfy consumer and retailer demands.

Bemis Clysar is part of Bemis Company, Inc., the largest flexible packaging provider in the Americas. Backed by extensive technology, expertise and resources, Bemis Clysar uses material science and innovation to serve a global marketplace.

Utilize this straightforward, user-friendly Selector Guide to help determine which Clysar film is right for you, or contact our team at 1-888-4CLYSAR (1-888-425-9727) or clysar@bemis.com. Also visit www.bemis.com.

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Demanding Application? We've Got the Solution.

All Clysar® films are polyolefin-based and biaxially oriented to provide maximum strength and uniform shrink characteristics. High-clarity, printable Clysar films are available in flat or folded formats to suit your production needs. Value-added options include:

- Corona treating for high ink adhesion and scuff resistance.
- Surface treatment for improved hot-slip performance.
- Pre-perforation for consistency of air evacuation and therefore enhanced presentation.

Attributes specific to each film are shown here and in the tables throughout this guide.

HIGH-ABUSE FILMS

NEW! Clysar® ShrinkBox™

Abuse-defying, high-clarity shrink film strong enough to replace rigid and flexible packaging alternatives like shipping cartons or polyethylene bags.



When you need extreme product protection along with outstanding optics, new Clysar ShrinkBox film delivers. Featuring the highest puncture, abrasion and tear resistance of any Clysar film, crosslinked ShrinkBox film provides unsurpassed protection and outstanding tamper resistance. With outstanding shrink and conformance to the product shape, ShrinkBox film creates packages that are taut, stable and “earless.” You can also count on ShrinkBox film for high-integrity seals without pinholes.

ShrinkBox film is strong enough to replace high-gauge polyethylene packaging, creating a crisper, more attractive presentation at retail. It also provides a high-visibility alternative to traditional corrugated shipping cartons, allowing products to be displayed in their original packaging.

Sample applications:

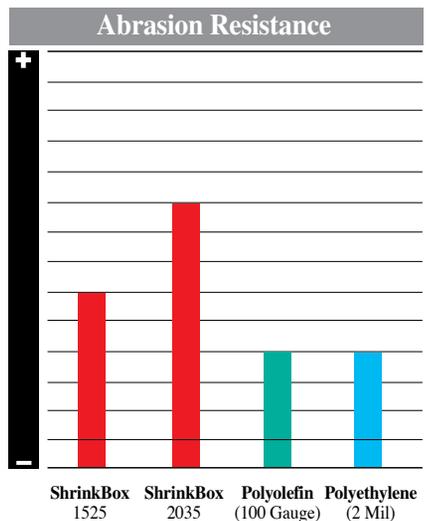
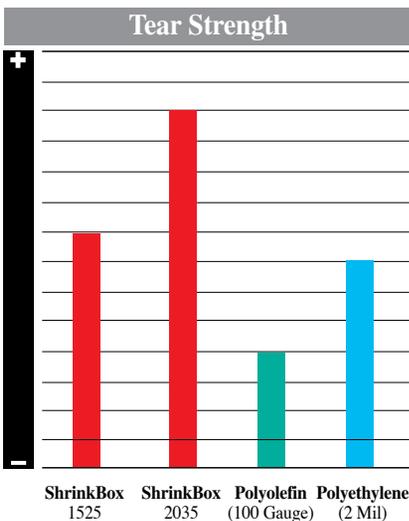
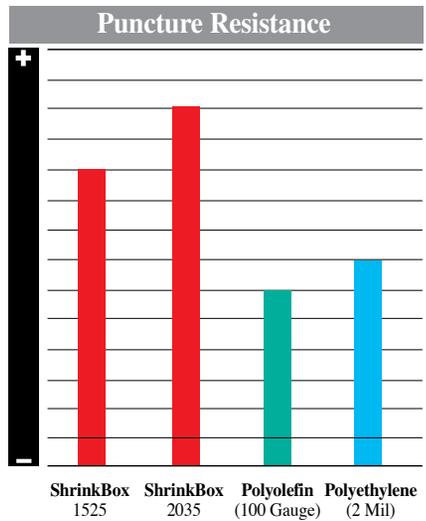
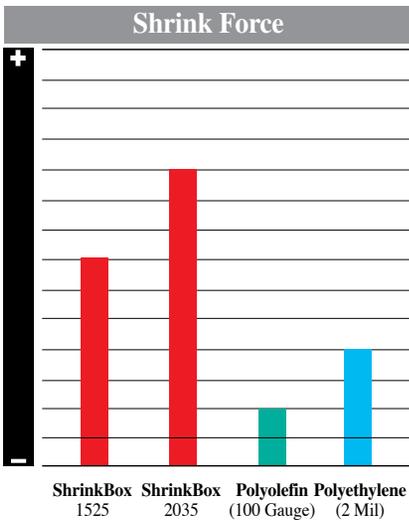
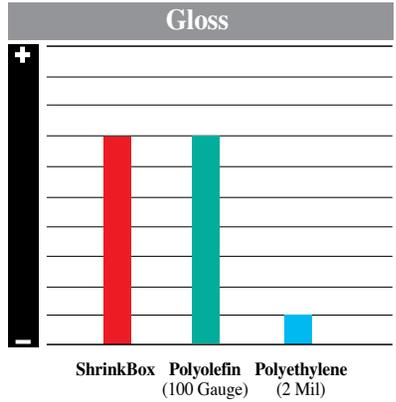
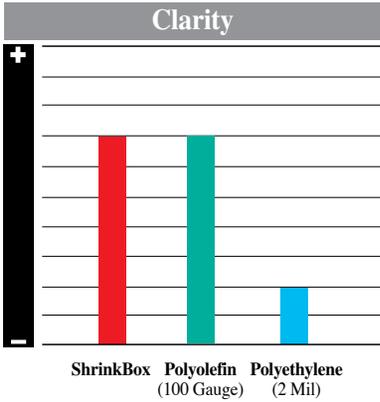
- Industrial products
- Commercial building products
- DIY products like windows, shower doors
- Furniture
- Carpets



