

Search query (6): [SP]: this application claims the benefit of u.s. provisional application 61/839,848, filed jun. 26, 2013. the disclosure of the prior application is hereby incorporated by reference herein in its entirety. technical field this application is directed to methods for corrosion inhibitor treatment in water systems, such as those used in industrial processes. background treatment of corrosion in water systems is typically achieved by continuous application of various corrosion inhibitors in the water including, for example, phosphates, polymer, chromates, zinc, molybdates, nitrites, and combinations thereof. these inhibitors work by the principle of shifting the electrochemical corrosion potential of the corroding metal in the positive direction indicating the retardation of the anodic process (anodic control), or displacement in the negative direction indicating mainly retardation of the cathodic process (cathodic control). corrosion inhibitors act on the cathode and/or anode of the corrosion cell. a common and practical approach of corrosion protection is by changing the environment around the metal surfaces. due to this reason, in conventional anti-corrosion treatment programs, continuous treatment of corrosion inhibitors is applied. the mechanism of corrosion inhibition was thought to require a continuous dose because of the equilibrium nature of the inhibitor film. if the maintenance dose of the inhibitor is interrupted, corrosion rates tend to increase quite quickly as the inhibitor film needs continuous replenishment. in the absence of any inhibitor, the film deteriorates rapidly. however, applying continuous inhibitors at high levels is associated with a high cost and can be particularly cost prohibitive in those instances in which the volume of water consumption is high. continuous treatment methods also impact the effluent stream of the treated water systems and can result in toxicity issues, environmental concerns and/or additional costs associated with remedial treatment or enhanced handling of the effluent stream. historically, the use of tin compounds as a corrosion inhibitor has been the subject of some experimentation in water systems like those described above. stannous salts are known to inhibit corrosion but, unlike more conventional corrosion inhibitors, the mechanism by which the stannous salts inhibited corrosion was not well understood. previous corrosion inhibition programs utilized the stannous salts in much the same manner as conventional corrosion inhibitors in which a maintenance dose of the stannous inhibitors were introduced into the aqueous systems to continuously maintain a minimum stannous concentration in order to be effective. examples of such prior art methods may be found in, for example, u.s. pat. no. 7,910,024 to stapp et al. and u.s. pat. nos. 6,001,156 and 6,200,529 to riggs, jr., the contents of which are incorporated herein by reference, in their entireties. moreover, conventional corrosion inhibition practices with tin compounds have not been able to effectively deal with the problem of maintaining an effective amount of tin(ii) in solution long enough to form a protective film on the surface of the corrosive metal without losing active form, tin (ii), due to bulk phase oxidation and precipitation to tin (iv). these and other issues are addressed by the present disclosure. it is an object of this disclosure to provide methods for improved and effective use of tin-based corrosion inhibitors by proposing a shot feed concept of applying corrosion inhibitor for a short period of time to form a stable and persistent film of tin (iv) on the metal surface. this film of tin (iv) is shown to last a few days without any more inhibitor present and the film is also shown to last much longer with a very small service dose of corrosion inhibitor. summary in a first embodiment, there is provided a method of suppressing corrosion of a corrodible metal surface that contacts a water stream in a water system, the method comprising: (a) introducing into the water stream a shot dose of a treatment composition comprising a corrosion inhibitor, the shot dose being introduced into the water stream over a first time period and the water stream having a first concentration of corrosion inhibitor during the first time period (b) then reducing the amount of treatment composition that is introduced into the water stream and (c) after the first time period, maintaining a second concentration of corrosion inhibitor in the water stream over a second time period, the second concentration being less than 25 percent of the concentration of corrosion inhibitor during the first time period. in a second embodiment, there is provided a method of suppressing corrosion of a corrodible metal surface that contacts a water stream in a water system, the method comprising: (a) introducing into the water stream a first shot dose of corrosion inhibitor, the first shot dose being introduced into the water stream over a first time period and the water stream having a first concentration of corrosion inhibitor during the first time period (b) after the first time period, maintaining a second concentration of corrosion inhibitor in the water stream over a second time period, the second concentration being less than 25 percent of the concentration of corrosion inhibitor during the first time period and (c) after the second time period, introducing into the water stream a second shot dose of the corrosion inhibitor, the second shot dose being introduced into the water stream over a third time period, the third concentration being greater than the second concentration. brief description of the drawings fig. 1 is a graph illustrating the systems requirements of corrosion inhibitor and feeding of a corrosion inhibitor by shot dosing and service dosing according to an embodiment fig. 2 is a graph illustrating the systems requirements of corrosion inhibitor and feeding of a corrosion inhibitor by shot dosing and service dosing according to an embodiment fig. 3 is a graph illustrating the systems requirements of corrosion inhibitor and feeding of two corrosion inhibitors by shot dosing according to an embodiment fig. 4 is a graph illustrating corrosion rates for samples exposed to various treatment methods according to embodiments fig. 5 is a graph illustrating the concentrations of various corrosion inhibitors in a water system over time and fig. 6 is an x-ray photoelectron spectroscopic image of a scanned mild steel coupon sample treated with a shot dose of corrosion inhibitor. detailed description embodiments of the disclosed methods apply the discovery of improved corrosion inhibition to water systems including, but not limited to cooling towers, water distribution systems, boilers, water and brine carrying pipelines, storage tanks and the like. embodiments of the methods are particularly useful with cooling towers in industrial water processes. improved corrosion inhibition can be achieved at lower cost and with less environmental impact by feeding corrosion inhibitors in an intermittent manner. both the embodiments of the disclosed method forms a very tenacious and persistent inhibitor film on the surface of corrodible metal by shot feeding a corrosion inhibitor (i.e., delivering a higher dose than the regular application rate initially and/or intermittently) for a short period of time. subsequent shot feeding, also can be termed as service dosing, is then carried out at intermittent intervals to meet the system and metal surface demands and to maintain the stable inhibitor film on the metal surface. as explained below, the shot and service intermittent feeding methods are particularly useful for stannous corrosion inhibitors. these intermittent feed methods can result in a significant reduction in the amount of corrosion inhibitor required, which is beneficial for the environment and reduces the cost of treatment. the intermittent feed methods can also provide for more economical treatment of large volume systems including, for example, once-through applications and other systems in which the water consumption and losses pose a significant challenge for dosage and control using conventional anti-corrosion treatments. shot and service intermittent feeding also greatly reduces the amount of corrosion inhibitor(s), such as stannous salts, required to protect the treated system by reducing consumptive losses associated with oxidation and discharge of water from the system. the intermittent feed method embodiments using stannous inhibitors are also beneficial if the effluent from the treated system is being used in a manner or for a purpose where a conventional inhibitor would be regarded as a contaminant or otherwise detrimental to the intended use. such stannous-based corrosion inhibitors are more tolerant of overdosing when compared to conventional zinc or phosphate programs which rely on polymeric dispersants to suppress formation of unwanted deposits. other reactive metal salts, for example, zirconium and/or titanium metal salts, may also be used in intermittent feed methods according to the present disclosure. indeed, embodiments of the disclosed methods should be operable with any metal salt capable of forming stable metal oxides resistant to dissolution under the conditions in the targeted system. metals particularly suitable for use with the disclosed methods are multivalent, e.g., are found in at least two different oxidation states, $mx+$ and $my+$, in which the lower oxidation state metal ion, such as tin(ii), is more soluble in aqueous solutions than a higher oxidation state metal ion, such as tin(iv). for such metals, the lower oxidation state species can be introduced into the

