Introducing

# AIRCOFLEX 500

Airco's

"LATEX of the FUTURE"

GLD005920

# AIRCOFLEX* 500

## ACETOXYLATED POLYETHYLENE LATEX FOR INTERIOR AND EXTERIOR PAINTS

AIRCOFLEX 500 is an emulsion copolymer of vinyl acetate and ethylene. As such, it is a member of the first series of vinyl acetate-ethylene copolymers to be manufactured in emulsion form.

AIRCOFLEX 500 is an agreeable latex to work with, as it is extremely easy to formulate. The intrinsic coalescing ability of the copolymer minimizes the need for coalescing agents with their tendency to cause pigment flocculation. The balanced surfactant system of the latex gives good pigment wetting, and stabilizes the formulated paint. And, although AIRCOFLEX 500 is the first of its kind for the paint industry, it takes to conventional latex paint techniques like an old friend.

The paper used in this brochure was coated with AIRCOFLEX 100, Airco's new emulsion binder for the coating of paper and paperboard.

GLD005921

*Trademark of Air Reduction Company, Inc.

## SPECIFICATIONS

| | |
|---|---|
| Total solids | 55% to 57% |
| Viscosity* | 300 to 600 cps. |
| pH | 4.5 to 5.5 |
| Free monomer | 0.4% max. |

| TYPICAL EMULSION PROPERTIES | | TYPICAL FILM PROPERTIES | |
|---|---|---|---|
| Copolymer type | Acetoxylated polyethylene | Clarity | Clear, water white |
| Appearance | Milky, bluish-white | Gloss | High |
| Odor | Slight | Light stability | Excellent |
| Average particle size | About 0.17 | Aging characteristics | Excellent |
| Particle charge | Nonionic | Film formation | Excellent |
| Mechanical stability** | Stable | Water resistance | Excellent |
| Weight per gallon at 77° F.*** | 9.1 pounds | Flexibility | Excellent |
| Reaction to borax | Stable | | |

*Brookfield Viscometer, Model LV, at 60 r.p.m. and 25° C.
**Passes 30 minutes in a Waring Blendor at high speed.
***Foam-free. Weight per gallon when received may be lower because of [illegible]

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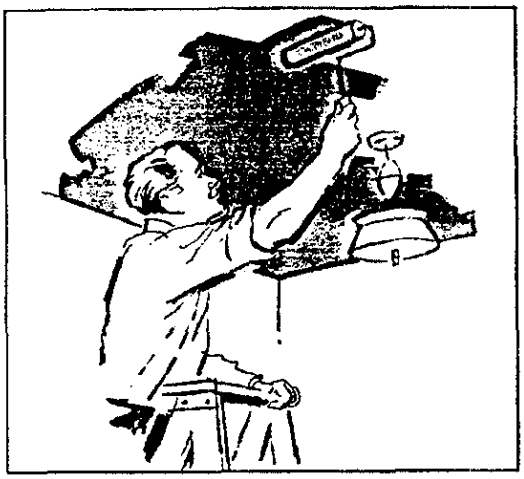
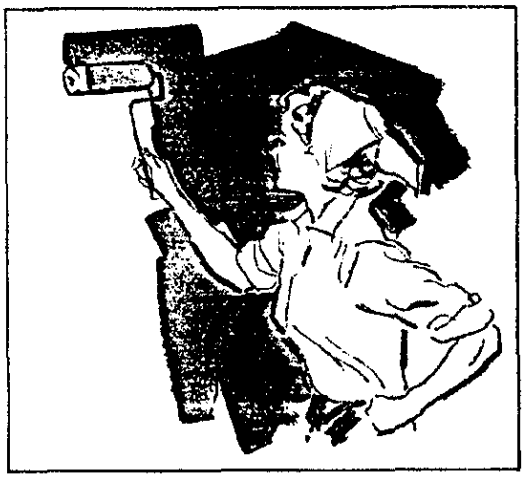
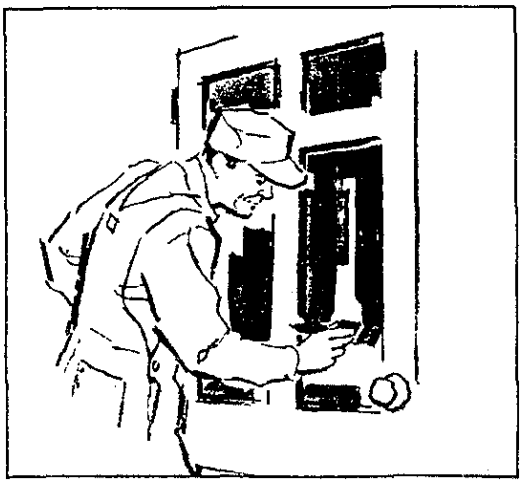
# AIRCOFLEX 500

