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# THERMAL TRANSFER LABELSTOCK





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# AN INTRODUCTION TO THERMAL TRANSFER

The sheer volume of variable information printed by thermal transfer (TTR) reflects a vast and rapidly expanding market. With so many TTR labelstock products available for numerous end-uses, it becomes difficult to select the right product for the right application. But making the correct choice does not need to be that complicated. UPM Raflatac has applied its universally acknowledged expertise with pressure sensitive labelstock to design and produce a range of dedicated thermal transfer products to meet virtually every need.

One of the most critical requirements of any TTR application is the longevity and durability of the label in difficult environmental, physical or chemical conditions. The TTR printed image must be equally enduring whether the end-use is tracking and tracing, product identification, logistics or industrial. This makes choosing the right ribbon crucial. Also, matching the right UPM Raflatac product with the most suitable thermal transfer ribbon is essential. An on-line product and ribbon consultant can be found under 'Labelstock Products' at [www.upmraflatac.com](http://www.upmraflatac.com).

## The leader in thermal transfer labelstock

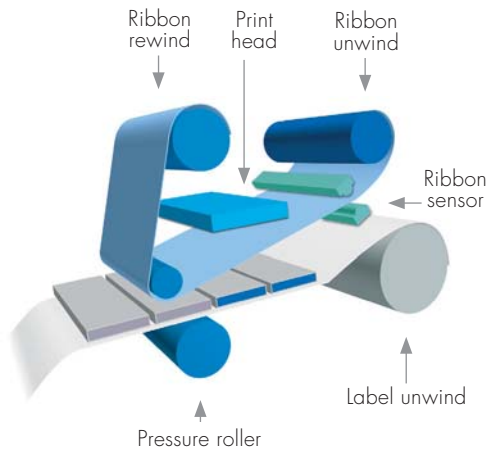
UPM Raflatac is constantly looking for ways to make the selection and use of thermal transfer labelstock easier. We work actively with material and ribbon manufacturers and carefully follow the developments that take place in thermal printing technologies. This, combined with a thorough understanding of the requirements of your process and end-use applications, has enabled us to design a streamlined, dedicated thermal transfer product range that covers all the different thermal transfer applications.



# THERMAL TRANSFER PRINTING TECHNOLOGY

## How it works

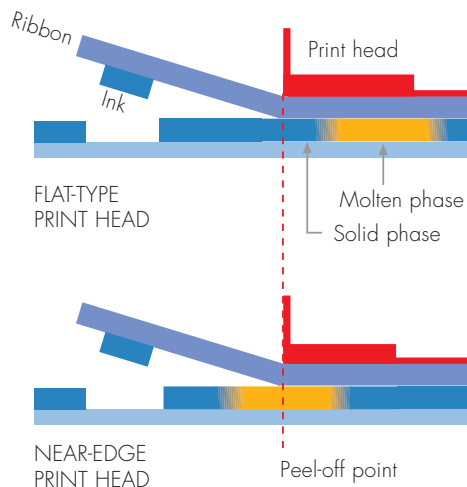
Thermal transfer printing creates an image by melting solid ink coated on a film ribbon and transferring it onto a receiving material. The receiving material can be an uncoated paper, a coated paper or a film. Though almost all pressure sensitive labelstocks can be printed by thermal transfer, the best results are achieved with the use of carefully selected materials. Depending on the type of print and level of quality that converters and their customers require, a suitable ribbon must be used in combination with an appropriate and correctly set printing device.



Source: Sony Chemicals Corporation

## Printers and thermal print heads

Standard thermal transfer printers, which have a resolution of 200 dpi and work at speeds below 10 in./sec., use flat thermal print heads. With flat-type print heads, the time taken to transfer the ink is sufficiently long so that the receiving face material doesn't need a special coating to enhance its absorbency or smoothness. High-speed printers with resolutions of 300-600 dpi use near-edge/corner-edge print heads. At printing speeds higher than 10 in./sec., the ink is transferred very quickly as the ribbon is removed while the ink is still molten. With this type of thermal print head, a special ribbon is required along with a special coating on the face paper. The coating should have specific absorption properties that provide fast ink transfer but allow the paper to retain good on-press printing properties.



