

- [54] **FILMING AMINE EMULSIONS**
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- [51] Int. Cl. **C09k 11/14, C09d 5/08**
- [58] Field of Search..... **106/14; 252/392**

[56] **References Cited**

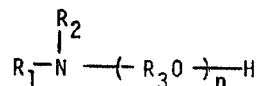
UNITED STATES PATENTS

2,712,531	7/1955	Maguire.....	252/392
2,956,889	10/1960	Denman.....	106/14
3,418,254	12/1968	Bishof et al.....	106/14
3,456,013	7/1969	Egan.....	260/584
3,520,820	7/1970	Hwa.....	106/14
3,718,604	2/1973	Scherf et al.....	106/14

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[57] **ABSTRACT**

Filming amine emulsions employing polyoxyalkylene-containing tertiary amines are used to protect metal piping and apparatus which are subject to corrosive attack by aqueous media which is being transported or with which they are otherwise in contact. The corrosion-inhibiting composition comprises an aliphatic film-forming amine, water, and a polyoxyalkylene-containing tertiary amine dispersing agent represented by the formula:



wherein R₁ and R₂ are aliphatic hydrocarbon radicals having from 12 to 20 carbon atoms, and wherein R₃O is a polyoxyalkylene chain of randomly distributed oxyethylene and oxypropylene units in a ratio of from 1:10 to 10:1 respectively, the total of all units in the chain being n, which is an integer of 3 to 100. The corrosion-inhibiting composition may also include an aliphatic amine salt, particularly tallow amine acetate, and/or a neutralizing amine, particularly diethylaminoethanol.

37 Claims, No Drawings

FILMING AMINE EMULSIONS

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to methods and compositions for inhibiting the corrosion of metal components which are contacted by aqueous fluids. It particularly concerns the use of filming amine emulsions employing polyoxyalkylene containing tertiary amines to protect metal piping and apparatus which are subject to corrosive attack by the aqueous media which is being transported or with which they are otherwise in contact. A wide variety of systems employ aqueous fluids for various industrial and commercial purposes and include, among others, steam turbine systems, boiler systems, steam condensate return systems, steam distribution systems, heat transfer water systems, evaporator systems, processing water systems, wet pipe fire systems, cooling water systems, and so forth.

Reference herein to metal and metal components and apparatus is intended to include ferrous materials and alloys, non-ferrous materials and alloys such as those based on copper and nickel, and so forth; and various structures such as pipes, tanks, fittings, valves, traps, heat exchangers, deaerators, and similar devices.

While the description of the invention concerns itself primarily with corrosion of metal components produced by contact of the metal surfaces with steam and steam condensate, the methods and compositions of this invention also find useful application generally to inhibiting corrosion of metal surfaces contacted by corrosive aqueous fluids which are transported, circulated and contained within the metal components. Nevertheless, the methods and compositions of the invention have proven especially beneficial in steam and steam condensate systems where it is desired to keep additives to the system at a minimum, since corrosion inhibiting results are realized in this environment when using only extremely small quantities of the compositions of this invention.

The corrosion which is experienced by metal exposed to aqueous fluids, particularly steam and steam condensate, is apparently due in large measure to carbon dioxide and oxygen dissolved or otherwise entrained in the aqueous fluid. However, the corrosive action may also be caused by ammonia, hydrogen sulfide, sulfur dioxide, or other substances present in the aqueous fluid in gas, liquid, or vapor form; or by the aqueous fluid itself; or by a combination of any of these.

2. Description of the Prior Art

The use of aliphatic amines to inhibit the corrosion of metal and metal components taking place under the conditions described above is well known in the art. U.S. Pat. No. 2,460,259 discloses deposition of a protective, substantially mono-nuclear film of a corrosion inhibiting substance comprising, among other materials, high molecular weight amines, particularly octadecylamine. While these aliphatic amines provide adequate protection against corrosion for metal surfaces on which they are actually coated, they have confronted the art with a number of problems. For example, aliphatic amines satisfactory for corrosion inhibition are also solids at room temperature, thus requiring transformation to a liquid form to be usable. Proper utilization requires that the composition be accurately metered to and dispersed within the system to be treated. However, the aliphatic amines useful for corro-

