

4. Measuring equipment

4.1. Thermocouples XK or XA, connected to thermal station or KCIИ, for measurement of air temperature.

4.2. Wattmeter (of class not higher than 1.5) for measurement of capacity of electric furnaces.

4.3. Measuring tape for measurement of the enclosure area.

5. Method for determination of full heat-transfer factor of a cabin

5.1. The thermocouple readings shall be registered every 15 minutes from the moment of actuation of electric furnaces. At the same time the capacity readings of electric furnaces shall be registered. Duration of the tests shall be 3 to 3.5 h.

5.2. Mean-volume air temperature in a cabin \bar{t}_i shall be determined as arithmetic-mean value at the established moments of time τ_i

$$\bar{t}_i = \frac{\sum_{j=1}^m t_j}{m} \quad (1)$$

where j – is the point of temperature measurement,

t_j – is the air temperature in j -th point of a cabin,

m – is the number of measurement points.

5.3. Temperature of external air t_0 shall be determined at the established moments of time as arithmetic-mean value by indications of external thermocouples.

5.4. Dependence of mean-volume air temperatures in a cabin against the external air temperatures shall be represented on the diagram as dependences $\bar{t} = f(\tau)$ and $t_0 = \varphi(\tau)$.

5.5. When determining the full heat-transfer factor of a cabin using the obtained dependence it is necessary to choose two time intervals outside, when there comes a regular heating mode of the 2-nd kind. This mode is characterized by constant speed of temperature change in the whole volume of a cabin. Practically, the regular mode comes in 1.5 to 2 h after the beginning of heating.

Since this time, which in calculations is accepted as the initial one, it is necessary to choose two time intervals $\Delta\tau_1 = \tau_1 - \tau_H$ and $\Delta\tau_2 = \tau_2 - \tau_H$, so that $\Delta\tau_2 = 2 \Delta\tau_1$. Using the diagram $\bar{t} = f(\tau)$ it is possible to determine medium-volume temperatures of air in a cabin \bar{t}_H , \bar{t}_1 and \bar{t}_2 at the time moments τ_H , τ_1 and τ_2

Full heat-transfer factor of a cabin shall be determined using the measured temperature values by the equation

$$K_{nom} = \frac{Q}{F} \frac{2v_1 - v_2 - v_H}{v_1^2 - v_2 - v_H} \quad (2)$$

where $v_H = \bar{t}_H - t_0$, $v_1 = \bar{t}_1 - t_0$, $v_2 = \bar{t}_2 - t_0$ – are the air temperature drops inside and outside of a cabin at the initial time moment τ_H and the time moments τ_1 and τ_2 .