



A DISCUSSION FOR

Florida Healthcare Engineering Association  
September 22, 2010

# **Lower Humidity Requirements in Surgery and Other Spaces: Why and What It Means**

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## **Objectives:**

- Role of FGI and AIA
- ANSI/ASHRAE/ASHE 170d Changes
- History of Humidity Requirements
- Why the Change?
- Clinical Impacts
- Practical Application

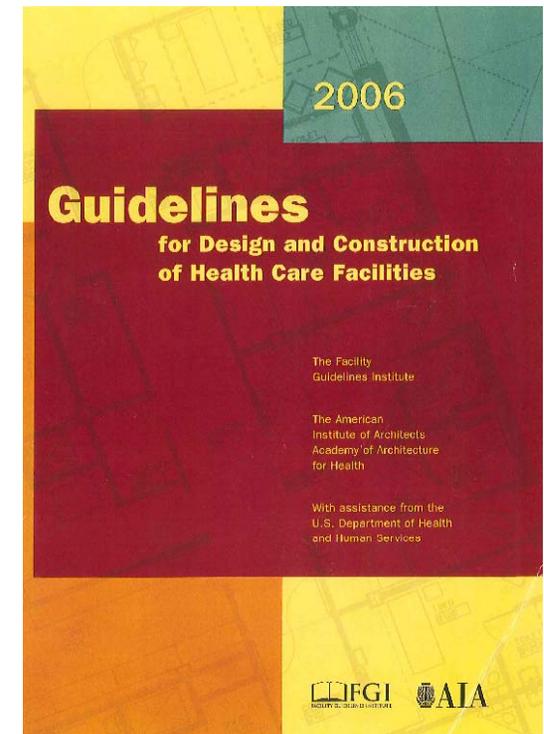


**SSR** Smith  
Seckman  
Reid, Inc.

# The History and Role of Facility Guidelines Institute (FGI)

## History(From FGI Website):

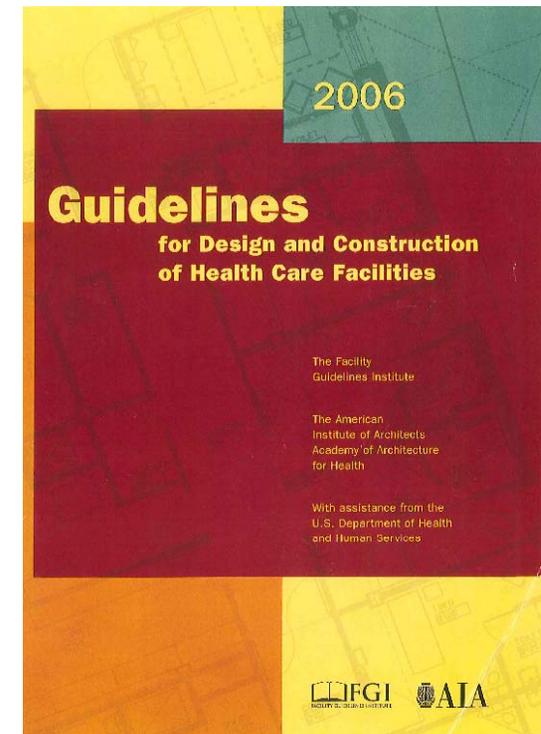
- The Guidelines began with federal program after World War II
- The program was dropped during President Reagan's tenure with the downsize of federal government.
- Those in leadership with the Guidelines looked for an organization to continue updating and publishing the Guidelines and the AIA Academy of Architecture for Health took it on.
- At the end of the 1990's a small non-profit called the Facilities Guideline Institute (FGI) was formed to shepherd the revision process.



