

Covid Safe Space IAQ calculator and “Is My Space Safe” Series

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Vice President, Build Equinox

The Covid Safe Space IAQ calculator has been constructed as a design tool and communication platform to help groups create Covid Safe Spaces. Beyond our immediate concern of developing Covid Safe Spaces is the more permanent need to establish truly healthy indoor environments. A Covid Safe Space should not be a temporary adjustment to the operation of an indoor environment. It is the way all indoor environments should be operated.

The “IAQ” aspect of the calculator’s second worksheet determines our dissatisfaction with indoor air quality, sick days we experience from seasonal colds and influenza viruses, and air quality impact to our cognition and work productivity. Covid Safe Space indoor environments also provide insurance against future pandemics by retarding the spread of new contagions. We need to change today’s indoor virus incubators to virus inhibitors.

What is the cost of improving indoor ventilation in cold northern or hot, humid climates? The calculator’s third worksheet provides energy and cost information for ventilation systems. The energy and cost worksheet emphasizes a “per hour per person” viewpoint. From this viewpoint, one finds that the cost to improve indoor environments is a penny or so per hour per person in comparison to a human health and productivity gains worth several times this amount.

A series of informational and educational YouTube videos provide background and usage examples for the Covid Safe Space IAQ calculator. Five categories of videos are available (see the attached figures with active links). The five instructional video categories are: Getting Started, Special Topics, “Is My Space Safe”, “Is My Space Healthy”, and “Is My Space Energy and Cost Efficient” videos. Bold items have links to online videos. Unlinked items are in process and will be posted as they are developed. The video list will continue to grow, and your input and ideas are requested to help guide our efforts.

Download a Google sheets copy of the [Covid Safe Space IAQ calculator here](#). For those who would like additional background and understanding of the calculator, read our report, “[Indoor SARS-CoV-2 Herd Immunity and Infection Probability Estimates Based on Ventilation, Vaccination, Infections and Face Masks](#)”.

Questions, Comments and Criticism are appreciated and can be directed to Ty at:

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Getting Started

Covid Safe Space IAQ calculator
Introduction
By Newell, Ph.D., PE, Build Equinox, University of Illinois

The slide features a central diagram of a house with 'EQUINOX' written on the roof. Inside the house, there are icons for 'Ventilation', 'Filtration', and 'Humidity Control'. Below the house, there are icons for 'People' and 'Air'. To the left of the house, there is a list of 'Inputs' including: Room Volume, Occupancy, Outdoor Air, Filtration Efficiency, Humidity Control, and Ventilation Rate. To the right of the house, there is a list of 'Outputs' including: IAQ, Humidity, and Ventilation. Below the diagram, there is a red box with the text: 'Find conditions that reduce risk to a target level. Includes: Mechanical, Natural, and Hybrid Ventilation. Includes: Filtration, Humidity Control, and Humidity Control. Includes: Mechanical, Natural, and Hybrid Ventilation. Includes: Filtration, Humidity Control, and Humidity Control.' Below the red box, there is a list of 'Find conditions that reduce risk to a target level' including: Mechanical, Natural, and Hybrid Ventilation. Includes: Filtration, Humidity Control, and Humidity Control. Includes: Mechanical, Natural, and Hybrid Ventilation. Includes: Filtration, Humidity Control, and Humidity Control.

[Introduction](#)

Covid Safe Space IAQ calculator
Background
By Newell, Ph.D., PE, Build Equinox, University of Illinois

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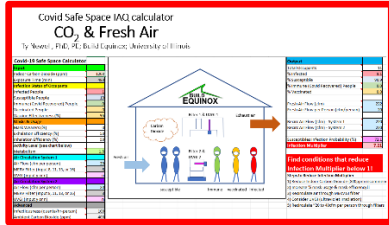
[Background](#)

Covid Safe Space IAQ calculator
Calculator Use
By Newell, Ph.D., PE, Build Equinox, University of Illinois

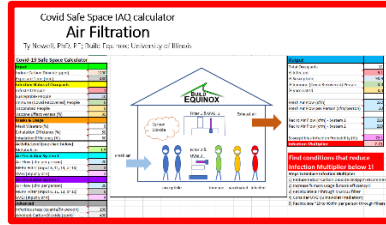
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[Calculator Use](#)

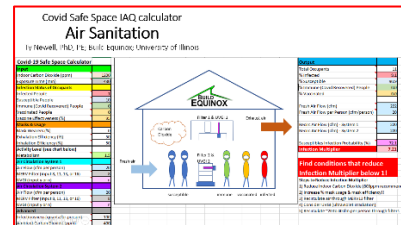
Special Topics: Covid Safe; Healthy Indoors; Energy & Cost Efficiencies