Results: 10

Search history

Search (Results)

1:

Search PN=(WO 2014210347) (Results 1000000)

2:

Search PN=(WO2014210347) (Results 1)

3:

Search PN=(WO2014210347) (Results 1)

4:

Search [SP]: 1. a method of suppressing corrosion of a corrodible metal surface that contacts a water stream in a water system, the method comprising: (a) introducing into the water stream a shot dose of a treatment composition comprising a corrosion inhibitor in amounts sufficient to provide a stable film of tin(iv) on the metal surface, the shot dose being introduced into the water stream over a first time period and the water stream having a first concentration of corrosion inhibitor during the first time period (b) then reducing the amount of treatment composition that is introduced into the water stream (c) after the first time period, maintaining a second concentration of corrosion inhibitor in the water stream over a second time period, the second concentration being less than 25 percent of the concentration of corrosion inhibitor during the first time period and (d) then increasing the amount of treatment composition that is introduced into the water stream during a third time period at a third concentration that is higher than the second concentration and is in the range of 20 to 100 percent of the first concentration, the third concentration being sufficient to maintain or re-stabilize portions of the stable film of tin(iv) on the metal surface. 2. the method of suppressing corrosion according to claim 1, wherein the corrodible metal surface is a metal or alloy selected from the group consisting of ferrous metals, aluminum metals, brass, copper containing alloys, and galvanized steels. 3. the method of suppressing corrosion according to claim 1, wherein the first time period is in the range of from 5 minutes to 2 days. 4. the method of suppressing corrosion according to claim 1, wherein the first time period is in the range of from 10 minutes to 24 hours. 5. the method of suppressing corrosion according to claim 1, wherein the corrosion inhibitor is tin(ii). 6. the method of suppressing corrosion according to claim 5, wherein the corrosion inhibitor is provided as a stannous salt selected from the group consisting of stannous sulfate, stannous bromide, stannous chloride, stannous oxide, stannous phosphate, stannous pyrophosphate, and stannous tetrafluoroborate. 7. the method of suppressing corrosion according to claim 1, wherein the first concentration of the corrosion inhibitor in the water stream during the

first time period is from about 0.1 to 1000 ppm. 8. the method of suppressing corrosion according to claim 1, wherein the first concentration of the corrosion inhibitor in the water stream during the first time period is from about 0.5 to 50 ppm. 9. the method of suppressing corrosion according to claim 1, wherein the first concentration of the corrosion inhibitor in the water stream during the first time period is from about 1.5 to 5 ppm. 10. the method of suppressing corrosion according to claim 1, wherein the corrosion inhibitor is provided as a salt in the treatment composition. 11. the method of suppressing corrosion according to claim 1, wherein the treatment composition further comprises a reducing agent selected from the group consisting of erythrobate, glycolic acid or other aliphatic polycarboxylic acid, amine carboxylic acid, phosphonocarboxylic acid, hydroxycarboxylic acids, hydroxyphosphono carboxylic acid based complexing agents, or combinations thereof. 12. the method of suppressing corrosion according to claim 1, wherein the treatment composition includes at least one of a chelating agent, scale inhibitor, and dispersant. 13. the method of suppressing corrosion according to claim 1, wherein the second concentration of corrosion inhibitor in the water stream during the second time period is zero or substantially zero. 14. the method of suppressing corrosion according to claim 1, wherein the second concentration of corrosion inhibitor in the water stream during the second time period is from about 0.01 ppm to 2 ppm. 15. the method of suppressing corrosion according to claim 1, wherein the second concentration of corrosion inhibitor in the water stream during the second time period is from about 0.1 ppm to 0.5 ppm. 16. the method of suppressing corrosion according to claim 1, further comprising introducing a secondary corrosion inhibitor with the shot dose, after the shot dose and/or during the second time period, wherein the secondary corrosion inhibitor is different from the corrosion inhibitor introduced by the shot dose. 17. the method of suppressing corrosion according to claim 16, wherein the secondary corrosion inhibitor is selected from the group consisting of compounds producing metal ions with multiple oxidation states, ortho phosphates, pyro phosphates, zinc, molybdates, nitrites, hydroxycarboxylic acids, unsaturated carboxylic acid polymers, acrylate/2-acrylamido-2-methylpropane sulfonic acid (apms) copolymers, acrylate/acrylamide copolymers, acrylate homopolymers, terpolymers of carboxylate/sulfonate/maleate, terpolymers of acrylic acid/amps, phosphonates and phosphinates, salts of molybdenum and tungsten, amines, azoles, their salts, and combinations thereof. 18. the method of suppressing corrosion according to claim 1, further comprising: (e) measuring a parameter of the metal surface or water stream, (f) introducing into the water stream a second shot dose including the corrosion inhibitor during the third time period, wherein the timing of introducing the second shot dose is controlled based on the measured parameter. 19. a method of suppressing corrosion of a corrodible metal surface that contacts a water stream in a water system, the method comprising: (a) introducing into the water stream a first shot dose of corrosion inhibitor in amounts sufficient to provide a stable film of tin(iv) on the metal surface, the first shot dose being introduced into the water stream over a first time period and the water stream having a first concentration of corrosion inhibitor during the first time period (b) after the first time period, maintaining a second concentration of corrosion inhibitor in the water stream over a second time period, the second concentration being less than 25 percent of the concentration of corrosion inhibitor during the first time period and (c) after the second time period, introducing into the water stream a second shot dose of the corrosion inhibitor over a third time period and at a third concentration greater than the second concentration, the third concentration being sufficient to maintain or re-stabilize portions of the stable film of tin(iv) on the metal surface. 20. the method of suppressing corrosion according to claim 19, wherein the third concentration is less than the first concentration. 21. the method of suppressing corrosion according to claim 19, wherein the second time period is the same duration as the first time period. 22. the method of suppressing corrosion according to claim 19, wherein the second concentration of corrosion inhibitor is zero or substantially zero. 23. the method of suppressing corrosion according to claim 19, wherein the concentration of corrosion inhibitor during the third time period is from 5 to 100 percent of the first concentration of corrosion inhibitor. 24. the method of suppressing corrosion according to claim 19, wherein the concentration of corrosion inhibitor during the third time period is from 10 to 20 percent of the first concentration of corrosion inhibitor. 25. the method of suppressing corrosion according to claim 19, wherein the second shot dose further includes a reducing agent. 26. the method of suppressing corrosion according to claim 25, wherein the first shot dose does not include a reducing agent. 27. the method of suppressing corrosion according to claim 26, wherein the reducing agent is selected from the group consisting of erythrobate, glycolic acid or other aliphatic polycarboxylic acid, amine carboxylic acid, phosphonocarboxylic acid, hydroxycarboxylic acids, hydroxyphosphono carboxylic acid based complexing agents, and combinations thereof. 28. the method of suppressing corrosion according to claim 19, wherein the third concentration of corrosion inhibitor is in the range of from about 0.1 to 1000 ppm. 29. the method of suppressing corrosion according to claim 19, wherein the third concentration of corrosion inhibitor is in the range of from about 0.5 to 50 ppm. 30. the method of suppressing corrosion according to claim 19, wherein the third concentration of corrosion inhibitor is in the range of from about 1.5 to 5 ppm. 31. the method of suppressing corrosion according to claim 19, further comprising periodically and intermittently feeding a shot dose of the corrosion inhibitor into the water system. 32. the method of suppressing corrosion according to claim 31, wherein the time between the periodic and intermittent shot doses is from about 2 to 30 days. 33. the method of suppressing corrosion according to claim 31, wherein the time between the periodic and intermittent shot doses is from about 3 to 7 days. 34. the method of suppressing corrosion according to claim 19, further comprising: (d) measuring a parameter of the metal surface or water stream. 35. the method of suppressing corrosion according to claim 34, wherein the timing (Results 0)

