MAINCOTE™ 1200 Acrylic Resin

Waterborne Acrylic Resin for Industrial Coatings.

Regional Product Availability

- Asia-Pacific

Description

MAINCOTE™ 1200 Acrylic Resin is an aqueous acrylic polymer based on AVANSE™ Technology. It is an ambient temperature self-crosslinking polymer, and offers formulators a single resin which facilitates the formulation of corrosion-resistant primers, highly durable topcoats, and high gloss direct-to-metal (DTM) finish coats. The novel technology behind the AVANSE Technology product line leads to new standards in corrosion control, metal adhesion, film gloss, durability, and chemical and solvent resistance. One aspect of this technology is the formation of polymer-pigment composite particles, which offer a more homogeneous pigment distribution in the dry film, and coatings with better barrier properties, enhanced corrosion resistance and greater durability. The benefits of AVANSE Technology make MAINCOTE 1200 Acrylic Resin a great match for both factory and field applied finishes for metal, concrete and masonry substrates.

Key Features and Benefits

- AVANSE™ Technology Platform.
- Excellent corrosion resistance.
- Excellent water and blister resistance.
- Facilitates the formulation of high gloss coatings.
- Excellent adhesion (especially to metal substrates, such as steel, galvanized steel or untreated aluminium).
- Excellent exterior durability.
- Ambient self-crosslinking offers excellent chemical and solvent resistance.
- APEO-free*.

Typical Properties

(These properties are typical but do not constitute specifications).

Property	Typical Values
Appearance	Opaque, white to off-white liquid
Solids, by weight, %	45.0%
Density, wet, (g/ml)	1.05
pH	8.8
Glass Transition Temperature, (± 2°C)	35
Viscosity (Brookfield LV #1, 60 rpm, 24°C), cps	< 100

* Manufactured without the use of Alkyl Phenyl Ethoxylate (APEO) surfactants.

Potential Applications

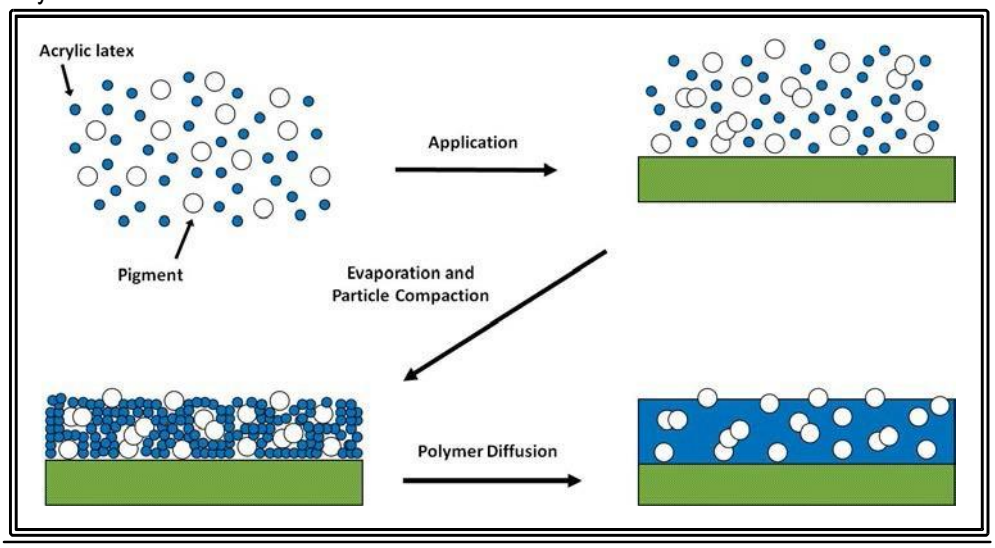
- Industrial maintenance finishes for steel and concrete.
- Commercial architectural finishes for metal.
- Institutional coatings for concrete and masonry.
- DIY metal coatings.
- Water resistant coatings.
- General industrial finishes for metal.
- Transportation coatings (e.g railcar, shipping containers).

Introduction to AVANSE™ Technology

Mechanism and Benefits of AVANSE™ Technology.

The benefits observed with coatings based on MAINCOTE™ 1200 Acrylic Resin are partly due to its role in the film formation process. With a conventional acrylic latex polymer, the final paint film rarely displays an optimum distribution of pigment and extender particles throughout the film. Both in the wet state and as the film is drying, pigment and extender particles can aggregate together and form larger agglomerates. Keeping the pigment particles separated in the wet state is really the function of dispersants and surfactants, which adsorb to the pigment surface and provide both steric and electrostatic stabilization. Figure 1 shows how pigment agglomeration in a conventional acrylic coating can affect the structure of the final dry film, which will ultimately impact on film properties. Pigment-pigment interfaces of agglomerates can provide pathways for water and electrolytes to migrate through a film and reduce barrier properties, while bare pigment particles protruding from the film surface will affect surface roughness and gloss.

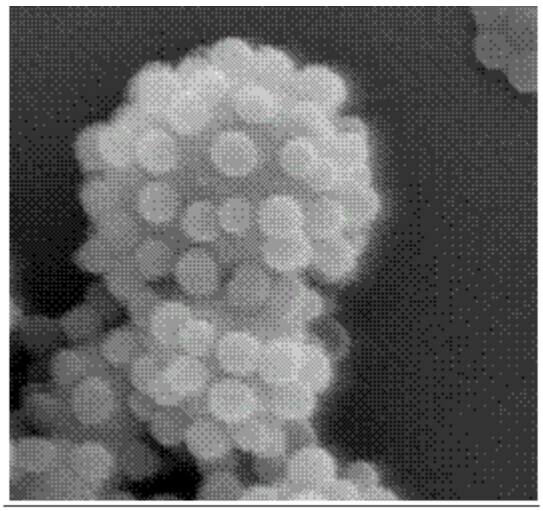
Figure 1. Mechanism of film formation for a pigmented coating based on a conventional acrylic latex.



