DEUREX®

THE WAX COMPANY

POLYETHYLENE WAXES

DEUREX® EWAX

POLYETHYLENE WAXES

SUGAR CANE WAXES

DEUREX® XWAX

SUGAR CANE WAXES

HYBRID WAXES

DEUREX® HWAX

HYBRID WAXES

1989 Foundation of DEUREX GmbH

1990 Installation of the first production site for polyethylene waxes (capacity 3000 t. p. a.)

1997 Invention of spray micronisation of waxes

2000 Startup of 1st spray tower

2001 Increase of production capacitY

2005 Increase of production capacity for polyethylene waxes to 11,000 t. p. a.

2007 Foundation of DEUREX AG for marketing of waxes

2008 Invention of natural sugar cane waxes for industrial purposes

2009 Increase of production capacity

2010 Invention of oil and chemical adsorbent DEUREX PURE

2011 Sale of micro business

2012 Expansion of production and warehouse site

2013 Startup of production DEUREX PURE (capacity 900 t. p. a.)

2013 Startup of production sugar cane waxes (capacity 600 t. p. a.)

2014 Development and introduction of hybrid waxes

2015 Increase of production capacity for polyethylene waxes by further 5,000 t.p.a.

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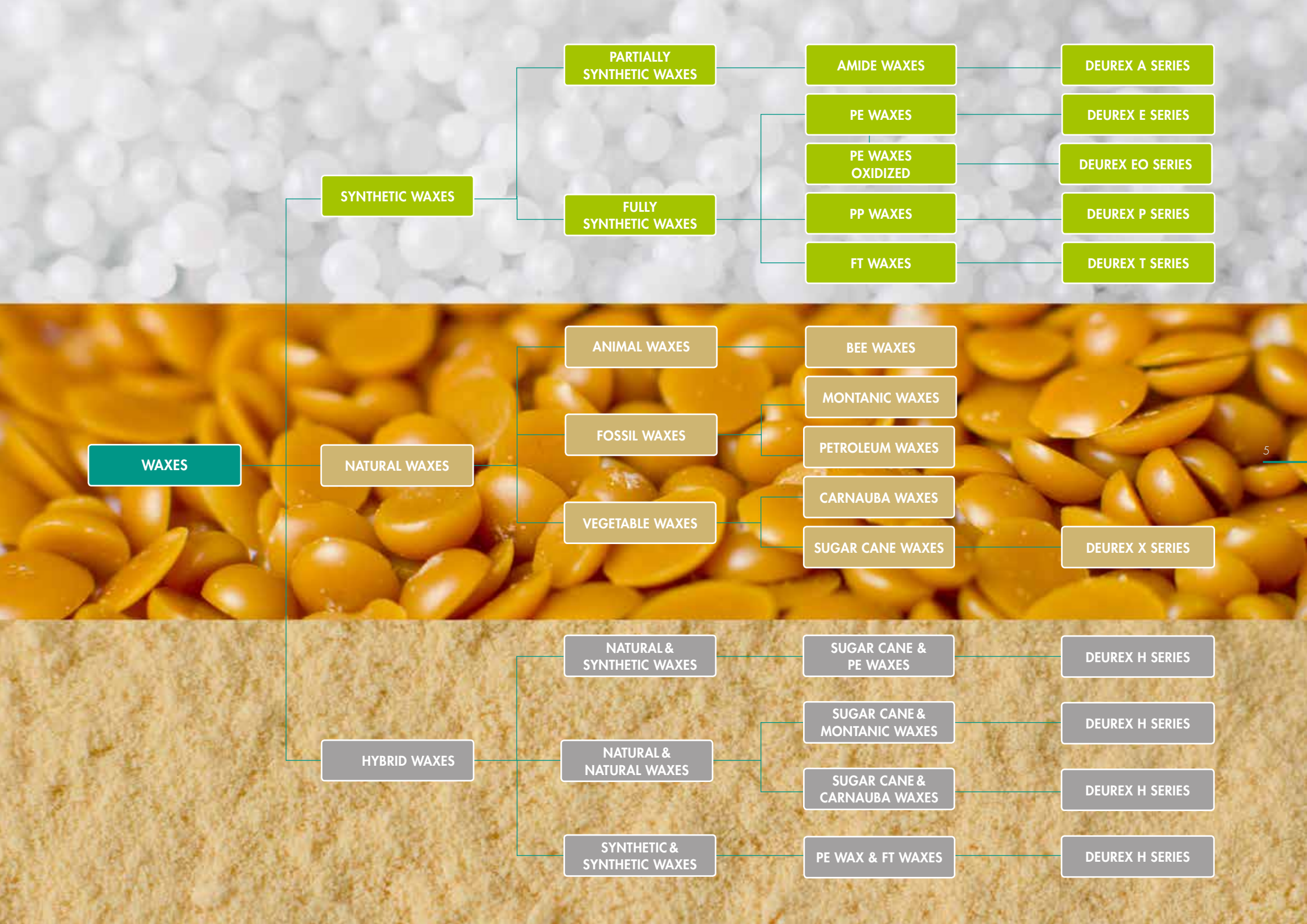
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POLYETHYLENE WAXES

