

Zschimmer & Schwarz

TEXTILE AUXILIARIES

RECYCLED POLYESTER – rPET



ZSCHIMMER & SCHWARZ

RECYCLED POLYESTER - rPET

► GENERAL INFORMATION – linear economy



Consumption of 1.2 million plastic bottles per minute.
80% of them are disposed on landfills or in the ocean.
8 million tons of plastics are wasted into the oceans per year, additional to 150 million tons which are already in.
Projection for 2050: There are more plastics in the seas than fishes !

Source: NGO Ocean Conservancy



RECYCLED POLYESTER - rPET

► GENERAL INFORMATION – circular economy



Reduce Reuse Recycle

100 % RECYCLED

100 % recycled sewing threads developed by A&E Gütermann

Do you know that one PET bottle enables the production of approx. 1.000 m of thread?

Source: A&E Gütermann

15  = 

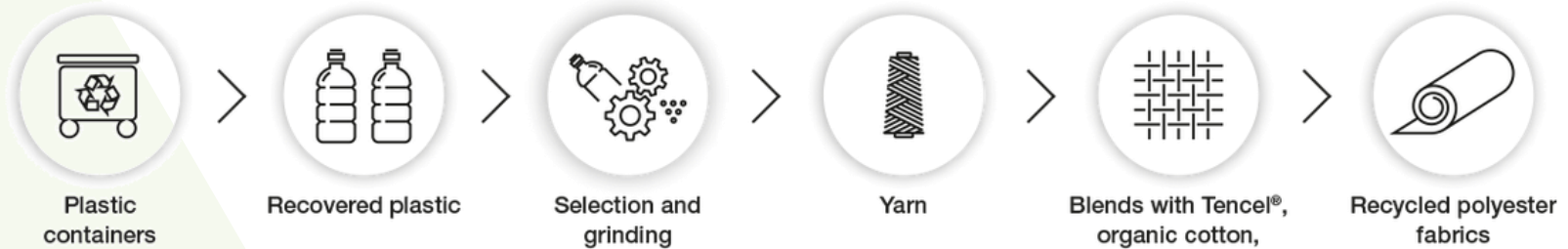
Source: Marjorie van Elven

Source: KOKOworld



RECYCLED POLYESTER - rPET

► GENERAL INFORMATION – Process flow



RECYCLED POLYESTER - rPET

▶ YARN AND FABRIC FINISHING

- ▶ **Pre-wash**
DEPICOL TLK new or TISSOCYL RC9
- ▶ **Dyeing**
CEFATEX ENN, SETACID AB conc, ZETESAN REP, ZETESAN P-AE,
SETAVIN PLD, SETAVIN MIG or SETAVIN SU-E, *optional LUBATEX LV conc*
- ▶ **Optional reduction clearing**
yarn: alk.-red. with **ZETESAN REP**, *optional ZETESAN P-AE*
piece: alkaline or acid-reduction with **ZETESAN REP** and **ZETESAN PA-E**
or **ZETESAL NWM**
- ▶ **Finishing**
yarn: **KATAMIN UNI**
piece: softening with **CEFASOFT** types, further functionalisation
regarding customer requests



Yarn



Recycled polyester
fabrics



rPET - pretreatment

Detergents

- ▶ **DEPICOL TLK new** – detergent with excellent fat and oil dissolving power
- ▶ **TISSOCYL RC9** – high efficient detergent for PES/EL

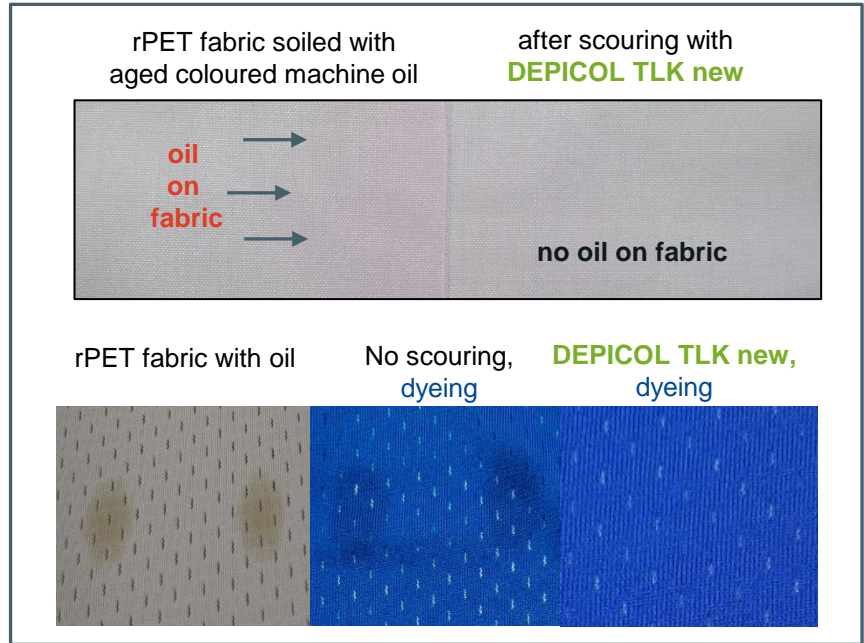
Anti-yellowing protection

- ▶ **PROTELAN CF2** – anti-yellowing agent to prevent thermo-yellowing of synthetics and their blends with elastane during heat-setting process



