



FLORIDA HEALTHCARE ENGINEERING ASSOCIATION

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Complying with the TJC Utility-System Maintenance Standards

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The Joint Commission

• Issued July 1, 2014 •

Prepublication Requirements

The Joint Commission has approved the following revisions for prepublication. While revised requirements are published in the semiannual updates to the print manuals (as well as in the online E-dition®), accredited organizations and paid subscribers can also view them in the monthly periodical *The Joint Commission Perspectives*®. To begin your subscription, call 800-746-6578 or visit <http://www.jcrinc.com>.



Standards Revisions and Clarifications Related to Medical Equipment and Utility System Maintenance

APPLICABLE TO HOSPITALS

Effective July 2, 2014

Environment of Care (EC)

Standard EC.02.04.01

The hospital manages medical equipment risks.

The concepts of EPs 3 and 4 were merged in the revised EP 4.

C-3. The hospital identifies the activities, in writing, for maintaining, inspecting, and testing for all medical equipment on the inventory. (See also EC.02.04.03, EPs 2, 3, and 24)

Note: Hospitals may use different strategies for different items as appropriate. For example, strategies such as predictive maintenance, reliability-centered maintenance,

BACK GROUND

Changes in this section based on CMS requirements. Effective 7/1/14.



MEDICAL EQUIPMENT & UTILITIES

MED EQUIP EC.02.04.01 UTILITIES EC.02.05.01

- | | |
|---|--|
| <ul style="list-style-type: none">• EP 2: Medical Equipment Inventory<ul style="list-style-type: none">– NO Deemed Status: inventory of all equipment OR risk-based– Deemed Status: Inventory of all equipment | <ul style="list-style-type: none">•EP 2: Utilities Inventory<ul style="list-style-type: none">– NO Deemed Status: inventory of all components OR risk-based– Deemed Status: Inventory of all components |
|---|--|

MEDICAL EQUIPMENT & UTILITIES

MED EQUIP EC.02.04.01 UTILITIES EC.02.05.01

- Old EPs 3 & 4 omitted
 - Written maintenance, testing, and inspection procedures
 - Written frequencies
- Old EPs 3 & 4 omitted
 - Written maintenance, testing, and inspection procedures
 - Written frequencies

MEDICAL EQUIPMENT & UTILITIES

MED EQUIP EC.02.04.01 UTILITIES EC.02.05.01

- EP 3 (New): “The hospital identifies high-risk medical equipment on the inventory for which there is a risk of serious injury or death to a patient or staff member should the equipment fail.”
 - Includes life support equipment
- EP 3 (New): “The hospital identifies high-risk operating components of utility systems on the inventory for which there is a risk of serious injury or death to a patient or staff member should the component fail.”
 - Includes life support equipment

MEDICAL EQUIPMENT & UTILITIES

- EC.02.04.01 & EC.02.05.01
- EP 4 (New): Maintenance, testing, and inspection activities and frequencies based on manufacturers' recommendations or alternative equipment maintenance (AEM), which doesn't reduce safety and is based on accepted standards of practice

MEDICAL EQUIPMENT & UTILITIES

- | | |
|----------------------------------|---|
| MED EQUIP EC.02.04.01 | UTILITIES EC.02.05.01 |
| • Accepted Standards of Practice | • Accepted Standards of Practice |
| – AAMI | – Electrical Systems: NFPA 99, 1999 edition |
| | – ASHE Maintenance Management for Healthcare Facilities |

MEDICAL EQUIPMENT & UTILITIES

MED EQUIP EC.02.04.01 UTILITIES EC.02.05.01

Deemed Status:

- EP 5: Medical equipment requiring manufacturer's recommendations
 - Based on COPs, lasers, imaging, new equipment

Deemed Status:

- EP 5: Utilities components requiring manufacturer's recommendations
 - Based on COPs, new equipment

