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Degreasing of Metal & Alloys Surfaces with Alkaline Chemical

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***Abstract**: The invention includes a method for cleaning metals (Aluminum, Copper, Brass) & alloys surface comprising: 1) contacting the surface with 10-50 ml/liter of a composition comprising about about 2 to 10 % chelant, 1-10 % TKPP (1)(Tetra sodium poly phosphate), 2-10% Sodium Gluconate (5)and about 30 to 90 % water; 2) maintaining contact to remove residue from the surface; 3The compositions may further include a surfactant(3) selected from the group consisting of anionic(4), cationic(7), and nonionic surfactants(6) to enhance cleaning performance.*

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I. INTRODUCTION

BACKGROUND OF THE INVENTION: The present invention relates to compositions and methods for cleaning of aluminum, Copper , Brass & alloys surfaces, such as gas flow equipment, auto mobile components etc .

During the past fifteen- twenty years the requirements for cleanliness in metals (Aluminum, Copper, Brass) & alloys components have increased at least a hundred times. These components productions have doubled or tripled in the same time period. It also appears that the rate of change is accelerating (8) rather than holding at past rates. With these changes, the problems caused by contamination in metals (Aluminum, Copper, Brass) & alloys (9) components become even more serious.

In the past, metals (Aluminum, Copper, Brass) & alloys components used in these processes have been cleaned almost universally by use of solvents. In addition to the problems of atmospheric pollution and operator health hazards (10), solvents do not clean absolutely. They leave films and particle residuals. Ultrasonic cleaning (11) may also drive particles into crevices in instrument parts, for a later release. Chlorofluorocarbon cleaning solvents sold under the trademark Freon are examples of known cleaning solvents as well as 1,1,1 - trichloroethane (12) and methylene chloride.

The lack of cleanliness of the components cleaned by conventional solvents, methods and apparatus is problematical where active ions and organic contamination such as organic films remain on the components.
It is a purpose of the present invention to provide alkaline based formulations which clean metals (Aluminum, Copper, Brass) & alloys surfaces without leaving organic films and not as much hazardous as solvents.

SUMMARY OF THE INVENTION

The invention is a method for treating metals (Aluminum, Copper, Brass) & alloys components that cleans surfaces. Specifically, the invention is a method for cleaning surface comprising
1 . Contacting the surface with 10-50 ml/liter of a composition comprising between about 2 to 10% chelant, (8) 1-10 % TKPP (Tetra sodium poly phosphate), 2-10% Sodium Gluconate and about 30 to 90 % water.
2. The compositions may further include a 2-5 % of surfactant selected from the group consisting of anionic, cationic, nonionic and surfactants to enhance cleaning performance.
3. Maintaining contact to free and remove residue from the surfaces.

II. EXPERIMENTAL

DETAILED DESCRIPTION OF THE INVENTION

Compositions which are used for treating metals (Aluminum, Copper, Brass) & alloys components according to the present invention include an alkaline component, a chelant, and water. The compositions treat the metals (Aluminum, Copper, Brass) & alloys components surface by removing residue

Compositions of the invention comprise between about 2 to 10% chelant, (EDTA of AVA Chemicals Pvt. Ltd.) (8), 1-10 % TKPP (Tetra sodium poly phosphate) (Advance Inorganics), 2-10% Sodium Gluconate (Advance Inorganics), 2-5 % of surfactant (VCP 66) (Kusa Chem Pvt. Ltd.) and about 30 to 90 % water.

Alkaline components are not suitable for the present invention are hydroxide salts including, but not limited to, sodium hydroxide, potassium hydroxide, and quaternary ammonium hydroxide. Such quaternary ammonium hydroxides include, but are not limited to, unsubstituted alkyl (9)quaternary ammonium hydroxides such as tetra methyl ammonium hydroxide, tetraethyl ammonium hydroxide, tetrapropyl ammonium hydroxide, tetra butyl ammonium hydroxide, and unsubstituted alkyl and aryl substituted ammonium hydroxides, including trimethylphenyl ammonium hydroxide and tripropylphenyl ammonium hydroxide. Alkaline salts such as carbonate salts are also not suitable for the present invention. Chelants especially suitable for the present invention includ ethylenediaminetetraacetate, hydroxyacetic acid, hydroxylamino- tetraacetate and citric acid. Sodium gluconate is suitable but Chelants (11) such as polyacrylic acid is not suitable for the present invention.