# The History and Role of Facility Guidelines Institute (FGI)

## History(cont):

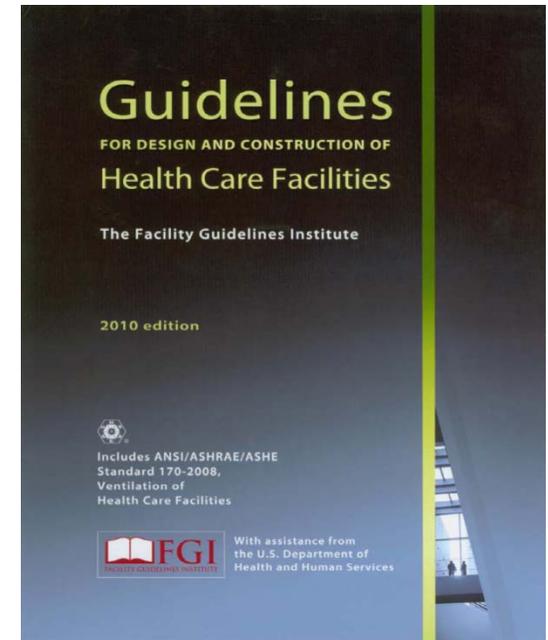
- FGI was to ensure the process would be done regularly with a public, multidisciplinary process.
- FGI and AIA wrote a contract for each edition of the Guidelines beginning in 2001.
- AIA agreed to provide support – editor, planning, publishing and marketing services for the revision process and to publish the document.
- In the last few years the AIA significantly reduced its publishing program and support for the revision process no longer fit into its plans.



# The History and Role of Facility Guidelines Institute (FGI)

## History (cont):

- As a result of the change with AIA, FGI had to find a new publisher and the 2010 addition was published under an agreement between FGI and ASHE.
- It is now appropriate to call the document the FGI Guidelines, which emphasizes the multidisciplinary source of its content FGI is not associated with any one group in healthcare design and construction.





# ANSI/ASHRAE/ASHE 170d

From the cover, Approved by:

- The ASHRAE Standards committee on June 26, 2010;
- The ASHRAE Board of Directors on June 30, 2010;
- The American Society for Healthcare Engineering of the American Hospital Association on July 9, 2010;
- The American National Standards Institute on July 10, 2010.



# ANSI/ASHRAE/ASHE 170d

TABLE 7-1 Design Parameters

Function of Space	Pressure Relationship to Adjacent Areas (n)	Minimum Outdoor ach	Minimum Total ach	All Room Air Exhausted Directly to Outdoors (j)	Air Recirculated by Means of Room Units (a)	RH (k), %	Design Temperature (l), °F/°C
<b>SURGERY AND CRITICAL CARE</b>							
Class B and C operating rooms, (m), (n), (o)	Positive	4	20	N/R	No	<del>20-60</del> 60	68-75/20-24
Operating/surgical cystoscopic rooms, (m), (n), (o)	Positive	4	20	N/R	No	<del>20-60</del> 60	68-75/20-24
Delivery room (Caesarean) (m), (n), (o)	Positive	4	20	N/R	No	<del>20-60</del> 60	68-75/20-24
Treatment room (p)	N/R	2	6	N/R	N/R	<del>20-60</del> 60	70-75/21-24
Trauma room (crisis or shock) (e)	Positive	3	15	N/R	No	<del>20-60</del> 60	70-75/21-24
Laser eye room	Positive	3	15	N/R	No	<del>20-60</del> 60	70-75/21-24
Class A Operating/Procedure room (o), (d)	Positive	3	15	N/R	No	<del>20-60</del> 60	70-75/21-24
<b>DIAGNOSTIC AND TREATMENT</b>							
Gastrointestinal endoscopy procedure room	Positive	2	6	N/R	No	<del>20-60</del> 60	68-73/20-23



# ANSI/ASHRAE/ASHE 170d

Do these same reduced humidity requirements apply to ICU?  
Informal response from ASHE:

ICU is different in the minds of some of the committee members:

- Short-stay (OR) vs. long-stay (ICU)
- Influenza virus becomes more virulent in a lower humidity



# History of Humidity Requirements

## **From the ASHE Advocacy Alert announcing the change:**

1. For decades health care organizations have struggled to maintain relative humidity in operating rooms and other short-term clinical spaces above 30% RH.
2. Clinical arguments for this level have always been that it is needed for infection control purposes and for control of static discharge.



# History of Humidity Requirements

3. After reviewing these claims, ASHRAE Standing Standard Project Committee (SSPC)-170 conducted a literature search and, working with organizational representatives from APIC, CDC, and NIH, found no direct correlation between infections and humidity below 30% RH.
4. The SSPC also looked into the claim made by NFPA 99: *Standard on Health Care Facilities that a 35% RH must be maintained for fire safety in operating rooms.* Research did not show any correlation between an RH below 35% and operating room fires.



