Printing chemicals additives

pcc

More than Chemistry

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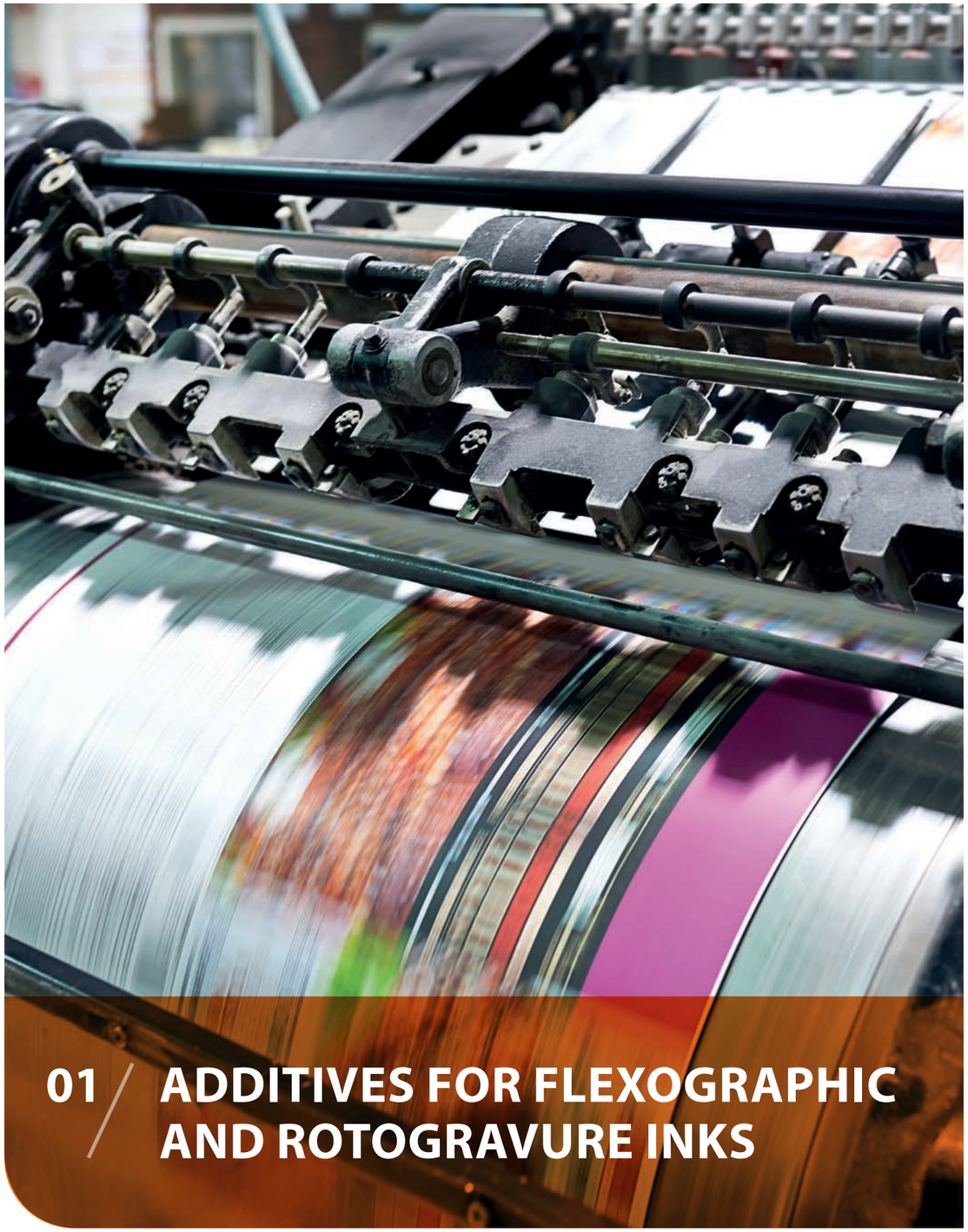


01 / ADDITIVES FOR FLEXOGRAPHIC AND ROTOGRAVURE INKS

ADDITIVES FOR FLEXOGRAPHIC AND ROTOGRAVURE INKS

Water-based inks for flexographic and rotogravure printing are among the most important products used in the modern printing industry. This is due to not only the increasing share of flexographic and rotogravure printing in overall printing, but also due to ecological reasons and a reduced impact on human health. Ready flexographic and rotogravure inks should meet a number of requirements regarding viscosity, stability, colour strength and intensity, gloss, adhesion to the substrate or the drying time of the coating. The PCC Exol's product offer for e.g. dispersing and wetting agents, used in the production of water-based pigment concentrates for the printing industry. For ready-made paint formulations, it is recommended to use agents that improve paint flow and humectants, which for example act as agents that extend the open time of the paint.

Wetting and dispersing additives

The best quality high gloss coats and high feature coverage power, with perfectly dispersed pigments, require an optimal size of pigment particles as well as long-term stabilisation of dispersed particles in the composition of the whole formulation. The pigment dispersing process, performed in order to create a stable, timely suspension with paint or ink formulations, consists of three stages:

- **Pigment wetting** all of the air is removed from the surface of pigment and from the space between the pigment, as well as from pigment agglomerates, and is replaced by the resin solution. The pigment/air interface is transformed into a solid/liquid (pigment/resin solution).
- **Pigment grinding** (pigment milling) through mechanical energy (impact and shear forces), the pigment agglomerates are broken up and disrupted into smaller particles and dispersed (uniformly distributed).
- **Stabilisation of the pigment** suspension pigment dispersion is stabilised by dispersing agents in order to prevent the formation of flocculates and agglomerates. The resultant suspension is stabilised due to the adsorption of the binder or dispersing agents on the pigment's surface.

Product	Active, %	Description	Resin-containig	Resin-free	Inorganic pigments	Organic pigments	WB	SB
EXOdis PC250	34–36	Mixture of Surface active polymers	●			●	●	
EXOdis PC40	42–44	Polyacrylic acid sodium salt		●	●		●	
EXOdis PC416	89–92	Nonionic wetting&dispersing additive with pigment affinic group		●		●	●	
EXOdis PC417	min. 99	Phosphate ester with pigment affinic group		●	○	●	●	
EXOdis PC418	min. 97.5	Phosphate ester with pigment affinic group, alkylamonium salt		●	○	●	●	
EXOdis PC800	78–82	Mixture of W&D additive		●	●	●	●	
EXOdis PC950	89–92	Nonionic surfactant		●		●	●	
ROKAdis 900	min. 98.5	Phosphate ester		●	●	○	●	
EXOdis PC220	min.	Polyether copolymer		●	●			●
EXOdis PC230	min. 97	Phosphate ester		●		●		●
Rodys L	39–41	Naphthalenesulfonic acid, polymer with formaldehyde, sodium salt		●	○	●	●	

○ partially recommended ● recommended

Wetting agents

Flexographic and rotogravure printing processes are characterised by a relatively high speed, so the key factor is the quick wetting of the surface by the applied ink. Water is characterised by a high value of surface tension, which translates into poor wettability of the surface. In order to reduce the value of this parameter as much as possible, appropriate surface agents are used, which visibly improves the wettability of the substrate by the paint.

