

# PICOFILM THERMAL

## Recommendations for printing and processing

As one of the World's leading manufacturers of thermal substrates, Sihl has been providing a wide range of materials from 100 to 375 g/m<sup>2</sup> for direct thermal printing based on its unique development expertise for more than 30 years.

Along with our TICKETTHERM thermal paper range, we also offer with ENDURO THERMAL a range of tear-resistand thermal boards and with PICOFILM THERMAL a range of thermal film materials.

7820 PICOFILM SR-75 PP W (75 µm) BOPP-thermal film with topcoat for Facestock, loop labels and hang labels

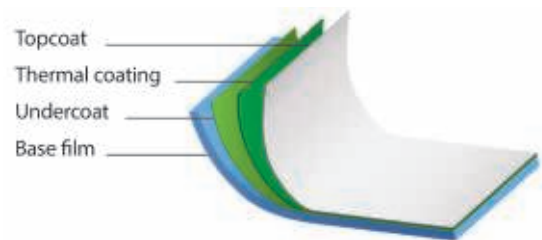
7805 PICOFILM SR-95 WP (108 µm) HDPE-thermal film with topcoat for loop labels and hang labels

7804 PICOFILM SR-115 WP (125 µm) HDPE-thermal film with topcoat for loop labels and hang labels

7827 PICOFILM SR-270 K1 (250 µm) PET/PP-composite thermal film with topcoat for metro tickets and entrance tickets

## General information on thermal films

PICOFILM THERMAL grades are thermosensitive special films, designed for use with direct thermal printers. A base film is provided with an undercoat and thermosensitive functional coating for this. The topcoat is an additional protective coating, which protects the thermal function more effectively against mechanical and chemical influences from the environment. The film reverse side is corona-treated, to enable conventional printing as flexographic and UV-offset.



The following information generally applies to the processing and storage of thermal films and thermal printout:

- Always store thermal films in a cool, dry place away from light.
- Do not expose to direct sunlight or direct UV radiation.
- The storage temperature and room conditions during processing should not exceed 23°C for longer periods of time at an ambient humidity of 40 to 60% relative humidity.
- Do not store near intensive heat sources where 40°C is permanently exceeded, e.g. radiators, ventilation systems etc.
- Do not touch thermal coating with wet hands, as fingerprints can affect the thermal print quality.
- Do not expose the thermal film to excessive pressure. Avoid strong mechanical friction, e.g. pulling over fixed edges and rollers, scratching with fingernails.
- Do not bring into contact with solvents or substances containing solvents, e.g. adhesives, nail varnish, disinfectants etc.
- Tanning agents (softeners) in wallets containing leather will cause the thermal print to fade.
- Avoid contact with materials containing softeners, e.g. transparent wallets made from soft PVC, adhesive tape etc.
- Avoid contact with oils and grease as well as petrochemical liquids such as petrol or diesel.
- Do not store layer upon layer.

When our thermal films are handled and stored correctly and the print image is fully developed in direct thermal printing, we guarantee the readability of the print-out for at least 12 years.

We do not use bisphenol A or S in the production of our thermal films. All PICOFILM THERMAL grades are phenol-free.

An overview of our product range is available in the appendix in the table: THERMAL TECHNOLOGY product properties and resistances. You can find detailed information in our technical data sheets, which our Customer Service will be happy to send you. Please send enquiries by email to: [CustomerService@sihl.com](mailto:CustomerService@sihl.com).

## Information on printing

### PRE-PRINTING

PICOFILM THERMAL grades do all have a topcoat. This protective layer has a very closed surface with low absorbency and low ink adhesion. This behaves like a film material on account of the surface tension similar to the film on the back. Printing inks suitable for films or additional adhesion promoters should therefore be used to overprint the topcoat and if available activate corona pre-treating.

> [Care must be taken to ensure good ink adhesion on thermal papers with topcoat.](#)

The print head in direct thermal printers is very sensitive to mechanical influences. In order to ensure a long service life with high performance for the print head, thermal films have a smooth and closed paper surface. As a rule, the following information should be observed in the pre-print so as to avoid rubbing on the print head and ink deposits:

- The ink must be suitable for direct thermal printing, which means the softening point should be above 240°C. Ask your ink supplier for a suitable heat-resistant ink series.
- The ink should not contain any abrasive components, such as metallic pigments in metallic inks or titanium dioxide in opaque white, as this can damage the print head.
- Chemical components that could attack the print head should largely be avoided in the ink.
- The ink must be sufficiently dried or cured so that it does not adhere to the print head.
- Low-migration inks require UV lamps with a higher wattage or should at least be printed at low speed.

You can find an overview which common printing ink series are suitable in the appendix in the table: THERMAL TECHNOLOGY ink recommendations for pre-printing thermal materials.