Available in two grades:

- ShrinkBox 1525 film for advanced product protection with maximum optical properties
- ShrinkBox 2035 film for maximum physical properties with excellent optical characteristics

How Does ShrinkBox™ Film Compare to Popular Flexible Packaging Alternatives



MULTIPURPOSE FILMS

Clysar® HP Gold (HPG)

A general purpose, crosslinked film providing excellent seals and shrinkage across a broad operating range.

Ideal for the majority of shrinkwrap applications, exceptionally versatile Clysar HPG film delivers strong, durable seals and excellent shrinkage in less than optimum operating conditions. The film does a superior job of conforming to irregular shapes without creating dog ears, and also offers gloss, clarity and printability for outstanding visual appeal. Designed to tolerate tunnels and sealing systems that have wide variations in control, Clysar HPG film creates strong, pinhole-free seals and is compatible with all sealing systems. Clysar VHG is the 50-gauge version of Clysar HP Gold.

Sample applications:



- On-pack promotions
- Bundled products
- Multi-packs
- Consumer goods

Clysar® LLG

A non-crosslinked version of Clysar HPG film

Tough, durable Clysar LLG film has very good optical properties and is suitable for a wide variety of consumer products. Performing best on equipment with a narrow temperature window and short dwell times, Clysar LLG film is a good all-around choice for many manual, semi-automatic and automatic packaging machines.

HIGH-SPEED FILMS

Clysar® EHC

Stiff, flat film that allows for high-speed printing, high-impact graphics and easy static sealing.

Featuring superior stiffness, sheet flatness and gloss, high-clarity Clysar EHC film presents unparalleled graphics capabilities for outstanding shelf appeal. Achieving its best shrink performance at higher temperatures, Clysar EHC outperforms all competitive high-speed films and is unsurpassed in creating pinhole-free seals in static-seal applications.

