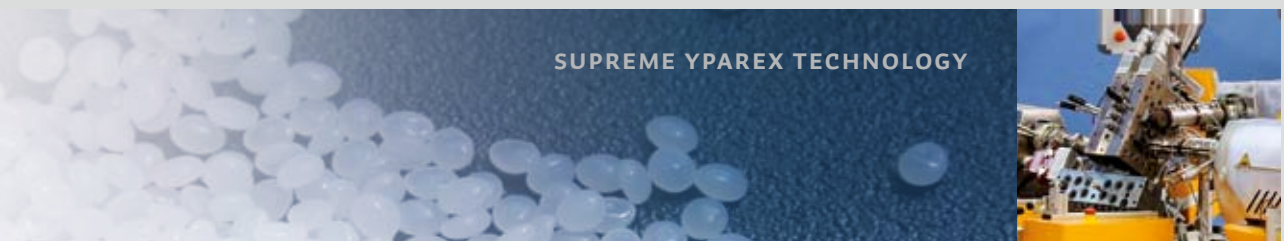
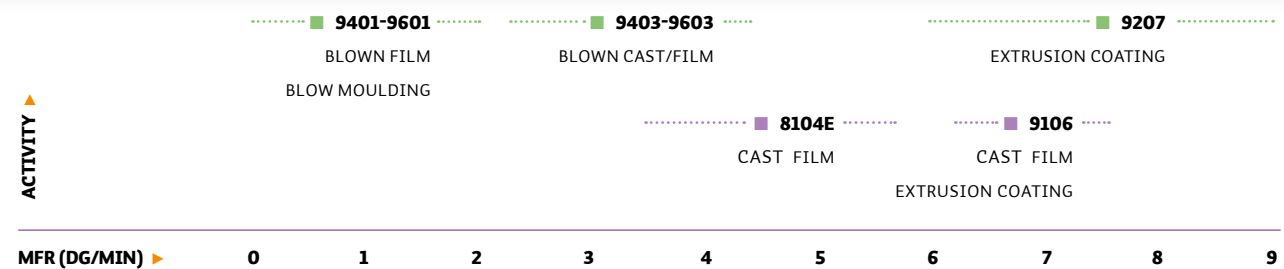


PACKAGING APPLICATIONS

PROPERTIES	UNIT	9401	9601	9403	9603	8104 E	9106	9207	TEST METHOD
BASE POLYMER	-	LLDPE	LLDPE	LLDPE	LLDPE	LLDPE	LLDPE	LDPE	
DENSITY	kg/m ³	926	928	923	928	923	920	926	ISO 1183
MELT FLOW RATE	dg/min	1.0	1.0	3.0	3.0	4.6	7	7.4	ISO 1133 (190 °C and 2.16 kg)
VICAT SOFTENING TEMPERATURE	°C	105	105	100	100	100		93	ISO 306 (50 °C / h.10N)
MELTING TEMPERATURE	°C	125	125	124	125	124	124	105	ISO 11357-1/-3 (10 °C / min)
ENTHALPY OF MELTING	J/g	130	113	128	129	110	131	122	ISO 11357-1/-3
ADHESION AGAINST	-	PE	PE	PE	PE	PE	PE	PE	
	-	Al	Al	Al	Cu/Al	Al	Al	Al	
	-	EVOH	EVOH	EVOH	EVOH	EVOH	EVOH	EVOH	
	-	PA	PA	PA	PA	PA	PA	PA	



SUPREME YPAREX TECHNOLOGY

YPAREX, RESINS WITH REASON



SUMMARY

Yparex® is a family of extrudable adhesive resins with a portfolio tailored for blow moulding, blown film, cast film and extrusion coating, offering:

- ▶ Excellent adhesion between PE and barrier materials
- ▶ Attractive dilution opportunities
- ▶ Good optical and mechanical properties
- ▶ The easy processability of PE
- ▶ Food compliance



