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## Non-blushing, low viscous, high resistance to organic acids and fuels

### Hardener HY 2969 (aromatic polyamine hardener)

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in combination with Araldite GY 250, GY 260, GY 281, PY 302-2, PY 304  
cure speeded with:  
- salicylic acid  
- hardener HY 837  
- hardener HY 850

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### Applications

- coatings for tanks holding organic acids, fuels and other dilute chemicals. Perfect films even under the most adverse conditions
- coatings for sewer transport and treatment
- flooring in food processing plants where high resistance to organic acids is a priority (dark colours to hide yellowing)

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### Properties

- long potlife
- no exudation, good surface aspect
- high hardness, good flexibility
- adequate adhesion
- very good resistance to organic acids and to solvents
- will yellow under light and discolour when exposed to chemicals
- effect of speeding cure: with:
  - salicylic acids ⇒ only shorter potlife
  - HY 837 ⇒ improved cure speed, adhesion and chemical resistance
  - HY 850 ⇒ faster cure

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### Processing

Short potlife when cure is speeded makes the use of heatable two-component spray equipment advisable.

Suppliers are:

- Gray Company Inc., Minneapolis, MN, USA (represented in practically all European countries)
- Kent-Moore International AG (represented in Baar/Zug, Switzerland)
- Secmer, Chemin du Sablon, F-38 La Tronche, France
- Binks International, Chaussée de Bruxelles 684, B-1410 Waterloo, Belgium
- Reinhardt Technik, D-58566 Kierspe 1, Germany

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## Solvent-free coatings

Formulation No.	1	2	3	4
Araldite GY 250	100	-	-	-
Araldite GY 260	-	100	-	-
Araldite GY 281	-	-	100	-
Araldite PY 304	-	-	-	100
Hardener HY 2969	60	60	66	66
Viscosity at 25 °C (ISO 9371B)	3200	3200	1700	1600
Gel time (BS 5332)	150	170	150	135
Dust-dry time (Landolt) <sup>1)</sup> at 20 °C, 65 % RH	7	9	11	8
Full-cure time (Landolt) <sup>1)</sup> at 20 °C, 65 % RH	approx. 11	approx. 13	approx. 12	approx. 13
Flow <sup>2)</sup> (horizontal) at 5 °C, 45 % RH at 20 °C, 65 % RH	good good	good good	good good	good good
Transparency / gloss <sup>1)</sup> after curing: 1 day, 5 °C, 45 % RH after curing: 1 day, 20 °C, 65 % RH after curing: 1 day, 20 °C, 100 % RH	clear clear clear	clear clear clear	clear clear clear	clear clear clear
Surface aspect <sup>1)</sup> after curing: 1 day, 5 °C, 45 % RH after curing: 1 day, 20 °C, 65 % RH after curing: 1 day, 20 °C, 100 % RH	smooth, smooth, smooth,	pitting, glossy pitting, glossy pitting, glossy	pitting, glossy pitting, glossy pitting, glossy	pitting, glossy pitting, glossy pitting, glossy
Exudation <sup>1)</sup> after curing: 1 day, 5 °C, 45 % RH after curing: 1 day, 20 °C, 65 % RH after curing: 1 day, 20 °C, 100 % RH	none none none	none none none	none none none	none none none
Persoz hardness <sup>1)</sup> (ISO 1552) after curing: 1 day, 5 °C, 45 % RH after curing: 7 days, 5 °C, 45 % RH after curing: 30 days, 5 °C, 45 % RH after curing: 1 day, 20 °C, 65 % RH after curing: 7 days, 20 °C, 65 % RH after curing: 30 days, 20 °C, 65 % RH	10 220 295 270 335 345	too soft 140 250 250 330 340	too soft 120 230 240 330 345	too soft 220 290 240 315 315
Distensibility (Erichsen) <sup>2)</sup> (ISO 1520) after curing: 2 months, 20 °C, 65 % RH after curing: 2 months, 60 °C, 65 % RH	6 - 8 4 - 6	5 - 8 4 - 7	4 - 6 3 - 6	5 - 7 4 - 6
Impact strength <sup>2)</sup> (direct) (ISO 6272) after curing: 2 months, 20 °C, 65 % RH after curing: 2 months, 60 °C, 65 % RH	70 80	60 80	70 80	50 50
Mandrel bend test <sup>2)</sup> ∅ = 15 mm (ISO 1519) after curing: 2 months, 20 °C, 65 % RH after curing: 2 months, 65 °C, 65 % RH	180 70	60 180	50 70	50 180
Boiling water test <sup>3)</sup> (6 h, 96 °C) after curing: 10 days, 20 °C, 65 % RH	no change	no change	blisters	full of blisters
Adhesion <sup>3)</sup> after curing: 10 days, 20 °C, 65 % RH	moderate	moderate	moderate	poor

