



PRIMAL™ HG-98 Binder

Pure Acrylic Polymer for Gloss and Semi-Gloss Paints

Regional Product Availability

EMEA

Description

PRIMAL™ HG-98 Binder is a pure acrylic emulsion polymer designed for gloss enamels providing superior film resistance properties and very nice appearance.

PRIMAL™ HG-98 Binder uses ambient temperature cross-linking technology to offer improved film performance versus conventional polymers. It has a high gloss potential, excellent hardness development and durability for interior and exterior applications.

Product Characteristics

- * APEO free*
- * Very good gloss potential
- * Excellent hardness development and block resistance
- * Very good exterior durability
- * Excellent alkyd adhesion
- * Remarkable stain and grease resistance
- * APEO is not intentionally added and is not knowingly introduced from another raw material.

Typical Physical Properties

(The following properties are typical but should not be regarded as specifications)

Property	Typical Values
Appearance	Milky white liquid
Solids content	44.5–45.5%
pH	8.5–9.5
Brookfield LV Viscosity (spindle 3, 60 rpm)	< 500 mPa.s
Minimum Film Formation Temperature	~24°C
Specific gravity (wet polymer)	1.06 g/cm ³
Specific gravity (dry polymer)	1.14 g/cm ³

Formulations Guidelines

Ambient Temperature Cross-linking Technology

PRIMAL™ HG-98 Binder uses ambient temperature cross-linking chemistry in a one-pack system. Gloss paints formulated with PRIMAL™ HG-98 Binder will oxidatively cure during and after the latex particles have coalesced to form a film with improved toughness and resistance properties. The binder develops very good early film properties, which improve during the curing process.

Formaldehyde or aldehyde releasing additives will adversely affect the performance of paints based on PRIMAL™ HG-98 Binder and are not recommended.

Below are some guidelines to help formulators: Dispersants

Traditional hydrophobic copolymers like OROTAN™ 731A ER or hydrophilic copolymers like OROTAN™ 1124 can be used for pigment dispersion with this self-cross-linking binder. Both give good gloss development and pigment stability upon aging of the paint.

Defoamers

A combination of Byk-019 and Byk-024 was found to give good performance in gloss formulations based on emulsion PRIMAL™ HG-98 Binder. For semi-gloss formulations DOWSIL™ 8590 Additive in the grind and DOWSIL™ 74 Additive in the let-down was the best combination.

Rheology modifiers and thickeners

ACRYSOL™ RM-3030 and ACRYSOL™ RM-2020E Rheology Modifiers were found to be among the most suitable rheology modifiers to achieve a good balance of application properties and ultimate dry film performance.

If higher low shear viscosity is required, addition of ACRYSOL™ RM-8WE or ACRYSOL™ SCT-275 can be done without affecting flow and application performance.

Coalescents and cosolvents

PRIMAL™ HG-98 Binder has a lower coalescent demand than other acrylic emulsion binders developing similar hardness and dry film properties.

This improves the development of early block resistance, leaves more formulation latitude to achieve improvements in open time and reduces formulation cost.

We suggest starting with a coalescent level in the range of 8–10% calculated on binder solids. In our studies we found that a level of 8% DOWANOL™ DPnB Glycol Ether or UCAR™ Filmer IBT or Texanol ester alcohol provides good properties.

Propylene glycol (PG) used at 3% on total formulation improves paint application properties. This PG level yields a calculated VOC of 60 g/L to 75 g/L (Calculation done on paint as delivered, including water).

Extenders and opaque polymer

PRIMAL™ HG-98 Binder has been developed for the formulation of gloss and semi-gloss paints. In semi-gloss formulations, any standard extenders, e.g. calcium carbonate, talc, clays can be used.

The use of ROPAQUE™ Ultra E Organic Opacifier can help reducing the amount of titanium dioxide, thus formulation cost without affecting dry film appearance and resistance characteristics.