Poorly dispersed pigment leads to lower gloss and worse barrier properties than in an optimally dispersed system. MAINCOTE™ 1200 Acrylic Resin solves the problem of pigment distribution in the wet and dry states by actually forming latex-pigment composites, where the latex associates with the surface of the pigment particles. This phenomenon is depicted in Figure 2, which shows a SEM micrograph of titanium dioxide particles dispersed in MAINCOTE 1200 Acrylic Resin. The latex particles have adsorbed onto the pigment surface to form a composite particle. With a conventional acrylic binder, there is little to no association of the binder with the pigment surface. The formation of latex-pigment composites is not limited to titanium dioxide, but occurs with other mineral pigments as well,

including typical extenders such as calcium carbonate, nepheline syenite, and silica, and color pigments such as iron oxides. The latex-pigment composites help to keep the pigment and extender particles separated in the wet paint and provide a more optimal distribution of pigment in the dry film, because the latex particles act as spacers between pigment particles.

Figure 2. SEM micrograph (x100K) of a latex-pigment composite particle formed by MAINCOTE™ 1200 Acrylic Resin and titanium dioxide.



The effect of the AVANSE™ Technology on the film formation process is shown in Figure 3. The composite particles form in the wet state, as the paint is being made. As the film dries, the adsorbed latex acts as a spacer to keep the pigment particles separated. The surface of the film is also rich in binder compared to the conventional acrylic because each pigment particle is already surrounded by a layer of latex. The result is higher gloss due to a smoother, binder rich surface, better hiding due to better spacing of the titanium dioxide, and improved barrier properties (e.g., corrosion resistance) due to fewer pigment-pigment interfaces. Improvements in exterior durability relative to conventional acrylics are also observed, and thought to be due to the improved dispersion of UV-absorbing pigments such as TiO2 throughout the film. Better dispersion of such pigments in a matrix of AVANSE Resin will prevent UV light from penetrating deep into the film and directly degrading the polymer matrix via a photolytic process (Figure 4).

Figure 3. Mechanism of film formation for a pigmented coating based on AVANSE™ Technology.

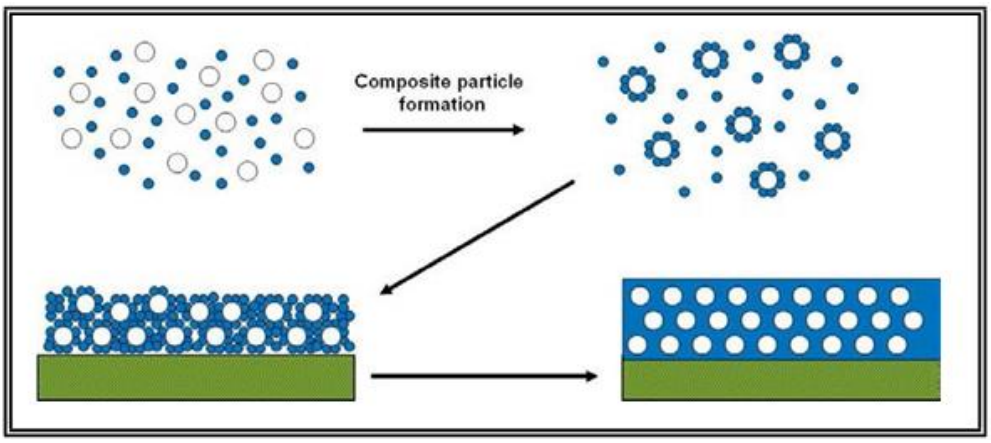
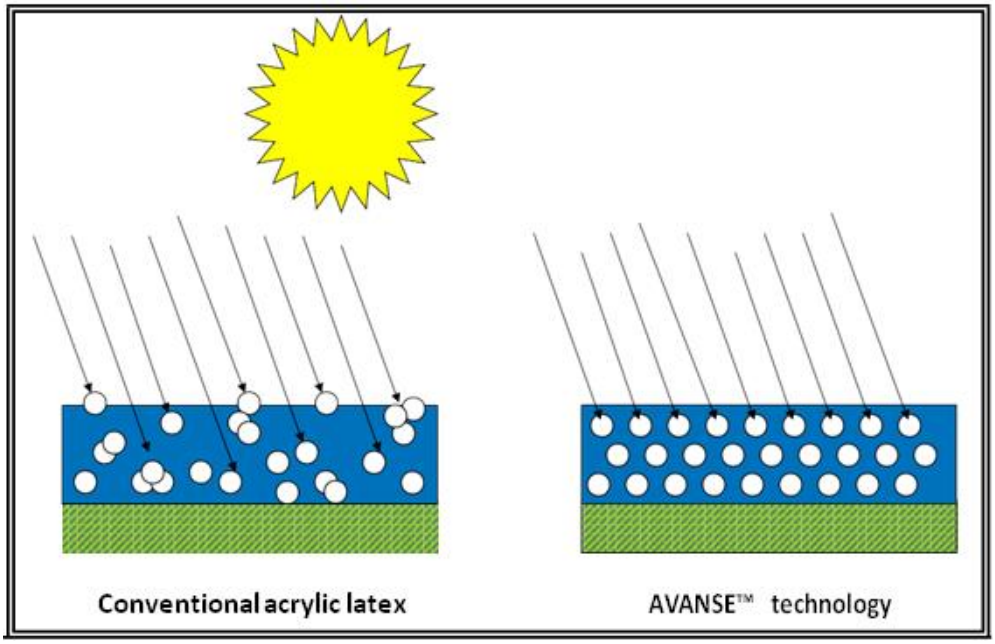


Figure 4. Proposed mechanism for improved UV light durability. Better dispersion of UV-absorbing pigments such as TiO_2 prevent UV light from penetrating deeply into the film.



