

CLAIMS:

We claim:

1. A devolatilization vessel, comprising:
a first set of one or more devolatilization plates;
5 a second set of one or more devolatilization plates;
a first distributor above the first set of one or more devolatilization plates and the second
set of one or more devolatilization plates; and
a second distributor above the second set of one or more devolatilization plates.
- 10 2. The devolatilization vessel of claim 1, wherein the first distributor is configured to provide
a first polymer solution through the first set of one or more devolatilization plates and through the
second set of one or more devolatilization plates; and wherein the second distributor is configured
to provide a second polymer solution through the second set of one or more devolatilization plates.
- 15 3. The devolatilization vessel of claim 2, wherein a flow path of the first polymer solution
through the first set of one or more devolatilization plates and through the second set of one or
more devolatilization plates is longer than a flow path of the second polymer solution through the
second set of one or more devolatilization plates.
- 20 4. The devolatilization vessel of any of claims 1-3, wherein each plate of the first set of one
or more devolatilization plates has a plurality of holes and wherein each plate of the second set of
one or more devolatilization plates has a plurality of holes, wherein the plurality of holes of the
first set of one or more devolatilization plates has a diameter that is smaller than a diameter of the
plurality of holes of the second set of one or more devolatilization plates.
- 25 5. The devolatilization vessel of any of claims 1-4, wherein the first set of one or more
devolatilization plates are disposed above the second set of one or more devolatilization plates.
6. The devolatilization vessel of any of claims 1-5, wherein the second distributor is further
30 disposed below the first set of one or more devolatilization plates and above the second set of one
or more devolatilization plates.

7. The devolatilization vessel of claim 4, wherein each of the plurality of holes of the first set of one or more devolatilization plates have a diameter from about 5 mm to about 10 mm and wherein each of the plurality of holes of the second set of one or more devolatilization plates have a diameter from about 25 mm to 50 mm.
8. A devolatilization vessel, comprising:
a first set of one or more devolatilization plates, each plate having:
a first set of holes at a center region of the plate, the holes of the first set of holes having a first diameter, and
a second set of holes at an edge region of the plate, the holes of the second set of holes having a second diameter, wherein the second diameter is larger than the first diameter;
a second set of one or more devolatilization plates, each plate having a plurality of holes, wherein the second set of one or more devolatilization plates is below the first set of one or more devolatilization plates; and
a distributor above the first set of one or more devolatilization plates and the second set of one or more devolatilization plates.
9. The devolatilization vessel of claim 8, wherein the distributor is configured to flow a first polymer solution through the first set of one or more devolatilization plates and through the second set of one or more devolatilization plates, and the distributor is configured to flow a second polymer solution through the first set of one or more devolatilization plates bypassing the second set of one or more devolatilization plates.
10. The devolatilization vessel of any of claims 8-9, wherein the first diameter is from about 5 mm to about 10 mm; and the second diameter is from about 25 mm to about 50 mm.
11. The devolatilization vessel of any of claims 8-10, wherein an outer diameter of the first set of one or more devolatilization plates is larger than an outer diameter of the second set of one or more devolatilization plates.

12. The devolatilization vessel of any of claims 8-11, wherein the distributor is configured to provide a first flow path and a second flow path different than the first flow path, wherein the first flow path is through the first set of holes of the first set of one or more devolatilization plates and
5 then through the second set of one or more devolatilization plates.

13. The devolatilization vessel of claim 12, wherein the second flow path is through the second set of holes of the first set of one or more devolatilization plates and bypasses the second set of one or more devolatilization plates.

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14. A process of forming a polymer comprising:
forming a first polymer solution having a first viscosity;
forming a second polymer solution having a second viscosity;
flowing the first polymer solution and the second polymer solution at separate times to a
15 devolatilization vessel; and
removing volatiles from the first polymer solution and the second polymer solution at separate times in the devolatilization vessel to form a devolatilized first polymer melt and a devolatilized second polymer melt.

20 15. The process of claim 14, wherein the first polymer melt has a lower neat viscosity than the second polymer melt.

16. The process of any of claims 14-15, wherein removing volatiles from the first polymer solution and the second polymer solution comprises:
25 flowing the first polymer solution through a plurality of devolatilization plates to remove volatiles from the first polymer solution; and
flowing the second polymer solution through a subset of the plurality of devolatilization plates to remove volatiles from the second polymer solution.

30 17. The process of claim any of claims 14-15, wherein removing volatiles from the first polymer solution and the second polymer solution comprises:

- flowing the first polymer from a first distributor;
flowing the second polymer from a second distributor;
flowing the first polymer solution through a low viscosity flow path via a first set of one or more devolatilization plates and then through a second set of one or more devolatilization plates;
5 and
flowing the second polymer solution through a high viscosity flow path via the second set of one or more devolatilization plates.
18. The process of claim 17, wherein the high viscosity flow path bypasses the first set of one or more devolatilization plates.
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19. The process of any of claims 14-15, wherein removing volatiles from the first polymer solution and the second polymer solution comprises:
flowing the first polymer solution and the second polymer solution utilizing a same
15 distributor;
flowing the first polymer solution on a low viscosity flow path through a first set of one or more devolatilization plates and through a second set of one or more devolatilization plates; and
flowing the second polymer solution through a high viscosity flow path via the first set of one or more devolatilization plates.
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20. The process of claim 19, wherein the high viscosity flow path bypasses the first set of one or more devolatilization plates.
21. A polymerization system, comprising;
25 one or more reactors,
a devolatilization vessel coupled to the one or more reactors, the devolatilization vessel, comprising:
a first set of one or more devolatilization plates;
a second set of one or more devolatilization plates; and
30 a distributor configured to provide a first flow path through both the first set of one or more devolatilization plates and the second set of one or more devolatilization plates, and

configured to provide a second flow path through either the first set of one or more devolatilization plates or the second set of one or more devolatilization plates; and
a pelletizer coupled to the devolatilization vessel.