



Always around

NOVA

PLASTIC CASINGS / PRODUCT GUIDE

ViskoTeepak in brief.

ViskoTeepak is one of the biggest manufacturers of fibrous, cellulose and plastic casings in the world. We have production plants, converting facilities and technical support offices worldwide. We're also proud to have the industry's largest business-partner network, through which our products are offered in nearly 100 countries. Our head office (ViskoTeepak Holding Ab), which opened in May 2018, is located in Mariehamn, in Finland's Åland Islands.

In Europe, we have fibrous and cellulose production plants in Lommel (Belgium) and Hanko (Finland). Additionally, we have a plastic-casing production plant in Nuevo Laredo (Mexico). Our converting facilities are located in Delfzijl (Netherlands), Brno (Czech Republic), Kenosha (Wisconsin, USA) and Poznan (Poland). Our sales and representative offices are located all around the globe.

ViskoTeepak is owned by the Eriksson Capital Group, based in Mariehamn, Finland. Eriksson Capital is a privately owned investment company with a focus on small to medium-size high-tech industrial companies operating in the global marketplace. Eriksson Capital is active in various industries such as medical tubing, shipping, real estate, aircraft leasing and asset management.



Learn more at:



viskoteepak.com



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Statement

ViskoTeepak verifies that all information given in this product guide is based on our best knowledge and information. ViskoTeepak does not guarantee the accuracy and/or completeness of the information. This guide is solely intended for general information and is not intended to be used as the primary basis for commercial decisions. When starting to use ViskoTeepak products, it is always recommended to complete a product qualification process. The risks associated with the use of ViskoTeepak products is limited to the conditions defined in the "General Sales Terms and Conditions". These can be consulted at ViskoTeepak.com.

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The evolution of ViskoTeepak.



Always around



1950

Gunnar Eriksson was enjoying a famous Scandinavian smorgasbord on a ferry boat in between Finland and the Åland Islands. While enjoying a tasteful sausage, he noticed the casing was made artificially which caught his interest. He got so curious he put a piece of the casing into his pocket and had it analyzed in a laboratory.



1965

The converting center in *Delfzijl, Netherlands* opened.



1962

Visko started to manufacture fibrous casings.



1952

Gunnar became convinced artificial casing was the future. He wanted to take part in this industry and raised some money to start the Visko Company in *Hanko, Finland*.

Visko started to manufacture cellophane casings with just 30 employees.





1975

The cellulose and fibrous manufacturing plant in Lommel, Belgium was established.



1994

The cellulose converting center in the *Czech Republic* opened.



1995

Production of Nova plastic casing started.



2007

The current owners of ViskoTeepak believed in the future of the industry and were willing to create a world-leading seller, producer, and supplier of artificial casings.

By merging Visko and Teepak into one, a new era began!



Today

ViskoTeepak is **#MakingFoodMoreAccessible** by tailor-making productive solutions in close collaboration with the global food chain.



2052 - The Future

ViskoTeepak is 100 years old! We are now serving your casing needs around the globe in just minutes with our new drone delivery service!



2020

The fibrous converting center in Poznan, Poland was acquired.



2014

The fibrous converting center in Kenosha, USA merged with ViskoTeepak.



2011

The sales and logistics center in Hamburg, Germany was acquired.

Brand Cornerstones.

ViskoTeepak is a global brand with a local touch that delivers tailor-made productive casing solutions. We understand the needs of our customers and nurture long-lasting mutually beneficial and rewarding relationships. What are we referring to when we talk about our Brand Cornerstones?

Brand Cornerstones



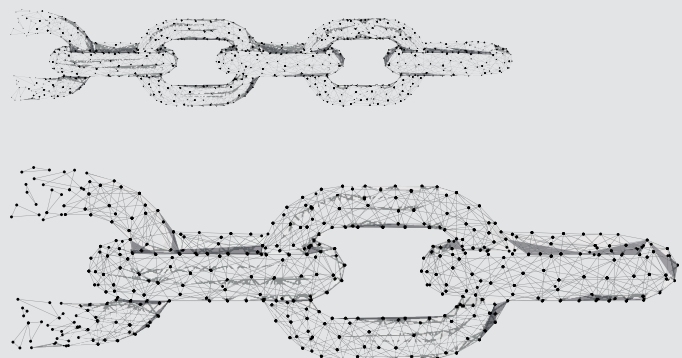
Tailor-making

Our goal is to tailor-make the most productive casing solution for each customer. We're willing to go the extra mile to craft each product to perfectly fit our customers' needs. This makes our products unique and gives our customers the ability to produce with great efficiency and high quality.

Productive Solutions

We offer the world's most productive casing solutions. We constantly improve and develop new solutions that bring value. We're creative, and we sustainably develop our products.

If there's a better way, we'll find it.



Teamwork

Our success is achieved with inclusiveness and collaboration. We work closely with our customers so that we can identify their specific needs. We're in it for the long run, and together with our Partners, we'll always be around to support you.

Company culture.

The company culture is the personality of the company. At ViskoTeepak we base our business and our culture on three company Values: Trust, Ambition and Fun. What do we mean when we talk about these values?

Values

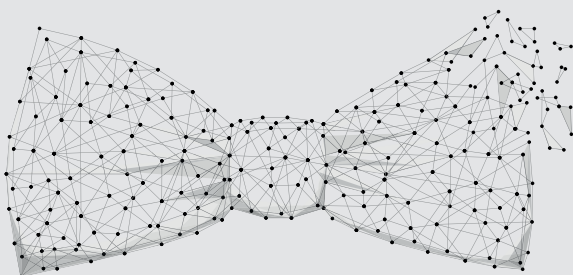


Trust

Trust is built on credibility, being fair, and treating each other with respect. We earn trust by delivering on our promises, which is particularly true for how we manage our business and our people. Respecting your colleagues regardless of their age, sex or race is a base requirement for a fair working community.

Ambition

We have a strong desire to be the best and want to be ambitious on our road to success. That is why we will walk the extra mile to help our customers and partners to succeed in their business. Our “can-do” mentality creates energy and by providing training and development opportunities, we make sure we reach our goals.



Fun

Fun is created by being successful in achieving your goals and by working with a team of people that you trust and feel connected to. It creates the energy that we need for taking on the next challenge!

What is Nova casing?

Nova is a wide group of engineered plastic casing products extruded from a variety of raw materials combined to develop unique performance properties. Ranging from one to multi-layers, each raw material is melted at an individual extruder to form a tubing. Once formed, the seamless tubular film of many Nova products may be stretched or oriented through a bubble process to create specific mechanical and physical properties. After initial cooling the casing is stabilized through a process called annealing to provide increased durability and structural integrity. The specific manufacturing process is designed to produce a Nova product with advanced performance features, creating one of the most reliable and broadest array of plastic casing solutions in the world today.

Applications

Nova casings are broadly used primarily in the food industry, applications include a wide variety of meat, poultry, vegan, meat analogues, cheese, butter and pet food as well as soups and gravies.

Adding Value With Optimized Structures

Nova casings are manufactured with one to many layers of unique food grade plastic film resins, designed to provide optimized performance characteristics for the product application. At the same time the Nova material is manufactured, specialized characteristics are imparted to provide features such as flexibility for easy and stable size control and filling, as well as shrink and a special product contact layer to improve product yield along with ease of casing removal. These product attributes bring maximum value in the particular application.

Using Nova plastic casings

Nova casings are often filled directly out of the case or may be pre-soaked in water. Some customers achieve better performance or find it more suitable for stuffing with pre-soaking while others don't. Soaking will make certain Nova casing more flexible which allows to stuff more resulting in larger diameter products. For us to provide the most productive solution, it is crucial to understand well the customer's process and requirements.

