

# White Pigments for Flexible Packaging Inks



Great Solutions with Small Particles



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## Introduction

In flexible packaging the consistency and performance of white ink are crucial to the quality of the printed image. White ink should give sufficient hiding power to allow high quality colour printing.

Sachtleben  $\text{TiO}_2$  has these requirements covered. Sachtleben has an excellent reputation in the white pigment market and is one of the global market leader in  $\text{TiO}_2$  pigments for packaging inks.

## Product descriptions

We have a wide selection of unique titanium dioxide grades for flexible packaging inks:

SACHTLEBEN RDI-S is our premium rutile-grade pigment for high quality, high-gloss, and high-opacity inks across the packaging ink field.

SACHTLEBEN RODI is a new rutile product that provides additional opacity and potential for lower dispersion viscosity.

SACHTLEBEN RDE2 is a rutile pigment used in lamination and reverse printing inks.

SACHTLEBEN RDDI is a rutile pigment recommended for full flat surface and reverse printing inks when excellent hiding power is required.

HOMBITAN A300 a fine particle size anatase pigment has good dispersibility and good gloss, and is recommended for UV curing.



	Unit		RDI-S	RODI	RDE2	RDDI
▶ Partical size (Coulter N5)	[nm] approx.		280	290	340	450
▶ Oil absorption	[ml/100 g] approx.		21	20	28	45
▶ TiO <sub>2</sub> content	[%] approx.		95	95	90	83
▶ Surface treatment			Al, org.	Al, org.	Al, Si, org.	Al, Si, org.
▶ Bulk density	[kg/m <sup>3</sup> ] approx.		800	800	700	500
▶ Grey paste tests: tint reducing power	[L*] approx.		64,5	64,8	63,8	62,7
▶ Undertone	[b*] approx.		-7,6	-6,5	-6,8	-6,3

## Applications

In flexible packaging applications, white ink is used in surface printing, reverse printing and lamination structures. Sachtleben TiO<sub>2</sub> pigments are suitable for use in various solvent-, water- and oil-based inks and also in UV curable inks.

Our pigments have been tested and used in several kinds of resin systems. White inks made from Sachtleben pigments can be applied with flexo, gravure, screen printing, ink jet or sheet fed offset methods.

SACHTLEBEN RDI-S is regarded as an industry standard and performs well in all flexible packaging applications.

SACHTLEBEN RODI continues the success story of SACHTLEBEN RDI-S and gives more opacity for all types of packaging inks.

SACHTLEBEN RDE2 and SACHTLEBEN RDDI are also recommended for lamination and reverse printing applications.



## Technical properties

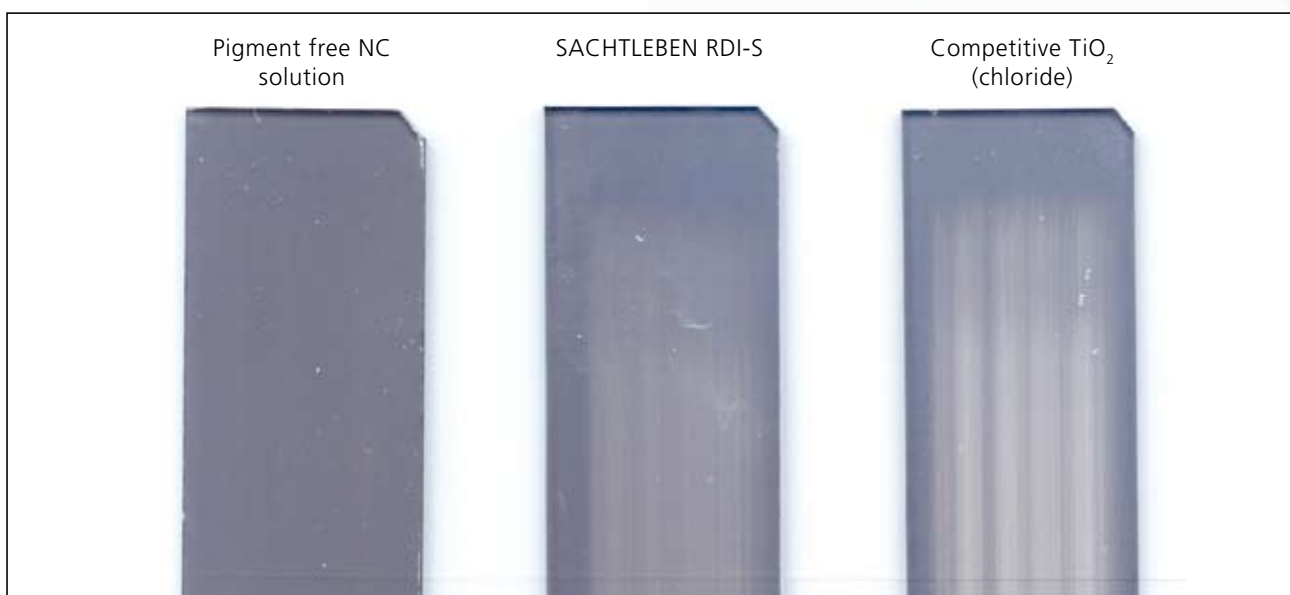
Optical properties, whiteness and opacity (hiding power), are the main reasons for using  $\text{TiO}_2$  in white inks. Titanium dioxide has superior optical properties compared to all other white pigments. The opacity of  $\text{TiO}_2$  pigments is a culmination of several factors of which refractive index and particle size distribution are the most important.