sion inhibition are also nearly water insoluble. Thus, it has been conventional to prepare compositions containing salts of aliphatic amines which are more water soluble than the amines themselves. U.S. Pat. No. 2,712,531 discloses the use of a blend of octadecylamine and octadecylamine acetate as a corrosion inhibitor. U.S. Pat. No. 2,767,106 discloses the use of an aliphatic amine glycolate, either alone or in combination with an aliphatic amine, as a corrosion inhibitor. It has also been conventional to prepare dilute aqueous dispersions of aliphatic amines by combining them with dispersing aids or emulsifiers. U.S. Pat. No. 2,649,415 discloses the use of polyalkoxylated derivatives of monocarboxylic acids, monohydric alcohols, and of alkylphenols as non-ionic dispersing agents for aliphatic amine corrosion inhibitors. U.S. Pat. No. 2,956,889 discloses a corrosion inhibitor comprising an aqueous emulsion of an aliphatic amine which is stabilized by the presence of a water-soluble condensate of at least 5 moles of ethylene oxide with a high molecular weight aliphatic amine. U.S. Pat. No. 3,088,796 discloses the use of polyoxyethylene tertiary amine and quaternary ammonium chloride compounds as emulsifiers for film-forming aliphatic amines to produce corrosion inhibiting compositions. U.S. Pat. No. 3,239,470 discloses the combination of a primary aliphatic amine, an ethoxylated amine condensate, and a phenolic lignin sulfonate used as a corrosion inhibitor. U.S. Pat. No. 3,418,253 discloses the use of an aqueous dispersion of a straight chain primary amine emulsified with a polyethoxylated long chain amide as a corrosion inhibitor. U.S. Pat. No. 3,418,254 discloses the use of an aqueous emulsion of a primary aliphatic amine emulsified by an alkylphenoxy (ethyleneoxy) alkanol as a corrosion inhibitor. U.S. Pat. No. 3,554,922 discloses the use of an aqueous dispersion of octadecylamine and a vegetable polysaccharide gum as a corrosion inhibitor. U.S. Pat. No. 3,717,433 discloses a steam-corrosion inhibition method employing a composition comprised of a fatty amine, an isothiuronium salt as a cationic emulsifier, and an ethoxylated straight chain aliphatic acid as an emulsion stabilizer.

In addition to the fatty amines described above, other amine compounds have found use as corrosion inhibitors. U.S. Pat. Nos. 3,029,125 and 3,378,581 discloses the use of alkoxyated alkylene diamines and their aliphatic carboxylic acid salts as corrosion inhibitors. U.S. Pat. No. 3,203,904 discloses corrosion inhibition with ethoxylated straight long chain amines emulsified by ethoxylated quaternary ammonium chloride salts.

SUMMARY OF THE INVENTION

It is an object of this invention to provide a method and composition for inhibiting the corrosion of metal surfaces exposed to corrosive aqueous fluids.

It is a further object of this invention to provide a corrosion inhibiting composition which permits preparation of feed solutions having from 0.1% active amine up to any practical maximum concentration.

Another object of this invention is to provide a corrosion inhibiting composition which is very fluid at room temperature, thus allowing easy introduction into the system to be treated.

Another object of this invention is to provide a corrosion inhibiting composition having excellent freeze-thaw characteristics.

Another object of this invention is to provide a corrosion inhibiting composition having incorporated therein, in addition to an aliphatic amine, a neutralizing amine.

Another object of this invention is to provide a corrosion inhibiting composition which is solid, preferably an extruded solid, consisting of a blend of all ingredients required to permit direct feeding, or requiring only dilution with water to the desired concentration before feeding to the system to be treated.

It is another object of this invention to provide a corrosion inhibiting composition which employs emulsifiers which are themselves film-forming materials that aid in corrosion inhibition.

Other objects of this invention will become apparent from the additional description of the invention set out herein. However, it is intended that the description of the invention should not limit the invention, but merely indicate the preferred embodiments thereof, since various modifications within the scope of this invention will become apparent to those skilled in the art.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

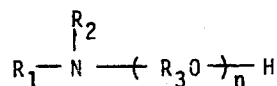
The film-forming amines useful in this invention are generally the fatty amines and this is intended to include saturated n-alkyl amines containing 10 to 22 carbon atoms; unsaturated n-alkyl amines containing 10 to 22 carbon atoms, but with 1 or 2 unsaturated moieties present in the carbon atom chain, the remainder being saturated; branched alkyl amines containing 10-22 carbon atoms; mixtures of any or all of the above; and hydrogenated mixtures of any of the above unsaturated amines. Useful fatty amines include, among others, dodecylamine; tetradecylamine; hexadecylamine; octadecylamine; tallow amines and hydrogenated tallow amines. The preferred fatty amines for use in this invention are octadecylamine, tallow amine and hydrogenated tallow amine. The aliphatic film-forming amine may be contained in the compositions of this invention in an amount of from about 1% by weight to about 90% by weight, and preferably from about 1% by weight to about 15% by weight.