Sample applications:

- Multi-packs
- DVDs, CDs
- Window boxes
- Printed packages



Clysar® EZ

Multilayer film with excellent all-around performance at medium and high speeds.

For overall versatility and ease of use, nothing beats Clysar EZ film. This multilayered film has excellent clarity and printability to drive shelf appeal, plus balanced shrink properties for a consistently crisp, clean appearance. Highly machinable, Clysar EZ film achieves hermetic lap seals under a wide range of operating conditions. It is an excellent choice for both manual and fully automated machines running medium- or high-speed static sealing applications. Clysar VEZ is the 50-gauge version of Clysar EZ.

Sample applications:

- Pizzas
- Books
- Consumer goods
- Video cassettes
- DVDs, CDs
- Software



SOFT FILMS

New! Clysar® LE Gold (LEG)

High-clarity, low shrink-force film that does away with product crushing or distortion.

Featuring exceptional toughness and elasticity, Clysar LEG film is engineered to conform to and protect even the most delicate or thin products without bending, crushing or creating dog ears. A soft crosslinked film, Clysar LEG film also features superior optical properties, high available shrinkage, excellent low-temperature shrink and superior, pinhole-free sealing across a wide operating range.

Sample applications:

- Thin products
- School and office papers
- Magazines
- Coffee filters
- Stationery



Clysar® ABL

Tough, durable crosslinked film with great memory for oddly shaped packages and more.

With its excellent tear and puncture resistance, high available shrinkage and superior memory, Clysar ABL film is versatile enough to protect products ranging from toys to tools, creating a tight, dog-ear free package no matter what the product shape. Perfect for older equipment, this soft film is designed specifically for use with a wide variety of sealers and for tunnels with limited air flow. No other soft film shrinks without burn-through at such a wide range of temperatures. It also runs well on all L-sealers and automatic side-seal systems.

Sample applications:

- Automobile/vehicle parts
- Craft items
- Gift wrap rolls
- Toys
- Tools



ANTIFOG FILM

Clysar® AFG

Anti-fog film ideal for fresh food and meat products.

Clear, glossy and printable Clysar AFG film is a perfect overwrap to keep foods looking fresh and appetizing at point-of-sale. Engineered to keep condensation in check under ambient and refrigerated conditions, Clysar AFG film also offers excellent recovery and memory properties to create a clear, tight package that maintains its appearance during distribution, display and consumer handling. The tough film resists tears and punctures and provides tight seals.

Sample applications:



- Fruits
- Vegetables
- Sausage
- Poultry

Compare Properties to Find the Perfect Fit

Shrink Force

Figure 1A.

Shrink Force at 230° F (110° C).
Average value of MD and TD.

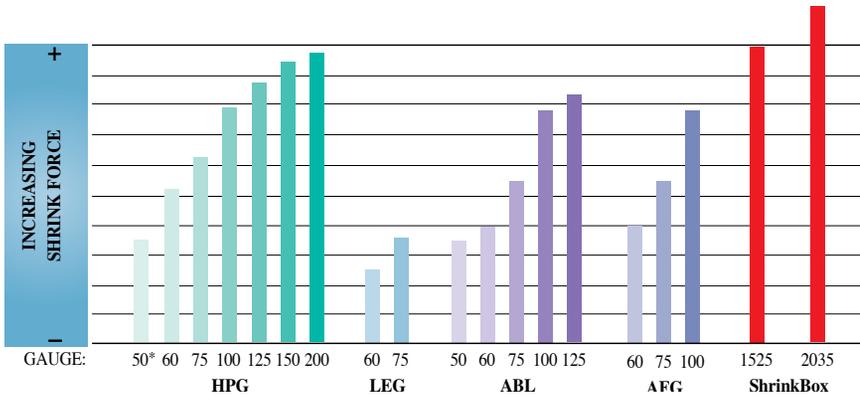
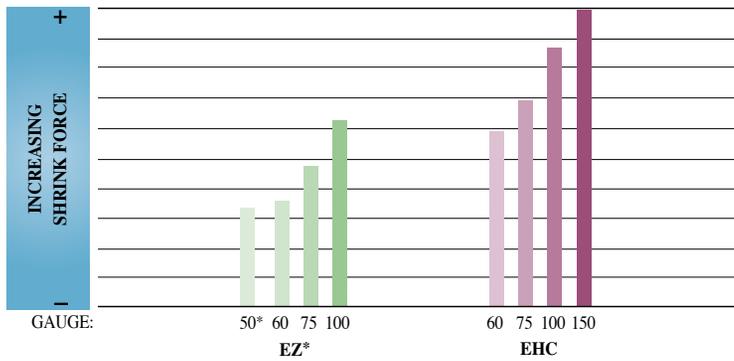