Another key feature of MAINCOTE™ 1200 Acrylic Resin is its ability to self-crosslink at ambient temperatures and still maintain true one-package stability. The functional groups present in the resin crosslink via both oxidative and photolytic curing mechanisms. Formulations based on MAINCOTE 1200 Acrylic Resin will begin to crosslink after film formation, and may require about 2 to 4 weeks under laboratory conditions until some properties have reached their maximum performance level. Exposure to UV light will accelerate the crosslinking process. The crosslinked film provides improved dirt pickup resistance, chemical and solvent resistance, and further enhances durability.

Performance Data

MAINCOTE™ 1200 Acrylic Resin has been evaluated in several types of coatings applications, including direct to metal (DTM) finish coats and anti-corrosive primers designed for metal surfaces, and concrete and masonry coatings such as basement waterproofers for below-grade interior concrete and block walls. The results described below demonstrate that MAINCOTE 1200 Acrylic Resin is a versatile binder and displays high performance in a variety of demanding applications.

The typical performance of MAINCOTE 1200 Acrylic Resin in a gloss white direct to metal (DTM) finish is described in Table 1, where it is compared to a commercial styrene-acrylic DTM binder based on conventional acrylic technology. The conventional acrylic used in this study had a similar glass transition temperature of 35°C. Both binders were formulated into the same 16% PVC / 36% VS gloss white formula with 15% Texanol ester alcohol coalescent (% on polymer solids), to yield a calculated VOC of approximately 125 g/L (see Formulation 200-1). MAINCOTE 1200 Acrylic Resin offers the expected benefits of higher gloss potential, improved adhesion, and better gloss retention compared to the conventional binder.

Table 1. Comparison of film properties for MAINCOTE™ 1200 Acrylic Resin and a conventional acrylic in a 16 PVC gloss white DTM formulation.

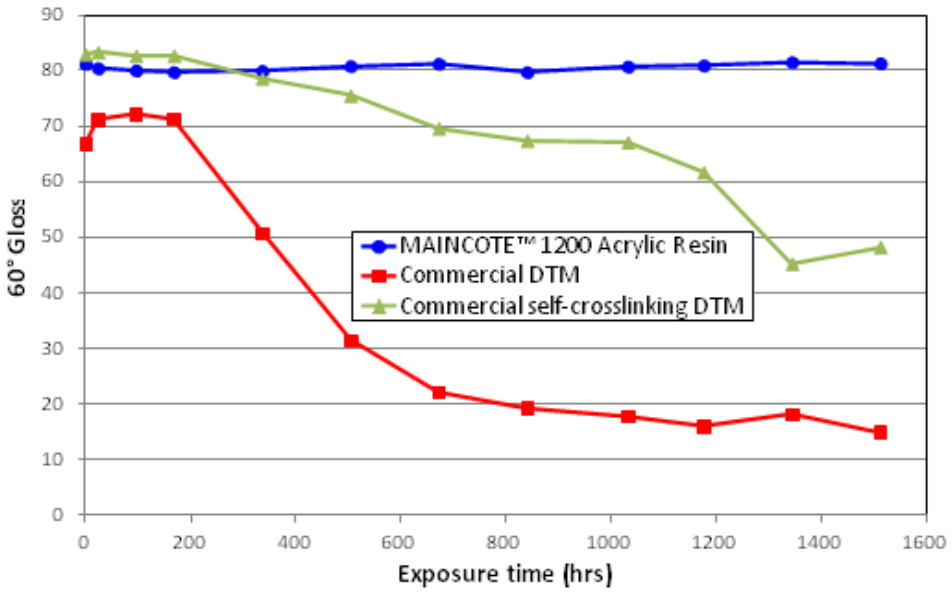
	MAINCOTE™ 1200 Acrylic Resin	Conventional Acrylic
PVC / VS	16.0% / 36.4%	16.0% / 36.5%
Stormer Viscosity (KU)	97	91
ICI Viscosity (poise)	1.0	1.1
pH	9.4	8.9
Film Properties:		
Gloss (20°/60°)	50 / 75	29 / 66
Konig hardness (2 week)	26.6 sec	31.1 sec
Pencil hardness (2 week)	HB	HB
Block resistance[1]		
1 day dry		
24 hr at RT	3	4
30 min at 60°C	5	3
7 day dry		
24 hr at RT	7	8
30 min at 60°C	6	8
Adhesion (dry / wet, ASTM D3359)		
Cold rolled steel	5B / 2B	5B / 0B
Galvanized steel	5B / 5B	5B / 0B
Untreated aluminum	5B / 5B	5B / 0B
Scrub resistance (ASTM D2486)	740	410
Gloss retention (60° gloss on UV-A exposure)[2]		
Initial	76	70
2 week	73 (96%)	52 (74%)
4 week	67 (88%)	43 (61%)
Stain removal (% removal)		
Pencil	65	30
Blue Pen	50	25
Red China marker	95	95
Red lipstick	85	100
Purple crayon	95	95
Coffee	100	100
Tea	95	100
Grape Juice	90	100
Mustard	80	95

Notes:
1) Block resistance rated on a 1 to 10 scale, 10 = best. Coatings were dried for either 1 or 7 days before being subjected to the room temperature or 60°C block test.
2) Weathering cycle consisted of 4 hrs UV light at 60°C and 4 hrs condensation at 50°C.

