"Conveyor dishwasher and method for operating a conveyor dishwasher"

Patent claims

1. A conveyor dishwasher (1), in particular commercial conveyor dishwasher, having at least one wash zone (10, 11.1, 11.2, 11.3) and at least one final rinse zone (13.1) which is arranged downstream of the at least one wash zone (10, 11.1, 11.2, 11.3), and having a conveyor apparatus (2) for conveying washware through the at least one wash zone (10, 11.1, 11.2, 11.3) and the at least one final rinse zone (13.1), with the final rinse liquid which is sprayed onto the washware to be treated in the at least one final rinse zone (13.1) having a metered disinfection chemical, and with at least one additional final rinse zone (13.2) which is arranged downstream of the at least one final rinse zone (13.1) as seen in the conveying direction (T) being provided for spraying fresh water without a disinfection chemical onto the washware to be treated;
characterized
in that the at least one additional final rinse zone (13.2) has an associated collection device (22.2) for collecting liquid which is sprayed in the at least one additional final rinse zone (13.2); and
in that a liquid transfer system is provided, it being possible to supply the liquid which is collected in the collection device (22.2) directly to the at least one wash zone (10, 11.1, 11.2, 11.3) by means of said liquid transfer system, or it being possible to supply the liquid which is collected in the collection device (22.2) directly to a wastewater outlet of the conveyor dishwasher (1) by means of said liquid transfer system.

2. The conveyor dishwasher (1) as claimed in claim 1, with the collection device (22.2) which is associated with the at least one additional final rinse zone (13.2) being in

the form of a tank or collection container and being arranged with respect to final rinse nozzles (34a, 34b) which are associated with the additional final rinse zone (13.2) in such a way that the liquid which is sprayed in the at least one additional final rinse zone (13.2) flows into the collection device (22.2) due to the force of gravity and is collected there.

3. The conveyor dishwasher (1) as claimed in claim 1 or 2, with the liquid transfer system having a bypass line (6) which is or can be connected at one end to the collection device (22.2) which is associated with the at least one additional final rinse zone (13.2) and at the other end to the at least one wash zone (10, 11.1, 11.2, 11.3), and in particular to a wash tank (20, 21.1, 21.2, 21.3) which is associated with the at least one wash zone (10, 11.1, 11.2, 11.3).

4. The conveyor dishwasher (1) as claimed in claim 3, with the liquid transfer system having at least one pump (38a) with which the liquid which is collected in the collection device (22.2) which is associated with the at least one additional final rinse zone (13.2) can be supplied to the at least one wash zone (10, 11.1, 11.2, 11.3), and in particular to the wash tank (20, 21.1, 21.2, 21.3) which is associated with the at least one wash zone (10, 11.1, 11.2, 11.3), via the bypass line (6).

5. The conveyor dishwasher (1) as claimed in claim 4, it being possible to actuate the at least one pump (38a) by means of a control device (50) in such a way that the liquid which is collected in the collection device (22.2) which is associated with the at least one additional final rinse zone (13.2) is supplied continuously or at prespecified or prespecifiable times or events to the at least one wash zone (10, 11.1, 11.2, 11.3), and in particular to the wash tank (20, 21.1, 21.2, 21.3) which is associated with the at least

one wash zone (10, 11.1, 11.2, 11.3), via the bypass line (6).

6. The conveyor dishwasher as claimed in one of the preceding claims,
with the liquid transfer system having an outlet line (35) which is or can be connected at one end to the collection device (22.2) which is associated with the at least one additional final rinse zone (13.2) and at the other end to a wastewater outlet of the conveyor dishwasher (1).

7. The conveyor dishwasher (1) as claimed in claim 6,
it being possible for the outlet line (35) to be connected to the wastewater outlet of the conveyor dishwasher (1) via a valve, it being possible for the valve to be actuated by means of a control device (50) in such a way that the liquid which is collected in the collection device (22.2) which is associated with the at least one additional final rinse zone (13.2) is supplied continuously or at prespecified or prespecifiable times or events to the wastewater outlet of the conveyor dishwasher (1) via the outlet line (35).

