

**THE BATTLE ONLY STARTS
WITH A CLEAN SURFACE.**

BREATHE EASY.

IC Sentinel®
ENVIRONMENTAL MONITOR

*Introduction to the
IC Sentinel®
Environmental Air Quality
Monitoring System*

Winning the War on Airborne Infectious Disease.

Oberon's IC Sentinel® is a unique Healthcare Environmental monitoring system, addressing the needs of infection control professionals, facilities managers, and patient satisfaction.

IC Sentinel
ENVIRONMENTAL MONITOR



Benefits of the IC Sentinel®:

- Monitor airborne particulates, differential room pressure, humidity, air quality, light, and sound levels
- Validate HVAC performance, ICRA compliance, construction barriers, isolation rooms, & protective environments
- Networked sensors provide real-time, 24/7 reporting of environmental quality metrics, with instant alerts
- Remotely monitor patient sites with Web based interface

VISIT ICSENTINEL.COM NOW TO LEARN MORE



What is *IC Sentinel*[®]?



- *IC Sentinel* is a facility wide, networked, Indoor Air Quality (IAQ) monitoring system that measures:
 - Airborne Particulates (Easy to Use ISO mode)
 - Differential Room Air Pressure
 - Air Quality (CO₂), Temperature, and Humidity
 - Sound and Light Levels (Patient Satisfaction)
 - Measurement are real time, 24/7/365, networked, with programmable alerts
- *IC Sentinel* is composed of units (one per room, as many as needed), Cloud Based Server SW (maintained by Oberon), and clients/users (as many as desired, a simple browser based interface).
- Each IC Sentinel unit can be connected to the Cloud by an Ethernet, WiFi, or Cellular Data Modem. It is powered by Power over Ethernet (PoE).
 - PoE power injectors are available if the Ethernet jack is not powered.

Who can use *IC Sentinel*®?



- **Facilities and Engineering Staff**
 - Responsible for overall facility engineering and management
- **Infection Preventionists**
 - Responsible for preventing Hospital Acquired Infections (HAIs)
- **Patient Satisfaction Staff**
 - Chartered with improving patient satisfaction and outcomes
- **Construction Firms**
 - Can use this system to prove compliance with hospital policy, and defend against negligence claims

Where should *IC Sentinel*[®] be deployed?



- **Operating Rooms (OR)**
 - To prevent Surgical Site Infections (SSIs)
- **Intensive Care Units (ICU)**
 - To help improve patient outcomes
- **Immunocompromised Rooms (ICR, BMT)**
 - To help protect critically ill patients
- **Neonatal intensive Care Units (NICU)**
 - To help protect at risk infants
- **Standard Patient Rooms**
 - To help improve patient outcomes and satisfaction
- **Airborne Isolation Rooms**

Where should *IC Sentinel*[®]
be deployed?



Construction Areas

- To ensure that construction does not cause HAI risks
 - Contractors can utilize IC Sentinel to ensure compliance with IRCRA procedures
 - Contractors can use our Cellular Data Modem option if they do not have any internet access at their work-site
- Hospital Pharmacy
 - Pharmacy is a clean environment
 - Data Centers
 - ASHRAE recommends ISO clean room status in data centers

Cloud Server Features (<https://my.icsentinel.com>)



- Simple browser based user interface
- Monitor any facility, from anywhere
- Any number of users, established by administrator
- Designed for ease of use
 - Dashboard for instant analysis of facility status
 - Both real-time and historical compliance summary
 - Overview screen for current snapshot of all units
 - Detailed screens per unit, with graphing and data exporting
 - Threshold setting screen with help tips for establishing thresholds
- Very little hospital IT department support needed
- Connectivity can be provided by Ethernet, WiFi, or Cellular Data Modem.

