

SPECIFICATION

Water Clean Up Aerosol Paint

The present invention relates to aerosol paints of the type that can be cleaned up with water.

U.S. Patent No. 4,125,499 discloses a water clean up aerosol paint and container from which the paint can be sprayed. The paint contains a film forming resin that has been rendered water soluble through neutralization of acid groups by an amine or ammonia, together with a water soluble solvent for the water soluble resin. U.S. Patent No. 4,125,499 states that to be successfully sprayed from the aerosol container the paint formulation should contain little, and preferably no water in the aerosol can.

U.S. Patent No. 4,125,499 also states that only a small amount of water insoluble solvent can be tolerated in the aerosol paint formulation. The working examples in U.S. Patent No. 4,125,499 consistent with this do not contain any water insoluble solvent but use relatively large amounts of water soluble acetone as part of the water soluble solvent system.

Contrary to these latter noted statements in U.S. Patent No. 4,125,499 concerning water insoluble solvent, it has been found that relatively large amounts of water insoluble solvent can be used advantageously and a highly satisfactory product having water clean up properties is obtained. The discovery upon which the present invention is based permits elimination of water soluble solvents such as acetone and substitution thereof with water insoluble solvents such as V.M.&P. naphtha. The resulting product provided by the present invention offers a cost savings in that V.M.&P. naphtha is less expensive than acetone. More important, a fire safety benefit is obtained through the use of solvents having higher flash points. For example, the Tag open cup flash point for acetone is 5 to 6°C, while the Tag open cup flash point for V.M.&P. naphtha is 30 to 60°C.

Accordingly the present invention provides a paint formulation comprising from 10 to 60 weight percent, preferably from 15 to 35 weight percent, of a water soluble film forming resin, from 10 to 30 weight percent, preferably from 15 to 30 weight percent, of a water soluble solvent for the resin, from 25 to 45 weight percent, of a water insoluble solvent for the resin, and 0 to 8 weight percent, preferably less than 1 weight percent, of water.

In one aspect, the present invention provides an aerosol container containing a propellant and a paint formulation as defined above.

The present invention contemplates gloss and satin clear varnish formulations, as well as those having pigments of various colours in amounts up to about 40 weight percent of the formulation. There are a number of additives which are conventionally used in aerosol paint formulations and the following table in percent by weight indicates the amounts of a number of such materials which may optionally be included.

35	Water soluble resin	10 to 60%	
	Water soluble solvent	10 to 30%	35
	Water insoluble solvent	25 to 45%	
	Pigments	0 to 40%	
	Drier	0.01 to 2.0%	
	Wetting agent	0 to 3.0%	
40	Flattening agent	0 to 20%	40
	Anti-settling agent	0 to 3.0%	

The important aspect of the present invention is the solvent system which includes sufficient water soluble solvent of the type used in U.S. Patent No. 4,125,499 to impart water clean up properties to the system. The balance of the solvent system can be made up with any water insoluble solvent or mixtures of such solvents that is a solvent for the film forming resin used in the paint. Typical water insoluble solvents are aliphatic hydrocarbon solvents such as hexane, heptane, aromatic hydrocarbon solvents such as toluene and xylene and in the preferred embodiment the solvent commonly used in the paint industry known as V.M.&P. naphtha. V.M.&P. naphtha is defined in *The Condensed Chemical Dictionary*, Eighth Edition, as follows:

“(petroleum spirits; petroleum thinner; mineral spirits; mineral thinner). Any of a number of narrow-boiling-range fractions of petroleum with boiling points of about 200 to 400°F, according to the specific use; distillation range 246 to 290°F; sp. gr. 0.7543; density 6.280 lbs/gal; pour point below -70°F; flash point 57°F (TCC).”

Other water insoluble solvents such as benzyl alcohol or chlorinated solvents may also be used, provided the solvent or solvent mixture is selected so as to give a paint base that when packaged in an aerosol has the desirable properties of, for example, proper sprayability, film formation and Tag time.