Soaking to change the properties

Nova can be stuffed dry or soaked depending on the customer's procedures. For compliance with the latest regulations on hygiene, it's strongly recommended to exclude soaking from the process in order to avoid any

contamination. However, if it's still necessary, cold water should be used at a recommended maximum temperature of +20°C (68°F) for no longer than 20 minutes. Shorter soaking times won't allow the casing to absorb enough water for stuffing to the maximum diameter. Longer soaking times won't improve the performance, but they don't negatively affect the casing, either. The casing can be stuffed to a maximum diameter of 2% larger than the recommended stuffing diameter (RSD). Overstuffing can result in casing breakage during stuffing or thermal processing.

If there's a delay between soaking and stuffing, it's recommended to store the casing in a sealed plastic bag or in the soaking water. During the soaking phase, the casing must be completely submerged in and filled with water.

Soaking is not effective with Nova SCF products as the construction of the material will not absorb water and therefore change the properties. Soaking other Nova items such as very high shrink Nova can create unexpected results. Consult your ViskoTeepak Technical Representative for recommendations.

Stuffing to perfection

Nova has a wide range of calibers and properties. For best yield and surface finish, stuffing round products to Recommended Stuffing Diameter (RSD) is advised. Some products are underfilled intentionally, such as D-shaped or molded products. For round products, stuffing too loosely may result in the formation of wrinkles on the products after thermal processing and cooling. Depending on the product, expansion may occur and so following guidelines on RSD for round products is important, while producing new D-shaped and mold-

ed products often requires some testing for optimal specification.

For molded products, the casing must usually be 5% to 10% longer than the mold. For example, if the mold has a length of 100 cm (39.37 in.), the casing length should be 105-110 cm (41.34 to 43.31 in.) measured from clip to clip. If it's too short, the final products will have rounded ends making the first slices unusable. If it's too long, the final product may have deep wrinkles, thus rendering the affected slices unusable. It's also important to use a suitable stuffing tube according to the casing specifications as well as the production process.

Water-vapor transmission rate

Water-vapor transmission rate (WVTR) is the amount of water vapor that passes through the casing at a specific temperature and relative humidity. The test conditions vary but Nova is continuously tested at 37.8°C (100°F) and RH of 100% as set forth in ASTM E-398 and/or ASTM D-1653. In practice, this value correlates with the water (i.e., weight) loss over storage of a specific product at specific temperature and air pressure. The lower the rate, the lower the weight loss. However, the rate varies depending on the actual material thickness, temperature and pressure.

Oxygen Transmission rate (OTR)

Oxygen transmission rate (OTR) is the amount of oxygen gas that passes through the casing over a certain period of time at a specific temperature, relative humidity and air pressure. The test conditions vary but Nova is continuously tested at 23°C (73°F) and RH of 0% as set forth in ASTM D-3985. The lower the rate, the less oxygen passes through the material. We offer Nova with a wide range of barrier properties to suit your application.

Shrink

The shrinkage of Nova is the ability of its nylon layers to return to their initial state with a certain force. The casing shrinks longitudinally (in the machine direction (MD) along the length) and transversally (in the transverse direction (TD) across the width). Nova shrink is thermally activated during the cooking process to provide improved yield and product shape. We have a range of shrink levels designed for the specific application.

Gauge / Thickness

The overall thickness or gauge of Nova is composed of all of its layers. It's the average of measurements taken at different points throughout the casing (excluding its edges).

Flat-width tolerance

The flat width tolerance indicates the maximum variation in the width of the casing.

Handle the casing with care

Always store, transport and handle Nova in a sealed plastic bag. Keep away from dust, moisture and direct sunlight. Store in a dry and cool place at room temperature.

Never store, transport or handle Nova at high temperatures (refer to "Temperature effects on Nova"). After storage at temperatures below 4°C (39°F), maintain the casing at normal room temperature for one day before use.

Temperature effects on Nova

High temperatures may have an adverse effect on the Nova's final shrinkage and flat width. If the temperature is too high at any stage of the transportation, storage or handling, the actual flat width and/or final shrinkage can go below the value specified herein.

High temperatures may reduce the flat width, making it difficult to reach the recommended stuffing diameter (RSD) during stuffing. The effects the temperature may have on the flat width are shown in the chart below. The figures are provided for casings stored in an oven up to seven days at certain temperatures.

The flat width was measured and compared before and after the storage. After shirring, the casing is moist. Be sure its moisture is maintained.





Nova Series.

We can tailor-make our Nova product to optimize performance for the needs in your product or production process. Based on a variety of choices below, we can select the most suitable casing for you here.

| Series name | Series description | Applications | Product options |
|--------------------------|--|---|------------------------------------|
| Core Series | Main round product series, common chubs, logs, cheeses, butters, vegan products. | Cooked Ham & Poultry, Vegan, Meat Analogues, Butter, Cheeses. Retail and long shelf life oriented. | L, X, RC, RCF, RHB, RX, PR |
| Shape Series | Molds, Square Products, D-Shaped Products, Curved Products. | Square or rectangular ham, poultry or plant based, D-Shaped, Natural and Ring bologna shapes and molds. Retail and long shelf life as well as food service applications. | HX, XHA, RM, XHA+, PR, RS, SP, RNG |
| Industrial Series | Single Layer, delamination risk elimination, high speed removal, soups, sauces, gravies. | Raw & Frozen Beef, Pork & Poultry Rolls, In House Sliced and Diced Ham, Poultry and Alt-Meats, Hot Dogs, Hot Fill Soups & Gravies, Chorizo, in house and food service product oriented. | M5, PB, PLL, PHD, C, SCF |
| True Series | Size/caliber controlled small diameter products, Pet Foods that require print and wrinkle free processing. | Pet foods thermally processed retail, liverwurst, small diameter chubs, braunschweigers, plant based, chorizos, hot dogs with casing left on. Retail oriented small diameters or harsh thermal processes. | RHC, XT, LT, REP, RXM, RP, HD |
| Permeable Series | Moisture- and oxygen-permeable plastics, creating a cost-effective and consistent plastic casing product. | Allows you to produce cured, smoked and fermented items such as salami, hams, hot dogs, while gaining performance and cost advantages. | HD-P, PN, PM |

Nova Attributes

| Attributes | Availability |
|------------------------------|--|
| Shrink Levels | 0%, 5%, 8%, 10%, 12%, 15% |
| Meat Adhesion | Standard, AP, HA, HA+ |
| Easy Release | LA, MR, MR+, SES, EP |
| O₂ Barrier | Permeable, Low Barrier, Medium Barrier, High Barrier |
| Gauge (mic) | 38,43,45,48,50,55 |
| Flexibility | Low Flex, Standard Flex, High Flex |
| Special Function | UV, PR, SMOKE |

Nova Core Series for Round Products.

With stellar performance our Nova Core series encompasses our group of high-performance multilayer plastic casing suitable for all types of round / cylinder-shaped products, including mortadella, chorizo, liver sausage, ground meats, pâté, soy, pet foods, butter and various cheese products. Giving you the power you need to achieve outstanding results!

Retail Chub Products

Nova Core Series products are perfect for both manual and automatic chub production lines for both fresh and frozen chub products with features optimized for the required shelf life. High yield / extremely low weight loss during processing and storage is a signature feature. With a range of thermal shrink and adhesion properties ensure a smooth, high yielding final product presentation after processing and cooling, while still being excellent for peeling. The Nova Core series is ideal for round vegan, meat analogue, butter, cheese, meat and poultry based products.

Dairy & Vegan Products

With a range of tailor fit options, the Nova Core Series is a great choice for many applications including extensive use for dairy products such as cheeses and butters, to vegan products such as tofu and meat analogues. Suitable for hot-filled products such as cheeses and ideal for cooked products that don't require smoking or drying. Built in selectable moisture and gas barriers, along with excellent size control in round-shaped applications. All Nova casings are offered in a wide range of calibers, colors and converting options to suit products sold in

the casing as the consumer packaging or peeled and sliced by the manufacturer.

Cheese Products

Hot fill cheese offers unique challenges which Nova Core Series Line products meet exceptionally well. High temperature filling and cooling while maintaining form is critical and Nova Core allows you fast smooth performance.

