EMGS
Environmental & Medical Gas Services Inc.

ALABAMA SOCIETY FOR HEALTHCARE ENGINEERING

Building an Effective Medical Gas Compliance Program

August 9th, 2023

Speaker Info

Cary Darden

- 22 years of medical gas inspection / verification and maintenance experience
- MGPHO (Medical Gas Professional Healthcare Org) VP of Credentials
- Licensed medical gas installer (6010), inspector (6020), verifier (6030), bulk gas verifier (6035), maintenance tech (6040) and instructor (6050)

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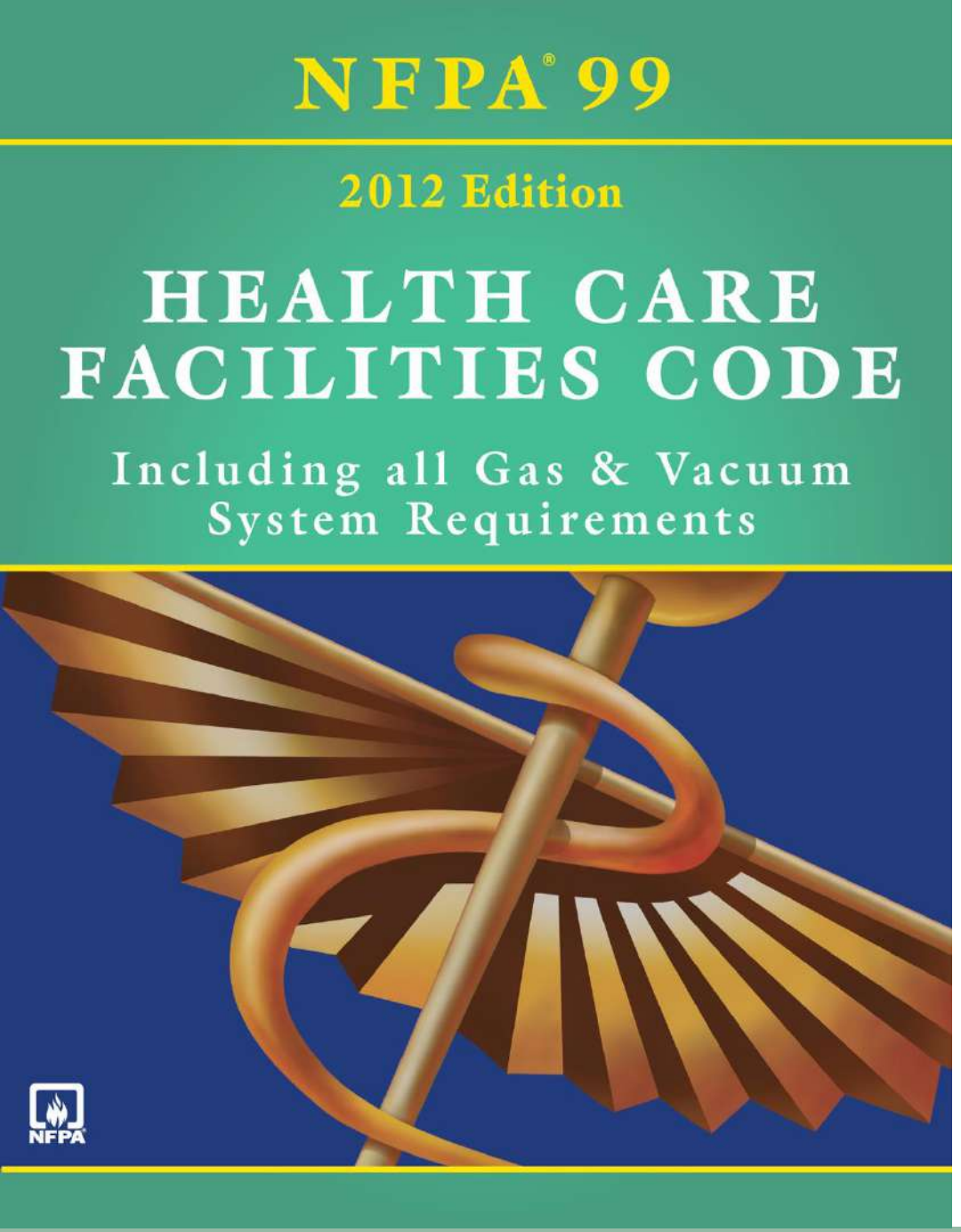

NFPA 99 – 2012 edition

- This is the edition of record for this discussion

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NFPA 99 – 2024 edition

- This is the newest edition of NFPA 99

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4 KEY QUESTIONS

- WHAT must be inspected & maintained?
- WHEN must it be inspected or maintained?
- HOW must it be inspected or maintained?
- WHO can perform these activities?

WHAT MUST BE INSPECTED & MAINTAINED?

