Thermohygrometer with the calculation of the THS-index “TKA-PKM” (24)

Main technical characteristics

Measurement range of **relative humidity**	5 ÷ 98%
Air temperature measurement range	from -30 to +60 ° C
Ranges of indications of calculated parameters:	
Temperature inside the black ball a) in measurement mode b) in display mode	from 0 to +60 ° C to +100 ° C
TNS index	from 0 to +70 ° C

WBGT-index (in the presence of solar radiation)	from 0 to +75 ° C
Wet bulb temperature	from -10 to + 60 ° C
Dew point	from -55 to +60 ° C
Average radiation temperature	from 0 to + 160 ° C
Heat radiation intensity	0 ÷ 1700 W / m^2

Basic absolute measurement errors of the device Thermohygrometer with the calculation of the THS-index "TKA-PKM" (24)

Limits of the **basic** absolute error of measurements of **relative humidity** at air temperatures from +15 to +25 ° C	± 3.0% rel. ow.
Limits of permissible **additional** absolute error of **relative humidity** measurements when the air temperature changes by every 10 ° C in the range from -30 to +15 and over + 25 to +60 ° C	± 3.0% rel. ow.
Limits of the **basic** absolute error of **air temperature** measurements **at air** temperatures from +15 to +25 ° C	± 0.2 ° C
Limits of **additional** absolute error of **air temperature** measurements **at air** temperature, ° C from -30 to -10 inclusive above -10 to +15 inclusive above +25 to +45 inclusive above +45 to +60	 ± 0.3 ° C ± 0.1 ° C ± 0.1 ° C ± 0.3 ° C

The range of ***the wet bulb temperature*** readings ***is*** calculated according to the analytical formula obtained by statistical processing of the Psychrometric Tables (GOST 8.524-85).

The range of indications of ***the heat load index of the environment (HPS-index) is*** calculated by the formula for calculating HPS indoors:

-THC · t = 0.7 $_{is}$ + 0.3 · t $_{sph}$, where t $_{is}$ – wet-bulb temperature, t $_{sph}$ – temperature of the black ball.

The reading range of the ***mean radiation temperature is*** calculated according to ISO 7726 using the formula:

t $_{rad\ Wed}$ = [(t $_{sph}$ + 273.2) ^{4} + 0.48 · 10 ^{8} · (t $_{sph}$ – t) $^{5/4}$] $^{1/4}$ – 273.2, ° C.

The range of indications of the ***intensity of thermal radiation is*** calculated according to ISO 7726, according to the formula:

W = 5.67 · 10 $^{-8}$ · [(t $_{rad.av}$ + 273.2) ^{4} – (t + 273.2) ^{4}], W / m^2 .

dimensions

Overall dimensions of PU, no more	(135 x 73 x 27) mm
Overall dimensions Probe No. 2 with a black ball (sphere), no more	(265 x Ø95) mm

Overall dimensions Probe No. 1, no more	(135 x Ø15) mm
Device weight (no more)	0.5KG

Two batteries – AA battery size	3 in

Advantages of the device Thermohygrometer “TKA-PKM” (24) over analogues

There are no direct analogs. The device has a unique opportunity to determine the values of the THC and WBGT indices in real time by simultaneously measuring the air temperature inside and the black ball, humidity and accurate calculation of wet bulb temperature value in a special program, protected Certificate of official registration of the computer program № 2004611468.
According a letter from the Chief Metrologist of the All-Russian Scientific Research Institute of Optical and Physical Measurements (VNIIOFI)
V.P. Kuznetsov’s “black sphere” is not a measuring instrument and its verification is not required. The parameters of the sphere should be verified during testing and manufacturing.

Additional simultaneous determination of the average radiation temperature and the intensity of thermal radiation provides an effective and reliable assessment of possible thermal overheating when examining a hot environment.

Equipping the device Thermohygrometer with the calculation of the THS-index “TKA-PKM” (24) USB-interface allows: expanding the capabilities of the device without prejudice to the time of information collection, to refuse paper media while reading the microclimate parameters.

The temperature measurement range inside the black ball has been expanded to + 100 ° C. The function of setting the exposure time by the operator when measuring thermal indices and parameters, in the range from 5 to 60 minutes, with a discreteness of 5 minutes, has been introduced. The whole process of measuring TNS and WBGT indices is fully automated. Additional functions for processing the received information have been introduced: storing, averaging, highlighting the minimum and maximum values, graphical display of the measured and calculated parameters of the microclimate.