Cooked Products

Nova Core Series products allow maximum yield with essentially zero weight loss. Nova Core Series can take the heat for a variety of different cook processing conditions from steam to water cook. It's critical that the product's core temperature achieve target requirements during cooking to achieve the necessary reduction in the number of active microorganisms which also provides the desired shelf life. While Nova casings have stated oxygen and water vapor barrier levels, final shelf life depends on many factors including initial microbial contamination, processing, as well as storage conditions and temperatures.

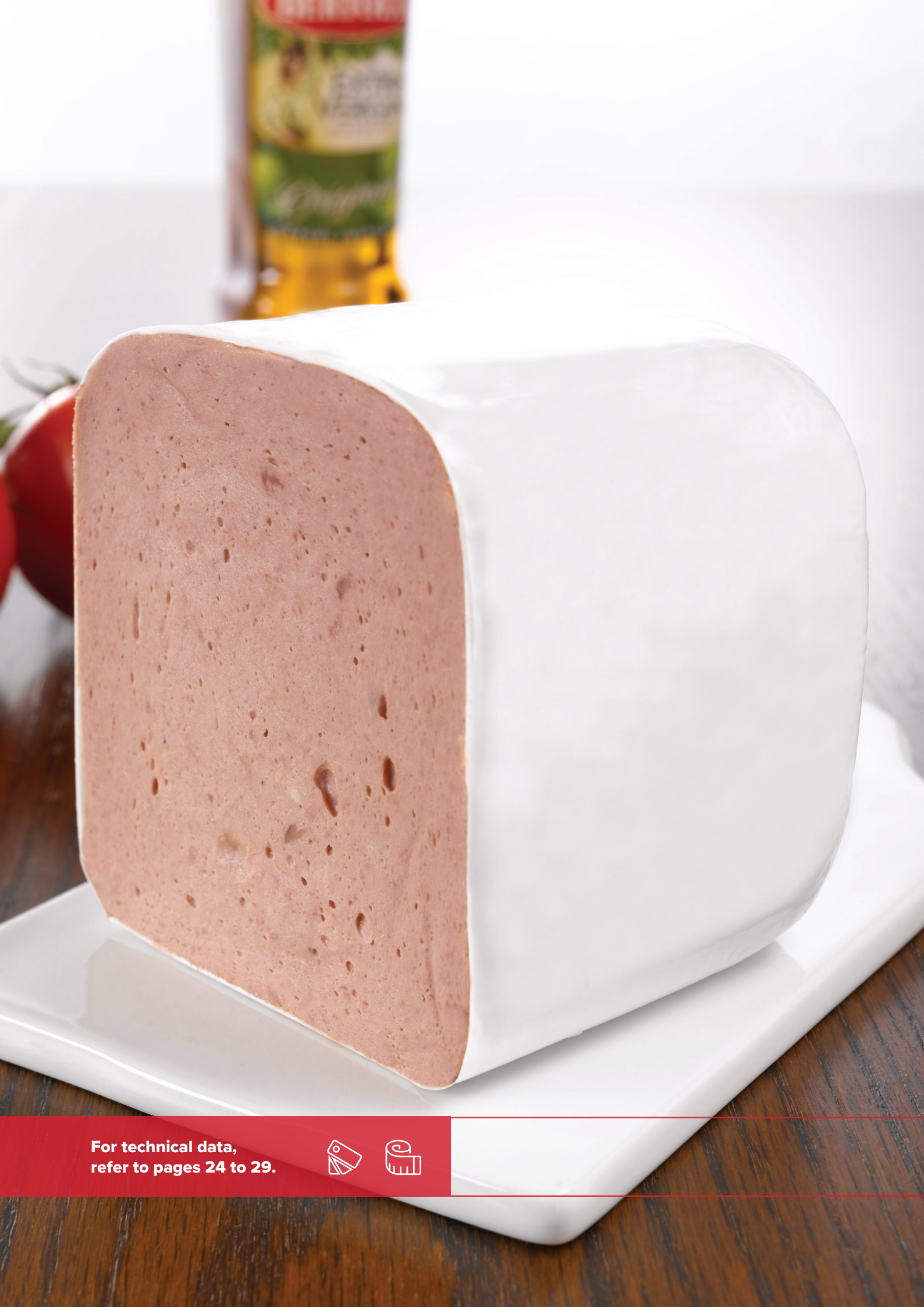
Nova Core Series is a great choice for
Retail Products



Plant-based products continue to be a growing category for the Nova Series



For technical data, refer to pages 24-29.



For technical data,
refer to pages 24 to 29.



Molded products are easy with the Nova Shape Series.

Nova Shape Series of products create a wide spectrum of shapes with ease. Designed for non-cylindrical products, special features of shrink, adhesion and thickness are tailor made to your application. From ham, poultry, vegan and cheese applications, results will light up your sales. From molded products to D-Shaped, our Shape Series of Nova products get the job done.

Suitable for many applications

The Nova Shape Series control adhesion, shrink and create a high yield, excellently formed product for the ideal appearance in your application. Along with extremely low weight loss during processing and storage, creating a uniform product every time. It's perfect for cooking without smoking or drying and suitable for products sold in the casing as the consumer packaging, peeled by the manufacturer or shipped with the casing on to consumers who want to peel, slice and repack in consumer packaging.

Molding the perfect solution

Depending on the product, whether it be poultry, red meat or vegan products, a Nova Shape Series product will allow you to achieve your goals of yield, shape and shelf life. Our experienced technicians have spent thousands of hours in the field to allow us to specify the best product for your application.

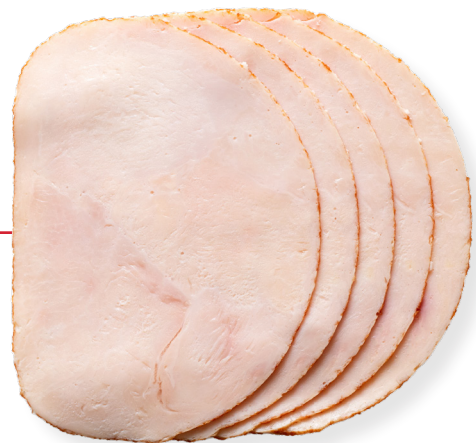
Nova Shape Series makes it possible to create natural D-Shaped products

D-Shapes

For a more natural semi round shape, often referred to as a 'D-Shape' because the product looks like a D laying on its flat side, a Nova Shape Series L product is the right choice. Several parameters affect creating the perfect product and are tailor fitted for optimal shape, size and appearance.

Custom Shapes

Within our Nova Shape series we offer even more custom options, from shapes such as our ring shaped for bologna.



| Features | Benefits |
|---------------------------|---|
| Controlled Shrink | Enhanced performance for sharp cornered molded and more natural D shaped products |
| Outstanding Print Quality | Increased brand awareness. Photographic print designs create a beautiful presentation for retail and deli products. |

Great processability with Nova Industrial Series.

Nova Industrial Series offers a range of single layer solid materials for optimizing performance. Packed with features for ease of use targeted to your application, we have a solution.

Hot Dogs

For plastic casing for Hot Dogs and Sausages, our Industrial Series has a solution, offering excellent performance at economical cost for small diameter products.

Soups & Gravies

Nova Industrial Series also has engineered plastics for optimum performance for hot fill soups and gravies.

Whole Muscle Meats

When economics and durability meet, our Nova Industrial Series performs with a highly crystalline and durable polyolefin material for processing whole muscle meats with ease.

Frozen Rolls

For those quick fill and freeze products from ground beef, pork sausage and meat analogues, Nova Industrial is a great economical solution.

High Temperature Cooking

When cook temps are required to be very hot, we have a Nova Industrial M5 solution with specialized structures that can handle the heat while staying durable and strong.

Chorizo

Our Industrial Series also offers a selection of semi-permeable barrier plastic casing designed for typical chorizo applications, both for manual and high-speed stuffing. The benefits of this casing include extended product shelf life, high strength and good bacterial resistance during production. It has a good caliber consistency to guarantee the same length and diameter of each stuffed piece and it's printable.