Water suitable for the present invention can be distilled water, soft water DM Water. Hard water(12) (e.g. <500 ppm) is also suitable if the amount of chelant is sufficiently higher than that which sequesters the metal ions such as calcium and magnesium. Optionally, compositions of the invention can include more than one alkaline component and more than one chelant.

The metals (Aluminum, Copper, Brass) & alloys components surfaces are treated by diluting the composition described above (which includes an alkaline component, a chelant, and water) to a concentration of 10-50 ml/liter to form a dilute solution, contacting the solution with the aluminum, Copper , Brass & alloys components surface to free and remove residue from the surface according to table 1 in 2 to 10% chelant, (EDTA of AVA Chemicals Pvt. Ltd.) (8), 1-10 % TKPP (Tetra sodium poly phosphate) (Advance Inorganics), 2-10% Sodium Gluconate (Advance Inorganics), 2-5 % of surfactant (VCP 66) (Kusa Chem Pvt. Ltd.) and about 30 to 70 % water.

Table 1.

Chemicals Used	Claim 1	Claim 2	Claim 3	Claim 4
EDTA	2%	2%	2%	2%
TKPP	2%	3%	4%	5%
Sodium Gluconate	5%	7%	8%	10%
VCP 66	2%	2%	2%	3%
DM Water	89%	86%	84%	80%

The method of the invention comprises:
1) contacting the surface with 10-15 ml/ltr
2) maintaining metals (Aluminum, Copper, Brass) & alloys components to remove residue from the surfaces.
In the invention, materials such as metals (Aluminum, Copper, Brass) & alloys components surfaces have to be cleaned.

III. RESULTS AND DISCUSSION

Metals (Aluminum, Copper, Brass) & alloys components surface cleaning comprising with following claims:
Claim 1. A method for cleaning Metals (Aluminum, Copper, Brass) & alloys components surfaces as concentration in table 2.

Table 2.

Chemicals Used	Claim 1
EDTA	2%
TKPP	2%
Sodium Gluconate	5%
VCP 66	2%
DM Water	89%

contacting the surface with 10-15 ml/liter of a composition comprising in table 2,
2) maintaining contact to remove residue from the surface.

Claim 2. A method of claim 1 comprising
cleaning metals (Aluminum, Copper, Brass) & alloys components surfaces as concentration in table 3.

Table 3.

Chemicals Used	Claim 2
EDTA	2%
TKPP	3%
Sodium Gluconate	7%
VCP 66	2%
DM Water	86%

contacting the surface with 10-15 ml/liter of a composition comprising in table 3,
2) maintaining contact to remove residue from the surface.

Claim 3. A method of claim 2 comprising
cleaning metals (Aluminum, Copper, Brass) & alloys components surfaces as concentration in table 4.

Table 4.

Chemicals Used	Claim 3
EDTA	2%
TKPP	4%
Sodium Gluconate	8%
VCP 66	2%
DM Water	84%

contacting the surface with 10-15 ml/liter of a composition comprising in table 4,
2) maintaining contact to remove residue from the surface.

Claim 4. A method of claim 3 comprising
cleaning metals (Aluminum, Copper, Brass) & alloys components surfaces as concentration in table 5.

Table 5.

Chemicals Used	Claim 4
EDTA	2%
TKPP	5%
Sodium Gluconate	10%
VCP 66	3%
DM Water	80%

contacting the surface with 10-15 ml/liter of a composition comprising in table 5,
2) maintaining contact to remove residue from the surface.

Cleaned Components Image 1.

Cleaned Components Image 2.

Cleaned Components Image 3.

IV. CONCLUSIONS

In this invention, the metals (Aluminum, Copper, Brass) & alloys components surfaces are cleaned through different formulation and get cleaned. While the some residue remains on the surface of aluminum, Copper , Brass & alloys components in claim 1,2 & 3. The data table 5 demonstrate that the formulation of EDTA, TKPP, Sodium Gluconate, VCP 66, DM Water are effect at given table and the aluminum, Copper , Brass & alloys components surfaces are cleaned (picture 1,2 & 3).

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