NUREL
ENGINEERING POLYMERS

ADVANCED POLYMERS FOR HIGH PERFORMANCE MEAT PACKAGING

Promyde®
POLYAMIDE 6 & 66

Enoxite®
BARRIER MATERIALS

50 YEARS OF **EXPERTISE** IN **ADVANCED MATERIALS**

- SYNTHETIC FIBERS
- **ENGINEERING POLYMERS**
  - PA6, PA66, PPA, PP, PBT/PET, PBT & PET
  - COMPOSTABLE, BIOBASED, & BIODEGRADABLE MATERIALS
  - ADVANCED BARRIER MATERIALS FOR PACKAGING
  - CERTIFIED RECYCLED ENGINEERING COMPOUNDS
- BIOPOLYMERS
- INJECTION SOLUTIONS

NUREL is a Spanish manufacturer of **synthetic fibers**, **biopolymers**, **injection molding** solutions, and **engineering polymers**. With over **50 years of experience**, we serve industries such as mobility, electronics, industrial applications, and especially **packaging**.

For the packaging industry, we offer a wide range of **polyamides**, **copolyamides**, and **high-barrier polymers**.

Our packaging solutions are offered under two key brands: **PROMYDE®**, for **polyamides and copolyamides**, and **ENOXITE®**, focused on **advanced barrier materials** for optimal food protection. These solutions ensure **extended shelf life**, **product integrity**, **and safety**.

At NUREL, innovation, technical expertise, and sustainability drive the future of high-performance packaging.

OUR R&D CENTER FOR NEW ADVANCED MATERIALS

At NUREL, we operate a **state-of-the-art Innovation Center** fully equipped for the development of **advanced packaging materials**.

This cutting-edge facility enables us to accelerate innovation and deliver **high-performance, high-quality solutions** tailored to the needs of the packaging industry.

EQUIPMENT

PILOT **POLYMERIZATION** PLANT

2 COMPOUNDING EXTRUDERS PILOT SCALE

2 MONOLAYER BLOWN EXTRUDER

CAST & THERMOFORMING PILOT LINE

BLOWN 7 LAYERS COEXTRUDER

INJECTION LINE

MATERIAL CHARACTERIZATION

MECHANICAL: STRESS AT BREAK, TEAR & PUNCTURE RESISTANCE, ETC

OPTICAL: HAZE & COLOR

PERMEABILITY: WVTR & OTR

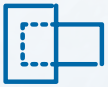
THERMAL: DSC, AUTOCLAVE

CHEMICAL: HPLC, FTIR

OXYGEN BARRIER AND **TECHNICAL PACKAGING SOLUTIONS** FOR MEAT PRODUCTS

DEEP THERMOFORMING & HIGH PERFORMANCE

ENHANCED PUNCTURE AND TEAR RESISTANCE



HIGH TRANSPARENCY

REDUCED CURLING PROPERTIES

SOLUTIONS FOR SMOKED CASING

THERMAL RESISTANCE SOLUTIONS

EXTENDED SHELF LIFE

FOOD WASTE REDUCTION

RECYCLABILITY AND BIODEGRADABILITY

OPTIMIZING PERFORMANCE STARTS WITH **THE RIGHT MATERIAL CHOICE**

Promyde®
POLYAMIDE 6 & 66

Enoxite

VACUUM THERMOFORMED PACKAGING – LID FILM SOLUTIONS

Lid films must deliver superior properties such as transparency, gloss, printability, and high barrier performance to ensure the preservation of packaged meat products.

NUREL offers a wide range of PA-based solutions specifically designed to ensure **excellent lid performance**, even in the most demanding tray formats. These materials provide outstanding **transparency**, **gloss**, and **ease of printing**, giving the final packaging a premium appearance.

SOLVING CURLING IN ASYMMETRIC MULTILAYER STRUCTURES

Curling is a common issue in asymmetric PA/PE film extrusion used for the production of lidding films and vacuum bags. **Curled films are difficult to wind**, **print**, or **thermoform properly**.

