

Peelable

PPL

Data Sheet (December 2005)

Product family Introduction

Nuroll Peelable is a bi-axially oriented polyester (BOPET) film with an amorphous polyester heat seal layer.

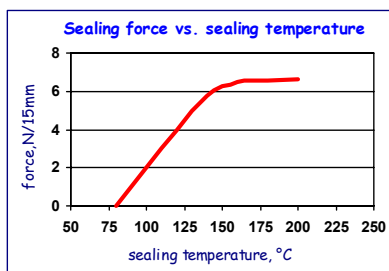
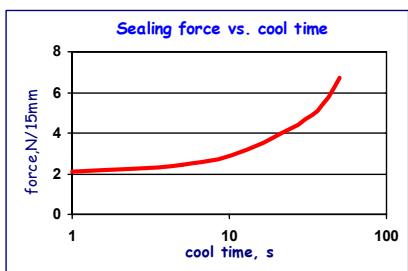
It is specially designed for heat sealable lidding application in packaging refrigerated and frozen foods. Nuroll Peelable shows also an excellent hot-tack for hot filling process.

Nuroll Peelable film can be placed at temperature down to -60°C and up to 200°C with only limited distortion of the base film, for this reason the film is dual ovenable, pasteurizable and provides strong, consistent peeling to substrates such as APET, CPET, PETG and PVC in all the usual conditions

The heat seal layer is available in 2 different thickness, 2 (**PPL** grade) and 3,5 (**PPH** grade) microns. Nuroll Peelable is commercially available also with **anti-fogging** characteristics to assure more clarity and transparency when stored in refrigerators

Sealing properties

Nu Roll Peelable film shows a very good seal immediately after the sealing (hot tack properties), for this reason represents the right choice for hot filling and MAP packaging applications. Its particular formulation guarantees a good seal without stress the shredding behavior.



Welding force of 23 PPH on different substrates

| Welding conditions | Film/Film | Film/Film at 0°C | Film/ CPET (APET layer) | Film/ Cardboard | Film/ Cardboard at 0°C | Film/ 23µ Film plain |
|--------------------|-----------|------------------|-------------------------|-----------------|------------------------|----------------------|
| 140°C-4bar-1sec | > 6,5 | 5 | 5,5 | 2,5 | 2,5 | 2,5 |
| 140°C-4bar-2sec | > 6,5 | 5,5 | 6,5 | 3,5 | 2,5 | 2,5 |
| 140°C-4bar-4sec | > 6,5 | 5,5 | 7,5 | 3,5 | 2,5 | 2,5 |
| 160°C-4bar-1sec | > 7 | 6,5 | 7 | 3 | 3 | 3 |
| 160°C-4bar-2sec | > 7 | 6,5 | 7,5 | 3 | 3 | 3 |
| 160°C-4bar-4sec | > 7 | 6,5 | 7,5 | 4 | 3 | 3 |
| 190°C-4bar-1sec | > 7 | > 7 | 7 | 3,5 | 3,5 | 4 |
| 190°C-4bar-2sec | > 7 | > 7 | 8 | 4 | 3,5 | 4 |
| 190°C-4bar-4sec | > 7 | > 7 | 8 | 4 | 3,5 | 4 |

| Specimen structure | N/15 mm |
|----------------------|---------|
| Film/Film | > 6,5 |
| Film/ 50µ Film plain | 5 |
| Film/ Cardboard | 3,5 |
| Film/ APET | 7,5 |
| Film/ 100% CPET | 5 |
| Film/ Aluminium 64µ | 3,5 - 4 |

FORCE is measured by INSTRON dynamometer in N Sample dimension is 15 mm width

Cardboard is laminated with BOPET film, cardboard polyester extrusion coated behaviour is like CPET

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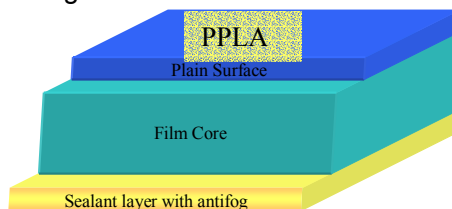
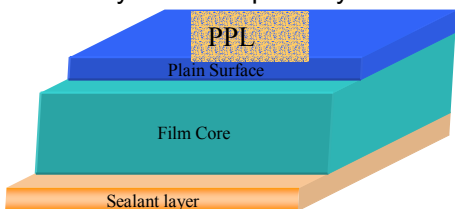
PPL

Product description

Nuroll PPL is widely used when good sealability is requested but the tray substrate is not complex and the filling process does not dirty the sealing area (by powder, fats or liquids).

