Claims

1. A process for clean sailing of marine ship, comprising steps of:

a) leading exhaust gas of the ship engine and seawater into a scrubber, scrubbing and cleaning the exhaust gas ~~of engine~~ with seawater to generate scrubbing seawater;

b) discharging the scrubbing water into a bypass box of water gas balance, which is communicated with the atmosphere, through a water seal of the scrubber, wherein the flow capacity of the water seal of the scrubber is configured so that the engine exhaust gas can pass safely and the height of water column of the water seal of the scrubber is configured to be equal to the upper limit of safety air pressure of scrubber; and

c) discharging the scrubbing water in the bypass box of water gas balance.

2. The process of claim 1, wherein the opening gas pressure of the water seal of the scrubber is equal to the upper limit value of the safety air pressure of the scrubber.

3. The process of claim 1, wherein the process further comprises:

~~b)~~ disposing of the scrubbing seawater discharged from bypass box of water gas balance in an open loop operation mode, including neutralizing the scrubbing seawater in an open loop operation mode; and/or

~~c)~~ disposing of the scrubbing seawater discharged from bypass box of water gas balance in a closed loop operation mode, including:

i) storing the scrubbing seawater in a storage container; and

ii) neutralizing the scrubbing seawater in a closed loop operation mode.

~~2~~4. The process of claim ~~1~~3, wherein the storage container includes a ballast tank.

~~3~~5. The process of claim ~~2~~4, wherein the process further comprises mixing the scrubbing seawater and ballast water in the ballast tank.

~~4~~6. The process of claim ~~1~~3, wherein the process further comprises storing the scrubbing seawater in the storage container and using the scrubbing seawater as ballast water.

~~5~~7. The process of claim ~~1~~3, wherein step i) is carried out before step ii); or, step i) is carried out after step ii); or, step i) and step ii) are carried out at the same time.

~~6~~8. The process of claim ~~1~~3, wherein the process further comprises providing a neutralization equipment for open-closed loop operation, and both of the neutralizing in an open loop operation mode and the neutralizing in a closed loop operation mode are carried out in the neutralization equipment.

~~7~~9. The process of claim ~~1~~3, wherein the process further comprises providing a neutralization equipment for open loop operation and a neutralization equipment for close loop operation, and the neutralizing in an open loop operation mode is carried out in the neutralization equipment for open loop operation, and the neutralizing in a closed loop operation mode is carried out in the neutralization equipment for closed loop operation.

~~8~~10. The process of claim ~~1~~3, wherein the process further comprises providing a neutralization equipment for open loop operation, and the neutralizing in an open loop operation mode is carried out in the neutralization equipment for open loop operation, and the neutralizing in a closed loop operation mode is carried out in the storage container.

~~9~~11. The process of claim ~~1~~3, wherein the neutralizing in an open loop operation mode includes mixing the scrubbing seawater and natural seawater, and/or mixing the scrubbing seawater and an alkaline chemical; and the neutralizing in a closed loop operation mode includes mixing the scrubbing seawater and natural seawater, and/or mixing the scrubbing seawater and an alkaline chemical.

~~10~~12. The process of claim ~~9~~11, wherein the alkaline chemical is selected from a group consisting of magnesium based alkaline chemical, calcium based alkaline chemical, sodium based alkaline chemical and the combination thereof.

~~11~~13. The process of claim ~~1~~3, wherein the step of disposing of the scrubbing seawater in a closed-loop operation mode further includes: iii) killing organisms in the scrubbing seawater.

~~12~~14. The process of claim ~~11~~13, wherein the step of killing organisms in the scrubbing seawater includes UV killing treatment, and/or hypochlorite killing treatment, and/or ozone killing treatment.

~~13~~15. The process of claim ~~1~~3, wherein an inner wall of the storage container and an inner wall of pipes and pumps for transporting the scrubbing seawater to the storage container are configured to be acid resistant.