The PCC Group offers products whose addition effectively reduces the value of static and dynamic surface tension. They are used as flow improvers in water-based formulations of flexographic and rotogravure inks, as well as OPV varnishes.

Product	Active	Solvents	Description
SULFOSUCCINATE DOSS	min. 60	water	Sodium di(2-ethylhexyl) sulfosuccinate
SULFOSUCCINATE DOSS70GP	min. 70	propylene glycol/water	Sodium di(2-ethylhexyl) sulfosuccinate
SULFOSUCCINATE DOSS70E	68 – 72	ethanol/water	Sodium di(2-ethylhexyl) sulfosuccinate
SULFOSUCCINATE DOSS50BGE	48 – 52	butyldiglycol/water	Sodium di(2-ethylhexyl) sulfosuccinate
ROSULfan E	38 – 42	water	Sodium 2-ethylhexyl sulfate

Emulsifiers

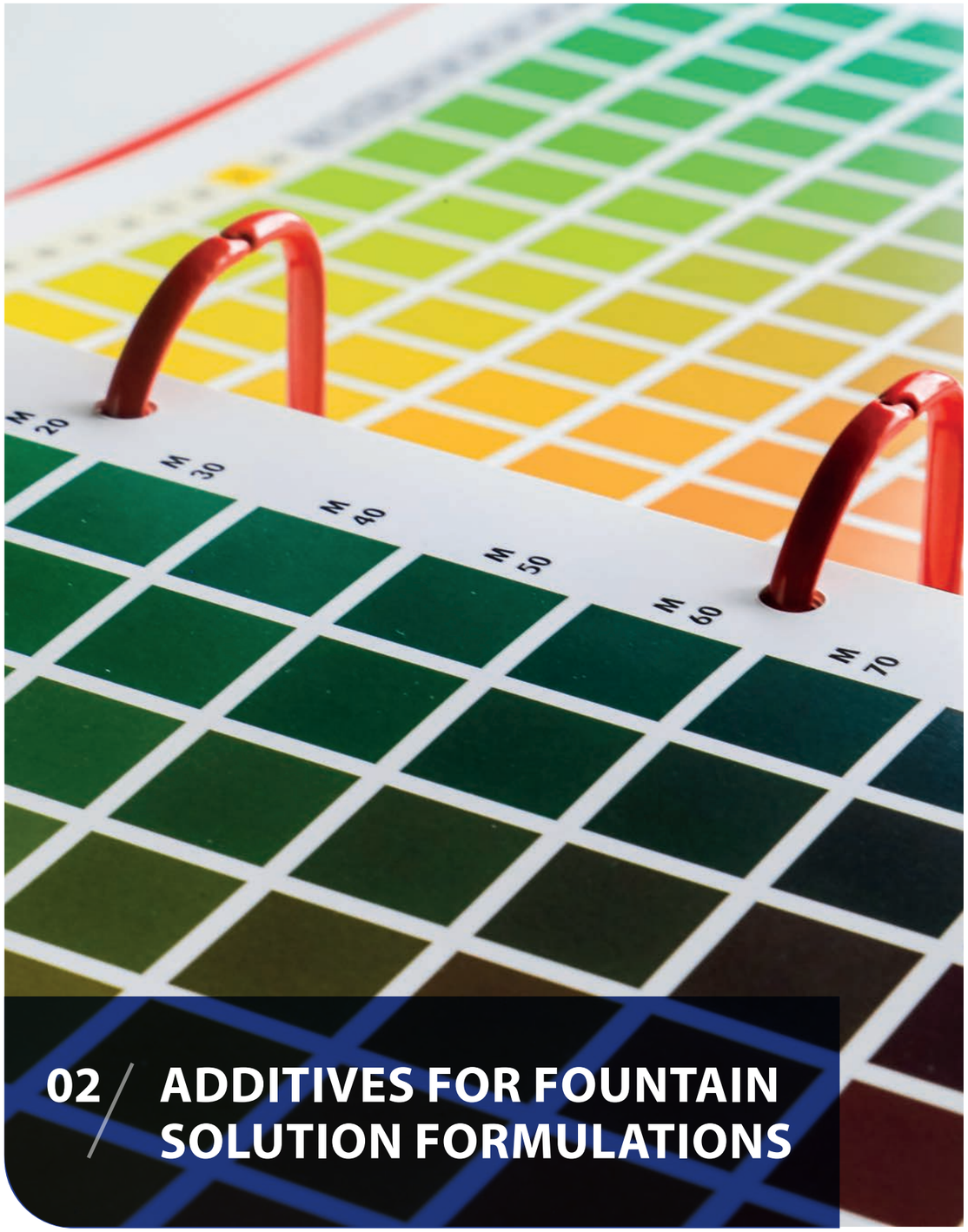
One of the basic properties of surface active agent is the ability to emulsify substances that are insoluble in water. Products from the PCC Exol's portfolio provide very good emulsifying properties, which translates into excellent stability of the finished emulsion.

Product	Active	HLB	Description
SULFOROKAnol A360/1	58–62	-	Ammonium laureth sulfate
ROKAnol IT15	min. 98.5	15.3	Alcohols, C13-iso ethoxylated
ROKAnol K3	min. 99.0	7.0	Alcohols, C16-18 ethoxylated
ROKAnol O3	min. 99.0	6.6	Alcohols, C16-18 ethoxylated
Rokwin 80	min. 99.0	4.3	Sorbitan monooleate

Humectants

Adjusting the ink drying time can have a positive effect on the appearance of the coating, eliminating faults and defects appearing on the surface. In addition, it prevents the ink from drying too quickly in presses and printing devices.

Product	Active	Description	Mw	Appearance
POLIKOL 200	min. 99.5	Polyoxoethylene glycol	200	liquid
POLIKOL 300	min. 99.5	Polyoxoethylene glycol	300	liquid
POLIKOL 400	min. 99.5	Polyoxoethylene glycol	400	liquid
POLIKOL 600	min. 99.5	Polyoxoethylene glycol	600	liquid
POLIKOL 1000	min. 99.5	Polyoxoethylene glycol	1000	wax
POLIKOL 1500	min. 99.0	Polyoxoethylene glycol	1500	wax
POLIKOL 2000	min. 99.0	Polyoxoethylene glycol	2000	wax
POLIKOL 3000	min. 99.0	Polyoxoethylene glycol	3000	wax
POLIKOL 4500	min. 99.0	Polyoxoethylene glycol	4500	wax
POLIKOL 6000	min. 99.0	Polyoxoethylene glycol	6000	wax
ROKAnol G8	min. 99.5	Glycerine ethoxylated	-	liquid
ROKAnol G12	min. 99.5	Glycerine ethoxylated	-	liquid
ROKAnol G15	min. 99.5	Glycerine ethoxylated	-	liquid
ROKAnol G30	min. 99.5	Glycerine ethoxylated	-	liquid



02 / ADDITIVES FOR FOUNTAIN SOLUTION FORMULATIONS

ADDITIVES FOR FOUNTAIN SOLUTION FORMULATIONS

Offset printing is one of the most important techniques used in modern printing. One of the key products used in the offset printing process are wetting solutions, the so-called fountain solution. Their task is to wet and adsorb on the hydrophilic surfaces of the mould cylinder, corresponding to the unprinted areas, which prevents ink particles from settling on them.

