

**Department of Employee Relations  
State Safety and Industrial Hygiene Unit**



**Indoor Environmental Quality Checklist  
Including Background Information in Comment Section**

Safety and  
Industrial  
Hygiene Unit

**Building Description**

|   |   |
|---|---|
| Original construction date                    |   |
| Renovation dates                              |   |
| Number of floors above grade                  |   |
| Number of floors below grade                  |   |
| Number of occupants                           |   |
| Number of occupants building was designed for |   |
| Original construction documents available     | <input type="checkbox"/> yes <input type="checkbox"/> no  |
| Carpeting present                             | <input type="checkbox"/> yes (date of install _____) <input type="checkbox"/> no  |
| Exterior wall construction                    | <input type="checkbox"/> Brick <input type="checkbox"/> Sheetrock<br><input type="checkbox"/> Plaster/lath <input type="checkbox"/> vinyl wall covering<br><input type="checkbox"/> Vapor barrier <input type="checkbox"/> _____  |
| HVAC system                                   | <input type="checkbox"/> Heat pump <input type="checkbox"/> terminal reheats<br><input type="checkbox"/> VAV <input type="checkbox"/> roof top<br><input type="checkbox"/> CAV <input type="checkbox"/> residential forced air<br><input type="checkbox"/> Fan coil/induction |
| Supply duct work insulation                   | <input type="checkbox"/> internal <input type="checkbox"/> not present<br><input type="checkbox"/> external (vapor barrier intact <input type="checkbox"/> yes <input type="checkbox"/> no )  |

| Component   | OK                       | Needs Attention          | Not Applicable           | Not Inspected            | Comments  | Completed (date) |
|---|--------------------------|--------------------------|--------------------------|--------------------------|---|------------------|
| <b>Preventive Maintenance</b>   |                          |                          |                          |                          |   |                  |
| A preventative maintenance schedule exists and is followed.               | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | The State of Minnesota Building Air Quality Guide identifies specific preventative maintenance items including filter replacement, coil cleaning, and duct inspection to be completed at regular intervals. Please refer to page 5.3 of the guide for a preventative maintenance schedule.  |                  |
| <b>Cooling Tower</b>  |                          |                          |                          |                          |   |                  |
| Cooling tower does not leak.  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Leaking cooling towers located on rooftops can cause water infiltration into buildings and create microbial contamination.  |                  |
| Cooling tower is equipped with mist eliminators.                          | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Cooling towers are a possible reservoir of the bacteria responsible for Legionnaires disease. Mist eliminators reduce the drift of mist from the cooling tower to nearby areas and the air intakes.   |                  |
| There is no slime or algae present in the cooling tower.                  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | The presence of algae and/or slime is an indication that your water treatment program may not be adequately controlling <i>Legionella</i> bacteria. Consult with your water treatment vendor.   |                  |
| Cooling tower has a biocide treatment schedule.                           | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Treatment schedule should be designed to control <i>Legionella</i> . Consult with your water treatment vendor.  |                  |
| <b>Chillers</b>   |                          |                          |                          |                          |   |                  |
| Chiller is properly insulated and not experiencing condensation problems. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Uncontrolled condensation can lead to microbial contamination.  |                  |
| <b>Mechanical Rooms</b>   |                          |                          |                          |                          |   |                  |
| Mechanical room is in good condition and clean.                           | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | “A clean mechanical room, free of tracked in dirt and stored chemicals, is an important element in the prevention of indoor air quality problems. Airborne contaminants in the mechanical room can be drawn into the ductwork through return air openings or unsealed seams in return ducts and circulated throughout the building.” Reference – EPA Building Air Quality – A Guide For Building Owners and Facility Managers |                  |
| Chemicals are properly stored.  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Chemicals stored in mechanical rooms are a potential indoor air pollutant. Do not permit the storage of unnecessary chemicals within the building. Combustible chemicals must be stored in accordance with state and federal regulations.   |                  |

| Component  | OK                       | Needs Attention          | Not Applicable           | Not Inspected            | Comments   | Completed (date) |
|--|--------------------------|--------------------------|--------------------------|--------------------------|--|------------------|
| Mechanical room has been surveyed for asbestos and insulation is in good repair.   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Asbestos containing materials must be inspected and maintained in good condition in accordance with state and federal regulations.   |                  |
| <b>Boilers and other combustion sources.</b>   |                          |                          |                          |                          |  |                  |
| Flues and breaching are sealed and not leaking into building.  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Leaking flues and breaching are a source of indoor pollutants including combustion gases (e.g. carbon monoxide) and particulate.   |                  |
| Combustion air source exists.  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Combustion sources require sufficient make up air to allow for proper exhausting of combustion gases from the building. Large boilers with insufficient make up air can cause the building to be under negative pressure.                              |                  |
| <b>Outside Air Intake</b>  |                          |                          |                          |                          |  |                  |
| Located away from contamination sources such as restaurants, garages, road. (use this space to describe those items that need attention) | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | The location of the building outside air intakes in relation to outdoor contamination sources can impact the indoor air quality.   |                  |
| Trash compactor within 100 feet?<br><input type="checkbox"/> parking<br><input type="checkbox"/> loading dock                            | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Trash compactors are a source of odors that can be drawn into the air handling system if located near air intakes.   |                  |
| Dumpster?  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Dumpsters are a source of odors that can be drawn into the air handling system if located near air intakes.  |                  |
| Unobstructed.  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Items blocking the air intakes will reduce the air handling system's ability to deliver outside air to the occupied areas.   |                  |
| There is no standing water, bird droppings in vicinity.  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Standing water and bird droppings can be a source of microbes that can then be distributed through the building.   |                  |
| Evidence of precipitation entering intake area?  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Water entering the air intake area can lead to microbial contamination within the system. Also, water entering the building via the air intakes may damage adjacent building material (e.g. wallboard and ceiling panels) leading to microbial growth. |                  |