# History of Humidity Requirements

5. It is the belief of the ASHE staff that the 35% RH is a holdover from the era when flammable anesthetics were used in operating rooms. The proposed 2012 edition of NFPA 99 has eliminated the 35% requirement and refers to ASHRAE Standard 170.



# History of Humidity Requirements

## Fire Safety

- 550-650 surgical fires/year
  - 30-60 serious patient injury
  - 1-2 patient fatalities
- 75% involve ESUs
- 10% involve Lasers
- Oxidizers & Fuels
  - 75% involve O<sub>2</sub> enriched atmosphere (concentration > 21%)
  - 4% involve alcohol-based preps
- No reports related incidents to RH

(Source: HEALTH DEVICES OCTOBER 2009)





# Why the Change Now

## Impacts to Design

1. Often times humidifiers are only designed/installed to because the AHJ expects them to be in place.
2. In moderate climates the code minimum humidity requirement often dictates the design not climatic criteria.



# Why the Change Now

## Impacts to costs

1. Installing humidifier equipment adds up front capital cost, maintenance cost, and on going energy costs.
2. From ASHE's briefing to CMS: "Without jeopardizing patient outcomes, this change is estimated to save the health care industry more than \$200 million in the next 10 years by reducing the initial ventilation system installation cost, eliminating the need to modernize existing systems to maintain 35 percent RH, and providing energy conservation savings."



# Why the Change Now

## Impacts to Maintenance

From ASHE's briefing to CMS:

1. Lower RH level facilitates flexibility in HVAC parameters that will have little, if any, risk of adverse effect on system performance and patient safety.
2. Broadens the range of humidity that health care engineers work hard to maintain.
3. No investment in expensive changes to HVAC systems to keep RH greater than or equal to 30 percent.



# Why the Change Now

## Impacts to Maintenance

From ASHE's briefing to CMS(cont):

4. RH is intimately tied to outdoor air conditions and local climate conditions. Many facilities in the United States are located in more arid climates or areas with variable seasons, which ambient local conditions often make maintaining a 30 percent RH impossible to achieve.



# Clinical Impacts

From the ASHE briefing to CMS:

1. **Ventilation Technician Expert** : Dr. Farhad Memarzadeh, Director, Division of Technical Resources, at the National Institutes of Health: “there is no clinical evidence or research that shows any correlation between minimum levels of relative humidity and hypothermia or wound infections in short-term patient spaces.”



# Clinical Impacts

From the ASHE briefing to CMS (cont):

2. Judene Bartley, Vice President of Epidemiology Consulting Services and a Clinical Consultant for Premier's Safety Institute, stresses that what evidence exists for a relationship between RH and surgical site infections (SSIs) involves prolonged periods of RH exceeding 60 percent and that RH is only one variable among others, such as airflow direction and exchange, temperature, and filtration, that affects the incidence of SSI.





