

CLAIMS

What is claimed is:

1. An apparatus for introducing a gas into concrete reclaimed water comprising
 - 5 (i) a first conduit operably connected to a source of concrete reclaimed water at a proximal end of the first conduit, wherein the first conduit allows the reclaimed water to flow through it from the proximal end and out of it at a distal end; and
 - (ii) a second conduit situated inside the first conduit, wherein the second conduit is operably connected to a source of a gas and is configured to allow the gas to flow into it and to flow
 - 10 out of it into the reclaimed water in the first conduit.
2. The apparatus of claim 1 wherein the gas comprises carbon dioxide
3. The apparatus of claim 1 wherein the diameter of the first conduit is 0.5-5 inches and the
 - 15 diameter of the second conduit is 0.3-3 inches.
4. The apparatus of claim 1 wherein the first conduit is operably connected to the source of concrete reclaimed water at its proximal end by a third conduit, wherein the diameter of the first conduit is greater than the diameter of the third conduit.
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5. The apparatus of claim 1 wherein the first conduit is operably connected at its distal end to a reclaimer by a fourth conduit, wherein the diameter of the first conduit is greater than the diameter of the fourth conduit.
6. The apparatus of claim 1 further comprising a control system comprising
 - 25 (iii) a sensor to sense the specific gravity of the reclaimed water and transmit information regarding the specific gravity to
 - (iv) a controller that processes the information from the sensor.
7. The apparatus of claim 6 further comprising
 - 30 (v) an actuator that receives a signal from the controller based, at least in part, on the processed information from the sensor.

8. The apparatus of claim 7 wherein the actuator comprises a valve that can modulate the flow of the gas into the second conduit.

9. The apparatus of claim 1 wherein the second conduit comprises perforations that are configured to allow the gas to pass from the second conduit to the reclaimed water in the first conduit when the gas exceeds a threshold pressure in the second conduit, but that do not allow reclaimed water from the first conduit into the second conduit.

10. The apparatus of claim 7 further comprising at least one of a sensor to sense a level of reclaimed water in a reclaimed water holding tank, a sensor to sense a temperature of the reclaimed water, a sensor to sense rate of flow of the gas into the second conduit, a sensor to sense whether and/or how much admixture is added to the reclaimed water, a device that indicates whether a pump to pump reclaimed water through the first conduit is activated, or a timer, wherein the sensor, device or timer is configured to send information to the controller, which processes the information.

11. The apparatus of claim 7 further comprising at least two of a sensor to sense a level of reclaimed water in a reclaimed water holding tank, a sensor to sense a temperature of the reclaimed water, a sensor to sense rate of flow of the gas into the second conduit, a sensor to sense whether and/or how much admixture is added to the reclaimed water, a device that indicates whether a pump to pump reclaimed water through the first conduit is activated, or a timer, wherein the sensor, device or timer is configured to send information to the controller, which processes the information.

12. The apparatus of claim 7 further comprising at least three of a sensor to sense a level of reclaimed water in a reclaimed water holding tank, a sensor to sense a temperature of the reclaimed water, a sensor to sense rate of flow of the gas into the second conduit, a sensor to sense whether and/or how much admixture is added to the reclaimed water, a device that indicates whether a pump to pump reclaimed water through the first conduit is activated, or a timer, wherein the sensor, device or timer is configured to send information to the controller, which processes the information.

13. The apparatus of claim 7 further comprising at least four of a sensor to sense a level of reclaimed water in a reclaimed water holding tank, a sensor to sense a temperature of the

reclaimed water, a sensor to sense rate of flow of the gas into the second conduit, a sensor to sense whether and/or how much admixture is added to the reclaimed water, a device that indicates whether a pump to pump reclaimed water through the first conduit is activated, or a timer, wherein the sensor, device or timer is configured to send information to the controller,
5 which processes the information.