Good dispersibility is a distinct advantage, as it has a great influence on the production costs and on post-dispersion. The maximum particle size allowed in inks, especially in flexo and gravure inks, is ideally below  $2\ \mu\text{m}$ . The surface treatments of Sachtleben  $\text{TiO}_2$  grades are developed to guarantee the best dispersion. This is the foundation for trouble-free printing.

White ink is stored in sealed containers prior to printing and no settling of the pigment is allowed, even at low viscosity. Sachtleben  $\text{TiO}_2$  grades are stable in different flexible packaging ink formulations and they are inert to most chemicals used in inks.

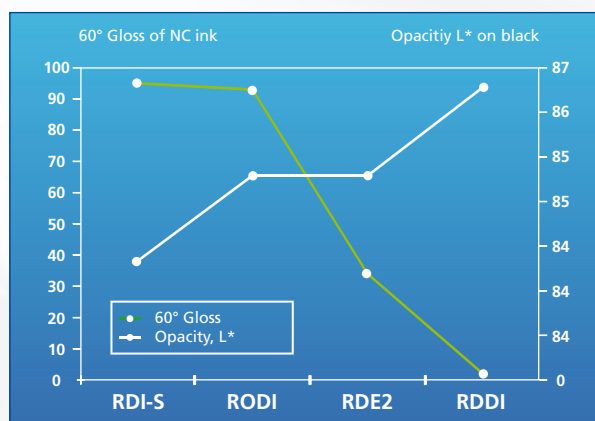
The heat resistance of Sachtleben  $\text{TiO}_2$  allows the normal use of the pigments in flexible packaging. This means that the pigment properties do not change at higher temperatures, for example during heat sealing, sterilization and extrusion or lamination. Sachtleben  $\text{TiO}_2$  exhibits no yellowing after heat treatment.

The abrasiveness of  $\text{TiO}_2$  originates mainly from the hardness of base crystals, the fineness of particle size and the dispersion quality. When the abrasion of the  $\text{TiO}_2$  products made by the two commercial processes is compared, the softer sulphate grades are favoured over their chloride counterparts. Abrasive white ink can create problems in printing machine parts. With Sachtleben sulphate grades the printer will benefit of longer doctor blade life and low cylinder wear.

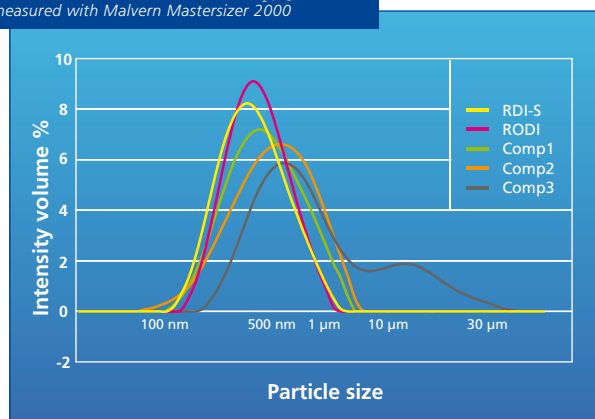


Cr-coated glass plates after abrasion test (NC ink). Reduction of Cr-coating on a glass plate for RDI-S is significantly smaller vs. the competition (CI) indicating that RDI-S is softer.