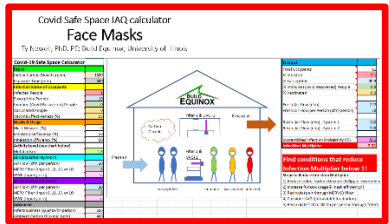
CO₂ & Fresh Air



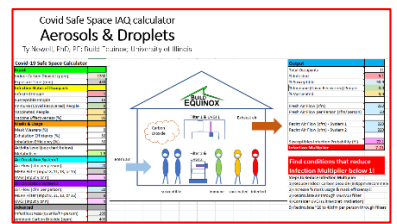
Air Filtration



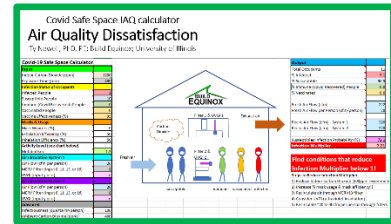
Air Sanitation (UVGI)



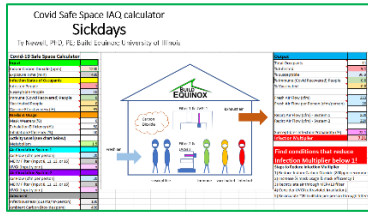
Face Masks



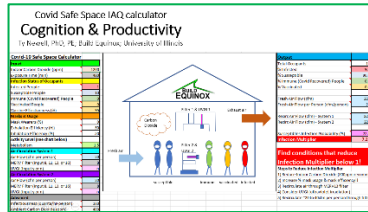
Aerosols & Droplets



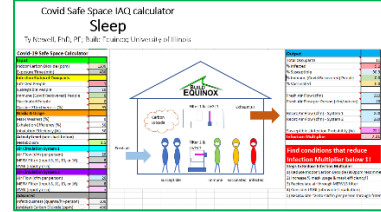
Air Quality Dissatisfaction



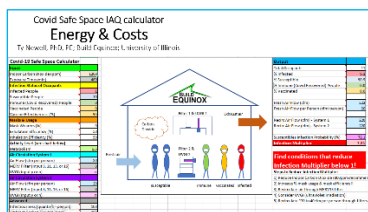
Sickdays



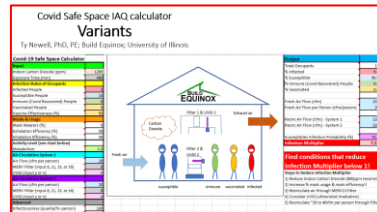
Cognition & Productivity



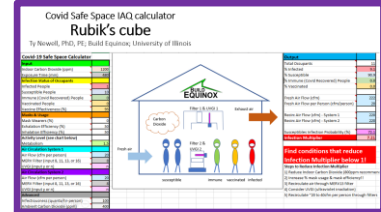
Sleep



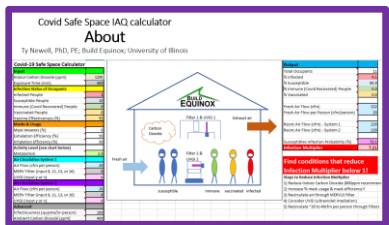
Energy & Costs



Variants



Rubik's Cube



About

"Is My Space Covid Safe?" series

Covid Safe Space IAQ calculator
"Is My Space Safe?" Series Introduction
Ty Newell, PhD, PE, Bala Equinox, University of Illinois

The interface shows a central house diagram with 'EQUINOX' branding and a flow of air from 'OUTSIDE' to 'INDOOR'. To the left is a 'Covid-19 Safe Space Calculator' table with various input fields. To the right is a 'Find conditions that reduce Infection Multiplier below 1!' section with a list of parameters and their values.

Covid Safe Space IAQ
Is My School Safe?
Ty Newell, PhD, PE, Bala Equinox, University of Illinois

The interface is similar to the first one but tailored for a school environment, with a 'Covid-19 Safe Space Calculator' table and a list of conditions to reduce the infection multiplier.

Covid Safe Space IAQ
Is My Restaurant Safe?
Ty Newell, PhD, PE, Bala Equinox, University of Illinois

The interface is similar to the first one but tailored for a restaurant environment, with a 'Covid-19 Safe Space Calculator' table and a list of conditions to reduce the infection multiplier.

"Is My Space Safe?" Series Intro

Is My School Safe?

Is My Restaurant Safe?

Covid Safe Space IAQ
Is My Office/Business Safe?
Ty Newell, PhD, PE, Bala Equinox, University of Illinois

The interface is similar to the first one but tailored for an office or business environment, with a 'Covid-19 Safe Space Calculator' table and a list of conditions to reduce the infection multiplier.