## Label faces and ribbon compatibility

The chemical and physical properties on the surface of the labelstock's face material determine the type of thermal transfer ribbon that will be compatible. There are three main types of ribbons.

### Wax ribbons

Wax ribbons are the most commonly used ribbon type and provide an economical solution for thermal transfer. Designed for use with flat-type print heads, wax ribbons can be used with comparatively absorbent uncoated face papers that have a low parker print of around 3.0 microns PPS10, as well as with coated papers.

### Wax/resin ribbons

Wax/resin ribbons supply high performance for a variety of end-uses. The mechanical resistance of the printed image is very good, and it is possible to print rotated bar codes. Wax/resin ribbons are intended for use with non-absorbent materials such as coated paper and films, but they can also be used with uncoated face papers when exceptional mechanical resistance is required. Wax/resin ribbons can be printed with near-edge/corner-edge print heads.

### Resin ribbons

Resin ribbons are designed for use in very demanding applications. Images printed with a resin ribbon have very high resistance to mechanical wear, solvents and heat. This type of ribbon is usually used on film face materials like PE, PP and PET, which have a smoothness of around 1000s bekk and require comparatively less transfer ink to produce an opaque image.

# THERMAL TRANSFER FACE MATERIALS

## Transfer Flex

One-side matte-coated face paper.

Transfer Flex is a universal label paper for prime and VIP labeling. It is especially suitable for applications such as box end, distribution and warehouse labeling. Transfer Flex is also printable with flexo, offset and letterpress.

### Typical technical values

Substance weight	47 lbs./ream (25" x 38")	ISO536
Caliper	2.6 mil.	ISO534
Tensile strength MD	25 lbf/in.	ISO1924
Tensile strength CD	13 lbf/in.	ISO1924
Roughness	1.2 microns PPS10	ISO8791-4
Opacity	86%	ISO2471
Brightness	90%	ISO2470

## Transfer Premium Lite

Two-sided, matte-coated, lignin-free label paper.

Transfer Premium Lite is tailor-made for the most demanding thermal transfer applications, such as multipass ribbon systems and color thermal transfer. Transfer Premium Lite offers high-speed printability and extremely high print resolution. It is a reliable choice for applications such as distribution, stock control and warehousing, where the readability and accuracy of bar codes of all sizes are of paramount importance. Transfer Premium Lite is also excellent for all forms of press printing, especially flexo.

### Typical technical values

Substance weight	44 lbs./ream (25" x 38")	ISO536
Caliper	2.9 mil.	ISO534
Tensile strength MD	26 lbf/in.	ISO1924
Tensile strength CD	17 lbf/in.	ISO1924
Roughness	1.8 microns PPS10	ISO8791-4
Opacity	87%	ISO2471
Brightness	87%	ISO2470

## Transfer Premium Plus

Two-sided, matte-coated, lignin-free label paper.

Transfer Premium Plus is an ultra-smooth, coated face material tailored for premium thermal transfer printing. It also provides optimal surface characteristics that enable the product to be printed by all main types of press printing, including water-based flexo.

### Typical technical values

Substance weight	47 lbs./ream (25" x 38")	ISO536
Caliper	2.9 mil.	ISO534
Tensile strength MD	26 lbf/in.	ISO1924
Tensile strength CD	17 lbf/in.	ISO1924
Roughness	1.8 microns PPS10	ISO8791-4
Opacity	87%	ISO2471
Brightness	85%	ISO2470

## Transfer Premium Plus Opaque

Ultra-smooth, matte-coated label paper with opaque coating on the reverse side.

Transfer Premium Plus Opaque is a smooth, coated face material tailored for premium thermal transfer printing. It has an opaque coated reverse side to enable total block out. It is suitable for all forms of press printing.

### Typical technical values

Substance weight	47 lbs./ream (25" x 38")	ISO536
Caliper	3.1 mil.	ISO534
Tensile strength MD	26 lbf/in.	ISO1924
Tensile strength CD	17 lbf/in.	ISO1924
Roughness	1.8 microns PPS10	ISO8791-4
Opacity	99%	ISO2471
Brightness	85%	ISO2470

## Transfer Premium Extra

Two-sided, matte-coated, lignin-free label paper.