MEDICAL EQUIPMENT & UTILITIES

MED EQUIP EC.02.04.01 UTILITIES EC.02.05.01

- | | |
|---|---|
| <ul style="list-style-type: none">• EP 6: Use of written criteria by qualified individual(s) to justify alternative equipment maintenance• EP 7: Identify items under AEM on inventory | <ul style="list-style-type: none">• EP 6: Use of written criteria by qualified individual(s) to justify alternative equipment maintenance• EP 7: Identify items under AEM on inventory |
|---|---|

MEDICAL EQUIPMENT & UTILITIES

MED EQUIP EC.02.04.01 UTILITIES EC.02.05.01

- Re-numbering:
 - SMDA becomes EP 8 (formerly 5)
 - Written failure procedures becomes EP 9 (formerly 6)
- Re-numbering:
 - Waterborne pathogens becomes EP 14 (formerly 5)
 - Airborne contaminants becomes EP 15 (formerly 6)
 - Mapping distribution becomes EP 16 (formerly 7)



MEDICAL EQUIPMENT & UTILITIES

MED EQUIP EC.02.04.03 UTILITIES EC.02.05.05

- EP 1: Performance and Safety Testing
 - NO Deemed Status: Before initial use
 - Deemed Status: Before initial use and after major repairs or upgrades
- EP 1: Testing
 - NO Deemed Status: Before initial use
 - Deemed Status: Before initial use and after major repairs or upgrades

MEDICAL EQUIPMENT & UTILITIES

MED EQUIP EC.02.04.03 UTILITIES EC.02.05.05

- EP 2: Change “life support” to “high risk”
 - High risk includes life support
- EP 3: Change “non-life support” to “non-high risk”
- EP 3: Change “life support” to “high risk”
 - High risk includes life support
- EP 5: Change “non-life support” to “non-high risk”
- NOTE: EP 4, Infection Control, remains unchanged

UTILITY SYSTEMS & COMPONENTS

- Systems
 - Support use & function of physical environment
 - Heating, cooling, water distribution, etc.
- Components
 - Performance related & delivers measurable outcome
 - Heating: boiler, de-aeration tank, feed water pumps, circulation pumps, condensate return
 - System would fail if component failed

OTHER INFORMATION

HIGH RISK

- Based on risk assessment
- More than life support & infection control

QUALIFIED INDIVIDUAL

- Based on job description

MEDICAL EQUIPMENT

- ALL diagnostic imaging or radiology equipment must be tested according to manufacturers' recommendations
- Includes ultrasound equipment

Dilemma on Compliance

- The hospital maintains a written inventory of all operating components of utility systems.
 - According to 'ASHE Listserve' a hospital was cited for not listing steam traps in their inventory
 - If steam traps should be listed, what about pressure reducing stations, light ballasts, etc.?
- What is an alternative equipment maintenance (AEM) program?
 - 'Run-to-fail' given as an example in *EC News*
- A **qualified** individual(s) uses written criteria...
 - How are we qualified? ...CHFM?

Sample Policy & Procedure

- TITLE: Utility Systems and Equipment Maintenance Strategies
- PURPOSE: The primary goal of maintenance is to avoid or mitigate the consequences of equipment or system failure. Preventive Maintenance is designed to preserve and restore equipment reliability by replacing worn components before they actually fail. Preventive maintenance activities may include partial or complete overhauls, oil changes, lubrication, etc. at specified intervals of time. In addition, equipment deterioration can be monitored during periodic inspections so worn parts can be replaced or repaired before they cause system failure. The ideal preventive maintenance program would prevent all equipment failure before it occurs.
- POLICY: Differing maintenance strategies are utilized to ensure optimal operation and service of utility systems and equipment that support the healthcare physical environment. Preventive maintenance strategies are used for critical systems that provide life support or infection control service and would also be used to extend the life of major, capital intensive, systems and equipment. Meanwhile, various components of the same systems may have minimal or no effect on the overall operation of the system and may thus use "Run-to-Fail" strategy while other components of the same system require specific periodic preventive maintenance.

Sample Policy & Procedure, cont.