Fountain solution owes its properties to a properly selected composition, which consists of e.g. wetting agents, corrosion inhibitors and antistatic agents.

Wetting agents

In order to properly wet the mould cylinder, the fountain solution should have a sufficiently low surface tension value. This is possible to obtain through the use of an appropriate surface active agent, added as an auxiliary wetting agent. PCC Exol's products provide effective reduction of static and dynamic surface tension and are fully compatible with other components of the fountain solution.

Product	Active [%]	Description	Appearance
ROKAnol GA4	min. 99.5	2-propylheptanol ethoxylated	liquid
ROKAnol GA4LA	min. 99.5	2-propylheptanol ethoxylated/ propoxylated	liquid
ROKAnol GA7LA	min. 99.5	2-propylheptanol ethoxylated/ propoxylated	liquid
ROKAnol GA8LA	min. 99.5	2-propylheptanol ethoxylated/ propoxylated	liquid
ROKAnol H5	min. 99	Hexanol ethoxylated	liquid
ROKAnol LP3841	min. 99	C8 – C18 alcohols ethoxylated/ propoxylated	liquid
ROKAnol NL6	min. 99.5	C9 – C11 alcohols ethoxylated	liquid
ROSULfan E	38 – 42	Sodium 2-ethylhexyl sulfate	liquid
SULFOSUCCINATE DOSS70GP	min. 70	Sodium di(2-ethylhexyl) sulfosuccinate	liquid

Corrosion inhibitors

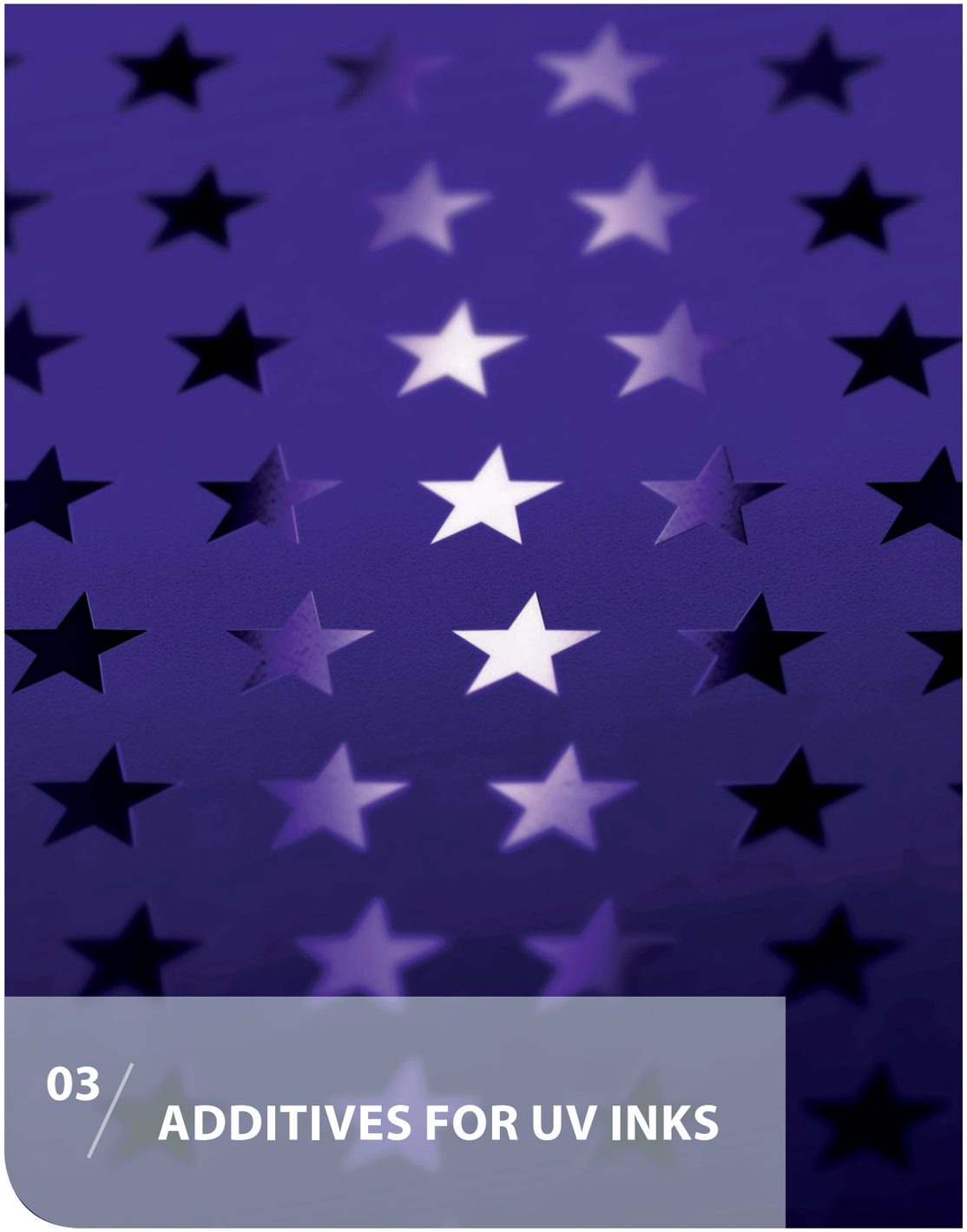
The metal parts of the press are exposed to the fountain solution. Due to its composition and specific pH (4.5 – 5.5), the fountain solution may contribute to the acceleration of corrosion processes. In order to counteract this phenomenon, corrosion inhibitors are added to the solution. PCC Exol's offers corrosion inhibitors that are highly effective at a relatively low level of use.

Product	Active [%]	Description	Appearance
EXOhib PC400	Approx. 70	Aminoborate solution	liquid
EXOhib PC500	49 – 51	Mixture	liquid
EXOhib FS300	29 – 31	Lauroyl sarcosinate	liquid

Antistatic agents

Polymer materials are characterised by high surface resistance, which in turn leads to excessive accumulation of electrostatic charge on the surface of the material. The accumulated charge may cause the individual layers of the polymer material to stick together, and in an extreme case, it leads to the formation of an electric arc that may cause an explosion. Antistatic agents available in the portfolio of the PCC Group effectively reduce the surface resistance of the polymer, eliminating the phenomenon of electrostatic charge accumulation.

