

Specification for Measurements instruments

The services/products: Instruments that are required are the following:

- Sound level meter.
- Sound level meter calibrator.
- WBGT monitor.
- Sampling pump.

Instrument name	Specification	Quantity	Delivery point
Sound level meter	<p>Class 1 integrating sound level meter as specified in SANS 61672-1.</p> <p>The sound level meter is a combination of a microphone, a signal processor, and a display device. The signal processor includes the combined functions of an amplifier with a specified and controlled frequency response, a device to form the square of the frequency weighted time varying sound pressure, and a time integrator or time average. Signal processing that is necessary to conform to the specifications of SANS61672 is an integral part of a sound level meter. A display device provides either a physical and visible display, or storage, of measurement results. Any stored measurement result shall be available for display by means of a manufacturer-specified device, for instance a computer with associated software. The sound level meter measures exponential time-weighted sound level, measures time-average sound level; and measures sound exposure level. Frequency weighting A is mandatory for all sound level meters. The sound level meter must have a specified frequency response for sound incident on the microphone from one principal direction in an acoustic free field or from random directions. The sound level meter is intended to measure sounds generally in the range of human hearing. The sound level meter is designed for use with an operator present or for automatic</p>	1	Eskom Rosherville

	and continuous measurements of sound level without an operator present. Specifications in SANS 61672 for the response to sound waves apply without an operator present in the sound field. The configuration of the complete sound level meter and its normal mode of operation shall be stated in the instruction manual. If appropriate, the configuration of the complete sound level meter includes a windscreen and other devices that are installed around the microphone as integral components for the normal mode of operation.		
Sound level meter calibrator	The calibrator is used with the sound level meter and complies with the requirements of SANS 60942. Sound calibrators have two principal applications: the determination of the electroacoustical pressure sensitivity of specified models of microphone in specified configurations; and checking or adjusting the overall sensitivity of acoustical measuring devices or systems. The device that generates a sinusoidal sound pressure of specified sound pressure level and frequency when coupled to specified models of microphone in specified configurations. All specified sound pressure level(s) generated shall be stated in the instruction manual with a resolution better than, or equal to, 0,1 dB. The principal sound pressure level of the sound calibrator shall be at least 90 dB 20 μ Pa) when the sound calibrator is applied to the models of microphone in the configurations specified in the instruction manual. The sound calibrator shall include as an integral part some means of checking that the supply voltage is sufficient to operate the sound calibrator in accordance with the requirements of this SANS 60942, or shall ensure that the sound calibrator ceases to produce any sound output when the supply voltage falls below that required to operate the sound calibrator in accordance with the requirements of SANS60942. The instruction manual for the sound calibrator shall state the microphone configuration as designated in IEC 61094-1 or IEC 61094-4, or alternatively (and in addition if desired), the name of the	1	Eskom Rosherville

	<p>manufacturer or supplier, model designation and configurations (for example, with or without protective grid) of those microphones with which the sound calibrator is specified to operate in conformity with the requirements of this standard. In case, the instruction manual shall state the required adaptor configuration (if any). The sound calibrator shall be supplied with an instruction manual which shall contain the following information:</p> <ul style="list-style-type: none"> - identification of the microphone models (and of the configurations in which they are used) and of the relevant adaptors required, together with detailed instructions which need to be followed to ensure that the sound calibrator functions as intended when used as described in the instruction manual; - the range of environmental conditions over which the sound calibrator is specified to operate, and the correction data, if applicable, specified in 5.4, together with the expanded uncertainties of measurement corresponding to a confidence level of approximately 95 % associated with the correction data; for class 2 sound calibrators with letter 'C' designation that are not required to be supplied with a barometer, information on how to calculate the correction when operating the calibrator at different heights above sea level; - types of battery which may be used, if applicable, together with the typical operation lifetime, details of any battery status indicator and its operation, and the nominal, maximum and minimum supply voltages; method of connection to an external power supply, where applicable. 		
Thermal Stress Wet Bulb Globe Temperature (WBGT) monitor	<p>Uses wet bulb, globe and dry bulb to measure heat and cold stress and complies with the requirements of ISO 7726. Wet Bulb Globe Temperature more directly measures temperature as it relates to a person's risk of heat illness by factoring the effects of air temperature, relative humidity, wind velocity and radiant heat. Wet Bulb Globe Temperature, WBGT, is the</p>	1	Eskom Rosherville

	<p>weighted of average of Wet Bulb, Black Globe and Air Temperature in which $WBGT = 0.7T_w + 0.2T_g + 0.1T_d$. The natural wet bulb temperature is the value indicated by a temperature sensor covered with a wetted wick that is ventilated naturally, i.e. placed in the environment under consideration without artificially forced ventilation. It is exposed to the air temperature, radiation, humidity and air velocity of the environment. The natural wet bulb temperature is thus different from the thermo-dynamic temperature determined with a psychrometer. The temperature sensor shall have the following characteristics: a) shape of sensitive part of the sensor: cylindrical; b) external diameter of the sensitive part of the sensor: 6 mm \pm 1 mm; c) length of the sensor: 30 mm \pm 5 mm; d) measuring range: 5 °C to 40 °C; e) accuracy of measurement: \pm 0,5 °C; f) the whole sensitive part of the sensor shall be covered with a white wick of a highly water-absorbent material (for example, cotton); g) the support of the sensor shall have a diameter equal to 6 mm, and 20 mm of it shall be covered by the wick; h) the wick shall be woven in the shape of a sleeve and shall be fitted over sensor with precision (a too-loose grip is detrimental to the accuracy of measurement); i) the wick shall be kept clean; j) the lower part of the wick shall be immersed in a reservoir of distilled water, and the free length of the wick in the air shall be 20 mm to 30 mm; k) the reservoir shall be designed in such a way that the temperature of the water inside cannot rise as a result of radiation from the environment. The globe temperature is the temperature indicated by a temperature sensor placed in the centre of a globe having the following characteristics: a) diameter: 150 mm. b) mean emission coefficient: 0,95 (matte black globe); c) thickness: as thin as possible; d) measuring range: 20 °C to 120 °C; e) accuracy of measurement: range 20 °C to 50 °C: \pm 0,5 °C; range 50 °C to 120 °C: \pm 1 °C. The air temperature sensor shall, in particular, be protected from radiation device which does not impede the circulation of air around the sensor and not</p>		
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	re-radiate heat to it. The measuring range for the air temperature is 10 °C to 60 °C and the accuracy $\pm 0,5$ °C. Other required features include: Real-time data display, data logging and data downloading, in/out function displays the WBGT value with or without direct sun exposure, low battery indicator, operation manual.		
Gravimetric air sampling pump	Battery operated pump to draw a volume of air through a collection device ('sampler') which is mounted in the breathing zone of worker. Automatic constant flow assuring sampling is maintained within +/- 5% of the initial set point. Used for air sampling of dust, asbestos, gases, fumes and vapours in the workplace. The pump should be capable of drawing air through the sampler at the required flow rate for a set time period and constantly maintain that flow rate regardless of fluctuations in temperature or back pressure (the restriction to air flow of the sampler). The pump must be certified intrinsically safe. This means that it must not be a source of ignition in a potentially explosive atmosphere. An operation manual must be included.	1	Eskom Rosherville

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