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of the corrosion cell. a common and practical approach of corrosion protection is by changing the environment around the metal surfaces. due to this reason, in conventional anti-corrosion treatment programs, continuous treatment of corrosion inhibitors is applied. the mechanism of corrosion inhibition was thought to require a continuous dose because of the equilibrium nature of the inhibitor film. if the maintenance dose of the inhibitor is interrupted, corrosion rates tend to increase quite quickly as the inhibitor film needs continuous replenishment. in the absence of any inhibitor, the film deteriorates rapidly. however, applying continuous inhibitors at high levels is associated with a high cost and can be particularly cost prohibitive in those instances in which the volume of water consumption is high. continuous treatment methods also impact the effluent stream of the treated water systems and can result in toxicity issues, environmental concerns and/or additional costs associated with remedial treatment or enhanced handling of the effluent stream. historically, the use of tin compounds as a corrosion inhibitor has been the subject of some experimentation in water systems like those described above. stannous salts are known to inhibit corrosion but, unlike more conventional corrosion inhibitors, the mechanism by which the stannous salts inhibited corrosion was not well understood. previous corrosion inhibition programs utilized the stannous salts in much the same manner as conventional corrosion inhibitors in which a maintenance dose of the stannous inhibitors were introduced into the aqueous systems to continuously maintain a minimum stannous concentration in order to be effective. examples of such prior art methods may be found in, for example, u.s. pat. no. 7,910,024 to stapp et al. and u.s. pat. nos. 6,001,156 and 6,200,529 to riggs, jr., the contents of which are incorporated herein by reference, in their entireties. moreover, conventional corrosion inhibition practices with tin compounds have not been able to effectively deal with the problem of maintaining an effective amount of tin(ii) in solution long enough to form a protective film on the surface of the corrosive metal without losing active form, tin (ii), due to bulk phase oxidation and precipitation to tin (iv). these and other issues are addressed by the present disclosure. it is an object of this disclosure to provide methods for improved and effective use of tin-based corrosion inhibitors by proposing a shot feed concept of applying corrosion inhibitor for a short period of time to form a stable and persistent film of tin (iv) on the metal surface. this film of tin (iv) is shown to last a few days without any more inhibitor present and the film is also shown to last much longer with a very small service dose of corrosion inhibitor. summary in a first embodiment, there is provided a method of suppressing corrosion of a corrodible metal surface that contacts a water stream in a water system, the method comprising: (a) introducing into the water stream a shot dose of a treatment composition comprising a corrosion inhibitor, the shot dose being introduced into the water stream over a first time period and the water stream having a first concentration of corrosion inhibitor during the first time period (b) then reducing the amount of treatment composition that is introduced into the water stream and (c) after the first time period, maintaining a second concentration of corrosion inhibitor in the water stream over a second time period, the second concentration being less than 25 percent of the concentration of corrosion inhibitor during the first time period. in a second embodiment, there is provided a method of suppressing corrosion of a corrodible metal surface that contacts a water stream in a water system, the method comprising: (a) introducing into the water stream a first shot dose of corrosion inhibitor, the first shot dose being introduced into the water stream over a first time period and the water stream having a first concentration of corrosion inhibitor during the first time period (b) after the first time period, maintaining a second concentration of corrosion inhibitor in the water stream over a second time period, the second concentration being less than 25 percent of the concentration of corrosion inhibitor during the first time period and (c) after the second time period, introducing into the water stream a second shot dose of the corrosion inhibitor, the second shot dose being introduced into the water stream over a third time period, the third concentration being greater than the second concentration. brief description of the drawings fig. 1 is a graph illustrating the systems requirements of corrosion inhibitor and feeding of a corrosion inhibitor by shot dosing and service dosing according to an embodiment fig. 2 is a graph illustrating the systems requirements of corrosion inhibitor and feeding of a corrosion inhibitor by shot dosing and service dosing according to an embodiment fig. 3 is a graph illustrating the systems requirements of corrosion inhibitor and feeding of two corrosion inhibitors by shot dosing according to an embodiment fig. 4 is a graph illustrating corrosion rates for samples exposed to various treatment methods according to embodiments fig. 5 is a graph illustrating the concentrations of various corrosion inhibitors in a water system over time and fig. 6 is an x-ray photoelectron spectroscopic image of a scanned mild steel coupon sample treated with a shot dose of corrosion inhibitor. detailed description embodiments of the disclosed methods apply the discovery of improved corrosion inhibition to water systems including, but not limited to cooling towers, water distribution systems, boilers, water and brine carrying pipelines, storage tanks and the like. embodiments of the methods are particularly useful with cooling towers in industrial water processes. improved corrosion inhibition can be achieved at lower cost and with less environmental impact by feeding corrosion inhibitors in an intermittent manner. both the embodiments of the disclosed method forms a very tenacious and persistent inhibitor film on the surface of corrodible metal by shot feeding a corrosion inhibitor (i.e., delivering a higher dose than the regular application rate initially and/or intermittently) for a short period of time. subsequent shot feeding, also can be termed as service dosing, is then carried out at intermittent intervals to meet the system and metal surface demands and to maintain the stable inhibitor film on the metal surface. as explained below, the shot and service intermittent feeding methods are particularly useful for stannous corrosion inhibitors. these intermittent feed methods can result in a significant reduction in the amount of corrosion inhibitor required, which is beneficial for the environment and reduces the cost of treatment. the intermittent feed methods can also provide for more economical treatment of large volume systems