| Component   | OK                       | Needs Attention          | Not Applicable           | Not Inspected            | Comments  | Completed (date) |
|---|--------------------------|--------------------------|--------------------------|--------------------------|---|------------------|
| No cooling tower within 100 feet? (minimum of 40 feet horizontal distance)    | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Cooling towers are classed as large non-confined contamination sources. Cooling towers can be a source of bacteria (legionella). The outside air intake must be located no closer than 100 feet from the potential contamination source. This distance may be a combination of horizontal and vertical distances but the horizontal distance may never be less than 40 feet. Reference – IAQ Guide 1.11   |                  |
| No exhaust outlet within:<br>(small source 20 feet)<br>(large source 40 feet) | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <p><u>Small confined contamination sources</u> - such as sanitary vents. The fresh air intake must be installed no closer than 20 feet from such openings. This distance can be a combination of vertical and horizontal distances. For example, if the vent exhausts at an elevation 10 feet higher than the fresh air intakes, then the horizontal distance can be reduced to 10 feet.</p> <p><u>Large confined contamination sources</u> - such as clothes dryer vents, flue gas vents from combustion heaters, exhaust vents from parking garages, laboratory vent hoods and cooking exhaust vents. If the potential contamination source (i.e. cooking exhaust vent) has a vertical discharge stack extending at least 5 feet higher than the height of the fresh air intake on the roof, then the fresh air intake may be located no closer than 40 feet horizontal from the potential contamination source.</p> <p><u>Large non-confined contamination sources</u> - such as cooling towers, parking areas, and loading docks (loading dock area boundaries include the area where vehicles park while loading and unloading). The fresh air intake must be located no closer than 100 feet to the potential contamination source. This distance may be a combination of horizontal and vertical distances <b><u>but the horizontal distance may never be less than 40 feet.</u></b></p> |                  |
| <b>Bird Screen</b>  |                          |                          |                          |                          |   |                  |
| Intact and not plugged.   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Bird droppings can be a source of microbial contamination. Install a bird screen with a ½ inch maximum mesh to prevent birds from entering the air intake areas.  |                  |
| <b>Outside Air Dampers</b>  |                          |                          |                          |                          |   |                  |
| There is a minimum opening setting.   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Normally the minimum fresh air intake setting, while a building is occupied is 15 to 20 percent (15 to 20 percent of supply air to an occupied space is outdoor air) of the total mixed airstream (return air plus outdoor air). During building occupancy the fresh air intake should never be completely closed – with the exception of times of extreme cold to prevent coil from freezing. Verification of minimum damper settings needs to be conducted to determine adequate outside air ventilation.   |                  |

| Component  | OK                       | Needs Attention          | Not Applicable           | Not Inspected            | Comments   | Completed (date) |
|--|--------------------------|--------------------------|--------------------------|--------------------------|--|------------------|
| Outside air damper is controlled by economizer which has been tested during the past year.                                     | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Economizer systems automatically adjust system air dampers in an attempt to utilize the maximum amount of outside air to assist in cooling the building. These systems need to be checked periodically to verify proper function and minimum damper settings for sufficient rates of outdoor air introduction. |                  |
| Actuators operational intact and operational.  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | The damper positions are changed with an actuator and a linkage system. A malfunctioning actuator or broken linkage will result in lack of damper position control possibly leading to a lack of outdoor air introduction.   |                  |
| <b>Mixing Plenum</b>   |                          |                          |                          |                          |  |                  |
| The mixing plenum is clean and free of debris.   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |  |                  |
| If a floor drain is present it is equipped with a trap and is wet.   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Floor drains can be a source of sewer gasses entering the supply air stream. A trapped drain (provided the height is sufficient) will prevent sewer gas from entering the system.  |                  |
| The mixing plenum is equipped with a freeze stat.  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Excessive amounts of extremely cold outside air can cause cooling coils to freeze and burst causing water damage to building.  |                  |
| Mixing plenum is under negative pressure? <i>(If it is under positive pressure, outdoor air may not be entering)</i>           | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | The mixing plenum (ductwork) mixes air from the outdoor air duct with return air duct and supplies this mixed air to the air-handling unit. The plenum needs to be under a negative pressure to assure outdoor air introduction.   |                  |
| <b>Filters</b>   |                          |                          |                          |                          |  |                  |
| Air filters are at a minimum 25 to 35 percent efficient pleated filters.<br>Type    pleated<br>bag<br>box                      | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Filters are primarily used to remove particles from the air. 25 to 35 percent efficient filters as rated by the ASHRAE Dust Spot Efficiency Test. Reference – ASHRAE Standard 52.1-1992 Atmospheric Dust Spot Efficiency Test.   |                  |
| Filters completely cover air stream. (i.e., no bypassing)  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Air will always follow the path of least resistance, if there is incomplete coverage of the filter bank, unfiltered air will bypass the filters and enter the supply air-stream.   |                  |
| Correct pressure drop can be monitored? <i>(Compare to manufacturer's recommendations)</i>                                     | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Some systems have pressure drop indicators installed directly on the system, that are used as an indication of need of filter changing. Follow manufacturer's recommendations.   |                  |
| Filters are being changed with appropriate schedule? (pleated at least 3 times/yr.) (box and bag annually if using prefilters) | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Filters need to be changed regularly and this will vary from building to building to some extent. For most buildings, a filter-changing schedule of three times per year is recommended. Change filters in March or April, mid summer, and in September or October.  |                  |

