



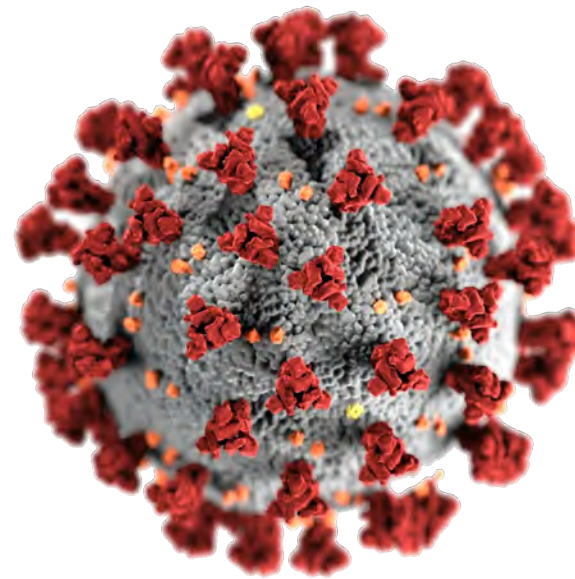
READY, SET, COVID BREAKOUT SESSIONS: FACILITIES

A Playbook for Reopening Minnesota's Schools
July 21, 2020 from 8:00 a.m. – 9:00 a.m.



Introduction from Arif

- What do we know now? **What's changed?**
- The “**why**” **behind the playbook**
- Webinar and speaker(s) **introduction**
- Breakout **session content**
- **Q&A**



Ready, Set, COVID: Facilities

Physical Space Re-Organization and Infrastructure Modification Considerations



Our Speakers on Facilities



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Introduction:

Schools will undoubtedly need to re-think their day-to-day operations in order to adhere to public health guidance in the wake of COVID-19. Nearly every aspect of daily operations will need to be carefully examined to determine the appropriate steps and modifications to be taken based on the unique circumstances within each individual District and facility. From physical distancing protocols and transportation considerations to if/how meals will be served will all need to be considered.

All of these elements will ultimately have implications on staffing and other costs.

It is our recommendation that districts consider the merit of each individual component of information included in this document based on the unique characteristics of its current situation. A benefit analysis should be conducted for each element based on factors such as cost, impact on health and wellness, time/feasibility, operational impact, and educational impact to determine whether or not a specific strategy or consideration is prudent for the district to implement.



General Recommendations

- Consider installation of **hand sanitizing stations at each classroom** along with the typical locations (i.e. toilet rooms, etc.)
- Consider **removal of all soft seating** (non-vinyl/cleanable fabric) from the building
- Consider **replacement/transition to use of hard surface (VCT, LVT, rubber, etc.)** and/or cleanable floor, wall, and ceiling finishes (vinyl-coated ceiling tiles)
- Consider replacement/transition to use of **touchless towel, paper dispensers, sinks, urinals, and toilets**
- Consider **discontinuing use of student lockers and shared storage areas**



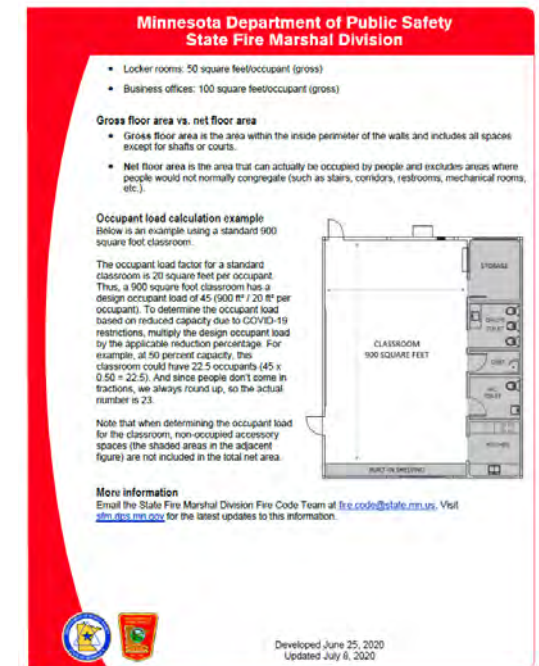
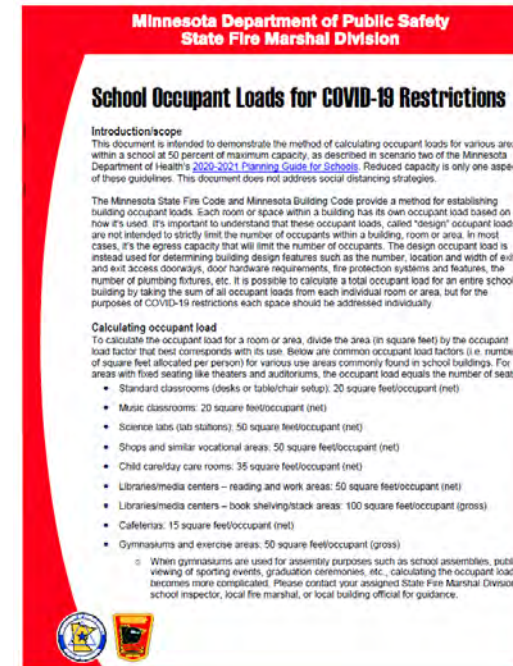
General Recommendations