In addition to the aliphatic film-forming amines described, this invention also contemplates the use of various known salts of the aliphatic amines described. Such known salts include the glycolate and acetate salts of various aliphatic amines. The use of the acetate salts of the aliphatic amines described herein is especially preferred for the compositions and methods of this invention. These salts of the aliphatic film-forming amines may be used in the compositions of this invention in an amount of from about 0.1% by weight to about 50% by weight, preferably from about 0.5% by weight to about 10% by weight.

Neutralizing amines are known in the art and function as corrosion inhibitors by neutralizing carbonic acid present in water and steam systems as the result of dissolved carbon dioxide. Any other acids present would also be neutralized. They are employed in the methods and compositions of this invention along with fatty film-forming amines and the polyoxyalkylene containing tertiary amines of this invention to give improved corrosion inhibition. Examples of neutralizing amines known in the art are cyclohexylamine, morpholine and diethylaminoethanol (DEAE). Of these, diethylaminoethanol is especially preferred for use with the

methods and compositions of this invention. The neutralizing amine may be contained in the compositions of this invention in an amount of from about 1% by weight to about 50% by weight, preferably from about 1% by weight to about 20% by weight.

The polyoxyalkylene-containing tertiary amines useful in this invention may be represented by the formula:



wherein R_1 and R_2 are aliphatic hydrocarbon radicals having from 12 to 20 carbon atoms, which can be the same or different; and wherein R_3O is a polyoxyalkylene chain of randomly distributed oxyalkylene units, the total of these units in the chain being n , which is an integer of 3 to 100 and preferably 5 to 50, said polyoxyalkylene chain consisting of randomly distributed oxyethylene and oxypropylene units in a ratio of from 1:10 to 10:1, respectively.

polyoxyalkylene-containing tertiary amines of this type are described in U.S. Pat. No. 3,456,013, which is incorporated herein by reference.

Such polyoxyalkylene-containing tertiary amines are condensation products of a secondary mono-amine containing two aliphatic hydrocarbon radicals with a mixture of ethylene oxide and propylene oxide. The different oxyalkylene groups are distributed randomly throughout the oxyalkylene chain and the oxyalkylene chain itself may vary in length. While this results in a varying structure, the compounds produced are characterized by the average length of the polyoxyalkylene chain and the average ratio of oxyethylene units to oxypropylene units in the polyoxyalkylene chain. Several particular polyoxyalkylene-containing tertiary amines were used in preparing formulations according to this invention, as will be described later. These tertiary amines contain 5, 10, 15, 20, 30 and 50 moles of polyoxyalkylene per mole of the tallow amine component of the tertiary amine, and are designated EO/PO (for ethylene oxide/propylene oxide) 5, 10, 15, 20, 30 and 50 respectively. The tertiary amine will be present in the compositions of this invention in an amount of from about 0.1% by weight to about 10.0% by weight, preferably in an amount from about 0.2% by weight to about 5.0% by weight.

This invention contemplates the use of the polyoxyalkylene-containing tertiary amines just described with aliphatic film-forming amine and water to produce what is, in effect, an emulsifiable concentrate. That is, the mixture is an emulsion which is suitable to be diluted to any desired concentration and then fed directly to the system to be treated. This invention further contemplates the use of one or more salts of an aliphatic film-forming amine, which are more water soluble than the amine itself, along with the mixture of the film-forming amine and polyoxyalkylene-containing tertiary amine as described above. These salts of aliphatic film-forming amines are well known in the art and include, for example, the acetate and glycolate salts of various aliphatic film-forming amines. In this invention the use of tallow amine acetate is particularly preferred. This invention also contemplates the use of a neutralizing amine along with the mixture of the aliphatic film-forming amine and the polyoxyalkylene-containing tertiary amine amine described above. In this invention the use of diethylaminoethanol (DEAE)

is particularly preferred. These various aspects of this invention will now be further described by way of illustrative examples which disclose the preparation of representative formulations that may be utilized in accordance with the teachings of the present invention.

EXAMPLE I

The following ingredients were mixed together:

Ingredient	Amount (grams)	% by Weight
Armeen HT (hydrogenated tallow amine)	30	15
EO/PO 20	4	2
Distilled Water	166	83

The mixture was heated to 150°F. and then agitated. The agitation continued while the mixture was removed from the source of heat, and was maintained until the mixture was cold. The finished product was a uniform paste.