PRODUCTION

HIGH-PRESSURE POLYMERIZATION

Polyethylene waxes are being produced through the high-pressure polymerization of ethylene. Highly derived, very stable (temperature, pressure, UV light, chemicals) molecular structures are being produced. DEUREX waxes produced through the high-pressure polymerization are for example DEUREX E 08, DEUREX E 12 and DEUREX E 13. Final products made from these are very durable and do not yellow.

SYNTHESIS BY THE ZIEGLER-NATTA METHOD

The polymerization named after Karl Ziegler and Giulio Natta is carried out at low pressures and temperatures with the use of organometallic catalysts. This causes low-branched, crystalline structures. The crystalline DEUREX E 09 therefore provides a very high surface hardness as well as the typical wax properties. Wider carbon chains such as DEUREX E 11 result in the best allround waxes with all the typical wax features and the best price-performance ratio.

THERMAL DEGRADATION PROCESS OF POLYETHYLENE

The term degradation means the targeted and controlled reduction of the molecular weight of polymers under pressure and temperature. The main purpose here is to improve the rheological properties and the specific formation of required carbon chains (molecular weight). Shorter carbon chains such as in DEUREX E 10 are flexible, offer good adhesion properties, are polishable and emulsifiable. Additionally, the thermal degradation allows the production of PE waxes such as DEUREX E 06 with a melting range of below 100 °C.

FISCHER-TROPSCH SYNTHESIS

During the Fischer-Tropsch process coal, natural gas or biomass is being converted into synthesis gas at temperatures above 1000 °C using steam and air or oxygen. In the following reaction, the gas is being converted to hydrocarbons such as alcohols, paraffin and olefins. Resulting products are the so-called hard waxes such as DEUREX T 39 with a linear molecular structure and high hardness.

OXIDATION OF SYNTHETIC WAXES

With the aid of oxygen all synthetic waxes can be oxidized at temperatures usually just below the melting point. Oxidized waxes of the DEUREX EO series are used for the preparation of water borne emulsions and serve as internal lubricants.

WALTER-REPPE SYNTHESIS

Walter Reppe was the name giver of the synthesis with acetates under increased pressure. The polyethylene wax is being produced according to the vinylation method. DEUREX V 2 is the only wax melting at 50 °C which provides a high hardness and stability.

HYBRID WAXES

The hybrid waxes from DEUREX connect benefits of polyethylene waxes and various other wax types. The newly developed products combine the high drop point and the hardness of polyethylene waxes with the acid value and the flexibility of sugar cane waxes.

