Claims

1. A system (5, 53) for ships for treating a fluid used for cleaning exhaust gas from a marine engine including particulate matter, comprising

a circulation tank (7) for accommodating said fluid, said circulation tank (7) comprising an outlet (23) for bleeding off part of the fluid,

first means (9a) for adding, downstream said outlet (23) of the circulation tank (7), a first chemical to said part of the fluid, said first chemical comprising a coagulant, and

a separation device (15) comprising an inlet (39) arranged downstream said first means (9a), which separation device (15) is arranged for receiving a mixture comprising said part of the fluid and said first chemical, and for separating the mixture into a first fraction and a second fraction, which first fraction contains more particulate matter than the second fraction,

wherein the system further comprises

a flocculation arrangement (13, 57) comprising a first flocculator device (29, 65) arranged upstream said inlet (39) of the separation device (15) and downstream said first means (9a), which flocculation arrangement (13, 57) comprises a pipe (33, 71) having a pipe length and comprising a plurality of pipe portions (35, 73), wherein said pipe (33, 71) is bent such that said pipe portions (35, 73) at least partly extend along each other, and wherein the first flocculator device (29, 65) comprises a first pipe portion (35a, 73a) of said pipe portions (35, 73), the length of the pipe (33, 71), and the number of bends of the pipe (33, 71), being chosen such that the flocculation arrangement (13, 57) retains the mixture including said part of the fluid and said first chemical in the flocculation arrangement (13, 57) for 20 – 40 seconds to promote agglomeration of particulate matter comprised in said part of the fluid before the mixture is received by the separation device (15).

2. A system (5, 53) according to claim 1, further comprising a first mixer device (27, 61) arranged upstream said first flocculator device (29, 65) and downstream the outlet (23) of the circulation tank (7), which first mixer device (27, 61) is arranged to disperse said first chemical in said part of the fluid.

3. A system (5, 53) according to claim 2, wherein the first mixer device (27, 61) is static.

4. A system (5, 53) according to any of the preceding claims, wherein the first flocculator device (29, 65) is static.

5. A system (5, 53) according to any of the preceding claims, further comprising second means (9b) for adding, downstream said outlet (23) of the

circulation tank (7) and upstream said inlet (39) of the separation device (15), a second chemical to said part of the fluid, said second chemical comprising a flocculant.

6. A system (5, 53) according to any of the preceding claims, further comprising third means (9c) for adding, downstream said outlet (23) of the circulation tank (7) and upstream said inlet (39) of the separation device (15), a third chemical to said part of the fluid, said third chemical comprising an alkaline agent for obtaining a pH of said part of the fluid of between 6 and 8.

7. A system (5, 53) according to any of the preceding claims, wherein the flocculation arrangement (13, 57), in a normal state of use of the system (5), has a width (W), a length (L) and a height (H), the height (H) exceeding the width (W).

8. A system (5, 53) according to claim 7, wherein at least one of the width (W), the length (L) and the height (H) of the flocculation arrangement (13, 57) is less than 1/10 of the pipe length of the pipe (33, 71).

9. A method for ships for treating a fluid used for cleaning exhaust gas from a marine engine including particulate matter, comprising

accommodating said fluid in a circulation tank (7) (Step A),

bleeding off part of the fluid from the circulation tank (7) through an outlet (23) of the circulation tank (7) (Step B),

adding, through first means (9a), downstream said outlet of the circulation tank, (7) a first chemical to said part of the fluid, said first chemical comprising a coagulant (Step D),

receiving, in a separation device (15), through an inlet (39) of the separation device (15) arranged downstream said first means (9a), a mixture comprising said part of the fluid and said first chemical (Step H), and

separating, by means of the separation device (15), the mixture into a first fraction and a second fraction, which first fraction contains more particulate matter than the second fraction (Step I),

wherein the method further comprises

conveying said part of the fluid and said first chemical through a flocculation arrangement (13, 57) comprising a first flocculator device (29, 65) arranged upstream said inlet of the separation device (15) and downstream said first means (9a), which flocculation arrangement (13, 57) comprises a pipe (33, 71) comprising a plurality of pipe portions (35, 73), wherein said pipe (33, 71) is bent such that said pipe portions (35, 73) at least partly extend along each other, and the first flocculator device (29, 65) comprises a first pipe portion (35a, 73a) of said pipe portions (35, 73), the length of the

pipe (13, 57), and the number of bends of the pipe (33, 71), being chosen such that the flocculation arrangement (13, 57) retains the mixture including said part of the fluid and said first chemical in the flocculation arrangement (13, 57) for 20 – 40 seconds to promote agglomeration of particulate matter comprised in said part of the fluid before the mixture is received in the separation device (15) (Step F).

10. A method according to claim 9, further comprising mixing, in a first mixer device (27, 61) arranged upstream said first flocculator device (29, 65) and downstream the outlet (23) of the circulation tank (7), said first chemical and said part of the fluid (Step E).

11. A method according to any of claims 9 - 10, wherein the first mixer device (27, 61) is static.

12. A method according to any of claims 9 - 11, wherein the first flocculator device (29, 65) is static.

13. A method according to any of claims 9 -12, further comprising adding, through second means (9b), downstream said outlet (23) of the circulation tank (7) and upstream said inlet (39) of the separation device (15), a second chemical to said part of the fluid, said second chemical comprising a flocculant (Step G).

14. A method according to any of claims 9 - 13, further comprising adding, through third means (9c), downstream said outlet (23) of the circulation tank (7) and upstream said inlet (39) of the separation device (15), a third chemical to said part of the fluid, said third chemical comprising an alkaline agent for obtaining a pH of said part of the fluid of between 6 and 8 (Step C).