| Component  | OK                       | Needs Attention          | Not Applicable           | Not Inspected            | Comments  | Completed (date) |
|--|--------------------------|--------------------------|--------------------------|--------------------------|---|------------------|
| <b>Cooling Coil</b>  |                          |                          |                          |                          |   |                  |
| Cooling coils have access for inspection and cleaning.   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Dirt can build up on the cooling coils (primarily the upstream side) and act as a food source for microbes. Cooling coils should be inspected two times per year, therefore access for inspection and cleaning of coils is needed. Clean out doors are needed upstream and downstream of the coils to allow maintenance workers good access to clean the coils and adjacent ductwork  |                  |
| Cooling coils are cleaned twice per year.  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Dirt can build up on the cooling coils (primarily the upstream side) and act as a food source for microbes. Cooling coils should be cleaned at least two times per year usually in the spring and fall. Refer to page 2.14 of the Air Quality Guide.  |                  |
| No evidence that water carry over is or has occurred.  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Water that has condensed on the cooling coil should run down to the drain pan. If water carries over, adjacent internal duct surfaces may become wet which may lead to mold growth.   |                  |
| Internal duct insulation within 10 ft of coils has been cleaned and modified to create washable surface. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Any ductwork in areas where the relative humidity is greater than 70 percent has a good potential for undesirable microbe growth, if a suitable site for growth and a food source exists. The suitable site in many ventilation systems is the porous fibrous glass lining 10 feet upstream and all areas downstream of the cooling coils, which the air has to pass by before being distributed throughout the building. The food source is any dust, which travels with the air being circulated in the ventilation system, which collects on the fibrous glass lined ductwork. The microbes grow on the dirt, which has collected on the fibrous glass liner. Reference IAQ Guide page 2.14. |                  |
| <b>Condensate Drip Pans</b>  |                          |                          |                          |                          |   |                  |
| Condensate drip pans have access for inspection and cleaning.  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | As a component of the HVAC Preventative Maintenance Program, drain pans need to be inspected and cleaned on a regular basis, which requires accessibility. Reference IAQ Guide page 2.14 and 2.17.  |                  |
| Condensate drip pans are clean with no residue.  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Debris can build up on the coiling coils (especially on the upstream side of the coils) and act as a food source for the microbes. Reference IAQ Guide page 2.14.   |                  |
| Condensate drip pans do not contain excessive amounts of standing water and are not leaking.             | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Standing water within drain pans can become a reservoir for fungal and bacterial growth. It is important for drain pans to properly drain during the cooling season. Reference IAQ Guide page 2.14.   |                  |

| Component   | OK                       | Needs Attention          | Not Applicable           | Not Inspected            | Comments   | Completed (date) |
|---|--------------------------|--------------------------|--------------------------|--------------------------|--|------------------|
| Condensate drip pans do not contain visible growth (e.g., slime).   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Debris can build up in the drainage pans and act as a food source for the microbes to grow in this area. In addition, the debris can block the drainage from the cooling coils and cause water to be sprayed or leaked on to the ductwork downstream from the cooling coils. Reference IAQ Guide page 2.14.  |                  |
| Condensate drip pans are equipped with a drain line that is working properly and has a trap in the line.                                      | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Drainage systems, which are not properly engineered, will not drain and will allow standing water to accumulated in the drainage pans and/or adjacent ductwork. All drainage pans need to have a water trap (normally at least 3 inches deep) in the drainage system to prevent air from traveling up the drainage system, aspirating water into the airstream. Reference – IAQ Guide page 2.14. |                  |
| There is no evidence that water has overflowed from the condensate drip pan (e.g. water stains in insulation).                                | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Water overflowing from drain pans can wick up into adjacent internal fibrous glass liners, which can lead to microbial growth. Evidence of water overflow may be an indication of blocked drains.  |                  |
| <b>Supply Fans</b>  |                          |                          |                          |                          |  |                  |
| Number of supply air units for whole building<br><br>Number of supply air units serving the complaint area<br><br>Types of air handling units | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |  |                  |
| Fan blades are clean.   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Supply Fans or Air Blowers should be cleaned as a part of the duct cleaning process, see Building Air Quality Guide - Section 5.E.3. HVAC Ventilation Ductwork. Supply Fans should be thoroughly inspected at least annually for surface debris and general operation.   |                  |
| Belt guards are in place.   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Refer to OSHA regulations contained in Subpart O – Machinery and Machine Guarding.   |                  |
| There is no excess vibration caused by the fan (e.g. rumble or building vibration).   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Excessive HVAC vibration can lead to numerous complaints from building occupants. HVAC vibration issues, in some instances, can be quite complicated to diagnose and correct. A mechanical engineer familiar with HVAC sound and vibration problems may need to be consulted.  |                  |
| No corrosion present on fan and fan casing.   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | A highly corroded fan casing can lead to supply air bypassing the ductwork and lead to reduced amounts of air delivered to the occupied spaces. Fan casing corrosion may also be an indication of excess humidity levels within the ductwork.  |                  |

| Component  | OK                       | Needs Attention          | Not Applicable           | Not Inspected            | Comments  | Completed (date) |
|--|--------------------------|--------------------------|--------------------------|--------------------------|---|------------------|
| There are no reports of excessive fan noise in occupied spaces.  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Excessive fan noise can lead to numerous complaints from building occupants. Fan noise and vibration issues, in some instances, can be quite complicated to diagnose and correct. A mechanical engineer familiar with HVAC sound and vibration problems may need to be consulted.   |                  |
| Fans are not cycled "off" while building is occupied?  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Fan cycling off will reduce the amount of outside air being distributed to the indoor environment and can cause temperature fluctuations.   |                  |
| Are fans cycled "off" while building is unoccupied?<br><input type="checkbox"/> Yes<br><input type="checkbox"/> No<br>Schedule | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Fan start time must be early enough to allow building temperature to achieve desired set point prior to typical arrival of building occupants.  |                  |
| <b>Primary Heating Coil</b>  |                          |                          |                          |                          |   |                  |
| Coils are accessible for inspection and cleaning.  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | It is important to periodically inspect the upstream side of the heating coils. Excess dust and debris build-up can lead to lowered coil efficiency and possibly reduced airflow. Inspection access, then, is necessary to conduct any coil inspection.                             |                  |
| Coils are clean and are cleaned at least two times per year.   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | The main heating coil should be cleaned at the same time as the cooling coil and drain pan. Typically this is done in the spring and the fall.  |                  |
| <b>Humidification</b>  |                          |                          |                          |                          |   |                  |
| Humidifier type?   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | The desirable water source for buildings using humidification systems is potable water. Steam humidification is the preferred method of humidification.   |                  |
| Treated boiler water is not used.  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | The following chemicals shall not be used in direct-steam humidification systems: cyclohexylamine, diethylaminoethanol and morpholine. Clean steam using a source of deionized water is recommended. Use of boiler treatment chemicals is not recommended. Reference IAQ Guide 1.3. |                  |
| Humidification system is not creating standing water in air handling system.   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | It is common for malfunctioning humidifiers to drip water on to adjacent surfaces. If these adjacent surfaces are porous materials, mold can readily grow in these areas.   |                  |