HOMOPOLYMER POLYETHYLENE WAXES

APPLICATIONS

· Masterbatch
· PVC
· Hot melts
· Rubber
· Cable
· Raw materials for emulsions
· Raw materials for micronization

PROPERTIES

· Improved dispersibility
· Improved lubrication and slip
· Improved rub resistance
· Matting effect
· Release agents
· Processing aids

DEUREX E SERIES

DEUREX EO 42

DEUREX V 2

POLAR OXIDIZED POLYETHYLENE WAXES

APPLICATIONS
· Masterbatch
· PVC
· Hot melts
· Raw materials for emulsions

PROPERTIES
· Lubricants
· Release agents
· Improved rub resistance
· Processing aids

DEUREX EO SERIES

SPECIAL WAXES & EMULSIONS

APPLICATIONS
· Leather and stone care products
· Masterbatch
· Emulsions

PROPERTIES
· Silky gloss
· Protect and seal surfaces
· Polymer compatibility
· Processing aids

DEUREX EV 03, DEUREX V 2, DEURESOL E 1035 W

WAX EMULSIFIER

APPLICATIONS
· Textile processing
· Paper industry
· Care products

PROPERTIES
· High performance
· Reduced dosage
· Excellent wetting properties
· Free of alkyl phenol ethoxylates

DEUREX EMU-E

WAX	CHEMICAL DESCRIPTION	DROP POINT °C	ACID VALUE mg KOH/g	VISCOSITY mPas 140 °C	PENETRATION dmm	DENSITY g/cm³
DEUREX E 06	non polar polyethylene wax	93 - 103	0	< 40	10 - 25	0.94 - 0.96
DEUREX E 08	non polar polyethylene wax	112 - 120	0	400 - 600	1.5 – 2.5	0.93 – 0.94
DEUREX E 09	non polar polyethylene wax	110 - 120	0	< 40	2 - 5	0.94 - 0.96
DEUREX E 10	non polar polyethylene wax	100 - 110	0	< 40	10 - 25	0.94 - 0.96
DEUREX E 11	non polar polyethylene wax	110 - 120	0	< 80	3 - 7	0.94 - 0.96
DEUREX E 12	non polar polyethylene wax	106 - 114	0	100 - 200	3 - 4	0.93 - 0.94
DEUREX E 13	non polar polyethylene wax	115 - 123	0	600 - 700	0.5 - 1	0.93 - 0.94
DEUREX E 18	non polar polyethylene wax	110 - 120	0	< 400	< 3	0.93 - 0.95
DEUREX E 25	non polar polyethylene wax	110 - 130	0	1,000 - 4,000	3 - 7	0.92 – 0.96

WAX	MASTERBATCH	PVC	HOT MELTS	RUBBER	CABLE	R. f. EMULSIONS	R. f. MICRONIZATION
DEUREX E 06		*	*	*	*		
DEUREX E 08	*	*	*			**	**
DEUREX E 09			**			**	**
DEUREX E 10	*	**	*	**	**	**	
DEUREX E 11	**	**	**	**	**		
DEUREX E 12	*	*	*	**	**	**	**
DEUREX E 13	*	*	*			*	*
DEUREX E 18	**	**	*			*	*
DEUREX E 25	*	*		*	*		

* suitable ** perfectly suitable

WAX	CHEMICAL DESCRIPTION	DROP POINT °C	ACID VALUE mg KOH/g	VISCOSITY mPas 140 °C	PENETRATION dmm	DENSITY g/cm³
DEUREX EO 40	Oxidized polar polyethylene wax	97 - 105	< 19	< 120	5 - 15	0.93 - 0.96
DEUREX EO 42	Oxidized polar polyethylene wax	106 - 114	15 - 19	100 - 300	2 - 4	0.93 - 0.95
DEUREX EO 45	Oxidized HDPE wax	130 -140	< 30	< 4,000 (160 °C)	< 0,5	0.97 – 0.99
DEUREX EV 03	Copolymer polyethylene vinyl acetate wax	96 - 104	0	200 - 600	6 - 10	0.93 - 0.95
DEUREX V 2	Polyvinylether wax	48 - 56	0	400 - 600	1 - 2	0.93 - 0.94