Product	Active [%]	Description	Appearance
EXOstat K	Min. 99.5	Cationic surfactant	liquid
EXOstat 122	Min. 99.5	Nonionic surfactant	liquid



03

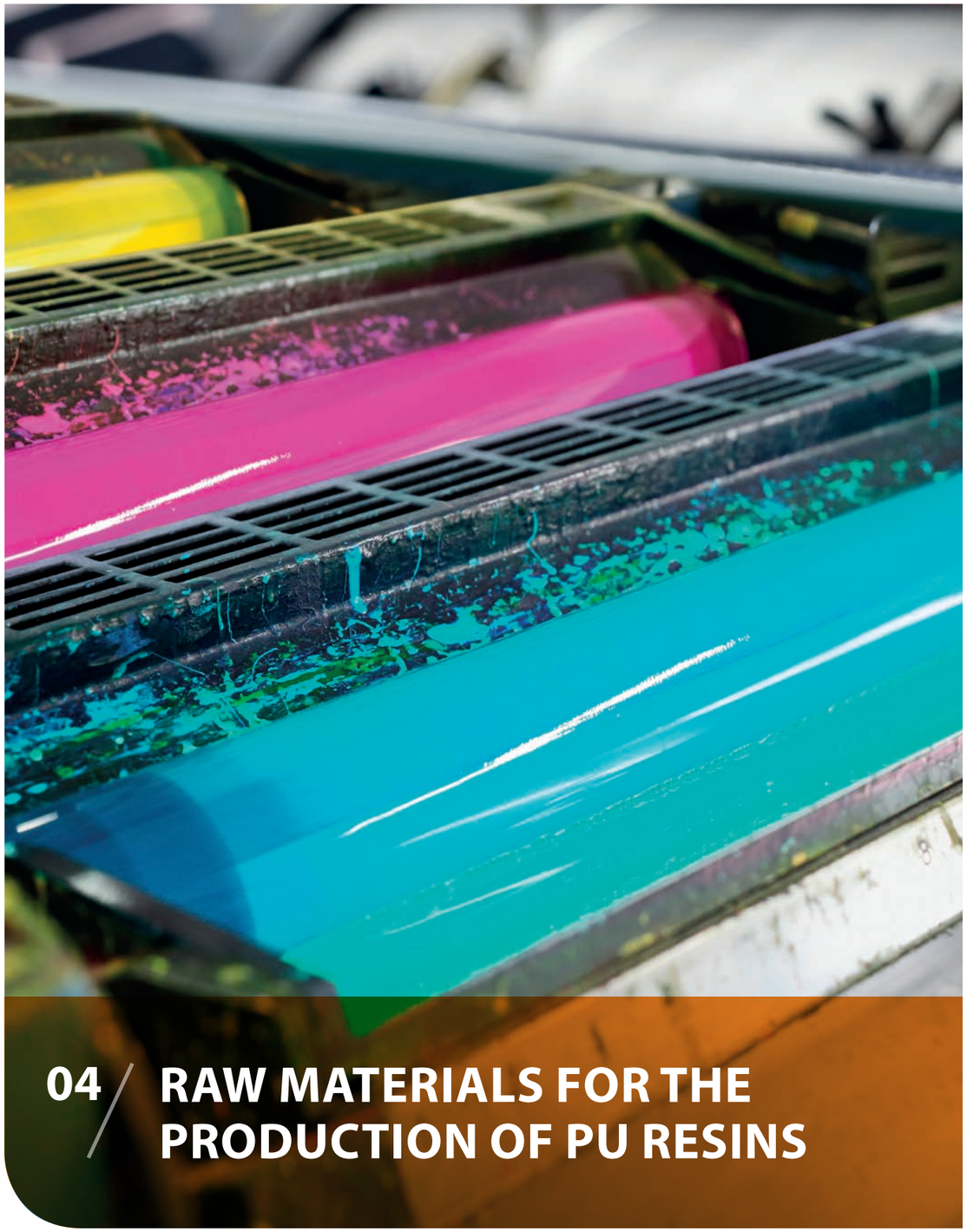
ADDITIVES FOR UV INKS

ADDITIVES FOR UV INKS

One of the most dynamically developing printing techniques is the method of curing coatings with UV light. UV light induces a polymerisation reaction in the applied coating, which allows for effective curing of the coating, without solvent emissions. This way of drying the paint is possible thanks to the special composition of the final product, which consists of e.g. photo-initiators and a polymer dissolved in the reactive monomer. UV paints are not only ecological, due to their emission-free nature, but also have better parameters of the applied coating, such as gloss, hardness, adhesion to substrates, mechanical resistance, and water resistance.

PCC's offer includes products that are substrates in the synthesis of reactive monomers.

Product	Active [%]	Description	Hydroxyl value	Appearance
ROKAnol GP3	min. 99.9	Propoxylated glycerin	550–590	liquid

