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# NATIONAL STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

# GB/T 44065-2024

## Thermometer screen

百叶箱

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## 3 Terms and definitions

3.1 Thermometer screen is defined as the white louvred box in which temperature, humidity and similar instruments are installed so as to be protected from direct solar radiation and from radiation reflected off the ground while still being suitably ventilated.

## 4 Technical requirements

4.1 Function. The screen is to be usable in the open air under natural conditions; to keep solar radiation and radiation reflected off the ground from falling directly on the instruments inside; to have a path by which inside and outside air exchange; and to protect the instruments inside from strong wind, rain and snow.

4.2 Performance. The radiation error is not to exceed one half of the half-width of the permitted error of the temperature sensor, and the ratio of the wind speed inside the box to the wind speed outside is to be about 1:3.

4.3 Structure and parameters. The screen is made up of the box and the top board, as Figure A.1 shows, and the box itself of the door, the door lock, the base, the walls and the ventilating partitions. The space inside is to suit the instruments to be installed, and the dimensions of Table 1 are preferred, the structural dimensions being drawn in Figures A.2 to A.7. Table 1 covers three kinds, the small wooden screen, the large wooden screen and the glass fibre reinforced plastic screen, and gives a basic dimension and a tolerance for each. The internal width is 460 mm plus or minus 2 mm for the small wooden screen, 460 mm plus or minus 2 mm for the large wooden screen and 466 mm plus or minus 3 mm for the plastic screen. The internal depth is 290 mm plus or minus 2 mm, 460 mm plus or minus 2 mm and 462 mm plus or minus 3 mm respectively. The internal height is 537 mm plus or minus 5 mm, 612 mm plus or minus 5 mm and 618 mm plus or minus 5 mm. The top board is 720 mm by 610 mm by 24 mm plus or minus 3 mm for the small wooden screen, 720 mm by 780 mm by 24 mm plus or minus 3 mm for the large wooden screen and 720 mm by 780 mm by 21 mm plus or minus 2 mm for the plastic screen. The vertical spacing of the louvres is 11 mm with a tolerance of plus 1 mm for both wooden screens and 45 mm with a tolerance of plus 2 mm for the plastic screen. The flatness of the outer edges is less than 2 mm for the wooden screens and less than 3 mm for the plastic screen, with no tolerance given. The ventilating partition thickness is 12 mm plus or minus 2 mm for all three. The top board makes an angle of 3 degrees plus or minus 0.5 degrees with the upper face of the box, sloping so that the door side is raised and the opposite side lowered. The ventilating partitions of the upper and lower faces of the box are both of the double-layer, five-board overlapping kind.

4.4 Materials. A material may be chosen that is hard, low in thermal conductivity, resistant to high and low temperature and does not readily take up water, such as glass fibre reinforced plastic or wood. Components may be of a strong, corrosion-resistant material; the stays inside the box may be metal with the surface treated against corrosion; and the door hinges and the door lock are to be of stainless steel.

4.5 Appearance. The surface of the box material is to be white, even in shade and without obvious colour difference. There are to be no knocks, no deformation and no areas of rubbing damage. There are to be no areas of small particles, foreign matter or protruding marks, no areas of pitting, bubbles or blowholes, no delamination and no cracks. Metal parts are to be given an effective anti-corrosion treatment.

4.6 Environmental adaptability. For transport shock the screen, in its packaging, is to withstand the shock transport test of GB/T 25480-2010 at a peak acceleration of 100 metres per second squared with a pulse duration of 16 ms. For free fall the screen, in its packaging, is to withstand the free fall test of GB/T 25480-2010. For salt spray corrosion the screen is placed in a salt spray chamber and subjected, under GB/T 2423.17-2008, to a continuous 48 h salt spray corrosion test at a temperature of 35 °C plus or minus 2 °C with a sodium chloride solution of 5 % plus or minus 1 % by mass; after the test it stands for 1 h and its appearance is observed within 2 h.



## 5 Test methods

5.1 Function is checked by eye, to see whether the space inside the box will take the instruments needed and whether the door opens and closes normally.