Apart from the solvent system used in the present paint formulation, the other parameters such as the aerosol container, types and amounts of volatile propellants which are used therein for spraying the paint formulation, types of water soluble film forming resins that may be used, types of water soluble solvents that may be used and pigments, are essentially the same as those disclosed in the

above cited U.S. Patent No. 4,125,499. With respect to neutralization of the resin to render it water soluble, it has been found that with certain types of resins it is desirable to carry out the neutralization with an organic amine as rather than ammonia for better stability of the paint.

The present invention is further illustrated by the following examples which provide typical formulations that can be packaged in an aerosol container along with propellant and applied to a surface by spraying. These formulations can be cleaned up with water for up to about 10 minutes after being sprayed on a surface.

Example 1
Water Soluble White Aerosol Paint Base

Ingredients	% wt.	% water soluble solvent	% water insoluble solvent
Aquamac 1000*	21.88	6.56	
AMP—95**	1.44		
Titanium Dioxide	20.89		
BYK 301***	0.22		
6% Cobalt Naphthenate****	0.22		
6% Manganese Naphthenate****	0.18		
Activ—8****	0.05		
Ethylene Glycol			
Monobutyl Ether*****	5.89	5.89	
Butyl Carbitol (a)	4.77	4.77	
(registered Trade Mark)			
V.M.&P. Naphtha	44.46		44.46
Total	100.00	17.22	44.46

*Aquamac 1000 is a water reducible alkyd resin obtained from International Minerals and Chemical Corporation. It is a 70% solution in butyl cellosolve and n-butanol.

**2-amino-2-methyl-1-propanol containing 5% water

***wetting agent

****drier

*****butyl Cellosolve (registered Trade Mark)

(a) diethylene glycol monobutyl ether.

Example 2
Water Soluble Yellow Aerosol Base Paint

Ingredients	% wt.	% water soluble solvent	% water insoluble solvent
Aquamac 1000	41.35	10.34	
AMP—95	2.61		
Titanium Dioxide	8.22		
Dalmar Yellow	1.67		
Minex 7*	1.96		
(Registered Trade Mark)			
Ethylene Glycol			
Monobutyl Ether	10.90	10.90	
Butyl Carbitol	3.26	3.26	
6% Cobalt Naphthenate	0.41		
6% Manganese Naphthenate	0.29		
BYK 301	0.25		
Activ—8	0.10		
V.M.&P. Naphtha	28.98		28.98
Total	100.00	24.50	28.98

*filler

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Example 3

Water Soluble Clear Gloss

<i>Ingredients</i>		<i>% wt.</i>	<i>% water soluble solvent</i>	<i>% water insoluble solvent</i>	
5	XP—4366*, 70% NV Resin	49.57	14.87		5
	28% Ammonium Hydroxide	2.11			
	Cobalt Hydrocure**	0.07			
	Manganese Hydrocure**	0.07			
	Activ—8	0.06			
10	L—5310***				10
	(20% in butyl cellosolve)	0.23	0.18		
	Ethylene Glycol				
	Monobutyl Ether	14.63	14.63		
	V.M.&P. Naphtha	33.26		33.26	
15	Total	100.00	29.68	33.26	15

*This is a water reducible oil modified urethane in Butyl Cellosolve, glycol ester, ketone ether solvent combination obtained from Spencer Kellogg Division of Textron Inc.