<sup>1)</sup> Film thickness 200 µm on glass / <sup>2)</sup> Film thickness 200 µm on steel plate (pickled, degreased) / <sup>3)</sup> Sandblasted steel plate

## Chemical resistance

Formulation No.	1												2											
	½	1	2	4	6	8	10	12	½	1	2	4	6	8	10	12								
Water, deionized	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+								
Hydrochloric acid 20 %	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+								
Hydrochloric acid 36 %	+	+	+	A	A	D			+	+	+	A	A	D										
Sulfuric acid 50 %	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+								
Acetic acid 5 %	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+								
Acetic acid 10 %	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+								
Ammonia 10 %	A	A	D						A	A	D													
Ethanol 50 %	+	+	A	A	D				+	+	A	A	D											
Ethanol 96 %	A	A	D						A	A	D													
Xylene	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+								
Formulation No.	3												4											
Test in months	½	1	2	4	6	8	10	12	½	1	2	4	6	8	10	12								
Water, deionized	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+								
Hydrochloric acid 20 %	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+								
Hydrochloric acid 36 %	A	A	A	D					+	+	+	D												
Sulfuric acid 50 %	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+								
Acetic acid 5 %	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+								
Acetic acid 10 %	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+								
Ammonia 10 %	A	A	D						+	+	A	D												
Ethanol 50 %	+	A	A	A	D				+	+	+	+	+	+	+	+								
Ethanol 96 %	A	A	D						+	+	+	+	+	+	+	+								
Xylene	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+								

+ = resistant A = attacked D = destroyed / Substrate: Steel plate, sandblasted / Immersion temperature: 20 - 22 °C  
Film thickness: approx. 400 µm / Curing: 7 days, 20 °C, 65 % RH

## Pigmented solvent-free coating

Formulation No		5
Araldite GY 260	[p.b.w.1]	100
Ferric Oxide Red 130 F (Bayer, Leverkusen, Germany)		38
Barium Sulfate EWO 423 (Alberti, Bad Lauterberg/ Harz,		100
Borchigol VL 73 S (Gebr. Borchers, Düsseldorf, Germany)		2
Hardener HY 2969		60
Gel time (BS 5332)	[min]	160
Dust-drv time (Landolt) <sup>1)</sup> at 20 °C, 65 % RH	[h]	6
Full-cure time (Landolt) <sup>1)</sup> at 20 °C, 65 % RH	[h]	approx. 14
Flow <sup>2)</sup> (horizontal) at 5 °C, 45 % RH at 20 °C, 65 % RH at 20 °C, 100 % RH		good good good
Transparency / gloss <sup>1)</sup> after curing: 1 day, 5 °C, 45 % RH after curing: 1 day, 20 °C, 65 % RH after curing: 1 day, 20 °C, 100 % RH		clear clear clear
Surface aspect <sup>1)</sup> after curing: 1 day, 5 °C, 45 % RH after curing: 1 day, 20 °C, 65 % RH after curing: 1 day, 20 °C, 100 % RH		smooth smooth smooth
Exudation <sup>1)</sup> after curing: 1 day, 5 °C, 45 % RH after curing: 1 day, 20 °C, 65 % RH after curing: 1 day, 20 °C, 100 % RH		none none none
Persoz hardness <sup>1)</sup> (ISO 1552) after curing: 1 day, 5 °C, 45 % RH after curing: 2 days, 5 °C, 45 % RH after curing: 3 days, 5 °C, 45 % RH after curing: 7 days, 5 °C, 45 % RH after curing: 30 days, 5 °C, 45 % RH after curing: 1 day, 20 °C, 65 % RH after curing: 3 days, 20 °C, 65 % RH after curing: 7 days, 20 °C, 65 % RH	[si]	13 95 170 235 285 245 305 305
Distensibility (Erichsen) <sup>2)</sup> (ISO 1520) after curing: 2 months, 20 °C, 65 % RH after curing: 2 months, 60 °C, 65 % RH	[mm]	0.5 - 1 0.5 - 1
Impact strength <sup>2)</sup> (direct) (ISO 6272) after curing: 2 months, 20 °C, 65 % RH after curing: 2 months, 60 °C, 65 % RH	[cm ka]	40 - 60 40
Mandrel bend test <sup>2)</sup> Ø = 15 mm (ISO 1519) after curing: 2 months, 20 °C, 65 % RH after curing: 2 months, 60 °C, 65 % RH	[°]	slight slight