5.2 Performance. Radiation protection is tested under natural atmospheric conditions, using as the reference either the World Meteorological Organization reference ventilated psychrometer or a platinum resistance digital ventilated psychrometer that can serve as a second-order standard. The result is expressed as the systematic error variable obtained by comparing the temperature sensor dynamically with the reference by day and by night; the screen passes if the radiation error does not exceed one half of the half-width of the permitted error of the temperature sensor. The dynamic comparison test follows Annex B. Ventilation performance is tested in the natural state by comparing the natural wind speed outside the box with the wind speed inside, both measured with wind speed sensors. For the inside measurement the sensor is placed inside the box and the door closed. The instantaneous wind speeds inside and outside are to be read from the data logger at the same moment, generally not fewer than 60 pairs of readings; the inside and the outside values are averaged separately and the ratio of the inside mean to the outside mean is calculated.

5.3 Structure and parameters. The dimensions of 4.3.2 are generally checked or judged with ordinary gauges such as a steel rule, a steel tape, vernier callipers and feeler gauges, or with purpose-made gauges, the items and methods being set in Table 2. The internal dimensions of the box are measured with a steel rule, steel tape or purpose-made gauge, the width as the distance between the outer edges of the left and right louvres, the depth as the distance from the outer edge of the rear louvre to the inner frame of the door, and the height as the distance between the upper and lower wooden partitions inside the box. The top board is measured with a steel rule, steel tape or purpose-made gauge. The vertical

spacing of the louvres is measured with a steel rule, steel tape or similar gauge at three points and the mean recorded. The flatness of the outer edges is checked on the three outer faces of the box by holding a steel rule against the outer edges of the louvres in three positions in an asterisk pattern and observing and measuring with a feeler gauge the gap by which each louvre edge stands away from the rule, which is to be not more than 3 mm. The partition thickness is measured with a steel rule, steel tape or similar gauge at three points and the mean recorded. The slope of the top board is measured with a protractor as the angle between the sloping edge of the board and the horizontal edge of the box.

5.4 Materials and appearance are checked by eye.

5.5 Environmental adaptability. The transport shock test follows 4.5 of GB/T 25480-2010, the free fall transport test follows 4.7 of GB/T 25480-2010, and the salt spray corrosion test follows the requirements of Clause 6 of GB/T 2423.17-2008.

## 6 Inspection rules

6.1 Inspection is divided into type inspection and delivery inspection.

6.2 Type inspection is carried out on first production; when the structure, the material or the process changes enough to affect the performance of the product; when production restarts after being stopped for a year; when the delivery inspection result differs appreciably from the last type inspection; and when the quality inspection department asks for it. The items and test methods are listed in Table 3, which sets out six items with the clause that states the requirement and the clause that states the test method: function, 4.1 and 5.1; performance, 4.2 and 5.2; structure and parameters, 4.3 and 5.3; materials, 4.4 and 5.4; appearance, 4.5 and 5.4; and environmental adaptability, 4.6 and 5.5. In the same table a filled circle marks an item to be inspected and an open circle an item not inspected: type inspection covers all six items, while delivery inspection covers structure and parameters, materials and appearance only. Type inspection samples are drawn from products that have passed delivery inspection, the sampling plan and decision rules following 6.4.

6.3 Delivery inspection. Each screen is to pass inspection and be issued with a certificate of conformity before it leaves the works, and the items are those of Table 3.

6.4 Sampling plan and decision rules. Sampling inspection follows GB/T 2829, using a single sampling plan at discrimination level I, as set in Table 4. For class A non-conformities the unacceptable quality level is 30, the sample size 3 and the decision pair, acceptance number and rejection number, 0 and 1; for class B, 65, 3, and 1 and 2; for class C, 120, 3, and 3 and 4. A note explains that the two figures of the pair are the acceptance number and the rejection number. Non-conformities are classed as follows: class A means a failure in an important respect such as the performance test, the main structure or the material performance test, which destroys the usefulness of the product; class B means a more serious dimensional non-conformity, for instance one exceeding the tolerance by more than