Cloud Server Dashboard



IC Sentinel ENVIRONMENTAL MONITOR

Overview Dashboard Units User Admin Log In/Out

IC Sentinel® Dashboard Duration: 1 Week

Category	Airborne Particulates		Room Pressure		Air Quality/CO ₂		Relative Humidity		Sound Level		Light Level	
	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max	Avg	Max
Airborne Isolation Room:	80%	94%	64%	55%	72%	95%	151%	86%	94%	93%	64%	77%
Construction:	93%	75%	83%	141%	81%	63%	103%	77%	90%	98%	50%	71%
Inpatient Care:	89%	61%	53%	134%	51%	87%	141%	97%	83%	64%	52%	92%
Main Lobby:	50%	70%	60%	145%	89%	53%	52%	81%	96%	66%	77%	54%

Legend:

All OK, within target limits:	
Warning, above target limit:	
Alarm, above max threshold limit:	

Cloud Server Overview Screen



Overview
Dashboard
Units
User
Admin
Log In/Out

Unit	Status	Particle		CO ₂		Pressure Pa	Humidity %	Sound dB SPL	Light Lux
		ISO	R-T	STEL	TWA				
BMT	ALARM	7.8	760.8 ppm	477.8 ppm	749.2 ppm	+0.001 in WC	38.0%	41.7 dB SPL	105.7 Lux
ICU1	OK	7.5	750.3 ppm	473.6 ppm	737.5 ppm	+0.000 in WC	42.4%	43.5 dB SPL	225.1 Lux
ICU2	ALARM	7.9	446.3 ppm	413.8 ppm	443.8 ppm	-0.000 in WC	56.8%	46.1 dB SPL	115.4 Lux
Lab	ALARM	8.0	433.3 ppm	405.5 ppm	431.9 ppm	-0.000 in WC	58.0%	45.3 dB SPL	73.3 Lux
OR1	ALARM	7.8	654.3 ppm	435.6 ppm	646.4 ppm	+0.000 in WC	43.0%	45.3 dB SPL	375.2 Lux
OR2	ALARM	7.8	453.8 ppm	414.1 ppm	447.5 ppm	+0.001 in WC	57.4%	44.7 dB SPL	123.2 Lux
Pharmacy	ALARM	7.5	749.3 ppm	468.7 ppm	729.5 ppm	+0.000 in WC	42.7%	43.1 dB SPL	371.0 Lux
	✕	✕	✕	✕	✕	✕	✕	✕	✕

All Categories
⇩
⏪
🗑

Select Columns
⇩
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🗑
⚙
★

Particle Count



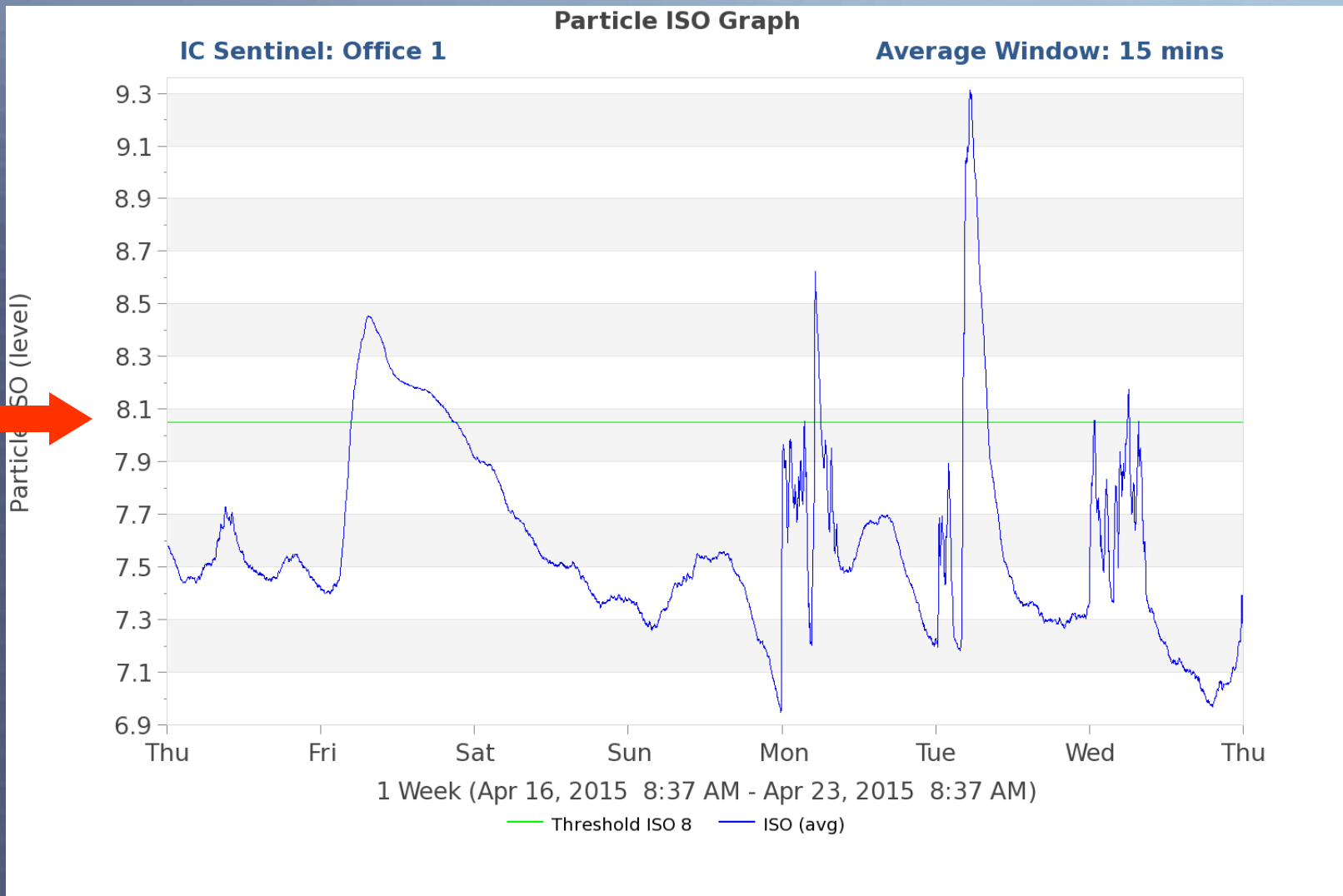
FGI/AIA ANSI/ASHRAE/ASHE 170/2014 Design Guidelines, specifies air particle removal for these facilities:

- Protective Environment
- Class B, C Surgery, Inpatient Care, Treatment, Diagnosis
- Class A Surgery, Laboratories
- Nursing Facility
- Inpatient Hospice Facility
- Assisted Living Facility

IC Sentinel® Graph- Particle Count



Desired ISO Level



Particulate Count, ISO 8 threshold setting, one week

Differential Room Pressure



The FGI/AIA ANSI/ASHRAE/ASHE 170/2014 Guidelines require the following differential pressure limits to be maintained:

- Airborne Infectious Isolation (All) Rooms: Negative 2.5 Pa/0.01 in WC
- Bronchoscopy Procedure/Sputum Induction Rooms: Negative 2.5 Pa/0.01 in WC
- Protective Environment (PE) Rooms: Positive 2.5 Pa/0.01 in WC
- Class B/C OR Rooms, Operating/Surgical Cystoscopic Rooms, Caesarean Rooms: Positive 2.5 Pa/0.01 in WC
- Hospital Construction Barriers: Negative 7 Pa/0.03 in WC.

The CDC EIC MMWR recommends:

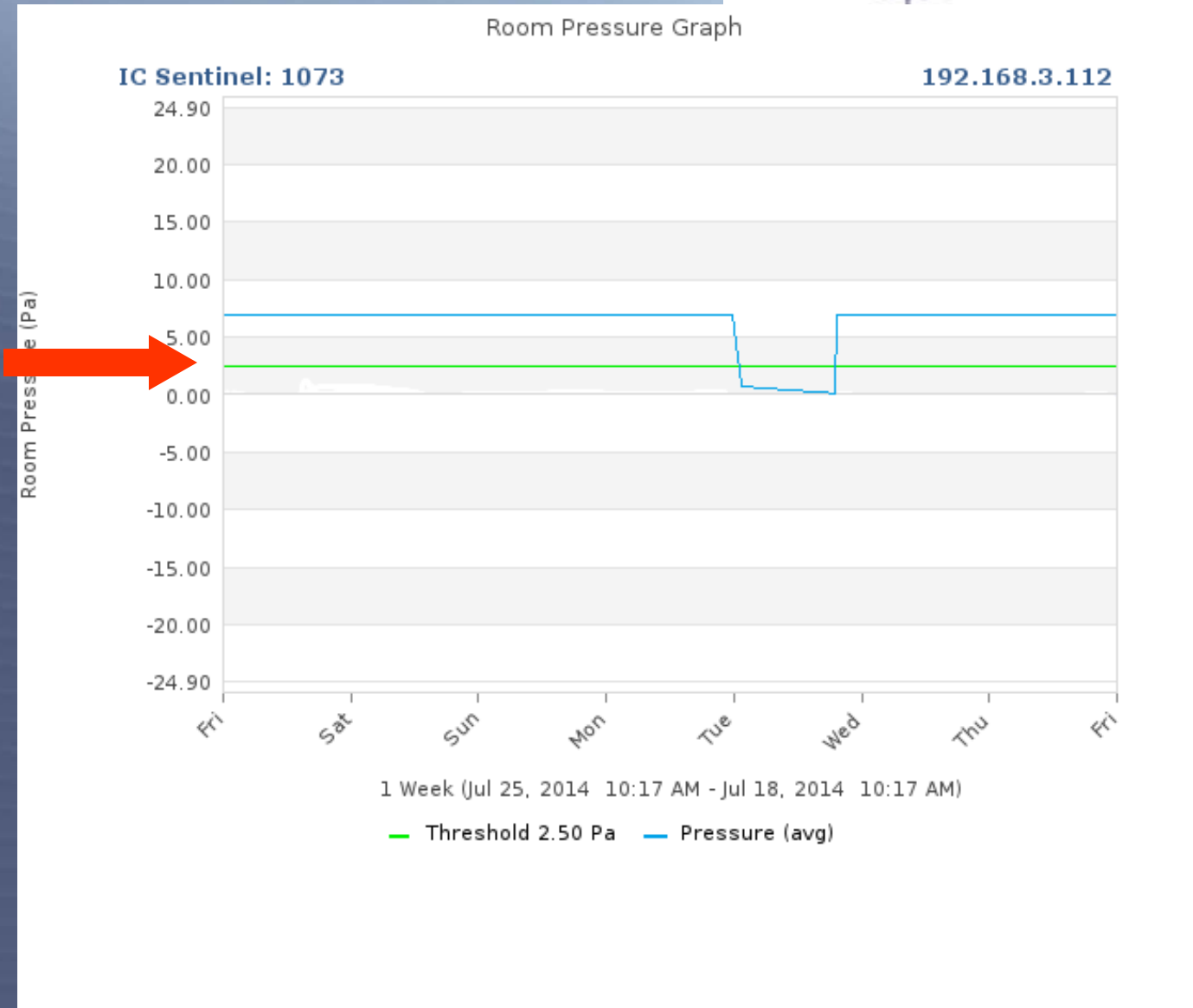
- PE Rooms: >Positive 8 Pa
- All Rooms: < Negative 2.5 Pa

Note that these should be tested for pressure on an on-going basis, and pressurization should be maintained at all times.

IC Sentinel® Graphs- Differential Room Pressure



FGI Guideline for Differential Pressure in OR



Differential Air Pressure, one week

Air Quality/ CO2 Thresholds



CO2 is a good indicator of proper building ventilation and indoor air exchange rates. OSHA has set the following PEL (Permissible Exposure Limits) for occupied buildings:

- Short Term Exposure Limit (STEL): 30,000 ppm
- Time Weighted Average (TWA): 5,000 ppm.