Nuroll PPL is commercially available in nominal thickness (plain film) 12, 23 and 36 microns but other thicknesses are available on request

Nuroll PPL is commercially available also with anti-fogging characteristics (PPLA) to assure more clarity and transparency when stored in refrigerators



Main Applications

Cheeses, salted meats, dried food

Technical details

Nuroll PPL is usually supplied with following characteristics:

- **Core diameter:** 6 inches (152.76 mm)
- **Film width:** min 400 mm, max 1400mm
- **Film length:** According with film thickness and max external reel diameter 640mm

| Substrate Thickness (μ) | 12 | 23 | 36 |
|-------------------------------|-------|-------|------|
| Max Reel lenght (m) | 12000 | 12000 | 8000 |

- **Packing presentation** suspended reel; wooden endboards, lid and pallet; stretchable PE film

Different characteristics than the above on request

Storage conditions

Nuroll PPL need to be stocked in a close warehouse and preserved from the light and from the humidity.

Reels must be not stacked

Nuroll will not accept any responsibility for material older than 1 year from the delivering

Compliance with regulations

Polyester Film produced by Nuroll SpA, complies with EEC, Italian and FDA requirements on packaging for direct contact with foodstuffs

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PPL

Typical Properties

| Properties | Unit | Test Method | Typical properties grade PPL | | | Typical properties PPLA grade | | |
|--|------------------------|------------------------------|------------------------------|-----|-----|-------------------------------|-----|-----|
| | | | | | | | | |
| Film base Thickness | Microns | ASTM E 252 | 12 | 23 | 36 | 12 | 23 | 36 |
| Coating weight | g/m ² | ASTM D1505 | 2 | 2 | 2 | 2 | 2 | 2 |
| Total thickness | Microns | ASTM E 252 | 14 | 25 | 38 | 14 | 25 | 38 |
| Area Yield (nominal) | m ² /kg | ASTM E 252 | 52 | 30 | 19 | 52 | 30 | 19 |
| Tensile strength | MD | N/mm ² ASTM D 882 | 230 | 230 | 230 | 230 | 230 | 230 |
| | TD | | 240 | 240 | 240 | 240 | 240 | 240 |
| Elongation at Break | MD | % ASTM D 882 | 130 | 130 | 140 | 130 | 130 | 140 |
| | TD | | 120 | 120 | 130 | 120 | 120 | 130 |
| Thermal Shrinkage 150°C-30' | MD | % ASTM 1204 | 2 | 2 | 2 | 2 | 2 | 2 |
| | TD | | 0,5 | 0,5 | 0,5 | 0,5 | 0,5 | 0,5 |
| Haze | % | ASTM D1003 | 7 | 7 | 8 | 7 | 7 | 8 |
| MVTR (38°C, 90%RH) | g/m ² *day | ASTM E398 | 50 | 25 | 15 | 50 | 25 | 15 |
| OTR (20°C, 0%RH) | cc/m ² *day | ASTM D3985 | 110 | 55 | 35 | 110 | 55 | 35 |
| Welding force (on itself) 140°C—4 bar—4 s | N/15mm | Internal | 5,5 | 5,5 | 5,5 | 3,5 | 3,5 | 3,5 |

1. This information is the best currently available on product and it is subject to revision as additional knowledge and experience is gained.
2. The results obtained and the above properties refer to average value of laboratory tests. Therefore, such results have only to be considered as an indicative general guide to material properties and not as an implied guarantee that the product actually has said properties and/or a warranty of fitness for a particular purposes and/or suggestion for infringement of any existing patents.
3. Due to many factors which may affect customer production process, including but not limited by different equipments and techniques used, PPL-PPLA film must be qualified before being used in any application.