- **PROCEDURE:** The attached chart outlines equipment maintenance strategies for the various utility systems and equipment at this organization. A detailed list of equipment with its specific scheduled maintenance procedures and tasks is maintained in the computerized maintenance management system (CMMS). Maintenance procedures are typically as recommended by the manufacturer of the equipment. Components of equipment or systems, such as individual light fixtures, steam traps, thermostats, etc. utilize a "run-to-fail" alternative equipment maintenance (AEM) strategy that requires users or maintainers (through a zone maintenance program) to identify failed components needing replacement or repair by calling the Engineering Services department.
- This maintenance strategy developed by a Certified Healthcare Facilities Manager (CHFM).

Sample Policy & Procedure, cont.

MAINTENANCE STRATEGIES

SYSTEM	SCHEDULED MAINTENANCE				PREDICTIVE MAINTENANCE	RUN-TO-FAIL
	HIGH RISK (LIFE SUPPORT/CRITICAL) 100% PM COMPLETION RATE	INFECTION CONTROL 100% PM COMPLETION RATE	LIFE SAFETY and CODE REQUIRED TESTING 100% PM COMPLETION RATE	NON-HIGH RISK UTILITY SYSTEMS & EQUIP. 100% PM COMPLETION RATE		
Electrical Distribution System			Line Isolation Monitors GFI Receptacle Testing Receptacle testing in critical care areas	Main Electrical Panels Motor Control Center Panels UPS / Power Conditioners	Infrared scan of all electrical switchgear, including transformers	All other electrical system components without specific PM
Lights and Lighting Systems			Exit Lights, including battery exit and egress lights	Battery operate task lighting		All other lighting system components without specific PM
Emergency Power System	Emergency Generators Automatic Transfer Switches Generator Day tank & fuel oil delivery system		Emergency Generators and Transfer Switches	Emergency power paralleling gear	Infrared scan of all emergency switchgear Fuel oil testing Generator oil analysis	All other components without specific PM, such as egress lighting
Vertical and Horizontal Transport Systems			Fireman Service Testing Load Testing (by Elev. Contractor)	Elevators & Dumbwaiters Pneumatic Tube System		All other components without specific PM
Heating				Steam to hot water heat exchangers & controls Hot Water circulating pumps		Temperature Controls and all other components of Heating System without specific PM
Ventilating (exhaust systems)		Airborne Infectious Isolation (AII) room pressure monitoring All pressure monitor calibration Exhaust Fans - for All rooms & SPD Decontamination	Periodic air flow monitoring with air change rate calculations for All rooms and other critical areas	Exhaust Fans - General Laminar Flow Hoods Dietary Exhaust Hoods		All other components without specific PM
Air Conditioning & Refrigeration		Air Handling Units (Surgery, Delivery, Cath Lab and other critical areas) OR, Delivery, sterile storage & other positive pressure rooms Ice Machines & Ice Dispensers	Temperature & RH monitoring in anesthetizing locations Periodic air flow monitoring with air change rate calculations for critical areas	Air Handling Units - non-critical CW & DX Fan Coil Units Chillers Cooling Towers Chilled Water and Condenser Water Pumps Chilled/Condenser water strainers & filters Water Treatment System (chillers & cooling towers) Variable Speed Drives Freon Monitoring System Air Curtains Refrigerators & Freezers	Chiller oil analysis	All other components without specific PM

Sample Policy & Procedure, cont.

