ROHM AND HAAS

RHOPLEX™ AC-464 Emulsion Polymer

50 g/l VOC Capable, 100% Acrylic Binder for Exterior Flat and Satin Architectural Coatings

Description

RHOPLEX AC-464 emulsion polymer represents Rohm and Haas Company's progress in design of an APEO (alkyl phenol ethoxylate) surfactant-free binder for low VOC exterior flat and satin paints. Since this binder was developed from the RHOPLEX AC-264 platform, it maintains the excellent balance of properties customers have come to know.

RHOPLEX AC-464 is a high solids emulsion vehicle for exterior latex paints which provides the same level of adhesion to chalky substrates as RHOPLEX AC-264. Similar to RHOPLEX AC-264, this new low VOC product has excellent adhesion to chalky paint. Early exposures are showing excellent general durability associated with all-acrylic binders, and to date, AC-464 is very similar in performance to RHOPLEX AC-264 in both exterior flat and satin formulations. The polymer composition has been modified in order to optimize the balance of properties with lower co-solvent levels. Also, in some formulations, it is possible to get a minimum of 3 cycles of freeze-thaw stability.

RHOPLEX AC-464 maintains an excellent response to non-ionic rheology modifiers.

Typical Properties

These properties are typical but do not constitute specifications.

Appearance	White milky liquid
Solids	60 to 61%
pH	8.5 to 9.5
Viscosity	400 to 1500 cps
Weight per U.S. gallon	8.8 to 8.9 lbs
Dry bulking value	0.108 gal/lb
Wet bulking value	0.113 gal/lb
MFFT (°C)	<0

Formulating Suggestion With RHOPLEX AC-464

Starting point formulation for both a 50 g/l VOC High Quality Flat and Sheen are given for the evaluation of RHOPLEX AC-464. The specific raw materials suggested were used in the development of these formulations, and to the best of our knowledge, all are APEO-free. Alternatives should be checked carefully before full scale production is undertaken.

Rheology modifiers are recommended as co-thickeners and sole thickeners for use with RHOPLEX AC-464. Starting point formulations include RM-2020NPR/HEC (flat) and RM-2020NPR/RM-8W (satin). ACRYSOL™ RM-5 rheology modifier can also be used and is best suited for interior applications. These rheology modifiers enable the formulator to achieve excellent flow and leveling, high film build, and excellent roller application properties, with freedom from roller spatter. These additives offer significant improvement over cellulosic thickeners in these properties.

With any of the thickeners, including cellulosics, there is the possibility of phase separation. If phase separation is encountered, the use of Attagel 50 at 5 to 10 pounds per 100 gallons of paint is suggested. With Attagel 50, some increase in structure and unsheared viscosity may result.

For the best exterior performance, one of our recommendations is Minex 4 (flat) and Minex 7 (sheen) extenders. Minex 3 could also be substituted for Minex 4 if looking for an even lower sheen, and durability will not be compromised.

We have also found that universal grade slurry TiO_2 performs similarly to its dry grade counterpart. As for dispersant selection, TAMOL™ 850, TAMOL 731A, and TAMOL 165A all performed similarly in our lab tests. We expect that TAMOL 1124 could also be a good alternative. However, for the best freeze-thaw results, we recommend TAMOL 731.

Texanol is the coalescent of choice at a level of approximately 2% based on binder solids. This level should ensure good performance to temperatures down to 40°F. If lower temperature application is required, it is recommended to evaluate the formulation with a ladder of coalescent to optimize the low temperature film formation. If looking for better freeze-thaw stability, incorporating a commercial low VOC plasticizer (i.e., Optifilm 400, Loxanol 200, Archer RC, KP-140) in place of a more volatile coalescent, will allow the formulator to add more glycol to the formulation.

As many customers are interested in APEO-free materials, we have evaluated several surfactants in recent studies. While not an exact substitute for Triton X-100, we have had some success with BYK-348 surfactant. While not in our published formulas, work done with other binders found that Carbowet DC-01 could be an APEO-free alternative to Triton CF-10. Much more formulation and colorant work is underway.

As for mildewcide selection, our studies have included either Eagle Zinc 417W or XX-503 with SKANE™ M-8 or ROZONE™ 2000 for customers who require non-zinc oxide formulations. We continue to monitor current exposure series and develop other formulations to include for exposure history.

As always, please consult your Rohm and Haas technical consultant for any further information.