EXAMPLE 2

The following ingredients were mixed together;

Ingredient	Amount (grams)	% by Weight
Armeen HT	25	12.5
Adogen 140A (tallow amine acetate)	5	2.5
EO/PO 20	4	2.0
Distilled Water	166	83.0

The mixture was not heated, but was simply agitated vigorously. The resultant product was foamy, but fluid. Feed solutions were prepared having 20%, 5% and 1% by weight of solids concentrations. These feed solutions were satisfactory for introduction into a system to be treated.

EXAMPLE 3

The following ingredients were mixed together:

Ingredient	Amount (grams)	% by Weight
Armeen HT	25	12.5
Adogen 140A	5	2.5
EO/PO 10	2.5	1.2
Distilled Water	167.5	83.8

The mixture was stirred while heating to 160°F. The mixture was then removed from the heat and agitated until cool. The finished product was a uniform paste.

EXAMPLE 4

The following ingredients were mixed together:

Ingredient	Amount (grams)	% by Weight
Armeen HT	25	12.5
Adogen 140A	5	2.5
EO/PO 15	5	2.5
Distilled Water	16.5	82.5

The mixture was heated to 160°F. with stirring. The mixture was then removed from the heat and agitated until its temperature reached 100°F. The resultant product was thick but still pourable initially at 100°F.

EXAMPLE 5

The following total amounts of ingredients were used:

Ingredient	Amount (grams)	% by Weight
Armeen HT	20	10
Armac HT	10	5
(hydrogenated tallow amine acetate)		
EO/PO 20	5	2.5
Distilled Water	165	82.5

A half gram (0.5) of the EO/PO 20, the 20 grams of Armeen HT, the 10 grams of Armac HT, and 100 grams of distilled water were mixed and heated with stirring to 160°F. The mixture was then removed from the heat and agitated until the mixture reached 120°F. Then the remaining 4.5 grams of EO/PO 20 and 65 grams of distilled water were added slowly to the mixture while agitation was continued. The mixture was very viscous prior to addition of the remaining EO/PO 20 and distilled water, but with the addition the viscosity was reduced, resulting in a very fluid, uniform product.

EXAMPLE 6

The following total amounts of ingredients were used:

Ingredient	Amount (grams)	% by Weight
Armeen (tallow amine)	20	10
Armac (tallow amine acetate)	10	5
EO/PO 20	0.4	0.2
Distilled Water	169.6	84.8

A 0.2 gram amount of the EO/PO 20 was added to 99.8 mls. of distilled water, then the 20 grams of Armeen and 10 grams of Armac were added, and the total mixture was heated with stirring to 160°F. The mixture was removed from the heat and agitated until it reached 120°F. The agitation was continued while the remaining amounts of the ingredients, 0.2 gram of EO/PO 20 and 69.8 of distilled water, were added slowly to the mixture. The final product was somewhat viscous but still fluid. Feed solutions of 20%, 5% and 1% by weight of solids content were prepared, and were satisfactory for introduction into a system to be treated.

In the following Examples, the use of a neutralizing amine in addition to the aliphatic film-forming amine and polyoxyalkylene-containing tertiary amine is illustrated.

EXAMPLE 7

The following total amounts of ingredients were used:

Ingredient	Amount (grams)	% by Weight
Armeen HT	10	5
Armac HT	6	3
Pennad 150 (DEAE or diethylaminoethanol)	36	18
EO/PO 20	1	0.5
Distilled Water	147	73.5

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One-fourth (0.25 grams) of the EO/PO 20 was admixed with the 10 grams of Armeen HT, 6 grams of Armac HT, 36 grams of Pennad 150, and one-half (73.5 grams) of the distilled water, and heated with stirring to 160°F. The mixture was then cooled while agitating to 120°F., at which time the remaining amounts of ingredients (0.75 gram EO/PO 20 and 73.5 grams distilled water) were added. The agitation was continued. The resultant product was uniform and very viscous.

EXAMPLE 8

The following total amounts of ingredients were used:

Ingredient	Amount (grams)	% by Weight
Armeen HT	10	4.8
Armac HT	2	1.0
Pennad 150	36	17.2
EO/PO 20	0.6	0.3
Distilled Water	160	76.7

The final product was prepared as in Example 7 and proved to be uniform and viscous.

EXAMPLE 9

The following total amounts of ingredients were used:

Ingredient	Amount (grams)	% by Weight
Armeen HT	20	10.0
Armac HT	4	2.0
Pennad 150	4	2.0
EO/PO 20	1.5	0.8
Distilled Water	170	85.2

The final product was prepared as in Example 7 above, and proved to be fluid and uniform.

