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PRODUCT PROFILE & TECHNICAL DATA · 产品介绍与技术参数

PE Heat Shrink Film

PE 热收缩膜 · 产品介绍与技术参数

Bilingual edition · 中英双语版 · For customer evaluation and packaging line selection · 供客户评估与包装线选型使用

Doc. No. API-TDS-PE-2026 **Rev.** 1.0 **Date** 2026-11-20 **Product** PE shrink film / PE 热收缩膜 **HS code** 3920109090

0.015–0.30 mm Thickness 厚度（常规 0.03–0.25 mm）	**100–6000 mm** Width 幅宽（筒膜折径 400–4200 mm）	**50–70 % / 20–55 %** Shrink MD / TD 纵/横向收缩率（120 ℃）	**≥38 dyn/cm** Wet tension 湿润张力（双面电晕）

01 Product overview

产品概述

PE heat shrink film is a polyethylene packaging film that has been oriented during manufacture and therefore keeps a “shrink memory”. When it passes through a shrink tunnel, the oriented molecular chains relax and the film contracts around the load, forming a tight, unitised pack that is dust-proof, moisture-resistant and difficult to tamper with. The film is produced by blown-film extrusion from LDPE as the base resin, blended with LLDPE — including metallocene LLDPE — together with slip, anti-block and antioxidant additives. Multilayer co-extrusion (3 or 5 layers) separates the sealing skins from a tougher core, balancing sealability, shrink force and puncture resistance.

PE 热收缩膜是以聚乙烯为基材、在成膜过程中经过定向拉伸而保留“收缩记忆”的包装薄膜。通过收缩炉时，被拉伸的分子链解取向，薄膜受热回缩并紧贴被包物，形成防尘、防潮、难以拆动的整体包装。生产上以 LDPE 为基础树脂，与 LLDPE（含茂金属 LLDPE）及爽滑、抗粘连、抗氧等助剂共混后吹塑成膜；三层或五层共挤可把热封表层与强韧芯层分开，兼顾封口性、收缩力与抗穿刺性。

Shrink behaviour is directional. GB/T 13519-2016 classifies these films into transverse-shrink film, used mainly for palletised loads and cartons, and longitudinal-shrink film, used for single or grouped fixed-shape products. Biaxially oriented grades shrink in both machine direction (MD) and transverse direction (TD) and follow irregular shapes more closely; uniaxially dominated grades give higher shrink force in one direction and are preferred for hooding and pallet wrapping.

收缩具有方向性。GB/T 13519-2016 将这类薄膜分为以横向收缩为主的横向收缩膜（用于托盘堆置物品的集合包装或纸箱等定型物品外包装）与以纵向收缩为主的纵向收缩膜（用于固定形状物品的单体或组合体外包装）。双向拉伸牌号在纵向（MD）与横向（TD）同时收缩，更贴合异形产品；单向主导的牌号在某一方向收缩力更高，适合罩膜与托盘裹包。

Compared with conventional LDPE film, LLDPE-rich PE shrink film gives higher tensile strength, better puncture and tear resistance and greater toughness at low temperature, while keeping the moisture barrier, chemical inertness and recyclability of polyethylene. Clarity is moderate — below POF and PVC — which is normally acceptable for industrial, beverage-collation and transit packaging, and can be improved with multilayer structures and high-clarity skins. Both surfaces are usually corona treated to at least 38 dyn/cm so that the film can be printed or laminated.

与普通 LDPE 膜相比，富 LLDPE 的 PE 热收缩膜拉伸强度更高、抗穿刺与抗撕裂更好、低温韧性更佳，同时保留聚乙烯的阻湿性、化学惰性与可回收性。透明度中等，低于 POF 与 PVC，用于工业包装、饮料集合包装与运输包装通常足够，也可通过多层结构与高透明表层改善。两面通常做电晕处理至不低于 38 dyn/cm，以便印刷或复合。

Key advantages 主要优势

- High tensile strength and puncture resistance — fewer failures on sharp corners and pallet edges. 拉伸强度与抗穿刺性高，锐角与托盘边缘不易破膜。
- Tough at low temperature — remains flexible at about −50 ℃, suitable for cold-store and winter transport. 低温韧性好，约 −50 ℃ 仍保持柔韧。
- Strong seals — a PE-to-PE seal reaches high peel strength over a wide temperature window. 焊口强度高，PE 对 PE 封合在较宽温度窗口内稳定。
- Chlorine-free polyethylene, recyclable in the PE (resin code 4) stream. 不含氯，属 PE（回收标识 4）体系。
- Lower material and storage cost than cartons; flat rolls save warehouse space. 相较纸箱降低材料与仓储成本。
- Printable after double-side corona treatment; available in tubular, single-wound or centre-folded form. 双面电晕后可印刷，可供应筒膜、单片或对折卷膜。