In a gloss white formulation, 60° gloss values with MAINCOTE™ 1200 Acrylic Resin are typically in the range of 75 – 85 units, and will depend on formulation variables such as PVC and TiO2 grade. However, compared to a conventional latex, gloss potential is higher due to the smoother surface resulting from the presence of the pigment-polymer composites, as described in Figure 3. The higher gloss potential is achieved without the need to lower molecular weight, a tactic often used to increase gloss but one which has a negative effect on aesthetic durability and chemical resistance. As shown in Table 1, gloss retention of MAINCOTE 1200 Acrylic Resin is excellent in accelerated UV-A weathering. Gloss retention of a similar 15 PVC gloss white DTM formulation is compared in Figure 5 to two commercial DTM coatings. The commercial DTM coatings are based on conventional acrylic technology, with one based on a self-crosslinking acrylic resin. The MAINCOTE 1200 Acrylic Resin formulation performs much better than the commercial DTM coatings out to 1500 hrs UV-A exposure. As expected, the conventional self-crosslinking DTM performed better than the technology without crosslinking, but it was still not the equal of MAINCOTE 1200 Acrylic Resin.

MAINCOTE 1200 Acrylic Resin has the advantage of both a more optimal dispersion of the TiO2 (Figure 4) and self-crosslinking to aid in improved durability. Results of exterior exposure corroborate the excellent durability of MAINCOTE 1200 Acrylic Resin. Figure 6 compares MAINCOTE 1200 Acrylic Resin in an 18 PVC gloss white DTM to a conventional acrylic in the same formulation, as well as a commercial two-component solvent borne polyurethane. After two years of south 45° exposure at a site in eastern Pennsylvania, the coating based on MAINCOTE 1200 Acrylic Resin was outperforming even the two-component polyurethane, which is recommended for high performance industrial maintenance applications.

Figure 5. Gloss retention of gloss white coatings in accelerated UV weathering (UV-A bulbs), comparing MAINCOTE™ 1200 Acrylic Resin in a 15 PVC gloss white DTM with commercial acrylic DTM coatings.



The excellent corrosion resistance of MAINCOTE™ 1200 Acrylic Resin is demonstrated in Figures 7 and 8. Figure 7 shows panels after salt spray exposure (ASTM B117) of 192 and 504 hrs, coated with 16 PVC gloss white DTMs based on MAINCOTE 1200 Acrylic Resin and a conventional acrylic DTM binder in Formulation 200-1. Even without corrosion inhibiting pigments, MAINCOTE 1200 Acrylic Resin performed very well over smooth cold rolled steel after 500 hrs exposure. Figure 8 shows results of 336 hr salt spray testing for 9 PVC gloss

yellow DTMs (Formulation 200-3) based on MAINCOTE™ 1200 Acrylic Resin and another conventional acrylic DTM binder. In this case, the films were applied at 75 microns DFT over blasted hot rolled steel, and again the performance of MAINCOTE 1200 Acrylic Resin was exceptional.

Figure 6. Gloss retention of gloss white coatings on exterior exposure (south 45°) at an eastern Pennsylvania site.

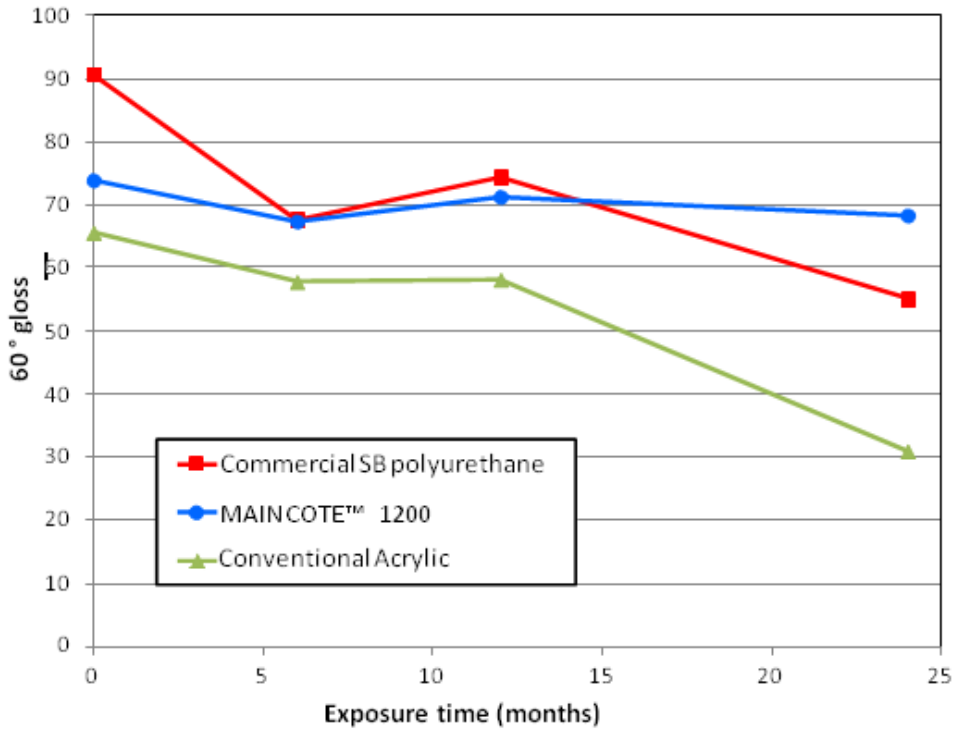


Figure 7. Salt spray resistance at 192 and 504 hrs exposure for 16 PVC gloss white DTM formulations applied at 2.2 mils DFT on cold rolled steel.