<sup>1)</sup> Film thickness approx. 200 µm on glass / <sup>2)</sup> Film thickness approx. 200 µm on steel plate (pickled, degreased)

### Chemical resistance

Formulation No	5											
Test in months	1	2	3	4	5	6	7	8	9	10	11	12
Water, deionized	+	+	+	+	+	+	+	+	+	+	+	+
Sulfuric acid 10 %	+	+	+	+	+	+	+	+	+	+	+	+
Sulfuric acid 30 %	+	+	+	+	+	+	+	+	+	A	A	D
Sulfuric acid 50 %	+	+	+	+	+	+	+	+	+	+	+	+
Sulfuric acid 70 %	+	+	+	+	+	+	+	+	+	+	+	+
Hydrochloric acid 10 %	A	D										
Hydrochloric acid 20 %	A	D										
Hydrochloric acid 36 %	A	D										
Nitric acid 10 %	A	D										
Phosphoric acid 10 %	+	+	+	+	+	+	+	+	+	+	+	+
Phosphoric acid 43 %	+	+	A	A	A	A	A	D				
Acetic acid 10 %	+	+	+	+	+	A	A	A	A	A	A	D
Acetic acid 50 %	+	A	D									
Lactic acid 10 %	+	+	+	+	+	+	+	+	+	+	+	+
Tall-oil fatty acid	+	+	+	+	+	+	+	+	+	+	+	+
Ammonia 10 %	+	+	+	A	A	D						
Ammonia 25 %	+	A	D									
Sodium hydroxide 10 %	+	+	+	+	+	+	+	+	+	+	+	+
Sodium hydroxide 30 %	+	+	+	+	+	+	+	+	+	+	+	+
Javelle water (NaOCl) 14 %	+	+	+	+	+	A	D					
Acetone	D											
Methanol	D											
Ethanol 50 %	+	+	+	+	+	+	+	+	+	+	+	+
Ethanol 96 %	+	+	+	+	+	+	+	+	+	+	+	+
Butanol	+	+	+	+	+	+	+	+	+	+	+	+
Benzene	+	+	+	+	+	+	+	+	+	+	+	+
Xylene	+	+	+	+	+	+	+	+	+	+	+	+
Premium gasoline, 98 octane	+	+	+	+	+	+	+	+	+	+	+	+

+ = resistant A = attacked D = destroyed / Substrate: Steel plate, sandblasted / Immersion temperature: 20 - 22 °C  
Film thickness: 300 - 400 µm / Curing: 10 days, 20 °C, 65 % RH

