

CLAIMS:

We claim:

- 5 1. A spiral wound membrane module comprising,
a membrane having water permeability (A-Value) of at least 8×10^{-5} cm/s/bar at 25 °C
and salt permeability, (B-Value) of at least 0.5×10^{-5} cm/s at 25 °C; and,
a permeate carrier with one or more of: a density of 54 wales per inch or more; flow
channel width measured at wide parts of the channel of 215 micrometers or less; or, average
10 flow channel width of 175 micrometers or less.
2. The spiral wound module of claim 1 wherein the permeate carrier has one or more of:
resin coating of 20 wt% or less; density of 60 wales per inch or less; flow channel width
measured at narrow parts of the channel of 83 micrometers or more; average flow channel
15 width of 121 micrometers or more; or, a channel cross-sectional area of 16×10^{-9} m² or more.
3. The module of claim 1 wherein the membrane has water permeability (A-Value) of at
least 21×10^{-5} cm/s/bar at 25 °C.
- 20 4. The module of any of claims 1 to 3 wherein the membrane has water permeability (A-
Value) of 45×10^{-5} cm/s/bar at 25 °C or less 35×10^{-5} cm/s/bar at 25 °C or less or 30×10^{-5}
cm/s/bar at 25 °C or less.
5. The module of any of claims 1 to 4 wherein the membrane has a salt permeability (B-
25 Value) of at least 3.2×10^{-5} cm/s at 25 °C or at least 6×10^{-5} cm/s at 25 °C.
6. The module of any of claims 1 to 5 wherein the membrane has a salt permeability (B-
Value) of 15×10^{-5} cm/s at 25 °C or less or 11×10^{-5} cm/s at 25 °C or less.
- 30 7. A process for treating water comprising,
feeding water at a pressure of at least 50 bar through a spiral wound membrane
module thereby creating a permeate and a retentate,

wherein the module comprises a membrane having water permeability (A-Value) of at least 8×10^{-5} cm/s/bar at 25 °C and salt permeability, (B-Value) of at least 0.5×10^{-5} cm/s at 25 °C,

5 8. The process of claim 7 wherein the feed pressure is 70 bar or more, 90 bar or more, or in a range of 70-120 bar.

9. The process of claim 7 or 8 wherein the retentate has a concentration of 100 g/L or more, 130 g/L or more or 140 g/L or more.

10

10. The process of any of claims 7 to 9 wherein the module has a permeate carrier with one or more of: a density of 54 wales per inch or more; flow channel width measured at wide parts of the channel of 215 micrometers or less; or, average flow channel width of 175 micrometers or less.

15

11. The process of any of claims 7 to 10 wherein the module has a membrane with a water permeability (A-Value) of 45×10^{-5} cm/s/bar at 25 °C or less 35×10^{-5} cm/s/bar at 25 °C or less or 30×10^{-5} cm/s/bar at 25 °C or less.

20

12. The process of any of claims 7 to 11 wherein the module has a permeate carrier with one or more of: resin coating of 20 wt% or less; density of 60 wales per inch or less; flow channel width measured at narrow parts of the channel of 83 micrometers or more; average flow channel width of 121 micrometers or more; or, a channel cross-sectional area of 16×10^{-9} m² or more.

25

13. The process of any of claims 7 to 12 wherein the membrane has water permeability (A-Value) of at least 21×10^{-5} cm/s/bar at 25 °C.

30

14. The process of any of claims 7 to 13 wherein the membrane has a salt permeability (B-Value) of at least 3.2×10^{-5} cm/s at 25 °C or at least 6×10^{-5} cm/s at 25 °C.

15. The process of any of claims 7 to 14 wherein the membrane has a salt permeability (B-Value) of 15×10^{-5} cm/s at 25 °C or less or 11×10^{-5} cm/s at 25 °C or less.

16. The process of any of claims 7 to 15 wherein the membrane has water permeability (A-Value) of $45 \cdot 10^{-5}$ cm/s/bar at 25 °C or less $35 \cdot 10^{-5}$ cm/s/bar at 25 °C or less or $30 \cdot 10^{-5}$ cm/s/bar at 25 °C or less.

5