This problem arises from the difference in solidification temperature between polyamide (PA) and polyethylene (PE). It can be effectively addressed with **PROMYDE® BF940**, a copolyamide **specifically designed for asymmetric multilayer structures**.

PA6 & PA6/66	PROMYDE® BF940
Curling	Low Curling

OUR PROPOSALS – POLYMERS FOR LIDDING FILMS

STANDARD

PA6 & PA6/66

Standard grades for lidding films.

ADVANCED

PROMYDE® BF940 ANTICURLING (PET LAMINATION)

It eliminates curling, making it easier to laminate with other polymers such as **PET**.
Its **high gloss** and **transparency** enhance the **visual appeal** of the final package.

SUSTAINABLE

PROMYDE® BF740 IMPROVED BARRIER

PLASTIC REDUCTION: PROMYDE® BF740 provides an **oxygen barrier up to twice higher than PA6**, thus reducing PA layer.

FOOD WASTE REDUCTION: The primary purpose of packaging is to **extend the shelf life of meat products**. By reducing oxygen exposure, it prevents premature spoilage and quality deterioration, which in turn leads to a significant reduction in food waste.

	STANDARD		ADVANCED	SUSTAINABLE
	BF40 (PA6)	BF540 (PA6/66)	BF940	BF740
OXYGEN BARRIER	●●	●	●●	●●●●
CURLING CONTROL	●	●●	●●●●	●●●●
TRANSPARENCY	●	●●●	●●●●	●●●●

VACUUM DEEP THERMOFORMED PACKAGING – FORMING FILM SOLUTIONS

NUREL offers a wide range of polyamides and copolyamides specifically designed for flexible deep thermoforming packaging applications.

PROMYDE® polyamides and copolyamides provide **a superior barrier properties** and **exceptional puncture resistance**, effectively extending the shelf life of fresh meat products such as red meat and helping to reduce food waste.

This type of packaging is particularly **suitable for large meat cuts**, thanks to its excellent thickness distribution even at the edges.

KEY REQUIREMENTS FOR DEEP THERMOFORMED VACUUM PACKAGING

- HIGH GLOSS AND TRANSPARENCY
- DEEP HERMOFORMING CAPABILITY
- EXCELLENT TEAR AND PUNCTURE RESISTANCE
- STRONG BARRIER PERFORMANCE
- IDEAL FOR LARGE CUTS
- SUITABLE FOR INDUSTRIAL PACKAGING MACHINES

OUR PROPOSALS – POLYMERS FOR FORMING FILMS

STANDARD

PA6 & PA6/66

Standard grades for forming film solutions.

TECHNICAL AND ADVANCED SOLUTIONS

PROMYDE® BF840

Designed for **deep thermoforming** with **enhanced barrier performance**.

PROMYDE® BF940

Provides **greater stiffness and structural integrity**, with **excellent transparency**.

SPECIAL SOLUTIONS FOR BONE-IN MEAT
PROMYDE® BF642 & BF840

Puncture resistance

Gloss and **transparency** for attractive shelf presence

Uniform **thickness distribution**

Minimal **thickness variation** at the edges

	STANDARD		ADVANCED		
	BF40 (PA6)	BF540 (PA6/66)	BF940	BF642	BF840
THERMOFORMABILITY	•	•••	•••	••••	••••
PUNCTURE RESISTANCE	••	••••	••	••••	••••
TRANSPARENCY	•	•••	••••	••••	••••

HIGH-PERFORMANCE POLYAMIDES FOR VACUUM BAGS

PA vacuum bags are commonly used to package fresh meat cuts (pork, beef, veal) and sausages, especially for **butcher shops and retail**.

Their vacuum seal and barrier help extend shelf life by preventing microbial spoilage. Shrink bags offer reliable **protection against moisture**, **gases**, **and off-flavors**, **preserving taste** and **aroma**.

By removing air, they **reduce volume, improving storage, transport, and product appearance**, this makes them a key solution in food packaging efficiency.

