

Product Range

DYNAPOL®

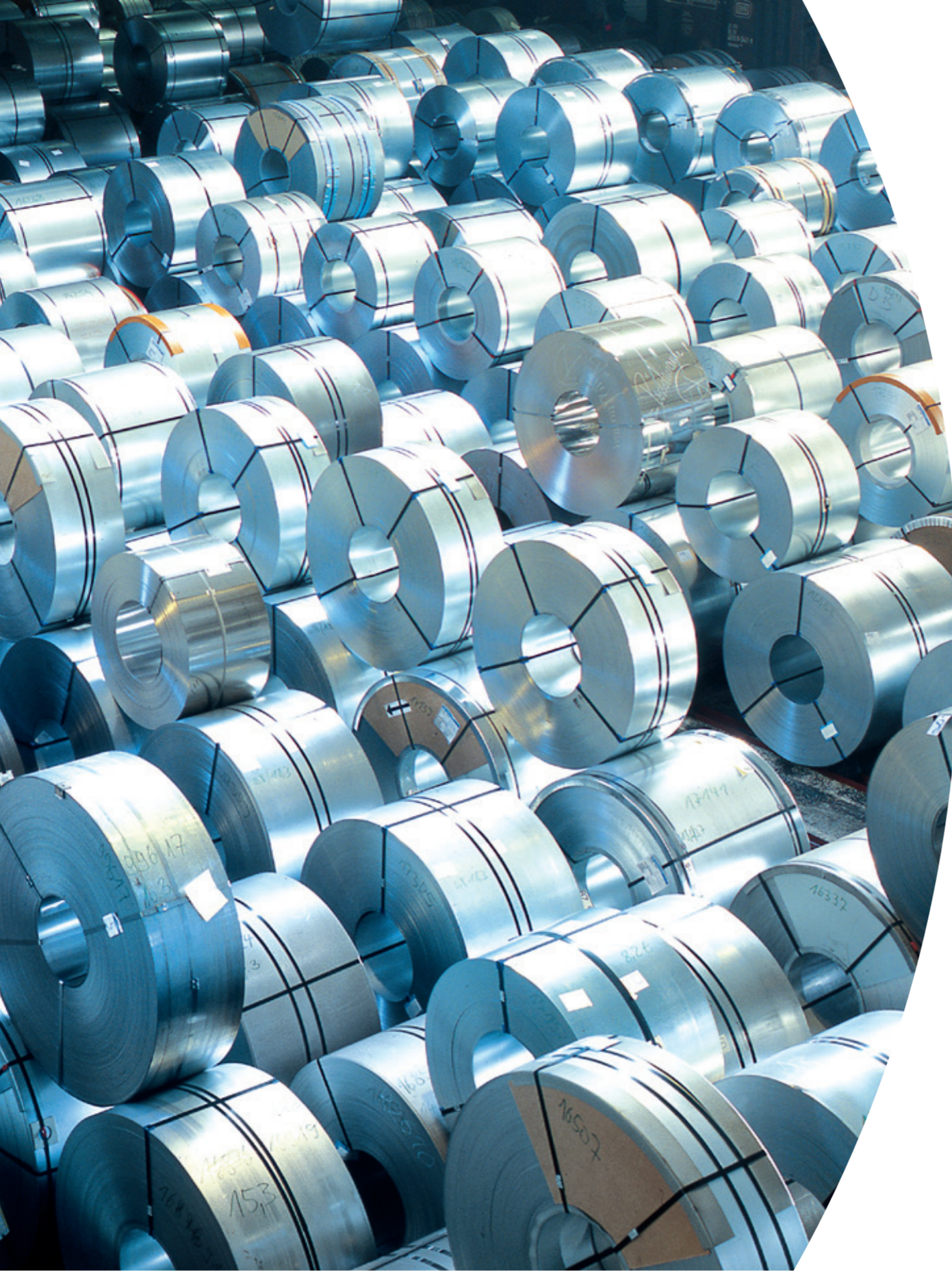
Polyester Resins

VESTICOAT® UB

Blocked Polyester-
polyurethane Systems



DYNAPOL®



More than a good partner. Your DYNAPOL® team.

More service. Better quality.
A wider choice.

If you'd like to know what distinguishes our products from our competitors', the answer is simple: Just that little bit extra – in every particular. To put it more precisely, only the best solutions are our benchmark. So that our achievements in many areas are exceptional.

Service and consulting

We offer a comprehensive service spectrum, ranging from consulting to an array of add-on services such as the development of guiding formulations. In both, business and technical aspects, our services are based on personal partnerships.