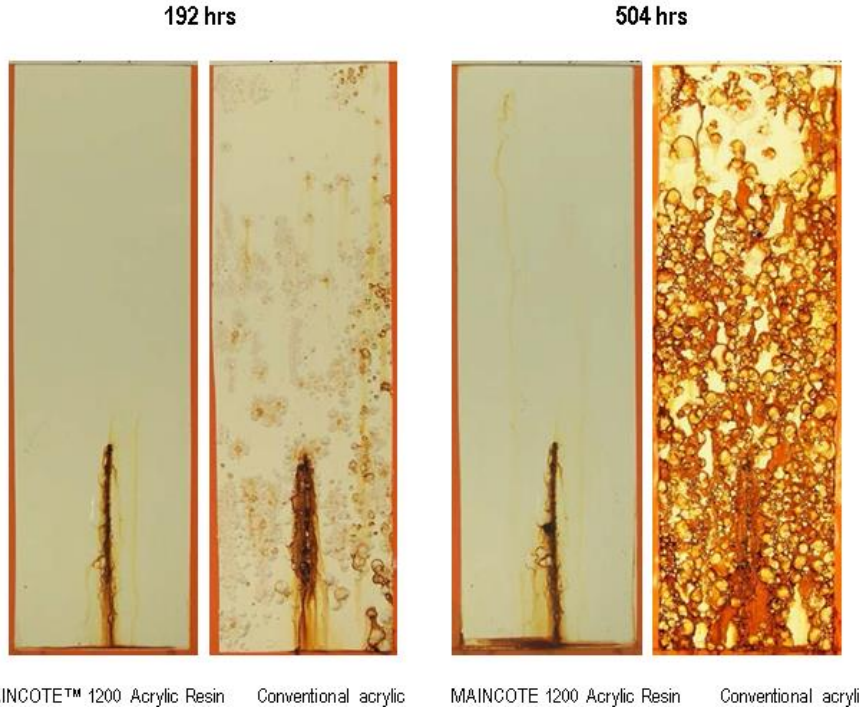


Figure 8. Salt spray resistance at 336 hrs exposure for 9 PVC gloss yellow DTM formulations applied at 3.0 mils DFT on blasted hot rolled steel.

Compared to conventional acrylics, the improved corrosion resistance of AVANSE™ Technology resins is due in part to the better dispersion of pigments in the dry film which offers a film with better barrier properties, and likely also due in part to better adhesion over metal. The adhesion of MAINCOTE™ 1200 Acrylic Resin is described in Table 1, which shows a key benefit of the technology over difficult substrates such as galvanized steel and untreated aluminum.

In addition to its excellent performance over metal, MAINCOTE 1200 Acrylic Resin has been shown to be very suitable for use over concrete and masonry substrates. Due to its hydrophobic composition and small particle size, it displays very good water resistance. It has been evaluated in a 46 PVC masonry waterproofing coating formulation (Formulation 200-5) and compared to a commercial acrylic waterproofing coating for resistance to hydrostatic pressure (ASTM D7088) on concrete blocks. Results of this study are detailed in Table 2. The commercial waterproofing coating failed at 4 psi, whereas the coating based on MAINCOTE 1200 Acrylic Resin passed at 10 psi. Formulation 200-5 is designed for use in masonry and concrete applications, including below-grade interior basement waterproofing coating.

Table 2. Film properties of MAINCOTE™ 1200 Acrylic Resin in a below grade masonry waterproofing coating formulation, and comparison with a commercial waterborne acrylic waterproofing coating.

	MAINCOTE™ 1200 Acrylic Resin	Commercial Waterproofer
PVC / VS	46.4% / 40.1%	unknown
Stormer Viscosity (KU)	132	137
pH	8.8	8.5
Film Properties:		
Gloss (60°/85°)	3.6 / 0.7	2.3 / 0.2
Resistance to Hydrostatic Pressure (ASTM D7088)		
4 psi	Pass	Fail
10 psi	Pass	Not tested

Formulating Guidelines

General Considerations when formulating with AVANSE™ Technology

Formulations containing AVANSE™ Technology resins can generally be prepared using similar techniques as with conventional acrylics. However, because the latex particles have an affinity for and adsorb to inorganic pigment surfaces, there are some procedures that should be followed to avoid possible stability problems and formation of grit or gel during manufacture. In general, slow addition of the pigment dispersion to the latex should be done during the letdown in order to avoid high concentrations of "bare" pigment. This procedure helps avoid bridging of pigment particles by adsorbing latex, which could result in viscosity instability and grit, and leads to more optimal formation of the composite particles. Good agitation is also essential during the letdown procedure to avoid areas of high pigment concentration and "dead zones" within a tank where material undergoes poor mixing. Tank and mixing blade configuration can also contribute to poor mixing, and should be considered before moving to full scale manufacturing. Dilution of the pigment dispersion with free water or co-solvent before addition can also aid in lowering the localized pigment concentration. Because composite particle formation can take varying amounts of time depending on formulation ingredients, it is recommended that pigmented coatings are mixed for approximately 30 to 60 minutes after the final ingredients have been added.