A high performance casing for a wide range of applications



| Features | Benefits |
|--|--|
| Almost zero weight lost during processing and handling | Higher Yields |
| Medium Barrier for special applications | Increased shelf life for products where gas permeability is necessary, i.e., chorizo |
| Good converting options | Tailor-made to your need |



For technical data,
refer to pages 24-29.



For technical data,
refer to pages 24 to 29.



Advanced caliber control with the Nova True Series.

Products in our Nova True series offer the power of a stable, stronger oriented plastic casing designed for cylindrical products. With selections for high and low expansion products, the series offers increased caliber control which also helps very small diameter products have excellent sizing consistency, with every chub at the same length as the last. With its very high durability, this casing is recommended for products that are hanged during processing and require a good final-size consistency. It also suits well products sold in the casing as the consumer packaging or peeled and sliced by the manufacturer.

Small Diameter Chub Products

Nova True Series products work well for caliber control, peeling and consistent sizing, from which allows every chub to be uniform in length, size. Achieving size control utilizing unique orientation processes that both increases caliber stability while increasing toughness. While our other product series are typically excellent, when tougher conditions arise, think Nova True!

Pet Foods

Pet Foods are often processed under more rigorous conditions, and so the higher durability and strength of the True Series products offer tough casing that can handle longer processing times, rougher handling and harsher cook conditions!

This product can offer tough casing that can handle longer processing times



| Features | Benefits |
|---------------------------|--|
| Excellent Caliber Control | Diameter and length sizing consistency |
| Increased Strength | Hanging products during thermal processing |
| Peeling Ease | Ergonomic improvement and labor savings |

Nova Permeable Series for Cured Products.

Advanced polymer materials have given us the ability to manufacture moisture- and oxygen-permeable plastics, creating a cost-effective and consistent plastic casing product. Producing smoked, cured, and fermented products was once thought to require specialized paper or collagen-based materials. Key advantages of stable permeation are preventing uneven drying and rind formation, as well as repeatable performance. Nova Permeable Series allows you to produce cured, smoked, and fermented items while gaining performance and cost advantages.

Fast Fermented Salami/Pepperoni

Nova Permeable Series products allow you to produce product size ranges from 28 to 100 millimeters in diameter, covering typical pepperoni and salami fermented product sizes. Making toppings for pizzas and other ingredients has never been easier. Available in colors matching fibrous products, such as reds, browns, as well as clear and blue colors for internal processing. Our technical team can help develop the optimal processing cycle to achieve your goals. Color books are available.

Ring Bologna Products

Producing old-world products, such as smoked ring bologna, is easy with Nova Permeable Series. Using a specialized process allows us to manufacture plastics that will produce curved shapes, such as ring bologna. Together, these features provide the look of a natural or collagen casing product with the consistency and reliability of precision-controlled manufacturing. Smoke penetrates through the plastic casing to develop flavors and colors, creating artisan-quality products.



Permeable Series can be used on all industry stuffing and linking machines.

Smoked Ham Products

For larger-sized smoked hams, Nova Permeable Series provides a great solution. With great process control, these shirred casings are easy to use to produce great ham products of many larger sizes. Controlled moisture and vapor transmission levels provide a great-looking finished product every time.

Hot Dog Products

Producing hot dogs, whether plant-based, meat, or poultry, was one of the first product applications created with this Nova HD-P product subgroup. Production of products in diameters from 15 to 32 millimeters covers all common hot dog types from small cocktails, 10:1 pound hot dog products to larger Jumbo Hot Dogs, Kielbasa, Polish Sausage, and Knockwurst types. Smoke and moisture permeability provide color and flavor. Some markets leave the casing on to provide a unique look and handling protection. Nova HD-P Permeable Series product is able to be used on all industry stuffing and linking machines. Excellent caliber control, along with improved yield, provides cost savings and appeal.

Nova Permeable Series utilizes the latest materials technology to reduce total operational costs, improve product consistency and appearance when creating a range of popular and traditional products. Sample some for your application today!

| Features | Benefits |
|---|---|
| Utilizes the latest materials technology | Reduce operational costs & improved product consistency |
| Precision-controlled manufacturing | Offers an excellent caliber control |
| Controlled moisture and vapor transmission levels | Provides a great-looking finished product |



For technical data,
refer to pages 24-29.



For technical data,
refer to pages 24 to 29.



Insight - Tailor-making with Nova Adhesion Control.

All our Nova casings offer a range of product adhesion and release options! From extra high adhesion control for emulsions where strong product adhesion is critical such as long shelf life high water content products, to Easy Release Plus to improve the ergonomics for operators removing the casing to allow rapid peeling and slicing performance when high throughputs are required. Overall a selectable release level can achieve your goals for ease of use, yield, shelf life and appearance.

Power Adhesion

Yield loss is expensive and messy. With multiple levels of adhesion available, designed for higher product adhesion without purge, drip and liquid release which can affect the product shelf life and appearance. We have targeted a number of levels of adhesion which is designed for applications from ham, chicken, turkey and MDM products as well as meat analogues.

No changes in the process or product

Nova Adhesion is a built in feature that can be implemented without any change in the current process or product formula. Unlike other plastic casings, it has the FDA approved adhesion aids as well as specialized materials incorporated in the inner contact layer eliminating any product contamination risks. The aspect to keep in mind is the recommended stuffing diameter. Following our recommendations, a targeted level of adhesion and benefits can be achieved. Note that if the casing is stuffed too loose, there is a risk that the adhesion increase potential isn't fully used.

Standard production

With strong experience is a broad array of applications, we have targeted adhesion levels for your application that will provide excellent improvement, often bringing yield savings that exceeds the cost of our casing!

Easy Release

Ergonomics and speed, both critical in today's production environment. Nova Easy Release selectable options are designed for enhanced release without purge resulting in improved peeling and slicing performance. Combining specialized resins with FDA approved aids create a range of release options. Food plant personnel love the ergonomic ease at removing the casing and everyone benefits from the lower cost that faster processing speeds and optimized yields provide. All raw materials are approved for direct food contact.

Standard production

Easy Release is often used in conjunction with tinted casings to confirm casing removal, and while any of the Nova Series products offer easy release option, for even more food safety this can often be combined with Nova products designed to peel off in a single or few large pieces.

| Features | Benefits |
|--|--------------------------------------|
| Controlled levels of adhesion | Optimized Yield |
| Increased speed of peeling and slicing | Higher yields |
| Controlled Release | Ergonomic, High Speed casing removal |

Tailor-made to perfection.

With a range of layers in the basic construction, it's possible to adapt a Nova casing construction to fit your process and application. You can then combine these alternatives with a variety of additional properties and/or converting options to really tailor-make the casing solutions to your exact requirements. However, often one converting step doesn't preclude the other. With an extensive array of possible combinations, ViskoTeepak can confidently state that we have something to offer for every customer. We stand by our word, so give us the chance to develop and test our solutions, and we will prove that we have some of the most productive solutions around.



Shirring

ViskoTeepak shirred plastic casings feature a highly consistent shirring pattern, which allows for trouble-free stuffing. Moreover, the large inner bore and extended length per strand result in a fluent and highly efficient workflow. A shirred casing is always in a premium condition, helping maintain an attractive end product appearance.

Shirred casings speed up your production through simplified planning and fast, easy handling. The amount of meters per strand is a function of the diameter of the shirring mandrel as well as the strand length, casing caliber and thickness. The diameter of the shirring mandrel depends on the diameter of the stuffing tube, and the strand length depends on the length of the stuffing tube. In this context, it's very important to get as much information as possible from the customer regarding the specific needs, such as the required meters per strand, longest possible strand length and stuffing tube diameter. Due to its multilayer construction, Nova is softer than a monolayer casing. If shirring after printing, make sure that the inks have dried and cured properly. We recommend that the casing should not be shirred within five days after printing ink finishing the curing time.