MAINTENANCE STRATEGIES

SYSTEM	SCHEDULED MAINTENANCE				PREDICTIVE MAINTENANCE	RUN-TO-FAIL
	HIGH RISK (LIFE SUPPORTS/CRITICAL) 100% PM COMPLETION RATE	INFECTION CONTROL 100% PM COMPLETION RATE	LIFE SAFETY and CODE REQUIRED TESTING 100% PM COMPLETION RATE	NON-HIGH RISK UTILITY SYSTEMS & EQUIP. 90% PM COMPLETION RATE		
Plumbing			Emergency Eyewash Emergency Showers Backflow Preventers	Domestic Hot Water Heaters Domestic Hot Water circulating pumps Domestic water house pumps (for upper floors) Hot water temperature monitoring Grease Trap Sump Pumps Garbage Disposal units		All other components without specific PM
Boiler and Steam				Boilers Dewarator and Boiler Feed Pumps Boiler Water Treatment system Boiler Feedwater Softener Condensate Pumps		Steam pressure regulation, steam traps, valves and all other components without specific PM
Medical Gas and Vacuum	Medical Gas Alarm Panels			Medical Gas System Medical Air Compressor & accessories Medical Vacuum Pump & accessories		All other components without specific PM
Communication Systems and Equipment	Code Blue System			Telephone System Nurse Call and Intercoms (except code blue) Overhead Music and Paging System Televisions and RF antenna system Security CCTV system		All other systems and components without specific PM
Special Systems, including Fire Safety/Warning		Scrubbers	Fire Alarm System Fire Sprinkler System, including fire pump Annual Kitchen Hood suppression system FM-200 Suppression systems (IT, NRI, etc.) Fire & Smoke Door Inspections Fire & Smoke Damper Inspections Fire Extinguishers	Building Automation System Temperature control air compressor/dryers, etc. Security Systems - Nursery, OR, Pharmacy, etc. Air Compressors - Process air		N/A - all components inspected or tested periodically

Sample Policy & Procedure, cont.

SYSTEM	SCHEDULED MAINTENANCE				PREDICTIVE MAINTENANCE	RUN-TO-FAIL
	HIGH RISK (LIFE SUPPORTS/CRITICAL) 100% PM COMPLETION RATE	INFECTION CONTROL 100% PM COMPLETION RATE	LIFE SAFETY and CODE REQUIRED TESTING 100% PM COMPLETION RATE	NON-HIGH RISK UTILITY SYSTEMS & EQUIP. 90% PM COMPLETION RATE		
Special Equipment		Kitchen Dishwasher		Food Services Equipment Automatic Doors Surgery Tables Warming Cabinets Patient Beds, Crib, etc. Stretchers and Wheelchairs Dock Levelers Compactors (trash and baller) Fountain / Pool pumps Washer/Dryer (EVS)		All other components without specific PM



MSL HEALTHCARE CONSULTING, INC.

Summary:

MAINTENANCE STRATEGIES

SYSTEM	SCHEDULED MAINTENANCE		RUN-TO-FAIL CORRECTIVE MAINTENANCE / SERVICE CALL RESPONSE PROGRAM
	HIGH RISK (LIFE SUPPORT/CRITICAL) 100% PM COMPLETION RATE	INFECTION CONTROL 100% PM COMPLETION RATE	
Emergency Power System	Emergency Generators Automatic Transfer Switches Generator Day tank & fuel oil delivery system		All other components without specific PM, such as egress lighting
Ventilating (exhaust systems)		Airborne Infectious Isolation (All) room pressure monitoring All pressure monitor calibration Exhaust Fans - for All rooms & SPD Decontamination	All other components without specific PM
Air Conditioning & Refrigeration		Air Handling Units (Surgery, Delivery, Cath Lab and other critical areas) OR, Delivery, sterile storage & other positive pressure rooms Ice Machines & Ice Dispensers	All other components without specific PM
Medical Gas and Vacuum	Medical Gas Alarm Panels		All other components without specific PM
Communication Systems and Equipment	Code Blue System		All other systems and components without specific PM
Special Systems, including Fire Safety/Warning		Sterilizers	N/A - all components inspected or tested periodically
Special Equipment		Kitchen Dishwasher	All other components without specific PM

The Survey Process:

according to TJC...

- Accuracy of inventory surveyed to determine all high risk and infection control equipment are identified, PM frequencies clearly defined, and work completed per schedule.
- Interviews with the department leader would cover how the inventory was created, details of the AEM program, and how effectiveness is monitored; e.g. what criteria is used as well as evaluation of completion rates of maintenance activities.

The Survey Process, cont.

- Surveyor may ask for proof of following manufacturer recommendations.
 - Be prepared to compare manufacturer recommendations with PM procedures and tasks for **critical** equipment.
- To evaluate effectiveness of the maintenance strategy, a surveyor may interview equipment users.
 - George's example was if he noticed heavy use of patient blankets, this could indicate a problem with the heating system.