## FOR INTERIOR PAINTS







### LITTLE OR NO COALESCING AGENT

AIRCOFLEX 500 is a flexible polymer, highly plasticized internally, with a fine particle size. These properties combine to give it such good intrinsic coalescing ability—even at low temperatures—that little or no coalescing agent is needed.

A conventional latex paint usually must contain from one to two percent of a coalescing agent in order to fuse properly. If you are chiefly interested in savings, the coalescing agent in an AIRCOFLEX 500 paint can be reduced to 0.5 percent or even zero percent. This can cut the raw materials cost of the paint from 2¢ to as much as 4¢ a gallon.

If quality is your target, the coalescing agent can be kept at the same level as that in a conventional paint, and the result will be better low-temperature fusion than that obtainable with any other emulsion vehicle.

### TOUCH-UP

AIRCOFLEX 500 has the good touch-up properties necessary for interior applications—another result of the coalescing ability of the polymer. Touch-up without lapping or ghosting is more readily obtainable with AIRCOFLEX 500 paints than with paints made from conventional latices.

### PIGMENT-BINDING CAPACITY

The best conventional paint latices usually have critical PVC's in the neighborhood of 59% or 60%. These critical PVC's are exceeded by those of AIRCOFLEX 500 because of its strong pigment-binding capacity, which can be used to advantage in either one of two ways: the amount of emulsion in any given paint formulation can be reduced, thereby cutting costs but still yielding paints of at least equal quality; or the emulsion can be kept at the same level, yielding paints of superior quality.

### COLOR STABILITY

The complete color stability of AIRCOFLEX 500, like that of polyvinyl acetate or all-acrylic polymers, depends on the complete saturation of the carbon-to-carbon bonds in the molecule. Unlike styrene-butadiene, for example, AIRCOFLEX 500 will not cause yellowing of interior paint films.

### SCRUBBABILITY

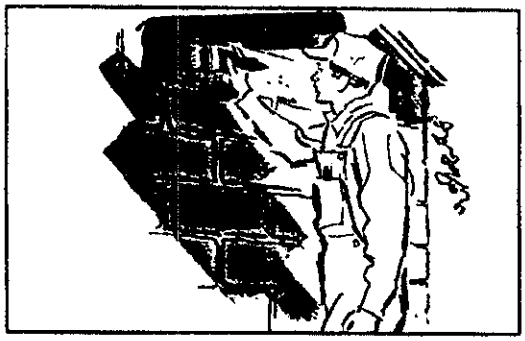
The high comonomer content of AIRCOFLEX 500 makes it easy for the polymer to coalesce into a continuous film. The high molecular weight takes over in the dried film, making it tough and durable. This combination of properties plus a balanced surfactant system give the AIRCOFLEX 500 film the resiliency and toughness it needs for strong wet-abrasion resistance.

# AIRCOFLEX 500
## FOR EXTERIOR PAINTS

Prototypes of AIRCOFLEX 500 have been exposed outdoors for two years in New Jersey and Florida with excellent results. They have performed well on masonry—even highly alkaline masonry—and on properly primed wood.

A parallel success for AIRCOFLEX 500 is indicated because of the wealth of properties it has that are necessary for exterior exposures:

- High molecular weight
- Flexibility and elongation
- Resistance to ultraviolet light
- Alkali resistance



### FLEXIBILITY AND ELONGATION

The flexibility and elongation of AIRCOFLEX 500 enable it to change shape with expanding or contracting substrates and to recover without rupturing. This minimizes the possibility of cracking or flaking in the paint film.