**drier

***wetting agent

Example 4

Water Soluble Clear Satin

<i>Ingredients</i>		<i>% wt.</i>	<i>% water soluble solvent</i>	<i>% water insoluble solvent</i>	
	XP—4366, 70% NV Resin	45.46	13.64		
25	28% Ammonium Hydroxide	1.94			25
	Cobalt Hydrocure	0.07			
	Manganese Hydrocure	0.07			
	Activ—8	0.55			
	Silica (Zeothir—95)	4.67			
30	Ethylene Glycol				30
	Monobutyl Ether	16.00	16.00		
	V.M.&P. Naphtha	31.24		31.24	
	Total	100.00	29.64	31.24	

Claims

- 35 1. A paint formulation comprising from 10 to 60 weight percent of a water soluble film forming resin, from 10 to 30 weight percent of a water soluble solvent for the resin, from 25 to 45 weight percent of a water insoluble solvent for the resin, and 0 to 8 weight percent of water. 35
 2. A paint formulation as claimed in Claim 1, wherein water is present in amount of less than 1 weight percent.
 - 40 3. A paint formulation as claimed in Claim 1 or 2, which comprises from 15 to 35 weight percent of a water soluble film forming resin, from 15 to 30 weight percent of a water soluble solvent for the resin, and from 25 to 45 weight percent of a water insoluble solvent for the resin. 40
 4. A paint formulation as claimed in any of claims 1 to 3, which includes up to 40 weight percent of a pigment.
 - 45 5. A paint formulation as claimed in Claim 1, which has the following ingredients in weight percent: 45
- | | | | |
|----|-------------------------|--------------|----|
| 50 | Water soluble resin | 10 to 60% | |
| | Water soluble solvent | 10 to 30% | |
| | Water insoluble solvent | 25 to 45% | |
| | Pigment | 0 to 40% | 50 |
| | Drier | 0.01 to 2.0% | |
| | Wetting agent | 0 to 3.0% | |
| | Flattening agent | 0 to 20% | |
| | Anti-settling agent | 0 to 3.0% | |
- 55 6. A paint formulation as claimed in any of claims 1 to 5, wherein the water insoluble solvent for the resin is V.M.&P. naphtha. 55
 7. A paint formulation as claimed in any of claims 1 to 6, wherein the water soluble solvent comprises ethylene glycol monobutyl ether and/or diethylene glycol monobutyl ether.



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Example 3
Water Soluble Clear Gloss

	<i>Ingredients</i>	<i>% wt.</i>	<i>% water soluble solvent</i>	<i>% water insoluble solvent</i>	
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	28% Ammonium Hydroxide	2.11			
	Cobalt Hydrocure**	0.07			
	Manganese Hydrocure**	0.07			
	Activ—8	0.06			
10	L—5310***				10
	(20% in butyl cellosolve)	0.23	0.18		
	Ethylene Glycol				
	Monobutyl Ether	14.63	14.63		
	V.M.&P. Naphtha	33.26		33.26	
15	Total	100.00	29.68	33.26	15

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**drier

***wetting agent

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Example 4
Water Soluble Clear Satin

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	<i>Ingredients</i>	<i>% wt.</i>	<i>% water soluble solvent</i>	<i>% water insoluble solvent</i>	
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4. A paint formulation as claimed in any of claims 1 to 3, which includes up to 40 weight percent of a pigment.
- 45 5. A paint formulation as claimed in Claim 1, which has the following ingredients in weight percent: 45
- | | | | |
|----|-------------------------|--------------|----|
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| | Water soluble solvent | 10 to 30% | |
| | Water insoluble solvent | 25 to 45% | |
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| | Drier | 0.01 to 2.0% | |
| | Wetting agent | 0 to 3.0% | |
| | Flattening agent | 0 to 20% | |
| | Anti-settling agent | 0 to 3.0% | 50 |
- 55 6. A paint formulation as claimed in any of claims 1 to 5, wherein the water insoluble solvent for the resin is V.M.&P. naphtha. 55
7. A paint formulation as claimed in any of claims 1 to 6, wherein the water soluble solvent comprises ethylene glycol monobutyl ethyl and/or diethylene glycol monobutyl ether.



8. A paint formulation substantially as described in any one of the Examples herein.
9. An aerosol container containing a propellant and a paint formulation as claimed in any of claims 1 to 8.

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