02 Product range & construction

产品系列与结构

Item 项目	Options / description 可选形式与说明
Resin system 树脂体系	LDPE base blended with LLDPE or metallocene LLDPE; additives for slip, anti-block, antioxidant and UV where required. LDPE 为基础，与 LLDPE 或茂金属 LLDPE 共混；按需加入爽滑、抗粘连、抗氧及抗紫外线助剂。
Layer structure 层结构	Single layer, 3-layer or 5-layer co-extrusion. Skin layers control sealing and optics; the core carries strength and shrink force. 单层、三层或五层共挤；表层控制热封与光学性能，芯层提供强度与收缩力。
Shrink direction 收缩方向	Transverse-shrink (TD-dominant), longitudinal-shrink (MD-dominant) or balanced biaxial, per GB/T 13519-2016 classification. 横向收缩、纵向收缩或双向平衡，对应 GB/T 13519-2016 分类。
Supply form 供货形态	Tubular roll (layflat), single-wound sheet, centre-folded roll, or pre-made bags. 筒膜卷（折径）、单片卷膜、对折卷膜，或成品袋。
Surface treatment 表面处理	Double-side corona treatment, normally ≥38 dyn/cm; one-side treatment or untreated film on request. 双面电晕，通常 ≥38 dyn/cm；可按需单面处理或不处理。
Colour & printing 颜色与印刷	Transparent, hazy, white, black or matched colour; flexo or rotogravure printing on request. 透明、雾面、白色、黑色或配色；可按需凹印或柔印。

03 Technical parameters

技术参数

3.1 Dimensions and supply 规格与供货

Property 项目	Unit 单位	Typical value 典型值	Condition / remark 条件与说明
Thickness 厚度	mm	0.015–0.30（常规 0.03–0.25）	Grade dependent 随牌号
Width 幅宽	mm	100–6,000	Single-wound or centre-folded 单片或对折
Layflat width, tubular 折径	mm	400–4,200	Open circumference = 2 × layflat width 展开周长 = 2 × 折径
Core inner diameter 纸芯内径	mm	76 (3 inch) standard	Other core sizes negotiable 其他规格可协商
Roll weight / diameter 卷重 / 卷径	kg / mm	15–30 kg per roll common	Limited by handling and pallet size 受搬运与托盘限制
Length per roll 每卷长度	m	Calculated from roll weight	L = M ÷ (W × t × ρ) 由卷重换算

3.2 Physical & mechanical properties 物理与力学性能

Property 项目	Unit 单位	Typical value 典型值	Test method 检验方法	Remark 说明
Density 密度	g/cm³	0.92–0.93	GB/T 1033.1; ASTM D1505	Depends on resin and blend ratio 随树脂与共混比例
Tensile strength MD 拉伸强度 纵向	MPa	≥20 (typical 24.14)	GB/T 1040.3; ASTM D882	GB/T 13519 minimum 标准下限
Tensile strength TD 拉伸强度 横向	MPa	≥18 (typical 25.36)	GB/T 1040.3; ASTM D882	GB/T 13519 minimum 标准下限
Elongation at break MD 断裂伸长率 纵向	%	≥200 (typical 388)	GB/T 1040.3; ASTM D882	High elongation indicates toughness 伸长率高说明韧性好
Elongation at break TD 断裂伸长率 横向	%	≥200 (typical 500)	GB/T 1040.3; ASTM D882	Same specimen geometry 同一试样
Shrink MD / TD 纵/横向收缩率	%	50–70 / 20–55	GB/T 13519-2016	At 120 ℃ conditions 120 ℃ 条件
Wetting tension 湿润张力	dyn/cm	≥38	GB/T 14216	Double-side corona 双面电晕

3.3 Thermal properties 热性能

Property 项目	Unit 单位	Typical value 典型值	Remark 说明
Shrink onset temperature 收缩起始温度	℃	approx. 110–120	Below this the film softens without meaningful shrink 低于此温度仅软化
Recommended tunnel temperature 推荐收缩炉温度	℃	140–180 common; 180–220 for thick or high-speed lines	Operating range 120–220 ℃ depending on grade 随牌号、厚度、停留时间与风量
Shrink force 收缩应力	N/mm²	Grade-dependent, to be confirmed	ISO 14616 · governs load tightness 决定束紧力

3.4 Optical & appearance 光学与外观

Property 项目	Unit 单位	Typical value 典型值	Remark 说明
Haze 雾度	%	Grade-dependent; PE is normally hazier than POF	Measured on the ordered grade 按订货牌号实测
Light transmittance 透光率	%	Grade-dependent	Measured to order requirement 按订单要求实测
Gloss (45°) 光泽度	GU	Grade-dependent	Report geometry (45° or 60°) 须注明测量角度
Appearance 外观	—	No bubbles, holes, streaks, creases, fisheyes or inclusions affecting use	Visual, GB/T 13519-2016 4.1 目测

04 Typical test data — high-strength PE shrink film

典型检测数据 · 高强度 PE 热收缩膜

Test item 检验项目	Unit 单位	Result 结果	Remark 说明
Tensile strength, TD 拉伸强度 横向	MPa	25.36	—
Elongation at break, MD 断裂伸长率 纵向	%	388	—
Elongation at break, TD 断裂伸长率 横向	%	500	—
Light transmittance 透光率	%	—	Measured to order requirement 按订单要求实测
Seal strength 焊口强度	N/15 mm	—	Measured to order requirement 按订单要求实测
Wetting tension 湿润张力	dyn/cm	≥38	Corona-treated surface 电晕处理面

Note: the values are typical for this product family; test conditions are given in the remarks. Normal batch-to-batch variation applies and the supply specification follows the technical confirmation sheet confirmed with the order.

说明：以上为本产品系列典型值，测试条件见备注；批量之间允许合理波动，正式供货规格以订单确认的技术确认单为准。

05 Comparison: PE vs POF vs PVC vs plain LDPE

与 POF、PVC、普通 LDPE 对比

Most packaging operations use more than one shrink film: heavy-duty PE for pallets and cartons, clear POF for retail packs, PVC for small collation and sleeve labels. The table below sets out what each material is, where it performs and where it does not, so that the right film — or the right combination of films — can be selected for each pack.

多数包装场景并不只用一种收缩膜：托盘与纸箱用重型 PE，零售包装用高透明 POF，小件集合与套标用 PVC。下表分别说明每种材料的构成、优势与局限，便于按每个包装件选择合适材料。

Property 项目	PE 热收缩膜	POF 热收缩膜	PVC 热收缩膜	普通 LDPE 膜
Raw material & structure 原料与结构	LDPE + LLDPE blend, mono or 3/5-layer co-extrusion	PE + PP, 3/5-layer co-extrusion, biaxial	PVC + plasticiser + stabiliser, oriented	Single-resin LDPE, low orientation
Density / grammage 密度 / 克重	0.92–0.93 g/cm³; lowest grammage at equal gauge	approx. 0.92–0.94; light for its strength	approx. 1.30–1.40; heaviest per m²	0.92–0.93 g/cm³
Food contact 食品接触	Food-grade PE available; confirm to GB 4806.7 / EU 10/2011	Suitable for direct food contact — chlorine-free polyolefin	Generally not recommended for direct food contact; restricted in some markets	Food-grade LDPE available
Recycling & regulatory risk 回收与法规风险	PE stream (code 4); low risk	Polyolefin; recyclable where PE/PP streams exist; low risk	Chlorine-containing; limited recycling, acidic flue gas on incineration; under scrutiny in EU packaging rules	PE stream; low risk
Storage stability 储存稳定性	Stable; 6–12 months in dry shade	Stable; keep away from heat and UV	Plasticiser migration, yellowing and cold brittleness over time	Stable; avoid compression
Typical thickness 常用厚度	0.03–0.25 mm (15–250 μm)	12–30 μm	15–50 μm	0.02–0.10 mm
Best-fit packs 最匹配的包装对象	Beverage collation, cartons, profiles, appliances, pallets, heavy and sharp loads	Retail multipacks, stationery, cosmetics, printed shelf packs	Small consumer goods, toys, batteries, stationery, shrink sleeves	Light bundling and general wrapping

Application recommendations 应用推荐

Application 应用场景	Recommendation 推荐	Reason 理由
Palletised loads, bagged goods 托盘与袋装货物	PE	Highest shrink force and puncture resistance at the thickness needed for a pallet 在托盘所需厚度下收缩力与抗穿刺最高
Cartons, profiles, appliances 纸箱、型材、家电	PE	Absorbs sharp corners and holds heavy packs tight 适应锐角并束紧重载
Retail multipacks 零售集合包装	POF	High clarity and soft hand for shelf presentation 高透明、手感柔和
Cold store and low-temperature logistics 低温仓储	PE	Retains toughness to about −50 ℃; PVC embrittles and POF loses impact strength faster in deep cold

Supply 供货说明**.** PE, POF and PVC shrink films are all available from APIG. The grade can be matched to your packaging line — tunnel type, line speed, pack weight and shape — and to the requirements of the end market, and the three materials can be combined in one supply programme where a mixed pack range calls for it. Samples and technical data are available on request.
PE、POF、PVC 三类收缩膜我们均可供应，可按收缩炉型式、线速、包装重量与形状匹配牌号，也可组合供货。样品与技术参数欢迎索取。

06 Processing, storage & handling

使用与储运要点

6.1 Shrink tunnel settings 收缩工艺设定

Parameter 参数	Recommended practice 推荐做法	Effect / risk 影响与风险
Temperature 温度	Start at the lower end of 140–180 ℃ and raise in 5 ℃ steps until the pack is tight but the print and film surface are unaffected. Thick hood film may need 180–220 ℃; light film can run at 120–150 ℃ with short dwell.	Too low: loose pack and dog-ears. Too high: burnt film, distorted print, seal failure. 过低松垮、过高烧膜
Airflow 风量与风路	Balance top, bottom and side air; keep nozzles clear and the return path unobstructed. A uniform tunnel is more important than a high set point.	Uneven airflow gives uneven shrink and wrinkles 风量不均导致收缩不均与起皱
Dwell time 停留时间	Set with line speed; longer dwell at lower temperature is gentler on print than a short pass at high temperature.	Short dwell at high temperature burns edges 高温短时易烧边
Sealing 封口	Seal through a single layer where possible; keep the sealing bar clean and let the seam cool before the tunnel.	Sealing through a fold or a hot seam entering the tunnel causes cracking 过折封口或热口入炉导致开裂

6.2 Storage & handling 储存与搬运

- Keep rolls in the original wrapping, on pallets, not in direct contact with the floor. 卷膜保留原包装、置于托盘，不与地面直接接触。
- Do not stack point loads or heavy pallets on rolls; deformation becomes permanent. 卷上不得压重或受点载荷。
- Apply first-in-first-out; shelf life is typically 6–12 months from production under the conditions above. 先进先出；保质期通常 6–12 个月。
- Condition rolls at line temperature for 24 h before use in cold weather to avoid condensation and blocking. 冬季使用前在车间温度下放置 24 h。

07 Purchasing information

采购信息

7.1 Thickness, grammage and yield 厚度、克重与出膜量

Grammage = thickness (mm) × 1000 × density (g/cm³). The values below use ρ = 0.925 g/cm³ and are for estimating only; the exact figure follows the approved grade.

Thickness 厚度 (μm)	Grammage 克重 (g/m²)	Area per kg (m²/kg)	Length per kg at 500 mm (m/kg)	Typical duty 典型用途
15	13.9	72.1	144.1	Light bundling 轻载捆扎
20	18.5	54.1	108.1	Bottle multi-packs 瓶组集合
25	23.1	43.2	86.5	Light-duty wrap 轻载裹包
30	27.8	36.0	72.1	Beverage collation 饮料集合
40	37.0	27.0	54.1	Medium-duty cartons 中载纸箱
50	46.3	21.6	43.2	Transit packaging 运输包装
60	55.5	18.0	36.0	Building materials 建材
80	74.0	13.5	27.0	Heavy cartons, profiles 重载纸箱、型材
100	92.5	10.8	21.6	Industrial pallet loads 工业托盘
150	138.8	7.2	14.4	Heavy-duty shrouds 重载罩膜
200	185.0	5.4	10.8	Pallet hoods, machinery 托盘罩膜、机械

Worked example: 0.09 mm × 500 mm at 0.925 g/cm³ = 83.3 g/m²; a 25 kg roll therefore holds about 300 m², or 600 m at 500 mm width. 计算示例：0.09 mm × 500 mm、密度 0.925 g/cm³ 时克重 83.3 g/m² , 25 kg 卷约 300 m² , 即 500 mm 宽约 600 m。

7.2 Troubleshooting 常见问题与处理

Symptom 现象	Probable cause 可能原因	Action 处理
Insufficient shrink 收缩不足	Tunnel temperature too low; line speed too high; airflow blocked; film too thick or a low-shrink grade; pack too large for the film width.	Raise temperature in 5 ℃ steps, extend dwell, clear nozzles, check the shrink curve of the grade, size the film to at least pack perimeter + 10–15 %.
Uneven shrink / wrinkles 收缩不均、起皱	Temperature gradient across the tunnel; one-sided airflow; uneven film gauge; product shape with deep recesses; pack not centred on the belt.	Map the tunnel with a datalogger, balance air, rotate the roll or change the slit position, re-orient the pack, pre-form the film around deep recesses.
Burnt or holed film 烧膜、破膜	Tunnel set point too high; dwell too long; film touching the heater or a hot nozzle; contaminated sealing bar; sharp product corner.	Lower temperature and shorten dwell, adjust nozzle position, clean and re-cover the sealing bar, add corner protection or increase thickness locally.
Seal cracking 焊口开裂	Sealing temperature, pressure or time too low; contaminated seam; sealing through a fold; seam still hot when it enters the tunnel; excessive shrink force pulling the seam.	Raise seal temperature or dwell within the film's window, clean the bar, seal a single layer, cool the seam before the tunnel, reduce shrink force or film tension.

All values in this document are typical values for the product family and are not a specification. Contractual values are the ones confirmed in the order and technical agreement. 本文件所有数值为本产品系列典型值，不构成产品规格；合同值以订单与技术协议确认为准。