The ethylene-derived portion of the polymer gives it its flexible, extensible properties. Some idea of the extensibility of AIRCOFLEX 500 may be had by referring to the accompanying table. The table shows the results obtained by stretching free paint films made from AIRCOFLEX 500 at PVC's of 25, 35, and 45 percent. The films were stretched on an Instron tester at a rate of extension of 20 inches per minute.

| PVC of AIRCOFLEX 500 Paint Films | 100% Modulus | Elongation at Rupture |
|---|---|---|
| 25% PVC | 219 p.s.i. | 824% |
| 35% PVC | 385 p.s.i. | 535% |
| 45% PVC | 422 p.s.i. | 169% |

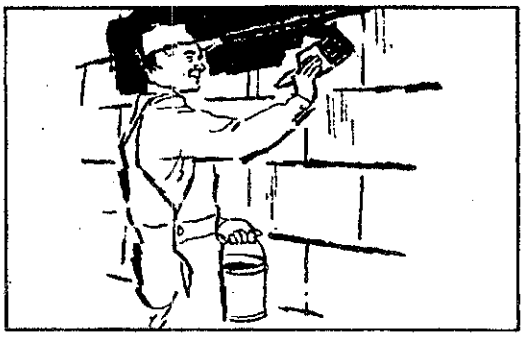


### TINT RETENTION

The tint retention of AIRCOFLEX 500 comes from the pigment-binding power and intrinsic coalescing ability of the polymer, which bind the pigment particles tightly into the paint film.

The tint retention is also strongly dependent on the resistance of the polymer to ultraviolet light. Even though AIRCOFLEX 500 is partially composed of ethylene, it is not attacked by ultraviolet light because branching does not occur in the ethylene segments of the molecule.

Low-density polyethylene, on the other hand, is highly branched, with the tertiary carbon atoms at the point of branching providing the sites for attack by ultraviolet light. Its branched nature is just one of the reasons polyethylene is unsuitable for paints, since this leads to early film degradation and chalking.



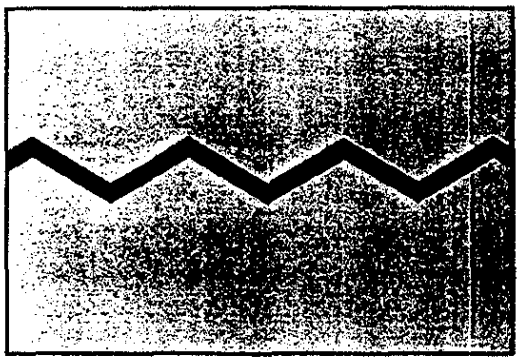
### ALKALI RESISTANCE

The alkali resistance of AIRCOFLEX 500 can be visually compared with that of conventional paint polymers by immersing free films of both types in 0.5% sodium hydroxide solutions. A free paint film based on a conventional polymer that has a PVC of 35% usually disintegrates overnight. Films of AIRCOFLEX 500 at the same and at higher PVC's have been in 0.5% caustic solutions for over a year without disintegrating.

# AIRCOFLEX 500

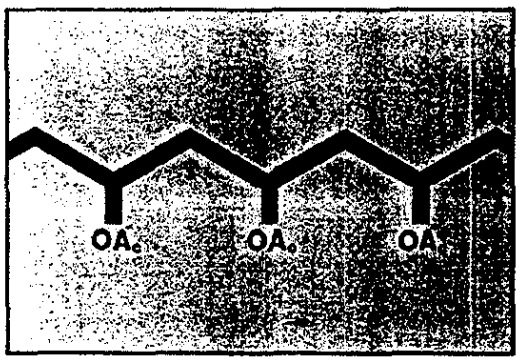
## What is AIRCOFLEX?

An AIRCOFLEX acetoxylated polyethylene is an entirely new polymer that incorporates the best properties of polyethylene and polyvinyl acetate. These properties are more useful in paints than those of either polyethylene or polyvinyl acetate by itself. A better understanding of AIRCOFLEX may be gained by briefly reviewing the two polymer extremes from which it is derived.