IC Sentinel® Graphs- Air Quality

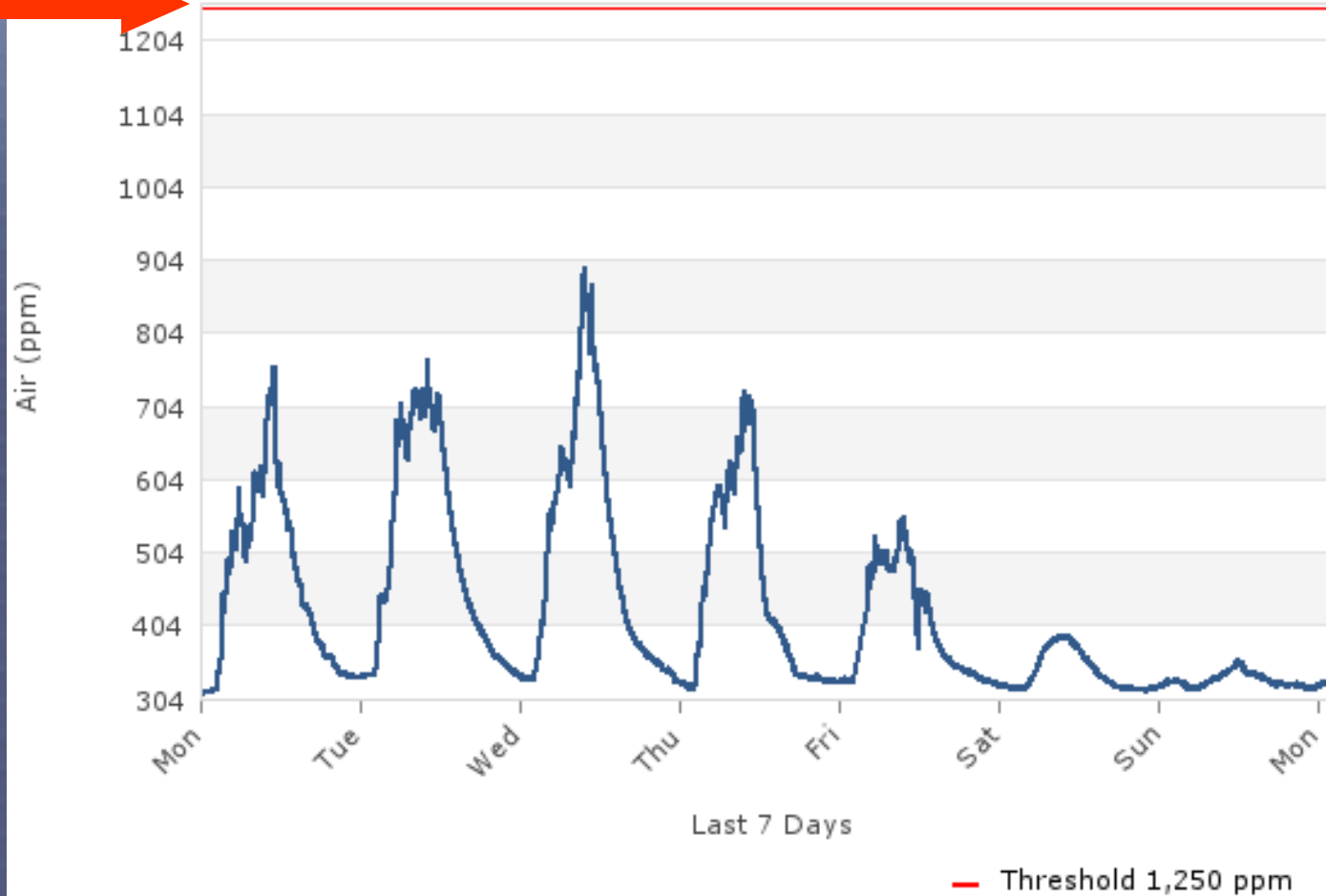


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OSHA Guideline for CO2



Indoor Air Quality (CO2 levels) one week

Humidity



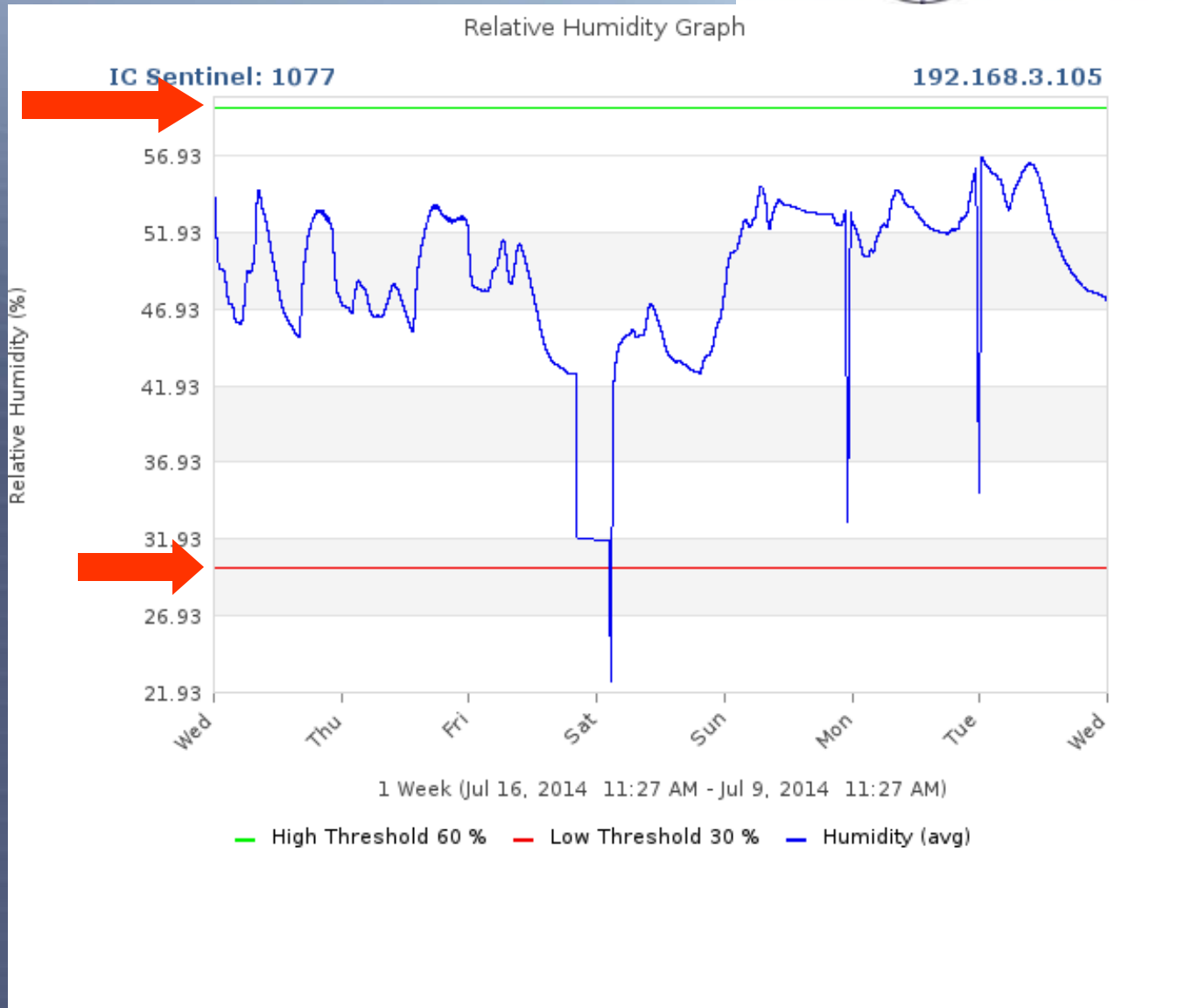
The FGI/AIA ANSI/ASHRAE/ASHE 170/2014 Guidelines require the following relative humidity limits to be maintained:

- Critical and Intensive Care: 30-60%
- Endoscopy Procedure Rooms: 30-60%
- Class B/C Operating Rooms: 20-60%
- Treatment/Recovery Rooms: 20-60%
- PE/All Rooms: Max 60%

IC Sentinel® Graphs- Humidity



FGI Relative Humidity range for ICU



Relative Humidity, one week

Sound and Light levels



The FGI/AIA ANSI/ASHRAE/ASHE 170/2014 Guidelines supply the following sound guidelines:

- Separate limits should be set for day and night periods
- The night limit should be 5 to 10 dBA below the day limit
- Daytime limits typically vary between 55 and 65 dBA.