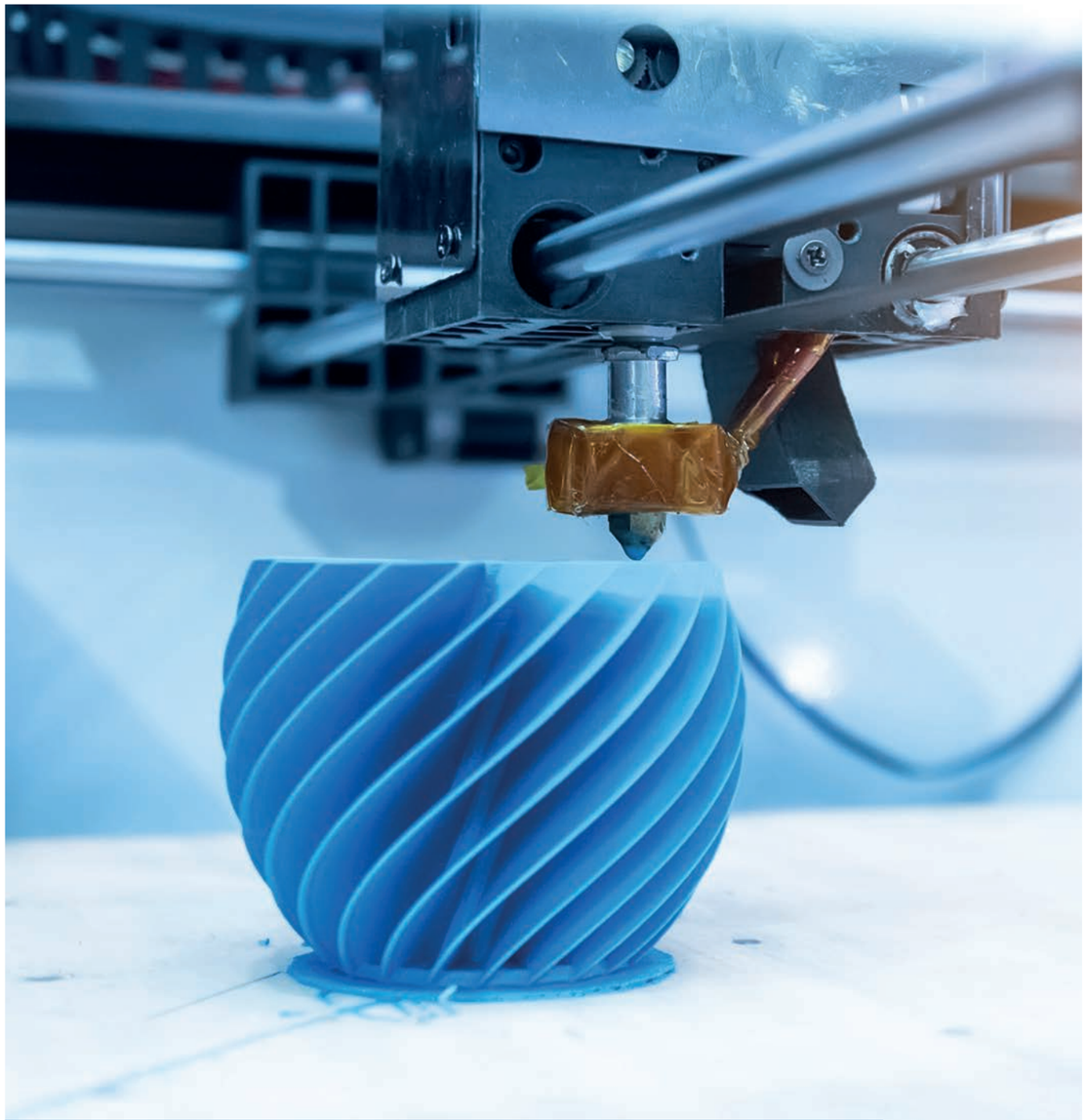


04 / RAW MATERIALS FOR THE PRODUCTION OF PU RESINS

RAW MATERIALS FOR THE PRODUCTION OF PU RESINS

The PCC Group offers polyhydric alcohols used in the production of polyurethanes, used as coating materials in formulations of paints and printing inks. The offer includes polypropylene glycols (PPG) with a weight ranging from 450 to 12.000 g/mol.

Product	Active	Description	Mw	Appearance
POLIKOL 600	min. 99.5	Polyoxoethylene glycol	600	liquid
POLIKOL 1500	min. 99.0	Polyoxoethylene glycol	1500	wax
Rokopol D450	min. 99.0	Polyoxopropylene glycol	450	liquid
Rokopol D1002	min. 99.94	Polyoxopropylene glycol	1000	liquid
Rokopol D2002	min. 99.94	Polyoxopropylene glycol	2000	liquid
Rokopol LDB Delta 4000	min. 99.95	Polyoxopropylene glycol	4000	liquid
Rokopol LDB Delta 8000 V2	min. 99.95	Polyoxopropylene glycol	8000	liquid
Rokopol LDB Delta VC 12000	min. 99.95	Polyoxopropylene glycol	12000	liquid
Rokopol LDB Delta VC 18000	min. 99.95	Polyoxopropylene glycol	18000	liquid



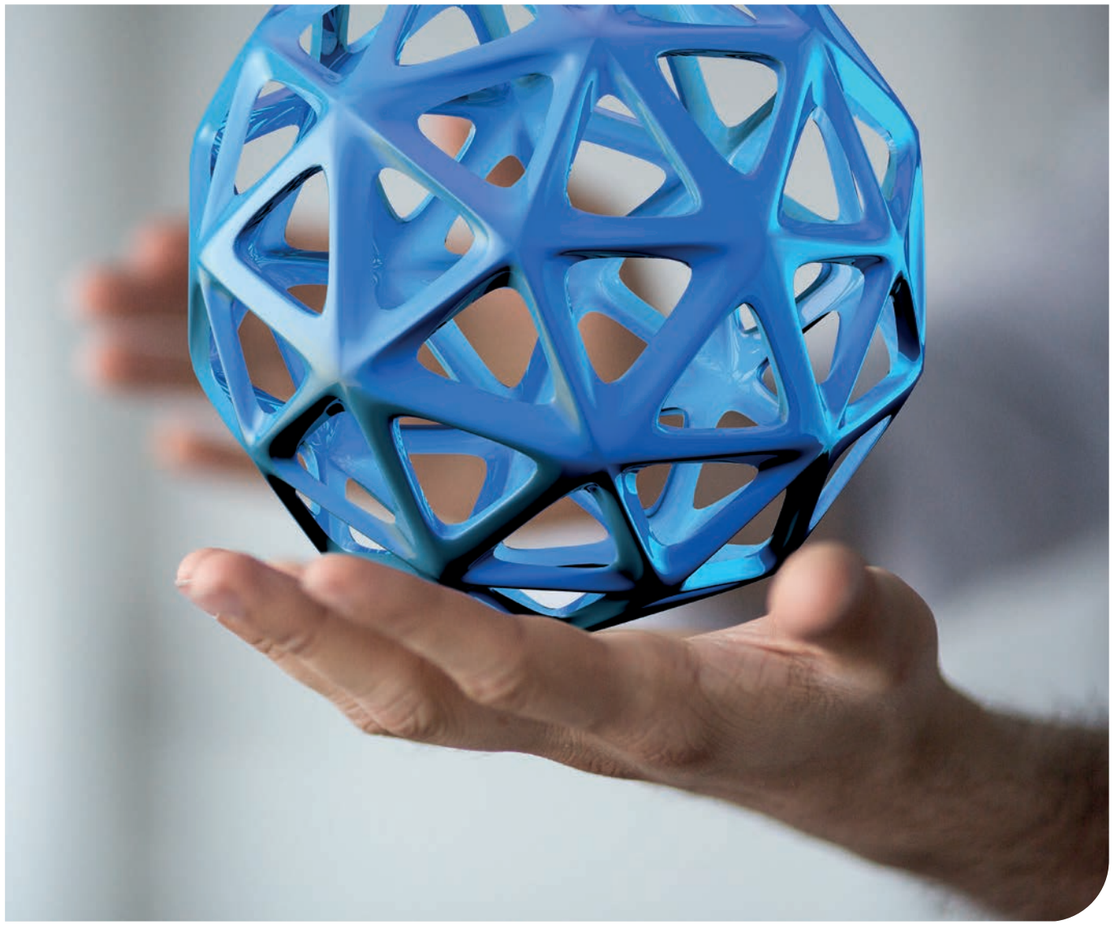
05

3D PRINTING ADDITIVES

3D PRINTING ADDITIVES

3D printing is one of the youngest and fastest growing techniques of modern printing. This method consists in applying successively thin layers of material (thermoplastic, metals, ceramics) to obtain the final object. EXOfos PA080 S can be successfully used as a dispersant for inorganic pigments and ceramic substances used in 3D printing.

