AABC Commissioning Group AIA Provider Number 50111116

IoT and Cloud Computing Meeting ASHRAE to Deliver Productivity and Energy Savings

Course Number: CXENERGY1906



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IoT and Cloud Computing Meet ASHRAE to Deliver Productivity and Energy Savings

World's fastest router (1 Tbps)

a.k.a. world's most expensive garage heater









\$3 / year
on Utilities

\$30 / year on Buildings

\$300 / year on People

Standard building

Enhanced green buildings with lower VOCs 101% Higher cognitive processing!

Millennials are changing the workplace

#shifthappens

Smart Companies are listening ...



The EDGE

Most advanced building in the world More than 40,000 sensors

15.11

180.80.0

Building controls are like Lego blocks







It takes a Lego master to make them into something useful..



The Early Days of the Computer Revolution





Relived Even Today in Building Automation



What if we could have non specialized technicians deploy the system in a fraction of the time ?



Picture: Bob The Builder @pinterest





Internet of Things (IoT) is a collection of physical objects like sensors with internet connectivity





IoT allows every area of the building to have connected sensors





new things will be connected every day..





Cloud Computing means using a group of remote servers hosted on the Internet to store, manage, and process data, rather than a local server.



The Opportunity to Disrupt







75F[®] Smart Node[™]

Controls

- Dampers
- VAV
- WSHP
- Fan Coil
- Unit heaters
- Mixing valves
- Pumps
- ... and more









Operational Efficiency

- Portfolio Energy Analysis
- Space management
- Energy Savings
- Equipment Lifecycle
- ...

Occupant Experience

- Temperature
- Indoor Air Quality
- Lighting
- ..





80% Labor Savings



80% Labor Savings

10x Faster to Install



80% Labor Savings

> 10x Faster to Install





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30 -70% Energy Savings

> Live Insight

So Easy a Kid Can Do It



- The purpose of this standard is to specify minimum ventilation rates and other measures intended to provide indoor air quality that is acceptable to human occupants and that minimizes adverse health effects.
- Ventilation requirements of this standard are based on chemical, physical, and biological contaminants that can affect air quality
- Consideration or control of thermal comfort is not included
- Acceptable indoor air quality may not be achieved in all buildings meeting the requirements of this standard



BreathingZoneOutdoorAirflow. The outdoor airflow required in the breathingzone (Vbz) of the occupiable space or spaces in a ventilation zone, i.e., the breathing zone outdoor airflow shall be not less than the value determined in accordance with Equation 6.2.2.1.

 $V_{bz} = R_p \times P_z + R_a \times A_z \tag{6.2.2.1}$

where

Az = zone floor area, the net occupiable floor area of the ventilation zone, ft2 (m2) Pz = zone population, the number of people in the ventilation zone during use Rp = outdoor airflow rate required per person as determined from Table 6.2.2.1 Informative Note: These values are based on adapted occupants. Ra = outdoor airflow rate required per unit area as determined from Table 6.2.2.1



ASHRAE 62.1

Occupancy Category	People Outdoor Air Rate R _p		Area Outdoor Air Rate R _e			Default Values			
						Occupant Density (see Note 4)	Combined Outdoor Air Rate (see Note 5)		
	cfm/ person	L/s- person	cfm/ft ²	L/s·m ²	Notes	#/1000 ft ² or #/100 m ²	cfm/ person	L/s- person	Air Class
Correctional Facilities									
Cell	5	2.5	0.12	0.6		25	10	4.9	2
Dayroom	5	2.5	0.06	0.3		30	7	3.5	1
Guard stations	5	2.5	0.06	0.3		15	9	4.5	1
Booking/waiting	7.5	3.8	0.06	0.3		50	9	4.4	2
Educational Facilities									
Daycare (through age 4)	10	5	0.18	0.9		25	17	8.6	2
Daycare sickroom	10	5	0.18	0.9		25	17	8.6	3
Classrooms (ages 5-8)	10	5	0.12	0.6		25	15	7.4	1
Classrooms (age 9 plus)	10	5	0.12	0.6		35	13	6.7	1
Lecture classroom	7.5	3.8	0.06	0.3	Н	65	8	4.3	1
Lecture hall (fixed seats)	7.5	3.8	0.06	0.3	н	150	8	4.0	1
Art classroom	10	5	0.18	0.9		20	19	9.5	2



62.1 typically works in opposition to energy conservation measures..



demand-controlled ventilation (DCV): any means by which the breathing zone outdoor airflow (Vbz) can be varied to the occupied space or spaces based on the actual or estimated number of occupants, and/ventilation requirements of the occupied zone, or both.

 $V_{bz} \neq R_p \times P_z + R_a \times A_z$


The 2016 edition revises and improves the standard in several ways. Scope was changed to remove residential occupancies from 62.1 with a concurrent change in 62.2 to add all residential spaces

Previously, Standard 62.1 had responsibility for multi-family residential buildings that are 4 stories or more. Now the dwelling units themselves are covered by Standard 62.2 regardless of building height, while common areas are covered by Standard 62.1.



Ventilation is allowed to be reduced to zero through the use of occupancy sensors (not through contaminant or CO2 measurements) for spaces of selected occupancy types, provided that ventilation is restored to Vbz whenever occupancy is detected?