Figure 1B.

Shrink Force at 230° F (110° C).
Average value of MD and TD.



Shrink force is the force exerted by a film as it is restrained while attempting to achieve full shrinkage at a given temperature. Shrink force—which represents the amount of pressure exerted on the product being wrapped—increases with film thickness.

A high shrink force gives window boxes a taut, wrinkle-free surface and provides stability for multi-packs. A lower shrink force is desirable for wrapping delicate or thin packages that may deform or curl.

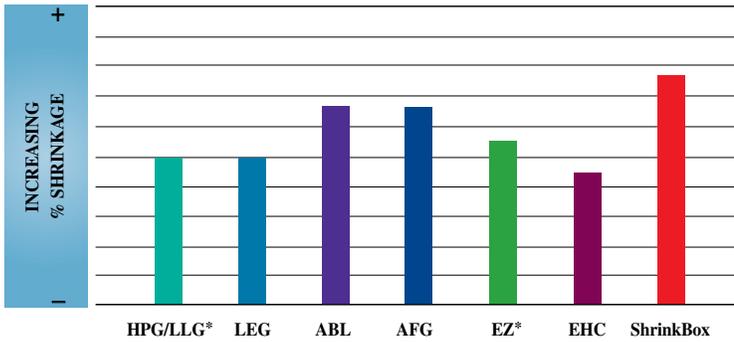
*VHG is the 50-gauge version of HPG. VEZ is the 50-gauge version of EZ. See data sheets for specific values.

Percent Shrinkage

Figure 2.

% Shrinkage – Total Area.*

Average value of MD and TD. For comparison, all films were run at temperatures most suited to polyethylene films. Clysar® EHC and Clysar® EZ would typically run at higher temperatures.



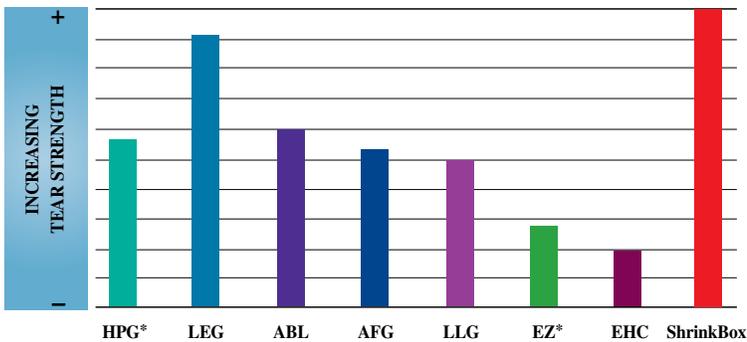
The oven shrinkage test measures the area reduction of a 10-cm x 10-cm unrestrained film sample held at a given temperature and time (ASTM D1204). Film with a high percent shrinkage is ideal for wrapping irregular shapes and minimizing “dog ears.”

Clysar films have balanced shrinkage in both the Machine Direction (MD) and Transverse Direction (TD) which ensures tight packages and increased shelf appeal.

Tear Strength

Figure 3.