IC Sentinel® Graphs- Sound Levels

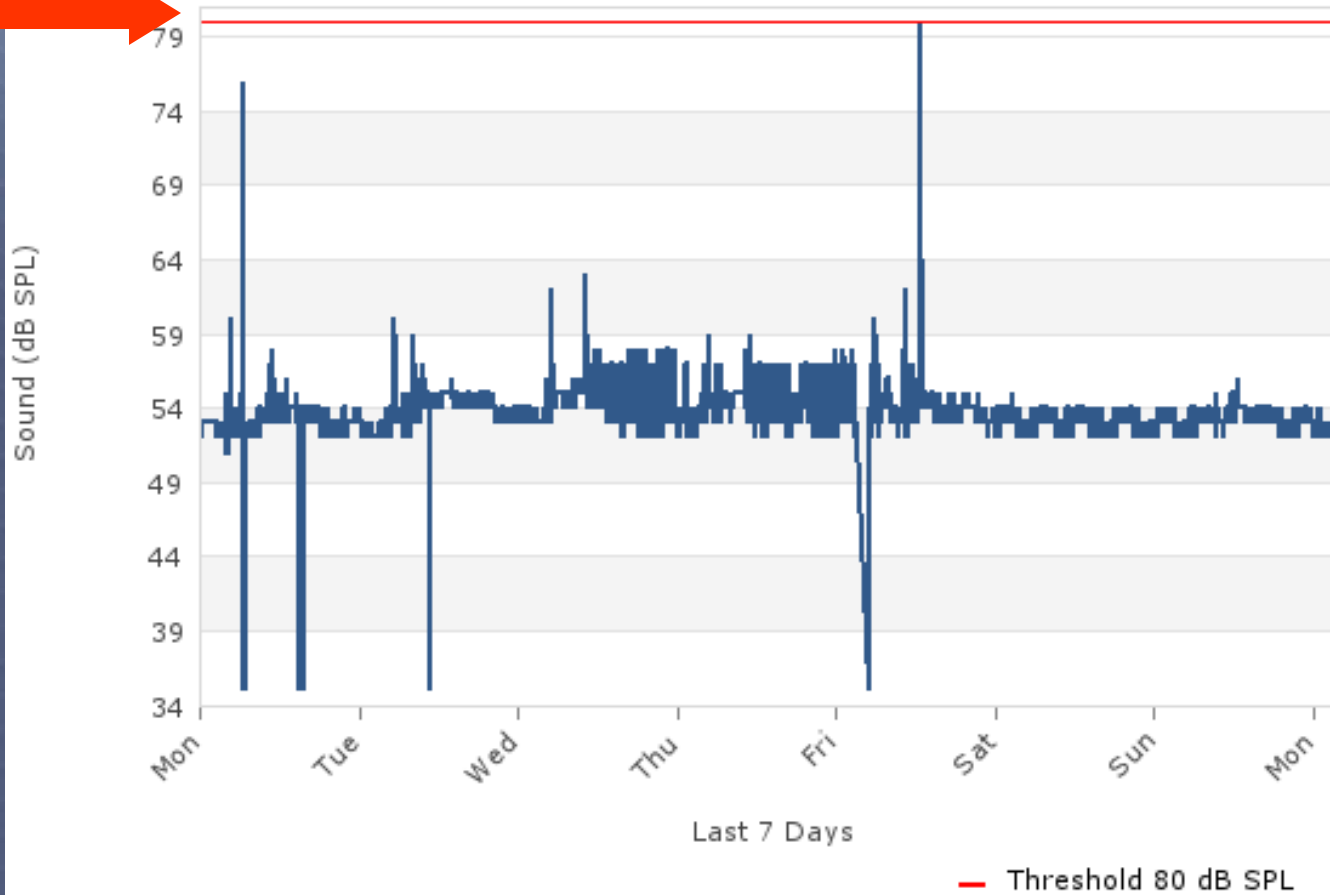


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Hospital Noise Threshold



Sound Levels, one week

IC Sentinel Ordering Items



- *IC Sentinel* units
- Cloud Server SW License
 - Unlimited access for authorized users to stored data and reports
 - Includes a yearly maintenance contract, with an annual calibration, we ship a new unit to the customer prior to the calibration due date
 - All SW updates are included
 - Any HW failures (not abuse related) are corrected at no-cost
 - Annual calibration included
- Accessories
 - PoE Power Injectors
 - Pressure Sensor Accessories
 - WiFi Kit
 - Cellular Data Modem

The *Bottom* Line



- Lost reimbursement for HAIs
- Lost revenue opportunity for HAI re-treatment
- Legal expenses
- Damaged reputation
- Sick health care workers
- A single HAI prevention using IC Sentinel will result in a positive return on the investment in a facility wide deployment

IC Sentinel Deployments



Oberon Contacts/Support



- IC Sentinel.com Website
 - Lots of good information, app notes, presentations, etc.
- Doug Schultz, CTO
 - rds@oberoninc.com, 814-867-2312 x213
- Theresa Somers, Marketing
 - tas@oberoninc.com, 814-867-2312 x208
- Oberon hosted web-based training calls
- Sales Representatives
- Distributors
- Value Added Integrators