Covid Safe Space IAQ
Is My House of Worship Safe?
Ty Newell, PhD, PE, Bala Equinox, University of Illinois

The interface is similar to the first one but tailored for a house of worship environment, with a 'Covid-19 Safe Space Calculator' table and a list of conditions to reduce the infection multiplier.

Covid Safe Space IAQ
Is My Gym Safe?
Ty Newell, PhD, PE, Bala Equinox, University of Illinois

The interface is similar to the first one but tailored for a gym environment, with a 'Covid-19 Safe Space Calculator' table and a list of conditions to reduce the infection multiplier.

Is My Office/Business Safe?

Is My House of Worship Safe?

Is My Gym Safe?

Covid Safe Space IAQ
Is My Store Safe?
Ty Newell, PhD, PE, Bala Equinox, University of Illinois

The interface is similar to the first one but tailored for a store environment, with a 'Covid-19 Safe Space Calculator' table and a list of conditions to reduce the infection multiplier.

Covid Safe Space IAQ
Is My Car Safe?
Ty Newell, PhD, PE, Bala Equinox, University of Illinois

The interface is similar to the first one but tailored for a car environment, with a 'Covid-19 Safe Space Calculator' table and a list of conditions to reduce the infection multiplier.

Covid Safe Space IAQ
Is My Flight Safe?
Ty Newell, PhD, PE, Bala Equinox, University of Illinois

The interface is similar to the first one but tailored for a flight environment, with a 'Covid-19 Safe Space Calculator' table and a list of conditions to reduce the infection multiplier.

Is My Store Safe?

Is My Car Safe?

Is My Flight Safe?

Covid Safe Space IAQ
Is My Home Safe?
Ty Newell, PhD, PE, Bala Equinox, University of Illinois

The interface is similar to the first one but tailored for a home environment, with a 'Covid-19 Safe Space Calculator' table and a list of conditions to reduce the infection multiplier.

Is My Home Safe?

"Is My Space Healthy?" IAQ series

Covid Safe Space IAQ calculator
"Is My Space Healthy?" Series Introduction
 Ty Nowell, PhD, PE, Build Equinox, University of Illinois

Covid Safe Space IAQ
Is My School Healthy?
 Ty Nowell, PhD, PE, Build Equinox, University of Illinois

Covid Safe Space IAQ
Is My Restaurant Healthy?
 Ty Nowell, PhD, PE, Build Equinox, University of Illinois

"Is My Space Healthy?" Intro

Is My School Healthy?

Is My Restaurant Healthy?

Covid Safe Space IAQ
Is My Office/Business Healthy?
 Ty Nowell, PhD, PE, Build Equinox, University of Illinois

Covid Safe Space IAQ
Is My House of Worship Healthy?
 Ty Nowell, PhD, PE, Build Equinox, University of Illinois

Covid Safe Space IAQ
Is My Gym Healthy?
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Is My Office/Business Healthy?

Is My House of Worship Healthy?

Is My Gym Healthy?

Covid Safe Space IAQ
Is My Store Healthy?
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Is My Car Healthy?
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Covid Safe Space IAQ
Is My Flight Healthy?
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Is My Store Healthy?

Is My Car Healthy?

Is My Flight Healthy?

Covid Safe Space IAQ
Is My Home Healthy?
 Ty Nowell, PhD, PE, Build Equinox, University of Illinois

Is My Home Healthy?

“Is My Space Energy & Cost Efficient?” series

Covid Safe Space IAQ calculator
“Is My Space Energy & Cost Efficient?” Series
Introduction
 By Newell, PhD, PE, Build Equinox, University of Illinois

Covid Safe Space IAQ
Is My School Energy & Cost Efficient?
 By Newell, PhD, PE, Build Equinox, University of Illinois

Covid Safe Space IAQ
Is My Restaurant Energy & Cost Efficient?
 By Newell, PhD, PE, Build Equinox, University of Illinois

“Is My Space E&\$ Eff?” Intro

Is My School E&\$ Eff?

Is My Restaurant E&\$ Eff?

Covid Safe Space IAQ
Is My Office/Business Energy & Cost Efficient?
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Covid Safe Space IAQ
Is My House of Worship Energy & Cost Efficient?
 By Newell, PhD, PE, Build Equinox, University of Illinois

Covid Safe Space IAQ
Is My Gym Energy & Cost Efficient?
 By Newell, PhD, PE, Build Equinox, University of Illinois

Is My Office/Business E&\$ Eff?

Is My House of Worship E&\$ Eff?

Is My Gym E&\$ Eff?

Covid Safe Space IAQ
Is My Store Energy & Cost Efficient?
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Covid Safe Space IAQ
Is My Home Energy & Cost Efficient?
 By Newell, PhD, PE, Build Equinox, University of Illinois

Is My Store E&\$ Eff?

Is My Home E&\$ Eff?