Product	Active	Description	Appearance
EXOfos PA-080S	min. 99.0	Phosphoric acid, 2-ethylhexyl ester	liquid



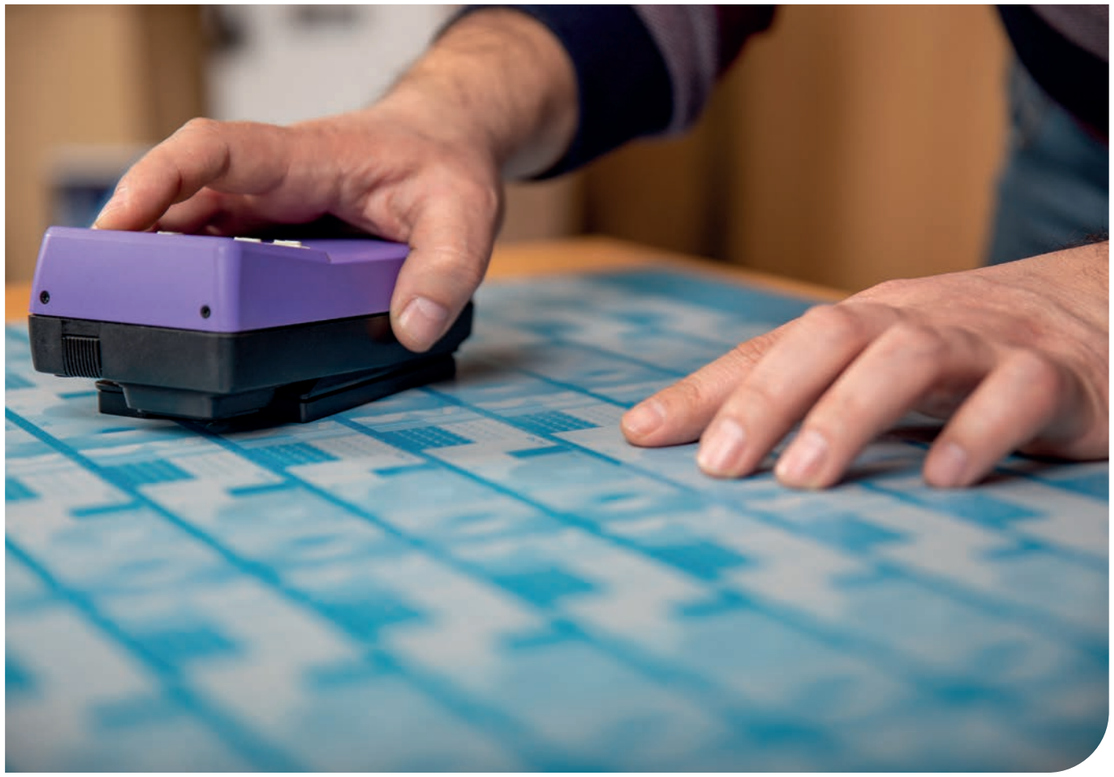
06 / ADDITIVES FOR THE PRINTING PLATE DEVELOPMENT PROCESS

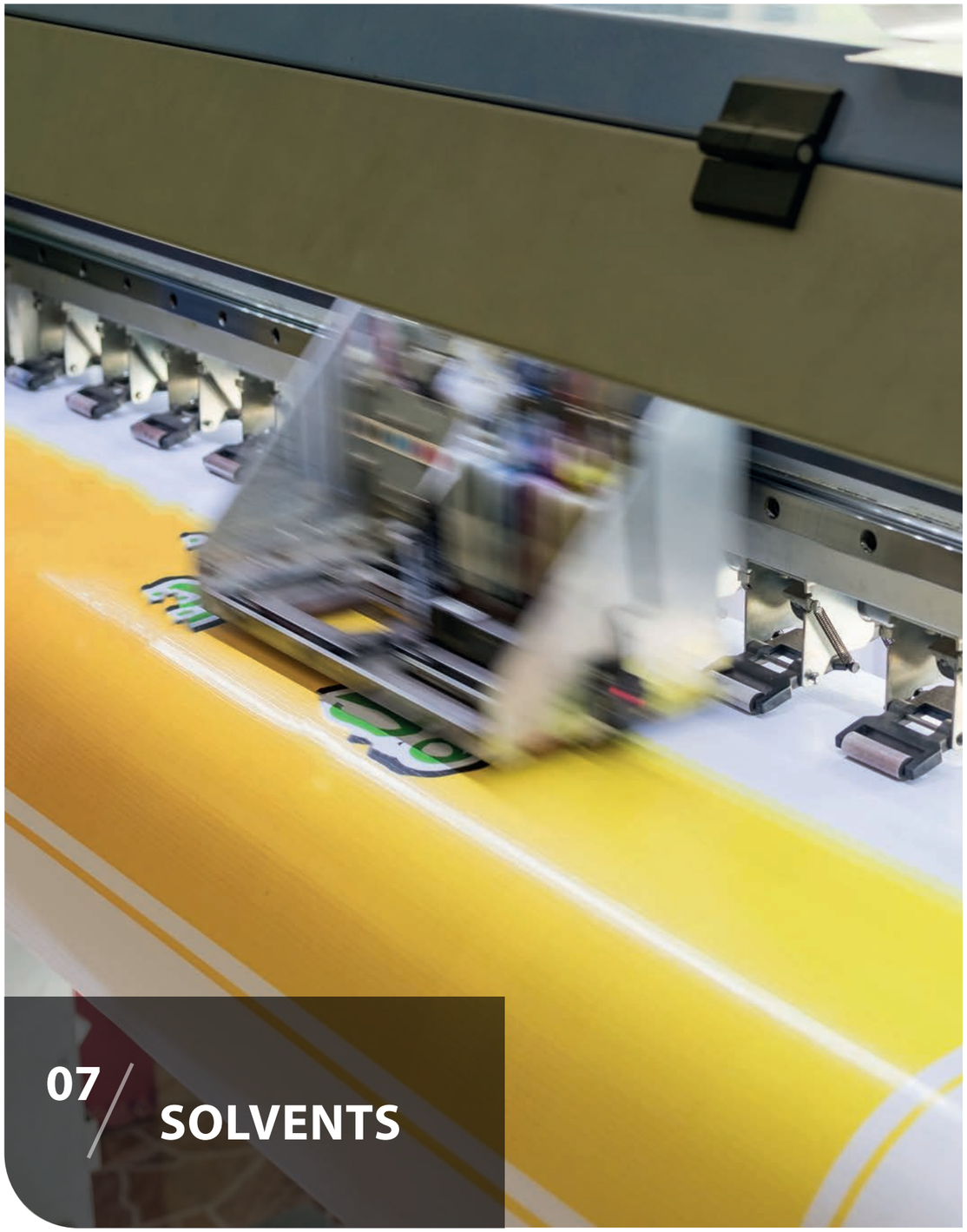
ADDITIVES FOR THE PRINTING PLATE DEVELOPMENT PROCESS

One of the key stages of offset printing is the appropriate preparation of the printing plate, which corresponds to the final image, transferred indirectly to the printed surface. In the plate preparation process, appropriate processing fluids are used to etch the selected areas of the plate. One of the components of such liquids are appropriate wetting agents, characterised by high efficiency and, at the same time, low foaming.