OXYGEN BARRIER PROPERTIES – PROMYDE® BF740

PROMYDE® BF740 is a high-barrier copolyamide offering up to **twice the gas barrier of standard PA6**, allowing for layer **downgauging and extended shelf life**.

It is **suitable for retort applications** while maintaining **barrier** properties, **transparency**, and excellent **thermoformability**. With a **processing temperature of 200°C**, it supports easy co-extrusion in both blown and cast processes.

Its **lower OTR enables reduced PA content in PE/PA structures**, improving compatibility with the **PE recycling stream**.

OUR PROPOSALS – VACUUM BAG APPLICATIONS

STANDARD

PROMYDE® BF36SC – KEY SOLUTION

Increased productivity and transparency, **premium performance at a competitive cost**, and an **improved alternative to standard PA6** with enhanced properties and easy processing.

PROMYDE® BF540

Reliable standard grade for vacuum bag production.

ADVANCED

PROMYDE® BF940

Offers **higher stiffness**, **transparency**, **and improved barrier**, along with curling elimination.

SUSTAINABLE

PROMYDE® BF740
ENHANCED BARRIER

Allows for **thickness reduction**, cutting down on plastic usage, or alternatively, **boosts shelf life** when maintaining standard thickness by offering **superior oxygen barrier**.

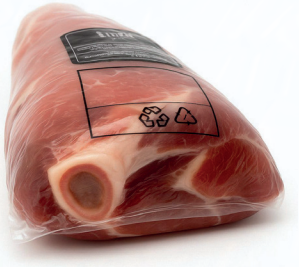
	STANDARD			ADVANCED	SUSTAINABLE
	BF40 (PA6)	BF36SC	BF540 (PA6/66)	BF940	BF740
OXYGEN BARRIER	●●	●●	●	●●	●●●●
PUNCTURE RESISTANCE	●●	●●●	●●●●	●●	●●●
TEAR RESISTANCE	●	●●	●●●	●	●●
CURLING	●	●●	●●	●●●●	●●●●
TRANSPARENCY	●	●●	●●●	●●●●	●●●●

SKIN AND SHRINK PACKAGING PERFORMANCE MATERIALS

SHRINK PACKAGING

Shrink films are ideal for fresh and processed meats, ensuring a tight seal and vacuum integrity. They help **maintain low oxygen levels, preventing spoilage, while adapting to irregular shapes** for a smooth, contoured finish.

At NUREL, our **PROMYDE® copolyamides** deliver **mechanical strength, barrier protection, gloss, and excellent shrink performance**.



SKIN PACKAGING

Skin packaging combines lightweight design, attractive presentation, and reliable sealing. A transparent film conforms tightly to the product on various tray types, offering **barrier protection and extended shelf life**.

PROMYDE® copolyamides from NUREL are **specially formulated for skin applications**, ensuring **strength**, **sealability**, **clarity**, and **high gloss**.

OUR PROPOSALS – SHRINK & SKIN PACKAGING

STANDARD

PA6/66

Due to its inherent properties, **standard PA6 is not suitable for skin packaging** structures.
In some cases, **PA6/66 may be used**; however, for demanding applications, our specially formulated **copolyamides are recommended**.

ADVANCED

PROMYDE® BF840, BF940 & BF642

These three **copolyamide grades** provide **excellent optical properties** and **inherent shrink behavior**.
Based on the mechanical demands and post-packaging thermal processes, our technical team will recommend the most suitable grade for each specific application.

SUSTAINABLE

SUSTAINABLE APPROACH

Skin packaging offers sustainable benefits by **reducing plastic use and extending shelf life**, minimizing food waste. Compared to traditional meat packaging, it also improves product protection and presentation.