EXAMPLE 10

The following ingredients were mixed together:

Ingredients	Amount (grams)	% by Weight
Armeen HT	25	12.0
Armac HT	5	2.4
Pennad 150	8	3.8
EO/PO 20	1.8	1.0
Distilled Water	168	80.8

The mixture was heated with stirring to 160°F. Agitation was continued while the mixture was cooled to 120°F. The final product was uniform and viscous.

EXAMPLE 11

The following ingredients were mixed together:

Ingredients	Amount (grams)	% by Weight
Adogen 140	3	1.5
Pennad 150	15	7.5
EO/PO 50	2	1.0
Distilled Water	80	40.0

The mixture was heated to 180°F. with mild agitation. The mixture was then removed from the heat and

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placed under a Heller mixer and mildly agitated until it cooled to room temperature.

This invention contemplates use of the corrosion-inhibiting compositions described herein in solid form as well as in fluid emulsion form. This solid form may simply be flakes of the corrosion-inhibiting composition produced by evaporating the water content from a thin layer of the fluid emulsion of the corrosion-inhibiting composition containing the desired proportions of components, disposed on any convenient surface. However, a preferred method of preparing a solid form of the corrosion-inhibiting compositions of this invention is by extrusion of a hot mixture of the components of the corrosion-inhibiting composition, wherein the extruding device is cooled sufficiently to induce solidification of the corrosion-inhibiting composition, which will normally be solid at room temperature. Most conveniently, this is accomplished during the manufacturing process for aliphatic amines. Immediately following their manufacture, these aliphatic amines will be in a heated condition, and thus liquid. At this point, the additional components of the corrosion-inhibiting compositions of this invention can simply be incorporated into the aliphatic amine. Alternatively, a hot mixture is prepared simply by adding to the desired amount of the aliphatic film-forming amine maintained at an elevated temperature sufficient to render it fluid, appropriate quantities of the polyoxyalkylene-containing tertiary amine dispersing agent, and such other of the additional components of the corrosion-inhibiting compositions described herein as may be desired. The mixture is agitated to insure uniform dispersion of all of the components. The extrusion itself may be performed with conventional equipment intended for this purpose, according to known extrusion techniques.

The compositions of this invention either already exist as emulsions, or, in the case of the extruded solid compositions, may be mixed with water to produce an emulsion. These emulsions may be diluted with water to form corrosion inhibiting compositions containing from 1% to 25% by weight of solids.

the corrosion inhibiting compositions of this invention may be incorporated into the system to be treated in a number of ways. They may be added to a water storage tank, or fed into water being added to such a storage tank, for example. For boiler systems, the compositions of this invention may be introduced to condensate receivers, deaerating heaters, boiler feed water lines, directly to the boiler itself, or directly to the steam lines for uniform distribution. Where necessary, a piston pump capable of exceeding the internal pressure of the boiler may be used. The feeding of the corrosion inhibiting composition may be continuous or at intervals. The corrosion inhibiting composition may be introduced at more than one point, and the treatment may be confined to the water alone, the steam alone, or both may be treated. Desirably, the corrosion-inhibiting composition is added in amounts sufficient to maintain a weight of composition to weight of system aqueous fluid ratio of from about 0.1 to about 100 parts per million. with a dynamic system, such as a boiler system, the amount added is expressed in terms of pounds of steam produced. Thus, the corrosion-inhibiting compositions of this invention would be added to a boiler system in an amount of from about 0.1 to about 100 pounds of product per million pounds of steam produced. Once the corrosion-inhibiting composition has

been added, it becomes evenly dispersed in the water of the system and subsequently, because of its hydrophobic nature, becomes deposited on metal surfaces with which it comes in contact. With the generation of steam, the aliphatic film-forming amine enters its vapor phase and thereby becomes distributed uniformly throughout the entire system. The amine thereupon becomes deposited as a very thin film upon all exposed metallic interior surfaces of the system. Since this film is hydrophobic in nature, it serves to protect the metallic surfaces of the system against corrosive attack by the steam or water, or by both, contained in the system. Where vaporization of the aliphatic film-forming amine occurs, the temperature of the system must be sufficient for this purpose. When the system is under elevated pressure, as with a boiler system, or possibly under reduced pressure, the temperature required to produce vaporization of the aliphatic amine will be higher or lower, respectively, than that required at atmospheric pressure.

As indicated previously, the corrosion-inhibiting compositions of this invention may be dispersed in the system to be protected in amounts sufficient to maintain a weight of composition to weight of system aqueous fluid ratio of from about 0.1 to about 100 parts per million. However, when the system being treated is a steam system, the amounts (by weight) of corrosion-inhibiting composition of this invention added to the system will preferably be in the range of from about 0.25 parts per million by weight.