Quality

You place outstanding, and highly specific demands on us. We satisfy these to fully meet – and surpass – your expectations. Our products are distinguished by high durability and worldwide consistency. Because, after all, you want to rely on the same level of product quality throughout the world.

Product range

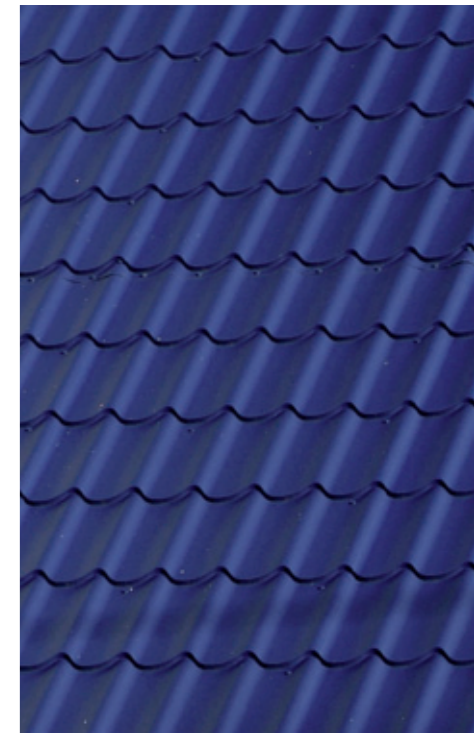
Whichever way you look at our product range, its depth and diversity are unrivalled. Whether for coil coating (top coats, backing coats, or primers) or metal packaging (primers, pigmented coatings, and clear coats), we cover the full spectrum of applications. You can choose from medium- or high-molecular weight polyesters or our VESTICOAT® UB range, comprising polyesters with crosslinkers, depending on your profile of requirements.

Innovation

We wouldn't stay at the top if we weren't always trying hard to improve. That's why we maintain a research and development department with a team working exclusively on polyester development. Close proximity to our customers often provides the impetus for making improvements, thinking ahead, and spotting trends early.

Global market leader

Why do we, as the global market leader, set such great store by customer orientation? Because, in addition to the factors already mentioned, we have a clear focus on our particular branch of industry. For our customers this translates into specialist expertise and absolute consistency of performance.



DYNAPOL®

High-molecular weight copolyesters.
 Medium-molecular weight copolyesters.
 Low-molecular weight copolyesters.

Saturated polyester resins for stoving enamels

By developing saturated polyesters, Evonik has played an important role in influencing and extending the possible applications of precoated metals.

These coating raw materials are suitable for the production of coatings with very good adhesion offering an optimum of flexibility and formability together with an excellent surface hardness. For this reason, lacquers based on DYNAPOL® have proved particularly suitable for stampable and deep drawable coatings.

A wide range of products is available for various requirements of the paint and coating industry. DYNAPOL® polyester resins are mainly used for stoving enamels in combination with amino resins. Special

properties, such as chemical resistance, weathering resistance and flexibility, can be improved by using blocked polyisocyanate resins. Stoving enamels based on high-molecular weight copolyesters show particularly good mechanical properties.

Medium and low-molecular weight polyester resins containing more hydroxyl groups are suitable for the manufacture of stoving enamels with good reactivity and high solids content. In combination with high-molecular weight copolyesters the quality of films can be optimized.

Depending on the technical requirements and the method of processing, DYNAPOL® grades can also be used to manufacture industrial coatings.

PUR systems for stoving enamels

VESTICOAT® UB

Blocked one pack polyester-polyurethane systems.

VESTICOAT® UB systems are made from saturated, hydroxylated polyester resins and blocked, cycloaliphatic polyisocyanate crosslinkers.

Evonik pioneered the development of PUR chemistry for coatings and now offers a range of high quality monomers, polyisocyanates, prepolymers and PUR systems based on VESTANAT®.

VESTICOAT® UB systems are suitable for the manufacture of industrial coatings, particularly coil coatings with high formability, good surface hardness and outstanding weatherability.

Because of these properties special VESTICOAT® UB types are also used to formulate high quality, storage stable, 1-pack PUR spray coatings.

The performance profile of VESTICOAT® UB-stoving enamels can be adjusted to the various enduses by suitable paint formulations. Particularly the modification with special Polyamide 12 fine powders (VESTOSINT®) results in special surface textures along with outstanding abrasion resistance and reduced tendency for dirt pick-up.

Development of guiding formulations.

Technical service.

