CSA Maintenance Requirements: What you NEED to Know!
CSA Maintenance Requirements: What you NEED to Know!

Presented by
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CHES National Conference
Winnipeg, MB – Sept 26, 2011
Agenda

• Why do maintenance?
• Three critical systems:
  – HVAC
  – Electrical
  – Medical Gasses
• Heads up!
• Closing thoughts

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Why do Maintenance?
“Failure is not an option.”

Gene Kranz –
NASA Flight Director, Apollo 13
HVAC

Clause 6.2.1.1.:

1) “Heating, ventilating and air-conditioning systems, including mechanical refrigeration equipment, shall be designed, constructed and installed to conform to good engineering practice such as described in CAN/CSA-Z317.2 “Special Requirements for HVAC Systems in Health Care Facilities.”

Note: Also in ABC, OBC and BCBC
CAN/CSA Z317.2-10

- Canadian Standards Association
- CAN/CSA Z317.2-10: Special Requirements for Heating, Ventilation, and Air Conditioning (HVAC) Systems in Health Care Facilities
  - Released in January 2010
Operations

• HVAC systems shall be continually monitored centrally
• HVAC systems shall be
  – Inspected
  – Calibrated
  – maintained
Filter and seal inspection:

- **Type I and Type II areas**
  - Visually inspected at least monthly

- **HEPA Filters**
  - Visual inspection once a month
  - In place for no more than 36 months
  - May require “bag-in, bag-out” filter housing
Filter and seal inspection:

- **Secondary filters**
  - > MERV 8
  - Visual inspections at least once a month
  - Replaced based on pressure drops
  - In place for no more than 24 months

- **Primary filters**
  - < MERV 9
  - Visual inspections at least once a week
  - Replaced based on pressure drops
  - In place for no more than 12 months
What’s wrong with this picture?
What’s wrong with this picture?
OR’s, PACU’s and IR’s

• Pressure alarms shall be centrally monitored
• Manual verification of pressurization is required
• Alarms tested monthly
• Records must be kept
• Room pressure shall be tested before admitting patients to Isolation Rooms (smoke test)
# Calibration:

## Table 5

### Monitoring of system performance

(See Clauses 6.14.4, 8.1.2, and 8.1.4.)

<table>
<thead>
<tr>
<th>Location</th>
<th>Parameters to be monitored and/or displayed</th>
<th>Frequency</th>
<th>Monitor sensor location</th>
<th>Monitor readout location</th>
<th>Alarmed (yes/no)</th>
<th>Location of alarm</th>
<th>Calibration frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type I areas</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>All operating rooms</td>
<td>Temperature Relative humidity Pressurization</td>
<td>Continuous</td>
<td>Each room and zone</td>
<td>Each room and central location</td>
<td>yes</td>
<td>Local, central</td>
<td>Monthly</td>
</tr>
<tr>
<td>Airborne isolation rooms</td>
<td>Temperature Relative humidity Pressurization</td>
<td>Continuous</td>
<td>Each room and zone</td>
<td>Each room and central location</td>
<td>yes</td>
<td>Local, central</td>
<td>Monthly</td>
</tr>
<tr>
<td>Protective isolation rooms</td>
<td>Temperature Relative humidity Pressurization</td>
<td>Continuous</td>
<td>Each room and zone</td>
<td>Each room and central location</td>
<td>yes</td>
<td>Local, central</td>
<td>Monthly</td>
</tr>
<tr>
<td>Wound intensive care units (burn units)</td>
<td>Temperature Relative humidity Pressurization</td>
<td>Continuous</td>
<td>Central</td>
<td></td>
<td>yes</td>
<td>Central</td>
<td>Monthly</td>
</tr>
<tr>
<td>Diagnostic imaging treatment areas</td>
<td>Temperature Relative humidity Pressurization</td>
<td>Continuous</td>
<td>Central</td>
<td></td>
<td>yes</td>
<td>Central</td>
<td>Semi-annually</td>
</tr>
<tr>
<td>(e.g., angiography)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other patient care areas (Type I)</td>
<td>Temperature Relative humidity</td>
<td>Continuous</td>
<td>Central</td>
<td></td>
<td>yes</td>
<td>Central</td>
<td>Semi-annually</td>
</tr>
</tbody>
</table>

Source: CSA Z317.2-10

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Fire and Smoke Dampers

- Tested at least once every 5 years
  - Activate the device
  - Visually inspect operation and seal
  - Reset to design position

- Smoke management systems shall be tested annually

- Record all results
System Maintenance

• Have O&M staff with sufficient training
• Prepare O&M schedules
• Maintenance areas are required to meet the requirements of CAN/CSA Z317.13-07
Duct Cleaning

- Annual duct inspection **shall** be established
- Cleaning schedule
  - Supply – as necessary
  - Return – at least once every 10 years
  - Exhaust – at least once every 10 years
  - Diffusers – at least once every 6 months
Continuity of service

