Standard for Caltech campus HVAC systems

Building type	Chemicals present	Minimum outside air flow rates*	Single pass ventilation	Air recirculation allowed	Pre-filtration MERV rating	Final filtration MERV rating
Wet Laboratories with fume hoods	yes	6 ACPH	yes	no	8	13
Wet Laboratories without fume hoods	yes	6 ACPH	yes	no	8	13
Dry labs without chemicals	no	15 CFM per occupant (this number is often exceeded to gain additional occupant comfort)	no	yes	8	13
Computational, laser, optics and microscopy labs	no		no	yes	8	13
Offices and administrative areas	no		varies	yes	8	11
Vivaria	no	10-15 ACPH	yes	no	8	13

ACPH= Air Changes Per Hour , CFM=Cubic Feet Per Minute, MERV = Minimum Efficiency Reporting Value

*Minimum ventilation rates are dictated by California Building Code and California Energy Code.

*The need for makeup air and pressurization also affects the ventilation rate.

Filter MERV ratings based on 2018 ANSI/ASHRAE 52.2 standards as compiled by Air Quality Engineering Inc.

MERV (Minimum Efficiency Reporting Value)	Composite Average Particle Size Efficiency, % in size, µm			Average Arrestance, %	Size of Contaminant that can be captured
	0.3-1.0	1.0-3.0	3.0-10.0		
1	-	-	20% or better	65% or Less	Lint Pollen Bugs Sanding Dust
2	-	-	20% or better	65% - 69%	
3	-	-	20% or better	70% - 74%	
4	-	-	20% or better	75% or Greater	
5	-	-	20% - 34%	-	Cement Dust Mold Spores Gelatin Powder
6	-	-	35% - 49%	-	
7	-	-	50% - 69%	-	
8	-	20% or better	70% or better	-	
9	-	35% or better	75% or better	-	Milled Flour Auto Emissions Welding Fumes
10	-	50% - 64%	80% or better	-	
11	20% or better	65% - 79%	85% or better	-	
12	35% or better	80% or better	90% or better	-	
13	50% or better	85% or better	90% or better	-	Bacteria Tobacco Smoke Talcum Dust
14	75% - 84%	90% or better	95% or better	-	
15	85% - 94%	90% or better	95% or better	-	
16	95% or better	95% or better	95% or better	-	