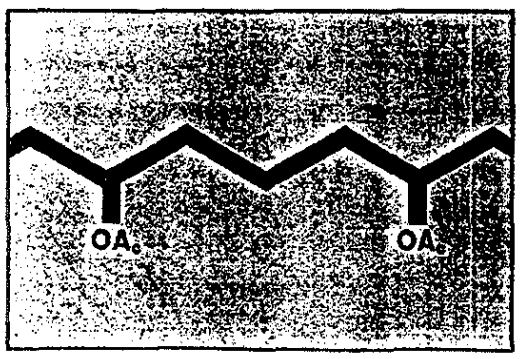
### POLYETHYLENE

An idealized polyethylene polymer consists simply of a carbon-to-carbon backbone on which only hydrogen atoms are attached. It is a soft, flexible, elastomeric polymer that strongly resists both acids and alkalies, since it does not contain sites at which hydrolysis can occur. The low-density type of polyethylene is highly branched.




### POLYVINYL ACETATE

An idealized polyvinyl acetate polymer consists of a carbon-to-carbon backbone on which acetoxy groups are attached to every second carbon atom. It is a hard, glassy, thermoplastic polymer that hydrolyzes to polyvinyl alcohol in the presence of acids or alkalies. Although it is a hydrophobic polymer, it can bond to hydrophilic (polar) substrates by means of the polar sites provided by the acetoxy groups in the molecule.




### AIRCOFLEX ACETOXYLATED POLYETHYLENE

*(A one-to-one mole ratio of vinyl acetate to ethylene is shown.)*

An AIRCOFLEX acetoxylated polyethylene has a carbon-to-carbon backbone on which acetoxy groups are attached with less frequency than in polyvinyl acetate. It is a flexible polymer, elastomeric in nature, but still able to be deformed by heat like a true thermoplastic. As in polyvinyl acetate, the acetoxy groups on the polymer chain provide polar sites for adhesion to polar substrates as well as binding capacity for the pigments used in paints.

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## SUGGESTED FORMULATIONS

### 50010 INTERIOR PRIMER SEALER

YIELD ..... 98 gallons
SOLIDS ..... 45%
PVC ..... 41.6%
RAW MATERIAL COST
About $0.85 per gallon

| | Pounds |
|---|---|
| Natrosol 250 HR (2% solution) | 175 |
| Igepal CO-610 | 3 |
| Tamol 731 | 5 |
| Ethylene glycol | 20 |
| Colloid 677 | 2 |
| Phenylmercuric acetate (18% mercury) | 0.3 |
| Titanox RA-50 | 75 |
| Camel-TEX | 100 |
| Satintone #1 | 30 |
| Asbestine 3X | 100 |
| Water | 225 |
| Texanol | 8 |
| AIRCOFLEX 500 | 300 |

### 50014 EXTERIOR WHITE

YIELD ..... 100 gallons
SOLIDS ..... 49.5%
PVC ..... 45%
RAW MATERIAL COST
About $1.52 per gallon

| | Pounds |
|---|---|
| Natrosol 250 HR (2% solution) | 175 |
| Polyglycol P-1200 | 3 |
| R & R 551 | 5 |
| SURFYNOL TG | 3 |
| Ethylene glycol | 20 |
| Phenylmercuric acetate (18% mercury) | 8 |
| Titanox RA-50 | 225 |
| Titanox A-168-LO | 25 |
| Nytal 300 | 155 |
| Carbitol acetate | 12 |
| Water | 220 |
| AIRCOFLEX 500 | 300 |

### 50011 INTERIOR WHITE

YIELD ..... 100 gallons
SOLIDS ..... 54%
PVC ..... 59.5%
RAW MATERIAL COST
About $1.30 per gallon

| | Pounds |
|---|---|
| Natrosol 250 HR (2% solution) | 250 |
| R & R 551 | 3 |
| Igepal CO-610 | 3 |
| Tamol 731 | 8 |
| Ethylene glycol | 25 |
| Nopco NDW | 2 |
| Phenylmercuric acetate (18% mercury) | 0.3 |
| Titanox RA-46 | 250 |
| Micro-Cel T-70 | 25 |
| Satintone #1 | 125 |
| Asbestine 3X | 50 |
| Gold Bond R Silica | 75 |
| Water | 163 |
| AIRCOFLEX 500 | 240 |