| Component   | OK                       | Needs Attention          | Not Applicable           | Not Inspected            | Comments  | Completed (date) |
|---|--------------------------|--------------------------|--------------------------|--------------------------|---|------------------|
| There is no visible microbial growth adjacent to or associated with the humidification system.  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | When humidification is needed, it must be added in a manner that prevents the growth of microbiologicals within the ductwork and air handlers. Steam humidifiers are the system of choice. Systems using media other than clean steam must be rigorously maintained in accordance with the manufacturers recommended procedures to reduce the likelihood of microbiological growth.   |                  |
| Mineral deposits have not built up on the humidification system.  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Mineral deposits on humidifier wand assemblies can lead to poor steam delivery efficiency and cause water to drip into ductwork.  |                  |
| Internal duct liner within 10 feet of the humidification system has been modified to create a washable surface which is cleaned two times per year. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Humidifiers are commonly found immediately downstream of the cooling coils. These units need to be cleaned semiannually in a manner similar to the cleaning procedures for the cooling coils. Porous surfaces (fibrous glass liners) should not be located within 10 feet of the humidifier. It is common for humidifiers to drip water on to adjacent surfaces. If these adjacent surfaces are porous materials, mold can readily grow in these areas. The humidifier and adjacent ductwork surfaces need to be thoroughly cleaned in the fall just before the heating season starts and in the spring at the end of the heating season. The humidifier should be cleaned at the same time that the cooling coils are cleaned and the same methods should be used. Reference IAQ Guide page 2.16 and 2.17. |                  |
| <b>Return Fan Chambers</b>  |                          |                          |                          |                          |   |                  |
| The return fan chamber is clean and free of debris.   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | “A clean mechanical room, free of tracked in dirt and stored chemicals, is an important element in the prevention of indoor air quality problems. Airborne contaminants in the mechanical room can be drawn into the ductwork through return air openings or unsealed seams in return ducts and circulated throughout the building.” Reference – EPA Building Air Quality – A Guide For Building Owners and Facility Managers   |                  |
| If a floor drain is present it is equipped with a trap.   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Floor drains can be a source of sewer gasses entering the supply air stream. A trapped drain (provided the height is sufficient) will prevent sewer gas from entering the system.   |                  |
| There is no standing water present.   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Standing water within drain pans can become a reservoir for fungal and bacterial growth. It is important for drain pans to properly drain during the cooling season.  |                  |
| If a floor drain is present it is equipped with a trap and is wet.  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Floor drains can be a source of sewer gasses entering the supply air stream. A trapped drain (provided the height is sufficient) will prevent sewer gas from entering the system.   |                  |

| Component   | OK                       | Needs Attention          | Not Applicable           | Not Inspected            | Comments   | Completed (date) |
|---|--------------------------|--------------------------|--------------------------|--------------------------|--|------------------|
| All doors close tightly and there are no air leaks in fan unit.   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Open doors or other air leaks will lead to reduction of return air and possibly negatively affect the overall system balance.  |                  |
| <b>Return Fans</b>  |                          |                          |                          |                          |  |                  |
| Number of return air fan units for whole building<br><br>Number of return air fan units serving the complaint area  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |  |                  |
| Fan blades are clean.   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Supply Fans or Air Blowers should be cleaned as a part of the duct cleaning process, see Building Air Quality Guide - Section 5.E.3. HVAC Ventilation Ductwork. Supply Fans should be thoroughly inspected at least annually for surface debris and general operation.   |                  |
| Belt guards are in place.   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Refer to OSHA regulations contained in Subpart O – Machinery and Machine Guarding.   |                  |
| There is no excess vibration caused by the fan (e.g. rumble or building vibration).   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Excessive HVAC vibration can lead to numerous complaints from building occupants. HVAC vibration issues, in some instances, can be quite complicated to diagnose and correct. A mechanical engineer familiar with HVAC sound and vibration problems may need to be consulted.  |                  |
| No corrosion present on fan and fan casing.   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | A highly corroded fan casing can lead to return air bypassing the ductwork and lead to reduced amount of return air drawn from the occupied spaces. Fan casing corrosion may also be an indication of excess humidity levels within the ductwork.  |                  |
| There are no reports of excessive fan noise in occupied spaces.   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Excessive fan noise can lead to numerous complaints from building occupants. Fan noise and vibration issues, in some instances, can be quite complicated to diagnose and correct. A mechanical engineer familiar with HVAC sound and vibration problems may need to be consulted.  |                  |
| <b>Supply Duct</b>  |                          |                          |                          |                          |  |                  |
| General cleanliness of supply ductwork is acceptable.<br><br>Supply ductwork has been cleaned?<br><input type="checkbox"/> Yes<br><input type="checkbox"/> No | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Things to look for are dust, mold (microbial) and water accumulations in the ductwork which indicate potential problems with the air-handling unit. Standard galvanized ductwork should be cleaned every 20 to 30 years. Cleaning ductwork lined with fibrous glass on the inside is very difficult and should always be approached with caution. This type of ductwork collects dirt very effectively and normally within 10 to 20 years will need to be professionally cleaned and coated or replaced. |                  |

| Component   | OK                       | Needs Attention          | Not Applicable           | Not Inspected            | Comments   | Completed (date) |
|---|--------------------------|--------------------------|--------------------------|--------------------------|--|------------------|
| Supply ductwork is sealed with no leaks.  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Ductwork air leaks will lead to a reduction of supply air delivered to the occupied space.   |                  |
| Fire dampers are open.  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Closed fire dampers will shut off all supply air downstream of the damper.   |                  |
| All access doors and panels close and seal properly.  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Open access doors/panels will lead to supply air bypassing the ductwork and lead to a reduction of supply air quantity delivered to the occupied space.  |                  |
| Internal duct insulation is intact and in good condition.   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | This type of ductwork collects dirt very effectively and normally within 10 to 20 years will need to be professionally cleaned and coated or replaced.   |                  |
| Internal duct liner within 10 feet of the water sources (cooling coils, humidification wands) has been modified to create a washable surface which is cleaned two times per year. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Any ductwork in areas where the relative humidity is greater than 70 percent has a good potential for undesirable microbe growth, if a suitable site for growth and a food source exists. The suitable site in many ventilation systems is the porous fibrous glass lining 10 feet upstream and all areas downstream of the cooling coils, which the air has to pass by before being distributed throughout the building. The food source is any dust, which travels with the air being circulated in the ventilation system, which collects on the fibrous glass lined ductwork. The microbes grow on the dirt, which has collected on the fibrous glass liner. The interior liners need to be modified within the system. Reference IAQ Guide page 2.14. |                  |
| Flex duct drops are in good condition and connected to diffusers.   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Ductwork leaks will lead to a reduction of supply air quantity delivered to the occupied space.  |                  |
| Supply systems was balanced after original construction.<br><br>Balancing report is available?<br><input type="checkbox"/> Yes<br><input type="checkbox"/> No                     | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Testing and balancing of the HVAC system following construction assures that the system is operating as designed.  |                  |
| Supply systems was balanced after recent renovations?<br><br>Balancing report is available?<br><input type="checkbox"/> Yes<br><input type="checkbox"/> No                        | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | System balancing following a renovation assures that the system continues to function properly after the space or HVAC system is modified.   |                  |

