

CLAIMS

1. An axial flow vacuum pump for evacuating a chamber in a semiconductor manufacturing process, the axial flow vacuum pump comprising:
 - 5 a rotor having a plurality of rotor blades; and
 - a stator having a plurality of stator blades, wherein the rotor blades and stator blades have a curved cross-sectional shape.
2. The axial flow vacuum pump of claim 1, wherein the rotor is supported for rotation
10 relative to the stator by magnetic bearings.
3. The axial flow vacuum pump of any preceding claim, wherein the rotor is formed from stainless steel.
- 15 4. The axial flow vacuum pump of any preceding claim, wherein an inlet stage of the pump comprises blades having a first radial length and an adjacent downstream stage of the pump comprises blades having a second radial length, wherein the ratio of first radial length to second radial length is 2:1 or greater.
- 20 5. The axial flow vacuum pump of any preceding claim, comprising between 4 and 10 pumping stages, each pumping stage comprising a row of rotor blades and a row of stator blades.
6. The axial flow vacuum pump of any preceding claim, comprising a bypass conduit
25 for directing a portion of the gas from the outlet of the pump towards the inlet of the pump.
7. The axial flow vacuum pump of claim 6, wherein the bypass conduit comprises a pressure relief valve.
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8. Apparatus for manufacturing semiconductor equipment comprising:
 - a chamber for manufacturing semiconductor equipment in;
 - a backing pump system positioned remote from the chamber and configured to evacuate gas from the chamber;

a foreline for fluidly connecting the backing pump system to the chamber; and
an axial flow vacuum pump according to any preceding claim configured to
evacuate gas from the chamber, wherein the axial flow vacuum pump is connected
between the chamber and foreline.

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9. The apparatus of claim 8, wherein the axial flow vacuum pump is positioned less
than 2 meters from the chamber.

10. The apparatus of claim 8 or 9, wherein the backing pump system is positioned
10 more than 8 meters from the chamber.

11. A method of evacuating a semiconductor fabrication chamber comprising:
using an axial flow vacuum pump as described in any of claims 1 to 7 to
evacuate gas from the chamber;

15 operating the axial flow vacuum pump to pump gas with a pressure of 1mbar
or higher;

operating the axial flow vacuum pump to pump gas with a pressure of between
1mbar and 10-3mbar; and

operating the axial flow vacuum pump to pump gas with a pressure of 10-3mbar
20 or lower.

12. The method of claim 11, comprising using a backing pump system to evacuate
gas from the chamber, the backing pump system being positioned remotely from the
chamber and axial flow vacuum pump.

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13. The method of claim 11 or 12, wherein the axial flow vacuum pump is positioned
less than 2 meters from the chamber.

14. The method of any of claims 11 to 13, comprising operating the axial flow vacuum
30 pump to pump gas at a temperature of 130 degrees Celsius or higher.