Tear Strength.*



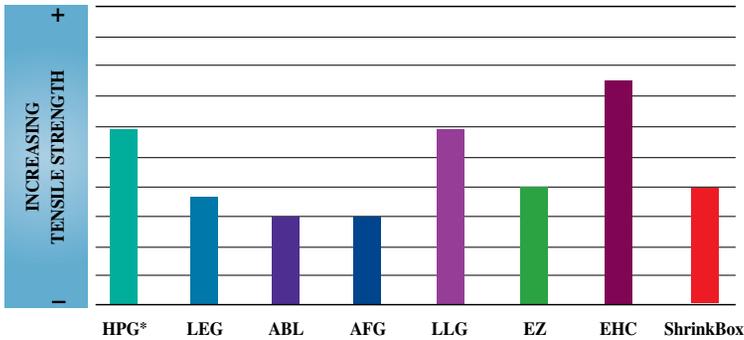
Elmendorf tear is the force required to tear, by propagation, a notched film sample. A high tear strength helps prevent tear propagation when the film is punctured by uneven or angular product shapes, or by needle perforations.

When using tear strips or specialty perforations, a low tear strength may be used to create an easy-open feature.

*VHG is the 50-gauge version of HPG. VEZ is the 50-gauge version of EZ. See data sheets for specific values.

Tensile Strength

Figure 4.
Ultimate Tensile Strength.*
Average value of MD and TD.

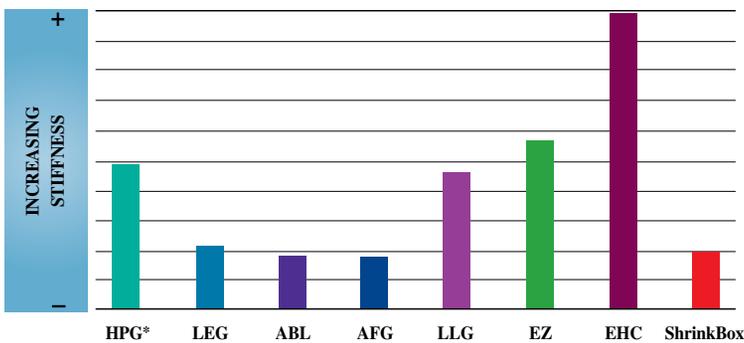


Tensile strength is the force required to break a 1-inch-wide film sample that is pulled between two grips moving at a fixed speed (ASTM D882).

A high tensile strength gives improved toughness and durability, high resistance to machine tension and an easy adjustment for manual feeding operations. A low tensile strength gives increased puncture resistance and improved recovery/memory properties.

Stiffness

Figure 5.
Stiffness (Modulus).
Average value of MD and TD.



Modulus is a measure of film stiffness or rigidity, as measured using a universal test machine (ASTM D882). A higher stiffness is generally appropriate for faster-running, high-speed films.

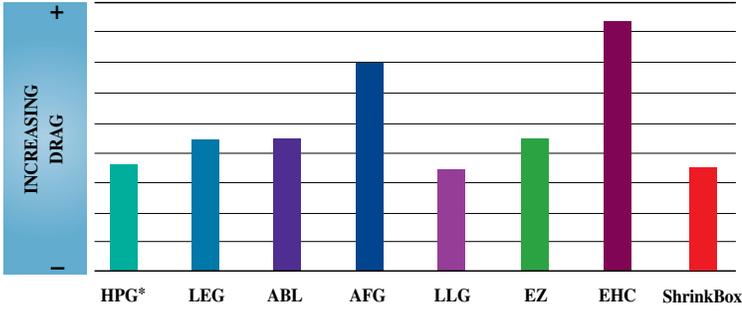
A high stiffness (“hard”) film gives low elongation, outstanding performance on high-speed automatic shrink equipment and excellent printability. A low stiffness (“soft”) film gives a softer feel, less “rustle” or noise and improved conformance to package shape.

*Test made on 60-gauge films, except VHG and VEZ. See data sheets for specific values.

Coefficient of Friction

Figure 6.

Coefficient of Friction. Film to film (cold slip).