| Component   | OK                       | Needs Attention          | Not Applicable           | Not Inspected            | Comments   | Completed (date) |
|---|--------------------------|--------------------------|--------------------------|--------------------------|--|------------------|
| Short circuiting or other air distribution problems are not apparent.<br>Note location(s)   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Short-circuiting of supply air into the return air system will lead to poor room air exchanges and temperature control problems.   |                  |
| No indication of condensation problems on supply ductwork.  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Water condensing on supply ductwork can be an indication of inadequate insulation and vapor barrier. This situation can lead to water damage of adjacent building material (e.g. ceiling panels).  |                  |
| <b>Fan Coils/Heat Pumps</b>   |                          |                          |                          |                          |  |                  |
| Coils, drain pan, and adjacent areas within two feet of the coils are cleaned at least 2 times per year.                                    | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Debris can build up on the cooling coils (especially on the upstream side of the coils), drain pan, and adjacent surfaces and act as a food source for the microbes. Reference IAQ Guide page 2.14.  |                  |
| Filtration is present and is changed at least three times per year.   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Filters are primarily used to remove particles from the air. For primary system filtration, 25 to 35 percent efficient filters as rated by the ASHRAE Dust Spot Efficiency Test are required. Reference – ASHRAE Standard 52.1-1992 Atmospheric Dust Spot Efficiency Test.   |                  |
| Internal duct liner within 10 feet of the cooling coils has been modified to create a washable surface which is cleaned two times per year. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Any ductwork in areas where the relative humidity is greater than 70 percent has a good potential for undesirable microbe growth, if a suitable site for growth and a food source exists. The suitable site in many ventilation systems is the porous fibrous glass lining 10 feet upstream and all areas downstream of the cooling coils, which the air has to pass by before being distributed throughout the building. The food source is any dust, which travels with the air being circulated in the ventilation system, which collects on the fibrous glass lined ductwork. The microbes grow on the dirt, which has collected on the fibrous glass liner. The interior liners need to be modified within the system. Reference IAQ Guide page 2.14. |                  |
| Condensate pan is clean and drains freely.  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Standing water within drain pans can become a reservoir for fungal and bacterial growth. It is important for drain pans to properly drain during the cooling season. The cause of the insufficient drainage needs to be verified and corrected.  |                  |
| There is no visible evidence of microbial contamination or past water damage within the unit.   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Discoloration is the primary indicator of microbial contamination. Water damage can be indicated by the presence of water lines and rust in/on the duct insulation.  |                  |

| Component   | OK                       | Needs Attention          | Not Applicable           | Not Inspected            | Comments   | Completed (date) |
|---|--------------------------|--------------------------|--------------------------|--------------------------|--|------------------|
| <b>Reheat Coils</b>   |                          |                          |                          |                          |  |                  |
| Coils are accessible for inspection and cleaning.   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Inspection panels are required to periodically inspect and clean the coils.  |                  |
| Coils are clean and are on a scheduled to be cleaned at least once each 10 years.                             | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | It is important to periodically inspect the upstream side of the reheat coils and adjacent ductwork annually. Excess dust and debris build-up can lead to lowered coil efficiency and possibly reduced airflow. Inspection access, then, is necessary to conduct any coil inspection. Reference IAQ Guide page 2.14. |                  |
| Reheat coils are operational during....<br><input type="checkbox"/> Winter<br><input type="checkbox"/> Summer | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Proper humidity and temperature control may require the operation of terminal reheats during the summer.   |                  |
| <b>Terminal Diffusers (supply)</b>  |                          |                          |                          |                          |  |                  |
| Diffusers are clean and unobstructed.   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Diffusers that have been modified by occupants will affect the HVAC system balance causing localized comfort concerns due to drafts and stagnant air.  |                  |
| Diffusers are delivering rated volume.  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Diffusers that are delivering volumes of air not consistent with the design may lead to drafts, noise, or lack of airflow.   |                  |
| Type of diffuser.   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |  |                  |
| <b>Return Air System</b>  |                          |                          |                          |                          |  |                  |
| Return air system is:<br><input type="checkbox"/> open plenum<br><input type="checkbox"/> ducted              | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |  |                  |
| Ceiling tiles are in place and there are no unintentional openings in the return system.                      | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Removed ceiling panels can lead to short-circuiting of supply air. Unintentional openings in the return air plenum can lead to an unbalanced return air system.  |                  |
| Return grilles exist in appropriate locations and are clean.  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Over time, it is not uncommon for dirt and debris to build up on return air grills. Grills should be vacuumed at least annually. Placement of grills to avoid short-circuiting is important.   |                  |

