

CLAIMS

1. A system for reducing the amount of SO_x in exhaust gas from marine engines, comprising
- 5 a) a spray tower (1) arranged to be vertically positioned and having an inner space (100), wherein the spray tower (1) comprises,
- 10 1) a central exhaust gas pipe (7) arranged for introducing exhaust gas into and in fluid connection with the inner space (100) of the spray tower (1) through an exhaust gas inlet (2) positioned at a proximal end (7b) of the central exhaust gas pipe (7), wherein said central exhaust gas pipe (7) is positioned at a bottom end (1a) of the spray tower (1) in installed position; and
- 15 2) at least one exhaust gas outlet (3) arranged for withdrawing purified exhaust gas from, and in fluid connection with, the inner space (100) of the spray tower (1), wherein said exhaust gas outlet (3) is positioned at a top end (1b) of the spray tower (1) in installed position,
- 20 wherein from the exhaust gas inlet (2) to the exhaust gas outlet (3), a general exhaust gas flow is passing through the inner space (100) of the spray tower; and
- 3) at least one scrubber liquid outlet (5) arranged to drain off the scrubber liquid out from the spray tower (1);
- 25 b) one or more spray devices (41, 42) configured to provide a stream of scrubber liquid within the inner space (100) of the spray tower (1) counter current to the general exhaust gas flow;
- 30 c) at least two engine exhaust gas pipes (6) being in fluid connection with the distal end (7a) of the central exhaust gas pipe (7).
2. A system according to claim 1, wherein the stream of scrubber liquid is fresh water, salt water or an alkaline aqueous solution.
3. A system according to claim 1 or 2, wherein the one or more spray devices (41, 42) are configured to provide scrubber liquid droplets when being in operation, wherein more than 50% of the volume of the droplets have a diameter of 0.35 mm to 4 mm, more specifically 0.5 to 2 mm, most specifically around 1 mm.

4. A system according to any one of claims 1 to 3, wherein all spray devices (42) are arranged to spray the scrubber liquid upwards or all spray devices (41) are arranged to spray the scrubber liquid downwards.
- 5 5. A system according to any one of claims 1 to 3, wherein part of the spray devices (42) are arranged to spray the scrubber liquid upwards and part of the spray devices (41) are arranged to spray the scrubber liquid downwards.
6. A system according to any one of claims 1 to 5, wherein
- 10 - the central exhaust gas pipe (7) passes through the bottom end (1a) of the spray tower (1) and extends into the inner space (100) of the spray tower (1); and
- the scrubber liquid outlet (5) is positioned below the proximal end (7b) of the central exhaust gas pipe (7).
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7. A system according to any one of claim 1 to 6, wherein the spray tower (1) comprises at least one deflection body (8) reducing or preventing used scrubber liquid from entering the central exhaust gas pipe (7).
- 20 8. A system according to any one of claim 1 to 7, wherein the system comprises a single spray tower (1).
9. A system according to any one of claim 1 to 8, wherein each of the engine exhaust gas pipes (6) comprises an exhaust gas valve (15) arranged to prevent backflow of
- 25 the exhaust gas into the exhaust gas pipes (6) when the exhaust gas valve (15) is closed.
10. A system according to any one of claim 1 to 9, wherein each of the engine exhaust gas pipes (6) are arranged to be connected to a separate engine to convey
- 30 the exhaust gas from each of the single engines to the central exhaust gas pipe (7).
11. A system according to any one of claims 1 to 10, wherein the spray tower (1) comprises an upper (14) and a lower scrubber chamber (13) fluidly connected to each other, wherein
- 35 a) both scrubber chambers (13, 14) comprise at least one spray device (41) configured to provide a stream of scrubber liquid counter current to the general exhaust gas flow through each of the scrubber chambers (13, 14);

- b) the upper scrubber chamber (14) comprises at least one deflection body (8) located below the spray device (41, 42) situated lowest in the upper scrubber chamber (14), and configured to prevent scrubber liquid from entering the lower scrubber chamber (13);
- 5 c) the upper scrubber chamber (14) comprises at least one scrubber liquid outlet (11) arranged to drain off the used scrubber liquid out of the upper scrubber chamber (14);
- d) the lower scrubber chamber (13) comprises at least one deflection body (8) located below the spray device (41, 42) situated lowest in the lower scrubber chamber (13), and configured to prevent scrubber liquid from entering the central exhaust gas pipe (7);
- 10 e) the lower scrubber chamber (13) comprises at least one scrubber liquid outlet (5) arranged to drain off the used scrubber liquid out of the lower scrubber chamber (13).
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12. A system according to claim 11, wherein the spray devices (41) in the upper chamber (14) are arranged to spray the scrubber liquid downwards and the spray devices (42) in the lower chamber (13) are arranged to spray the scrubber liquid upwards.
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13. A marine vessel comprising a system according to any one of the claims 1 to 12.
14. A method for purifying exhaust gas from at least two engines, preferably located in a marine vessel, by reducing the amount of SO_x in the exhaust gas, the method comprising the steps of:
- 25 a) conveying exhaust gas from the engines via two or more engine exhaust gas pipes (6) to a central exhaust gas pipe (7) arranged for introducing exhaust gas into the inner space (100) of a spray tower (1) through an exhaust gas inlet (2) positioned at the proximal end (7b) of the central exhaust gas pipe (7), the central exhaust gas pipe (7) being located at a bottom end (1a) of a vertically positioned spray tower (1), the two or more engine exhaust gas pipes (6) being arranged for introducing exhaust gas into the distal end (7a) of the central exhaust gas pipe (7);
- 30 b) generating a general exhaust gas flow from the exhaust gas inlet (2) to an exhaust gas outlet (3), for withdrawing purified exhaust gas out from the spray tower (1), said exhaust gas outlet (3) located at a top end (1b) of the spray tower (1),
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- c) injecting scrubber liquid into the spray tower (1) using one or more spray devices (41, 42), thereby providing a stream of scrubber liquid counter current to the general exhaust gas flow.

5 15. The method according to claim 14 wherein the scrubber liquid is fresh water, salt water or an alkaline aqueous solution.

16. A method according to claim 14 or 15 using a system according to any one of claims 1 to 12.