2014-2015 TJC STANDARDS CHANGES


DIAGNOSTIC IMAGING



DIAGNOSTIC IMAGING STANDARDS - AGAIN

- Prepublication standards issued 1/9/15
- Effective 7/1/15
- Similar to previous release
- Based on input from experts, professional organizations, and healthcare organizations

EC.02.01.01 SAFETY & SECURITY RISKS

- EP 14: MRI Safety Risks
 - Patient safety issues (claustrophobia, implants, etc.)
 - Ferromagnetic objects
 - Acoustic noise
- EP 16: MRI Restricted access 
 - Screening for scanner room and zone 3
 - Under supervision of those trained in MRI safety
 - Signage: potentially dangerous magnetic fields; always on

EC.02.02.01 HAZMAT & WASTE

- EP 17: Staff Dosimetry
 - CT, PET, and nuclear medicine staff
 - Results reviewed at least quarterly
 - ALARA
- NOTE: Radiology dosimetry covered in EP 18

EC.02.04.01 MEDICAL EQUIPMENT

- Establish quality control & maintenance activities
- Maintenance frequencies
 - CT
 - PET
 - MRI
 - Nuclear Medicine

EC.02.04.03 MED EQUIPT MAINTENANCE

- EP 15: Maintain quality of images
- EP 17: Annual measurement of CT radiation dose
- EP 19: Annual performance evaluation of all CT equipment
- EP 20: Annual performance evaluation of all MRI equipment



EC.02.04.03 MED EQUIPT MAINTENANCE

- EP 21: Annual performance evaluation of all nuclear medicine equipment
- EP 22: Annual performance evaluation of all PET equipment
- EP 23: Annual performance testing of all of the above includes testing of image acquisition display monitors

EC.02.06.05 CONSTRUCTION & RENOVATION

- EP4: Structural shielding design assessment prior to installation or replacement of imaging equipment
- EP 6: Radiation protection survey to verify adequacy of shielding after equipment installation or construction
 - CT, PET, Nuclear Medicine

JOINT COMMISSION TOP TEN

TOP TEN – 2014

1. EC.02.06.01: Safe Environment (56%)
2. EC.02.05.01: Utility Risks (53%)
3. IC.02.02.01: Infections associated with Medical Equipment, etc. (52%)
4. LS.02.01.20: Means of Egress (50%)
5. ~~RC.01.01.01: Accurate Medical Records (49%)~~

TOP TEN - 2014

6. EC.02.03.05: Fire Safety Equipment (48%)
7. LS.02.01.10: Fire Doors & Penetrations (46%)
8. LS.02.01.35: Extinguishing Systems (43%)
9. LS.02.01.30: Protection from Fire & Smoke (43%)
10. EC.02.02.01: HazMat (36%)

#1 SAFE ENVIRONMENT



Non-Flammable Medical Gas Volume & Storage



- 12 'E' cylinders (<300ft³) per smoke compartment (22,500ft³) may be open to the egress corridor in a rack or appropriate holders
- Between 300 and 3000ft³ must be stored in a room that is limited construction with doors that can be locked
- "In use" verses "in storage"
 - Properly secured to a gurney is considered "in use"
 - Properly racked is "in storage"
 - *Empty* are NOT considered part of the 12 *in storage*
 - *Empty* and *full* must be stored (racked) separately

#2 UTILITY RISKS



Ventilation Requirements for Functional Areas

Functional Areas	Airflow	Min. # air exchanges/hr AAMI/ANSI ST-79	Min. # air exchanges/hr AIA (2001)	Min. # air exchanges/hr AIA(2010)	All air exhausted directly to the outdoors?
Soiled/Decontamination	Negative(in)	10	6	6	Yes
Sterilizer equipment access	Negative(in)	10	10	10	Yes
Sterilizer loading/unloading	Positive (out)	10	---	4	Yes
Restrooms/Housekeeping	Negative (in)	10	10	10	Yes
Preparation and Packaging	Positive (out)	10 (down - draft type)	4	4	No
Textile pack room	Positive(out)	10 (down - draft type)	---	---	No
Clean/sterile storage	Positive(out)	4 (down - draft type)	4	4	No