	STANDARD	ADVANCED		
	BF540 (PA6/66)	BF840	BF940	BF642
TEAR RESISTANCE	●●●	●●●●	●	●●●●
PUNCTURE RESISTANCE	●●●●	●●●●	●●	●●●●
HEAT SHRINKAGE	●●●	●●●●	●●●	●●●
OXYGEN BARRIER	●	●	●●	●
TRANSPARENCY	●●●	●●●●	●●●●	●●●●

HIGH-PERFORMANCE POLYAMIDES FOR CASING APPLICATIONS

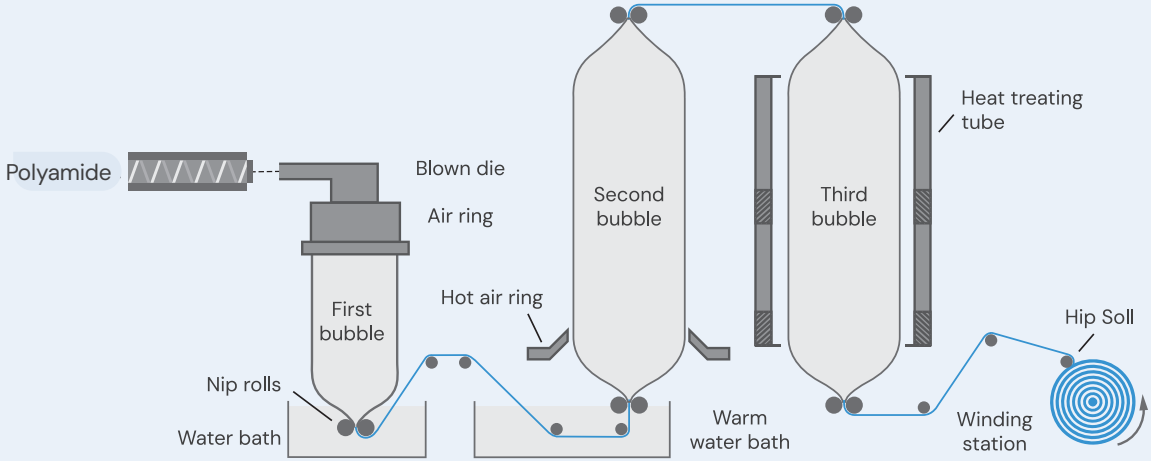
Polyamide is a key material in the **production of synthetic casings** for sausages and processed meats, thanks to its exceptional strength, barrier performance, and versatility.

PROMYDE® PA grades offer consistent shape retention, **excellent mechanical resistance**, and a **reliable barrier against external contaminants**, while enabling controlled moisture and gas transmission.

These qualities make it a **trusted choice across the meat processing industry**.

THREE BUBBLE EXTRUSION PROCESS

PROMYDE® PA6 RANGE PERFORMS EXCEPTIONALLY WELL IN THREE-BUBBLE EXTRUSION PROCESSES



OUR PROPOSALS – CASING APPLICATIONS

SUSTAINABLE APPROACH

All materials are available in a **biodegradable version**. They can biodegrade in **aerobic** (ISO 17556) and **anaerobic** (ASTM D5511) environments.

Promyde® bio
BIODEGRADABLE POLYAMIDE

	STANDARD		ADVANCED	
	BF40 (PA6)	BF36SC	BF933	BF642
ELONGATION	••	•••	•	••••
HEAT SHRINKAGE	•	•••	•••	•••

NEW SOLUTIONS FOR SMOKED FOOD CASINGS

When it comes to products that undergo **smoking processes**, ensuring high quality and extended shelf life is essential—especially for **processed meats** and **sausages**.

For these applications, the casing film must **offer a controlled permeability**, allowing the passage of **smoke components** and **water vapor**.

This enables aroma and color infusion, improves product appearance and flavor, and **supports preservation without compromising freshness**.

KEY REQUIREMENTS FOR SMOKED PRODUCTS CASING

- GAS PERMEABILITY
- DIMENSIONAL STABILITY
- HIGH MECHANICAL STRENGTH
- HIGH ELASTICITY
- GOOD SHRINKAGE
- EXCELLENT ADHESION TO FOOD SURFACES
- EXCELLENT PRINTABILITY

OUR PROPOSALS – CASING APPLICATIONS

ADVANCED

Enoxite SMOKE

ENOXITE® Smoke is a technical polymer **designed for smoked food casings**, offering an excellet smoke permeability. To achieve the necessary **smoke penetration** in the production of **smoked meat**, a mixture of **PA** with **20-30% of ENOXITE Smoke S20** is recommended.