Printing

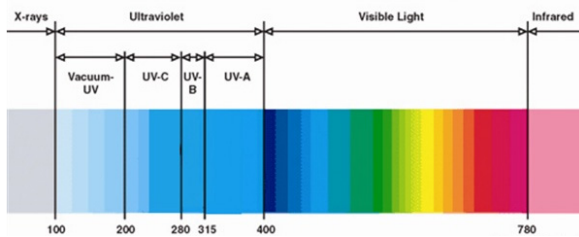
By printing the casing, customers can turn the casing into a consumer packaging instead of using a label on the product. Producers can print their logo, ingredients, and even EAN (bar codes) codes on the Nova plastic casing. We often talk about photo quality printing with Nova, which means we can offer you some of the best quality printing available on the market.

We have a Central Drum Flexo Printing Machine that is capable of printing 8 + 8 color (these numbers denote eight colors on the front and eight on the back, which are printed at the same time). The initial step in the process is the prepress, which includes a revision of the printing design by the designer and manufacturer of the photopolymer plate. Our prepress supplier uses the latest technology to create photos mechanically, using a flexible material such as rubber and coated with solutions that make certain areas impermeable to water. This creates high-quality photopolymer plates of a certain thickness. This is used in flexoprinting to transfer the specific amount of ink applied to raise an image on the photopolymer plate that is necessary to transfer the image to the printing substrate.

The surface of Nova is PA 6, which is a polar surface, making it easy to print with a perfect result. The number of colors in the print is denominated X+Y, where "X" corresponds to the number of colors on the upper side and "Y" to the number on the underside. For example, 4+1 means that the upper side is to be printed using four colors and the other side with one. We have the equipment, technology and trained personnel necessary to support and produce the best quality printing for our customers and fulfill their requirements.

Optimized Gauge

While we have standard thicknesses for many products, often benefits can be gained from adjusting the gauge or thickness of the material. We can offer a range of thicknesses that can either increase toughness or durability under certain conditions, or optimize cost when an application may be improved through a lighter casing.



Ultraviolet

The UV protection helps to reduce the color change in certain formulations and/or in certain types of products such as mortadella and bologna sausages. It also improves the casing shelf life and mechanical properties.



Puncture resistance

The PR feature is used when the casing needs to be protected from harsher conditions in processes where it's stuffed by hand or in tough automatic processes. It's also used in harsher molding conditions when the mold is in bad shape. The mix of special raw materials, together with the combination of strong layers, creates a very durable, puncture-resistant packaging material. This is

especially beneficial when the casing is used as the final packaging, in transportations, harsh storage conditions and much more.

High barrier

The HB addition improves the barrier properties of the casing and extends the shelf life of the sausage. It creates a high-performance casing that provides very high barriers against oxygen. With high barrier properties, there also comes the benefit of low weight loss during processing and in storage.

Thermal Shrink

With selectable levels of shrink we can further optimize finished product yield, appearance and shelf life. With our experienced technical and management team, tailor making the best solution is what we do!



Processes and applications.

Preparing for a test

When testing, it's important to create the same conditions as the customer would normally have in his regular production. For example, if the customer normally uses a shirred casing, then the tests should also be performed using a shirred casing.

Selecting the RSD for Nova X/L

If the customer is already uses a plastic casing and stuffs it round, it's best to get a couple of pieces to measure the product diameter before processing and after cooling. Because the casing industry has a lot of different trade names, just asking what size they are using normally doesn't work. Neither does it help to measure only the current casing's flat width, because the same flat width from different suppliers can stuff to different diameters. Nova casings can have an expansion of up to 2 mm during thermal processing, depending on the emulsion. By measuring the product diameter before processing and after cooling, you get all the sizes you need.

Technical sales support

Customer service is a top priority. In order to further develop this part of our service and to serve our customers better, we have established a TSS group with expertise in casing technology, customizing and sausage-making.

Technical Sales Support Services

The Technical Sales Support Team is responsible for creating new business solutions for a value-driven environment and to support the customer in improving his business as well as providing solutions to problems. The team members have many years of practical and theoretical experience. The service will offer consultations on how to maximize the benefits of plastic casing usage, optimize process parameters, cost control, product quality consistency and tailor-make casing for customers.

Production and delivery of a sample

A Sample Request form will be filled in with all the details given to you by the sales manager. This request will then be given a test number and a trial sample will be manufactured based on the information received from you. The delivery times for trial samples have to be agreed upon with ViskoTeepak marketing personnel on a case-by-case basis. We recommend that customizing is done by the same customizer used in the normal operations of the business.

Selecting the color

It's best to get a piece of the current casing before it's stuffed. Then match the color using the Nova plastic casing color book. Because different casing producers have different ways of adding the color, it's important to remember that a casing might have a different shade before and after processing. If a color isn't currently available for a Nova plastic casing, we might be able to develop it by matching a sample. When a new color needs to be developed, a minimum of 2 m (7 ft.) of casing is required. It's a quite long process to develop a new color, because our color suppliers have to match the sample. Also, the method of producing the casing can change because of adding a new color to the process.



| Color options | | | |
|---------------------------------|--------------------------------------|---------------------------------------|----------------------------------|
| <input type="radio"/> Clear 001 | <input type="radio"/> Red orange 330 | <input type="radio"/> Light blue 103 | <input type="radio"/> Gold 322 |
| <input type="radio"/> White 233 | <input type="radio"/> Dark red 316 | <input type="radio"/> Light green 119 | <input type="radio"/> Copper 313 |
| <input type="radio"/> Black 211 | <input type="radio"/> Brown 212 | <input type="radio"/> Light red 128 | <input type="radio"/> Cream 314 |
| <input type="radio"/> Red 328 | <input type="radio"/> Mahogany | <input type="radio"/> Light amber 111 | <input type="radio"/> Pink 635 |



Nova manufacturing plant in Nuevo Laredo, Mexico

Quality and safety.

Plastic casing quality assurance

From the very beginning, our goal has been to be at least as good as the world's top producers of biaxially oriented plastic casing. To reach that goal, we've been allowed to buy the best machines and equipment available. Additionally, everyone at the company is committed to giving his or her input in developing the process, the product, and the systems of quality control and assurance. Production data, QC data and samples from the orders manufactured are stored for two years. The opacity of every production reel is reference checked.

Product quality and safety systems

ViskoTeepak and ViskoTeepak S.A. de C.V. hold the Quality Management System Certificate, ISO 9001:2015, which is granted by the International Standards Organization. In accordance with ISO 9001:2015, all stages of product development in the casing manufacturing process associated with ViskoTeepak casings is conducted in line with the procedures and specifications set forth in the certified documentation, which is subject to continuous updating and occasional audits.

This ensures that ViskoTeepak's products and services meet the most demanding customer requirements. As a part of the ViskoTeepak Total Quality Concept, the ISO 14001:2015 environmental management system has been implemented at ViskoTeepak and ViskoTeepak S.A. de C.V. The ISO 14001:2015 EMS has been certified at ViskoTeepak and ViskoTeepak S.A. de C.V. To ensure that the risk for contamination is eliminated or reduced we obtained the certification per the BRC Packaging and Packaging Materials Food Safety Standard, Issue 5. The basis for the system is a risk analysis of all processes, beginning with development up to transportation of the products to the customer.

We always aim for the highest level of certification in all our product lines and for all our plants, to read more on this topic go to the last spread of this brochure.

Clip recommendations.

To help our customers make the best choice of clip, we have consulted Tipper Tie and Poly-Clip. These are two of the world's largest manufacturers of clipping machines.

The importance of clips

It's absolutely crucial to have the right size clip. A clip that is too big can create slippage that could result in a product with wrinkles and jelly pockets or purge. A clip that is too small, on the other hand, might cut the casing

and cause breakage during stuffing or processing. Also, we must take into account that the clip recommendations fit casings of standard thickness. If you're using a lighter or thicker casing, the clip may also require adjustment.

