Humidity Levels in Surgical Settings:
Understanding the Standards and Managing the Risk

Gallagher Healthcare Practice

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Recently, risk managers around the country have been called into internal discussions regarding “humidity requirements” in a surgical setting or operating room (OR). What are they? What should we be doing? What is required?

There have been a number of questions and conflicting interpretations of standards concerning relative humidity requirements (especially in California). In addition to the confusion we have seen about standards interpretation, there is also a “be careful what you wish for…” scenario that has developed.


After much debate and pressure from hospital associations, the CMS and subsequently The Joint Commission moved forward with a proposal to adopt the 2012 Edition of NFPA 101, which does not reference NFPA 99 but adopts the ASHRAE Standard 170 requirements for ventilation of healthcare facilities. Addendum D of ASHRAE Standard 170 requires relative humidity (RH) in anesthetizing locations to be maintained between 20% and 60%. It is important to note, this change to the 2012 Edition of NFPA 101: Life Safety Code is currently under “proposed status”. The proposal is with the Office of Management and Budget and is expected to be approved and issued in the Federal Register within the next month or two (March/April 2015).

Currently, many hospitals are following the “categorical waiver” which was granted by the CMS in March 2012. This waiver allowed for the reduction of RH from at least 35% to 20%. However, it must be noted that the CMS-accepted ASHRAE Standard does not apply if there are more stringent control levels required by state or local laws.

In California, for example, the Office of Statewide Health Planning and Development (OSHPOD) also incorporated the lower RH level (20%) in the 2013 California Building Standards Code. However, OSHPOD did not incorporate the 20% minimum level across the board. In the California Mechanical Code 325.0 - and specifically Table 325, you’ll note there is a minimum level of humidity requirement at:

20% or higher for:
- Operating rooms
- Cystoscopy procedure rooms
- Cardiac catheterization labs
- Trauma and cardiac rooms
- Delivery rooms and Caesarian section operating rooms
- Gastrointestinal endoscopy procedure rooms

30% or higher for:
- Post-anesthesia care unit
- Newborn nursery
- Newborn intensive care nursery unit
- Intensive care unit (ICU)
- Burn unit

Therefore, there is still a 30% or higher requirement in place for several clinical areas. Also, Standard 42 CFR 482.41 (b) 3 states, “The provisions of NFPA 101 do not apply in areas where the CMS finds that a fire and safety code imposed by state law adequately protects patients in hospitals.”

Even with these changes, hospital groups and associations continued to advocate for a reduction in the requirements for relative humidity. The argument was largely based on the original RH requirement of 35% which was established to minimize risks of fire associated with flammable anesthetics. Flammable anesthetics have been engineered out the surgery setting for many years now. The organizations also argued that the reduction of the required level to 20% humidity would save hospitals hundreds of millions of dollars.

The ongoing debates become a “be careful what you wish for” situation. The transition to an RH level of 20% was not expected to present minimal if any risk. When hospitals began applying for and receiving “categorical waivers” and subsequently reducing humidity levels in the OR to 20%, a new risk did evolve. The issue involved manufacturers’ warnings about RH levels lower than 30% - and the resulting impact on the integrity and functionality of equipment and supplies used in the operating room.
What has been determined is that a low humidity level can adversely impact equipment, supplies and shelf life. As a starting point, it is essential that the OR staff and suppliers are familiar with the manufacturer’s Instructions for Use (IFU). It also is referred to as the Directions for Use (DFU). An assessment of the UFI's for equipment and supplies used in the OR (electrodes, shelf life, etc.) will determine the required humidity requirements for using or storing the equipment.

In January 2015, a consortium of affected organizations (ASCA, AHA, ASHE, AAMI, AORN and more) came together to develop guidance for hospitals considering the pursuit of lowering humidity levels in those designated areas. The resulting recommendations were to conduct a risk assessment prior to reducing humidity levels below 30%. Essentially, the risks advised include:

- Conducting an inventory of equipment and supplies - and obtaining the manufacturer’s recommendations and warnings of product concerns in low-humidity environments.

- Obtaining data from manufacturers to determine the variance of time that a product can be exposed to low-humidity before impacting performance.

- Considering re-location of supplies that may be sensitive to low-humidity environments.

In the near future, it is likely the 2012 NFPA 101: Life Safety Code will be adopted. If that does occur, the 1999 edition of NFPA 99 will be dropped and replaced by the ASHRAE 170 Standard. In California and other states with more restrictive standards, complete adoption of a 20% humidity level is not anticipated until many years further down the road. Manufacturers are working to improve products that withstand the 20% humidity levels, but the development, testing and approval will take time as well.

In the interim, medical facilities should ensure they minimally establish and actively maintain a risk management assessment program that incorporates products, equipment, manufacturers, engineering controls and infection controls to help reduce the potential for adverse situations.
About the Author/Team

John K. Walpole, Area Senior Vice President, has 20 years experience focused exclusively on the provision of risk management services to the healthcare industry. John, is recognized for his expertise in integrating the Risk Management function into a healthcare organization’s clinical and operational processes.

John, has worked closely with the American Hospital Association and The Joint Commission in standards development and compliance.

John developed and implemented a broad range of risk management products and services ranging from clinical and operational consultations to educational programs/seminars to publishing. In addition to providing consultations to healthcare organizations around the country John has served as faculty on numerous ASHRM, AHA, JCAHO and ASHE sponsored events.

John is currently responsible for oversight of all client risk programs. These services include but are not limited to: clinical consultations, operational consultation, accreditation support and mock surveys, regulatory compliance, seminars and conferences, carrier relations and the overall management of the myriad of healthcare risk exposures.

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