14. The apparatus of claim 7 wherein the controller further receives information about the composition of the reclaimed water, wherein the information includes a proportion of the reclaimed water that is cementitious material.

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15. A method of treating concrete reclaimed water with a gas comprising
(i) flowing the reclaimed water from a source of the reclaimed water into a first conduit at a proximal end of the first conduit and out of the first conduit at a distal end of the first conduit;
(ii) flowing a gas from a source of the gas into a second conduit situated inside the first
15 conduit; and
(iii) flowing the gas out of the second conduit into the reclaimed water in the first conduit.

16. The method of claim 15 wherein the gas comprises carbon dioxide.

20 17. The method of claim 15 wherein the diameter of the first conduit is 0.5-5 inches and the diameter of the second conduit is 0.3-3 inches.

18. The method of claim 15 wherein the reclaimed water is flowed into the first conduit from the source of concrete reclaimed water via a third conduit operably connected to the source of
25 concrete reclaimed water and connected to the first conduit at the proximal end of the first conduit, wherein the diameter of the first conduit is greater than the diameter of the third conduit.

19. The method of claim 15 wherein the reclaimed water is flowed out of the first conduit
30 into a fourth conduit operably connected to the distal end of the first conduit, wherein the diameter of the first conduit is greater than the diameter of the fourth conduit.

20. The method of claim 15 further comprising determining the specific gravity of the reclaimed water and transmitting information regarding the specific gravity to a controller that processes the information.

5 21. The method of claim 20 further comprising sending a signal to from the controller to an actuator wherein the signal is based, at least in part on the processed information.

22. The method of claim 21 wherein the actuator comprises a valve that modulates the flow of the gas into the second conduit based, at least in part, on the signal received from the
10 controller.

23. The method of claim 15 wherein the gas moves from the second conduit into the reclaimed water in the first conduit via perforations that are configured to allow the gas to pass from the second conduit to the reclaimed water in the first conduit when the gas exceeds
15 a threshold pressure in the second conduit, but that do not allow reclaimed water from the first conduit into the second conduit.

24. The method of claim 20 further comprising sending information to the controller from at least one of a sensor to sense a level of reclaimed water in a reclaimed water holding tank, a
20 sensor to sense a temperature of the reclaimed water, a sensor to sense rate of flow of the gas into the second conduit, a sensor to sense whether and/or how much admixture is added to the reclaimed water, a device that indicates whether a pump to pump reclaimed water through the first conduit is activated, or a timer, and processing the information at the controller.

25 25. The method of claim 20 further comprising sending information to the controller from at least two of a sensor to sense a level of reclaimed water in a reclaimed water holding tank, a sensor to sense a temperature of the reclaimed water, a sensor to sense rate of flow of the gas into the second conduit, a sensor to sense whether and/or how much admixture is added to the reclaimed water, a device that indicates whether a pump to pump reclaimed water through the
30 first conduit is activated, or a timer, and processing the information at the controller.

26. The method of claim 20 further comprising sending information to the controller from at least three of a sensor to sense a level of reclaimed water in a reclaimed water holding tank, a sensor to sense a temperature of the reclaimed water, a sensor to sense rate of flow of the gas

into the second conduit, a sensor to sense whether and/or how much admixture is added to the reclaimed water, a device that indicates whether a pump to pump reclaimed water through the first conduit is activated, or a timer, and processing the information at the controller.

- 5 27. The method of claim 20 further comprising sending information to the controller from at least four of a sensor to sense a level of reclaimed water in a reclaimed water holding tank, a sensor to sense a temperature of the reclaimed water, a sensor to sense rate of flow of the gas into the second conduit, a sensor to sense whether and/or how much admixture is added to the reclaimed water, a device that indicates whether a pump to pump reclaimed water through the first conduit is activated, or a timer, and processing the information at the controller.
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28. The method of claim 20 wherein the controller further receives information about the composition of the reclaimed water, wherein the information includes a proportion of the reclaimed water that is cementitious material.

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