8. The conveyor dishwasher (1) as claimed in one of the preceding claims,
with the at least one final rinse zone (13.1) having an associated collection device (22.1), which is formed separately from the collection device (22.2) which is associated with the at least one additional final rinse zone (13.2), for collecting the liquid which is sprayed in the at least one final rinse zone (13.1), and with the at least one pre-rinse zone (12) being provided, upstream of the at least one final rinse zone (13.1) and downstream of the at least one wash zone (10, 11.1, 11.2, 11.3) as seen in the conveying direction (T), for spraying the liquid which is collected in the collection device (22.1) which is associated with the at least one final rinse zone (13.1) onto the washware to be treated.

9. The conveyor dishwasher (1) as claimed in one of claims 1 to 7,
with a metering device being provided for metering a disinfection chemical into the liquid which is to be sprayed in the at least one final rinse zone (13.1) in such a way that the liquid contains a predefinable or predefined minimum concentration of disinfection chemicals which depends on the type of metered disinfection chemical.

10. The conveyor dishwasher (1) as claimed in claim 8,
with a metering device also being provided for metering a disinfection chemical into the liquid which is sprayed in the at least one final rinse zone and which is to be sprayed in the at least one pre-rinse zone (12) and/or for metering a disinfection chemical into the liquid which is to be sprayed in the at least one final rinse zone (13.1) in such a way that the liquid which is sprayed in the at least one final rinse zone (13.1) and the liquid which is sprayed in the at least one pre-rinse zone (12) have a predefinable or predefined minimum concentration of disinfection chemicals which depends on the type of metered disinfection chemical.

11. The conveyor dishwasher (1) as claimed in claim 9 or 10, with the disinfection chemical containing chlorine dioxide, sodium hypochlorite, ozone, iodine and/or ammonium.

12. The conveyor dishwasher (1) as claimed in one of the preceding claims,
with the liquid which is sprayed in the at least one wash zone (10, 11.1, 11.2, 11.3) being at a temperature of less than 60°C, and preferably of less than 55°C, and/or with the liquid which is sprayed in the at least one final rinse zone (13.1) being at a temperature of less than 60°C, and preferably of less than 55°C.

13. The conveyor dishwasher (1) as claimed in one of the preceding claims,
with the liquid which is sprayed in the at least one additional final rinse zone (13.2) being at a temperature which is equal to or greater than the temperature of the liquid which is sprayed in the at least one final rinse zone (13.1).

14. The conveyor dishwasher (1) as claimed in one of the preceding claims,
with the liquid which is sprayed in the at least one additional final rinse zone (13.2) being at a temperature of greater than 60°C and the liquid which is sprayed in the at least one final rinse zone (13.1) being at a temperature of less than 60°C.

15. The conveyor dishwasher (1) as claimed in one of the preceding claims,
with the liquid which is sprayed in the at least one additional final rinse zone (13.2) being, in particular demineralized, fresh water.

16. The conveyor dishwasher (1) as claimed in one of the preceding claims,
with a sensor device (51) being provided for detecting the type of washware to be treated in the conveyor dishwasher (1), and with a control device (50) also being provided, said control device being designed to connect or disconnect the at least one additional final rinse zone (13.1) as a function of the type of washware detected.

17. A method for operating a conveyor dishwasher (1), in particular a commercial conveyor dishwasher, as claimed in one of the preceding claims, in which method the washware to be cleaned is conveyed through at least one wash zone (10, 11.1, 11.2, 11.3) and at least one final rinse zone (13.1) with the aid of a conveyor apparatus (2), with the at least

one final rinse zone (13.1) being arranged downstream of the at least one wash zone (10, 11.1, 11.2, 11.3) as seen in the conveying direction (T) of the washware which is conveyed using the conveyor apparatus (2), and with final rinse liquid being sprayed onto the washware to be treated in the at least one final rinse zone (13.1), with a disinfection chemical being added in a metered manner to the final rinse liquid which is sprayed in the at least one final rinse zone (13.1), and with the washware which is treated in the at least one final rinse zone (13.1) then being conveyed through at least one additional final rinse zone (13.2) in which fresh water without a disinfection chemical is sprayed onto the washware, preferably as a function of the type of washware to be treated,

characterized

in that the liquid which is sprayed in the at least one additional final rinse zone (13.2) is collected by a collection device (22.2) which is associated with the at least one additional final rinse zone (13.2); and

in that the liquid which is collected in the collection device (22.2) is supplied directly to the at least one wash zone (10, 11.1, 11.2, 11.3) or to a wastewater outlet of the conveyor dishwasher (1).