MAINCOTE™ 1200 Acrylic Resin can be formulated with common additives available for waterborne coatings. However, because of the crosslinking technology used in this emulsion, additives that contain or release formaldehyde are not recommended in combination with MAINCOTE 1200 Acrylic Resin. In addition, application of coatings based on MAINCOTE 1200 Acrylic Resin should not be made to substrates that release formaldehyde. The use of such materials or substrates may cause slight yellowing of the film and potential degradation of film properties.

Coalescents

Depending on drying conditions and application methods, the proper selection of a coalescent package is critical to obtaining optimum properties for coatings based on MAINCOTE 1200 Acrylic Resin. Texanol ester alcohol at approximately 15% on polymer solids is a good starting point for coalescent choice. Optifilm 400 Film Enhancer can be utilized as a non- volatile coalescent in order to lower VOC. Faster coalescents such as DOWANOL™ DPM Glycol Ether and Butyl CELLOSOLVE™ Glycol Ether can be used to provide faster hardness development, but are less efficient at lowering MFFT compared to Texanol. Care should be taken in adding coalescents to the letdown to avoid shocking the latex. Add coalescents slowly to avoid the formation of grit or gel, particularly when at lower

pH values. Dilution of water-miscible coalescents and inclusion of coalescents in the pigment dispersion are two methods that can also be used to avoid grit formation.

Dispersants

Because MAINCOTE™ 1200 Acrylic Resin interacts closely with the pigment and extender particles, the choice of pigment dispersant is critical. Copolymer dispersants such as OROTAN™ 165A Dispersant and OROTAN 681 Dispersant, or the low VOC alternative OROTAN 2002 Dispersant, at 1 to 2% solids on pigment solids are recommended as starting points. Surfynol CT-111 surfactant has also been used successfully as a co-dispersant. In general, polyacrylic acid and polymethacrylic acid dispersants are not good choices, as they can reduce corrosion resistance, as well as inhibit composite particle formation. High levels of dispersant should also be avoided, as that can also inhibit composite particle formation, as well as increase water sensitivity and lower corrosion resistance.

Titanium Dioxide

Both dry and slurry grades of titanium dioxide have been used successfully with MAINCOTE™ 1200 Acrylic Resin. Highly durable grades such as Ti-Pure R-706 and Ti-Pure R-746 titanium dioxides are recommended for best gloss and exterior durability in topcoats and DTMs. For white and grey primers, a less durable grade such as Ti-Pure R-900 titanium dioxide can be used. MAINCOTE 1200 Acrylic Resin will interact in a slightly different manner depending on TiO_2 grade and surface chemistry, so laboratory testing should be carried out to ensure good stability and performance.

Other Pigments and Extenders

MAINCOTE™ 1200 Acrylic Resin will interact and form composite particles with a variety of common inorganic pigments and extenders, such as iron oxides, calcium carbonates, silicas, talcs, and nepheline syenite. When formulating with MAINCOTE1200 Acrylic Resin, one needs to take into account the total amount of pigment surface area onto which the latex could adsorb. If there is not enough latex to cover all available pigment surfaces, bridging between pigment particles could occur, and result in viscosity instability and grit. Extender pigments tend to have large particle size and low surface areas compared to color pigments such as TiO2, so instability is not common except at high PVC levels. In general, stability should be monitored when developing formulations at PVC levels above approximately 35 – 40%.

Defoamers

Foam is a major concern in waterborne coating formulation design. Defoamers are needed to eliminate foam during manufacture and film application. Suitable defoamers for MAINCOTE™ 1200 Acrylic Resin include Tego Foamex 1488, Drewplus L-493, BYK-022 and Foamaster 111 defoamers. Tego Airex 902W defoamer at 0.5 – 1.0% by weight as supplied on total formulation has been found to assist in reduction of microfoam during spray application.

Wetting and Mar Aids

The addition of a wetting surfactant (such as Surfynol 104DPM or TRITON™ CF-10 Surfactants) offers good surface wetting and reduces the tendency for formulations based on MAINCOTE™ 1200 Acrylic Resin to crater or picture frame. The addition of BYK 333 and Tego Glide 410 mar aids offer excellent mar and slip resistance at levels of approximately 0.5–1% on polymer solids.

Viscosity Control

Nonionic HEUR rheology modifiers, such as ACRYSOL™ RM-8W, ACRYSOL RM-12W and ACRYSOL RM-2020NPR Rheology Modifiers are key to formulating a high quality, corrosion-resistant coating. The use of cellulosics or alkali-soluble thickeners can significantly degrade corrosion resistance when formulating waterborne coatings for metal substrates. The expected method of application is an important parameter to consider when selecting rheology control agents. Brushing formulations require higher viscosity under high shear conditions for the best brush drag and film build, and suitable rheology modifiers include ACRYSOL RM-5000 and ACRYSOL RM-2020NPR Rheology Modifiers. To increase the Stormer viscosity of a coating, ACRYSOL RM-8W, ACRYSOL RM-825 and ACRYSOL SCT-275 Rheology Modifiers are efficient thickeners. Low shear viscosity, which affects sag

resistance, can be increased using ACRYSOL™ RM-12W or ACRYSOL RM-995 Rheology Modifiers. Often a coating is used with various application methods such as airless spray and brush. Having a coating that provides optimum rheology for both brush and spray application can be difficult, and having a rheology profile of approximately 90 KU / 1.0 poise is a starting point for a compromise of low shear and high shear viscosity. To attain this rheology, it may be necessary to utilize more than one of the above thickeners.