Tipper Tie

| RSD (mm) | Flat width (mm) | RSD (inch) | Flat width | Tipper Tie | Tipper Tie Technopak | Tipper Tie Alpina |
|----------|-----------------|------------|-------------|------------|----------------------|-------------------|
| 35–49 | 52–73 | 1.38–1.93 | 2.05–2.87 | Z201 | E-220 | 18–07 5 × 1,5 |
| 50–59 | 75–88 | 1.97–2.32 | 2.95–3.1 | Z201 | E-231 | 18–09 5 × 2.0 |
| 60–79 | 90–118 | 2.36–3.11 | 3.54–4.65 | Z201 | E-232 | 18–09 5 × 2.0 |
| 80–104 | 120–156 | 3.15–4.09 | 4.72–6.14 | Z201 | E-510/E-520 | 18–11 5 × 2.0 |
| 105–134 | 157–200 | 4.13–5.28 | 6.18–7.87 | Z201 | E-520 | 18–12 5 × 2.0 |
| 135–169 | 201–253 | 5.31–6.65 | 7.91–9.96 | Z401 | E-520 | 18–12 5 × 2.0 |
| 170– | 254–260 | 6.69–7.05 | 10.00–10.23 | Z401 | E-520 | 18–12 5 × 2.0 |

Clip recommendations are for standard casing thicknesses.



Poly-Clip

| | | FCA 3410 / 3411 / 3415 / 3441 / 3451 / 3462 | | FCA 3451 / 3462 | | DFC, PDC,DCD, SFC,SCD, SCH |
|-----------------|--------------------|--|-------------------------|-----------------|-------------------------|-------------------------------|
| Caliber (mm) | Stuffing tube ø | Die | R-clips spreading 15 | Die | R-Clips spreading 18 | S-Clips |
| 30-39 | 20 | 15-7 | 15-07-5 × 1.5 L | | | 628, 735 |
| 40 | 20 | 15-7 | 15-07-4 × 1.25 L | | | 628 |
| | (22) | | 15-07-5 × 1.5 L | | | 735 |
| 41 | | 15-8 | 15-08-5 × 1.75 L | | | |
| 45 | 24 | 15-7 | 15.07-4 × 1.25 L | 18/07 | 18-7-5 × 1.5 L | 628, 632 |
| | | | | 18/8 | 18-08-5 × 1.75 | |
| | | | 15.07-5 × 1.5 L | 18/9 | 18-09- 5 × 1.75 L | 735 |
| | | 15-8 | 15-08-5 × 1.75 L | | | |
| 50 | 24 | 15-7 | 15-07-5 × 1.5 L | 18/7 | 18-7- 5 × 1.5 L | 628 |
| | | 15-8 | 15-08-5 × 1.5 L | 18/8 | 18-8- 5 × 1.75 | 735 |
| | | | 15-08-5 × 1.75 L | 18/9 | 18-9- 5 × 1.75 L | |
| | | | 15-08-5 × 2 L | | | |
| 55 | 24 | 15-7 | 15-07-5 × 1.5 L | 18/07 | 18-7- 5 × 1.5 L | 628 |
| | | 15-8 | 15-08-5 × 1.5 L | 18/8 | 18-8- 5 × 1.75 | 735 |
| | | | 15-08-5 × 1.75 L | 18/9 | 18-9- 5 × 1.75 L | |
| 60 | 28 | 15-8 | 15-8-5 × 1.5 L | 18/9 | 18-9- 5 × 2.0 L | 632 |
| | | | 15-8-5 × 1.75 L | | 18-9- 5 × 2.0 LR | 735 |
| 65 | 36 | 15-8 | 15-08-5 × 1.75 L | 18/8 | 18-8- 5 × 1.75 | 632 |
| | | 15-9 | 15-09-5 × 1.75 L | 18/9 | 18-9- 5 × 2.0 LR | 735 |
| | | | 15-09-5 × 2a | | | |
| 90 | 36 | 15-10 | 15-10-5 × 2.0 L | 18/8 | 18-8- 5 × 1.75 | 632, 844 |
| | | | | 18/9 | 18-9- 5 × 2.0 LR | |
| | | | | 18/10 | 18-10- 5 × 2.2 L | 740, 8740 |
| 95 | 48 | | | 18/10 | 18-10- 5 × 2.2 LR | 632 |
| | | | | | 18-10- 5 × 2.5 L | 740, 8740 |
| | | | | | 18-11- 5 × 2.2 L | 844 |
| | | | | | 18-11- 5 × 2.0 L | |
| 100 | 48 | | | 18/10 | 18-10- 5 × 2.2 L | 632 |
| | | | | 18/11-12 | 18-11- 5 × 2.0 LR | |
| | | | | | 18/12- 5 × 2.0 LR | |
| | | | | | 18-10- 5 × 2.5 L | 470, 8740 |
| | | | | | 18-11- 5 × 2.2 L | 844 |
| 110 | 48 | | | 18/11-12 | 18-11- 5 × 2.2 L | 747, 848, 8748 |
| | | | | | 18/12- 5 × 2.5 LR | |
| 120 | 60 | | | 18/11-12 | 18/11- 5 × 2.2 L | 747, 848, 8748 |
| | | | | 18/13 | 18/13- 5 × 2.5LR | |
| 150 | 60 | | | | | 854, 8748 |
| 170 | 60 | | | | | 854, 8748 |

Clip recommendations are for standard casing thicknesses.

RSD to flat width.