EMULSIFIER	CHEMICAL DESCRIPTION
DEUREX EMU-E	Emulsifier for synthetic waxes

EMULSION	CHEMICAL DESCRIPTION
DEURESOL E 1035 W	Water borne emulsion

WAX	MASTERBATCH	PVC	HOT MELTS	RUBBER	CABLE	R. f. EMULSIONS	R. f. MICRONIZATION
DEUREX EO 40	**	**				**	
DEUREX EO 42	**					**	
DEUREX EO 45		**	**			**	
DEUREX EV 03	**	*					
DEUREX V 2						**	

EMULSIFIER	MASTERBATCH	PVC	HOT MELTS	RUBBER	CABLE	R. f. EMULSIONS	R. f. MICRONIZATION
DEUREX EMU-E						**	

EMULSION	MASTERBATCH	PVC	HOT MELTS	RUBBER	CABLE	R. f. EMULSIONS	R. f. MICRONIZATION
DEURESOL E 1035 W						**	

* suitable ** perfectly suitable

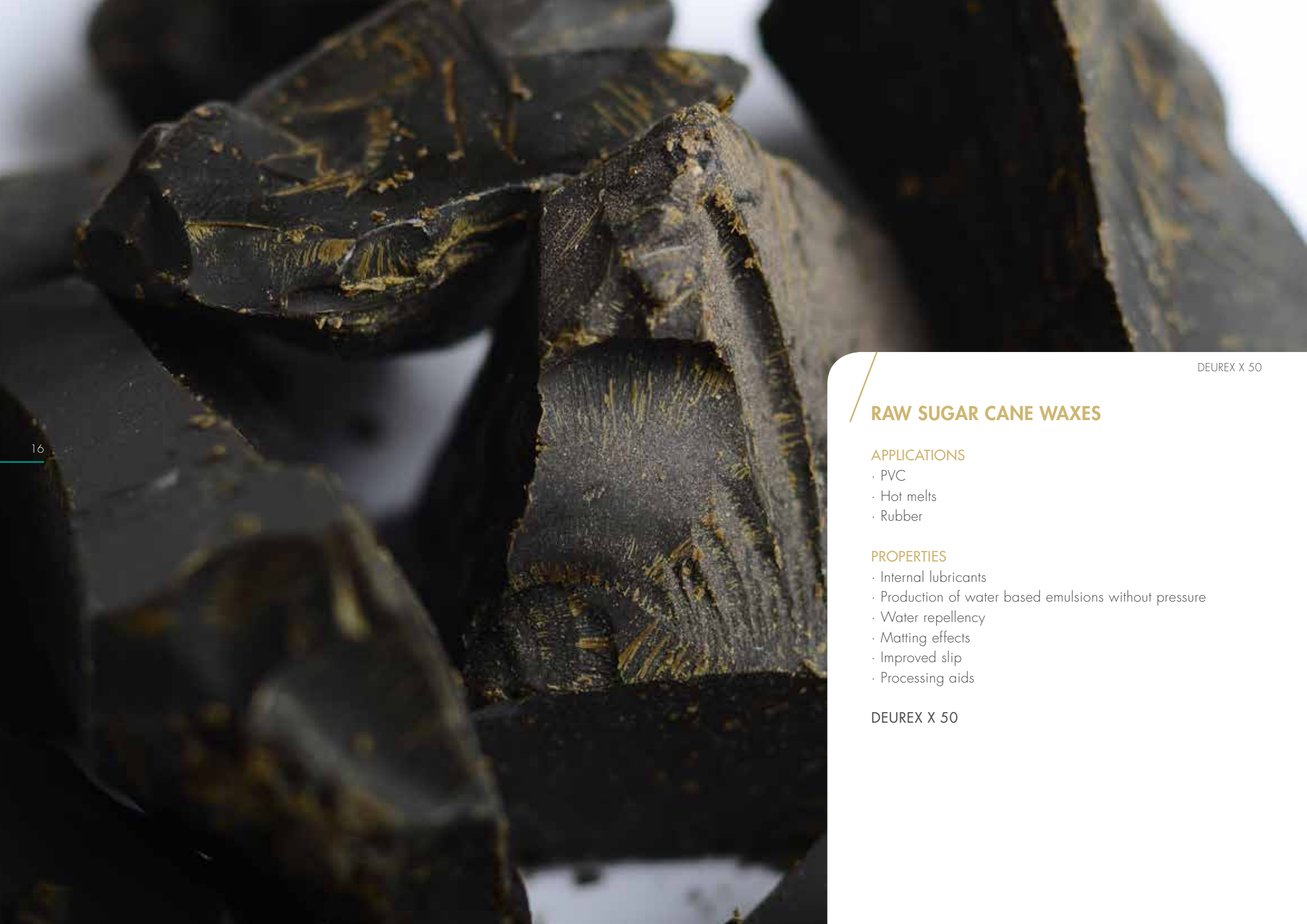
SUGAR CANE WAXES

PRODUCTION

Sugar cane is a monocotyledonous plant with a typical grass-like appearance. The origin is in East Asia but today sugar cane is being cultivated in every climatically suitable region. The biggest countries are Brazil, India, China, Thailand, Pakistan and Mexico.

Sugar cane wax is being extracted from the stalks of the sugar cane plant. To produce sugar, the sugary sap is being extracted from the plant. A by-product is the so-called bagasse. This filtration residue mainly consists of cellulose, hemicelluloses and lignin. After having cleaned the bagasse from plant residues and chlorophyll, it can be used for the production of sugar cane wax.

Sugar cane waxes are probably the most sustainable waxes. They contain 100 % sugar cane and are therefore pure natural products. Since the raw material is the filter residue of the sugar cane production, no further natural resources are being used. The added value of sugar cane plants is being increased significantly.