including, for example, once-through applications and other systems in which the water consumption and losses pose a significant challenge for dosage and control using conventional anti-corrosion treatments. shot and service intermittent feeding also greatly reduces the amount of corrosion inhibitor(s), such as stannous salts, required to protect the treated system by reducing consumptive losses associated with oxidation and discharge of water from the system. the intermittent feed method embodiments using stannous inhibitors are also beneficial if the effluent from the treated system is being used in a manner or for a purpose where a conventional inhibitor would be regarded as a contaminant or otherwise detrimental to the intended use. such stannous-based corrosion inhibitors are more tolerant of overdosing when compared to conventional zinc or phosphate programs which rely on polymeric dispersants to suppress formation of unwanted deposits. other reactive metal salts, for example, zirconium and/or titanium metal salts, may also be used in intermittent feed methods according to the present disclosure. indeed, embodiments of the disclosed methods should be operable with any metal salt capable of forming stable metal oxides resistant to dissolution under the conditions in the targeted system. metals particularly suitable for use with the disclosed methods are multivalent, e.g., are found in at least two different oxidation states, $mx+$ and $my+$, in which the lower oxidation state metal ion, such as tin(ii), is more soluble in aqueous solutions than a higher oxidation state metal ion, such as tin(iv). for such metals, the lower oxidation state species can be introduced into (Results 10)

Title: Corrosion inhibiting method and inhibition compositions

Abstract: Source: US5202058A The present invention provides a method and compositions useful for inhibiting corrosion of a corrodible metal resulting from contact of water and air with the metal. In this method, a stannous salt and a hydrocarbyl substituted succinimide of a polyethylene polyamine are added to the water in minor amounts and cooperatively reduce corrosion of the metal to a substantially zero rate. While the amount of each agent for an effective inhibition is minor, say in the range of from about 0.1 to 100 ppm, a relatively concentrated solution is required for addition to the water. Suitable solvent media include the lower alkanols and mixture thereof with or without added water. Isopropanol is preferred. The solvent component of the compositions also varies depending upon the particular imide and/or salt component employed and the concentration desired. In general, the lower alkanol portion of the medium is in the range of from about 15 to 100 volume percent and the water portion is in the range of from about 0 to 85 volume percent. A medium in the range of from about 50 to 67 volume percent water is preferred. The relative amounts of the imide and stannous salt components desirably used varies depending upon the nature of the water in which the agents are employed. Satisfactory relative amounts by weight for each to the other at set forth above, are in the range of from about 0.5 to 10, preferably 0.8 to 2 and more preferably about 1 to 1 weight ratio.

Classifications:

International (IPC 8-9): C23F11/08 C23F11/18 (Advanced/Invention)

International (IPC 1-7): C23F11/08 C23F11/10 C23F11/14

CPC: C23F11/08 C23F11/18

European: C23F11/08 C23F11/18

US: 106/14.14 106/14.15 106/14.16 106/14.17 106/14.21 106/14.41 106/14.42 106/14.44 252/387 252/389.1 252/392 252/394 252/396 422/16 422/19

**SUBSTITUTE
REPLACEMENT**

SECTION is not Present

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Family:

Publication number	Publication date	Application number	Application date
AU199230654 A1	19930607	AU19920030654	19921105
CA2122896 AA	19940504	CA19922122896	19921105
US5202058 A	19930413	US19910788530	19911106
US5510057 A	19960423	US19940232282	19940506
US5989322 A	19991123	US19980205839	19981203
US6001156 A	19991214	US19970837716	19970422
WO9309268 A1	19930513	WO1992US09511	19921105

Priority:

US19910788530 19911106	US19940232282 19940506	US19980205839 19981203
US19970837716 19970422	US19960015914P 19960422	WO1992US09511 19921105

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Agent(s): SIM AND MCBURNEY

Designated states: AT AU BE BF BJ BR CA CF CG CH CI CM CS DE DK ES FI FR GA GB GN GR HU IE IT JP KR LU MC ML MR NL NO PL RO RU SE SN TD TG US

Title: Corrosion inhibition method suitable for use in potable water

Abstract: Source: US2001022947A Effective corrosion inhibitors having minimal organic content, particularly suitable for use in municipal drinking water systems, are described. The corrosion inhibiting additive is a stannous salt of a non-carbon acid.

