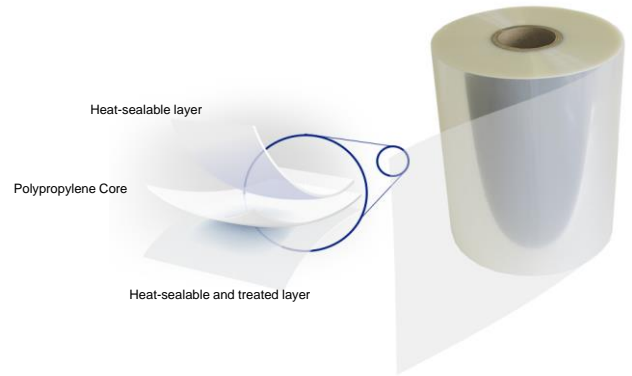


Main Characteristics

- Both sides heat-sealable, non-treated side from 105°C;
- Surface treatment on inner or outer layer;
- Optimum optical properties (gloss and transparency);
- Optimum performance in horizontal and vertical form-fill-seal packing machines.

Typical Applications

- Flexible packaging for food: cookies, snacks, chocolate bars, cereal bars and packaging for printed grouping;
- Non-food flexible packaging: monolayers or laminate;
- Continuous labels (WAL Roll Fed), monolayers or laminate;
- Developed for HFFS - Horizontal Form Fill Seal and VFFS - Vertical Form Fill Seal filling processes.



Properties		Methodology	Unit	Range	15TSY	17TSY	18TSY	20TSY	22TSY	25TSY	30TSY	35TSY	40TSY	50TSY	
Physical Properties															
Nominal Thickness	DIN 53370	µm	Target	15.0	17.0	18.0	20.0	22.0	25.0	30.0	35.0	40.0	50.0		
			Min.	14.3	16.2	17.1	19.0	20.9	23.8	28.5	33.3	38.0	47.5		
			Max.	15.8	17.9	18.9	21.0	23.1	26.3	31.5	36.8	42.0	52.5		
		Gauge	Target	59.1	66.9	70.9	78.7	86.6	98.4	118.1	137.8	157.5	196.9		
			Min.	56.1	63.6	67.3	74.8	82.3	93.5	112.2	130.9	149.6	187.0		
			Max.	62.0	70.3	74.4	82.7	90.9	103.3	124.0	144.7	165.4	206.7		
Unit Weight	ASTM D 4321	g/m²	Target	13.6	15.4	16.3	18.1	19.9	22.6	27.2	31.7	36.2	45.3		
			Min.	12.9	14.6	15.5	17.2	18.9	21.5	25.8	30.1	34.4	43.0		
			Max.	14.3	16.2	17.1	19.0	20.9	23.8	28.5	33.3	38.0	47.5		
		lb/ream	Target	8.3	9.5	10.0	11.1	12.2	13.9	16.7	19.5	22.2	27.8		
			Min.	7.9	9.0	9.5	10.6	11.6	13.2	15.8	18.5	21.1	26.4		
			Max.	8.8	9.9	10.5	11.7	12.8	14.6	17.5	20.4	23.4	29.2		
Yield	ASTM D 4321	m²/kg	Target	73.7	65.0	61.4	55.2	50.2	44.2	36.8	31.6	27.6	22.1		
			Min.	70.2	61.9	58.5	52.6	47.8	42.1	35.1	30.1	26.3	21.0		
			Max.	77.5	68.4	64.6	58.2	52.9	46.5	38.8	33.2	29.1	23.3		
		in²/lb	Target	51792	45698	43160	38844	35312	31075	25896	22196	19422	15537		
			Min.	49325	43522	41104	36994	33631	29595	24663	21139	18497	14798		
			Max.	54517	48104	45431	40888	37171	32710	27259	23365	20444	16355		
Surface Treatment	T	ASTM D 2578	dinas/cm	Target	42										
				Min.	38										
Coefficient of Friction	NT	ASTM D 1894	-	Target	0.25										
				Min.	0.20										
				Max.	0.30										
Optical Properties															
Haze	ASTM D 1003	%	Target	1.5	1.6	1.6	1.7	1.7	1.7	1.8	1.8	1.8	1.8		
			Max.	3.0											
Gloss (45°)	ASTM D 2457	u.b.	Target	95	93	93	91	91	91	90	90	90	90		
			Min.	85											
Mechanical Properties															
Tensile Strength	MD	ASTM D 882	N/mm²	Target	140										
	TD			Target	240										
	MD		lbf/in²	Target	20305										
	TD			Target	34809										
Elongation at Break	MD	ASTM D 882	%	Target	170	180	180	200	200	200	220	220	220	220	
	TD			Target	40	40	40	40	40	40	50	60	60	60	60
Shrinkage	MD	ASTM D 1204	%	Target	3										
	TD			Target	1										
Sealing Range	NT	ASTM F 88	°C	Target	105 - 130										
			°F	Target	221 - 266										
Sealing Strength	NT	ASTM F 88	g/25mm or gf/in	Target	380	400	430	450	480	500	550	600	650	800	
				Min.	300										
Barrier Properties															
TPVA 38°C / 90%UR	ASTM F 1249	g H ₂ O / (m².dia)	Target	≤ 8.5	≤ 8.5	≤ 7.5	≤ 7.5	≤ 6.0	≤ 5.0	≤ 4.0	≤ 3.5	≤ 3.5			
WVTR 100°F / 90%RH	ASTM F 1249	g H ₂ O / (100in².day)	Target	≤ 0.55	≤ 0.55	≤ 0.55	≤ 0.48	≤ 0.48	≤ 0.39	≤ 0.32	≤ 0.26	≤ 0.23	≤ 0.23		
TPO ₂ 23°C / 0%UR	ASTM D 3985	cm³ O ₂ / (m².dia)	Target	≤ 3500	≤ 3200	≤ 3200	≤ 3000	≤ 2700	≤ 2500	≤ 1900	≤ 1500	≤ 1300	≤ 1000		
OTR 73°F / 0%RH	ASTM D 3985	cm³ O ₂ / (100in².day)	Target	≤ 225	≤ 206	≤ 206	≤ 193	≤ 174	≤ 161	≤ 122	≤ 96	≤ 84	≤ 64		