Flash Rust Inhibitors

In waterborne coatings designed for steel substrates, the aqueous phase should contain flash rust inhibitors to prevent the rapid rusting (flash rust) that can occur as the coating is drying. The recommended additive is sodium nitrite ($NaNO_2$), which is effective at low use levels of 0.1 to 0.2 kg / 100 litres. Addition in a diluted form (15% aqueous solution) is recommended to prevent stability problems and grit formation. Commercial flash rust inhibitors are also available, such as Halox Flash-X 150, Halox 570 or Raybo 60 inhibitors, and are also suitable for use with MAINCOTE™ 1200 Acrylic Resin.

Corrosion Resistant Pigments

Corrosion resistant pigments, also known as reactive or inhibitive pigments, are often used in primer formulations to improve corrosion resistance. The level and type of these pigments can have a strong effect on paint stability due to their partial solubility and the presence of multivalent ions such as Zn+2, so these pigments should be thoroughly evaluated for compatibility. Halox SZP-391 and Heucophos ZCPP pigments have been successfully used with MAINCOTE™ 1200 Acrylic Resin at levels of approximately 6 kg / 100 litres. Lower levels of anti- corrosive pigments are sometimes used in DTM finishes, but can have a negative impact on gloss levels due to the particle size of the inhibitive pigment.

Suggested Starting Point Formulation

Gloss White Direct to Metal Finish
Based on MAINCOTE™ 1200 Acrylic Resin
Formulation Number: 200-1

Material Name	Kilograms	Litres
Grind		
Water	22.72	22.72
Ammonia (28%)	0.45	0.50
OROTAN™ 681 Dispersant	3.8	3.5
TRITON™ CF-10 Surfactant	0.68	0.65
Tego Foamex 1488 defoamer	0.45	0.46
Ti-Pure R-706 titanium dioxide	88.63	22.20
Grind Subtotal	116.75	50.00
Letdown		
MAINCOTE™ 1200 Acrylic Resin	291.36	276.80
Water	19.54	19.76
Ammonia (15%)	1.82	1.94
Add grind from above with good agitation		
Texanol ester alcohol	19.67	20.75
Tego Foamex 1488 defoamer	0.45	0.46
Sodium nitrite (15%)	4.10	3.8
ACRYSOL™ RM-5000 Rheology Modifier	6.82	6.54
Totals	460.74	380.00
Levels without Additives:	Volume Solids:	36.4%
	Weight Solids:	47.7%
	PVC:	16.0%
	Density, wet (g/ml)	1.235
	VOC (g/L):	126
Levels with Additives:	Volume Solids:	37.3%
	Weight Solids:	48.6%

Suggested Starting Point Formulation

Gloss Grey Direct to Metal Finish
Based on MAINCOTE™ 1200 Acrylic Resin
Formulation Number: 200-2

Material Name	Kilograms	Litres
Grind		
Water	22.76	22.8
Ammonia (28%)	0.91	1.03
OROTAN™ 2002 Dispersant	3.57	3.08
Surfynol CT-111 surfactant	0.91	0.95
BYK-022 defoamer	0.45	0.46
Colortrend 888-9907B lampblack colorant	0.14	0.11
Ti-Pure R-706 titanium dioxide	90.90	22.76
Grind Subtotal	119.34	51.15
Letdown		
MAINCOTE™ 1200 Acrylic Resin	262.73	249.58
Water	51.29	51.38
Add grind from above with good agitation		
Texanol ester alcohol	17.72	18.70
Sodium nitrite (15%)	4.10	3.8
ACRYSOL™ RM-2020NPR Rheology Modifier	5.45	5.43
Totals	460.63	380.00
Levels without Additives:	Volume Solids:	33.6%
	Weight Solids:	45.4%
	PVC:	17.9%
	Density, wet (g/ml)	1.212
	VOC (g/L):	118
Levels with Additives:	Volume Solids:	34.6%
	Weight Solids:	46.4%

Suggested Starting Point Formulation

Gloss Yellow Direct to Metal Finish Based on MAINCOTE™ 1200 Acrylic Resin

Formulation Number: 200-3

Material Name	Kilograms	Litres
Grind		
Water	14.11	14.36
DOWANOL™ DPM Glycol Ether	9.11	9.58
Ammonia (28%)	0.45	0.49
OROTAN™ 681 Dispersant	2.73	2.51
TRITON™ CF-10 Surfactant	0.90	0.87
BYK-022 defoamer	0.90	0.91
Bayferrox 1420M yellow iron oxide	28.00	6.69
Ti-Pure R-706 titanium dioxide	23.45	5.89
Grind Subtotal	79.69	41.08
Letdown		
MAINCOTE™ 1200 Acrylic Resin	318.94	302.97
Ammonia (15%)	1.14	1.22
Add grind from above with good agitation		
BYK-024	0.90	0.91
Tego Airex 902W	2.28	2.24
Texanol ester alcohol	14.35	15.12
Butyl CARBITOL™ Glycol Ether	7.18	7.52
Sodium nitrite (15%)	4.55	4.18
Ammonia (15%)	0.38	0.42
Water	2.05	2.05
ACRYSOL™ RM-12W Rheology Modifier	1.94	1.86
ACRYSOL RM-8W Rheology Modifier	0.40	0.38
Totals	433.81	380.00
Levels without Additives:	Volume Solids:	36.8%
	Weight Solids:	45.0%
	PVC:	9.0%
	Density, wet (g/ml)	1.141
	VOC (g/L):	177
Levels with Additives:	Volume Solids:	38.0%
	Weight Solids:	46.2%

