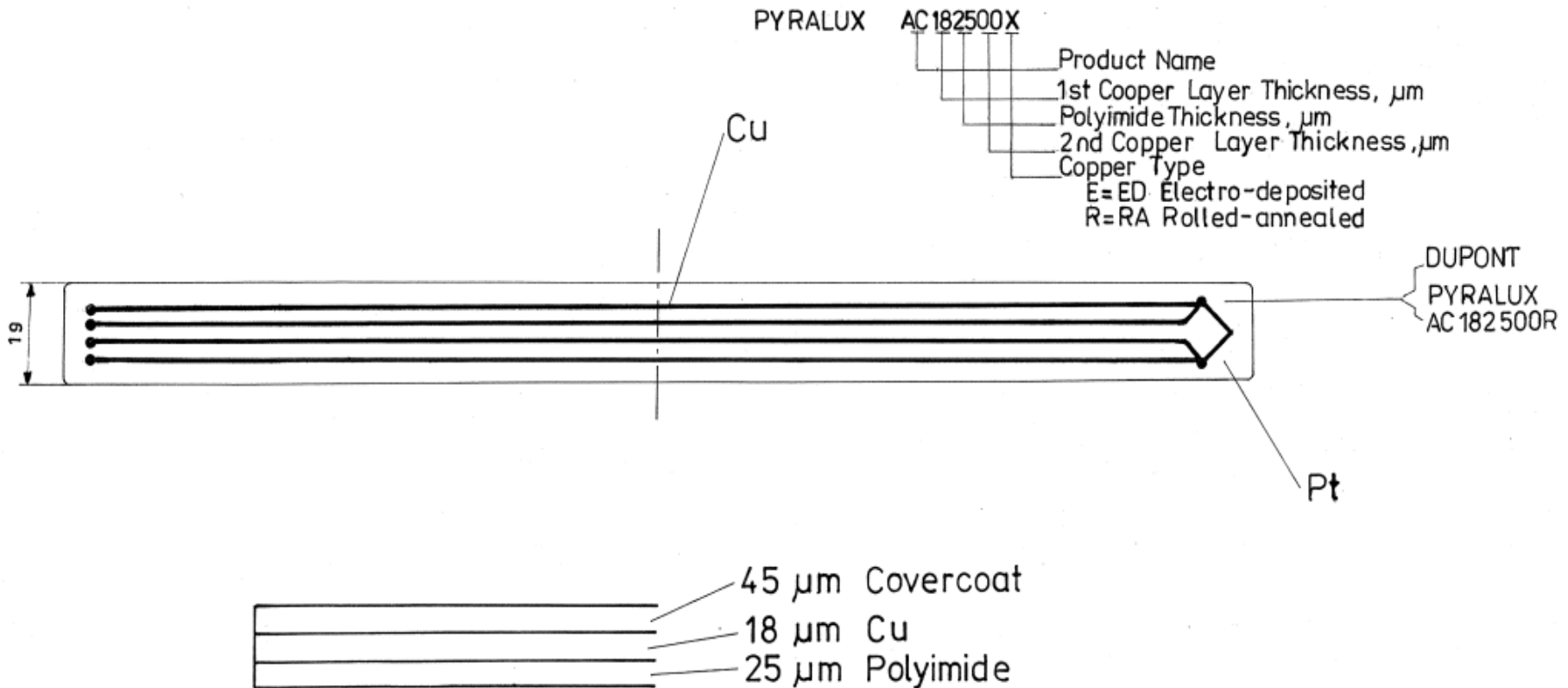


THE CONCEPT OF A THIN (ca. 90 micron)
TEMPERATURE SENSOR BY EVAPORATION OF
PLATINUM ON LAMINATE IN VACUUM

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- The concept is illustrated by the following Fig. An inverted V-shaped layer of Pt (99.99%) is evaporated in vacuum onto DuPont Pyralux AC Copper-Clad Laminate. This is the T-sensor. It consists of two arms about 1 mm wide and 10 mm long. Only four Cu lines are left by etching of the laminate: two to supply current from a constant current source (e.g. 1 - 3 mA) and two to measure the voltage drop across the platinum layer as it changes with changing temperature.



- A contact between the Cu lines and the sensor is provided by two circular islands (ca. 1mm in radius) where Pt and Cu layers overlap. The width of Cu lines is also 1mm. The section of the laminate together with the isolating covercoat demonstrates that the overall thickness will not exceed 90 microns.

Why DuPont Pyralux and not Kapton?

- When one googles on "dupont" one finds a lengthy list of air-plane accidents in which DuPont is blamed for failure of its Kapton-based conductors. Therefore, our final design is planned to be executed on DuPont Pyralux Copper-Clad Laminate.
- However, all our tests have been hitherto performed with the 30-micron Kapton, kindly offered to us by our colleagues. The evaporation regime has been established which avoids any deformation of the substrate. Under this regime also an excellent adherence of the evaporated Pt to Kapton was verified. A V-shaped mask, yet without the islands, was fabricated for this purpose. I let to circulate the sample V's through the audience to convince you in the quality of the obtained layers.

- Rather large resistances of the first V's were obtained (16.5 and ca. 30.1 Kohm), because an operator was rather shy to put a larger charge of Pt into a crucible.
- In the nearest future we plan to establish the evaporation regime yielding Pt-1000 and Pt-100 sensors (still on Kapton) in order to switch to Pyralux AC182500R in the following. The minimum amount of that to purchase is a roll of 25 cm width and 50m length.