smartIAQ™

IAQP & Standard 241

Indoor Air Quality, Outdoor Air, and Control of Infectious Aerosols

Potentially counterintuitive given recommended ventilation system design during the pandemic, it is possible to achieve Standard 241 equivalent clean airflow (ECAi) objectives while also reducing outdoor air under the Indoor Air Quality Procedure. Achieving both at the same time relies on system design with air cleaning and filtration as proven by ASHRAE standards 52.2 and the 241 Appendix A Testing Procedure.

The following example illustrates an approach. Under 241 a classroom has a target ECAi of 40cfm/person. In this example, the room is 950ft² and ventilation is sized for 25 people. In the "Existing" space **[1]**, designed to the V.R.P., the AHU is fed with 450cfm of O.A. and cleans recirculated air with a MERV8 filter. This configuration provides an ECAi of 18cfm/person. Boosting the AHU's filter to a MERV11 **[2]** delivers ECAi of 38cfm, below the target.

Alternatively, applying the IAQP via smartIAQ **[3]** to the same classroom with MERV11 filter in the AHU delivers an ECAi of 46.6cfm. A passing score. This works because smartIAQ's filtration is rated to MERV13A (77% removal value under 241) with 500cfm of capacity delivering 385cfm of equivalent clean air. By lowering O.A. the additional recycled air to the AHU with MERV11 boosts the VECAi via filtration to 630cfm.

Another alternative is using smartIAQ **[4]** under the IAQP across two zones (far right column). In this case, the on board filtration is boosted to a HEPA filter, with a 99% removal value under Standard 241. This provides 250cfm of ECAi into each room achieving 41.2cfm of equivalent clean air, a passing score.

		[1]	[2]	[3]	[4]
Phase of the Process		**Assessment**	**Planning**	**Planning**	**Planning**
Name of Space / AHU / Building	**Units**	**EXISTING**	**MERV 11**	**IAQP SmartIAQ**	**IAQP 1/2 smartIAQ**
Description of system or Option		Dedicated AHU	Dedicated AHU	Description	Description
Space Type from Standard 241	Type	Classroom	Classroom	Classroom	Classroom
Target ECAi from Standard 241 (See Instructions for Table)	CFM / Person	40	40	40	40
Area	Sq Ft	950	950	950	950
Average Ceiling Height	Ft	9	9	9	9
Volume	Cu Ft	8,550	8,550	8,550	8,550
Total Supply Air	CFM	1,200	1,200	1,200	1,200
Total Outdoor Air (6-1) (div by 0.75)	CFM	450	450	150	150
Occupancy - Design (Pz)	Quantity	25	25	25	25
Occupancy - IRMM Target ($P_{z,IRMM}$)	Quantity	25	25	25	25
$V_{ECAi,t,Des}$ Airflow Target - Design Occupancy	CFM	1200	1200	1200	1200
$V_{ECAi,t,IRMM}$ Airflow Target - IRMM Target Occ.	CFM	1200	1200	1200	1200
Central AHU Filter MERV Rating	MERV	8	11	11	11
Method for Rating Filter	241 or DNFE	241	241	241	241
Filter Pathogen Removal Efficiency	εPR	0.0%	60.0%	60.0%	60.0%
UV in HVAC - Single Pass Inactivation	%	0.0%	0.00%	0.00%	0.00%
Air Treatment in HVAC (Impacts Space)	CFM	0	0	0	0
Air Treatment Device in Space	CADR	0	0	385	250
Number of Air Treatment Devices in Space	Quantity	0	0	1	1
In Room UV	CFM	0	0	0	0
Number of In Room UV Type	Quantity	0	0	0	0
In Room Air Cleaner (Fan Filter Type)	CADR	0	0	0	0
Number of In Room Air Cleaners (Fan Filter type)	Quantity	0	0	0	0
Equivalent Clean Air per Technology					
Outdoor Air	CFM	450.0	450.0	150.0	150.0
$V_{ECAi,filter}$	CFM	0.0	450.0	630.0	630.0
$V_{ECAi,uv,hvac}$	CFM	0	0	0	0
$V_{ECAi,rac,hvac}$	CFM	0	0	0	0
$V_{ECAi,rac,space}$	CFM	0	0.0	385.0	250.0
$V_{ECAi,irac,uv}$	CFM	0	0.0	0.0	0.0
$V_{ECAi,irac,fanfilter}$	CFM	0	0.0	0.0	0.0
Total Equivalent Clean Air	CFM	450	900	1165	1030
Occupancy Count Method (Design or IRMM)	Method	IRMM	IRMM	IRMM	IRMM
ECAi Provided by the Option	**CFM / person**	**18.0**	**36.0**	**46.6**	**41.2**
DOES THIS SYSTEM MEET ECAi TARGET	Pass / Fail	**FAIL**	**FAIL**	PASS	PASS

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