## Influence of salicylic acid and fast hardeners

Formulation No		6	7	8	9	10	11
Araldite GY 250 Hardener HY 2969	[o.b.w.l]	100 60	100 60	100 60	100 60	1000 24	100 20
Salicylic acid		-	1	2	3	-	-
Hardener HY 837		-	-	-	-	21	-
Hardener HY 850		-	-	-	-	-	40
Viscosity at 25 °C (ISO 9371B)	[mPa s]	3200	3400	3600	3900	8000	7000
Gel time (BS 5332)	[min]	150	43	24	18	30	45
Dust-drv time (Landolt) <sup>1)</sup> at 20 °C, 65 % RH	[h]	7	6	4	4	4	4
Full-cure time (Landolt) <sup>1)</sup> at 20 °C, 65 % RH	[h]	2	approx. 8	approx. 7	approx. 6	approx. 8	approx. 7
Flow <sup>2)</sup> (horizontal) at 20 °C, 65 % RH		good	moderate	moderate	moderate	good	good
Transparency / gloss <sup>1)</sup> after curing: 1 day, 20 °C, 65 % RH		clear	clear	clear	clear	clear	clear
Surface aspect <sup>1)</sup> after curing: 1 day, 20 °C, 65 % RH		smooth	pitting	pitting	pitting	smooth	smooth
Exudation <sup>1)</sup> after curing: 1 day, 20 °C, 65 % RH		none	none	none	none	none	none
Persoz hardness <sup>1)</sup> (ISO 1552) after curing: 1 day, 20 °C, 65 % RH after curing: 7 days, 20 °C, 65 % RH	[s]	270 335	260 290	270 315	270 290	215 315	235 330
Distensibility (Erichsen) <sup>2)</sup> (ISO 1520) after curing: 2 months, 20 °C, 65 % RH after curing: 2 months, 60 °C, 65 % RH	[mm]	6 - 8 4 - 6	6 - 8 3 - 5	5 - 7 3 - 5	5 - 7 4 - 6	3 - 5 2 - 4	4 - 6 2 - 4
Impact strength <sup>2)</sup> (direct) (ISO 6272) after curing: 2 months, 20 °C, 65 % RH after curing: 2 months, 60 °C, 65 % RH	[cm kcal]	70 80	70 70	70 70	70 70	50 80	50 60
Mandrel bend test <sup>2)</sup> Ø = 15 mm (ISO 1519) after curing: 2 months, 20 °C, 65 % RH after curing: 2 months, 60 °C, 65 % RH	[°]	180 70	180 120	150 180	180 150	150 180	160 180
Boiling water test <sup>3)</sup> (6 h, 96 °C) after curing: 10 days, 20 °C, 65 % RH		no change	no change	no change	no change	no change	no change
Adhesion <sup>3)</sup> after curing: 10 days, 20 °C, 65 % RH		moderate	moderate	moderate	moderate		satisfactor

<sup>1)</sup> Film thickness approx. 200 µm on glass

<sup>2)</sup> Film thickness approx. 200 µm on steel plate (pickled, degreased)

<sup>3)</sup> Sandblasted steel plate

## Chemical resistance

Formulation No	10										11							
	GY 250 HY 2969/HY 837										GY 250 HY 2969/HY 850							
Test in months	½	1	2	3	4	6	8	10	12	½	1	2	3	4	6	8	10	12
Water, deionized	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Sulfuric acid 50 %	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Hydrochloric acid 20 %	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Hydrochloric acid 36 %	+	+	+	+	+	A	A	A	A	+	+	+	A	A	A	A	A	D
Acetic acid 5 %	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Acetic acid 10 %	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Ammonia 25 %	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Ethanol 50 %	+	+	+	+	+	+	+	+	+	+	+	+	A	A	A	A	A	A
Ethanol 96 %	+	+	+	+	+	+	+	+	+	A	D							
Xylene	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+

+ = resistant A = attacked D = destroyed

Substrate: Steel plate, sandblasted

Immersion temperature: 20 - 22 °C

Film thickness: approx. 400 µm

Curing: 7 days, 20 °C, 65 % RH