Product	Active	Description	Appearance
ROSULfan E	38 – 42	Sodium 2-ethylhexyl sulfate	liquid
Hydromax 300*	38 – 42	Quaternary Ammonium Chloride Solution	liquid

* product available only in North America





07 SOLVENTS

SOLVENTS

Polyalkylene glycols (PAG) are used as solvents in the production of graphic inks and paints. These products are characterised by an appropriate lipophilic-hydrophilic balance, which has a positive effect on the compatibility of the entire ink formulation. The portfolio of the PCC group includes low-molecular PAGs, characterised primarily by different values of kinematic viscosity.

Product	Active	Description	Kinematic viscosity at 25°C	Appearance
ROKOlub 50-B-10	min. 99.92	Butanol ethoxylated/ propoxylated	9–11	liquid
ROKOlub 50-B-20	min. 99.92	Butanol ethoxylated/ propoxylated	18–24	liquid
ROKOlub 50-B-32	min. 99.92	Butanol ethoxylated/ propoxylated	28–37	liquid

Application research of PCC's products

EXOdis PC250

A mixture of surface-active polymers used as an auxiliary dispersing and wetting agent in a synergistic system with a grinding resin.

Key features:

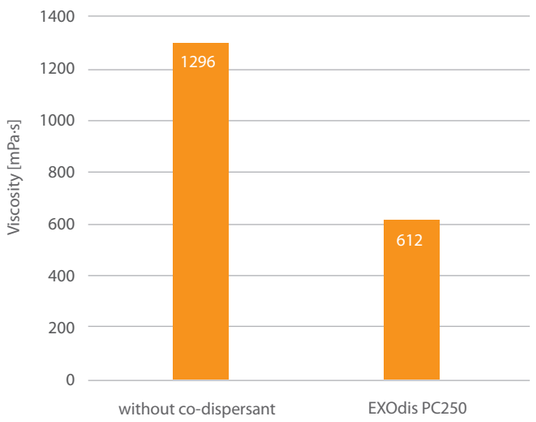
- water-based dispersing and wetting agent
- a mixture of surface-active polymers
- used in the production of concentrates with grinding resin
- concentrates of organic pigments and carbon blacks

Key benefits

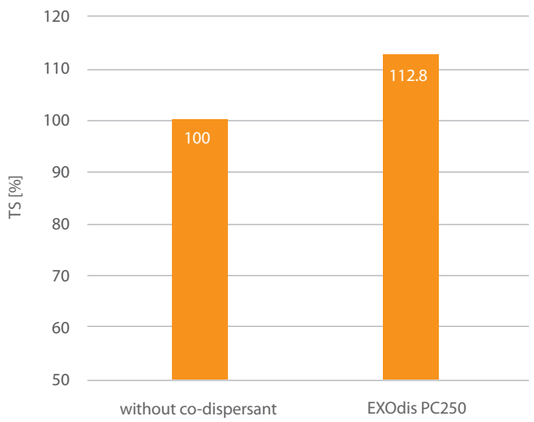
- significantly reduces the viscosity of the concentrate
- increases the tinting strenght of the concentrate
- provides excellent pigment compatibility in the formulation
- positively affects the gloss improvement
- product not classified in accordance with the CLP

RAW MATERIAL	LOADINGS (%wt)
Water	43.3
Defoamer	0.6
Grinding resin (35% solution)	17
EXOdis PC250	5
Pigment Black 7	34
Biocide	0.1