Conversion table

| RSD | | FW | | RSD | | FW | | RSD | | FW | | RSD | | FW | | RSD | | FW | |
|-----|------|-----|------|-----|------|-----|------|-----|------|-----|------|-----|------|-----|-------|-----|------|-----|-------|
| mm | inch | mm | inch | mm | inch | mm | inch | mm | inch | mm | inch | mm | inch | mm | inch | mm | inch | mm | inch |
| 34 | 1.34 | 51 | 2.01 | 69 | 2.72 | 103 | 4.06 | 104 | 4.09 | 155 | 6.10 | 139 | 5.47 | 207 | 8.15 | 174 | 6.85 | 260 | 10.24 |
| 35 | 1.38 | 52 | 2.05 | 70 | 2.76 | 104 | 4.09 | 105 | 4.13 | 157 | 6.18 | 140 | 5.51 | 209 | 8.23 | 175 | 6.89 | 261 | 10.27 |
| 36 | 1.42 | 54 | 2.13 | 71 | 2.80 | 106 | 4.17 | 106 | 4.17 | 158 | 6.22 | 141 | 5.55 | 210 | 8.27 | 176 | 6.93 | 263 | 10.35 |
| 37 | 1.46 | 55 | 2.17 | 72 | 2.83 | 107 | 4.21 | 107 | 4.21 | 160 | 6.30 | 142 | 5.59 | 212 | 8.35 | 177 | 6.97 | 264 | 10.39 |
| 38 | 1.50 | 57 | 2.24 | 73 | 2.87 | 109 | 4.29 | 108 | 4.25 | 161 | 6.34 | 143 | 5.63 | 213 | 8.39 | 178 | 7.01 | 265 | 10.43 |
| 39 | 1.54 | 58 | 2.28 | 74 | 2.91 | 110 | 4.33 | 109 | 4.29 | 163 | 6.42 | 144 | 5.67 | 215 | 8.46 | 179 | 7.05 | 267 | 10.51 |
| 40 | 1.57 | 60 | 2.36 | 75 | 2.95 | 112 | 4.41 | 110 | 4.33 | 164 | 6.46 | 145 | 5.71 | 216 | 8.50 | 180 | 7.09 | 268 | 10.57 |
| 41 | 1.61 | 61 | 2.40 | 76 | 2.99 | 113 | 4.45 | 111 | 4.37 | 166 | 6.54 | 146 | 5.75 | 218 | 8.58 | 181 | 7.13 | 270 | 10.63 |
| 42 | 1.65 | 63 | 2.48 | 77 | 3.03 | 115 | 4.53 | 112 | 4.41 | 167 | 6.57 | 147 | 5.79 | 219 | 8.62 | 182 | 7.17 | 271 | 10.69 |
| 43 | 1.69 | 64 | 2.52 | 78 | 3.07 | 116 | 4.57 | 113 | 4.45 | 169 | 6.65 | 148 | 5.83 | 221 | 8.70 | 183 | 7.20 | 273 | 10.75 |
| 44 | 1.73 | 66 | 2.60 | 79 | 3.11 | 118 | 4.65 | 114 | 4.49 | 171 | 6.73 | 149 | 5.87 | 222 | 8.74 | 184 | 7.24 | 274 | 10.80 |
| 45 | 1.77 | 67 | 2.64 | 80 | 3.15 | 119 | 4.68 | 115 | 4.53 | 172 | 6.77 | 150 | 5.91 | 224 | 8.82 | 185 | 7.28 | 276 | 10.86 |
| 46 | 1.81 | 69 | 2.72 | 81 | 3.19 | 121 | 4.76 | 116 | 4.57 | 173 | 6.81 | 151 | 5.94 | 225 | 8.86 | 186 | 7.32 | 277 | 10.92 |
| 47 | 1.85 | 70 | 2.76 | 82 | 3.23 | 122 | 4.80 | 117 | 4.61 | 175 | 6.89 | 152 | 5.98 | 227 | 8.94 | 187 | 7.36 | 279 | 10.98 |
| 48 | 1.89 | 72 | 2.83 | 83 | 3.27 | 124 | 4.88 | 118 | 4.65 | 176 | 6.93 | 153 | 6.02 | 228 | 8.98 | 188 | 7.40 | 280 | 11.04 |
| 49 | 1.93 | 73 | 2.87 | 84 | 3.31 | 125 | 4.92 | 119 | 4.69 | 177 | 6.97 | 154 | 6.06 | 230 | 9.06 | 189 | 7.44 | 282 | 11.10 |
| 50 | 1.97 | 75 | 2.95 | 85 | 3.35 | 127 | 5.00 | 120 | 4.72 | 179 | 7.05 | 155 | 6.10 | 231 | 9.09 | 190 | 7.48 | 283 | 11.16 |
| 51 | 2.01 | 76 | 2.99 | 86 | 3.39 | 128 | 5.04 | 121 | 4.76 | 180 | 7.09 | 156 | 6.14 | 233 | 9.17 | 191 | 7.52 | 285 | 11.22 |
| 52 | 2.05 | 78 | 3.07 | 87 | 3.43 | 130 | 5.12 | 122 | 4.80 | 182 | 7.16 | 157 | 6.18 | 233 | 9.21 | 192 | 7.56 | 286 | 11.27 |
| 53 | 2.09 | 79 | 3.11 | 88 | 3.46 | 131 | 5.16 | 123 | 4.84 | 183 | 7.20 | 158 | 6.22 | 236 | 9.29 | 193 | 7.60 | 288 | 11.33 |
| 54 | 2.13 | 81 | 3.19 | 89 | 3.50 | 133 | 5.24 | 124 | 4.88 | 185 | 7.28 | 159 | 6.26 | 237 | 9.33 | 194 | 7.64 | 289 | 11.39 |
| 55 | 2.17 | 82 | 3.23 | 90 | 3.54 | 134 | 5.28 | 125 | 4.92 | 186 | 7.32 | 160 | 6.30 | 239 | 9.41 | 195 | 7.68 | 291 | 11.45 |
| 56 | 2.20 | 84 | 3.31 | 91 | 3.58 | 136 | 5.35 | 126 | 4.96 | 188 | 7.40 | 161 | 6.34 | 240 | 9.45 | 196 | 7.72 | 292 | 11.51 |
| 57 | 2.24 | 85 | 3.35 | 92 | 3.62 | 137 | 5.39 | 127 | 5.00 | 189 | 7.44 | 162 | 6.38 | 242 | 9.53 | 197 | 7.76 | 294 | 11.57 |
| 58 | 2.28 | 87 | 3.43 | 93 | 3.66 | 139 | 5.47 | 128 | 5.04 | 192 | 7.48 | 163 | 6.42 | 243 | 9.57 | 198 | 7.80 | 295 | 11.63 |
| 59 | 2.32 | 88 | 3.46 | 94 | 3.70 | 140 | 5.51 | 129 | 5.08 | 193 | 7.60 | 164 | 6.46 | 245 | 9.65 | 199 | 7.83 | 297 | 11.69 |
| 60 | 2.36 | 89 | 3.50 | 95 | 3.74 | 142 | 5.59 | 130 | 5.12 | 194 | 7.64 | 165 | 6.50 | 246 | 9.68 | 200 | 7.87 | 298 | 11.74 |
| 61 | 2.40 | 91 | 3.58 | 96 | 3.78 | 143 | 5.63 | 131 | 5.16 | 195 | 7.68 | 166 | 6.54 | 248 | 9.76 | 201 | 7.91 | 300 | 11.80 |
| 62 | 2.44 | 92 | 3.62 | 97 | 3.82 | 145 | 5.71 | 132 | 5.20 | 197 | 7.76 | 167 | 6.57 | 249 | 9.80 | 202 | 7.95 | 301 | 11.86 |
| 63 | 2.48 | 94 | 3.70 | 98 | 3.86 | 146 | 5.75 | 133 | 5.24 | 198 | 7.79 | 168 | 6.61 | 251 | 9.88 | 203 | 7.99 | 303 | 11.92 |
| 64 | 2.52 | 95 | 3.74 | 99 | 3.90 | 148 | 5.83 | 134 | 5.28 | 200 | 7.87 | 169 | 6.65 | 252 | 9.92 | 204 | 8.03 | 304 | 11.98 |
| 65 | 2.56 | 97 | 3.82 | 100 | 3.94 | 149 | 5.47 | 135 | 5.31 | 201 | 7.91 | 170 | 6.69 | 254 | 10.00 | 205 | 8.07 | 306 | 12.04 |
| 66 | 2.60 | 98 | 3.96 | 101 | 3.96 | 151 | 5.94 | 136 | 5.35 | 203 | 7.99 | 171 | 6.73 | 255 | 10.04 | | | | |
| 67 | 2.64 | 100 | 3.94 | 102 | 4.02 | 152 | 5.98 | 137 | 5.39 | 204 | 8.03 | 172 | 6.77 | 257 | 10.12 | | | | |
| 68 | 2.68 | 101 | 3.98 | 103 | 4.06 | 154 | 6.06 | 138 | 5.43 | 206 | 8.11 | 173 | 6.81 | 258 | 10.16 | | | | |

For conversion from RSD to flat width, use the following formula: Flat width = RSD × 0.95 × 3.14 / 2
 For conversion from flat width to RSD, use the following formula: RSD = Flat width / 0.95 / 3.14 × 2

Product offering.

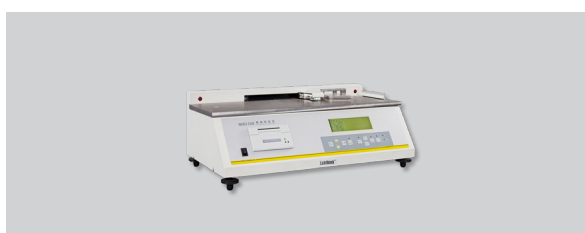
Casing caliber vs. inner diameter during shirring

| RSD (mm) | Inner diameter | Package |
|----------|------------------------|-------------------|
| 34–39 | Min. 24 mm (0.944 in.) | Net |
| 40–49 | Min. 28 mm (1.10 in.) | Net |
| 50–59 | Min. 36 mm (1.41 in.) | Net |
| 60–70 | Min. 41 mm (1.61 in.) | Net |
| 71–84 | Min. 52 mm (2.04 in.) | Net |
| 85–99 | Min. 61 mm (2.40 in.) | Net |
| 100–114 | Min. 74 mm (2.91 in.) | Net / plastic bag |
| 115–135 | Min. 85 mm (3.34 in.) | Net / plastic bag |
| 136–156 | Min. 95 mm (3.74 in.) | Net / plastic bag |
| 156–163 | Min. 115 mm (4.52 in.) | Net / plastic bag |
| 164–184 | Min. 125 mm (4.92 in.) | Net / plastic bag |
| 185–194 | Min. 141 mm (5.55 in.) | Net / plastic bag |
| 195–205 | Min. 158 mm (6.22 in.) | Net / plastic bag |



Laboratory solutions.