 $V_{bz} \neq R_p \times P_z + R_a \times A_z$

(6.2.2.1)



ASHRAE 62.1 - 2016

	People Outdoor Air Rate R _p		Area Outdoor Air Rate Re			Default Values			
Occupancy Category						Occupant Density (see Note 4)	Combined Outdoor Air Rate (see Note 5)		
	cfm/ person	L/s- person	cfm/ft ²	L/s·m ²	Notes	#/1000 ft ² or #/100 m ²	cfm/ person	L/s- person	Air Class
General					\wedge				
Break rooms	5	2.5	0.06	0.3	н	25	7	3.5	1
Coffee stations	5	2.5	0.06	0.3	н	20	8	4	1
Conference/meeting	5	2.5	0.06	0.3	н	50	6	3.1	1
Corridors	-	-	0.06	0.3	н	-			1
Occupiable storage rooms for liquids or gels	5	2.5	0.12	0.6	В	2	65	32.5	2
Hotels, Motels, Resorts, Dorn	mitories								
Bedroom/living room	5	2.5	0.06	0.3	н	10	11	5.5	1
Barracks sleeping areas	5	2.5	0.06	0.3	н	20	8	4.0	1

H - Ventilation air for this occupancy category shall be permitted to be reduced to zero when the space is in occupied-standby mode.



Confidential - 38

occupant sensor: a device such as a motion detector or a captive key system that detects the presence of one or more persons within a space.

occupied mode: when a zone is scheduled to be occupied.

occupied-standby mode: when a zone is scheduled to be occupied and an occupant sensor indicates zero population within the zone.

unoccupied mode: when a zone is not scheduled to be occupied.













Millions of data points

...every day



Higher Comfort + Air Quality





HOM

ENERGY-SAVINGS
~ 30% overall energy
4Billion BTU / yr / store

11.67













Per store	
Project Cost	\$42,800
Rebates	\$3500
Installed Cost	\$39,300
Annual Savings	\$51,000+
Simple Payback	<1 year

https://live.energyprint.com/properties/858/cost_avoidance_projects/124 Monthly Detail Hids / Show





x 0 0 0





10M sq. ft. and Marquee Customers



DREAM BIG

The Space



\$75в by 2020







The sky is the limit. If you can dream it, 75F can do it – and I mean that sincerely.

Todd W.



The solution is an innovative and unique combination of technologies. The approach is innovative and impactful.



To say that I was extremely impressed would be an understatement. I truly was not expecting this.

I have worked with Johnson Controls, Honeywell, Andover, Delta and of course Schneider and you are way ahead of the curve.

Robb Hulburt schneider controls INSTALLER Schneider Electric

Award Winning Technology

Google

MNCUP

EUREKA!

INNOVATION

ASSOCHAM

OF TECHNOLOGY

INESOTA'S







Top 100 Most Disruptive Companies in the World in 2017

FROST 🗳 SULLIVAN

Customer Value Leadership Award

The Building Automation Market



http://www.75f.io/award-winning-energy-savings

IN THE SPOTLIGHT

Service is two in On approach to Palo Alto for Google Demo Dayl #GoogleDemoDay @StaveCase inGoogleForEntrop #Recol/Rest ×



The 75F team at Google with the 75F plane in the background

STRET OF AM



THE WHITE HOUSE



Deepinder Singh sits on a panel on Capitol Hill to address why entrepreneurship is rising in Minneapolis with Senator Mark Warner and Rise of the Rest. 75F has made the technology so simple anyone can turn into an installer – no HVAC certification required. Both congressman Tim Walz and Senator Franken easily set up the system in 5 minutes

Contraction of the local division of the loc



ENERGY SAVINGS

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Saving energy, never felt better



Deepinder Singh

dsingh@75F.io 313.486.4694 In 2008, the United Nations launched a campaign to raise thermostats in their secretariat building from 70°F to 75°F to reduce their carbon emissions. We take inspiration from these actions, embodying it in our name and driving both who we are and what we do.



Partner



Higher Comfort + Air Quality

80% Labor Savings

Facility Managers Have Live Insight

10x Faster to Install

30 -70% Energy Savings








Operational Efficiency

- Portfolio Energy Analysis
- Space management
- Energy Savings
- Equipment Lifecycle

- ...

Occupant Experience

- Temperature
- Indoor Air Quality
- Lighting

- ..

ENERGY





75F is EDGE out of the Box - Complete Building Intelligence









WHY? * SOLUTIONS * MARKETS * RESULTS * BLOG CONTACT



HOW IT WORKS

+0

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Products

75F® Facilisight® 75F® Central Control Unit ** 75F® Smart Node ** 75F® Smart Stat ** 75F® Sensors ** 75F® Occupant App **

Applications

LOGIN *

- Dynamic Airflow Balancing Outside Air Optimization Indoor Air Quality Smart VAV With Reheat Hydronic Controls Dynamic Chilled Water Balancing
- Advanced Lighting Refrigeration Monitoring Portfolio Energy Manager Automated Demand Response



Enhanced Demand Response

Day Ahead Prices and Forecast Load





Peak Demand Limiting



Source: NSTAR customer interval data



Peak Demand Limiting



Source: NSTAR customer interval data

