Table 1 – Recommended IAQ parameters

Parameter	Acceptable limit (8 hours)	Unit	Measurement method / Analytical method
i. Thermal comfort parameters			
Operative temperature[1)]	24 to 26	°C	Air temperature – by hot wire, thermistor, thermometer sling or equivalent method. Globe temperature – by Globe thermometer.
Relative humidity	< 65 (for new buildings) < 70 (for existing buildings) (under peak and common part load conditions)	%	By thin film capacitor, hygrometer, thermometer sling or equivalent method.
Air movement	0.10 - 0.30	m/s	By hot wire method for linear air velocity or Kata thermometer for omni-directional air velocity method or equivalent.
ii. Chemical parameters			
Carbon dioxide	700 above outdoor	ppm	By real-time non-dispersive infra-red sensor or equivalent method.
Carbon monoxide	9	ppm	By real-time electrochemical sensor or equivalent method (NIOSH Manual of Analytical Methods 6604).
Formaldehyde	120 0.1	$\mu g/m^3$ ppm	By detection tubes, real-time electrochemical sensor or equivalent method for screening (ISO 16000-2). When formaldehyde concentration is higher than the limit, collect continuous air samples using dinitrophenylhydrazone (DNPH) cartridges and analyse by High Performance Liquid Chromatography (HPLC) using: NIOSH Manual of Analytical Methods 2016 or EPA Method 0100: Sampling for Formaldehyde and other Carbonyl Compounds. ISO 16000-3 or NIOSH Manual of Analytical Methods 2016.
Total volatile organic compounds (TVOC) that are photoionisable (10.6 eV)[2)]	3000 3	ppb ppm	By real-time photoionisation detector or equivalent method.
iii. Respirable suspended particles (aerodynamic diameter less than 10 μm sampled with a particle size-selective device having a median cut point of 4 μm)	50	$\mu g/m^3$	By real-time optical scattering or piezoelectric monitors or equivalent method

NOTES –

[1)] Operative temperature is the average of the air temperature (weighted by the convective heat transfer coefficient) and the mean radiant temperature (weighted by the linearised radiant heat transfer coefficient for the occupant). For occupants engaged in near sedentary physical activity (with metabolic rates between 1 and 1.3 met), not in direct sunlight, and not exposed to air velocities greater than 0.20 m/s, the relationship can be approximated with acceptable accuracy by:

$t_o = (t_a + t_r) / 2$

t_o = operative temperature

t_a = air temperature

t_r = mean radiant temperature (see also ISO 7726 'Ergonomics of the thermal environment - Instruments for measuring physical quantities')

Mean radiant temperature for a fully clothed subject: $t_r = t_g + 2.44 \times V^{0.5} (t_g - t_a)$

t_g is the globe temperature in ^0C

t_a is the air temperature in ^0C

V is the air speed in m/s

[2)] When TVOC > 3000 ppb or when smell is perceived or when ventilation rate is less than the recommended rate by SS 553 or recommendation by competent person, specific VOCs should be identified (e.g. endocrine disrupting chemicals, microbial VOC, etc.) by identifying the individual VOC species.

Table 1 – Recommended IAQ parameters (cont'd)

Parameter	Acceptable limit (8 hours)	Unit	Measurement method / Analytical method
iv. Biological parameters			
Total viable bacterial count	500	cfu/m^3	By Andersen single-stage impactor (N6), or equipment designed for airborne microbial sampling, flow rate at 28.3 L/min (1 ft^3/min) for 4 minutes or equal volume of air. Bacteria is cultured by Tryptone Soya Agar (TSA) media and incubated for 48 hours at 35 ^{0}C. When a single species dominating from the culture plate, speciation should be done (see Table 2). The samples on the culture plate should yield between 30 and 300 colonies for best results.
Total viable mould count	Up to 500 is acceptable, if the species present are primarily *Cladosporium*	cfu/m^3	By Andersen single-stage impactor (N6), or equivalent equipment designed for airborne microbial sampling, flow rate at 28.3 L/min (1 ft^3/min) for 4 minutes or equal volume of air. Mould is cultured by 2 % Malt Extract Agar (MEA) and incubated for 5 days at 25 ^{0}C. When a single species dominating from the culture plate, speciation should be done. The confirmation presence of 1 or more fungal species occurring as a significant percentage in indoor sample and not present in concurrent outdoor sample is an evidence of fungal growth. Air testing is used in some circumstances as part of an investigation to determine whether or not there is mould growth in a building, and is never a substitute for a building investigation. Surface sample should be taken from the growth area by tapes for microscopic identification.

NOTES –

Micro-organisms are ubiquitous in indoor environment and do not necessarily constitute a health hazard. The concentration at which contamination becomes a threat to health is unknown and may vary greatly with each individual. Culture-based methods are suitable for detection of culturable infection agents and allow species identification. However, it is widely agreed that only a small fraction (0.1 to 10 %) of the total microbial flora in an indoor environment is currently culturable (White DC, 1983). Total viable bacterial counts and total viable mould counts are a measure of the sanitary conditions of the premises and may not correlate with the presence of any specific pathogen.

If in the professional judgement of a competent person, investigation into target contaminants is necessary, then Table 2 is to be followed.