- Consider **cancelling or modifying classes** where students are likely to be in very close contact such as gym, choir, music, etc. Utilize outdoor spaces when weather permits to conduct these activities
- Consider **discontinuing use of communal use shared spaces** such as cafeterias and playgrounds with shared playground equipment if possible
- Consider **cancelling field trips, assemblies, and other large gatherings**
- Consider **cancelling or limiting cross-school transfer for special programs** such as academic clubs, activities, athletics, etc.
- Consider **installation of UVC/HEPA filtration units** in normally occupied spaces and/or where insufficient ventilation systems exist



COVID-19 School Occupant Loads

- The MN State Fire Code and Minnesota Building Code provide a method for **establishing building occupant loads within a school at 50% capacity**
- **Egress capacity** will limit number of occupants in most cases
- Occupant loads recommended to be **calculated for each space in building** (different for classroom vs. cafeteria)
- Gross floor area vs. net floor area



Indoor Educational + Shared Spaces

- Rearrange student desks/tables to **maximize the space between students to reduce transmission**. Turn desks/tables to face in the same direction and consider an alternating grid so that the back of the student's head isn't directly in front of the student behind them.
- Consider **utilizing large spaces** (gyms, student dining, field houses, auditoriums) to get as many kids into the building while social distancing (similar to ACT/SAT testing).
 - Utilize existing **gym dividers** (if available) to sub-divide spaces to better manage class size/type
 - **Mark out the floors** in these spaces to direct circulation paths
 - **Create shields at groups of doors** that separate entrances/exits where managing one-way traffic in corridors is feasible to further minimize contact





Indoor Educational + Shared Spaces

- Install **physical barriers, such as sneeze guards and partitions**, particularly in areas where it's difficult for individuals to remain at least 6 feet apart such as reception/administrative
 - **Create a transparent barrier (much like the plexiglass being used at gas stations, grocery stores, etc.) with transaction window/slot**
 - Any transfer of forms/ID/other items are passed through the slot, minimizing transmission
 - Utilize security intercom/video to streamline purpose of visit and minimize physical contact – provide a drop box and/or pick-up area at vestibule for anticipated or scheduled visits
 - **Place visitor management systems at kiosk station to minimize contact between visitors and office personnel**
 - Provide hand sanitizer/alcohol wipes at stations so visitors can wipe down their license and hands after utilizing
 - **Place physical guides, such as tape or vinyl dots in waiting areas to assist queuing of visitors with social distancing**

Indoor Educational + Shared Spaces

- **Discourage sharing of items and educational objects** that are difficult to clean or disinfect
- Keep each **child's belongings separated** from others and in individually labeled containers, cubbies, or areas
- Ensure **adequate supplies to minimize sharing of high-touch materials** to the extent possible (e.g., assigning each student their own art supplies, equipment) or limit use of supplies and equipment by one group of children at a time and clean and disinfect between use
- **Avoid sharing** electronic devices, toys, books, and other games or learning aids



Food Service

- Consider having students **bring their own meals as feasible or serve individually-plated meals** in classrooms instead of in cafeteria.
- Install hand sanitizing stations prior to going through the line if the cafeteria is used
- Use **disposable food service items** (e.g., utensils, dishes). If disposable items are not feasible or desirable, ensure that all non-disposable food service items are handled with gloves and washed with dish soap and hot water or in a dishwasher.
- Individuals should **wash their hands** after removing their gloves or after directly handling used food service items.
- If food is offered at any event, **have pre-packaged boxes or bags** for each attendee instead of a buffet or family-style meal. Avoid sharing food and utensils.