Like with conventional binders, the advantages of ROPAQUE™ Ultra E in terms of durability and dirt pick up resistance are noticeable.

Biocides

Although standard in can preservatives could be used in paint formulations, it is always recommended to test them for compatibility and efficacy. As in can preservatives, we recommended the use of ROCIMA MB2X Biocide.

For exterior coatings it is recommended to use a film preservative like BIOBAN 350 PST Biocide.

Formaldehyde or aldehyde releasing additives are not suggested when formulating paints with PRIMAL™ HG-98 Acrylic Binder. They can interact with the self-cross-linking mechanism present in the binder and adversely affect the performance of paints.

Interior / Exterior Gloss Formulation with DOWANOL™DPnB

Based on PRIMAL™ HG-98 Binder (PVC 18%) G-98-18-01

Material Name	Kilograms	Liters	PVC
Grind			
Propylene Glycol	30.5	29.4	
Water	30.0	30.0	
OROTAN™ 731A ER Dispersant	8.2	7.4	
Byk -019 Defoamer	2.0	2.0	
Ti-Pure R-706 Titanium dioxide	206.0	50.2	17.8%
Grind Sub-total	276.7	119.0	
Let Down			
PRIMAL™ HG-98 Binder	589.0	555.1	
Add the following premix			
DOWANOL™ DPnB Glycol Ether	21.2	23.2	
Water	29.0	29.0	
Byk-024 Defoamer	3.0	3.0	
ACRY SOL™ RM-5000 Rheology Modifier	19.5	18.7	
Water	53.6	53.6	
ROCIMA MB2X Biocide	1.0	0.9	
BIOBAN 350 PST Biocide	7.0	6.4	
Totals	1,000.0	808.9	17.8%

Paint Properties

Volume Solids:	36%
Weight Solids:	48%
Density:	1.230
pH:	~8.6
Dispersant (active based on total powders):	1.0%
Coalescent (based on polymer solids):	8.0%
Calculated VOC* content (g/L of wet paint):	66

(*) VOC: Amount in g/L of organic compounds having an initial boiling point less than or equal to 250°C measured at a standard pressure of 101.3 kPa

Viscosities:

Krebs Stormer (KU):	85-90
ICI Cone & Plate (Poise):	1.8-2.2
Brookfield (spindle 3/6 rpm) (mPa.s):	2500-3000

Film Properties

Gloss (100 µm, on glass), %:	
Gloss 20°:	55-58
Gloss 60°:	80-83
Block resistance (100 µm, N/cm ²):	
1 day:	0.6 (Excellent)
7 days:	0 (Excellent)
König hardness (100 µm, on glass), sec.:	
7 days:	~70
1 month:	~80

Interior / Exterior Gloss Formulation with UCAR™ Filmer IBT

Based on PRIMAL™ HG-98 Binder (PVC 18%) G-98-18- 02

Material Name	Kilograms	Liters	PVC
Grind			
Propylene Glycol	30.5	29.4	
Water	35.0	35.0	
OROTAN™ 731A ER Dispersant	8.2	7.4	
Byk-19 Defoamer	2.0	2.0	
Ti Pure R-706 Titanium dioxide	206.0	51.5	18.2%
Grind Sub-total	281.7	125.3	
Let Down			
PRIMAL™ HG-98 Binder	589.0	555.1	
Add the following premix			
UCAR™ Filmer IBT	21.2	22.3	
Water	30.0	30.0	
Byk-024 Defoamer	3.0	3.0	
ACRY SOL™ RM-5000 Rheology Modifier	19.5	18.7	
Water	47.6	47.6	
ROCIMA MB2X Biocide	1.0	0.9	
BIOBAN 350 PST Biocide	7.0	6.4	
Totals	1,000.0	809.3	18.2%

Paint Properties

Volume Solids:	36%
Weight Solids:	48%
Density:	1.23
pH:	~8.6
Dispersant (active based on total powders):	1.0%
Coalescent (based on polymer solids):	8.0%
Calculated VOC* content (g/L of wet paint):	40

(*) VOC: Amount in g/L of organic compounds having an initial boiling point less than or equal to 250°C measured at a standard pressure of 101.3 kPa.