| Component  | OK                       | Needs Attention          | Not Applicable           | Not Inspected            | Comments   | Completed (date) |
|--|--------------------------|--------------------------|--------------------------|--------------------------|--|------------------|
| Noticeable flow of air into return air grills.   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | In a properly functioning system, there will be noticeable flow of air into the grills (visualized with smoke tube).   |                  |
| Transfer ducts exist where necessary (i.e. restrooms).                                 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | A common means to provide a return air path for rooms isolated by firewalls, requires either a return duct system or a transfer duct system.   |                  |
| Fire dampers open.   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Closed fire dampers will lead to a lack of return air.   |                  |
| Return air system balanced after original construction or renovation.                  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | The return air system should be balanced in conjunction with the supply air system following the completion of construction or renovation. Inadequate return air can cause poor temperature control in a zone and reduce air change efficiency.  |                  |
| <b>Room Partitions</b>   |                          |                          |                          |                          |  |                  |
| Gap allowing airflow at top is at least 36 inches.                                     | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Wall dividers, which are used to separate work areas, may also contribute to poor air circulation. Wall dividers used in open bay areas should normally be less than 67 inches tall, and the top of the divider should not be closer than 36 inches to the ceiling. Dividers that are closer than 36 inches to the ceiling tend to interfere with airflow from ceiling air diffusers. Wall dividers over 67 inches tall normally do not improve noise control but do interfere with airflow. Reference - IAQ Guide page 2.4. |                  |
| Gap allowing airflow at bottom is 1-4 inches.  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Wall dividers which are used to separate work areas may also contribute to poor air circulation and become sinks or reservoirs where microorganisms accumulate. The dividers should have a 1 to 4 inch opening at the bottom. Openings at the bottom are desirable to allow air to freely circulate more efficiently. Reference - IAQ Guide page 2.4.  |                  |
| Each isolated room is equipped with a supply and return.                               | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | To maintain adequate outside air exchange rates in mechanically ventilated buildings, each room needs to have a source of supply air and a return air vent.  |                  |
| <b>Outdoor AIR (O.A.) Quantity (check against applicable codes and ASHRAE 62-1989)</b> |                          |                          |                          |                          |  |                  |
| For VAV systems: O.A. is increased as total system airflow is reduced?                 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | To maintain adequate volume of outside air reaching the occupied zone, the outside air amount needs to be increased as the total air volume decreases in a VAV system. A lack of outside air delivered to the occupied zone can result if this does not happen. The VAV system should be evaluated to verify adequate amount of outside air is delivered in all supply air volume conditions.  |                  |

| Component   | OK                       | Needs Attention          | Not Applicable           | Not Inspected            | Comments  | Completed (date) |
|---|--------------------------|--------------------------|--------------------------|--------------------------|---|------------------|
| Spot check for CO <sub>2</sub> is acceptable (<800 ppm).  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Carbon dioxide is commonly used to determine the quantity of outside air introduction into occupied buildings. There are certain requirements that must be met to use CO <sub>2</sub> to determine outside air introduction rates. If CO <sub>2</sub> spot measurements are in excess of 800 ppm, long term CO <sub>2</sub> should be conducted.  |                  |
| <b>Thermostats</b>  |                          |                          |                          |                          |   |                  |
| Operated in continuous "fan on" mode.   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Some thermostats have a fan setting that can be adjusted between Auto and Manual. Set to "Auto", the fans cycle on and off. No outside dilution ventilation would be supplied to the space while the fans are not operating.  |                  |
| Are properly located.   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Poorly located thermostats can lead to temperature control problems and occupant complaints.  |                  |
| Thermostats respond on demand and appear to be functioning properly.                              | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Thermostats should be calibrated periodically.  |                  |
| Setpoints<br>°F (summer)<br>°F (winter)   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |   |                  |
| Space temperature is within acceptable range.   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | In Minnesota the indoor temperatures during the summer within conditioned buildings should be 72 - 76 degrees. Temperatures within the ranges 68 - 72 and 76 - 78 degrees are considered borderline with temperatures over 78 or below 68 unacceptable. In the fall, winter and spring the indoor temperature should be 70 - 74 degrees. Temperatures within the ranges 68 - 70 and 74 - 76 are considered borderline with temperatures below 68 or over 76 unacceptable. |                  |
| Occupants using portable fans?<br><br><input type="checkbox"/> Yes<br><input type="checkbox"/> No | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | The use of portable fans is an indication of employee thermal discomfort.   |                  |
| <b>Humidity</b>   |                          |                          |                          |                          |   |                  |
| Relative Humidity is within acceptable range.   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Indoor relative humidity levels should be maintained within the range of 20 to 50 percent. Elevated humidity levels (>60 percent) may lead to microbial growth.   |                  |
| <b>Stairwells</b>   |                          |                          |                          |                          |   |                  |

| Component   | OK                       | Needs Attention          | Not Applicable           | Not Inspected            | Comments  | Completed (date) |
|---|--------------------------|--------------------------|--------------------------|--------------------------|---|------------------|
| Doors close and latch.  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Stairwells can be a pathway for outdoor and indoor pollutants to migrate through a building (e.g. vehicle exhaust).   |                  |
| No openings allowing uncontrolled airflow.                              | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Typically, it is desirable that occupied spaces be operated at a pressure positive relative to stairwell areas (i.e. air flows from the occupied are into the stairwell). If this is not feasible, it is important that doors are closed and well sealed (floor sweep may need to be installed) to minimize air infiltration to the occupied areas. |                  |
| No noticeable odors are present.  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | The presence of odors in a stairwell suggests that the stairwell is acting as a pathway for distribution of the odors through the building.   |                  |
| Lighting sufficient.  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Refer to MnOSHA standard 5205.0120 for recommended stairwell lighting levels.   |                  |
| <b>Exhaust Fans</b>   |                          |                          |                          |                          |   |                  |
| Laboratories have chemical hoods that are venting outside.              | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |   |                  |
| Kitchens and cafeterias have dedicated exhaust that is venting outside. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |   |                  |
| Occupant cooking areas are equipped with an exhaust fan.                | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Cooking areas not equipped with exhaust ventilation are common sources of complaints (e.g. food odors).   |                  |
| Building has a relief air system.                                       | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | An over pressurized building is evident by exterior doors and stairway doors remaining open.  |                  |
| Building is slightly positively pressurized.                            | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Buildings that are exhausting more air than make-up air introduction  |                  |
| <b>Toilet Exhausts</b>  |                          |                          |                          |                          |   |                  |
| Bathroom's air pressure is slightly negative relative to building?      | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | To prevent bathroom odors from migrating to adjacent occupied spaces, the bathrooms need to be operated under a negative pressure relative to the adjacent areas (i.e. air should flow from the adjacent space into the bathroom, this can be verified by releasing smoke at doors and observing air flow direction).                               |                  |
| Fans are operational during occupied hours.                             | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Bathroom exhaust fans operated in conjunction with the light switch may lead to odor problems in adjacent areas if switch off during periods when not occupied.   |                  |