- Maintenance shall not compromise life safety systems unless alternate plans are recorded and communicated.
- Written procedures required for critical functions in event of equipment failure:
  - OR
  - ED
  - ICU
Continuity of service

• “Button down” and “Open up” procedures shall be written
ELECTRICAL

Clause 3.2.7.9. 1 outlines requirements for emergency power for building systems

References the Canadian Electrical Code, Part 1

Note: Also in ABC, OBC and BCBC

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Rule 24-306: \textit{Emergency Supply}

Generators and Essential Electrical Systems are Required in Class “A” Health Care Facilities

CAN/CSA-C282-05 covers the design, installation, operation, maintenance, and testing of emergency generators and associated equipment for providing an emergency power supply.
Rule 24-306: *Emergency Supply*

Generators and Essential Electrical Systems are Required in Class “A” Health Care Facilities

CSA-Z32-09 covers …the emergency supply required to provide electrical power …in which interruption of the normal supply can jeopardize effective and safe patient care, the safety of the health care facility staff and public safety
Mike Hickey in his office June 7, 2007; 08:20:59 hr
Mike Hickey in his office June 7, 2007; 08:21:00 hr
Mike Hickey in his office June 7, 2007; 08:21:10 hr
(Gensets did not transfer)
Single Line Diagrams – very important
CSA C282-09

• Oil Analysis
  – Gen sets for HCF’s shall have the oil tested after 24 hr run time after initial installation
    • Copper
    • Bronze
    • Water
    • Glycol
    • Other contaminants
    • Records to maintained for future comparison
CSA C282-09
(Information formally at §6.12 of CSA Z32-04)

• Clause 11.4 – Operations and Maintenance
  – Weekly Testing of EES in Class “A” HCF (as required by Z32-09)
  – Semi-Annual, Annual and Five year tests per Tables 2 to 6 (minimum frequency)
  – Permanent logs shall be maintained
CSA C282-09
(Information formally at §6.12 of CSA Z32-04)

• Maintenance and testing logs shall contain
  – Date of work
  – Parts replaced
  – Unsatisfactory conditions
  – Corrective action taken
  – Indication that all safety measure were engaged

• Maintenance and testing logs shall be on site
Electrical System Tests in CSA Z32-09

- Breakers – Mechanical Operation (annually)
- Receptacles retentive force test
  - Intermediate and critical care
    - Annual
  - Basic care areas
    - Bi-annual
  - At completion of renovation or construction
What’s wrong with this picture?
What’s wrong with this picture?
Which one is it?

- CSA Z305.1-92
- CSA Z7396.1-06
- CSA Z7396.1-09
- CSA Z7396.1-12 (when will it be)
Is Maintenance a Requirement??

- CSA Z305.1-92 IN
- CSA Z7396.1-06 OUT
- CSA Z7396.1-09 IN
- CSA Z7396.1-12 WAY IN!

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CAN/CSA Z305.1-92

- Mandatory part of the standard
- Part IV:
  - Testing of source of supply (semi-annual)
  - Cylinders in N₂O source of supply (daily)
  - Med-air & Vacuum (weekly)
  - Control Equipment (daily, semi-annual, annual)
  - Terminal Units (annual)
CSA Z7396.1-06

- Mandatory Language
- Non-mandatory Annex “E”:
  - HCF shall develop a maintenance program
  - Testing of source (semi-annual)
  - Cylinders in N₂O source of supply (daily)
  - Med-air & Vacuum (daily, weekly, semi-annual, annual)
  - Control Equipment (daily, semi-annual, annual)
  - Terminal Units (annual)
CSA Z7396.1-09

• Mandatory Language
• Mandatory Standard Section 15:
  – HCF administrator shall develop a maintenance program
  – Records shall be documented and maintained
  – Testing of source (semi-annual)
  – Med-air & Vacuum (daily, weekly, semi-annual, annual)
  – Control Equipment (daily, semi-annual, annual)
  – Terminal Units (annual)
CSA Z7396.1-09

• Inspection Information
• Normative (mandatory) Annex “D”;
  – Minimum flow requirements for terminal units
  – Test protocol added
  – Table D.4 = Δ test
    • Meant to test contribution of pipeline
    • Not a purity test for supply

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CSA Z7396.1-12

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- Mandatory Standard Section 15:
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CSA Z7396.1-12

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Standards Requirements
Heads Up!

• **New documents expected in the next few years:**
  – CSA Z8000-11 (just released)
  – CSA Z8001-16???
  – CSA Z320-11 (released) & CSA Z318-13
  – NFPA 99- 2012 (approved in the last few months)
  – CSA Z7396.1-12
  – CSA Z317.13-12
A few last statistics:

- While we have been talking:
  - 480 CT exams were performed
  - 160 MRI exams were performed
  - There were 18 car accidents
  - There were 8 heart attacks
  - 44 babies were born
  - 6 vasectomies were performed
A few closing thoughts:

• While we have been talking:
  – You were here
  – Was your hospital ready?
  – Are you prepared for anything?
Thank you

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