DEPICOL TLK new – our solution for fat and oil dissolving

- ▶ Excellent dissolving and emulsifying power to oils, fats and lubricants
- ▶ Increased washing power due to special solvent components
- ▶ Prevention of evaporative emissions
- ▶ Suitable for continuous and discontinuous processes
- ▶ Low odour
- ▶ APEO free



TISSOCYL RC9 - High efficient detergent for polyester/elastane

- ▶ Spontaneous emulsifying of silicone oils in an aqueous system
- ▶ Very good emulsifying of ester oils and mineral oils
- ▶ Displays maximum emulsifying effect even in low temperature range
- ▶ Suitable for jets and continuous systems
- ▶ Not gelling, dosable, biodegradable, low in odour

Emulsifying power of TISSOCYL RC9



emulsifying test:

5 g/l coloured silicone oil
3 g/l detergent formulation
1 g/l soda ash

conditions:

liquor temperature 40 °C,
assessment after 60 min at room temperature



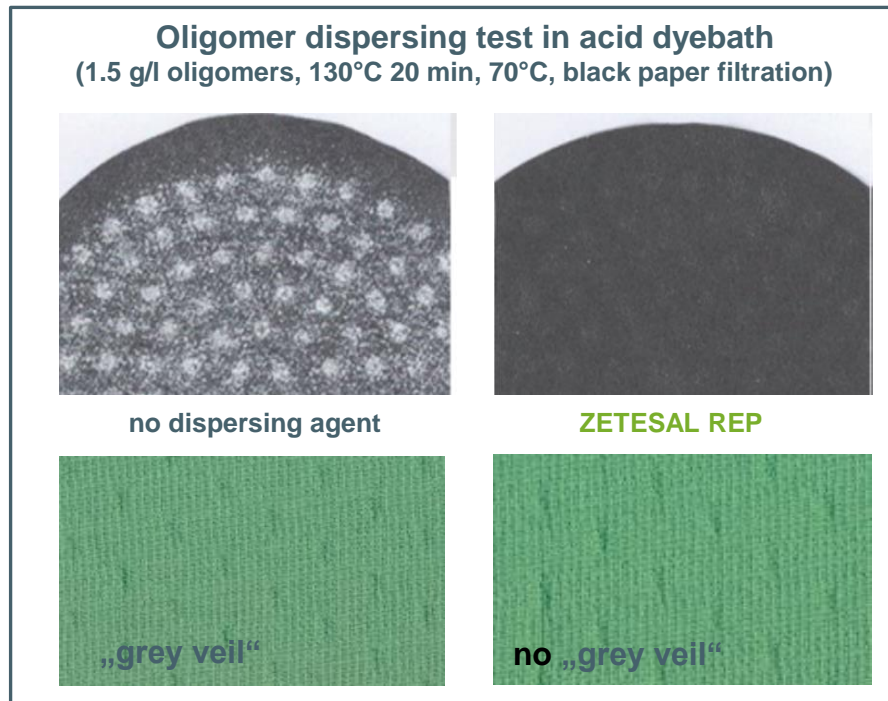
rPES - dyeing

- ▶ **CEFATEX ENN** – HT stable deaerator
- ▶ **SETACID AB conc** – concentrated acid buffer
- ▶ **LUBATEX LV conc** – concentrated antcrease agent for Jet dyeing
- ▶ **ZETESAN REP** – the specialist for oligomers and all other stainings
- ▶ **ZETESAN P-AE** – dye dispersing agent with levelling function
- ▶ **SETAVIN PLD** – high efficient levelling agent
- ▶ **SETAVIN SU-E** – concentrated levelling agent with very good migration properties
- ▶ **SETAVIN MIG** – levelling agent with migration properties



ZETESAN REP – excellent oligomer and stain removing

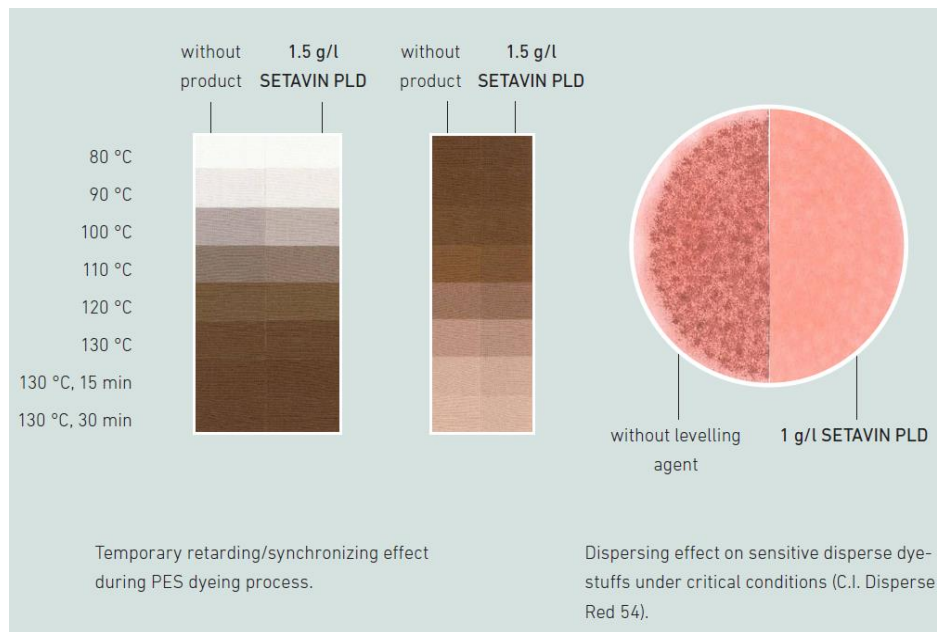
- ▶ Excellent dispersing and removing of oligomers and other stains
- ▶ Avoids “grey veil” on rPET fabric
- ▶ Used inside dyebath without influence on shade
- ▶ Further applications in reduction cleaning processes and cleaning of machines
- ▶ Improves running properties of yarn processing