As a rule, the entire production process for pre-printing and processing thermal paper should not have an adverse effect on the thermal function. We therefore recommend carrying out tests in advance in all production steps and performing appropriate application tests on the customer's own thermal printer. Please also bear in mind the climatic conditions and weather influences associated with the printer locations.

### FLEXOGRAPHIC PRINTING

Suitable for printing with water-based and UV/LED-reactive flexographic inks. Please pay attention to the following additional information:

- Only printing inks, additives and auxiliaries approved by the ink supplier for thermal papers may be used.
- Use solvent-free printing inks, additives and auxiliaries to avoid a pre-reaction with the thermal layer.
- Some water-based flexographic printing inks nevertheless have too high a solvent and alcohol content. Please ensure you use pure water inks, especially for non-topcoat papers.

- A slightly higher viscosity has a positive effect on the print result when UV-reactive inks are used. Only thinners recommended by the ink supplier, which do not adversely affect the polymerisation process, are permissible here.
- The temperature load during ink drying must not be too high overall, whereby attention must be paid to the sensitivity of the thermal paper. The heat effect is always in relation to the printing speed.
- The wetting properties of topcoat must be taken into account when selecting the anilox roller. Topcoat grades have a closed, non-absorbent surface.

Sufficient ink drying is essential. If the UV-reactive inks do not dry sufficiently, the following measures can help:

- If the ink application is excessive, reduce the layer thickness or use an anilox roller with a lower pick-up volume.
- Mix in blend coating according to the ink supplier's recommendations.
- Print dark tones at the beginning of the print run.
- Add 1-2% maximum photoinitiator.
- Switch on additional UV lamps, we recommend after every printing unit

## OFFSET PRINTING

Suitable for web printing in wet or dry offset with UV-reactive offset inks. Please pay attention to the following additional information:

- A low water and ink feed are essential from the outset in wet offset. The ink/water balance must be maintained at the smear limit in production printing and successively readjusted. With topcoat grades in particular, too much moisture would otherwise build up on the paper surface and impair effective ink transfer in the final printing units.
- The ink should be of low viscosity and low tensile strength. This can be set with the appropriate additives. A UV-reactive thinner (thinner paste with photoinitiators) can be used to adjust the tack of the ink without having a negative impact on the polymerisation process.
- Reducing the printing speed also reduces the drawing action of the ink and has proven effective in practice.
- Special rubber blankets for UV-reactive inks may be more critical because they exhibit a higher degree of smoothness. Quick-release rubber blankets have lower picking properties and are recommended above all for non-topcoat thermal papers.
- The isopropanol content of the fountain solution should ideally be 5-8%. Alcohol-free printing is also possible if corresponding alcohol substitutes are used.
- In multicolour printing, we recommend using UV lamps for drying after each printing unit. Thick and dark ink layers must be completely cured, otherwise they will cause deposits on the thermal print head.

## DIRECT THERMAL PRINTING

Our thermal film range has a high sensitivity and temperature stability. Owing to the large number of printer manufacturers and printer models with print heads in different resolutions (200/300/600 dpi), we nevertheless also recommend performing extensive thermal print tests in advance and adapting printer settings accordingly.

The printout must always have a sufficiently high optical density. The typeface should attain an optical density of at least 1.25 measured by reflectors immediately after printing.

Regular maintenance of the thermal printer and cleaning of the print head is recommended.

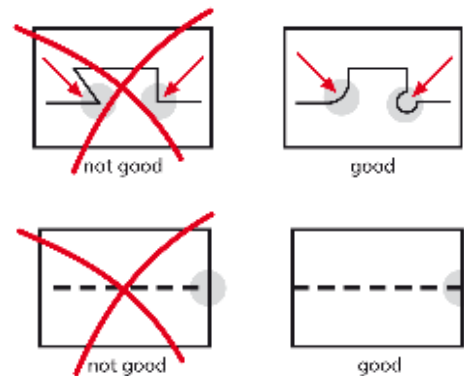
## Information on further processing

### CUTTING

The high tear strength is only retained if the cut edge is neat and smooth. Knives and cutting tools should be ground sharp so that the cutting edges do not become squeezed and frayed. Such irregularities lead to defined breaking points that tear easily. Ideally, films from the roll are cut from both sides with circular knives (shear cut) to avoid welding and sticking of the sheets and to obtain a burr-free cut.

### PUNCHING

All edges should be rounded during punching, as sharp edges or notches represent defined breaking points at which the material tears easy. Carbide punching knives are recommended (e.g., made from chrome-alloyed or high-frequency welded steel).



### PERFORATING

As thermal films have increased tear strength, the first cut must always begin at the edge of the sheet.

### DRILLING

It is essential to control the drilling stroke speed and drill speed during drilling. The drill must not overheat and should be well lubricated, for instance by pulse lubrication with wax paper. To prevent the drill from overheating and hence melting of the material, it is necessary to work with low stacks, high stroke speed and a low drill speed. Special Teflon-coated drills are recommended and should be sharpened regularly by professionals.