Temperature	(AAMI Guidelines)	AIA(2001)	AIA(2010)
General work areas	68-73 deg. F (20-23 degC)	75 deg. F	72-78 deg. F
Decontamination	60-65 deg. F (16-18 degC)	68-73 deg. F	72-78 deg. F
Sterilization equipment access room	75-85 deg. F (24-29 degC)	no requirements	no requirements
Sterile storage/support areas	75 deg. max. (max 24 deg. C)	75 deg. F	72-78 deg. F
Relative Humidity	(AAMI Guidelines)		
all work areas except Sterile Storage	30-60%	30-60%	max. 60%
Decontamination	30-60%	no requirements	no requirements
prep/packaging	Ideal is 50% not less than 35% RH	30-60%	max. 60%
Sterile Storage	should not exceed 70% max.	70% max.	max. 60%

Monitor and document temperature and humidity levels daily in all areas of department

AAMI = Association for the Advancement of Medical Instrumentation ; AIA = American Institute of Architects (now Facility Guidelines Institute)

NOTE: THIS JUST IN

ASHRAE voted in July 2013 to move endoscopy procedure rooms from positive to N/A. FGI is planning on releasing this in the November publication of the 2014 FGI Guidelines.

Therefore, if an organization had made a documented decision based on risk assessment to no longer monitor endoscopy procedure rooms as per the 2013 ASHRAE action, we would accept this.

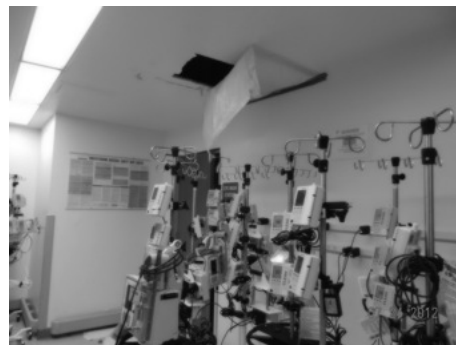
If the organization has not made a documented decision, the room should be evaluated as per the below table and construction date.

No change to bronchoscopy procedure rooms.

GUIDELINES VENTILATION TABLE: ENDOSCOPY & BRONCHOSCOPY

Edition	ENDOSCOPY				BRONCHOSCOPY	
	PROCEDURE		PROCESSING (CLEANING)		PROCEDURE	
	PRESSURE	DIRECT EXHAUST	PRESSURE	DIRECT EXHAUST	PRESSURE	DIRECT EXHAUST
2014 (pending)	N/A	N/A	Negative (-)	YES	Negative (-)	YES
2010	Positive (+)	N/A	Negative (-)	YES	Negative (-)	YES
2006	Neutral	N/A	Negative (-)	YES	Negative (-)	YES
2001	Negative (-)	N/A	N/A	N/A	Negative (-)	YES
1996/1997	N/A	N/A	N/A	N/A	Negative (-)	YES
1992/1993	N/A	N/A	N/A	N/A	N/A	N/A
1987	N/A	N/A	N/A	N/A	N/A	N/A
1979	N/A	N/A	N/A	N/A	N/A	N/A

#3 MEDICAL EQUIPMENT STORAGE



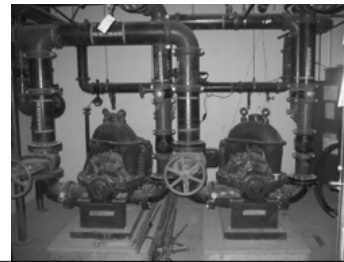
#4 MEANS OF EGRESS



#4 MEANS OF EGRESS



#6 FIRE SYSTEM TESTING



#7 FIRE DOORS & PENETRATIONS



#7 FIRE DOORS & PENETRATIONS



#8 EXTINGUISHING SYSTEMS



#9 PROTECTION FROM FIRE/SMOKE



#10 HAZARDOUS MATERIALS/AREAS



#10 HAZARDOUS MATERIALS/AREAS

Access to MRI Zones 3 and 4 without being screened





Questions?

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