1. Acronyms:

MD: Machine Direction | TD: Transverse Direction;
NT: Non Treated Layer | T: Treated Layer;
WAL: Wrap Around Label.

2. Additional:

The restrained information in this datasheet represent typical data, and does not constitute genuine warranty liability as far as the product process and or application. In case of doubts or development of other thicknesses or applications, consult your dealer or send e-mail to: contato@polofilms.com.br.

Food Contact Regulations

SEAL Family films comply with Mercosul, ANVISA, FDA (Food and Drug Administration) and the European Community legislations for applications involving direct contact with food. Full details are provided in the Declaration of Conformity. Customers intending to use SEAL Family films for applications intended to come into contact with food should request a copy of that document from POLO Films. The MSDS (Material Safety Data Sheet), as well as the evaluation of conformity for contact with food from other legislations are also available upon request. Contact your dealer for any questions.

Storage and Transportation Terms & Conditions

All products are stored and transported in dry, covered and clean environments. It is recommended that storage and transportation take place at temperature around 30°C and 60% relative humidity.

If the temperature and humidity are not as recommended, the following issues may occur:

- Decreased level of surface treatment, leading to printing and/or lamination difficulties;
- Decreased film transparency;
- Too low CoF, making processing and machinability difficult.

BOPP films are recommended to be kept at operating room temperature for 24 hours before use.

Dimensional Specifications / Product Validity

Width	Minimum: 0 mm Maximum: 2 mm (from standard width)
Outer Diameter*	Minimum: 30 mm Maximum: 20 mm (from standard diameter)
Core	Minimum: 1 mm Maximum: 1 mm (from standard diameter)
Splices per roll	Maximum: 2
% of Splices per order	Maximum: 30%
Shelf Life (after production)	6 months

* For other dimensional information, consult your dealer.

Polo Films Nomenclature

Unit Weight or Thickness | Technology | Main Feature | Sealing | Treatment

20 TSY 32

Unit Weight/ Thickness

Expressed in g/m². Used for white/opaque films;
Expressed in µm. Used for transparent, matte and metallized films.

Technology

T - Tenter | C - Cast.

Main Feature

SY - Transparent heat-sealable for printing and/or lamination.

Specialty

Not applicable.

Sealing

0 - Not Sealable;
1 - Sealing on the Inner Face;
2 - Sealing on the Outer Face;
3 - Sealing on both Sides.

Treatment

0 - No Treatment;
1 - Treatment on Inner Face;
2 - Treatment on Outer Face;
3 - Treatment on both Sides.