**INDOOR AIR QUALITY ASSESSMENT**

**Massachusetts Department of Transitional Assistance**

**95 Liberty Street**

**Springfield, Massachusetts**



Prepared by:

Massachusetts Department of Public Health

Bureau of Environmental Health

Indoor Air Quality Program

May 2017

**Executive Summary**

This general indoor air quality (IAQ) assessment was prompted by an employee complaint from another state office sharing the floor with Massachusetts Department of Transitional Assistance (DTA) Springfield office regarding lack of ventilation. Recommendations are made to increase fresh air supply, and reduce plants and clutter to improve air quality in the space.

**Background**

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| --- | --- |
| **Building:** | Massachusetts DTA |
| **Address:** | 95 Liberty Street, Springfield, MA |
| **Assessment Requested by:** | Referral from MA Department of Labor Standards |
| **Reason for Request:** | General IAQ concerns |
| **Date of Assessment:** | March 3, 2017 |
| **Bureau of Environmental Health/Indoor Air Quality (BEH/IAQ) Program Staff Conducting Assessment:** | Michael Feeney, Director, IAQ Program |
| **Date of Building Construction:** | 1970s |
| **Building Description:** | This is a concrete building constructed in the 1970s occupied by state and county offices. Windows are not openable in the building.  |

**Methods**

Please refer to the IAQ Manual and appendices for methods, sampling procedures, and interpretation of results (MDPH, 2015).

**IAQ Testing Results**

The following is a summary of indoor air testing results (Table 1).

* ***Carbon dioxide levels*** were above 800 parts per million (ppm) in most areas tested, indicating inadequate fresh air supply for the space.
* ***Temperature*** was within the recommended range of 70°F to 78°F in the areas tested.
* ***Relative humidity*** was below the recommended range of 40 to 60% in all areas tested, as is typical during the heating season.
* ***Carbon monoxide levels*** were non-detectable (ND) in all areas tested.
* ***Particulate matter (PM2.5***) concentrations measured were below the National Ambient Air Quality (NAAQS) level of 35 μg/m3 in all areas tested.

## Ventilation

Fresh air is provided by a number of rooftop-mounted air-handling units (AHU) and distributed through ducted ceiling vents. Mechanical exhaust ventilation is provided by ceiling-mounted return grates. Fresh air supply appears to be inadequate throughout the occupied space. Without adequate fresh air supply and exhaust ventilation, normally occurring environmental pollutants can build up and cause eye and respiratory system irritation. Airflow from a number of fresh air supply vents was blocked with cardboard (Picture 1). This practice can disrupt the airflow in the work area and may aerosolize particles and odors associated with cardboard.

In order to have proper ventilation with a mechanical supply and exhaust system, these systems must be balanced to provide an adequate amount of fresh air while removing stale air from a room. It is recommended that existing ventilation systems be re-balanced every five years to ensure adequate air systems function (SMACNA, 1994). It is unknown the last time these systems were balanced.

## Microbial/Moisture Concerns

The security area had three water-damaged ceiling tiles, which can become a medium for mold growth. Stained ceiling tiles should be replaced once the source of the water leak is repaired.

Indoor plants were noted in some areas. Plants can be a source of pollen and mold, which can be respiratory irritants to some individuals. Plants should be equipped with non-porous drip pans. Plants should also be located away from ventilation sources to prevent the entrainment and/or aerosolization of dirt, pollen, or mold.

Water coolers were observed on carpeted areas. Spills or leaks from these appliances can moisten carpeting. They should be located in a non-carpeted area or on waterproof mats.

## Other Conditions

Other conditions that can affect IAQ were observed during the assessment. In several areas, items were observed on the floors, windowsills and desks. The large number of items stored provides a source for dusts to accumulate. These items (e.g., papers, folders, boxes) make it difficult for custodial staff to clean. Items should be relocated and/or be cleaned periodically to avoid excessive dust build up. In addition, dust can accumulate on flat surfaces (e.g., desktops, shelving and carpets) in occupied areas and subsequently be re-aerosolized causing further irritation. Similarly, dust/debris from items placed on top of radiators can become airborne through movement of the heated air. Plastic sealable totes may be used to store items that are not needed daily to prevent dust from accumulating on the items and allow for easier cleaning.

**Conclusions/Recommendations**

In view of the findings at the time of the visit, the following recommendations are made:

1. Increase fresh air supply to the building through adjustments to the HVAC system. Ensure that all thermostats are set to have the fan on during occupied periods to provide circulation. Also ensure that intake vents are set to allow sufficient outside air into the building.
2. Consider adopting a balancing schedule of every 5 years for all mechanical ventilation systems, as recommended by ventilation industrial standards (SMACNA, 1994).
3. Remove cardboard from fresh air supply vents.
4. Replace water-damaged ceiling tiles. Repair the source of the water leak as needed.
5. Properly maintain indoor plants, avoid overwatering and do not place them on porous materials. Consider reducing the number of plants.
6. Place water coolers on plastic mats or in non-carpeted areas.
7. Reduce the amount of clutter to aid in cleaning.
8. For buildings in New England, periods of low relative humidity during the winter are often unavoidable. Therefore, scrupulous cleaning practices should be adopted to minimize common indoor air contaminants whose irritant effects can be enhanced when the relative humidity is low. To control for dusts, a high efficiency particulate arrestance (HEPA) filter equipped vacuum cleaner in conjunction with wet wiping of all surfaces is recommended. Avoid the use of feather dusters. Drinking water during the day can help ease some symptoms associated with a dry environment (throat and sinus irritation).
9. Refer to resource manuals and other related indoor air quality documents for further building-wide evaluations and advice on maintaining public buildings. Copies of these materials are located on the MDPH’s website: <http://mass.gov/dph/iaq>.