The corrosion-inhibiting method and corrosion-inhibiting properties of the compositions of this invention will be further illustrated by way of examples disclosing the usefulness of the method and compositions of this invention.

EXAMPLE 12

The following composition of this invention was employed in a test procedure to establish its corrosion-inhibiting properties.

Ingredient	% by Weight
Adogen 140	10
Adogen 140A	5
EO/PO 20	1
Distilled Water	84

Strips (coupons) of a suitable metal subject to corrosion were prepared. These were of uniform dimension: $1 \times 3 \times 1/16$ inches. They were cleaned, weighed and placed in steam of the particular system being used as the test basis. In this case the system was a steam system for a steel plant. The coupons remained in place for a predetermined period of time, during which the above corrosion-inhibiting composition of this invention was introduced into the steam system. For comparison, another corrosion-inhibiting material was employed for a separate and equal test interval. This material was hydrogenated tallow amine emulsified with isopropyl alcohol. After the predetermined period, the test coupons were removed from the system, acid cleaned to remove the corrosion products, and again weighed. The reduction in weight was then calculated on a yearly basis, noting the actual weight loss during the specific test period and the length of the predetermined time period. This yearly weight loss is expressed

as milligrams per year, or "mpy." The comparative results observed for the test procedure just described are summarized below.

Condensate Lines:	Corrosion Rates in Mills Per Year		
	A	B	C
Hydrogenated Tallow Amine Emulsified with Isopropyl Alcohol	7.0	15.0	12.0
Composition of this Example	2.4	6.2	7.6

EXAMPLE 13

The following composition of this invention was employed in two different systems, utilizing the same test procedure as outlined above in Example 12, to establish its corrosion-inhibiting properties:

Ingredient	% by Weight
Adogen 140	6
Pennad 150 (DEAE)	15
EO/PO 50	2
Distilled Water	77

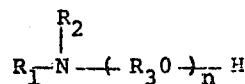
The systems used as the test bases were both steam systems; one located in a textile finishing plant and the second located on a naval base. The comparative results observed for the test procedure are summarized below.

Corrosion Rates in Mills Per Year			
1.	Textile Finishing Plant		
		Condensate	Lines
		A	B
	Hydrogenated Tallow Amine Emulsified with Isopropyl Alcohol	11.0	7.5
	Composition of this Example	7.5	1.3
2.	Naval Base		
		Condensate	Lines
		A	B
	Hydrogenated Tallow Amine Emulsified with Isopropyl Alcohol	28	60
	Composition of this Example	12	25

These Examples illustrate the dramatic increase in protection against corrosion achieved when using the particular compositions of this invention described. Similar corrosion-inhibiting results have been found when using other compositions of this invention.

We claim:

1. A corrosion-inhibiting composition comprising an aliphatic film-forming amine; and a polyoxyalkylene-containing tertiary amine dispersing agent represented by the formula:



wherein R_1 and R_2 are aliphatic hydrocarbon radicals having from 12 to 20 carbon atoms, which can be the same or different; and wherein R_3O is a polyoxyalkyl-

ene chain of randomly distributed oxyethylene and oxypropylene units in a ratio of from 1:10 to 10:1, respectively, the total of all units in the chain being n , which is an integer of 3 to 100.

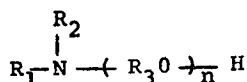
2. The composition of claim 1 wherein n is an integer of 5 to 50.

3. The composition of claim 1 containing from about 1 percent by weight to about 90 percent by weight of aliphatic film-forming amine; and from about 0.1 percent by weight to about 10.0 percent by weight of polyoxyalkylene-containing tertiary amine.

4. The composition of claim 1 additionally included water.

5. The composition of claim 4 containing from about 1 per cent by weight to about 90 per cent by weight of aliphatic film-forming amine; from about 1 per cent by weight to about 99 per cent by weight of water; and from about 0.1 per cent by weight to about 10.0 per cent by weight of polyoxyalkylene-containing tertiary amine.

6. A corrosion-inhibiting composition comprising an aliphatic film-forming amine; an aliphatic amine salt; and a polyoxyalkylene-containing tertiary amine dispersing agent represented by the formula:



wherein R_1 and R_2 are aliphatic hydrocarbon radicals having from 12 to 20 carbon atoms, which can be the same or different, and wherein R_3O is a polyoxyalkylene chain of randomly distributed oxyethylene and oxypropylene units in a ratio of from 1:10 to 10:1, respectively, the total of all units in the chain being n , which is an integer of 3 to 100.