What is claimed is:

1. A conveyor dishwasher (1), in particular commercial conveyor dishwasher, having at least one wash zone (10, 11.1, 11.2, 11.3) and at least one final rinse zone (13.1) which is arranged downstream of the at least one wash zone (10, 11.1, 11.2, 11.3), and having a conveyor apparatus (2) for conveying washware through the at least one wash zone (10, 11.1, 11.2, 11.3) and the at least one final rinse zone (13.1), with the final rinse liquid which is sprayed onto the washware to be treated in the at least one final rinse zone (13.1) having a metered disinfection chemical, and with at least one additional final rinse zone (13.2) which is arranged downstream of the at least one final rinse zone (13.1) as seen in the conveying direction (T) being provided for spraying fresh water without a disinfection chemical onto the washware to be treated;
characterized
in that the at least one additional final rinse zone (13.2) has an associated collection device (22.2) for collecting liquid which is sprayed in the at least one additional final rinse zone (13.2); and
in that a liquid transfer system is provided, it being possible to supply the liquid which is collected in the collection device (22.2) directly to the at least one wash zone (10, 11.1, 11.2, 11.3) by means of said liquid transfer system, or it being possible to supply the liquid which is collected in the collection device (22.2) directly to a wastewater outlet of the conveyor dishwasher (1) by means of said liquid transfer system.

2. The conveyor dishwasher (1) as claimed in claim 1, with the collection device (22.2) which is associated with the at least one additional final rinse zone

(13.2) being in the form of a tank or collection container and being arranged with respect to final rinse nozzles (34a, 34b) which are associated with the additional final rinse zone (13.2) in such a way that the liquid which is sprayed in the at least one additional final rinse zone (13.2) flows into the collection device (22.2) due to the force of gravity and is collected there.

3. The conveyor dishwasher (1) as claimed in claim 1 or 2,
with the liquid transfer system having a bypass line (6) which is or can be connected at one end to the collection device (22.2) which is associated with the at least one additional final rinse zone (13.2) and at the other end to the at least one wash zone (10, 11.1, 11.2, 11.3), and in particular to a wash tank (20, 21.1, 21.2, 21.3) which is associated with the at least one wash zone (10, 11.1, 11.2, 11.3);
with the liquid transfer system having at least one pump (38a) with which the liquid which is collected in the collection device (22.2) which is associated with the at least one additional final rinse zone (13.2) can be supplied to the at least one wash zone (10, 11.1, 11.2, 11.3), and in particular to the wash tank (20, 21.1, 21.2, 21.3) which is associated with the at least one wash zone (10, 11.1, 11.2, 11.3), via the bypass line (6);
it being possible to actuate the at least one pump (38a) by means of a control device (50) in such a way that the liquid which is collected in the collection device (22.2) which is associated with the at least one additional final rinse zone (13.2) is supplied continuously or at prespecified or prespecifiable times or events to the at least one wash zone (10, 11.1, 11.2, 11.3), and in particular to the wash tank (20, 21.1, 21.2, 21.3) which is associated with the at least

one wash zone (10, 11.1, 11.2, 11.3), via the bypass line (6).

4. The conveyor dishwasher as claimed in one of the preceding claims,
with the liquid transfer system having an outlet line (35) which is or can be connected at one end to the collection device (22.2) which is associated with the at least one additional final rinse zone (13.2) and at the other end to a wastewater outlet of the conveyor dishwasher (1).

5. The conveyor dishwasher (1) as claimed in claim 4, it being possible for the outlet line (35) to be connected to the wastewater outlet of the conveyor dishwasher (1) via a valve, it being possible for the valve to be actuated by means of a control device (50) in such a way that the liquid which is collected in the collection device (22.2) which is associated with the at least one additional final rinse zone (13.2) is supplied continuously or at prespecified or prespecifiable times or events to the wastewater outlet of the conveyor dishwasher (1) via the outlet line (35).