DYNAPOL® LH

Solutions		Characteristic values ¹⁾²⁾							Fields of application ³⁾										
Solvent blend ³⁾	Supply form (% by weight)	Glass transition temperature ^{**} (°C/°F) ⁴⁾	Molecular mass	Structure ⁵⁾	OH value (mg KOH/g)	Acid value (mg KOH/g)	Compatibility with DYNAPOL® L ⁷⁾	Exterior architecture	Interior architecture	Appliance finishing	Traffic uses	Primer for hot dip galv. steel	Primer for aluminium	Back coatings	Metal decorating enamels	Tube- and aerosol can coatings	Lacquers for aluminium foils	Interior can coatings	
Grades ¹¹⁾									COIL COATING					CAN COATING					
LH 820*	-16	55	60/140	5000	L	20	2	+			○	●							
LH 815	-05	50	55/122	7000	L	20	4	+				○	○		●	●			●
LH 833	-03	50	55/120	4000	B	35	2	+		○		●	●		○				
LH 818*	-05	50	30/86	6000	L	20	1	+		●	●	○	●		●				
LH 826	-05A	55	30/86	6000	L	20	2	+		●	○	○	○		●				
LH 773	-01	55	30/86	4000	B	35	2	+							●	●			
LH 538	-02	65	20/68	3000	B	45	2	+	●		●								
LH 898	-14	65	20/68	3000	L	35	2	+	●	●		○							
LH 830	-02	60	20/68	4000	B	35	2	+	●	●	●	●			●	●			
LH 775	-52	55	20/68	4000	B	40	3	+							●	○			
LH 318	-02	55	20/68	5000	L	20	2	+							○				●
LH 823	-01	60	20/68	6000	B	20	10	+							○	●			
LH 822	-01	55	15/59	6000	L	20	2	+		●	○	●							
LH 832	-02	60	15/59	4000	B	35	2	+	●	●	●	●							
LH 724	-24	70	10/50	2000	B	70	5	+	●	●	○	○							
LH 838	-02	65	10/50	3000	L	35	2	+	●	●		○			○				
LH 831	-24	70	10/50	2000	L	50	5	+	●	●		○		○	○				
LH 834	-02	65	10/50	3500	L	30	8	(+)	●	●	○								
LH 828	-24	70	10/50	2000	L	50	10	-	○	●		○			●				
LH 727	-02	65	5/41	2000	B	100	10	-							●				
LH 744	-23	65	0/32	4000	B	60	2	+	●										
LH 874	-26	75	-10/14	2000	L	60	7	+		●	○			○					

* further solvent blends available ** in order of decreasing glass transition temperature

DYNAPOL® LS

LS 415	-10	40	12/54	25000	L	5	3	+		○	○				●				
LS 436	-12	60	-5/23	7000	L	15	2	+	●	●									○
LS 4131	-10	40	-5/23	25000	L	5	3	+		●					○	●			○
LS 615		100	-50/-58	4000	L	25	2	(+)								●			●

DYNAPOL® L

Solutions		Characteristic values ¹⁾²⁾							Solubility ⁶⁾				Fields of application ⁸⁾												
Solvent blend ³⁾	Supply form (% by weight)	Glass transition temperature ^{**} (°C/°F) ⁴⁾	Molecular mass	Viscosity number (cm ³ /g)	Structure ⁵⁾	OH value (mg KOH/g)	Acid value (mg KOH/g)	Solvent Naphtha 150	Solvent naphtha 200	Methoxypropyl acetate	Dibasic ester mixture (DBE)	Primer for hot dip galv. steel	Primer for aluminium	Hot laminating adhesives	Appliance finishing	Elastification resin	Metal decorating enamels	Tube- and aerosol can coatings	Interior can coatings	Adhesion promoters	Foil primers, printing inks	Heat sealing lacquers			
Grades ¹¹⁾													COIL COATING					CAN COATING							
L 912		105/221	15000	55	L	5	3	+	+	-	-						○		●						
L 952		70/158	18000	56	L	6	2	-	+	+	+	○		●			○		●						
L 205		67/153	15000	55	L	6	2	-	+	+	+	●	○		○		○		○						
L 206		67/153	20000	63	L	5	2	-	+	+	+				○							●	○		
L 208		65/149	20000	70	B	6	6	-	+	+	+	●		●								○			
L 210		63/145	20000	63	L	5	2	-	+	+	+			●								●	○		
L 411		47/117	16000	61	L	5	2	-	+	+	+	●	●	●	○	●	●		●	○	●	●	●		
L 490		40/104	15000	60	B	9	3	-	+	+	+				○	●	●	●	○						
L 651		40/104	15000	64	L	5	2	+	+	+	+						○		●	●			○		
L 658		40/104	20000	65	B	8	4	-	+	+	+						○		●						
L 850		40/104	15000	62	L	4	2	+	+	+	+				●	○	●								