7. The composition of claim 6 wherein n is an integer of 5 to 50.

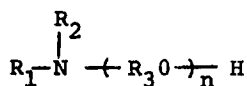
8. The composition of claim 6 wherein the aliphatic amine salt is tallow amine acetate.

9. The composition of claim 6 containing from about 1 per cent by weight to about 90 per cent by weight of aliphatic film-forming amine; from about 0.1 per cent by weight to about 50.0 per cent by weight of aliphatic amine salt; and from about 0.1 per cent by weight to about 10.0 per cent by weight of polyoxyalkylene-containing tertiary amine.

10. The composition of claim 6 additionally including water.

11. The composition of claim 10 containing from about 1 per cent by weight to about 90 per cent by weight of aliphatic film-forming amine; from about 0.1 per cent by weight to about 50.0 per cent by weight of aliphatic amine salt; from about 1 per cent by weight to about 99 per cent by weight of water; and from about 0.1 per cent by weight to about 10.0 per cent by weight of polyoxyalkylene-containing tertiary amine.

12. A corrosion-inhibiting composition comprising an aliphatic film-forming amine; a neutralizing amine; and a polyoxyalkylene-containing tertiary amine dispersing agent represented by the formula:



wherein R_1 and R_2 are aliphatic hydrocarbon radicals having from 12 to 20 carbon atoms, which can be the same or different; and wherein R_3O is a polyoxyalkyl-

ene chain of randomly distributed oxyethylene and oxypropylene units in a ratio of from 1:10 to 10:1, respectively, the total of all units in the chain being n , which is an integer of 3 to 100.

13. The composition of claim 12 wherein n is an integer of 5 to 50.

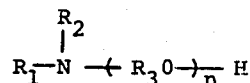
14. The composition of claim 12 wherein the neutralizing amine is diethylamino ethanol.

15. The composition of claim 12 containing from about 1 per cent by weight to about 90 per cent by weight of aliphatic film-forming amine; from about 1 per cent by weight to about 50 per cent by weight of neutralizing amine; and from about 0.1 per cent by weight to about 10.0 per cent by weight of polyoxyalkylene-containing tertiary amine.

16. The composition of claim 12 additionally including water.

17. The composition of claim 16 containing from about 1 per cent by weight to about 90 per cent by weight of aliphatic film-forming amine; from about 1 per cent by weight to about 50 per cent by weight of neutralizing amine; from about 1 per cent by weight to about 99 per cent by weight of water; and from about 0.1 per cent by weight to about 10.0 per cent by weight of polyoxyalkylene-containing tertiary amine.

18. A corrosion-inhibiting composition comprising an aliphatic film-forming amine; an aliphatic amine salt; a neutralizing amine; and a polyoxyalkylene-containing tertiary amine dispersing agent represented by the formula:



wherein R_1 and R_2 are aliphatic hydrocarbon radicals having from 12 to 20 carbon atoms, which can be the same or different, and wherein R_3O is a polyoxyalkylene chain of randomly distributed oxyethylene and oxypropylene units in a ratio of from 1:10 to 10:1, respectively, the total of all units in the chain being n , which is an integer of 3 to 100.

19. The composition of claim 18 containing from about 1 per cent by weight to about 90 per cent by weight of aliphatic film-forming amine; and from about 0.1 per cent by weight to about 50.0 per cent by weight of aliphatic amine salt; from about 1 per cent by weight to about 50 per cent by weight of neutralizing amine; and from about 0.1 per cent by weight to about 10.0 per cent by weight of polyoxyalkylene-containing tertiary amine.

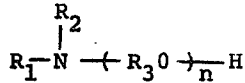
20. The composition of claim 19 additionally including water.

21. The composition of claim 20 containing from about 1 per cent by weight to about 90 per cent by weight of aliphatic film-forming amine; from about 0.1 per cent by weight to about 50.0 per cent by weight of aliphatic amine salt; from about 1 per cent by weight to about 50 per cent by weight of neutralizing amine; from about 1 per cent by weight to about 99 per cent by weight of water; and from about 0.1 per cent by weight to about 10.0 per cent by weight of polyoxyalkylene-containing tertiary amine.