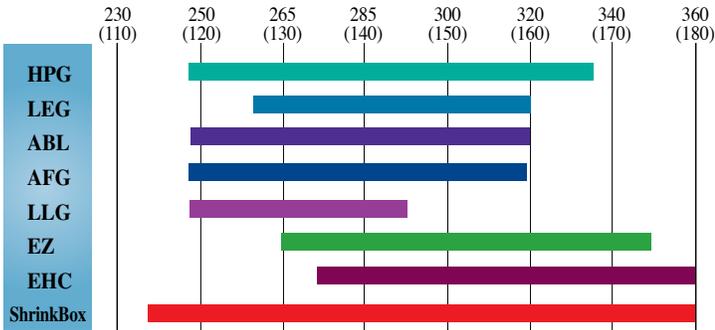
Coefficient of friction (COF) is a measure of how easily film will slip across metal surfaces or other film surfaces. COF is the ratio of the frictional force to the gravitational force between the two surfaces in contact (ASTM D1894).

When warm products are case-packed at high speeds, packages have a tendency not to slip easily across each other inside the case. Improved hot-slip performance can be achieved with a surface treatment on Clysar® HPGS, Clysar® LLGS, Clysar® CHS, Clysar® LEGS and Clysar® VHGS. Clysar® VEZ and EZ have excellent hot-slip properties without any surface treatment required.

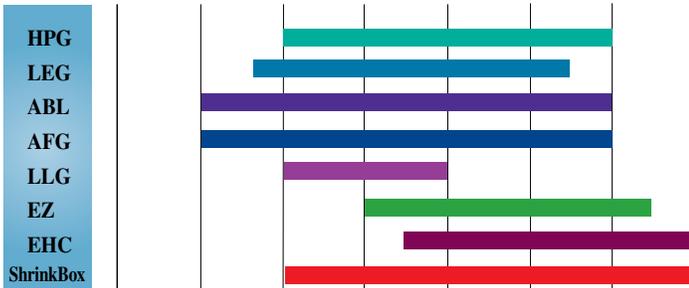
Shrink Tunnel Temperature

Figure 7.

Conveyor Speed: 20/ft/min (6m/min). Temperature: °F (°C).



Conveyor Speed: 46/ft/min (14m/min). Temperature: °F (°C).



Clysar films have a wide range of shrinking temperatures, which makes them function well on many types of machines. These values are for reference only and may vary depending on tunnel characteristics.

Table I. Available Lengths for Flat Clysar® Shrink Films.*

Core ID, in.(mm)	Roll OD, in.(mm)	GAUGE					
		50 ft (m)	60 ft (m)	75 ft (m)	100 ft (m)	125 ft (m)	150 ft (m)
3 (76)	9.5 (241)	10,500 (3,200)	8,750 (2,667)	7,000 (2,134)	5,250 (1,600)	4,200 (1,280)	3,500 (1,067)
3 (76)	13 (330)	21,000 (6,400)	17,500 (5,334)	14,000 (4,268)	10,500 (3,200)	8,400 (2,560)	7,000 (2,134)
6 (150)	11 (279)	10,500 (3,200)	8,750 (2,667)	7,000 (2,134)	5,250 (1,600)	4,200 (1,280)	3,500 (1,067)
6 (150)	14 (356)	21,000 (6,400)	17,500 (5,334)	14,000 (4,268)	10,500 (3,200)	8,400 (2,560)	7,000 (2,134)
6 (150)	18.75 (476)	42,000 (12,800)	35,000 (10,668)	28,000 (8,534)	21,000 (6,400)	16,800 (5,120)	14,000 (4,268)

Not all gauges and lengths are available for all Clysar grades. Consult your Sales Representative for specific needs.

Table II. ShrinkBox Films.

Core ID, in.(mm)	Roll OD, in.(mm)	GRADE	
		1525	2035
3 (76)	10.5 (267)	3,300 (1,006)	2,200 (671)
3 (76)	14.5 (368)	6,600 (2,012)	4,400 (1,342)

Table III. Available Widths for Clysar® Shrink Films.