RAW SUGAR CANE WAXES

APPLICATIONS

- PVC
- Hot melts
- Rubber

PROPERTIES

- Internal lubricants
- Production of water based emulsions without pressure
- Water repellency
- Matting effects
- Improved slip
- Processing aids

DEUREX X 50

SUGAR CANE WAXES

APPLICATIONS
· Masterbatch
· PVC
· Hot melts
· Cable
· Raw materials for emulsions
· Raw materials for Micronization

PROPERTIES
· Production of water based emulsions without pressure
· Internal lubricant
· Polishable
· Gloss keeping
· Water repellency
· Improved rub and scratch resistance
· UV resistance
· Matting agent

DEUREX X 51

SUGAR CANE WAX EMULSIONS

APPLICATIONS
· Production of ecological products
· Bio plastics and hot melts
· Water borne paints and coatings
· Water borne printing inks
· Leather care products
· Textile processing
· Care products

PROPERTIES
· Rub resistance
· Anti-blocking for water borne printing inks
· Improved water repellency
· Optimized gloss and smoothness
· Optimized slip
· Good matting
· Pleasant haptic

DEURESOL X 5135 W

NATURAL WAX EMULSIFIER

APPLICATIONS
· Care products
· Textile processing
· Paper industry
· Printing inks

PROPERTIES
· Production of natural emulsions
· Production of emulsions without pressure
· Excellent wetting properties

DEUREX EMU-X

DEUREX X 51 G

WAX	CHEMICAL DESCRIPTION	DROP POINT °C	ACID VALUE mg KOH/g	VISCOSITY mPas 140 °C	PENETRATION dmm	DENSITY g/cm³
DEUREX X 50	Raw sugar cane wax	68 - 80	20 - 50	< 40	9 - 13	< 0.90
DEUREX X 51	Raw sugar cane wax	68 - 80	20 - 50	< 40	2 - 4	< 0.90