# References

Massachusetts Department of Public Health. (MDPH). 2015. “Indoor Air Quality Manual: Chapters I-III”. Available from: <http://www.mass.gov/eohhs/gov/departments/dph/programs/environmental-health/exposure-topics/iaq/iaq-manual/>

SMACNA. 1994. HVAC Systems Commissioning Manual. 1st ed. Sheet Metal and Air Conditioning Contractors’ National Association, Inc., Chantilly, VA.

**Picture 1**

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**Fresh air supply vent blocked with cardboard**

| **Location** | **Carbon****Dioxide****(ppm)** | **Carbon Monoxide****(ppm)** | **Temp****(°F)** | **Relative****Humidity****(%)** | **PM2.5****(µg/m3)** | **Occupants****in Room** | **Windows****Openable** | **Ventilation** | **Remarks** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Supply** | **Exhaust** |
| Background (outdoors) | 375 | ND | 48 | 8 | 14 |  |  |  |  |  |
| 2nd floor NE corner | 1143 | ND | 72 | 28 | ND | 1 | N | Y | Y | Supply blocked with cardboard |
| 2nd floor North | 1146 | ND | 73 | 28 | 1 | 0 | N | Y | Y | Plant, photocopier |
| 241 | 1165 | ND | 74 | 27 | ND | 0 | N | Y | Y |  |
| 2nd floor NW corner | 1170 | ND | 74 | 27 | 1 | 0 | N | Y | Y |  |
| 2nd floor SW corner | 1179 | ND | 74 | 27 | ND | 0 | N | Y | Y |  |
| 2nd floor South | 1143 | ND | 74 | 23 | 2 | 0 | N | Y | Y | Plants |
| 2nd floor Conference room | 1113 | ND | 74 | 27 | 3 | 0 | N | Y | Y |  |
| 2nd floor SE corner | 1173 | ND | 73 | 28 | 2 | 1 | N | Y | Y |  |
| 206 | 1175 | ND | 73 | 28 | 2 | 0 | N | Y | Y |  |
| 1st floor waiting room | 1340 | ND | 72 | 22 | 4 | 30+ | N | Y | Y |  |
| 1st floor reception | 1607 | ND | 71 | 27 | 4 | 6 | N | Y | Y | Plants, photocopier |
| 117 | 1541 | ND | 73 | 27 | 4 | 7 | N | Y | Y |  |
| Area director | 1528 | ND | 73 | 27 | 11 | 0 | N | Y | Y |  |
| 1st floor Vending machine area | 1584 | ND | 73 | 27 | 5 | 0 | N | Y | Y | Water cooler on carpet |
| 1st floor SE | 1572 | ND | 74 | 28 | 5 | 3 | N | Y | Y | Supply blocked with cardboard |
| 1st floor SW | 1495 | ND | 73 | 26 | 6 | 2 | N | Y | Y |  |
| 3rd floor NW corner | 952 | ND | 71 | 19 | ND | 1 | N | Y | Y |  |
| 312 | 872 | ND | 72 | 18 | ND | 2 | N | Y | Y |  |
| 339 | 962 | ND | 73 | 17 | ND | 4 | N | Y | Y | Plants |
| 345 | 869 | ND | 73 | 17 | ND | 5 | N | Y | Y |  |
| 359 | 834 | ND | 73 | 17 | ND | 0 | N | N | N | Plants |
| Security | 819 | ND | 72 | 17 | ND | 0 | N | N | N | 3 water damaged ceiling tiles |
| Records | 742 | ND | 71 | 15 | ND | 1 | N | Y | Y |  |
| 3rd floor SW corner | 981 | ND | 72 | 18 | ND | 4 | N | Y | Y | Plants |
| 3rd floor South | 858 | ND | 72 | 16 | ND | 2 | N | Y | Y | Supply blocked with cardboard |
| 3rd floor NE corner | 788 | ND | 72 | 15 | ND | 0 | N | Y | Y |  |
| 3rd floor N | 798 | ND | 73 | 15 | ND | 5 | N | Y | Y | Supply blocked with cardboard |
| Photocopier | 816 | ND | 73 | 16 | ND | 3 | N | Y | Y | Photocopier |
| 3rd floor conference room | 822 | ND | 74 | 15 | ND | 0 | N | Y | Y | Plants |