Circular Note on Air Pollution - January 2020

What to do and what we do at our UN compound

Some parts of the Asia and the Pacific region, including Thailand, experience very poor air quality levels with a seasonal pattern, which can be attributed to multiple sources. In Bangkok, relatively high PM2.5 levels are observed between December to January, lasting until April in some years. In addition to vehicles, construction, and industrial sources, open burning of agricultural residues and municipal waste are key sources of pollution in Thailand during this period.

Air quality, including the concentration of fine particulate matter (those of 2.5 micrometers or less in diameter – or “PM2.5” which cause significant health impacts), is typically communicated through an air quality Index (AQI), which takes into account concentration of five key pollutants, i.e. PM2.5 and PM10, ground level ozone (O₃), carbon monoxide (CO), nitrogen dioxide (NO₂), and sulfur dioxide (SO₂). Thailand’s AQI ranges from “Excellent” to “Very unhealthy”. From 1st to 22nd January 2020, 24-hour average PM2.5 levels in Bangkok ranged from 17µg/m³ to 152µg/m³. There have been over 2,000 hotspots / active fires¹ observed in the country by the ASEAN Specialised Meteorological Centre.

¹ For more information, visit http://asmc.asean.org/asmc-hotspot/
Effects of air pollution on human health

Air pollution poses significant health risks to everyone and different pollutants affect our bodies in different ways. Certain groups of people are more vulnerable than others including:

- People with lung diseases such as asthma or COPD
- Children under five and older adults
- Pregnant women
- People with a cardiovascular disease or diabetes
- People who work or exercise outdoors
- People who live or work in close proximity to activities with high levels of air pollution including busy highways, poorly managed demolition and construction sites, open burning of waste, forest fires.
- People who smoke and/or are exposed to second-hand smoke
Three things we can do to reduce exposure to air pollution

1. Be aware - monitor the Air Quality Index (AQI) in your city and area

The AQI is a tool for reporting on air quality that links the levels of various air pollutants to a system of colour coding, alerts and public health advice. Thailand’s air quality index system from the Pollution Control Department is available as a mobile application called Air4Thai both iOS and Google Play or through web.

Alternatively, levels of key pollutants can be compared to national air quality standards or the WHO Air Quality Guidelines, which identify the concentrations of air pollutants which would not be expected to cause adverse health effects.

2. Reduce exposure to pollutants in your home

- Identify pathway by which polluted outdoor air enters the indoor environment such as poorly fitted doors or windows, air conditioning system, etc., and ensure that these are properly sealed.

- Minimize internally created pollutants like cigarette smoke and items that burn (candles, firewood, incense), cooking fumes, ozone generating air cleaners, etc. Do not burn leaves, garbage, and other materials in your backyard.

- Keep rooms inside your home clean - wet mopping is preferable to vacuuming and sweeping as these stir up additional dust and particles. Consider using a vacuum cleaning with HEPA filter.

- Consider using an air purifier (non-ozone generating type) at home, in addition to daily precautions and if indicated.[refer to the SEARO FAQ “what to do when there is an Air Pollution alert and FAQ on air cleaning devices from California EPA). Recommendations:
  - Suitable cleaning technology: For removing fine particles, highly efficient filters, such as High Efficiency Particulate Air (HEPA) filters (with a rating of HEPA 13 or above), are preferred.
  - Appropriate Size: For effective cleaning, the unit should be sized appropriately for the intended room. The effective floor area, air changes per hour and flow rate of the air purifier are factors to consider for this purpose.

- Clean your air conditioner filters regularly and have the coil regularly serviced.

3. Personal measures to reduce risk when outdoors

- Limit time and prolonged or heavy exertion outdoors during periods of, and in areas with, high levels of air pollution.

- Appropriate masks may be considered in certain circumstances such as an N95 or N99 (which filter particulate matter as low as PM2.5) if outdoors for prolonged periods and/or the AQI levels are high (e.g., AQI level above 100). Scientific evidence is still limited on

Useful links on air pollution information

- WHO: Air Pollution
- WHO SEARO TOPICS: Air Pollution
  - What is Air Pollution?
  - Preventing the Harmful Effects of Air Pollution
  - What to do when there is an Air Pollution alert
- Environmental Protection Agency (EPA): Air Topics
  - Air quality sensor at the UN Compound in Bangkok (using Clarity Movement). Search for “Bangkok UN”.  

Tools and Mobile Apps that report on AQI

- WHO Global Ambient Air
  - Pollution For Location Specific Air Quality Index (AQI) See AQICN or AIR4THAI
  - Several mobile phone AQI monitoring apps are available on both android and IOS like AirVisual Air Quality For ecast.

- Recommend using mobile apps like Clarity Movement for real-time air quality monitoring.
the effectiveness of masks. Disposable surgical masks, bandana’s and dust masks should not be relied upon as they are largely ineffective in providing protection against fine particles.