** in order of decreasing glass transition temperature

DYNAPOL® P/S

P 1500	25/77		88	partially crystalline polyester for thermoplastic application
S 1510	-23/-9		97	partially crystalline polyester for thermoplastic application

CATALYSTS

DYNAPOL® Catalyst 1203	50 % (b.w.) in xylene	non-ionic blocked sulfonic acid catalyst for aminoplast crosslinking
VESTICOAT® Catalyst C 31	50 % (b.w.) in xylene	tin (IV) alkoxyate catalyst for polyisocyanate crosslinking

¹⁾ measuring methods see page 9

²⁾ typical values

³⁾ solvent blend codes see page 9

⁴⁾ measured on solvent free polyester resin; guide parameter for the product list (values decreasingly listed)

⁵⁾ L = linear, B = branched

⁶⁾ 30 % solutions: + = soluble, - = insoluble, at best suitable as thinner;

(ketones always +, glycolethers as thinners only; aliphatic hydrocarbons and alcohols -)

⁷⁾ (except for L 912): + = compatible, (+) = compatibility very limited, - = incompatible

⁸⁾ ● = important reference, ○ = less important use

⁹⁾ polyol-hydroxyl value: class I: 30-50; class II: 50-100; class III: > 100 (mg KOH/g)

¹⁰⁾ minimum stoving temperature (°C/°F): A: 150 / 302 resp. 210 / 410 PMT;

B: 160 / 320 resp. 220 / 428 PMT;

C: 180 / 356 resp. 230 / 446 PMT (peak metal temperature)

¹¹⁾ further DYNAPOL® / VESTICOAT® grades available on request

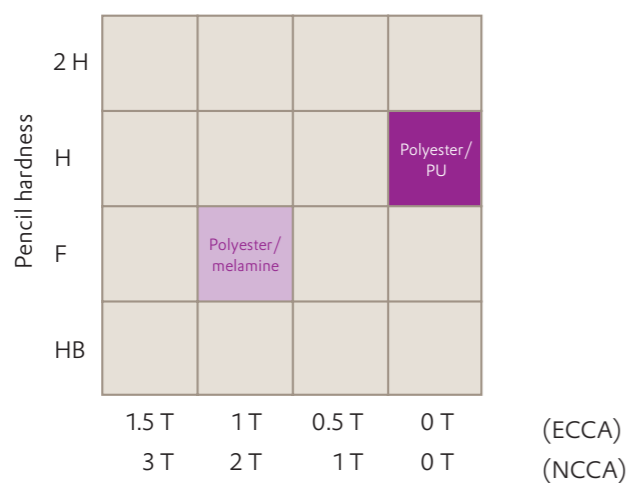
Consistent product properties worldwide.

VESTICOAT® UB

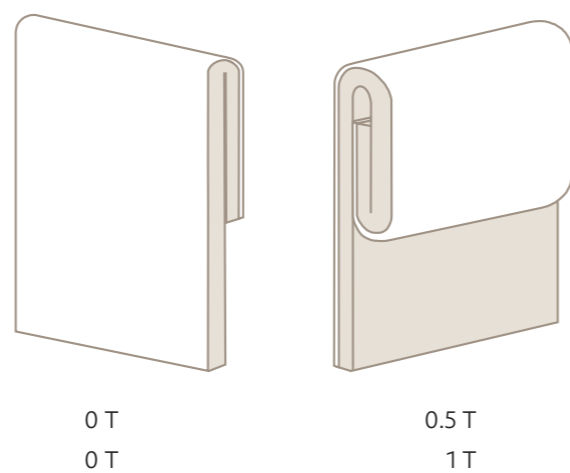
Solutions		Characteristic values ¹⁾²⁾				Fields of application ³⁾											
Solvent blend ³⁾	Supply form (% by weight)	Approx. glass transition temperature ^{**} (°C/°F) ⁴⁾ of cured paint film	Class ⁵⁾	Reactivity ⁷⁾	Exterior architecture	Interior architecture	Appliance finishing	Traffic uses	Primer for hot dip galv. steel	Primer for aluminium	Industrial coatings	Metal decorating enamels	Tube- and aerosol can coatings	Interior can coatings	Adhesion promoters	Foil primers, printing inks	Heat sealing lacquers
					COIL COATING						CAN COATING						
UB 790	-03	60	35/95	I	B	●	●	○	●	●	●	○					
UB 791	-03	60	35/95	I	C	●	●	○	○	●	●						
UB 1173	-03	60	35/95	II	C	●			●								
UB 1052	-03	60	35/95	II	C	●			●								
UB 1174	-27	70	35/95	II	B	●			○			○					
UB 877	-01	60	40/104	I	C			●	●			○					
UB 41	-05	54	40/104	I	B		○	○		○		●					
UB 1256	-06	60	50/122	III	C	●		○	●								
UB 909	-06	60	50/122	III	A	●		○			●						

** in order of decreasing glass transition temperature

Balance of hardness and flexibility polyester/PU vs. polyester/melamine



Flexibility in ECCA / NCCA units (crack free on T-bend)



T-bend test

Continual innovation and development.