Classifications:

International (IPC 8-9): C02F1/68 C02F5/04 C02F5/08 C23F11/08 C23F11/18 (Advanced/Invention)

International (IPC 1-7): C02F5/04 C09K3/00 C23F11/00 C23F11/08 C23F11/18

CPC: C02F1/683 C02F5/083 C02F5/086 C02F2103/02 C02F2103/42 C02F2303/08 C23F11/18 C23F11/188 C23F11/08

European: C02F1/68K C02F5/08C C02F5/08E C23F11/08 C23F11/18 C23F11/18M2 M02F103/02 M02F103/42 M02F303/08

US: 210/696 210/697 210/701 210/754 210/764 252/387 252/387S 252/389.2 252/389.21 252/389.22 252/389.23

252/389.24 252/389.61 252/389.610S 422/14 422/14P 422/15 422/15S 422/18 422/18S 422/7

Family:

Publication number	Publication date	Application number	Application date
AT296365 E	20050615	AT20000950666T	20000725
AU200063739 A5	20010213	AU20000063739D	20000725
AU2002231096 AA	20020701	AU20020231096	20011217
AU200231096 A5	20020701	AU20020031096	20011217
CA2380325 AA	20020121	CA20002380325	20000725
CA2431455 AA	20030612	CA20012431455	20011217
DE60020377 D1	20050630	DE20006020377	20000725
DE60020377 T2	20060202	DE20006020377T	20000725
EP1208248 A1	20020529	EP20000950666	20000725
EP1208248 B1	20050525	EP20000950666	20000725
EP1343922 A2	20030917	EP20010991368	20011217
JP2003505597 T2	20030212	JP20010512947T	20000725
JP2004516387 T2	20040603	JP20020551473T	20011217
US2001022947 AA	20010920	US20000740190	20001219
US6200529 BA	20010313	US19990360768	19990726
US6416712 BB	20020709	US20000740190	20001219
WO0107682 A1	20010201	WO2000US20231	20000725
WO0249966 A2	20020627	WO2001US49298	20011217
WO0249966 A3	20030227	WO2001US49298	20011217

Priority:

US19980114551P 19981231 US19990360768 19990726 US20000740190 20001219
WO2000US20231 20000725 WO2001US49298 20011217

Probable Assignee: GUARD PRODUCTS LLC

Assignee(s): (std): INC AS ; RIGGS OLEN L JR

Assignee(s): RIGGS OLEN L ; A S INC ; A S INC OAKLAND ; AS INC ; GUARD PRODUCTS LLC

Inventor(s): (std): RIGGS JR OLEN L ; RIGGS L ; RIGGS OLEN L JR ; RIGGS OLEN L

Inventor(s): OLEN L RIGGS JR

Agent(s): FB RICE; GOWLING LAFLEUR HENDERSON LLP

Designated states: AE AG AL AM AT AU AZ BA BB BE BF BG BJ BR BY BZ CA CF CG CH CI CM CN CO CR CU CY CZ DE DK DM DZ EC EE ES FI FR GA GB GD GE GH GM GN GQ GR GW HR HU ID IE IL IN IS IT JP KE KG KP KR KZ LC LI LK LR LS LT LU LV MA MC MD MG MK ML MN MR MW MX MZ NE NL NO NZ OM PH PL PT RO RU SD SE SG SI SK SL SN SZ TD TG TJ TM TR TT TZ UA UG US UZ VN YU ZA ZM ZW

Title: CORROSION INHIBITION METHOD FOR USE IN RECIRCULATING COOLING WATER SYSTEMS

Abstract: Source: US2006118761A Methods are described for inhibiting corrosion of corrodible metals present in contact with water in recirculating cooling water systems. The compositions employed are particularly effective at high temperatures and/or high hardness levels, and form little or no deposits on the metal surface.

Classifications:

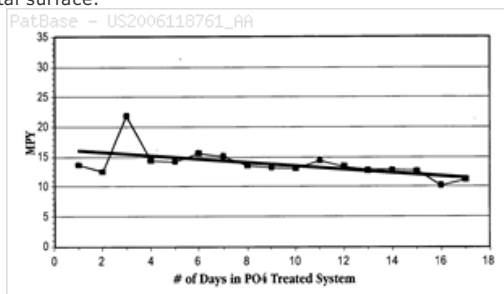
International (IPC 8-9): C02F5/08 C23F11/18 (Advanced/Invention);

C02F5/08 C23F11/08 (Core/Invention)

CPC: C02F5/08 C02F2103/023 C23F11/18

European: C02F5/08 C23F11/18 M02F103/02B

US: 252/175 252/175P



Family:

Publication number	Publication date	Application number	Application date
US2006118761 AA	20060608	US20050262037	20051027
WO06047766 A1	20060504	WO2005US39182	20051027

Priority:

US20040622750P 20041027 US20050262037 20051027

Probable Assignee: AS INC

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Assignee(s): A S INC ; AS INC

Inventor(s): (std): STAPP WILLIAM ; STAPP WILLIAM E

Agent(s): PERKINS COIE LLP

Designated states: AE AG AL AM AT AU AZ BA BB BE BF BG BJ BR BW BY BZ CA CF CG CH CI CM CN CO CR CU CY CZ DE DK DM DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GW HR HU ID IE IL IN IS IT JP KE KG KM KN KP KR KZ LC LK LR LS LT LU LV LY MA MC MD MG MK ML MN MR MW MX MZ NA NE NG NI NL NO NZ OM PG PH PL PT RO RU SC SD SE SG SI SK SL SM SN SY SZ TD TG TJ TM TN TR TT TZ UA UG US UZ VC VN YU ZA ZM ZW

Title: CORROSION INHIBITION COMPOSITIONS AND METHODS FOR USING THE SAME

Abstract: Source: US2009069202A Compositions and methods are described for inhibiting corrosion of corrodible metals present in contact with water in cooling water and other water storage systems. The compositions include concentrated stannous salts and agents to solubilize such salts.