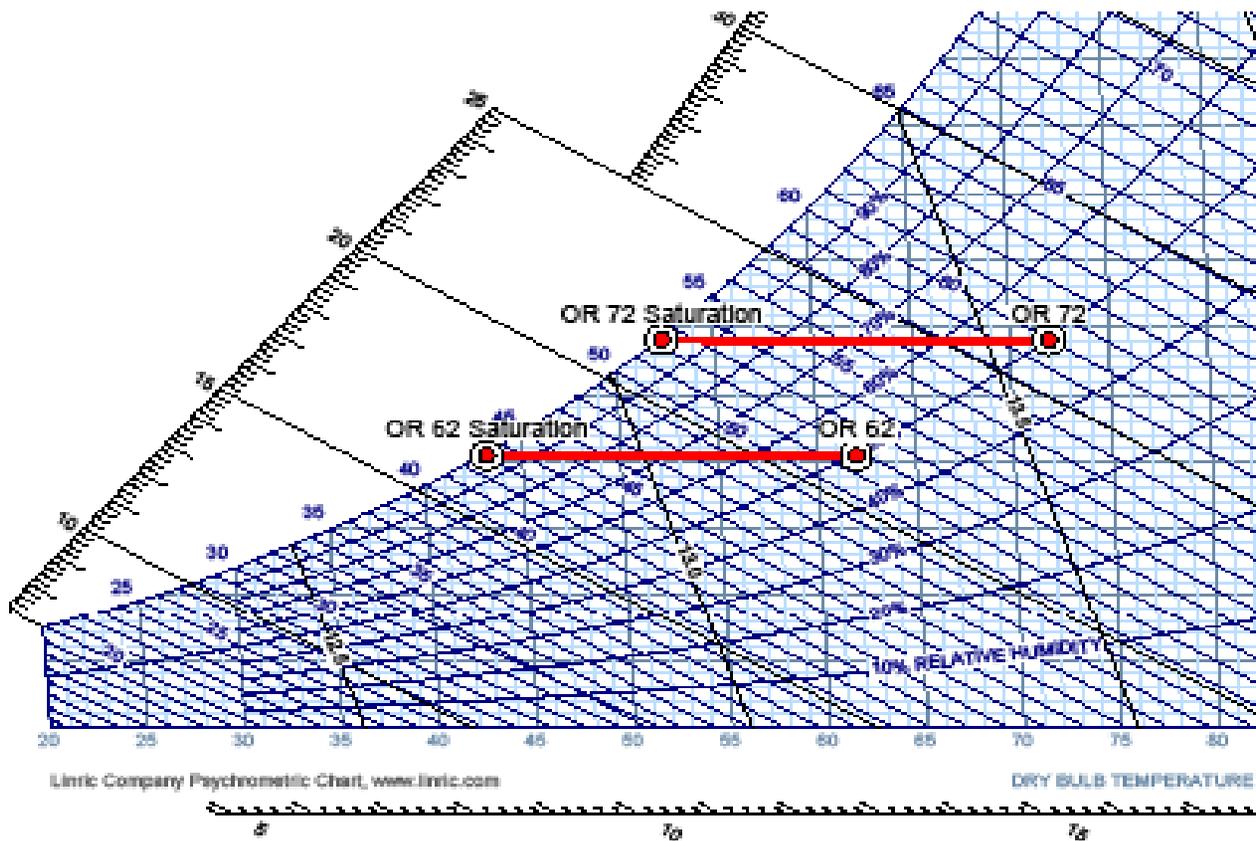
# Clinical Impacts

The clinical aspects of lowering the humidity in OR's has been researched and documented in earnest.

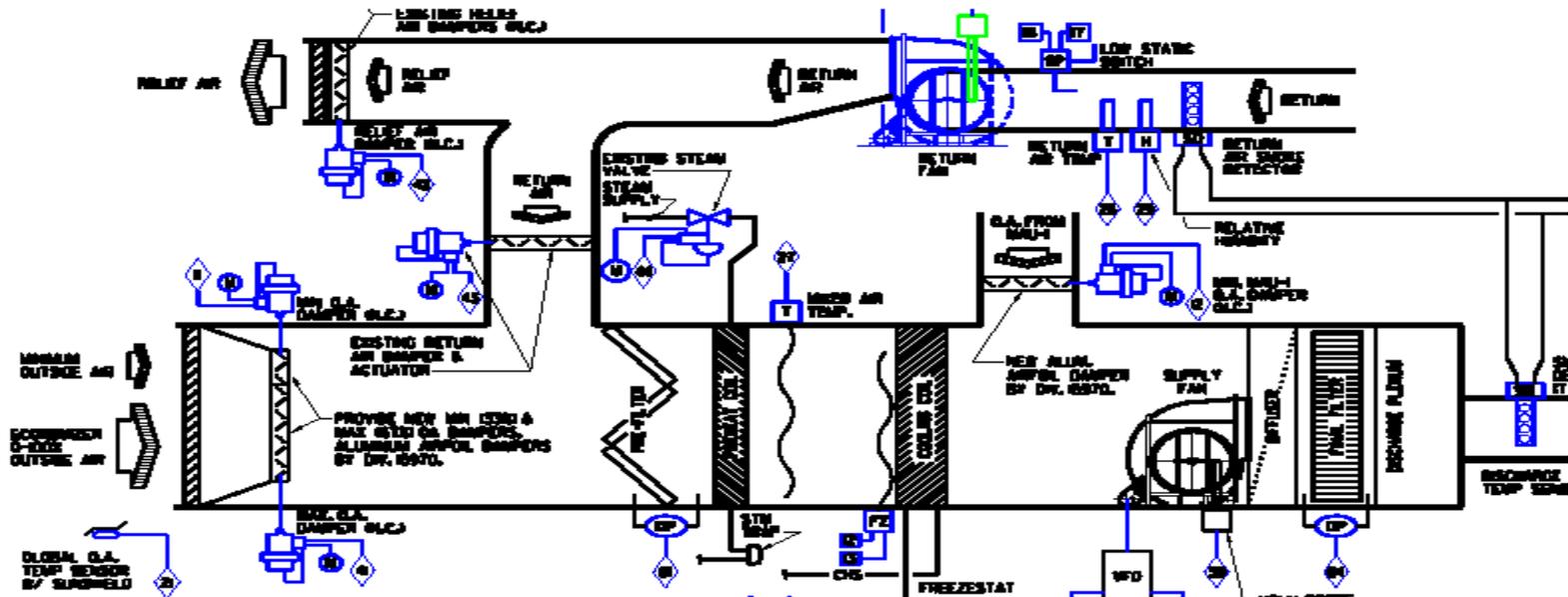
For more information in this area, see and hear the June 7, 2010 presentation on this topic that will be coming soon to the ASHE website: [ashe.org](http://ashe.org)