CONTACT

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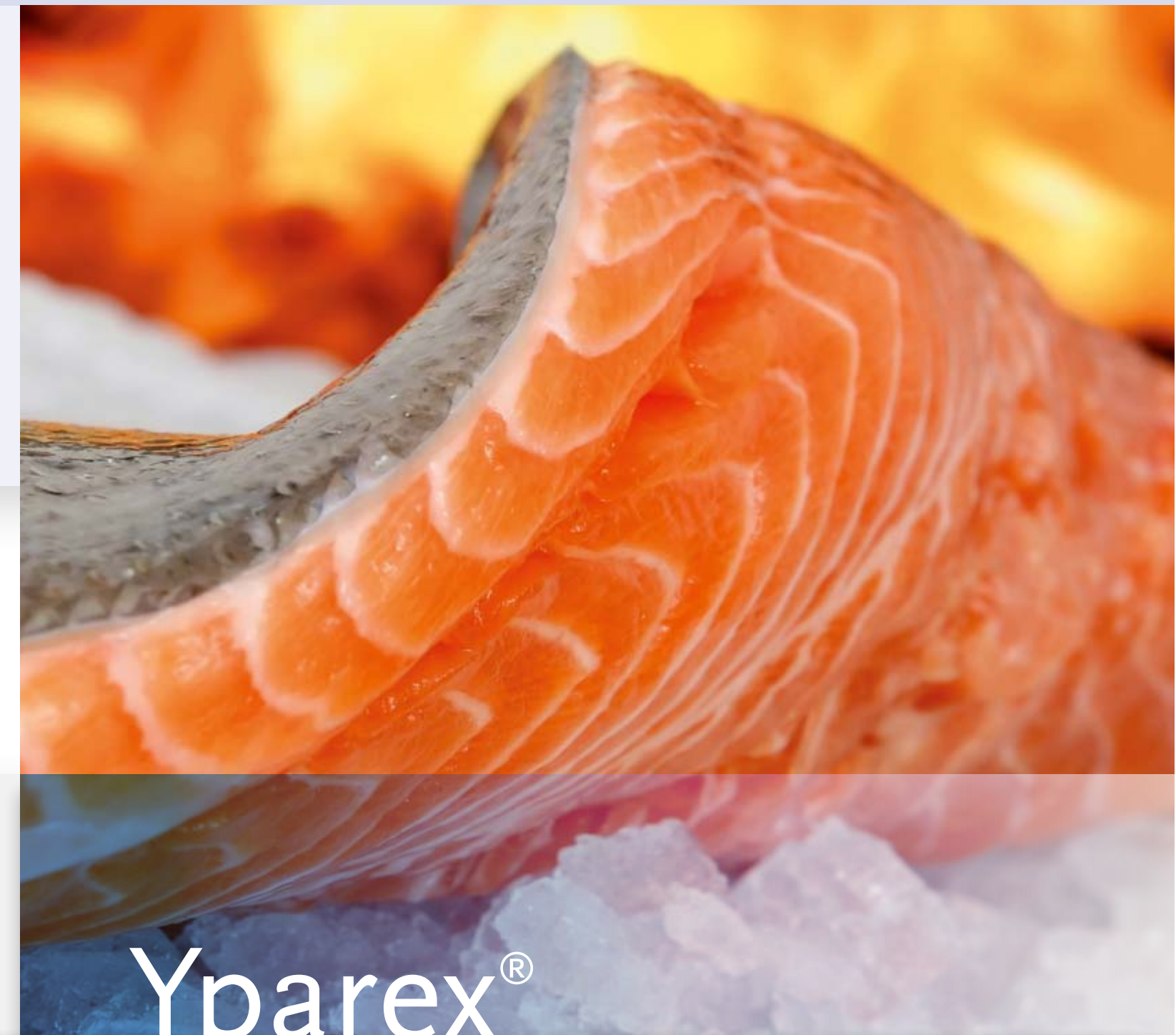
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WORKING TOGETHER

Yparex BV is a subsidiary of RESIN (Products & Technology) B.V., based in Enschede, The Netherlands. RESIN is a specialist in production of thermoplastic compounds with:

- ▶ Improved mechanical properties
- ▶ Increased flame retardant properties
- ▶ Enhanced barrier properties
- ▶ Increased aesthetics via colorants (and special-effects packages)

As custom compounders with a broad experience in toll manufacturing, RESIN can produce a product according to specifications, or work together to develop new or tailor-made formulations. While RESIN has formally only been in operation since May 2006, plastics compounding know-how stretches back more than 25 years.