Solvent blend code

-01	Solvent Naphtha 150	-14	Solvent Naphtha 150 / xylene
-02	Solvent Naphtha 150 / butylglycol	-16	Solvent Naphtha 150 / MPA / methoxypropanol
-03	Solvent Naphtha 150 / DBE	-23	Solvent Naphtha 100
-05/05A	Solvent Naphtha 150 / Solvent Naphtha 200	-24	Solvent Naphtha 100 / butylglycol
-06	Solvent Naphtha 150 / methoxypropylacetate (MPA)	-26	Solvent Naphtha 100 / methoxypropanol
-10	Solvent Naphtha 150 / DBE / Solvent Naphtha 200	-27	Solvent Naphtha 100 / methoxypropylacetate (MPA)
-12	Solvent Naphtha 150 / DBE	-52	methoxypropanol / methylpropyleneglycol

Methods of determining characteristic values

Glass transition temperature

Determination by DSC method (differential scanning calorimetry)

Molecular mass

Values calculated based on contents of hydroxyl- and carboxyl endgroups

Viscosity number

DIN 53 728. The procedure is to dissolve 0.5 g of the substance in 100 ml of solvent, consisting of 50 parts by weight of phenol and 50 p.b.w. of 1,2-dichlorobenzene, and to measure the efflux time of this solution

in an Ubbelohde capillary viscometer at a temperature of 25 °C.

The viscosity number is calculated with the following formula:

$$VZ = 100 \frac{t_1 - t_2}{t_2} \text{ (cm}^3\text{/g)}$$

t_1 = efflux time of the solution

t_2 = efflux time of the solvent

OH value (hydroxyl value)

On the lines of DIN 53 240-2. Approx. 3 g of polyester are dissolved in dichloromethane. The OH groups contained in the solution are esterified at room

temperature with acetic anhydride, 4,4-dimethyl amino-pyridine being used as a catalyst. Following the hydrolysis of the anhydride, the titration is made using 0.5 N methanolic KOH solution.

Acid value

DIN EN ISO 2114. Approx. 4 g of polyester are dissolved in 50 ml of dichloromethane or tetrahydrofuran.

A titration is made with 0.1 N methanolic or ethanolic KOH with phenolphthalein as indicator.

¹⁾ measuring method

²⁾ typical values

³⁾ solvent blend codes

⁴⁾ measured on solvent free polyester resin; guide parameter for the product list (values decreasingly listed)

⁵⁾ L = linear, B = branched

⁶⁾ 30 % solutions: + = soluble, - = insoluble, at best suitable as thinner;

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C: 180 / 356 resp. 230 / 446 PMT

(peak metal temperature)

¹¹⁾ further DYNAPOL® / VESTICOAT® grades available on request



More service. Better quality. A wider choice. Specialist for precoated metal.

DYNAPOL® / VESTICOAT® UB for ...

... coil coating

Fields of application

- Exterior and interior architecture (roofings, claddings, panels, venetian blinds, ceilings, lighting fixtures)
- Appliance finishing (domestic appliances, steel furniture)
- Transportation uses (automotive construction, trailer- and mobile home claddings, licence plates)
- Primer for galvanized steel or aluminium
- Hot laminating adhesives for films

Properties

- Very good adhesion to aluminium, steel and galvanized steel
- Excellent flexibility and formability
- Depending on the grade, good to excellent weathering resistance
- Good processability (reactivity, solids content, overbake resistance)
- Wide range of grades with special properties for different applications

... can coating

Fields of application

- Decorative stamping enamels for cans, caps and closures
- Decorative enamels for tubes and aerosol cans
- Clear overprint varnishes
- Interior protection enamels for cans
- Adhesion promoter for caps and closures
- Foil lacquers, heat-seal lacquers, printing inks

Properties

- Excellent adhesion to metals, even after extreme deformation and exposure to heat (sterilization)
- Completely tasteless / no smell
- Good processability (solids content, mild solvents, reactivity, resistance to yellowing even if overbaked)
- Depending on the grade, also suitable for contact with food

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Evonik. Power to create.