- **Reduce exposure to pollutants while commuting by car** by minimizing or stopping unnecessary travel, closing the windows, setting the air conditioning to recirculate, and consider using accessory air filters suitable for your vehicle. In addition, air the car during journeys of more than 40 minutes.

**What about our compound’s air quality?**

*If you are afraid that the indoor air at our compound may be as polluted as the Bangkok outdoor air, be reassured, our facilities management team monitor it with advanced technology!*

The UN Compound’s air conditioning and ventilation system has a **two-stage air filtration - primary (fresh air units) and secondary (floor units)** with MERV-13 filters with antimicrobial media, that are able to trap small size contaminants, including fungal and bacterial spores, and keep a very low particulate count.

Building management software **constantly monitors** and controls the concentration **levels of carbon dioxide (CO₂)**, which are kept well below international thresholds for office environments (1000-1200 ppm).

On a weekly basis, our “Particle counter” (AeroTrak TSI 9306 V2) is used to collect accurate information on the compound’s indoor air quality based on ISO 14644-1 a standard used for rating clean rooms and compare our readings against Class 9 which is for offices and commercial buildings. The instrument counts particles per square meter of 0.3 μm, 0.5 μm, 1 μm, 3 μm, 5 μm and 10 μm particles. The reports are analysed by ESCAP facilities team to inspect for presence of airborne contaminants and take corrective measures, if necessary.

During recent days of hazardous pollution levels in Bangkok, the air quality inside the facilities is being checked to ensure we maintain safe levels, thanks to the high-efficiency filters of the Air Handling Units and the Fresh Air Pre-treatment Units.

**Preventive maintenance activities** are carried out, such as regular cleaning and changing of air filters. These filters are also antimicrobial to prevent growth of microbes.

Our indoor air quality **complies with or exceeds** **ASHRAE** and other international standard requirements for office environments, as shown in the tables below:

<table>
<thead>
<tr>
<th>Air quality indicator</th>
<th>ASHRAE requirements</th>
<th>OSHA req.</th>
<th>UN Compound</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Amount of CO₂</td>
<td>1000-1200 ppm</td>
<td>CO₂ &lt; 5,000 ppm</td>
<td>CO₂ &lt; 1,000 ppm</td>
</tr>
<tr>
<td>b) Temperature/humidity</td>
<td>Temperature 22.8 – 26 °C Humidity &lt;70%</td>
<td>24-26 for offices, 23-26 for Conference Rooms 50-60%</td>
<td>8.5 m³/h/person minimum</td>
</tr>
<tr>
<td>c) Presence of airborne contaminants</td>
<td>Ventilation 8.5 m³/h/person (5 cfm/person)</td>
<td></td>
<td></td>
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</tbody>
</table>
### ISO 14644-1

<table>
<thead>
<tr>
<th>Size</th>
<th>Class 9 Cleanroom Maximums (per m³)</th>
<th>ESCAP Office Average (per m³) (December 2019)</th>
</tr>
</thead>
<tbody>
<tr>
<td>≥ 0.3 μm particles</td>
<td>102,000,000</td>
<td>9,391,018</td>
</tr>
<tr>
<td>≥ 0.5 μm particles</td>
<td>35,200,000</td>
<td>859,262</td>
</tr>
<tr>
<td>≥ 1 μm particles</td>
<td>8,320,000</td>
<td>180,998</td>
</tr>
<tr>
<td>≥ 3 μm particles</td>
<td>846,000</td>
<td>65,269</td>
</tr>
<tr>
<td>≥ 5 μm particles</td>
<td>293,000</td>
<td>36,484</td>
</tr>
<tr>
<td>≥ 10 μm particles</td>
<td>69,200</td>
<td>7,702</td>
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The results of indoor air quality measurements in the table above showed the good indoor air quality within the range of cleanrooms standard.

For any other related queries and concerns on this topic, please contact the UN Medical Service in Bangkok by email: bkkmedservice@un.org, or telephone: +66 2 288 1352/1353/1761, or ESCAP Facilities Management Unit.

**What you can do to help reduce the air pollution levels?**

1. Think seriously before using your car for a journey. Consider the benefits offered by other modes of transport, like cycling, walking or using public transport (for example: increased safety, particularly for children; reduced congestion; better health by ensuring you meet the World Health Organization (WHO) recommended 20 minutes of exercise every day; saved time, it can be much quicker to travel by other forms of transport than by car; saved money).

2. When doing the school run, shopping or going to work, think about car sharing, turn off your engine while stationary, maintain your car properly and reduce your speed.

3. Buy ‘green’ and ‘efficient’ (for example, when buying your next vehicle consider an electric one or a hybrid one with greater fuel economy and lower emissions.

4. Look at reducing your energy consumption at home or switching to clean renewable energy sources.

5. Do not burn solid fuels, particularly rubbish or treated woods.