Film Type, All Gauges	WIDTH (in.)	
	Min	Max
VHG/VHGS VHGF/VHGFS	4 5	68 36
HPG/HPGS HPGF/HPGFS	4 5	68 47
LEG/LEGS LEF/LEFS	4 5	68 47
ABL ABLF	4 5	68 36
AFG AFGF	4 5	68 36
LLG/LLGS LLGF/LLGFS	4 5	68 47
VEZ VEZF	4 5	68 35
EZ EZF	4 5	68 35
EHC/CHS EHCF/CHSF	4 5	68 35
ShrinkBox (Flat) ShrinkBox (Folded)	4 5	68 35

*Folded films will have one-half the linear length of flat film for the same thickness and roll dimensions.

Table IV. Quick Reference Guide for Clysar® Shrink Films.

	Clysar® HPG	Clysar® LEG	Clysar® ABL	Clysar® AFG	Clysar® LLG	Clysar® EZ	Clysar® EHC	Clysar® SHRINK BOX
Available Gauges:								
50	•		•		•	•	•	N/A
60	•	•	•	•	•	•	•	N/A
75	•	•	•	•	•	•	•	N/A
100	•		•	•	•	•	•	N/A
125	•		•					N/A
150	•				•			N/A
200	•							N/A
Print-Treated Available	YES	NO	NO	YES	YES	YES	YES	NO
Equipment:								
Automatic L-Sealer	P	P	P	P	P	A	A	P
Semi-Automatic L-Sealer	P	P	P	P	P	A	A	P
Manual L-Sealer	P	P	P	P	P	A	A	P
L-Sealers:								
Impulse Wire	P	P	P	P	P	P	P	P
Hot Knife	P	P	P	P	P	A	A	P
FFS-Cross:								
Impulse Wire	P	P	P	P	P	P	P	P
Hot Knife	P	P	P	P	P	A	A	P
FFS-Side:								
Single Wire	P	P	P	P	P	P	P	P
Dual Wire	P	P	P	P	P	P	P	P
Heated Ribbon	P	P	P	P	P	A	A	P
Heated Blade	P	P	P	P	P	P	P	P
Heated Wheels	P	P	P	P	P	P	P	P
Hot Air	P	P	P	P	P	P	P	P
FFS-Bottom:								
Thermal Seal	P	P	P	P	P	P	P	P
Static Seal	A	A	A	A	A	P	P	NR
Fin Trim	P	P	P	P	P	P	P	P
Speed:								
More than 80 FPM	A	NR	NR	NR	A	P	P	A
Properties:								
Moisture Barrier	Med	Med	Med	Med	Med	Med	Hi	Med
Cold Slip	Hi	Med	Med	Med	Hi	Med	Low	Hi
Hot Slip	S	S	Low	Low	S	Hi	S	NR
Pre-Perforated** Film Available	YES	YES	YES	NO	YES	YES	NO	NO

P = Preferred.
A = Acceptable.
NR = Not Recommended.
S = Sprayed Version.

** Check specific availability with your Clysar representative.

*VHG is the 50-gauge version of HPG. VEZ is the 50-gauge version of EZ. See data sheets for specific values.

Make the Clear Choice: Clysar® Shrink Films

High-performance Clysar polyolefin shrink films from Bemis Clysar can enhance every phase of your package's lifecycle—from running seamlessly on your equipment to lowering overall packaging costs to protecting and showcasing your products at retail. Plus, Clysar films are distributed worldwide through a premiere network of distributors to make sure you get uncompromised on-time service no matter where you're located.

For quality, performance and consumer appeal, the choice is clear. Clysar shrink films.

For more information about Clysar films, call 1-888-4CLYSAR (1-888-425-9727), email us at clysar@bemis.com or visit www.clysar.com

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The data listed here fall within the normal range of product properties, but should not be used to establish specification limits or as the sole basis for design. Bemis Clysar assumes no obligation or liability for any advice furnished or for results obtained with respect to these products. All such advice is proved gratis, and the Buyer assumes sole responsibility for results obtained if relying on this data.



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