Transfer Premium Extra is a very smooth, coated face material tailored for premium thermal transfer printing. It also provides optimal surface characteristics that enable the product to be printed by all main types of press printing, including water-based flexo.

### Typical technical values

Substance weight	46 lbs./ream (25" x 38")	ISO536
Caliper	2.7 mil.	ISO534
Tensile strength MD	26 lbf/in.	ISO1924
Tensile strength CD	16 lbf/in.	ISO1924
Roughness	1.2 microns PPS10	ISO8791-4
Opacity	87%	ISO2471
Brightness	89%	ISO2470

## Transfergloss Plus

White, cast-coated label paper.

Transfergloss Plus is a cast-coated label paper designed for thermal transfer applications where an attractive glossy look and feel are essential. It boasts excellent printability with all pre-press techniques, including gravure. Transfergloss Plus is an ideal choice for prime labeling where color and high-definition of the pre-printed images are as important as good TTR performance.

Typical technical values		
Substance weight	57 lbs./ream (25" x 38")	ISO536
Caliper	3.9 mil.	ISO534
Tensile strength MD	26 lbf/in.	ISO1924
Tensile strength CD	16 lbf/in.	ISO1924
Roughness	0.4 microns PPS10	ISO8791-4
Opacity	90%	ISO2471
Brightness	90%	ISO2470
Gloss	93%	Hunter 75°

## Rafasilk

White, lignin-free, on-machine coated, super calendered, semi-gloss label paper.

Rafasilk is a multipurpose label paper for high quality, multicolor labels that require good print definition and fine detail. Following extensive testing for TTR printability, this face material carries our "Thermal Transfer Guarantee" when used with wax/resin ribbons.

Typical technical values		
Substance weight	57 lbs./ream (25" x 38")	ISO536
Caliper	2.8 mil.	ISO534
Tensile strength MD	33 lbf/in.	ISO1924
Tensile strength CD	15 lbf/in.	ISO1924
Roughness	0.7 microns PPS10	ISO8791-4
Opacity	89%	ISO2471
Brightness	93%	ISO2470
Gloss	78%	Hunter 75°

## 3.0 mil. PP Matte White TC

Matte white, biaxially oriented, top-coated polypropylene film.

3.0 mil. PP Matte White TC is a durable, moisture resistant polypropylene film. It is ideal for VIP labeling that requires dependable thermal transfer print properties and resistance to a variety of environments.

Typical technical values		
Substance weight	35 lbs./ream (25" x 38")	DIN53352
Caliper	3.0 mil.	DIN53370
Opacity	90%	DIN53146/1

## 3.9 mil. Kimdura® Multi-Task

White, matte, synthetic paper with a patented smudgeproof coating.

3.9 mil. Kimdura® Multi-Task offers high performance strength that can be embossed, drilled, die cut, sewn, stapled, punched, folded, scored and strung. It is an outstanding choice for applications that require resistance to chemicals, moisture and tears. Its smooth, ultra-consistent top coating prevents smudges and rub-offs with both variable and conventional print methods. Kimdura® Multi-Task synthetic paper offers extended weather resistance, making it suitable for a wide variety of applications.

Typical technical values		
Substance weight	68 lbs./ream (25" x 38")	ISO536
Caliper	3.9 mil.	ISO534
Opacity	93%	ISO2471

## 4.0 mil. Kimdura® Smudgeproof

White, matte, biaxially oriented polypropylene synthetic paper with patented smudgeproof coating.

4.0 mil. Kimdura® Smudgeproof synthetic paper offers resistance to chemical solvents and moisture. In addition, the polypropylene substrate offers excellent converting characteristics along with a proprietary top coating that provides rub and smudging resistance while accepting variable and conventional press printing methods.

Typical technical values		
Substance weight	55 lbs./ream (25" x 38")	ISO536
Caliper	4.0 mil.	ISO534
Opacity	93%	ISO2471

# THERMAL TRANSFER ADHESIVES

The adhesives used in UPM Raflatac's dedicated range of thermal transfer products are perfectly suited to the requirements of thermal transfer printing techniques. The adhesives are environmentally stable and offer good heat resistance, providing trouble-free performance in all thermal transfer printers. Below is a brief description of the adhesives used in UPM Raflatac's thermal transfer product range.