Classifications:

International (IPC 8-9): C09K15/06 C09K15/30 C09K15/32 C09K8/54 C09K8/60 C09K8/88 C23F11/00 C23F11/10 C23F11/14 C23F11/18 (Advanced/Invention); C09K8/60 (Core/Invention)

CPC: C02F1/683 C02F5/083 C02F5/125 C02F5/145 C02F2103/023 C02F2303/08

European: C02F1/68K C02F5/08C C02F5/12B C02F5/14B M02F103/02B M02F303/08

US: 106/14.12 106/14.21 148/250 148/260 148/261 252/388 252/389.22 252/389.23 252/399 252/400.22 252/400.23 422/15 422/16 507/224 507/224P 507/237 507/238 507/238S

Family:

Publication number	Publication date	Application number	Application date
US2009069202 AA	20090312	US20070899768	20070907
US7910024 BB	20110322	US20070899768	20070907
WO09035569 A1	20090319	WO2008US10499	20080905

Priority:

US20070899768 20070907

Probable Assignee: INC AS

Assignee(s): (std): INC AS ; STAPP WILLIAM ; STAPP WILLIAM E ; WESTLUND GARY

Assignee(s): A S INC ; AS INC

Inventor(s): (std): STAPP WILLIAM ; STAPP WILLIAM E ; WESTLUND GARY

Agent(s): PERKINS COIE LLP; KING AND SPALDING LLP; PETER J; TODD STEPHEN ET AL

Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BR BW BY BZ CA CF CG CH CI CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IS IT JP KE KG KM KN KP KR KZ LA LC LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PG PH PL PT RO RS RU SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

Title: CORROSION CONTROL METHODS

Abstract: Source: US2015004054A There are provided methods of suppressing corrosion of a corrodible metal surface that contacts a water stream in a water system, the method comprising: (a) introducing into the water stream a shot dose of a treatment composition comprising a corrosion inhibitor, the shot dose being introduced into the water stream over a first time period and the water stream having a first concentration of corrosion inhibitor during the first time period; (b) then reducing the amount of treatment composition that is introduced into the water stream; and (c) after the first time period, maintaining a second concentration of corrosion inhibitor in the water stream over a second time period, the second concentration being less than 25 percent of the concentration of corrosion inhibitor during the first time period. There is also provided, after the second time period, introducing into the water stream a second shot dose of the corrosion inhibitor, the second shot dose being introduced into the water stream over a third time period, the third concentration being greater than the second concentration.

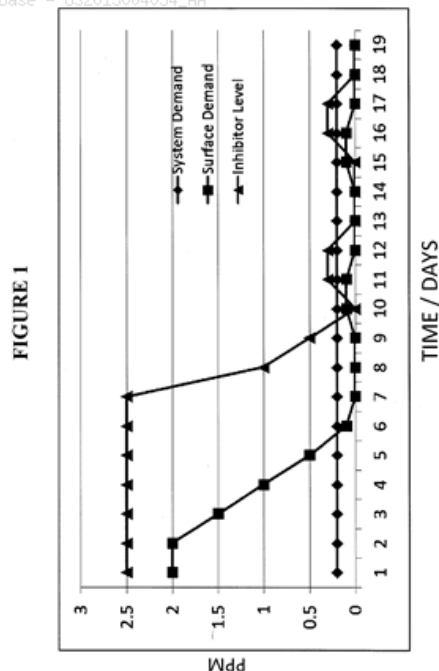
Classifications:

International (IPC 8-9): B08B9/00 B08B9/04 C02F1/68 C02F1/70 C02F101/20 C02F103/02 C02F5/02 C02F5/08 C23F11/00 C23F11/10 C23F11/12 C23F11/14 C23F11/167 C23F11/18 G05B1/00 (Advanced/Invention); C02F101/20 C02F103/02 (Advanced/Non-invention)

CPC: C23F11/00 C02F1/68 C02F1/683 C02F1/70 C02F5/083 C02F2101/203 C02F2103/023 C02F2303/08 C23F11/18

US: 1/1 422/14 422/15 422/16 422/17

PatBase - US2015004054 AA

**Family:**

Publication number	Publication date	Application number	Application date
CA2916926 AA	20151223	CA20142916926	20140626
CL2015003725 A1	20161014	CL20150003725	20151223
CO7610684 A2	20160520	CO20160016092	20160125
EP3013755 A1	20160504	EP20140741485	20140626
IN201617002490 A	20160812	IN201617002490	20160122
MX2016000142 A1	20160301	MX20160000142	20140626
US2015004054 AA	20150101	US20140316411	20140626
US9290849 BB	20160322	US20140316411	20140626
WO14210347 A1	20141231	WO2014US44391	20140626

Priority:

US20130839848P 20130626 US20140316411 20140626 WO2014US44391 20140626

Probable Assignee: CHEMTREAT INC

Assignee(s): (std): CHEMTREAT INC

Assignee(s): KALAKODIMI RAJENDRA ; RICHARDSON JOHN ; WILLS GUY DEANN

Inventor(s): (std): WILLS GUY DEANN ; RICHARDSON JOHN ; KALAKODIMI RAJENDRA

Inventor(s): DEANN WILLS GUY ; JOHN RICHARDSON ; RAJENDRA KALAKODIMI

Agent(s): AIRD AND BERLIS IP PARTNERSHIP LTD; ESTUDIO CLARKE MODET AND CO CHILE LIMITADA; CAROLINA MERCEDES DAZA MONTALVO; WINTER BRANDL FUERNISS HUEBNER ROESS KAISER POLTE PARTNERSCHAFT MBB; OLIFF PLC; WEBB AARON L

Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BN BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IR IS IT JP KE KG KM KN KP KR KZ LA LC LI LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PA PE PG PH PL PT QA RO RS RU RW SA SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

Title: CORROSION INHIBITING COMPOSITIONS AND METHODS

Abstract: Source: US2015118103A Compositions and methods for inhibiting the corrosion of metals in contact with an aqueous system are provided. The method of inhibiting corrosion includes maintaining effective amounts of (1) an amino acid-based polymer, such as a polyaspartic acid compound, and (2) a dispersible and/or soluble tin compound in the aqueous system. The corrosion inhibiting components of the treatment may be added simultaneously or separately into the water of the aqueous system, i.e., provided either in a single treatment product or as separate products. The single treatment single treatment product may include the amino acid-based polymer and a dispersible and/or soluble tin compound. Such a corrosion inhibiting composition may optionally also include a polycarboxylic acid chelating agent and/or a carboxylate/sulfonate functional copolymer.