## Information on storage and disposal

### STORAGE

For quality reasons, PICOFILM THERMAL reels should always be stored in original packaging. For storage and processing, we recommend room temperature of 18 to 28°C and a relative humidity of 40 to 60%. Under these conditions, we guarantee a minimum shelf life of 12 months from the date of production.

Longer storage or room conditions above 40°C or above 65% relative humidity will lead to impaired thermal function, discoloration of the thermal layer and/or loss of contrast in direct thermal printing.

### DISPOSAL & RECYCLING

You can find detailed information on this in our safety instructions. Please ask our Customer Service with indication of the relevant PICOFILM THERMAL grade. Please send enquiries by email to: [CustomerService.Dueren@sihl.com](mailto:CustomerService.Dueren@sihl.com).

# THERMAL TECHNOLOGY

## Product properties and resistances

		g/m <sup>2</sup>	µm	Non-topcoat	Topcoat	Backcoat	Tear-resistant	Security features	FSC®-certified	Bisphenol free	Phenol free	SKIDATA-release	Light stability	Temperature stability	Humidity stability	Water stability	Oil / fat stability	Plasticizer stability	Sensitivity	Durability of thermal print (years)	Thermal printer max. resolution (dpi)	UV-Flexo printability	UV-Offset printability
<b>Thermal paper with film core (composite)</b>																							
7010	ENDURO Thermal 170 K	170	180		✓		✓		✓	✓			++	++	++	++	++	++	○	12*	200	✓	✓**
7004	ENDURO Thermal 180 High sensitivity	170	170		✓	✓	✓		✓	✓			+	+	+	+	+	+	++	12*	300 <sup>1</sup>	✓	✓**
7022	ENDURO Thermal 190 G	190	180		✓		✓		✓	✓			++	++	++	++	++	++	○	12*	200	✓	✓**
7029	ENDURO Thermal 205 pro	195	190	✓			✓		✓	✓			+	○	○	○	○	○	○	7*	200	✓	✓**
7011	ENDURO Thermal 200 J	200	205		✓		✓		✓	✓			++	++	++	++	++	++	○	12*	200	✓	✓**
7015	ENDURO Thermal 205 G	200	175		✓		✓		✓	✓			++	++	++	++	++	++	○	12*	200	✓	✓**
7037	ENDURO Thermal 225 Metal detectable	225	195		✓	✓	✓		✓	✓			++	++	++	++	++	++	+	12*	300 <sup>1</sup>	✓	✓**
7028	ENDURO Thermal 270 N	265	250		✓	✓	✓		✓	✓			++	++	++	++	++	++	○	12*	200	✓	✓**
7012	ENDURO Thermal 290 N	290	265		✓		✓		✓	✓			++	++	++	++	++	++	○	12*	200	✓	✓**
7007	ENDURO Thermal 295 M	300	275		✓		✓		✓	✓			++	++	++	+	++	++	○	12*	200	✓	✓**
7036	ENDURO Thermal 360 High sensitivity	365	370		✓	✓	✓		✓	✓			+	+	+	+	+	+	++	12*	300 <sup>1</sup>	✓	✓**
7035	ENDURO Thermal 380 High sensitivity	375	390		✓	✓	✓		✓	✓			+	+	+	+	+	+	++	12*	300 <sup>1</sup>	✓	✓**
<b>Thermal film</b>																							
7805	PICOFILM SR-95 WP	100	108		✓		✓						++	++	++	+	++	+	○	12*	200	✓	✓**
7804	PICOFILM SR-115 WP	122	125		✓		✓						++	++	++	+	++	+	○	12*	200	✓	✓**
7827	PICOFILM SR-270 K1	325	250		✓		✓		✓				++	++	++	++	++	++	+	12*	200	✓	✓**
<b>Non-topcoat thermal paper</b>																							
6557	TICKETTHERM PRO 100 DC	105	105	✓		✓			✓	✓			++	++	++	++	+	+	+	10*	300 <sup>1</sup>	✓	✓**
6551	TICKETTHERM PRO 130	128	120	✓		✓			✓	✓			+	++	++	+	○	+	+	10*	300 <sup>1</sup>	✓	✓**
6572	TICKETTHERM PRO 140	140	140	✓					✓	✓			+	++	++	+	○	○	+	10*	300 <sup>1</sup>	✓	✓**
6576	TICKETTHERM PRO 150	148	148	✓		✓			✓	✓			+	++	++	+	○	+	+	10*	300 <sup>1</sup>	✓	✓**
6533	TICKETTHERM PRO 160	173	178	✓					✓	✓			+	++	++	+	○	○	+	10*	300 <sup>1</sup>	✓	✓**
6621	TICKETTHERM ATB 170 B	180	171	✓		✓			✓	✓			+	++	++	+	○	○	+	10*	300 <sup>1</sup>	✓	✓**
6574	TICKETTHERM PRO 220	212	216	✓					✓	✓			+	++	++	+	○	+	+	10*	300 <sup>1</sup>	✓	✓**
6599	TICKETTHERM PRO 270	245	265	✓					✓	✓			++	++	++	++	+	+	+	10*	300 <sup>1</sup>	✓	✓**
<b>Topcoat thermal paper</b>																							
6602	TICKETTHERM ALPHA 105	105	105		✓	✓			✓	✓			++	++	++	++	++	+	+	12*	300 <sup>1</sup>	✓	✓**
6502	TICKETTHERM ALPHA 125	130	135		✓	✓			✓	✓			++	++	++	++	++	○	+	12*	300 <sup>1</sup>	✓	✓**
6603	TICKETTHERM ALPHA 155	150	150		✓	✓			✓	✓			+	++	++	+	++	+	+	12*	300 <sup>1</sup>	✓	✓**
6568	TICKETTHERM ALPHA 160 DC	178	156		✓	✓			✓	✓			○	++	++	+	++	+	+	12*	300 <sup>1</sup>	✓	✓**
6601	TICKETTHERM ALPHA 185	182	185		✓	✓			✓	✓			++	++	++	++	++	+	+	12*	300 <sup>1</sup>	✓	✓**
6550	TICKETTHERM ALPHA 190 DC Plus	210	185		✓	✓			✓	✓			○	++	++	+	++	+	++	12*	300 <sup>1</sup>	✓	✓**
6608	TICKETTHERM ALPHA 240 DC	260	235		✓	✓			✓	✓			++	++	+	+	++	++	+	12*	300 <sup>1</sup>	✓	✓**
6545	TICKETTHERM V-TOP 390	370	385		✓	✓			✓	✓			+	++	+	+	+	+	+	12*	300 <sup>1</sup>	✓	✓**
<b>Thermal paper with SKIDATA-release</b>																							
6508	TICKETTHERM TOP 190 SD	175	185		✓				✓	✓	✓	✓	++	++	++	++	++	++	+	12*	300 <sup>1</sup>	✓	✓**
6513	TICKETTHERM TOP 220 SD	215	235		✓				✓	✓	✓	✓	++	++	++	++	++	++	+	12*	300 <sup>1</sup>	✓	✓**