## RR22

RR22 is a rubber-resin dispersion adhesive that offers good long-term removability from rough substrates, such as corrugated board, as well as curved substrates. The service temperature range of RR22 is  $-22^{\circ}\text{F}$  to  $158^{\circ}\text{F}$ , and the minimum labeling temperature is  $14^{\circ}\text{F}$ .

## RR28

RR28 is a modified acrylic dispersion removable adhesive. It is intended for film labels and has good long-term removability, good clarity, UV-stability and water resistance. The service temperature range of RR28 is  $14^{\circ}\text{F}$  to  $176^{\circ}\text{F}$ , and the minimum labeling temperature is  $41^{\circ}\text{F}$ .

## RP48AT

RP48AT is a modified acrylic dispersion, all-temperature/ deep freeze adhesive. It is perfect for applications where very good adhesion at low temperatures is required. Its adhesion to non-polar surfaces is very good, and it remains adherent at low temperatures. The service temperature range of RP48AT is  $-65^{\circ}\text{F}$  to  $200^{\circ}\text{F}$ , and the minimum labeling temperature is  $-20^{\circ}\text{F}$ .

## RP51

RP51 is a modified acrylic dispersion, general purpose, strong permanent adhesive that offers good adhesion to all normal substrates, including non-polar surfaces, most films and corrugated board. It has good low temperature performance. The service temperature range of RP51 is  $-4^{\circ}\text{F}$  to  $176^{\circ}\text{F}$ , and the minimum labeling temperature is  $32^{\circ}\text{F}$ .

## RH09

RH09 is a rubber-resin hotmelt, permanent adhesive that is recommended for applications where the surface is moist or if very high initial adhesion is required. It offers good low temperature performance and very good adhesion to non-polar surfaces. The service temperature range is  $-40^{\circ}\text{F}$  to  $122^{\circ}\text{F}$ , and the minimum labeling temperature is  $32^{\circ}\text{F}$ .

## RP77

RP77 is an acrylic dispersion, permanent adhesive used with film face materials. It is specially designed for labeling of HDPE drums and other rough substrates. The service temperature range is  $-4^{\circ}\text{F}$  to  $158^{\circ}\text{F}$ , and the minimum labeling temperature is  $32^{\circ}\text{F}$ .



# QUICK REFERENCE GUIDE

	Face material	Wax ribbon	Wax/resin ribbon	Resin ribbon
Uncoated papers	Data and laser	—		
	Fluorescents	—	—	
Coated papers	Raflacoat	◆	◆◆	
	Raflagloss	—	◆◆	
	Raflasilk	◆	◆◆	
	Transfergloss Plus	◆	◆◆	—
	Transfer Flex	◆◆	◆◆	
	Transfer Premium Lite	◆◆	◆◆	
	Transfer Premium Extra	◆◆	◆◆	
	Transfer Premium Plus	◆◆	◆◆	
Films	3.0 mil. PP Matte White TC	◆◆	◆◆	—
	PE and PP		◆	◆◆
	PE and PP TC		◆	◆◆
	Polyester White		◆	◆◆
	Kimdura®	◆◆	◆◆	

- = Limited appearance
- ◆ = Medium quality
- ◆◆ = Highly recommended

Wax ribbons do not provide scratch resistant print on coated, non-absorbent media. Premium and super premium ribbons do not print cleanly on rough surfaces due to the low coat weight of the transfer ink.