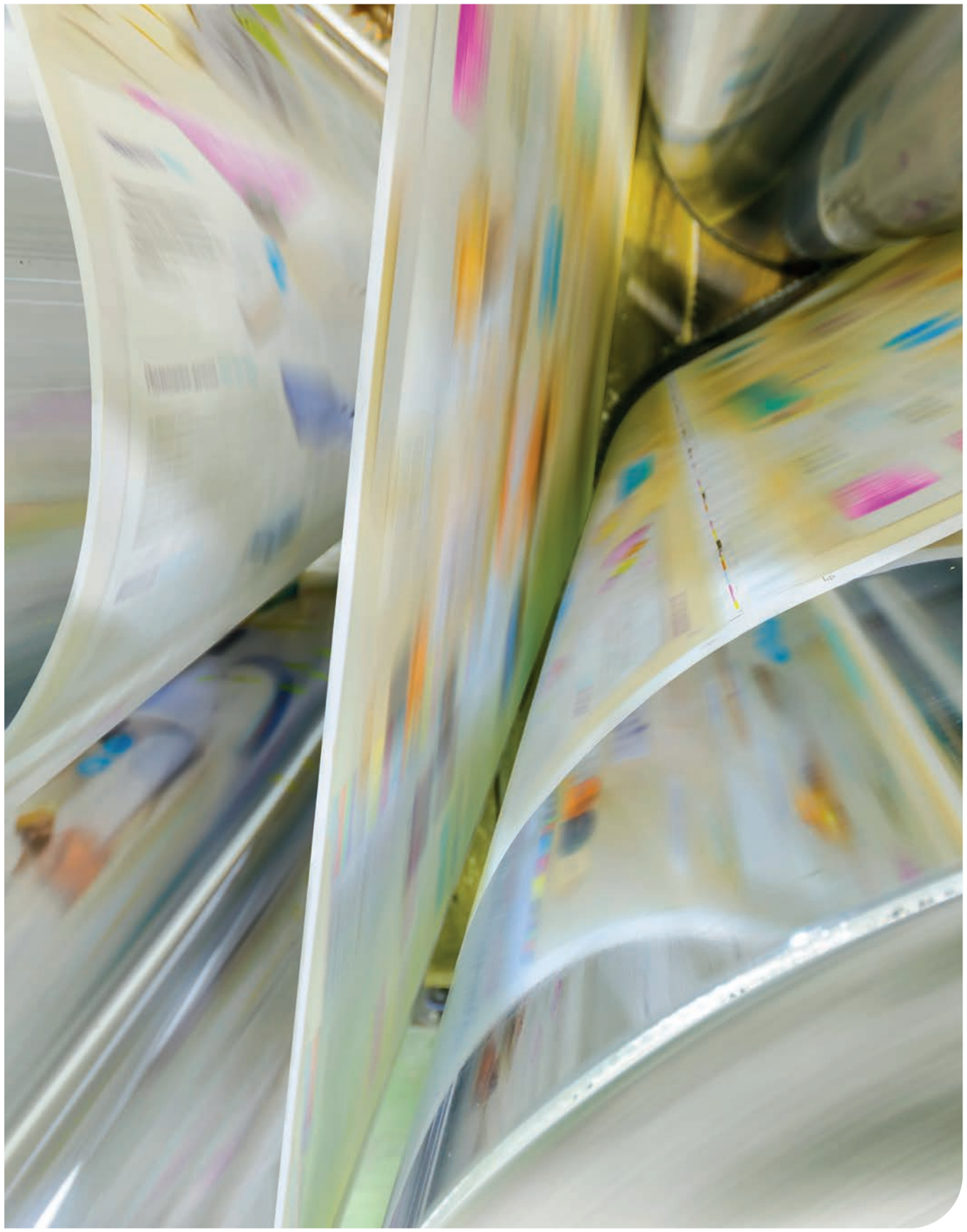
Viscosity



Tinting strenght



EXOdis PC250 visibly lowers the initial viscosity of the formulation and significantly increases the colour strength of the colourant.



Guidance concerning the functional parameters and notation used in the catalogue

HLB (Hydrophilic-Lipophilic Balance)

The hydrophilic-hydrophobic balance is a parameter that determines the ratio of the content of the hydrophilic group and that of the hydrophobic group in a particle. The validity scope of the HLB number for non-ionic surface-active compounds is included within the range of 0 to 20 and is the measure of the share of the hydrophilic group in the particle.

$$HLB=20 \cdot \frac{\text{molecular mass of hydrophilic part}}{\text{molecular mass of compound}}$$

On the other hand, aqueous solutions of ionic surface-active agents acquire additional transformations increasing their degree of hydrophilicity, and the value of the HLB number goes up to 40.

HLB for ester type compounds (polyoxyethylenated fatty acids):

$$HLB=20 \cdot \left(1-\frac{LZ}{LK}\right)$$

where:

LZ saponification number of oxyethylenation product, mgKOH/g

LK acid number of acids subjected to oxyethylenation, mgKOH/g

On the basis of the HLB scale, the range of the utility fitness of surface-active agents can be determined.

HLB NUMBER	EO CONTENTS IN PRODUCT, %	PRODUCT APPLICATION
1-3	5-15	Anti-foaming agent
4-6	20-30	Emulsifier W/O
7-11	35-55	Wetting agent
8-18	40-90	Emulsifier O/W
10-15	50-75	Detergent
10-18	50-90	Solubilizer

Cloud point

Cloud point is an indicator determining the behaviour of water or other organic solutions of non-ionic surfactants. Solutions of surfactants become cloudy during heating and revert to a clear solution at a certain temperature when cooled. This temperature is defined as 'cloud point'.

Depending on the temperature range at which the solution becomes cloudy, five determination methods are set out:

Method A – aqueous solution (10 - 90°C)
Method B – solution of NaCl 50g/l (>90°C)
Method C – solution of NaCl 100g/l (>90°C)
Method D – solution 45g of butyl diglycol/water (<10°C)
Method E – solution 25 g of butyl diglycol/water (<10°C)

PCC Group
We build value through sustainable innovation

Each project or venture with a long-term success story shares one common thing – it's based on in-depth market research and knowledge acquired through years of experience. It is knowledge and experience that enable us to constantly aim higher and deliver greater value through dynamic and sustainable world-wide development of the PCC Group.
The companies, operating as a part of the PCC Group, act with responsibility and care. We only embark on new business challenges when we are certain that we have the skills and knowledge to achieve success. We operate in three major markets: chemicals, energy and logistics. Several dozen business units, managed by PCC SE, work in synergy to generate the greatest possible competitive advantage inboth local and international markets. Each day nearly three thousand professionals contribute their energy and effort to secure the sustainable development of the PCC Group. The key element of our strategy is to ensure the development of each individual business unit through taking advantage of innovative technology and new market applications. We achieve our goals in a sustainable and responsible way – we care about the environment and the society within which we operate.
We are always ready to reach our strategic goals. Efficient and dynamic management helps our employees to fully develop their potential and therefore enhances the overall PCC Group value. Joint enterprises and individual initiatives of our companies are the results of the entrepreneurship culture promoted within the PCC Group. Our philosophy is built on simple values - integrity, trust and reliability. We believe that following those principles is the only way to build a long-term competitive advantage.

The PCC Group currently employs nearly 3300 people. We operate in 17 countries, in 39 different locations around the world. Sales of PCC Group is generated in 3 areas: Chemicals, Logistics, Holding & Projects. Our portfolio includes five segments: Polyols & derivatives, Surfactants & derivatives, Chlorine & derivatives, Silicon & derivatives, Trade & service.

Segments of PCC Group

Chemicals 83%

Polyols & derivatives
- Polyether polyols
- Polyester polyols
- Polyurethane systems
- Prepolymers
- Acryl phenols

Surfactants & derivatives
- Anionic surfactants
- Non-ionic surfactants
- Amphoteric surfactants (betaines)
- Household and industrial cleaners, detergents, personal care products

Chlorine & derivatives
- Chlorine
- Chlorine derivatives
- MCAA
- Phosphorus and naphthalene derivatives

Silicon & derivatives
- Quartzite
- Metallic silicon

Logistics 12%

Logistics
- Intermodal transport
- Road transport
- Rail transport
- Container terminal in Kutno

Holding & projects 5%

Holding & projects
- Investment management
- Projects
- Renewable energy
- Conventional energy

In accordance with our environmental concerns, this publication from the PCC Group was printed on Cocoon Silk - an ecological double-sided-coated matt paper. This paper is made of 100% waste paper via environment-friendly technology. The FSC® Certificate confirms that the raw materials used during the paper production process come from well-managed forests or other certified and controlled sources.

TEXT PAGES	
Brand	Cocoon Silk
Grammage	135
Number of pages	28

COVER PAGES	
Brand	Cocoon Silk
Grammage	250
Number of pages	4

PUBLICATION	
Size (cm)	21 x 29.7
Quantity	250

By using Cocoon Silk rather than non-recycled paper, the environmental impact was reduced by:

42	kg of landfill
5	kg CO_2 and greenhouse gases
56	km travel in the average European car
1 640	litres of water
91	kWh of energy
68	kg of wood

Carbon footprint data evaluated by Labelia Conseil in accordance with the Bilan Carbone® methodology. Calculations are based on a comparison between recycled paper used versus a virgin fibre paper - according to the latest European BREF data (virgin fibre paper) available.

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