### 50015 EXTERIOR TINT BASE

YIELD ..... 100 gallons
SOLIDS ..... 58%
PVC ..... 40%
RAW MATERIAL COST
About $1.31 per gallon

| | Pounds |
|---|---|
| Natrosol 250 HR (2% solution) | 150 |
| Nopco NDW | 2 |
| Tamol 731 | 2 |
| Igepal CO-610 | 2 |
| R & R 551 | 4 |
| Ethylene glycol | 20 |
| Phenylmercuric acetate (18% mercury) | 6 |
| Ti-Pure R-610 | 150 |
| Lorite | 200 |
| Water | 190 |
| Igepal CO-610 | 2 |
| Carbitol acetate | 12 |
| AIRCOFLEX 500 | 360 |

### 50012 INTERIOR WHITE AND TINT BASE

YIELD ..... 100 gallons
SOLIDS ..... 52%
PVC ..... 57%
RAW MATERIAL COST
About $1.15 per gallon

| | Pounds |
|---|---|
| Natrosol 250 HR (2% solution) | 250 |
| R & R 551 | 3 |
| Igepal CO-610 | 3 |
| Tamol 731 | 8 |
| Ethylene glycol | 30 |
| Nopco NDW | 2 |
| Phenylmercuric acetate (18% mercury) | 0.3 |
| Titanox RA-46 | 200 |
| Celite 281 | 25 |
| Satintone #1 | 50 |
| Snowflake White | 200 |
| Water | 163 |
| AIRCOFLEX 500 | 240 |

### 50016 INTERIOR WHITE AND TINT BASE

| | Pounds |
|---|---|
| Natrosol 250 HR (2% solution) | 300 |
| R & R 551 | 3 |
| Igepal CO-610 | 3 |
| Tamol 731 | 5 |
| Ethylene glycol | 20 |
| Colloid 677 | 2 |
| Phenylmercuric acetate (18% mercury) | 0.3 |
| Titanox RA-50 | 150 |
| Micro-Cel T-70 | 30 |
| Satintone #1 | 125 |
| Camel-Ark | 50 |
| Gold Bond R Silica | 75 |
| Water | 20 |
| AIRCOFLEX 500 | 1[illegible] |

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## TRADEMARKS AND SUPPLIERS

| | |
|---|---|
| Asbestine 3X | International Talc Co., Inc. |
| Camel-CARB | Harry T. Campbell Sons' Corp. |
| Camel-TEX | |
| Carbitol acetate | Union Carbide Corporation |
| Celite 281 | Johns-Manville |
| Colloid 677 | Colloids, Inc. |
| Gold Bond R Silica | Tamms Industries, Inc. |
| Igepal CO 610 | Antara Chemicals, Division of General Aniline & Film Corp. |
| Lorite | National Lead Co., DeLore Division |
| Micro-Cel T-70 | Johns-Manville |
| Natrosol 250 HR | Hercules Powder Company, Inc. |
| Nopco NDW | Nopco Chemical Company |
| Nytal 300 | [illegible] Vanderbilt Co., Inc. |
| Polyglycol P-1200 | [illegible] Chemical Company |
| R & R 551 | Ross & Rowe, Inc. |
| Satintone #1 | Minerals & Chemicals Philipp Corp. |
| Snowflake White | Thompson, Weinman and Company |
| SURFYNOL TG | Air Reduction Chemical & Carbide Co. |
| Tamol 731 | Rohm & Haas Company |
| Texanol | Eastman Chemical Products, Inc. |
| Ti-Pure R-510 | E. I. du Pont de Nemours & Co., Inc. |
| Titanox A-168-LO | Titanium Pigment Corp., Subsidiary of National Lead Company |
| Titanox RA-46 | |
| Titanox RA-50 | |

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Airco Company International
150 East 42nd St., New York, New York 10017
Tel. 212 MUrray Hill 2-6700, Extension 563



ASK THE MAN FROM AIRCO about chemicals and polymers [illegible]

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