6. The conveyor dishwasher (1) as claimed in one of the preceding claims,
with the at least one final rinse zone (13.1) having an associated collection device (22.1), which is formed separately from the collection device (22.2) which is associated with the at least one additional final rinse zone (13.2), for collecting the liquid which is sprayed in the at least one final rinse zone (13.1), and with the at least one pre-rinse zone (12) being provided, upstream of the at least one final rinse zone (13.1) and downstream of the at least one wash zone (10, 11.1, 11.2, 11.3) as seen in the conveying direction (T), for spraying the liquid which is collected in the

collection device (22.1) which is associated with the at least one final rinse zone (13.1) onto the washware to be treated.

7. The conveyor dishwasher (1) as claimed in one of claims 1 to 5,
with a metering device being provided for metering a disinfection chemical into the liquid which is to be sprayed in the at least one final rinse zone (13.1) in such a way that the liquid contains a predefinable or predefined minimum concentration of disinfection chemicals which depends on the type of metered disinfection chemical.

8. The conveyor dishwasher (1) as claimed in claim 6, with a metering device also being provided for metering a disinfection chemical into the liquid which is sprayed in the at least one final rinse zone and which is to be sprayed in the at least one pre-rinse zone (12) and/or for metering a disinfection chemical into the liquid which is to be sprayed in the at least one final rinse zone (13.1) in such a way that the liquid which is sprayed in the at least one final rinse zone (13.1) and the liquid which is sprayed in the at least one pre-rinse zone (12) have a predefinable or predefined minimum concentration of disinfection chemicals which depends on the type of metered disinfection chemical.

9. The conveyor dishwasher (1) as claimed in claim 7 or 8,
with the disinfection chemical containing chlorine dioxide, sodium hypochlorite, ozone, iodine and/or ammonium.

10. The conveyor dishwasher (1) as claimed in one of the preceding claims,

with the liquid which is sprayed in the at least one wash zone (10, 11.1, 11.2, 11.3) being at a temperature of less than 60°C, and preferably of less than 55°C, and/or with the liquid which is sprayed in the at least one final rinse zone (13.1) being at a temperature of less than 60°C, and preferably of less than 55°C.

11. The conveyor dishwasher (1) as claimed in one of the preceding claims,
with the liquid which is sprayed in the at least one additional final rinse zone (13.2) being at a temperature which is equal to or greater than the temperature of the liquid which is sprayed in the at least one final rinse zone (13.1).

12. The conveyor dishwasher (1) as claimed in one of the preceding claims,
with the liquid which is sprayed in the at least one additional final rinse zone (13.2) being at a temperature of greater than 60°C and the liquid which is sprayed in the at least one final rinse zone (13.1) being at a temperature of less than 60°C.

13. The conveyor dishwasher (1) as claimed in one of the preceding claims,
with the liquid which is sprayed in the at least one additional final rinse zone (13.2) being, in particular demineralized, fresh water.

14. The conveyor dishwasher (1) as claimed in one of the preceding claims,
with a sensor device (51) being provided for detecting the type of washware to be treated in the conveyor dishwasher (1), and with a control device (50) also being provided, said control device being designed to connect or disconnect the at least one additional final rinse zone (13.1) as a function of the type of washware detected.

15. A method for operating a conveyor dishwasher (1), in particular a commercial conveyor dishwasher, as claimed in one of the preceding claims, in which method the washware to be cleaned is conveyed through at least one wash zone (10, 11.1, 11.2, 11.3) and at least one final rinse zone (13.1) with the aid of a conveyor apparatus (2), with the at least one final rinse zone (13.1) being arranged downstream of the at least one wash zone (10, 11.1, 11.2, 11.3) as seen in the conveying direction (T) of the washware which is conveyed using the conveyor apparatus (2), and with final rinse liquid being sprayed onto the washware to be treated in the at least one final rinse zone (13.1), with a disinfection chemical being added in a metered manner to the final rinse liquid which is sprayed in the at least one final rinse zone (13.1), and with the washware which is treated in the at least one final rinse zone (13.1) then being conveyed through at least one additional final rinse zone (13.2) in which fresh water without a disinfection chemical is sprayed onto the washware, preferably as a function of the type of washware to be treated,
characterized
in that the liquid which is sprayed in the at least one additional final rinse zone (13.2) is collected by a collection device (22.2) which is associated with the at least one additional final rinse zone (13.2); and
in that the liquid which is collected in the collection device (22.2) is supplied directly to the at least one wash zone (10, 11.1, 11.2, 11.3) or to a wastewater outlet of the conveyor dishwasher (1).