# PRINTABILITY AND AREAS OF USE

Sales code	Product description	PRINT TECHNIQUES				Areas of use
		Letter press	Flexo	Offset	Gravure	
TT17T	TRANSFER FLEX RP51 2.5 mil. WHITE KRAFT	●	●	●	—	General box end, distribution and warehouse labeling.
TT62T	TRANSFER FLEX RR22 2.5 mil. WHITE KRAFT	●	●	●	—	General applications where label removability is required.
TT49E	TRANSFER PREMIUM LITE RP51 2.5 mil. WHITE KRAFT	●	●	●	—	High definition, high resolution bar codes; destitution, data capture, multi-color, multi-pass and ribbon printable. Excellent flexo press print.
TT6OR	TRANSFER PREMIUM LITE RP48AT 40# WHITE KRAFT (2.5 mil.)	●	●	●	—	High definition, high resolution bar codes; destitution, data capture, warehouse, distribution, all-temperature/freezer applications.
TT61S	TRANSFER PREMIUM LITE RH09 2.5 mil. WHITE KRAFT	●	●	●	—	High definition, high resolution bar codes and distribution. Very high initial adhesion applications.
TT14Q	TRANSFER PREMIUM PLUS RP51 40# WHITE KRAFT (2.5 mil.)	●	●	●	—	High definition, high resolution bar codes; destitution, data capture, multi-color, multi-pass and ribbon printable. Excellent flexo press print.
TT23B	TRANSFER PREMIUM PLUS RR22 40# WHITE KRAFT (2.5 mil.)	●	●	●	—	High definition, high resolution bar codes, warehouse, distribution, removable applications.
TT21Z	TRANSFER PREMIUM PLUS OPAQUE RP51 40# WHITE KRAFT (2.5 mil.)	●	●	●	—	Opaque-coated for total block out.
TT50F	TRANSFER PREMIUM EXTRA RP51 2.5mil. WHITE KRAFT	●	●	●	—	High definition, high resolution bar codes; destitution, data capture, multi-color, multi-pass and ribbon printable. Excellent flexo press print.
TT28G	TRANSFERGLOSS PLUS RP51 40# WHITE KRAFT (2.5 mil.)	●	●	●	●	High-gloss, high definition bar coding where multicolor and printed images are required.
PL206VW	RAFLASILK RP36TX 2.5 mil. WHITE KRAFT	●	●	●	●	Semi-gloss prime label material suitable for thermal transfer printing with compatible ribbons.
PL157V	RAFLASILK RP48AT 2.5 mil. WHITE KRAFT	●	●	●	●	Semi-gloss prime label material suitable for thermal transfer printing with compatible ribbons.
PL159X	RAFLASILK RP51 2.5 mil. WHITE KRAFT	●	●	●	●	Semi-gloss prime label material suitable for thermal transfer printing with compatible ribbons.
PL178S	RAFLASILK RH09 2.5 mil. WHITE KRAFT	●	●	●	●	Semi-gloss prime label material suitable for thermal transfer printing with compatible ribbons.
PL68Y	RAFLASILK RR22 40# WHITE KRAFT (2.5 mil.)	●	●	●	●	Semi-gloss prime label material suitable for thermal transfer printing with compatible ribbons.
PL207X	RAFLASILK OPAQUE RP51 2.5 mil WHITE KRAFT	●	●	●	●	Semi-gloss prime label material suitable for thermal transfer printing with compatible ribbons.
UM07K	TRANSFER PREMIUM PLUS RP51 40# WHITE KRAFT RP51 40# WHITE KRAFT (2.5 mil.)	●	●	●	—	Multi-layered, piggyback construction.
UM08L	TRANSFER PREMIUM PLUS RP51 40# WHITE KRAFT RP51 60# WHITE KRAFT (3.2 mil.)	●	●	●	—	Multi-layered, piggyback construction.
SY35V	3.0 mil. PP MATTE WHITE TC RP37 2.5 mil. HIGH DENSITY WHITE	●	●	●	●	Matte-coated, white film suitable for thermal transfer printing. For applications requiring good water, chemical and oil resistance.
SY116P	3.9 mil. KIMDURA® MULTI-TASK RP51 3.2 mil. WHITE KRAFT VIP	●	●	●	—	For applicaions requiring excellent strength; exceptional environmental resistance.
SY100T	4.0 mil. KIMDURA® SMUDGEPROOF RP51 3.2 mil. WHITE KRAFT VIP	●	●	●	—	For applications requiring excellent strength; exceptional environmental resistance.

# STORAGE RECOMMENDATIONS FOR LABELSTOCK

## Storage instructions

UPM Raflatac recommends that labelstock is stored at room temperature (+68 °F) with a maximum relative humidity of 50%. Labelstock should be kept in its original packaging and protected from light. Damp or hot conditions should be avoided.

## Shelf life

The shelf life is calculated from the date of the labelstock's manufacture and is based on the adhesive's ability to maintain optimal labeling properties during storage.

Paper-based and film-based labelstock:

4 years	RP51
2 years	RH09, RR22, RR28 & RP77
1 year	RP48AT





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