The continuous testing of the Nova Plastic Casing makes our customers confident to receive a plastic casing with the best quality and helps us to develop and improve the performance of our plastic casing to reach and fulfill the current market trends. We follow the ASTM standards because these have been developed to meet procedures and regulations worldwide. Some countries use the ASTM standards as a basis for their governor regulations, codes or laws.



Friction coefficient test

The friction coefficient is related to the slip properties of plastic films, which are of great interest in packaging applications. Testing provides empirical data for control purposes in film production.



Film impact Test

The impact test is performed to determine the film resistance to impact-puncture penetration. It allows to know how the impact energy is absorbed by the specimen as it's being deformed under the impact load and how the specimen behaves after yielding.



Tear test (Elmendorf Test)

The tear resistance is important for plastic films because, due to orientation during their manufacture they frequently show a marked anisotropy in their resistance to tearing. This is further complicated by the fact that some films elongate greatly during tearing, even at relatively rapid rates of loading encountered in this test method. The degree of this elongation is dependent in turn on film orientation and the inherent mechanical properties of the polymer from which it's made.



Tensile Strength force and Tensile strength at break

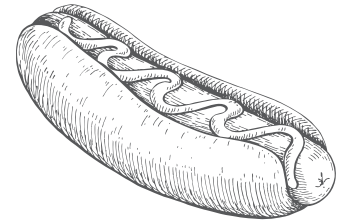
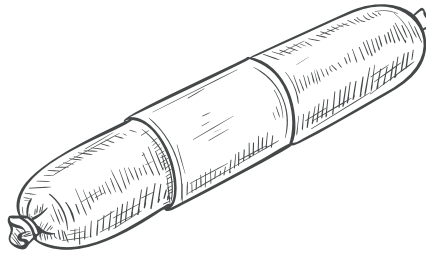
WVTR and OTR test

All tests are performed in accordance with the ASTM standards. ASTM D3985-17 is used to determine the steady-state rate of transmission of oxygen gas through plastics in the form of film. ASTM E398-13 is used for dynamic evaluation of the rate of transmission of water vapor through a flexible barrier material.

For barrier properties of high-barrier Nova plastic casings, refer to "Product offering"



PRODUCT PORTFOLIO.



● Fibrous Family

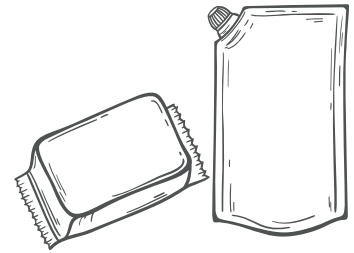
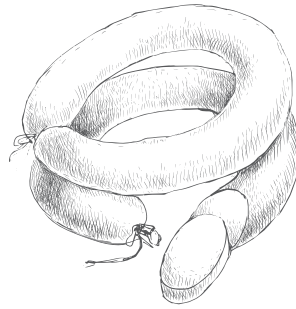
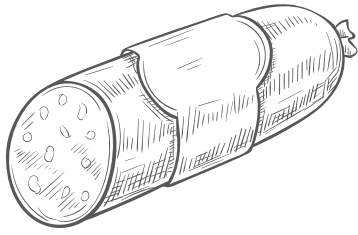
We're the world's leading manufacturer of fibrous casings, in terms of volume as well as variety. We offer the widest range of diameters, from the smallest to the largest casing diameter. Fibrous casings are used for a wide range of applications, such as pepperoni, salami, and lunch meats.

- **Fibrous Standard (ST)**
- **Fibrous MAX**
- **Fibrous Super Protect**
- **Fibrous Glide**
- **Fibrous Xtreme**
- **Fibrous XL/LCXL**
- **Fibrous Brilliant**
- **Fibrous FLX**
- **Fibrous CRF**
- **Fibrous Preserve**

● Cellulose Family

Our cellulose product line is called Wienie-Pak. We're one of the big players in the cellulose-casing market as well. We offer our customers the most efficient cellulose casing available. Wienie-Pak is used for a wide range of applications, such as frankfurters, hot dogs, beer sausages, and mini-salamis.

- **Wienie-Pak Rapid Peel**
- **Wienie-Pak Colored Casing**
- **Wienie-Pak Window**
- **Wienie-Pak D-Tech**
- **Wienie-Pak Printed**
- **Wienie-Pak Logoprint**
- **Wienie-Pak Multicolor Printed**
- **Wienie-Pak Long-Shirred**



● Plastic Family

Our plastic product line is called Nova. The Nova casing is a combination of different types of high-performance plastic resins, which work together to provide a unique level of performance. Nova is used for a wide range of applications such as cooked hams, liver sausages, and pâtés.

- Core Series
- Shape Series
- Industrial Series
- True Series
- Permeable Series

● Collagen Family

We supply collagen casings from the world's top producers. We offer both edible and non-edible collagen for the US and German markets. Collagen is a strong and flexible casing that is used for a wide range of applications such as cooking, dry, and fresh sausages.

- Devro edible (Germany)
- Devro non-edible (Germany)
- Nippi edible (USA)
- Nippi non-edible (USA)
- Fibran non-edible (USA)

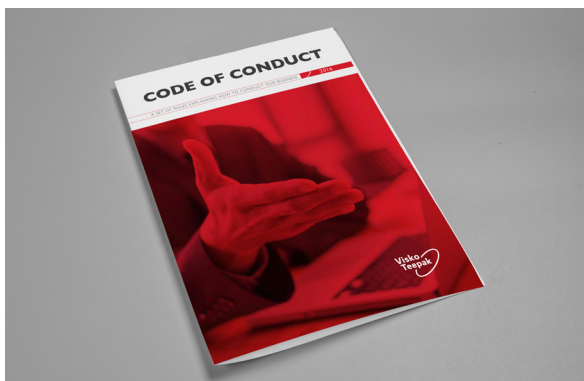
● Packaging Family

We're a full-line food packaging supplier to the meat and poultry processing industry. Our packaging materials and brands are today offered mainly in Germany, Canada, Mexico, the Nordics, and the U.S. Our packaging materials are used for a wide range of products such as pouches, shrink bags, and films.

- TNI Elastic Food Loops
- Evolv Shrink Bags
- Ally Films
- Vivid Pouches
- Vista Gel

Principles and guiding values.

ViskoTeepak is committed to conduct its business with honesty and integrity, to follow the law and to make sure that each employee and business partner is treated respectfully. We have the highest level of certification in the casing industry and act responsible when it comes to quality, health, safety and the environment.



Code of Conduct

The full text of our Code of Conduct is available in English on our website:

www.viskoteepak.com



Sustainability Report

The full text of our Sustainability Report is available on our website:

www.viskoteepak.com

| Certificates | Lommel | Hanko | Delfzijl | Brno | Nuevo Laredo | Kenosha | Poznan |
|--|--------|-------|----------|------|--------------|---------|--------|
| GFSI recognized food safety certification | ★ | ★ | ★ | ★ | ★ | ★ | ★ |
| Quality: ISO 9001 | ★ | ★ | ★ | ★ | ★ | | |
| Environment: ISO 14001 | ★ | ★ | | | ★ | | |
| OHS: ISO 45001 | ★ | ★ | | | | | |
| Kosher | ★ | ★ | ★ | ★ | ★ | ★ | ★ |
| Halal | ★ | ★ | ★ | ★ | ★ | ★** | ★ |
| EU Food Contact Compliance: (EC) No. 1935/2004 | ★ | ★ | ★ | ★ | | | ★ |
| U.S. Food Contact Compliance: C.F.R. 21 FDA 170-199* | ★ | ★ | ★ | ★ | ★ | ★ | |
| U.S. FDA Food Facility Registration | ★ | ★ | ★ | ★ | | ★ | |
| Customs and trade: AEO status | ★ | ★ | ★ | | | | |

*Applicable parts

**For alginate casing



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