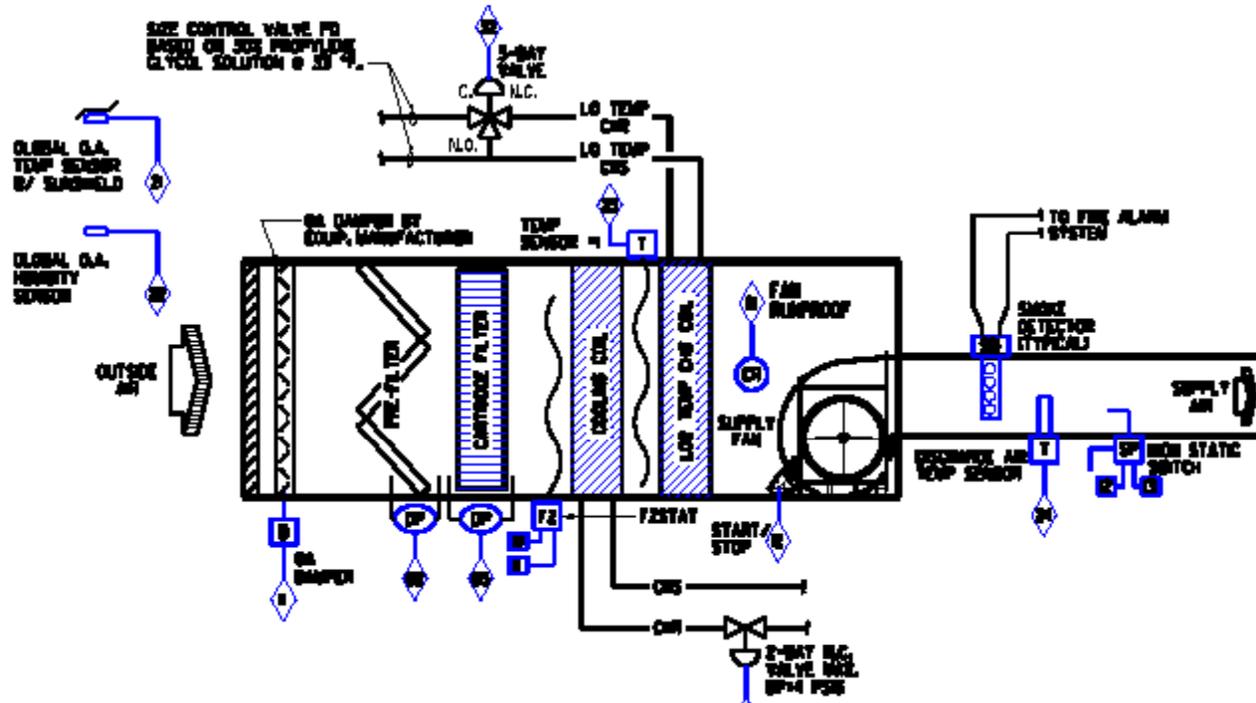
# Application: Low Temp OR's



# Application: Low Temp OR's



# Application: Low Temp OR's



# Questions/Follow-up

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