Yparex®

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RESINS WITH REASON

HIGH TECH PACKAGING

Today's packaging applications demand a number of properties from the materials used. These include:

- ▶ **BARRIER TO FLAVOUR, OXYGEN AND WATER**
- ▶ **MECHANICAL STRENGTH**
- ▶ **TRANSPARENCY AND GLOSS**
- ▶ **SEALABILITY**
- ▶ **PRINTABILITY**
- ▶ **THERMOFORMABILITY**
- ▶ **HIGH TEMPERATURE RESISTANCE**
- ▶ **FOOD CONTACT APPROVAL**
- ▶ **FLEXIBILITY OR RIGIDITY**

Usually these properties cannot be generated by one single material.

Therefore multilayer concepts are widely used. However, polymers used in these

concepts are often incompatible. Yparex® adhesive resins provide the solution.

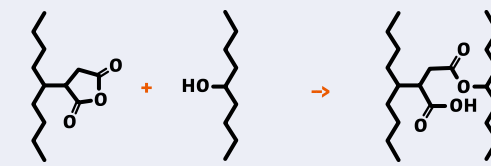
Yparex® is a family of extrudable maleic anhydride modified and functionalised

polyolefin compounds. Yparex® grades show excellent processing characteristics

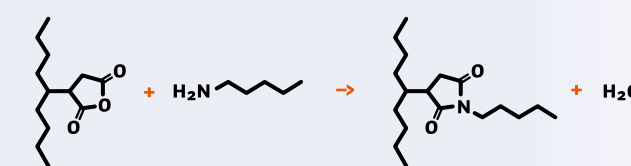
and are tailored for blow moulding, blown film, cast film and extrusion coating.

EXCELLENT ADHESION TOWARDS PE, PA AND EVOH

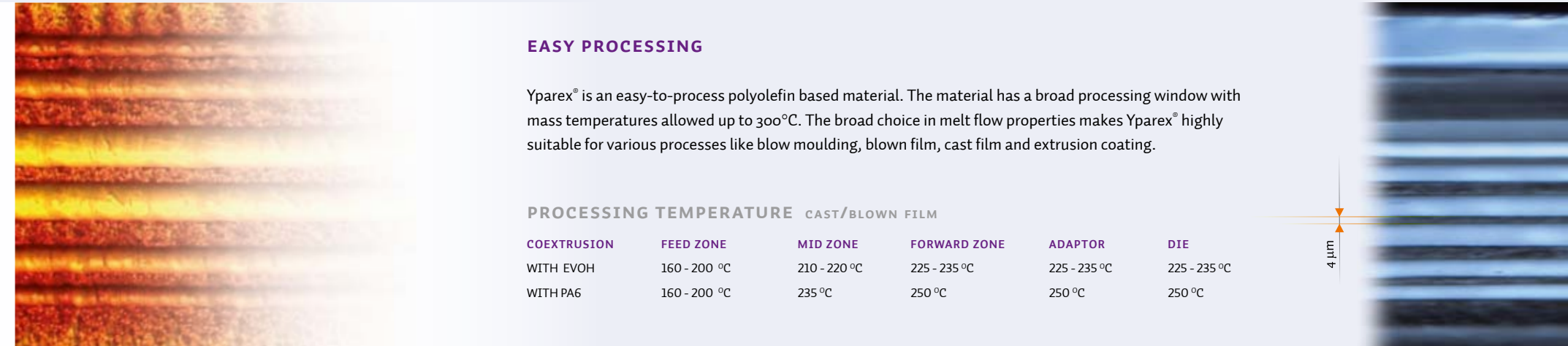
Yparex® provides chemical reaction sites between PE and packaging barrier materials such as polyamide (PA) and EVOH, giving reliable and high quality bond strength. The basic formation of adhesive sites is shown in the following figures.



YPAREX WITH EVOH



YPAREX WITH PA



EXCELLENT OPTICAL PROPERTIES

In many multilayer film applications optical properties such as haze and clarity are extremely important. The excellent quality, low gel content and wide choice in rheological properties of Yparex® ensure that the optical performance of the full packaging concept remains at a high level.

EASY PROCESSING

Yparex® is an easy-to-process polyolefin based material. The material has a broad processing window with mass temperatures allowed up to 300°C. The broad choice in melt flow properties makes Yparex® highly suitable for various processes like blow moulding, blown film, cast film and extrusion coating.