EMULSIFIER	CHEMICAL DESCRIPTION
DEUREX EMU-X	Emulsifier for natural waxes

EMULSION	CHEMICAL DESCRIPTION
DEURESOL X 5135 W	Water borne emulsion

DEUREX X 51 P

DEURESOL X 5135 W

WAX	MASTERBATCH	PVC	HOT MELTS	RUBBER	CABLE	R. f. EMULSIONS	R. f. MICRONIZATION
DEUREX X 50		*	*	**			
DEUREX X 51	**	**	**		**	**	**

EMULSIFIER	MASTERBATCH	PVC	HOT MELTS	RUBBER	CABLE	R. f. EMULSIONS	R. f. MICRONIZATION
DEUREX EMU-X						**	

EMULSION	MASTERBATCH	PVC	HOT MELTS	RUBBER	CABLE	R. f. EMULSIONS	R. f. MICRONIZATION
DEURESOL X 5135 W						**	

* suitable ** perfectly suitable

HYBRID WAXES

HYBRID WAXES CONNECT

Hybrid materials and products make working processes more efficient and allow the development of totally new products. Hybrid engines combine an electric engine and a combustion engine. The electric engine reduces consumption of fuel; the combustion engine keeps you mobile when the battery is empty. Glass-fiber reinforced plastics are hybrid materials as well. This composite material benefits from the stability of the fibers in combination with the flexibility of the plastics. Each component of a hybrid material also works on its own, but the combination is a new product with benefits from both materials. That is why we invented DEUREX hybrid waxes.

TYPES OF HYBRID WAXES

NATURAL HYBRID WAXES

The products of the DEUREX H 70 Series connect properties of various natural waxes. Our hybrid waxes combine the benefits of sugar cane waxes and montanic waxes as well as the benefits of sugar cane waxes and carnauba waxes.

NATURAL-SYNTHETIC HYBRID WAXES

The products of the DEUREX H 80 Series connect properties of natural waxes and synthetic waxes. Our hybrid waxes combine high drop points and hardness of polyethylene waxes with an acid value and the flexibility of sugar cane waxes.

SYNTHETIC HYBRID WAXES

The products of the DEUREX H 90 Series connect properties of various synthetic waxes. Our hybrid waxes combine the benefits of polyethylene waxes and Fischer-Tropsch waxes as well as the benefits of polyolefin waxes and amide waxes.

NATURAL HYBRID WAXES

APPLICATIONS

· Masterbatch
· PVC
· Rubber
· Cable
· Raw materials for emulsions
· Raw materials for Micronization

PROPERTIES

· Natural products, perfect for ecological formulations
· Internal lubricants
· Can reduce amounts of plasticizers
· High gloss at low dosage
· Water repellency
· Improved rub-, scratch- and UV resistance
· Emulsifiable without pressure

DEUREX H 70 SERIES

DEUREX H 84 G

DEUREX H 91 K

NATURAL-SYNTHETIC HYBRID WAXES

APPLICATIONS
· PVC
· Hot melts
· Rubber
· Cable
· Raw materials for emulsions
· Raw materials for micronization

PROPERTIES
· Internal and external lubricants
· Silky gloss after polishing
· Water repellency
· Adjustment of viscosity
· Improved UV resistance
· Improved scratch resistance
· Improved slip

DEUREX H 80 SERIES

SYNTHETIC HYBRID WAXES

APPLICATIONS
· PVC
· Hot melts
· Raw materials for emulsions
· Raw materials for micronization

PROPERTIES
· Adjustment of viscosity in hot melts
· Substitutes for pure Fischer-Tropsch waxes
· Processing aids

DEUREX H 90 SERIES

TAILOR MADE HYBRID WAXES

Hybrid waxes combine properties of various wax types to a new product. If you would like to connect benefits of different waxes, please just contact us and we will produce a tailor-made hybrid wax according to your requirements.