Occupant Flow: Arrival/Dismissal

- **Avoid mixing students in common areas**
 - For example, **allow students to eat lunch and breakfast in their classrooms** rather than mixing in the cafeteria
 - If you can't suspend the use of common areas, try to **limit the extent to which students mix with each other**, and particularly with students from other classes
 - **Restrict hallway use** through homeroom stays or staggered release of classes
 - Try to **avoid taking multiple classes to bathrooms at once**
 - In child care or elementary school settings, consider **staggering playground use** rather than allowing multiple classes to play together, and limit other activities where multiple classes interact.
- **Stagger arrival and/or dismissal times**
 - These approaches can limit the amount of close contact between students in high-traffic situations and times.

Administrative Office/Staff Spaces

- **Reduce congestion in the health/nurse's office**
 - For example, use the health office for children with flu-like symptoms and a satellite location for first aid or medication distribution.
 - If Nurse's area allows, build a containment room with a cot to isolate a student that is exhibiting flu-like symptoms or is running a high fever.
 - If space does not allow, designate a conference room to serve this use to keep the student(s) isolate.
- **Limit nonessential visitors**
 - Limit the presence of volunteers for classroom activities, mystery readers, cafeteria support, and other activities.



Plumbing + Water Systems

- Consider replacement/transition to use of **touchless faucets and flush valves on all plumbing fixtures.**
- Consider **discontinuing use of drinking fountains** or other shared water dispensers.
 - Encourage staff and students to bring their own water or provide single use bottled water.
- Consider **adding physical barriers**, such as plastic flexible screens, between bathroom sinks especially when they cannot be at least 6 feet apart.





HVAC Systems - Introduction

- **Changes to building operations, including the operation of HVAC systems, can reduce airborne exposure.**
 - There is broad variation of complexity, flexibility, and age in HVAC equipment, systems, controls and Building Automation Systems (BAS) in educational facilities.
- **This guidance has been formulated to help designers retrofit and plan for the improvement of indoor air quality (IAQ) and to slow the transmission of viruses via the HVAC systems.**
 - The underlying effort of the designer should be to increase outside air to the spaces, treat return air and or supply air to spaces via mechanical filtration and maintain indoor comfort as defined by the design temperature and relative humidity.
- **Modifications and adjustments to existing HVAC systems can result in negative impacts and issues within your facilities.**
 - We recommend that any changes to HVAC systems currently serving your facilities be reviewed and approved by a qualified engineer or HVAC systems professional prior to being implemented.

HVAC Systems

- **Basically, there are three (3) choices when it comes to preparing your HVAC systems to deal with COVID:**
 - Modify and adjust how the current system is being operated and controlled.
 - Enhance the current system by physically adding components and/or capabilities (i.e. improved filtration, more capacity, etc.)
 - Supplement operation and capabilities of the existing system by adding an additional system/equipment to serve the same spaces being served by the existing system (i.e. portable equipment, stand-alone air filtration units, etc.)



HVAC Systems



The screenshot shows the ASHRAE Epidemic Task Force Schools & Universities webpage. The header features the ASHRAE logo, the title 'ASHRAE EPIDEMIC TASK FORCE SCHOOLS & UNIVERSITIES', and the date 'Updated 7-17-2020'. The background image shows a classroom with students and a green virus icon with a book inside. The main content is organized into several sections with blue links:

- Introduction**
 - [Determining Building Readiness](#)
 - [Summer Checklist for Fall Classes](#)
 - [Startup Checklist for HVAC Systems Prior to Occupancy](#)
- Equipment & System Specific Checks & Verifications During Academic Year**
 - [Cleaning & Air Flush](#)
 - [Boilers](#)
 - [Chilled, Hot & Condenser Water Systems](#)
 - [Air Cooled Chillers](#)
 - [Water Cooled Chillers](#)
 - [Cooling Towers & Evaporative-Cooled Devices](#)
 - [Steam Distribution Systems](#)
 - [HVAC Water Distribution Systems](#)
 - [Pumps](#)
 - [Air Handling Units](#)
 - [Roof Top Units](#)
 - [Unitary & Single Zone Equipment](#)
- New/Modified Facility Design Recommendations**
 - [Introduction](#)
 - [Designer Guidelines – General School](#)
 - [Nurses Office – General Requirements](#)
- Filtration Upgrades**
 - [Introduction](#)
 - [Filtration Basics](#)
 - [Filtration Target Level](#)
 - [Information Gathering Stage](#)
 - [Data Analysis & Review](#)
 - [Implementation & Considerations](#)
- Operation of Occupied Facilities**
 - [Controlling Infection Outbreak in School Facilities](#)
- Higher Education Facilities**
 - [Student Health Facilities](#)
 - [Laboratories](#)
 - [Athletic Facilities](#)
 - [Residence Facilities](#)
 - [Large Assembly](#)

At the bottom, there is a 'QUESTIONS?' link with the email 'COVID-19@ashrae.org' and the website 'www.ashrae.org/covid19'.



**ASHRAE Epidemic Task
Force for Schools &
Universities:**

<https://bit.ly/30tMv0N>

HVAC Systems

Formulas to Determine % OSA and Minimum Position Control

$$\frac{\text{Return Air Temperature} - \text{Mixed Air Temperature}}{\text{Return Air Temperature} - \text{Outdoor Air Temperature}} \times 100\% = \text{Volume (\%) of Outside Air}$$

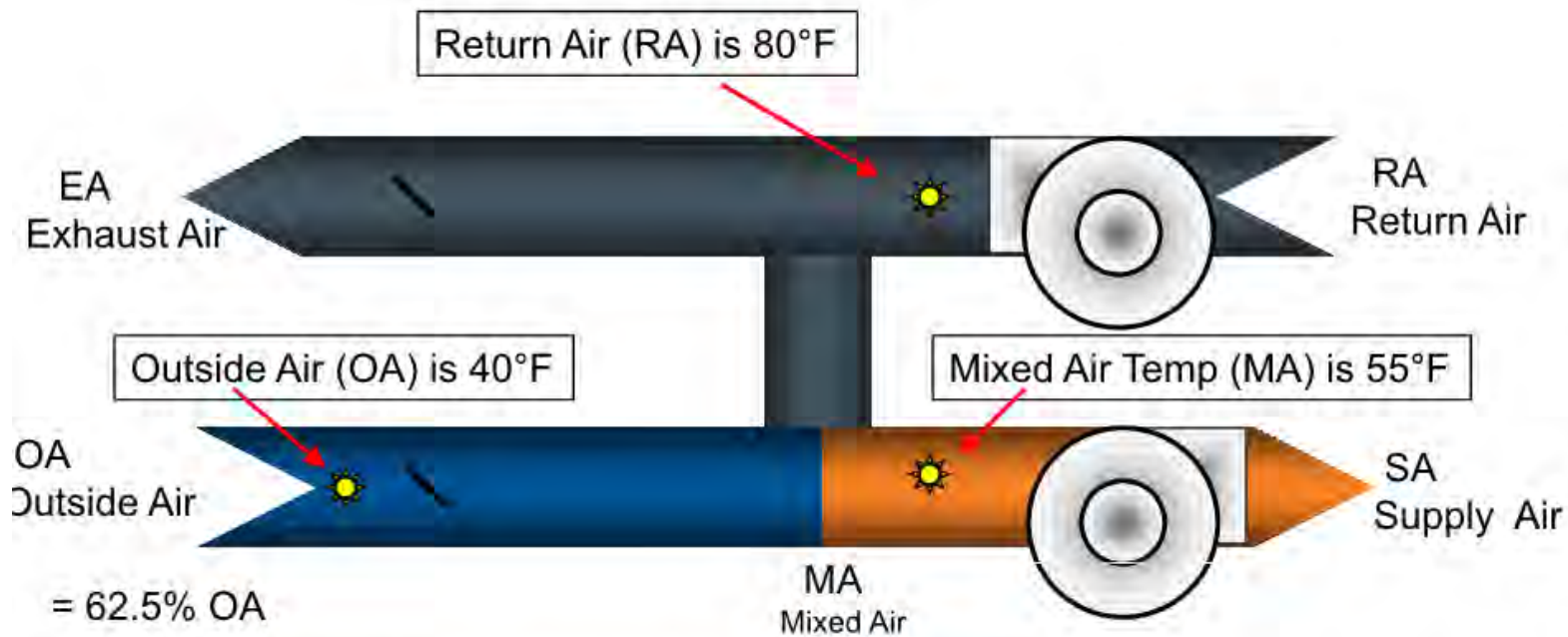
Formula for Calculating the Percentage of Outside Air in an Air Handler from Measured Temperature

$$\left[\text{Return Air Temperature} \times \frac{\% \text{ of Return Air}}{100} \right] + \left[\text{Outside Air Temperature} \times \frac{\% \text{ of Outside Air}}{100} \right] = \text{Temperature of Mixed Air}$$