22. A method of inhibiting the corrosion of metal components which are contacted by aqueous fluids, comprising dispersing throughout said aqueous fluids a composition comprising an aliphatic film-forming

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amine; and a polyoxyalkyl-ene-containing tertiary amine dispersing agent represented by the formula:



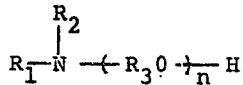
wherein R_1 and R_2 are aliphatic hydrocarbon radicals having from 12 to 20 carbon atoms, which can be the same or different; and wherein R_3O is a polyoxyalkyl-ene chain of randomly distributed oxyethylene and oxypropylene units in a ratio of from 1:10 to 10:1 respectively, the total of all units in the chain being n , which is an integer of 3 to 100.

23. The method of claim 22 wherein for the composition employed therein n is an integer of 5 to 50.

24. The method of claim 22 wherein the composition employed therein contains from about 1 per cent by weight to about 90 per cent by weight of aliphatic film-forming amine; and from about 0.1 per cent by weight to about 10.0 per cent by weight of polyoxyalkylene-containing tertiary amine.

25. The method of claim 22 wherein the composition employed therein additionally includes water.

26. A method of inhibiting the corrosion of metal components which are contacted by aqueous fluids, comprising dispersing throughout said aqueous fluids a composition comprising an aliphatic film-forming amine; an aliphatic amine salt; and a polyoxyalkylene-containing tertiary amine dispersing agent represented by the formula:



wherein R_1 and R_2 are aliphatic hydrocarbon radicals having from 12 to 20 carbon atoms, which can be the same or different; and wherein R_3O is a polyoxyalkyl-ene chain of randomly distributed oxyethylene and oxypropylene units in a ratio of from 1:10 to 10:1, respectively, the total of all units in the chain being n , which is an integer of 3 to 100.

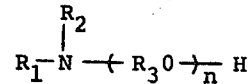
27. The method of claim 26 wherein for the composition employed therein n is an integer of 5 to 50.

28. The method of claim 26 wherein the composition employed therein contains from about 1 per cent by weight to about 90 per cent by weight of aliphatic film-forming amine; from about 0.1 per cent by weight to about 50.0 per cent by weight of aliphatic amine salt; and from about 0.1 per cent by weight to about 10.0 per cent by weight of polyoxyalkylene-containing tertiary amine.

29. The method of claim 26 wherein the composition employed therein additionally includes water.

30. A method of inhibiting the corrosion of metal components which are contacted by aqueous fluids, comprising dispersing throughout said aqueous fluids a composition comprising and aliphatic film-forming amine; a neutralizing amine; and a polyoxyalkylene-containing tertiary amine dispersing agent represented by the formula:

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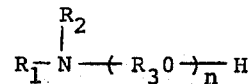
wherein R_1 and R_2 are aliphatic hydrocarbon radicals having from 12 to 20 carbon atoms, which can be the same or different; and wherein R_3O is a polyoxyalkyl-ene chain of randomly distributed oxyethylene and oxypropylene units in a ratio of from 1:10 to 10:1 respectively, the total of all units in the chain being n , which is an integer of 3 to 100.

31. The method of claim 30 wherein for the composition employed therein n is an integer of 5 to 50.

32. The method of claim 30 wherein for the composition employed therein contains from about 1 per cent by weight to about 90 per cent by weight of aliphatic film-forming amine; from about 1 per cent by weight to about 50 per cent by weight of neutralizing amine; and from about 0.1 per cent by weight to about 10.0 per cent by weight of polyoxyalkylene-containing tertiary amine.

33. The method of Claim 30 wherein the composition employed therein additionally includes water.

34. A method of inhibiting the corrosion of metal components which are contacted by aqueous fluids, comprising dispersing throughout said aqueous fluids a composition comprising an aliphatic film-forming amine, an aliphatic amine salt; a neutralizing amine; and a polyoxyalkylene-containing tertiary amine dispersing agent represented by the formula:



wherein R_1 and R_2 are aliphatic hydrocarbon radicals having from 12 to 20 carbon atoms, which can be the same or different; and wherein R_3O is a polyoxyalkyl-ene chain of randomly distributed oxyethylene and oxypropylene units in a ratio of from 1:10 to 10:1 respectively, the total of all units in the chain being n , which is an integer of 3 to 100.

35. The method of claim 34 wherein for the composition employed therein n is an integer of 5 to 50.

36. The method of claim 34 wherein the composition employed therein contains from about 1 per cent by weight to about 90 per cent by weight of aliphatic film-forming amine; and from about 0.1 per cent by weight to about 50.0 per cent by weight of aliphatic amine salt; from about 1 per cent by weight to about 50 per cent by weight of neutralizing amine; and from about 0.1 per cent by weight to about 10.0 per cent by weight of polyoxyalkylene-containing tertiary amine.

37. The method of claim 34 wherein the composition employed therein additionally includes water.

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