~~14~~16. A ship for carrying out the process of claim 1, comprising:

a scrubber, in which the seawater is used to scrub the exhaust gas to generate the scrubbing seawater; ~~and~~

a storage container~~.~~;

a bypass box of water gas balance;

wherein the scrubber includes a water collecting pool and a water seal, the bypass box of water gas balance includes a bypass discharging passage, the water-gas inlet of the bypass box of water gas balance is connected with the water seal, and the water outlet of the bypass box of water gas balance is connected with a water quality recovery system.

17. The ship of claim 16, wherein the flow capacity of the water seal is configured so that the engine exhaust gas can pass safely.

18. The ship of claim 16, wherein the water seal is composed of a sealing structure in which the height of water column is configured to be equal to the upper limit of safety air pressure of scrubber.

19. The ship of claim 16, wherein the scrubber and the bypass box of water gas balance are composed of high temperature resistant materials.

~~15~~20. The ship of claim ~~14~~16, wherein the storage container is located near a center point of a ship plane below the ship waterline.

~~16~~21. The ship of claim ~~14~~16, wherein the ship further includes a neutralization

equipment for open-closed loop operation, and both of the neutralizing in an open loop operation mode and the neutralizing in a closed loop operation mode are carried out in the neutralization equipment for open-closed loop operation.

~~17~~22. The ship of claim ~~16~~21, wherein the ship further comprises an equipment for supplying natural seawater, and the equipment for supplying natural seawater is configured to provide natural seawater for the neutralization equipment for open-closed loop operation for the purpose of neutralization treatment.

~~18~~23. The ship of claim ~~16~~21, wherein the ship further comprises an equipment for supplying alkaline chemical, and the equipment for supplying alkaline chemical is configured to provide alkaline chemical for the neutralization equipment for open-closed loop operation for the purpose of neutralization treatment.

~~19~~24. The ship of claim ~~14~~16, wherein the ship further comprises a neutralization equipment for open loop operation and a neutralization equipment for close loop operation, and the neutralizing in an open loop operation mode is carried out in the neutralization equipment for open loop operation, and the neutralizing in a closed loop operation mode is carried out in the neutralization equipment for closed loop operation.

~~20~~25. The ship of claim ~~19~~24, wherein the ship further comprises an equipment for supplying natural seawater, and the equipment for supplying natural seawater is configured to provide natural seawater for the neutralization equipment for open loop operation and/or the neutralization equipment for closed loop operation for the purpose of neutralization treatment.

~~21~~26. The ship of claim ~~19~~24, wherein the ship further comprises an equipment for supplying alkaline chemical, and the equipment for supplying alkaline chemical is configured to provide alkaline chemical for the neutralization equipment for open loop operation and/or the neutralization equipment for closed loop operation for the purpose of neutralization treatment.

~~22~~27. The ship of claim ~~14~~16, wherein the ship further comprises a neutralization equipment for open loop operation, and the neutralizing in an open loop operation mode

is carried out in the neutralization equipment for open loop operation, and the neutralizing in a closed loop operation mode is carried out in the storage container.

~~23~~28. The ship of claim ~~22~~27, wherein the ship further comprises an equipment for supplying natural seawater, and the equipment for supplying natural seawater is configured to provide natural seawater for the neutralization equipment for open loop operation and/or the storage container for the purpose of neutralization treatment.

~~24~~29. The ship of claim ~~22~~27, wherein the ship further comprises an equipment for supplying alkaline chemical, and the equipment for supplying alkaline chemical is configured to provide alkaline chemical for the neutralization equipment for open loop operation and/or the storage container for the purpose of neutralization treatment.

~~25~~30. The ship of claim ~~14~~16, wherein the ship further comprises an equipment for killing organisms, and the equipment for killing organisms includes an UV killing equipment, and/or a hypochlorite killing equipment, and/or an ozone killing equipment.

~~26~~31. The ship of claim ~~14~~16, wherein packings are provided in the scrubber to increase the contact area between the seawater and the exhaust gas.