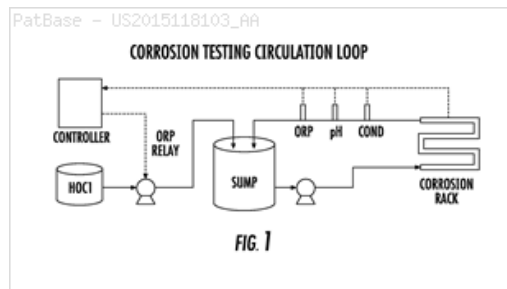
Classifications:

International (IPC 8-9): C23F11/08 C23F11/14 C23F11/173

C23F11/18 (Advanced/Invention)

CPC: C23F11/144 C23F11/187 C23F11/173 C23F11/08 C23F11/18

US: 1/1 252/389.1 252/389.23 422/7

**Family:**

Publication number	Publication date	Application number	Application date
CA2927846 AA	20160415	CA20142927846	20141017
EP3063311 A1	20160907	EP20140789753	20141017
US2015118103 AA	20150430	US20130069109	20131031
US2015284859 AA	20151008	US20150747272	20150623
US9290850 BB	20160322	US20130069109	20131031
WO15065733 A1	20150507	WO2014US61081	20141017

Priority:

US20130069109 20131031 US20150747272 20150623 WO2014US61081 20141017

Probable Assignee: U S WATER SERVICES INC

Assignee(s): (std): ERICKSON DONOVAN L ; JOHNSON ROY A ; LABROSSE MATTHEW RYAN ; U S WATER SERVICES INC ; YOUNG PAUL R

Assignee(s): US WATER SERVICES INC

Inventor(s): (std): ERICKSON DONOVAN L ; JOHNSON ROY A ; LABROSSE MATTHEW RYAN ; YOUNG PAUL R

Agent(s): GOWLING WLG CANADA LLP; BOESL RAPHAEL KONRAD; FOLEY AND LARDNER LLP; CARTER CHARLES G ET AL

Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BN BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IR IS IT JP KE KG KM KN KP KR KZ LA LC LI LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PA PE PG PH PL PT QA RO RS RU RW SA SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

Title: CORROSION INHIBITION

Abstract: A method of inhibiting corrosion of duplex stainless steel by aqueous acidic solution, comprises carrying out a preliminary treatment which is passivation of the steel while exposing the steel to a first aqueous acidic solution containing at least one organic corrosion inhibitor able to adsorb to a steel surface, so as to deposit a passivating and corrosion inhibiting film on the steel surface; and thereafter during a second period of time exposing the steel to a second aqueous acidic solution different from the first aqueous acidic solution and also containing at least one organic corrosion inhibitor able to adsorb to a steel. The second aqueous acidic solution maintains the film on the steel surface, such that weight loss through corrosion in the second period of time is lower than the weight loss which would be observed with the same second aqueous acidic solution but without carrying out the preliminary treatment.

Classifications:

International (IPC 8-9): C09K8/54 C10G75/02 C23F11/00
C23F11/04 C23F11/173 E21B41/02 F16L58/10 (Advanced/Invention)
CPC: C09K8/54 C23F11/04 E21B41/02 C10G75/02 C23F11/00
C23F11/173 F16L58/10

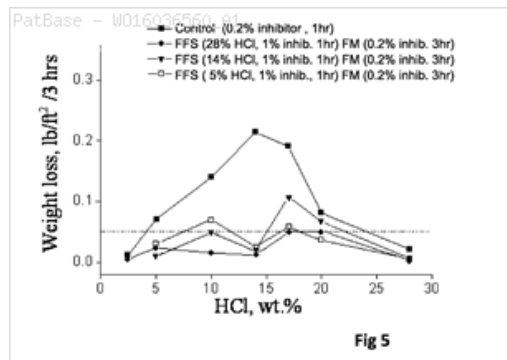


Fig 5

Family:

Publication number	Publication date	Application number	Application date
GB201415614 A0	20141015	GB20140015614	20140903
GB201614786 A0	20161019	GB20160014786	20140903
GB2529852 A1	20160309	GB20140015614	20140903
GB2538899 A1	20161130	GB20160014786	20140903
WO16036560 A1	20160310	WO2015US46958	20150826

Priority:

GB20140015614 20140903 GB20160014786 20140903

Probable Assignee: SCHLUMBERGER HOLDINGS

Assignee(s): (std): PRAD RES AND DEV LTD ; SCHLUMBERGER CA LTD ; SCHLUMBERGER HOLDINGS ; SCHLUMBERGER TECHNOLOGY CORP ; SCHLUMBERGER TECHNOLOGY BV ; SCHLUMBERGER SERVICES PETROL

Assignee(s): SERVICES PETROLIERS SCHLUMBERGER ; SCHLUMBERGER HOLDINGS LTD ; SCHLUMBERGER CANADA LTD ; PRAD RESEARCH AND DEVELOPMENT LTD

Inventor(s): (std): BARMATOV EVGENY ; BARMATOV EVGENY BORISOVICH ; EVGENY BARMATOV ; GEDDES JILL ; GEDDES JILL F ; HUGHES TREVOR LLOYD ; JILL GEDDES ; TREVOR HUGHES

Inventor(s): TREVOR LLOYD HUGHES

Agent(s): GAHLINGS STEVEN ET AL

Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BN BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IR IS IT JP KE KG KM KN KP KR KZ LA LC LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PA PE PG PH PL PT QA RO RS RU RW SA SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