Higher Quality Flat White Exterior House Paint
Formulation W-464-1

Materials	Pounds	Gallons
Natrosol 250 MHR	3.0	0.25
Water	133.5	16.00
TAMOL 731A	15.9	1.75
KTPP	1.0	0.05
BYK-348	2.0	0.23
Tego Foamex 810	2.0	0.28
KATHON™ LX 1.5%	1.7	0.20
Propylene Glycol	9.0	1.00
Titanium Dioxide, Ti-Pure R-706	200.0	6.00
Zinc Oxide (XX-503)	25.0	0.53
Silicate, Minex 4	165.0	7.44
Attagel 50	5.0	0.25

Grind for 10-15 minutes on high speed disperser at 3800-4500 fpm and let down at slower speed as follows:

RHOPLEX AC-464 (60.5%)	323.6	36.50
ROPAQUE™ ULTRA	44.6	5.25
Tego Foamex 810	2.0	0.28
Texanol	4.2	0.55
SKANE M-8	3.0	0.34
Ammonia	0.8	0.10
Water	75.0	9.00
Natrosol 250 MHR (2 1/2%)	117.8	14.00
	1134.1	**100.00**

Formulation Constants	
PVC	45.0%
Volume Solids	38.1%
pH	9.0 ± 2
Viscosity, Initial	95 ± 3 KU
ICI Viscosity	1.0 ± 0.1 P
V.O.C.	50 g/l

Higher Build High Quality Flat White House Paint
Formulation W-464-2
Thickened with Rheology Modifier ACRYSOL RM-2020NPR

Materials	Pounds	Gallons
Natrosol 250 MHR	3.0	0.25
Water	133.5	16.00
TAMOL 850	15.9	1.75
KTPP	1.0	0.05
BYK-348	2.0	0.23
Tego Foamex 810	2.0	0.28
KATHON LX 1.5%	1.7	0.20
Propylene Glycol	9.0	1.00
Titanium Dioxide, Ti-Pure R-706	200.0	6.00
Zinc Oxide (XX-503)	25.0	0.53
Silicate, Minex 4	165.0	7.44
Attagel 50	5.0	0.25

Grind for 10-15 minutes on high speed disperser at 3800-4500 fpm and let down at slower speed as follows:

RHOPLEX AC-464 (60.5%)	323.6	36.50
ROPAQUE ULTRA	44.6	5.25
Tego Foamex 810	2.0	0.28
Texanol	4.2	0.55
SKANE M-8	3.0	0.34
Ammonia	0.8	0.10
Water	102.1	12.25
ACRYSOL RM-2020NPR	20.8	2.50
Natrosol 250 MHR (2 1/2%)	68.8	8.25
	1133.0	**100.00**

Formulation Constants	
PVC	44.8%
Volume Solids	36.1%
pH	9.0 ± 2
Viscosity, Initial	90 ± 3 KU
ICI Viscosity	1.5 ± 0.2 P
V.O.C.	50 g/l

White Satin Exterior House Paint
Formulation W-464-3
Thickened with Rheology Modifier ACRYSOL RM-2020NPR and RM-8W

Materials	Pounds	Gallons
Water	64.7	7.75
TAMOL 165A	13.3	1.50
BYK-348	2.5	0.31
Tego Foamex 810	1.0	0.12
Propylene Glycol	4.2	0.50
Titanium Dioxide, R-706	175.0	5.24
Zinc Oxide (XX-503)	25.0	0.53
Minex 7	100.0	4.59
KATHON LX 1.5%	1.5	0.18
Grind for 15-20 minutes on high speed disperser at 3800-4500 fpm and let down at slower speed as follows:		
RHOPLEX AC-464 (60.5%)	356.8	40.25
ROPAQUE ULTRA	38.5	4.50
Propylene Glycol	4.1	0.46
Texanol	4.6	0.57
Tego Foamex 810	1.0	0.12
SKANE M-8	3.0	0.34
Ammonia (28%)	0.7	0.10
ACRYSOL RM-2020NPR	25.0	2.85
ACRYSOL RM-8W	14.0	1.61
Water	237.3	28.48
	1072.2	**100.00**

Formulation Constants	
PVC	33.4%
Volume Solids	34.6%
pH	9.0
Viscosity, Equilibrated	95
ICI Viscosity	1.1 ± 0.1 P
V.O.C.	50 g/l

Material Safety Data Sheets

Rohm and Haas Material Safety Data Sheets (MSDS) contain pertinent information that you may need to protect your employees and customers against any known health or safety hazards associated with our products.

Under the OSHA Hazard Communication Standard, workers must have access to and understand MSDS on all hazardous substances to which they are exposed. Thus, it is important that you provide appropriate training and information to your employees and make sure they have available to them MSDS on any hazardous products in their workplace.

Rohm and Haas Company sends MSDS on non-OSHA-hazardous as well as OSHA-hazardous products to both the "bill to" and "ship to" locations of all our customers upon initial shipment (including samples) of all of our products (whether or not they are considered OSHA-hazardous). If you do not have access to one of these MSDS, please contact your local Rohm and Haas representative for an additional copy. Updated MSDS are sent upon revision to all customers of record. In addition, MSDS are sent on an annual basis to all customers of record.

MSDS should be obtained from your suppliers of other materials recommended in this bulletin.

Rohm and Haas Company is a member of the American Chemistry Council (ACC) and is committed to ACC's Responsible Care® Program.

For More Information...

To further assist you, Rohm and Haas publishes *Handling and Storage of Polymer Emulsions*, a comprehensive guide on the safety, health, first aid measures, toxicology, and storage of its acrylic polymer emulsions. Please contact your local sales representative or sales office to obtain a copy.

In addition, specific inquiries on these issues, including bulk storage and handling considerations, may be directed to your Rohm and Haas technical representative or customer service supervisor.

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