PROCESSING TEMPERATURE CAST/BLOWN FILM

COEXTRUSION	FEED ZONE	MID ZONE	FORWARD ZONE	ADAPTOR	DIE
WITH EVOH	160 - 200 °C	210 - 220 °C	225 - 235 °C	225 - 235 °C	225 - 235 °C
WITH PA6	160 - 200 °C	235 °C	250 °C	250 °C	250 °C

MULTIPLE APPLICATION AREAS

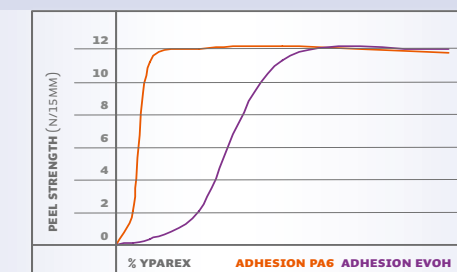
Typical application areas for Yparex® in multilayer concepts are:

- ▶ Flexible packaging (meat, sausage, cheese, fish)
- ▶ Liquid packaging (juice, milk)
- ▶ Medical packaging (intravenous bags, needle packaging)
- ▶ Containers and bottles (IBC, sauces)
- ▶ Agricultural film (fumigation)
- ▶ Protective film (bubble wrap)

COST ATTRACTIVE DILUTION OPPORTUNITIES

The Yparex® product range includes grades with a high level of activity, offering attractive options for cost optimization. In the figure on the right an indication of the dilution potential of Yparex® grade 9403 is shown.

The requirements of the application and the processing variables (e.g. contact time, melt temperature, layer thickness) determine the attainable dilution potential.

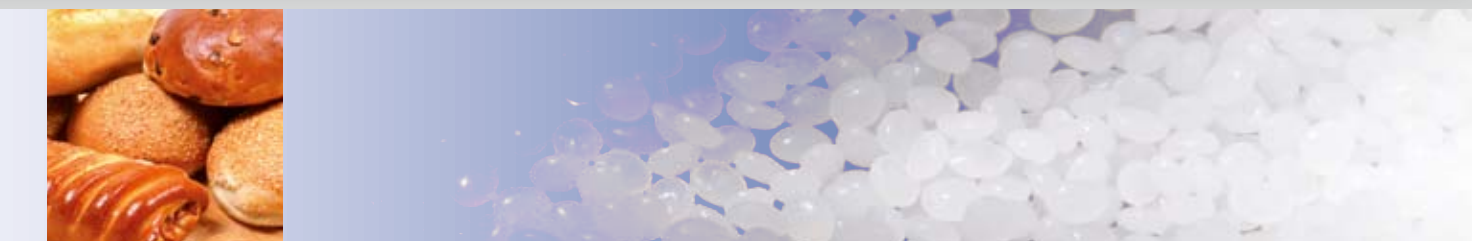
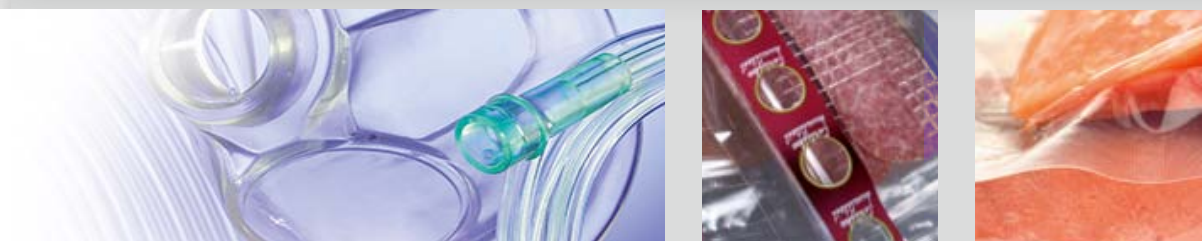


FOOD COMPLIANCE

The composition of Yparex® meets:

- ▶ The relevant requirements laid down in Regulation (EC) No 1935/2004, Commission Regulation (EC) No 2023/2006 and Commission Regulation (EU) No 10/2011
- ▶ The code of Federal Regulations, issued by FDA, paragraph 21 CFR 175.105.

Please contact us for specific requests regarding food compliance and other regulatory affairs.



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