The values stated above related to grammage and caliper are only for orientation.  
 \* Minimal durability under consideration our storage recommendations / ✓ applicable / ✓\*\* applicable under consideration our printing recommendations  
 Stability: ++ very good / + good / ○ standard, Sensitivity: ++ very high / + high / ○ standard  
<sup>1</sup> Exceptional BOCA printer with max. 200 dpi only.

# THERMAL TECHNOLOGY

## Ink recommendations for pre-printing thermal materials

	Manufacturers	Ink name
Flexo printing waterbased	Siegwerk	Aqualabel HK 53-20 UNILABEL T
	Zeller + Gmelin	Hydrotek
	FlintGroup	Thermokett TC
UV-Flexo printing	Jänecke + Schneemann	UV Supraflex UV Supraflex LMI *
	Zeller + Gmelin	Uvaflex Y80 Uvaflex Y81 *
	huberGroup	NewV flex UF 4000
	FlintGroup	Flexocure FORCE Flexocure ANCORA 50 * Flexocure ANCORA * ANCORA HR Gleitlack YVFO-0006 *
	Siegwerk	Sicura Flex 39-8 Sicura Nutriflex 10 (LM) *
LED-Flexo printing	FlintGroup	EkoCure ANCORA *
UV- Offset printing	Jänecke + Schneemann	Supra UV 570160-ff Supra UV 572150-ff
	Zeller + Gmelin	Uvalux U40 Uvalux U41 (LM) *
	hubergroup	NewV pack UG 5000 NewV pack UG 4000
	FlintGroup	Lithocure Premium Lithocure ANCORA *
	Siegwerk	SICURA LITHO Web 456 SICURA LITHO Board 900 SICURA LOW NRGY / LED
	SunChemical	SunCure Lazer

\* low migration ink series (LM - low migration)

The mentioned ink series are suitable to print on our non-topcoat and topcoat thermal papers, thermal films and thermal composite materials. They are heat-stable and suitable for post-printing on thermal printers. This recommendations are based on information from ink manufacturers, we do not assume any warranty or guarantee for this recommendations. For further information and specific consulting concerning ink additives, bonding agents, thinners etc., please contact your ink supplier.

Please consider our printing and processing recommendations for thermal paper. If you have any further question please contact us by e-mail to: [CustomerService@sihl.com](mailto:CustomerService@sihl.com).