	Flexible	Metal can	Paper&Board	Other
▶ SACTLEBEN RDI-S	●	●	●	●
▶ SACTLEBEN RODI	●	●	●	●
▶ SACTLEBEN RDE2	●			
▶ SACTLEBEN RDDI	●		●	
▶ HOMBITAN A300				●



Particle size distribution curves of TiO<sub>2</sub> pigments, measured with Malvern Mastersizer 2000



Gloss is an important factor in the surface printing of flexible packaging material. SACTLEBEN RDI-S is a product famous for its high gloss. The narrow TiO<sub>2</sub> particle size distribution and lack of coarse particles over 1 µm are the key elements for high gloss.

Sachtleben TiO<sub>2</sub> grades have an exceptionally narrow particle size distribution, a result of Sachtleben's well-known expertise in particle size distribution. This ensures consistently good quality from batch to batch.

### Instructions for use

The particle sizes of Sachtleben TiO<sub>2</sub> grades are effectively reduced by intensive wet milling and jet-milling during processing, regardless of the type or amount of surface treatment. The ink manufacturer need make no further milling.

An optimum dispersion is achieved with the right process conditions for dispersion and with a balanced formulation. There are several choices of dispersion equipment.

Typically, high shear equipment with a special blade structure or rotor stator head are used. The pigment-binder ratio in the formulation should be adjusted and this is usually specific for each pigment and binder.

# Additional Product Information

## Starting formula

For basic white nitrocellulose ink, the following formulation could be used:

(Pigment-binder ratio = 6 : 1)

### Parts

▶ Nitrocellulose (Nobel DLX 5-8)	10
Dissolve thoroughly in ethanol and ethyl acetate	
▶ Ethanol	20
▶ Ethyl acetate	7
▶ Dioctyladipate	3
▶ Titanium dioxide (SACHTLEBEN RDI-S)	60
(Mix slowly during adding, after premixing increase rpms)	

Continue dispersing (normally 30 minutes is enough) with high shear rotor stator equipment until the temperature reaches 55°C. The above white base is let down into the ink by adding the appropriate modifying resins, additives and solvents.

## Packaging and storage

Standard packaging sizes are 25 kg paper bags and 1000 kg in woven polypropylene FIBC with bottom emptying spout/valve. Paper bags and FIBCs are supplied on wooden pallets, to facilitate handling. Keep the product unstacked in dry and closed rooms at normal temperature and air humidity. To achieve best possible results, we recommend storage under the conditions stated above and use within 12 months from delivery.

## Product safety

Product safety is one of the fundamental elements operating under our certified management system fulfilling the requirements of ISO 9001, ISO 14001 and OHSAS18001. The purity requirements set by legislative regimes must be complied with for products designed for food contact applications, such as printing inks.

Sachtleben titanium dioxide pigments are in compliance with the requirements mentioned below:

- FDA (Food and Drug Administration, US) Title 21; Chapter 1, Applicable parts like 175.300
- EU Regulation 1935/2004 on materials and articles intended to come into contact with food
- Council of Europe Resolution AP (2004) 1, on coatings intended to come into contact with foodstuffs
- BfR (Bundesinstitut für Risikobewertung, Germany) Empfehlung IX

The total incidental amounts of lead, cadmium, mercury, and hexavalent chromium contained in Sachtleben titanium dioxide pigments do not exceed 100 parts per million by weight (0,01 %) in compliance with the requirement of the EC Packaging and Packaging Waste Directive (94/62/EC, 2004/12), and with the requirements of the Model Toxics Legislation developed by the Source Reduction Council of CONEG, US

## Sachtleben and Kemira

Two experienced titanium dioxide specialists are pooling their activities: the modern  $\text{TiO}_2$  plants operated by Sachtleben Chemie and Kemira Pigments will in future run under unified management. The corresponding joint venture has been set up by Rockwood Holdings Inc., of which Sachtleben is part, and Finland's Kemira Oyj chemicals group.

## Known name

The joint venture bears its own, independent, name: Sachtleben, a name which stands for 130 years of experience, high-quality products and global awareness. Customers of many years' standing know: you can trust Sachtleben's dependability and performance. This is the tradition that provides the basis for the joint road into a successful future.

## Economic benefits for customers

Sachtleben has strengthened its core capabilities. Its products and competent services assure extra functions, process advantages and genuine economic benefits. Sachtleben's product portfolio, which includes both titanium dioxide specialties and inorganic functional additives, assures the company a unique ranking among the world's pigment producers.



Duisburg | Germany



Pori | Finland

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