Vent hole calculator

Altimeter Cloud

The Nano measures altitude from air pressure, so the air inside the section it sits in has to keep up with the air outside. Vent holes in the body tube let it do that. This calculator works out the size of each hole.

Calculator

Vent hole calculator

Tube diameter

75.0 mm

Section length

1000 mm

Number of holes

4

Each hole diameter

5.21 mm

Total vent area

85.28 mm²

Use the inside diameter of the tube and the length of the sealed section the Nano sits in, in millimetres. The calculator uses the Vern Knowles vent hole formula, which sizes the holes so the air inside can equalise quickly enough to follow the pressure changes during the climb and descent.

How many holes?

Use at least three, and four or more if you can, evenly spaced around the tube. A single hole gives noisy and wrong readings, because the pressure at one point is affected by wind and by the angle of the airflow as the rocket flies. Several holes around the tube average those effects out.

Tips

Placement

Keep the holes at least three body tube diameters below the base of the nose cone, and away from joints and transitions, where the air is turbulent.

Finishing

On cardboard tubes, a drop of CA glue around each hole stops it fraying. Sand the outside smooth afterwards.

Light

Pressure sensors are sensitive to light. Keep the holes as small as the calculator recommends, mount the Nano under its bay cover, and consider painting the inside of the section black. See installing the altimeter for more.

The formula

hole diameter = 0.004396 × tube diameter × √(section length ÷ number of holes)

All measurements are in millimetres.

Reference: vernk.com, Altimeter Port Sizing