DEUREX H SERIES

WAX	CHEMICAL DESCRIPTION	DROP POINT °C	ACID VALUE mg KOH/g	VISCOSITY mPas 140 °C	PENETRATION dmm	DENSITY g/cm³
DEUREX H 71	Hybrid wax, sugar cane wax and montanic wax, partly saponified	85 - 95	15 - 25	< 100	1 - 2	0.92 - 0.95
DEUREX H 72	Hybrid wax, sugar cane wax and montanic wax	78 - 88	15 - 25	< 10	1 - 2	0.92 - 0.95
DEUREX H 72 EMU	Hybrid wax, sugar cane wax and montanic wax, incl. emulsifier	75 – 83	15 - 25	< 10	< 6	0.92 - 0.95
DEUREX H 73	Hybrid wax, sugar cane wax and carnauba wax	80 - 86	15 - 25	< 20	< 1	0.92 - 0.95
DEUREX H 81	Hybrid wax, sugar cane wax and polyethylene wax	80 - 100	18 - 25	< 30	4 - 8	0.90 - 0.93
DEUREX H 82	Hybrid wax, sugar cane wax and polyethylene wax	90 - 110	10 - 20	< 30	2 - 4	0.90 - 0.93
DEUREX H 83	Hybrid wax, sugar cane wax and polyethylene wax	90 - 110	5 - 10	< 20	5 - 10	0.90 - 0.93
DEUREX H 84	Hybrid wax, sugar cane wax and polyethylene wax	120 - 130	8 - 13	< 20	4 - 8	0.90 - 0.93
DEUREX H 91	Hybrid wax, polyethylene wax and Fischer-Tropsch wax	110 - 120	0	< 20	< 5	0.94 - 0.95
DEUREX H 92	Hybrid wax, polyolefin wax and amide wax	130 - 140	< 5	< 40	< 5	0.97 - 0.99

WAX	MASTERBATCH	PVC	HOT MELTS	RUBBER	CABLE	R. f. EMULSIONS	R. f. MICRONIZATION
DEUREX H 71		**				**	
DEUREX H 72	**	**		**	**	**	
DEUREX H 72 EMU						*	
DEUREX H 73	**	*				**	**
DEUREX H 81		*				**	**
DEUREX H 82		*	**				**
DEUREX H 83		**		**	**	**	*
DEUREX H 84	*	*		*	**		*
DEUREX H 91	*	**	**			**	**
DEUREX H 92		*	*				**

* suitable ** perfectly suitable

DEUREX A 27 P

DEUREX P 36

AMIDE WAXES

APPLICATIONS
- Masterbatch
- PVC
- Hot melts
- Raw materials for micronization

PROPERTIES
- Release agents
- Lubricants
- Good printability
- Defoamer for paper production

DEUREX A SERIES

POLYPROPYLENE WAXES

APPLICATIONS
- Masterbatch
- PVC
- Raw materials for micronization

PROPERTIES
- Good dispersing properties
- Lubricants
- Matting agents

DEUREX P SERIES

FISCHER-TROPSCH WAXES

APPLICATIONS
- PVC
- Hot melts
- Rubber
- Raw materials for emulsions
- Raw materials for micronization

PROPERTIES
- Lubricants
- Release agents
- Processing aids

DEUREX T SERIES

AMIDE WAXES	CHEMICAL DESCRIPTION	DROP POINT °C	ACID VALUE mg KOH/g	VISCOSITY mPas 140 °C	PENETRATION dmm	DENSITY g/cm³
DEUREX A 20	Ethylene-Bis-Stearamide wax	140 - 145	< 10	< 20 (160 °C)	1 - 3	0.98 - 1.00
DEUREX A 26	Erucamide wax	81 - 89	< 1	7 - 12	2 - 5	0.87 - 0.88
DEUREX A 27	Oleamide wax	70 - 79	< 1	6 - 11	2 - 5	0.91 - 0.92
DEUREX A 28	Stearamide wax	101 - 111	< 5	7 - 12	2 - 8	0.90 - 0.91