It is also possible to **combine** these products with **copolyamides**.*

* See **PROMYDE®** PA packaging portfolio

ENOXITE SMOKE PERMEABILITY PERFORMANCE

	100% PROMYDE BF40 (PA6)	20% ENOXITE S20 + 80% PROMYDE BF40 (PA6)	30% ENOXITE S20 + 70% PROMYDE BF40 (PA6)
WATER VAPOUR PERMEABILITY	•	••	•••
OXYGEN PERMEABILITY	•	••	•••

POLYAMIDES & COPOLYAMIDES FOR RETORTABLE PACKAGING

Retort pouches, bags, and vacuum bags made from these flexible multilayer films can **withstand temperatures between 116°C and 121°C under high pressure**, ensuring product safety.

Retort packaging is ideal for **prepared foods**, **pet food**, **sauces**, and **baby food**, offering high resistance to both thermal and mechanical stress.

The retort process uses high temperatures and pressures **to eliminate harmful microorganisms and extend the shelf life of** packaged foods while preserving their nutritional value.

STANDARD

PROMYDE® BF40R

PROMYDE BF40R is a high viscosity PA6 designed for retort applications, offering outstanding **hydrolysis resistance**.

Its exceptional features makes it the perfect choice for applications requiring **high resistance to thermal and mechanical stress**.

ADVANCED

PROMYDE® BF940R

PROMYDE BF940R is a hydrolisis resistant high viscosity copolyamide designed for retortable packaging solutions.

With **advantages** such as **extreme transparency**, **gloss**, **no curling**, and an **excellent processability.**

HIGH-PERFORMANCE POLYMERS FOR OVEN FILM APPLICATIONS

PROMYDE HT is ideal for **cooking juicy and tender meats**, **fish**, and **vegetables** in **oven-safe baking bags**, offering high performance and reliability.

Specifically designed for oven bag applications, it withstands **high temperatures while maintaining integrity**, making it perfect for safely cooking food in the oven, even under extended **high-temperature conditions**.

STANDARD

PROMYDE® BF40HT

The heat-resistant PROMYDE PA6 grades for flexible packaging are the preferred materials **for baking bags and oven-safe packaging**.

These materials are specially designed to **withstand high temperatures** while maintaining their integrity, making them ideal for **cooking moist, tender meat and vegetables**, even under **extended cooking conditions**.

ADVANCED

PROMYDE® BF940HT

For a higher transparency and better processability, copolyamide grade **PROMYDE® BF940HT** is highly recommended for oven bag applications, for high temperatures resistance while mantaining integrity.

GENERAL VALUES

	BF40 (PA6)	BF36SC	BF540 (PA6/66)	BF940	BF840	BF642	BF740
MELTING TEMPERATURE, °C	220	210	190	210	180	185	180
OXIGEN BARRIER	●●	●●	●	●●	●	●	●●●●
MODULUS	●●●●	●●●	●●	●●●	●	●●	●●●●
STRESS AT BREAK	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●	●●●●
TEAR STRENGTH	●	●●	●●●	●	●●●●	●●●●	●●
PUNCTURE	●●	●●●	●●●●	●●	●●●●	●●●●	●●●
HEAT SHRINKAGE	●	●●	●●●	●●●	●●●●	●●●	-
CURLING SOLUTION	●	●	●●	●●●●	●●●●	●●●●	●●●●
TRANSPARENCY	●	●●	●●●	●●●●	●●●●	●●●●	●●●●

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NUREL
ENGINEERING POLYMERS

Ctra. Barcelona km 329
50016 Zaragoza Spain
Tel.: +34 976 465 579
polymers.NUREL.com

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