

CLAIMS

1. A vacuum apparatus temperature sensor assembly, comprising:
a sheet substrate configured to conform to a shape of a vacuum apparatus
5 whose temperature is to be determined; and
a temperature sensor thermally coupled with said sheet substrate, wherein
the sheet substrate is configured to provide a thermal path from said vacuum
apparatus to said temperature sensor.
- 10 2. The vacuum apparatus temperature sensor assembly of claim 1, wherein
said sheet substrate is configured to conform to an external surface of said
vacuum apparatus.
3. The vacuum apparatus temperature sensor assembly of claim 1 or 2,
15 wherein said sheet substrate is pliable to conform to an external surface of said
vacuum apparatus.
4. The vacuum apparatus temperature sensor assembly of any preceding
claim, wherein said sheet substrate is a planar sheet.
- 20 5. The vacuum apparatus temperature sensor assembly of any preceding
claim, wherein said sheet substrate has a length which is longer than its width.
6. The vacuum apparatus temperature sensor assembly of any preceding
25 claim, wherein said sheet substrate has a width which is greater than a distance
between heater elements of said vacuum apparatus.
7. The vacuum apparatus temperature sensor assembly of any preceding
claim, wherein said sheet substrate has a length which is greater than a length of
30 said external surface of said vacuum apparatus.

8. The vacuum apparatus temperature sensor assembly of any preceding claim, wherein said sheet substrate has a length which provides for a plurality of turns around said vacuum apparatus.
- 5 9. The vacuum apparatus temperature sensor assembly of any preceding claim, wherein said sheet substrate is configured to provide a greater thermal conductivity across its surface than between said plurality of turns.
- 10 10. The vacuum apparatus temperature sensor assembly of any preceding claim, wherein said sheet substrate has a thermal conductivity which reduces a temperature variation across a surface of said sheet surface compared to a temperature variation across a surface of said vacuum apparatus.
- 15 11. The vacuum apparatus temperature sensor assembly of any preceding claim, wherein said sheet substrate has a thermal mass which is lower than a thermal mass of said vacuum apparatus.
- 20 12. The vacuum apparatus temperature sensor assembly of any preceding claim, wherein said sheet substrate is interposed between said temperature sensor and said vacuum apparatus.
13. The vacuum apparatus temperature sensor assembly of any preceding claim, wherein said temperature sensor overlies said sheet substrate.
- 25 14. The vacuum apparatus temperature sensor assembly of any preceding claim, wherein said sheet substrate has a thermal conductivity which is greater than a thermal conductivity of said vacuum apparatus.
- 30 15. The vacuum apparatus temperature sensor assembly of any preceding claim, wherein said sheet substrate comprises an insulating layer.

16. The vacuum apparatus temperature sensor assembly of claim 15, wherein sheet insulating layer is disposed on said sheet substrate.
17. The vacuum apparatus temperature sensor assembly of any preceding
5 claim, comprising an outer insulating layer overlying said sheet substrate and said temperature sensor.
18. A method, comprising:
conforming a sheet substrate to a shape of a vacuum apparatus whose
10 temperature is to be determined; and
thermally coupling a temperature sensor with said sheet substrate to
provide a thermal path from said vacuum apparatus to said temperature sensor.