POLYPROPYLENE WAXES	CHEMICAL DESCRIPTION	DROP POINT °C	ACID VALUE mg KOH/g	VISCOSITY mPas 140 °C	PENETRATION dmm	DENSITY g/cm³
DEUREX P 36	Non polar polypropylene wax	150 - 170	0	130 - 230 (180 °C)	< 1	0.87 - 0.89
DEUREX P 37	Non polar polypropylene wax	158 - 168	0	900 - 1,500 (180 °C)	< 1	0.87 - 0.89
DEUREX P 38	Polypropylene wax	145 - 155	< 5	< 40 (180 °C)	< 3	0.92 - 0.98

FISCHER-TROPSCH WAX	CHEMICAL DESCRIPTION	DROP POINT °C	ACID VALUE mg KOH/g	VISCOSITY mPas 140 °C	PENETRATION dmm	DENSITY g/cm³
DEUREX T 39	Fischer-Tropsch wax	110 - 120	0	< 20	< 2	0.94 - 0.95

AMIDE WAXES	MASTERBATCH	PVC	HOT MELTS	RUBBER	CABLE	R. f. EMULSIONS	R. f. MICRONIZATION
DEUREX A 20	**	**	**				**
DEUREX A 26		*		*			*
DEUREX A 27		**		*			*
DEUREX A 28		**		*			

POLYPROPYLENE WAXES	MASTERBATCH	PVC	HOT MELTS	RUBBER	CABLE	R. f. EMULSIONS	R. f. MICRONIZATION
DEUREX P 36	**	**	*				**
DEUREX P 37	**		*				*
DEUREX P 38							**

FISCHER-TROPSCH WAX	MASTERBATCH	PVC	HOT MELTS	RUBBER	CABLE	R. f. EMULSIONS	R. f. MICRONIZATION
DEUREX T 39	*	**	**	**		**	**

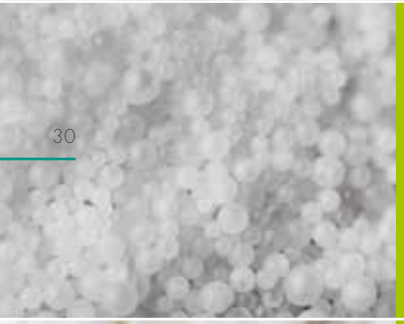
* suitable ** perfectly suitable

Polyethylene waxes with average to high viscosity
DEUREX E 08, E 12, E 13

Special waxes
DEUREX EV 03, V 2

Ziegler waxes as fine granules
DEUREX E 09, E 11

Amide waxes
DEUREX A 20, A 26, A 27, A 28



Thermally degraded polyethylene waxes
DEUREX E 06, E 10, E 18

Polypropylene waxes
DEUREX P 36, P 37, P 38

Polyethylene waxes with extremely high viscosity
DEUREX E 25

Fischer-Tropsch waxes
DEUREX T 39

Oxidized polyethylene waxes
DEUREX EO 40, EO 42, EO 45

Water borne emulsions
DEURESOL E 1035 W, X 5135 W

Raw sugar cane waxes
DEUREX X 50

Synthetic hybrid waxes
DEUREX H 91, H 92

Sugar cane waxes
DEUREX X 51

Wax emulsifier
DEUREX EMU-E, EMU-X, H 72 EMU

Natural hybrid waxes
DEUREX H 71, H 72, H 73, H 72 EMU

DEUREX BIT
The natural bitumen stabilizer
made of sugar cane wax

Natural-synthetic hybrid waxes
DEUREX H 81, H 82, H 83, H 84

DEUREX PURE
The oil and chemical adsorbent.

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TRANSMEDIAL

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