Viscosities:

Krebs Stormer (KU):	90–100
ICI Cone & Plate (Poise):	1.6–2.0
Brookfield (spindle 3/6 rpm) (mPa.s):	3500–4500
Brookfield (spindle 3/60 rpm) (mPa.s):	2000–3000

Film Properties

Gloss (100 µm, on glass), %:	
Gloss 20°:	55–58
Gloss 60°:	78–81
Block resistance (100 µm, N/cm ²):	
1 day:	1.5 (Very Good)
7 days:	0.0 (Excellent)
König hardness (100 µm, on glass), sec.:	
7 days:	~45
1 month:	~55
Contrast ratio:	
CR at 150 µm wet:	96.0%

Interior / Exterior Semi-gloss Formulation with UCAR™ Filmer IBT
Based on PRIMAL™ HG-98 Binder (PVC 35%) SG-98-35- 01

Material Name	Kilograms	Liters	PVC
Grind			
Propylene Glycol	25.0	24.1	
Water	71.0	71.0	
OROTAN™ 731A ER Dispersant	11.2	10.1	
DOWSIL™ 8590 Additive	1.0	1.0	
ACRYSOL™ RM-3030 Rheology Modifier	10.2	9.8	
Ti-Pure R-706 Titanium dioxide	180.3	45.0	15.2%
Micro Mica W1 Extender	100.2	35.5	12.0%
Grind Sub-total	398.9	196.6	
Let Down			
PRIMAL™ HG-98 Binder	487.0	459.0	
Add the following premix			
UCAR™ Filmer IBT Colent	17.5	18.4	
DOWSIL™ 74 Additive	1.0	1.0	
ROPAQUE™ Ultra E Organic Opacifier	47.0	45.9	8.1%
ACRYSOL™ RM-3030 Rheology Modifier	11.5	11.07	
Water	29.1	29.1	
ROCIMA MB2X Biocide	1.0	0.9	
BIOBAN 350 PST Biocide	7.0	6.4	
Totals	1,000.0	761.1	35.3%

Paint Properties

Volume Solids:	36%
Weight Solids:	52%
Density:	1.2
pH:	~9
Dispersant (active based on total powders):	1.0%
Coalescent (based on polymer solids):	7.5%
Calculated VOC* content (g/L of wet paint):	34

(* VOC: Amount in g/L of organic compounds having an initial boiling point less than or equal to 250°C measured at a standard pressure of 101.3 kPa.

Viscosities:

Krebs Stormer (KU):	100–110
ICI Cone & Plate (Poise):	2.4–2.8
Brookfield (spindle 4 / 60 rpm) (mPa.s):	3600–4400
Brookfield (spindle 4 / 6 rpm) (mPa.s):	10300–12300

Film Properties

Gloss (100 µm, on glass), %:	
Gloss 20°:	2–4
Gloss 60°:	16–18
Block resistance (100 µm, N/cm²):	
2 days:	0 (Excellent)
7 days:	0 (Excellent)
König hardness (100 µm, on glass), sec:	
7 days:	~74
1 month:	~78

Handling Precautions Before using this product, consult the Material Safety Data Sheet (MSDS)/Safety Data Sheet (SDS) for details on product hazards, recommended handling precautions and product storage.

Storage Store products in tightly closed original containers at temperatures recommended on the product label.

Disposal Considerations Dispose in accordance with all, local or national regulations. Empty containers may contain hazardous residues. This material and its container must be disposed in a safe and legal manner.

It is the user's responsibility to verify that treatment and disposal procedures comply with local or national regulations. Contact your Dow Coating Materials Technical Representative for more information.

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