Title: METHODS OF PRE-TREATING EQUIPMENT USED IN WATER SYSTEMS

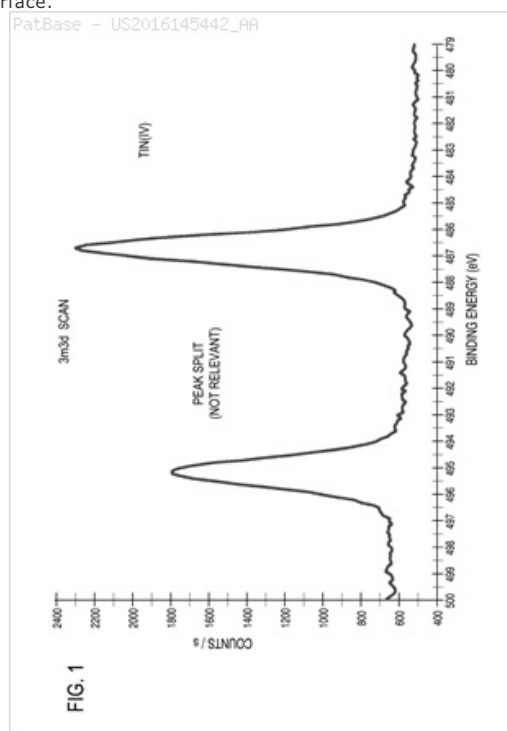
Abstract: Source: US2016145442A Methods for preventing corrosion of equipment having a corrodible metal surface that contacts water in a water system, the method comprising pre-treating the corrodible metal surface before the equipment is brought into service in the water system, the pre-treating including contacting a stannous corrosion inhibitor with the corrodible metal surface, wherein the stannous corrosion inhibitor is provided in sufficient amount and for sufficient time to form a protective film on at least a portion of the corrodible metal surface.

Classifications:

International (IPC 8-9): B05D3/00 C09D5/08
C23F11/08 (Advanced/Invention)

CPC: C09D5/08 C23C22/00 C23C22/68

US: 427/327



Family:

Publication number	Publication date	Application number	Application date
US2016145442 AA	20160526	US20140549241	20141120
WO16081209 A1	20160526	WO2015US59477	20151106

Priority:

US20140549241 20141120

Probable Assignee: CHEMTREAT INC

Assignee(s): (std): CHEMTREAT INC

Inventor(s): (std): EMERY KEVIN ; KALAKODIMI RAJENDRA PRASAD ; RICHARDSON JOHN

Agent(s): WEBB AARON L WEBB

Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BN BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IR IS IT JP KE KG KM KN KP KR KZ LA LC LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PA PE PG PH PL PT QA RO RS RU RW SA SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

Title: COMPOSITIONS AND METHODS FOR INHIBITING CORROSION IN HYDROSTATIC SYSTEMS

Abstract: Source: US2016215400A Compositions and methods for preventing corrosion of equipment having a corrodible metal surface that contacts water in a hydrostatic system are provided. Compositions may include a liquid-phase corrosion inhibitor and vapor-phase corrosion inhibitor. Methods may include introducing into the hydrostatic system a liquid-phase corrosion inhibitor, vapor-phase corrosion inhibitor and/or a scaling inhibitor. A protective film can be formed on the corrodible metal surface.

Classifications:

International (IPC 8-9): C23F11/02 C23F11/18
C23F15/00 (Advanced/Invention)

CPC: C23C22/62 C23F11/08 C23F11/02

US: 422/9



Family:

Publication number	Publication date	Application number	Application date
US2016215400 AA	20160728	US20160007771	20160127
WO16118976 A1	20160728	WO2016US15137	20160127

Priority:

US20150106785P 20150123 US20160007771 20160127

Probable Assignee: CHEMTREAT INC

Assignee(s): (std): CHEMTREAT INC

Inventor(s): (std): KALAKODIMI RAJENDRA PRASAD ; RICHARDSON JOHN ; TURNER CURT

Agent(s): WEBB AARON L ET AL

Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BN BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IR IS IT JP KE KG KM KN KP KR KZ LA LC LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PA PE PG PH PL PT QA RO RS RU RW SA SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

Title: USE OF PHOSPHINO POLYMER AND POLYHYDROXYPOLYCARBOXYLIC ACID AS CORROSION INHIBITOR

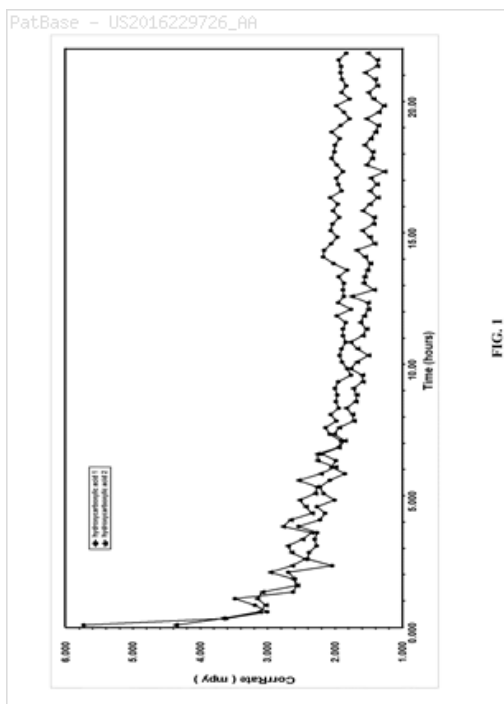
Abstract: Source: US2016229726A A polyhydroxypolycarboxylic acid and a water soluble phosphino polycarboxylate may be added to an aqueous system, such as a cooling water system, in order to inhibit corrosion as well as the deposition of corrosion within the system. The water soluble phosphino polycarboxylate may be derived from a phosphinyl unsaturated monomer and an ethylenically unsaturated carboxylic acid monomer. The aqueous system may be a cooling water system such as a cooling tower, a closed cooling water system, an air-conditioning water systems, a wastewater treatment system as well as a deionized water production system.

Classifications:

International (IPC 8-9): C02F5/10 C02F5/14 C09K15/32 C23F11/10 C23F11/12 C23F11/167 C23F11/173 (Advanced/Invention)

CPC: C02F5/14 C09K15/322 C09K15/324 C23F11/167 C02F5/10 C02F2303/22 C02F2103/023 C02F2303/08 C23F11/10 C23F11/173

US: 210/699



Family:

Publication number	Publication date	Application number	Application date
US2016229726 AA	20160811	US20160000490	20160119
WO16126800 A1	20160811	WO2016US16337	20160203

Priority:

US20150113072P 20150206 US20160000490 20160119

Probable Assignee: BAKER HUGHES INC

Assignee(s): (std): BAKER HUGHES INC

Inventor(s): (std): FELIPE MARY JANE LEGASPI ; FULMER DAVID N ; GUO BING BING ; NGUYEN KHAC TRUC

Agent(s): MATHENY ANTHONY F

Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BN BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IR IS IT JP KE KG KM KN KP KR KZ LA LC LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PA PE PG PH PL PT QA RO RS RU RW SA SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW