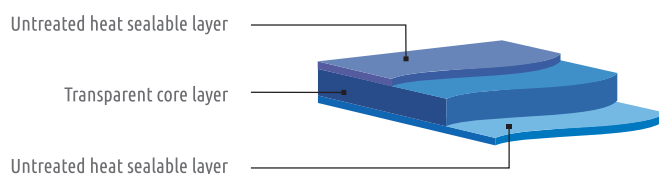


## Description

**Transparent heat sealable non-shrinkable BOPP film for “soft” paper packs packaging on high-speed machines**



Properties		Unit	Limit	Method	Value				
Thickness		μm	±5%	WATERFALL PRO	16	18	20	25	30
Density		g/cm <sup>3</sup>	±10%		0,91				
Weight m <sup>2</sup>		g/m <sup>2</sup>	±5%		14,56	16,40	18,20	22,80	27,30
Tensile strength	MD	N/mm <sup>2</sup> (MPa)	not less	ASTM D882 ISO 527 GOST 14236	130		140		
	TD				230		250		
Elongation at break	MD	%	not more		220		200		
	TD			80		80			
Kinetic coefficient of friction	outer side in a roll / outer side in a roll	-	+0,05 -0,10	ASTM D1894 ISO 8295 GOST 27492	0,25				
	inner side in a roll / inner side in a roll				0,3				
Shrinkage at 120°C, 5 min	MD	%	not more	ASTM D1204 ISO 11501 GOST 18616	4				
	TD				2				
Heat sealing strength at 130°C, 1 bar, 1 sec	inner side in a roll / outer side in a roll	N/15 mm	not less	ASTM F88/F88M D882 ISO 527 GOST 27319	2,5				
Heat sealing temperature	inner side in a roll / outer side in a roll	°C	-	WATERFALL PRO	105-140				
Haze	-	%	not more	ASTM D1003 ISO 14782 GOST 15875	2,5				
Gloss	outer side in a roll	%	not less	ASTM D2457 ISO 2813	85				

MD – Machine Direction; TD – Transverse Direction

### Main characteristics

- standart shrinkable
- standart coefficient of friction
- high rigidity
- high gloss
- high transparent

### Application

- for wrapping “soft” and “hard” paper packs of cigarettes, cigarette blocks, tea, marshmallows, sweets, perfumes, etc.

#### For packing

- on the high-speed HFFS packaging machines without a thermotunnel
- with hot (heat sealing) seal formation
- “soft” and “hard” paper packs and boxes

### Storage

- Films should be stored on the pallets in a closed dry place and should not be exposed to direct sunlight, at a safe distance of not less than 1 m from heating devices or anything that can cause damage the package.
- The film should be kept in workplace not less than 48 hours before being used.
- Guaranteed storage period – 6 months from production date.

### Reeling

- Maximum roll diameter: 500 mm
- Film width in a roll from 90 to 450 mm
- Diameter of paper cores (inside): 76 mm

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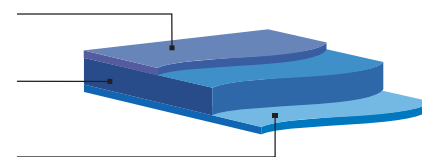
## Description

**Transparent heat sealable shrinkable BOPP film with low coefficient of friction for “hard” paper packs packaging on high-speed machines**

Untreated heat sealable layer with a low coefficient of friction

Transparent core layer

Untreated heat sealable layer



Properties		Unit	Limit	Method	Value		
Thickness		μm	±5%	WATERFALL PRO	16	18	20
Density		g/cm <sup>3</sup>	±10%		0,91		
Weight m <sup>2</sup>		g/m <sup>2</sup>	±5%		14,56	16,38	18,20
Tensile strength	MD	N/mm <sup>2</sup> (MPa)	not less	ASTM D882 ISO 527 GOST 14236	150		
	TD				260		
Elongation at break	MD	%	not more		160		
	TD				70		
Kinetic coefficient of friction	outer side in a roll / outer side in a roll (slippery side / slippery side)	-	+0,05 -0,10	ASTM D1894 ISO 8295 GOST 27492	0,15		
	inner side in a roll / inner side in a roll (non-slip side / non-slip side)				0,2		
Shrinkage at 120°C, 5 min	MD	%	-	ASTM D1204 ISO 11501 GOST 18616	6,5-9,0		
	TD				6,5-9,0		
Heat sealing strength at 130°C, 1 bar, 1 sec	inner side in a roll / outer side in a roll (non-slip side / slippery side)	N/15 mm	not less	ASTM F88/F88M D882 ISO 527 GOST 27319	2,5		
Heat sealing temperature	inner side in a roll / outer side in a roll (non-slip side / slippery side)	°C	-	WATERFALL PRO	105-140		
Haze	-	%	not more	ASTM D1003 ISO 14782 GOST 15875	2,5		
Gloss	outer side in a roll (slippery side)	%	not less	ASTM D2457 ISO 2813	85		

MD – Machine Direction; TD – Transverse Direction

### Main characteristics

- high hardness
- high gloss
- high transparent
- low stable coefficient of friction, including over heated surfaces

### Application

- for wrapping “hard” paper packs of cigarettes, cigarette blocks, tea, marshmallows, sweets, etc.
- for film tightening of packs due to shrinkable properties of the film
- for tightening packs small and medium sizes

#### For packing

- on the high-speed HFFS packaging machines with a thermotunnel
- on the high-speed HFFS packaging machines without a thermotunnel where the film shrink is able due to heating of the weld seal
- with hot (heat sealing) seal formation
- “hard” paper packs

### Storage

- Films should be stored on the pallets in a closed dry place and should not be exposed to direct sunlight, at a safe distance of not less than 1 m from heating devices or anything that can cause damage the package.
- The film should be kept in workplace not less than 48 hours before being used.
- Guaranteed storage period – 6 months from production date.

### Reeling

- Maximum roll diameter: 500 mm
- Film width in a roll from 90 to 450 mm
- Diameter of paper cores (inside): 76 mm

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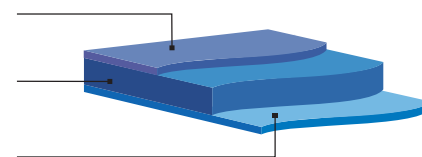
## Description

**Transparent heat sealable shrinkable BOPP film with a very low coefficient of friction for “hard” paper packs packaging on high-speed machines**

Untreated heat sealable layer with a very low coefficient of friction

Transparent core layer

Untreated heat sealable layer



Properties		Unit	Limit	Method	Value		
Thickness		μm	±5%	WATERFALL PRO	16	18	20
Density		g/cm <sup>3</sup>	±10%		0,91		
Weight m <sup>2</sup>		g/m <sup>2</sup>	±5%		14,56	16,38	18,20
Tensile strength	MD	N/mm <sup>2</sup> (MPa)	not less	ASTM D882 ISO 527 GOST 14236	140		
	TD				260		
Elongation at break	MD	%	not more		180		
	TD				70		
Kinetic coefficient of friction	outer side in a roll / outer side in a roll (slippery side / slippery side)	-	±0,05	ASTM D1894 ISO 8295 GOST 27492	0,15		
	inner side in a roll / inner side in a roll (non-slip side / non-slip side)				0,2		
Shrinkage at 120°C, 5 min	MD	%	±1,0	ASTM D1204 ISO 11501 GOST 18616	8,5		
	TD				6,5		
Shrinkage at 130°C, 15 min	MD	%	±2,0		12,0		
	TD				12,0		
Heat sealing strength at 130°C, 1 bar, 1 sec	inner side in a roll / outer side in a roll (non-slip side / slippery side)	N/15 mm	not less	ASTM F88/F88M D882 ISO 527 GOST 27319	2,5		
Heat sealing temperature	inner side in a roll / outer side in a roll (non-slip side / slippery side)	°C	-	WATERFALL PRO	105-140		
Haze	-	%	not more	ASTM D1003 ISO 14782 GOST 15875	2,8		
Gloss	outer side in a roll (slippery side)	%	not less	ASTM D2457 ISO 2813	85		

MD – Machine Direction; TD – Transverse Direction

### Main characteristics

- resistant to scratching and abrasion
- low stable coefficient of friction asymmetric, including over heated surfaces
- high hardness
- high transparent
- high gloss

### Application

- for wrapping “hard” paper packs of cigarettes, cigarette blocks, tea, marshmallows, sweets, etc.
- for film tightening of packs due to shrinkable properties of the film
- for tightening packs small and medium sizes

#### For packing

- on the high-speed HFFS packaging machines with a thertotunnel
- on the high-speed HFFS packaging machines without a thertotunnel where the film shrink is able due to heating of the weld seal
- with hot (heat sealing) seal formation
- “hard” paper packs

### Storage

- Films should be stored on the pallets in a closed dry place and should not be exposed to direct sunlight, at a safe distance of not less than 1 m from heating devices or anything that can cause damage the package.
- The film should be kept in workplace not less than 48 hours before being used.
- Guaranteed storage period – 6 months from production date.

### Reeling

- Maximum roll diameter: 500 mm
- Film width in a roll from 90 to 450 mm
- Diameter of paper cores (inside): 76 mm

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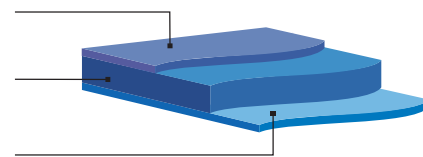
## Description

**Transparent heat sealable shrinkable BOPP film with a low threshold of heat sealability with a very low coefficient of friction for “hard” paper packs packaging on high-speed machines**

Untreated heat sealable layer with a very low coefficient of friction

Transparent core layer

Untreated heat sealable layer with a low threshold of heat sealability (from 90°C)



Properties		Unit	Limit	Method	Value		
Thickness		μm	±5%	WATERFALL PRO	20	25	30
Density		g/cm <sup>3</sup>	±10%		0,91		
Weight m <sup>2</sup>		g/m <sup>2</sup>	±5%		18,20	22,75	27,30
Tensile strength	MD	N/mm <sup>2</sup> (MPa)	not less	ASTM D882 ISO 527 GOST 14236	140		
	TD				260		
Elongation at break	MD	%	not more		160		
	TD				70		
Kinetic coefficient of friction	outer side in a roll / outer side in a roll (slippery side / slippery side)	-	±0,05	ASTM D1894 ISO 8295 GOST 27492	0,15		
	inner side in a roll / inner side in a roll (non-slip side / non-slip side)				0,2		
Shrinkage at 120°C, 5 min	MD	%	±1,0	ASTM D1204 ISO 11501 GOST 18616	8,5		
	TD				6,5		
Shrinkage at 130°C, 15 min	MD	%	±2,0		12,0		
	TD				12,0		
Heat sealing strength at 130°C, 1 bar, 1 sec	inner side in a roll / outer side in a roll (non-slip side / slippery side)	N/15 mm	not less	ASTM F88/F88M D882 ISO 527 GOST 27319	2,5		
Heat sealing temperature	inner side in a roll / outer side in a roll (non-slip side / slippery side)	°C	-	WATERFALL PRO	90-140		
Haze	-	%	not more	ASTM D1003 ISO 14782 GOST 15875	2,3	2,5	3,0
Gloss	outer side in a roll (slippery side)	%	not less	ASTM D2457 ISO 2813	85		

MD – Machine Direction; TD – Transverse Direction

### Main characteristics

- resistant to scratching and abrasion
- low stable coefficient of friction asymmetric, including over heated surfaces
- high hardness
- high transparent
- high gloss

### Application

- for wrapping “hard” paper packs of cigarettes, cigarette blocks, tea, marshmallows, sweets, etc.
- for film tightening of packs due to shrinkable properties of the film
- for tightening packs small and medium sizes

#### For packing

- on the high-speed HFFS packaging machines with a thermotunnel
- on the high-speed HFFS packaging machines without a thermotunnel where the film shrink is able due to heating of the weld seal
- with hot (heat sealing) seal formed at lower heat sealing temperatures (from 90°C)
- “hard” paper packs

### Storage

- Films should be stored on the pallets in a closed dry place and should not be exposed to direct sunlight, at a safe distance of not less than 1 m from heating devices or anything that can cause damage the package.
- The film should be kept in workplace not less than 48 hours before being used.
- Guaranteed storage period – 6 months from production date.

### Reeling

- Maximum roll diameter: 500 mm
- Film width in a roll from 90 to 450 mm
- Diameter of paper cores (inside): 76 mm

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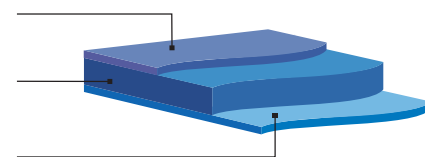
## Description

**Transparent heat sealable shrinkable BOPP film with a very low coefficient of friction for “hard” paper packs packaging on the high-speed machines**

Untreated heat sealable layer with a very low coefficient of friction

Transparent core layer

Treated heat sealable layer



Properties		Unit	Limit	Method	Value			
Thickness		µm	±5%	WATERFALL PRO	16	18	20	25
Density		g/cm <sup>3</sup>	±10%		0,91			
Weight m <sup>2</sup>		g/m <sup>2</sup>	±5%		14,56	16,38	18,20	22,75
Tensile strength	MD	N/mm <sup>2</sup> (MPa)	not less	ASTM D882 ISO 527 GOST 14236	150			
	TD				260			
Elongation at break	MD	%	not more		180			
	TD				70			
Kinetic coefficient of friction	untreated side/ untreated side	-	±0,05	ASTM D1894 ISO 8295 GOST 27492	0,15			
Shrinkage at 120°C, 5 min	MD	%	±1,0	ASTM D1204 ISO 11501 GOST 18616	8,5			
	TD				6,5			
Shrinkage at 130°C, 15 min	MD	%	±2,0		12,0			
	TD				12,0			
Heat sealing strength at 130°C, 1 bar, 1 sec	treated side/ untreated side	N/15 mm	not less	ASTM F88/F88M D882 ISO 527 GOST 27319	2,0			
Heat sealing temperature	treated side/ untreated side	°C	-	WATERFALL PRO	105-140			
Haze	-	%	not more	ASTM D1003 ISO 14782 GOST 15875	2,8			
Gloss	untreated side	%	not less	ASTM D2457 ISO 2813	85			
Surface tension*	treated side	mN/n (dyn/cm)	not less	ASTM D2578 ISO 8296	38			

MD – Machine Direction; TD – Transverse Direction  
 \*Measure after treatment with n-heptane

### Main characteristics

- activated for printing
- resistant to scratching and abrasion
- low stable coefficient of friction asymmetric, including over heated surfaces
- high hardness
- high gloss
- high transparent

### Application

- for wrapping “hard” paper packs of cigarettes, cigarette blocks, tea, marshmallows, sweets, etc.
- for film tightening of packs due to shrinkable properties of the film
- for tightening packs small and medium sizes

#### For packing

- on the high-speed HFFS packaging machines with a thermotunnel
- on the high-speed HFFS packaging machines without a thermotunnel where the film shrink is able due to heating of the weld seal
- with hot (heat sealing) seal formation
- “hard” paper packs

#### For printing

- high-quality rotogravure and flexographic print
- with the use of special paints

### Storage

- Films should be stored on the pallets in a closed dry place and should not be exposed to direct sunlight, at a safe distance of not less than 1 m from heating devices or anything that can cause damage the package.
- The film should be kept in workplace not less than 48 hours before being used.
- Guaranteed storage period – 6 months from production date.

### Treatment

- The guaranteed period for maintaining the minimum permissible level of surface tension on the activated film surface from the date of manufacture, subject to proper storage conditions, is:
- for all film types (except metallized) – 6 months;
  - for metallized film – 3 months.

### Recycling

- In the process of printing on activated tobacco films it is recommended not to perform corona treatment.

### Reeling

- Maximum roll diameter: 500 mm
- Film width in a roll from 90 to 450 mm
- Diameter of paper cores (inside): 76 mm

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