Formula for Adjusting the Minimum Position Control.


$$\% \text{ Return Air} = (100 - \% \text{ Outside Air})$$

HVAC Systems



Using the Outside Air Equation to determine % of OA

$$\% \text{ OA} = \frac{T_{ra} 80^{\circ}\text{F} - T_{ma} 55^{\circ}\text{F}}{T_{ra} 80^{\circ}\text{F} - T_{oa} 40^{\circ}\text{F}} \times 100 = \frac{80^{\circ}\text{F} - 55^{\circ}\text{F}}{80^{\circ}\text{F} - 40^{\circ}\text{F}} = 62.5\% \text{ OA}$$

 Temperature Sensor



HVAC Systems

- **Perform initial air flush of all spaces prior to occupants re-entering building for the school year**
 - Mechanical systems should operate in occupied mode for minimum period of one week prior to students returning (may be completed at same time as teachers start returning to building) while assuring the outside air dampers are open.
- **Daily air flush prior to occupancy**
 - Mechanical Systems should be operated in occupied mode (including normal or peak outside air rate introduced to each space) for minimum period of 2 hours prior to occupants re-entering building.
- Follow current **ASHRAE 62 or local ventilation standards** for minimum outside air requirements
- For existing AHU's, **increase outside air to maximum allowable per Air Handling Unit (AHU)** without compromising indoor thermal comfort and humidity levels.
- For Dedicated Outdoor Air Systems (DOAS), **increase airflows to at least 150% of code minimum** flow where possible.



HVAC Systems

- Consider introducing **portable, all electric HEPA/UV air filtration units** in each classroom
- Operate **exhaust fans 24/7** and **run DOAS systems as make-up air** with the goal of flushing the building with OA and positively pressurize the building
- If approved by your engineer or ASHRAE professional, consider **turning off Energy Recovery Wheels** for systems with rotary energy recovery wheels to limit cross contamination at the wheel (Enthalpy and Sensible wheels)
- Check and fix **economizer dampers and controls and maximize the economizer operation** when possible (favorable outdoor conditions and outdoor air pollution)
- Check, fix and modify **control sequences in VAV systems** to avoid outdoor air flow/minimum OA air flow shortage



HVAC Systems

- In VAV systems, **maximize the total supply air flow in each VAV terminal** when the system is in full economizer mode
- **Minimize the unit air recirculation** to minimize zones cross contamination thru the return air system
- Consider **installation of UV/C lights, ionization in AHU's**
- Consider **isolating the ventilation system that serves the nurse's area** to eliminate cross-contamination with any other spaces. If that isn't practical, consider relocating the nurse's area to a space that is served by a dedicated system

We recommend that any changes to HVAC systems currently serving your facilities be reviewed and approved by a qualified engineer or HVAC systems professional prior to being implemented



Next Steps

- **PowerPoint slides, webinar recordings, and more** are available on our [website](#) and more will be available in the coming months
- **Monthly updates through December from districts discussing reopening schools topics including:**
 - Challenges of reopening
 - What's gone well?
 - What hasn't gone well?
 - What processes have been implemented?
 - How has your plan changed?
 - Any lessons learned?
- Combined **links/resources available** at the end of the presentation



Q&A



Thank You for Your Time!

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Presentation Resources

- **School Occupant Loads**
 - [MN Department of Public Safety School Occupant Loads for COVID-19 Restrictions](#)
- **MN Department of Health**
 - [2020-2021 Planning Guide for Schools](#)
- **Technical Resources**
 - [ASHRAE 62.1 Guidelines](#)
 - [ASHRAE Epidemic Task Force for Schools & Universities](#)
- **ICS Resources**
 - [Reopening Schools](#)