| Component   | OK                       | Needs Attention          | Not Applicable           | Not Inspected            | Comments   | Completed (date) |
|---|--------------------------|--------------------------|--------------------------|--------------------------|--|------------------|
| Fans exhausting to exterior of building.                          | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Bathroom fans must exhaust air to the building exterior.   |                  |
| Exhaust grilles are clean.  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Dirty exhaust grilles will reduce the efficiency of the exhaust fan and should be cleaned periodically.  |                  |
| Make-up air path or supply air exists.                            | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Exhaust fan efficiency will be reduced if makeup air is not provided to the bathroom.  |                  |
| Volume meets code requirement.                                    | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | The Uniform Building Code requires a minimum of 50 cfm of exhaust for each water closet in toilet rooms. Reference – Volume 1 Uniform Building Code, 1994 ed.  |                  |
| Floor drain traps are wet.  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Floor drains can be a source of sewer gasses if they are not the sealable types and allowed to dry out. As part of a preventative maintenance program, these need to be inspected periodically to verify that they do not dry out. |                  |
| <b>Smoking Lounge Exhaust</b>                                     |                          |                          |                          |                          |  |                  |
| Fans are operational during occupied hours.                       | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Exhaust fans operated in conjunction with the light switch may lead to odor problems in adjacent areas if switch off during periods when not occupied.   |                  |
| Fans exhausting to exterior of building.                          | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Smoking lounge fans must exhaust air to the building exterior.   |                  |
| Exhaust grilles are clean.  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Dirty exhaust grilles will reduce the efficiency of the exhaust fan and should be cleaned periodically.  |                  |
| Make-up air path or supply air exists.                            | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Exhaust fan efficiency will be reduced if makeup air is not provided to the smoking lounge.  |                  |
| Volume meets code requirement.                                    | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ASHRAE 62-1999 requires 60 cfm per person of make-up air.  |                  |
| Room runs negative relative to building?                          | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | To prevent environmental tobacco smoke from migrating to non-designated areas, smoking rooms must be maintained at a pressure lower than adjacent areas.   |                  |
| <b>Copy Room Exhaust</b>  |                          |                          |                          |                          |  |                  |
| Copy room air pressure is slightly negative relative to building? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | A negative pressure within a copy room will help contain odors and heat within the copy room.  |                  |

| Component  | OK                       | Needs Attention          | Not Applicable           | Not Inspected            | Comments  | Completed (date) |
|--|--------------------------|--------------------------|--------------------------|--------------------------|---|------------------|
| Large copiers are vented to plenum or exterior of building.        | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Large copiers can be a source of odors and heat. To alleviate this in a small room, venting the copier exhaust to the outside or the return air plenum can help.  |                  |
| <b>Garage Ventilation</b>  |                          |                          |                          |                          |   |                  |
| Garage air pressure is slightly negative relative to building.     | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | To prevent combustion by-products (e.g. carbon monoxide, oxides of nitrogen, and sulfur oxides) parking garages should be maintained at a negative pressure relative to the building. Refer also to Minnesota Rules 5205.0200 - Garage Ventilation.   |                  |
| <b>Microbial Concerns</b>  |                          |                          |                          |                          |   |                  |
| There have been no water infiltration episodes within 24-48 hours. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Water damaged building materials will commonly result in mold growth if not removed or dried within 24-48 hours. For proper small-scale removal of microbial contaminated materials refer to procedures on the DOER web site.   |                  |
| There are no water stained or discolored ceiling tiles present.    | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Water stained or discolored ceiling tiles may be an indication of fungal growth on the tile. The source of the water needs to be determined and corrected. The ceiling tile should be properly removed and replaced. If obviously fungal contaminated the tile should be removed and placed directly into a garbage bag – the individual performing this work should, at a minimum wear a respirator with an N95 or 100 filter. |                  |
| There are no water stained or discolored ceilings present.         | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Water damaged materials should be inspected for microbial contamination.  |                  |
| There are no water stained or discolored walls present.            | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Water damaged materials should be inspected for microbial contamination.  |                  |
| There are no water stained or discolored carpet present.           | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Water damaged materials should be inspected for microbial contamination.  |                  |
| There are no water stained or discolored stored items present.     | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Water damaged materials should be inspected for microbial contamination.  |                  |
| There is no vinyl wall covering present on exterior walls.         | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Vinyl wall covering can act as a vapor barrier and hold moisture in wall systems leading to potential microbial contamination.  |                  |
| There are no moldy odors present.                                  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Damp, musty, and “moldy” odors are all indicators of mold growth. The mold growth may be visible or it may be hidden.   |                  |

| Component   | OK                       | Needs Attention          | Not Applicable           | Not Inspected            | Comments   | Completed (date) |
|---|--------------------------|--------------------------|--------------------------|--------------------------|--|------------------|
| Exterior walls do not contain moisture?<br>Tested with<br><input type="checkbox"/> probe meter<br><input type="checkbox"/> surface meter                    | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Moisture present in exterior walls can result in microbial contamination. If moisture is suspected, the wall should be evaluated with moisture meters to determine the extent of the water infiltration. The cause of the moisture needs to be determined and corrected.   |                  |
| Occupants report that condensation does not occur on exterior windows during winter.  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Condensation on windows during winter can result in moisture entering the perimeter walls and can result in microbial contamination.   |                  |
| Basement / crawl space dry with no standing water.  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Damp basements and crawl spaces can be sources of microbial growth, which may impact indoor air quality.   |                  |
| Roof intact and not leaking.  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Leaking roofs are a common source of water damage to buildings, resulting in microbial contamination.  |                  |
| Attic space present and in good condition.  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Attic spaces should be inspected for evidence of water leaks and droppings of birds, bats, mice, etc.  |                  |
| Potted plants within building appear to be in good condition and not standing in water and are not a significant source of mold.                            | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Potted plants can contribute to indoor fungal levels. Plants should be repotted periodically. Plants should not be placed in organic containers (wicker) and left standing in water.   |                  |
| <b>Lighting</b>   |                          |                          |                          |                          |  |                  |
| Lighting levels are appropriate for tasks.<br><input type="checkbox"/> direct<br><input type="checkbox"/> indirect  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Levels of illumination should match the amount needed for the tasks conducted. In general office environments, lighting should be supplied within the range of <u>20</u> to <u>50</u> foot-candle power at desk level. In areas where VDT use is the predominant task (over 50 percent time), overhead lighting of <u>20</u> to <u>30</u> foot-candle power at desk level is to be provided. |                  |
| Bulb color/temp rating<br><input type="checkbox"/> 3000<br><input type="checkbox"/> 3500<br><input type="checkbox"/> 4100<br><input type="checkbox"/> _____ | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |  |                  |
| Light diffusers provide good dispersion of light.   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |  |                  |