SETAVIN PLD – high efficient levelling and dispersing agent for disperse dyeing

- ▶ Very good and well balanced levelling effect (retarding/synchronising)
- ▶ Outstanding dispersing effect (particularly for critical dyes, e.g. C.I. Disperse Blue 56, 60, 77, 87; Disperse Red 54, 60)
- ▶ Applicable in every kind of discontinuous and continuous dyeing, low foaming
- ▶ Ideal for automotive textiles with regard to highest light fastness requirements
- ▶ Low COD

Levelling and dispersing power of SETAVIN PLD



rPET - clearing / aftertreatment

- ▶ **ZETESAL NWM** – desorption accelerator for the effective removal of unfixed disperse dyestuff
- ▶ **ZETESAN REP** – oligomer remover and cleaning agent
- ▶ **ZETESAN P-AE** – dye dispersing agent used in RC process



rPET - softening

- ▶ **CEFASOFT BSH** – hydrophilic silicone micro-emulsion for moisture regulation
- ▶ **CEFASOFT SGL** – silicone macro-emulsion
- ▶ **ADULCINOL GV** – cationic softener as raising agent and for improved sewability
- ▶ **ADULCINOL T7515** – cationic softener with good hydrophilic and antistatic properties

rPET - storage yellowing protection

- ▶ **PROTELAN LTY** – anti-yellowing agent to prevent storage yellowing and yellowing caused by molding processes






rPET - finishing for yarn

- ▶ **KATAMIN UNI** – wet paraffinating agent



Zschimmer & Schwarz Auxiliaries






for recycled polyester and blends fully complies with

PRODUCT	GRS V4.2	ZDHC MRSL V2.0	STANDARD 100 by OEKO-TEX®	bluesign®	GOTS V5.0/6.0	SVHC
ADULCINOL GV	✓	Level 3	✓	✓	✓	free
ADULCINOL T7515	✓	Level 3	✓	✓	✓	free
CEFASOFT BSH	✓	Level 3	✓	✓		free
CEFASOFT SGL	✓	Level 3	✓	✓	✓	free
CEFATEX ENN	✓	Level 3	✓	✓	✓	free
DEPICOL TLK new	✓	<i>compliant</i>	✓	✓		free
KATAMIN UNI	✓	Level 3	✓	✓	✓	free
LUBATEX LV conc	✓	Level 3	✓	✓	✓	free
PROTELAN CF 2	✓	Level 3	✓	✓	✓	free
						
GRS ... Global Recycled Standard; ZDHC MRSL – Zero Discharge of Hazardous Chemicals - Manufacturing Restricted Substances List - GateGateway™ conformance level; GOTS ... Global Organic Textile Standard; SVHC – Substances of Very High Concern (REACH)						



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PRODUCT	GRS V4.2	ZDHC MRSL V2.0	STANDARD 100 by OEKO-TEX®	bluesign®	GOTS V5.0/6.0	SVHC
PROTELAN LTY	✓	Level 3	✓	✓		free
SETACID AB conc	✓	Level 3	✓	✓	✓	free
SETAVIN MIG	✓	<i>compliant</i>	✓			free
SETAVIN PLD	✓	Level 3	✓	✓		free
SETAVIN SU-E	✓	Level 3	✓	✓		free
TISSOCYL RC 9	✓	Level 3	✓	✓	✓	free
ZETESAN P-AE	✓	<i>compliant</i>	✓		✓	free
ZETESAN REP	✓	<i>compliant</i>	✓			free
ZETESAL NWM	✓	Level 3	✓	✓	✓	free
						
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for recycled polyester and blends fully complies with

- ▶ Global Recycled Standard (GRS) 4.2
- ▶ ZDHC level 3 and bluesign®
- ▶ STANDARD 100 by OEKO-TEX®, product classes I to IV
- ▶ GOTS 5.0/6.0

... and participate in

- ▶ The BHive® Chemical management system



ENGINEERING for
sustainable production
energy & water saving

*Considerable improvement
of CO₂ footprint*