Suggested Starting Point Formulation

Light Grey Anti-corrosive Primer
Based on MAINCOTE™ 1200 Acrylic Resin
Formulation Number: 200-4

Material Name	Kilograms	Litres
Grind		
Water	62.05	62.17
Methyl CARBITOL™ Glycol Ether	10.19	10.0
OROTAN™ 165A Dispersant	11.52	10.92
Surfynol 104DPM surfactant	.91	0.912
Tego Foamex 1488 defoamer	0.22	0.23
Ammonia (28%)	0.45	0.49
Ti-Pure R-900 titanium dioxide	26.6	6.65
Imsil A-10 silica	35.46	13.41
Talcron MP30-36 talc	35.46	13.07
Halox SZP-391	22.16	7.37
ACRYSOL™ RM-5000 Rheology Modifier	1.26	1.22
Cab-O-Sil M-5 fumed silica	1.07	0..49
Grind Subtotal	207.35	126.92
Letdown		
MAINCOTE™ 1200 Acrylic Resin	234.03	222.34
Water Tego Foamex 1488 defoamer	0..22	.228
Add grind from above with good agitation		
Texanol ester alcohol	19.00	20.02
Water	4.38	4.41
Sodium nitrite (15%)	4.11	3.8
UCD 1625E lampblack colorant	0.45	.38
ACRYSOL™ RM-8W Rheology Modifier	1.03	1.00
ACRYSOL RM-5000 Rheology Modifier	1.04	1.00
Totals	471.60	380.00
Levels without Additives:	Volume Solids:	35.4%
	Weight Solids:	48.0%
	PVC:	30.6%
	Density, wet (g/ml)	1.2408
	VOC (g/L):	176
Levels with Additives:	Volume Solids:	36.2%
	Weight Solids:	48.9%

Suggested Starting Point Formulation

Below Grade Masonry Water Resistant Coating Based on MAINCOTE™ 1200 Acrylic Resin Formulation Number: 200-5

Material Name	Kilograms	Litres
Grind		
Water	75.89	75.89
Ethylene glycol	4.54	4.07
Natrosol 250 MHR	0.90	0.68
OROTAN™ 681 Dispersant	5.45	5.01
Foamaster 111 defoamer	0.45	2.2
TRITON™ CF-10 Surfactant	0.90	0.87
Ti-Pure R-931 titanium dioxide	22.72	6.27
Minex 4 extender	68.18	26.18
Mistron 353 talc	22.72	8.17
Sand	79.54	30.06
Grind Subtotal	281.21	159.4
Letdown		
MAINCOTE™ 1200 Acrylic Resin	204.54	194.3
Optifilm 400 Film Enhancer	2.75	2.85
Add grind from above with good agitation		
Texanol ester alcohol	11.04	11.63
Foamaster 111 defoamer	0.9	0.9
Ammonia (28%)	0.5	0.57
ACRYSOL™ RM-5000 Rheology Modifier	5.45	5.24
Water	6.66	6.67
Totals	513.10	381.56
Levels without Additives:	Volume Solids:	33.6%
	Weight Solids:	45.4%
	PVC:	17.9%
	Density, wet (g/ml)	1.212
	VOC (g/L):	118
Levels with Additives:	Volume Solids:	34.6%
	Weight Solids:	46.4%

All information set forth herein is for informational purposes only. This information is general information and may differ from that based on actual conditions. Please note that while starting point formulations stated in this document are intended to improve product performance, it will ultimately depend on actual circumstances and is in no event a guarantee of achieving any specific results. Nothing in this document should be treated as a warranty by Dow.

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

Dispose in accordance with all local, state (provincial) and federal 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, state (provincial) and federal regulations. Contact your Dow Coating Materials Technical Representative for more information.

Chemical Registration

Many countries within the Asia-Pacific require the registration of chemicals, either imported or produced locally, prior to their commercial use. Violation of these regulations may lead to substantial penalties imposed upon the user, the importer or manufacturer, and/or cessation of supply. It is in your interests to ensure that all chemicals used by you are registered. Dow does not supply unregistered products unless permitted under limited sampling procedures as a precursor to registration.

Note on Asia-Pacific Product Line

Product availability and grades vary throughout the countries in Asia-Pacific. Please contact your local Dow Coating Materials representative for further information and samples.

Product Stewardship

Dow has a fundamental concern for all who make, distribute, and use its products, and for the environment in which we live. This concern is the basis for our product stewardship philosophy by which we assess the safety, health, and environmental information on our products and then take appropriate steps to protect employee and public health and our environment. The success of our product stewardship program rests with each and every individual involved with Dow products - from the initial concept and research, to manufacture, use, sale, disposal, and recycle of each product.

Customer Notice

Dow strongly encourages its customers to review both their manufacturing processes and their applications of Dow products from the standpoint of human health and environmental quality to ensure that Dow products are not used in ways for which they are not intended or tested. Dow personnel are available to answer your questions and to provide reasonable technical support. Dow product literature, including safety data sheets, should be consulted prior to use of Dow products. Current safety data sheets are available from Dow.

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