| Component  | OK                       | Needs Attention          | Not Applicable           | Not Inspected            | Comments   | Completed (date) |
|--|--------------------------|--------------------------|--------------------------|--------------------------|--|------------------|
| Task lighting available and used   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | In areas where ambient light levels are lowered for computer use, task lighting should be available for workers to read hard copy.   |                  |
| Outdoor lighting present<br><br><input type="checkbox"/> yes<br><input type="checkbox"/> no  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |  |                  |
| Window treatments (blinds, shades) available and useable.                                    | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | In areas where VDT use is the dominant task, lower illumination is recommended. Also, glare on computer monitors may lead to eyestrain. Thus, in areas where computers are located adjacent to windows, the ability to reduce lighting levels with window treatments is desirable.       |                  |
| <b>Acoustics</b>   |                          |                          |                          |                          |  |                  |
| Ambient noise levels are acceptable and not reported to be a concern by occupants.           | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |  |                  |
| Excessive HVAC noise is not present.   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Excessive fan noise can lead to numerous complaints from building occupants. Fan noise and vibration issues, in some instances, can be quite complicated to diagnose and correct. A mechanical engineer familiar with HVAC sound and vibration problems may need to be consulted.        |                  |
| White noise used in building.<br><input type="checkbox"/> yes<br><input type="checkbox"/> no | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | White noise can help to mask conversations in open office areas.   |                  |
| <b>Employee Work Stations</b>  |                          |                          |                          |                          |  |                  |
| Multi user workstations and chairs are adjustable.   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | If a workstation is to be used by multiple individuals, it is important that the workstation and seating are adjustable to meet the needs of the various users.  |                  |
| Single user workstations and chairs are adjusted to the user.                                | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Reference DOER web site:<br><a href="http://www.doer.state.mn.us/ei-safih/Ergon/measur2.htm">http://www.doer.state.mn.us/ei-safih/Ergon/measur2.htm</a><br><a href="http://www.doer.state.mn.us/ei-safih/Ergon/chairadj.htm">http://www.doer.state.mn.us/ei-safih/Ergon/chairadj.htm</a> |                  |
| Site has established a formal ergonomics program.  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | An effective ergonomic program can improve employee productively, reduce injuries, and increase morale.  |                  |
| Employees have received basic ergonomic training.  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Basic training covering risk factor identification and controls should be incorporated into employee training.   |                  |

| Component   | OK                       | Needs Attention          | Not Applicable           | Not Inspected            | Comments   | Completed (date) |
|---|--------------------------|--------------------------|--------------------------|--------------------------|--|------------------|
| Lighting levels appropriate for tasks being performed. (see lighting section)   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Levels of illumination should match the amount needed for the tasks conducted. In general office environments, lighting should be supplied within the range of <u>20</u> to <u>50</u> foot-candle power at desk level. In areas where VDT use is the predominant task (over 50 percent time), overhead lighting of <u>20</u> to <u>30</u> foot-candle power at desk level is to be provided.   |                  |
| Employees responsible for material handling have received back safety and lifting training.   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Training on back safety and proper lifting techniques will reduce the risk of injury.  |                  |
| <b>House Keeping</b>  |                          |                          |                          |                          |  |                  |
| Scheduled service exists.   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |  |                  |
| Vacuums are equipped with high efficiency filtration.   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Vacuums equipped with HEPA final filtration are the most desirable types to be used. Vacuums with a minimum efficiency rating of 90 percent for 1 micron sized particles are the minimum rating that should be used. Reference IAQ Guide page 2.3.   |                  |
| Occupant floor space is clear of clutter.   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | For housekeeping staff to effectively clean areas, the occupants need to keep their immediate floor space free of clutter.   |                  |
| Occupants clean work stations at least monthly.   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | It is the policy in many offices that housekeeping will not clean personal desk/workstation spaces. It is the occupants responsibility to clean these areas and the agency to supply appropriate cleaning materials.   |                  |
| Deep cleaning of carpet based on schedule and area use.<br>type of cleaning:<br><input type="checkbox"/> "steam"<br><input type="checkbox"/> hot water extraction<br><input type="checkbox"/> dry clean | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |  |                  |
| Entry mats being used.  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | At entrances to buildings, nonporous surfaces covered with properly selected entry mats are recommended. Entry mats are needed to collect or adsorb soil and moisture from people's shoes, when they enter the building. The number and type of mats will vary depending on the volume of traffic into and out of the building. Entry mats to collect or absorb soil and moisture are placed prior to carpeted areas in entries of buildings and not on top of carpet. |                  |

| Component  | OK                       | Needs Attention          | Not Applicable           | Not Inspected            | Comments  | Completed (date) |
|--|--------------------------|--------------------------|--------------------------|--------------------------|---|------------------|
| High traffic areas vacuumed daily.                                 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Daily vacuuming of high traffic areas should be incorporated into the cleaning schedule.  |                  |
| Wall to wall vacuuming occurring at least weekly.                  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Weekly wall to wall vacuuming should be incorporated into the cleaning schedule.  |                  |
| Supplies available to employees to immediately clean stains.       | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |   |                  |
| Upholstered furniture vacuumed/cleaned at least annually.          | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Upholstered furniture may become sinks or reservoirs where general dust and microorganisms accumulate. At a minimum this furniture needs to be vacuumed with high quality equipment at least annually.                                  |                  |
| Fleecy cubical walls vacuumed at east annually.                    | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Wall dividers that are used to separate work areas may become sinks or reservoirs where general dust and microorganisms accumulate. At a minimum these wall dividers need to be vacuumed with high quality equipment at least annually. |                  |
| General area dusting by housekeeping is occurring at least weekly. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |   |                  |
| Air supply vents are being vacuumed at least annually.             | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |   |                  |
| Recycling services available at site.                              | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |   |                  |
| Trash receptacles emptied daily.                                   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Trash receptacles can be a source of odors and microbials if not emptied daily.   |                  |

\* This Indoor Environmental Checklist was adapted from the State of Minnesota and EPA/NIOSH Building Air Quality Guides.