Know Your Inventory

- Central supply systems
- Valves
- Alarms
- Outlets
- Manufactured Assemblies (such as booms)

Central Supply Systems

- Bulk Oxygen

Central Supply Systems

- Bulk Oxygen
- Medical Air Compressors

Central Supply Systems

- Bulk Oxygen
- Medical Air Compressors
- Instrument Air Compressors

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- Instrument Air Compressors
- Medical Vacuum Pumps
  - Waste Anesthetic Gas Disposal (WAGD)

Central Supply Systems

- Bulk Oxygen
- Medical Air Compressors
- Instrument Air Compressors
- Medical Vacuum Pumps
  - Waste Anesthetic Gas Disposal (WAGD)
- Manifolds

Valves Part 1

- Source Valves
  - Isolates the entire piping system, located at the central supply system

Valv

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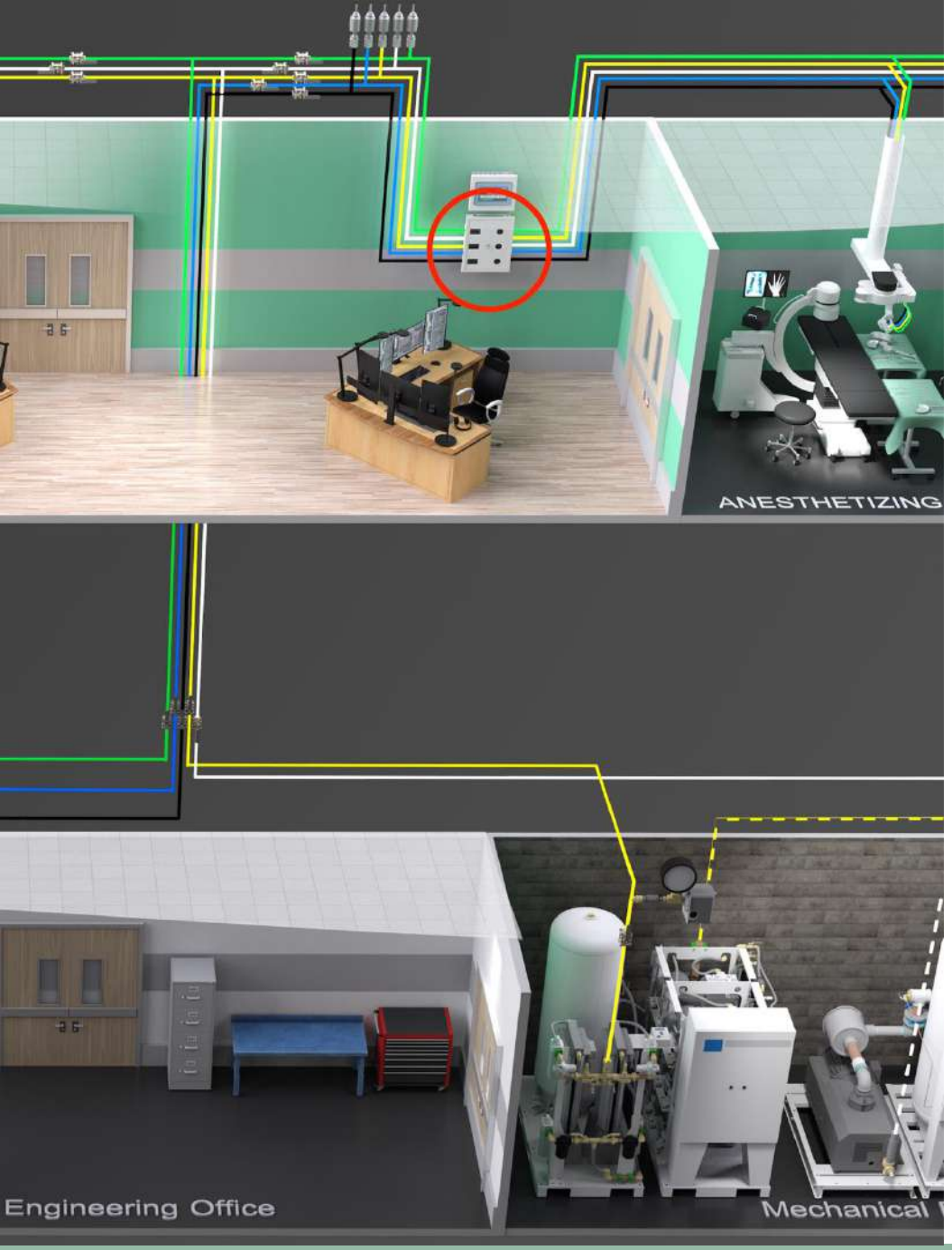

Valves Part 2

- Riser Valves
  - Isolates the vertical piping connecting individual floors
- Service Valves
  - Isolates lateral branch piping from mains or risers
- Zone Valves
  - Isolates individual rooms / areas

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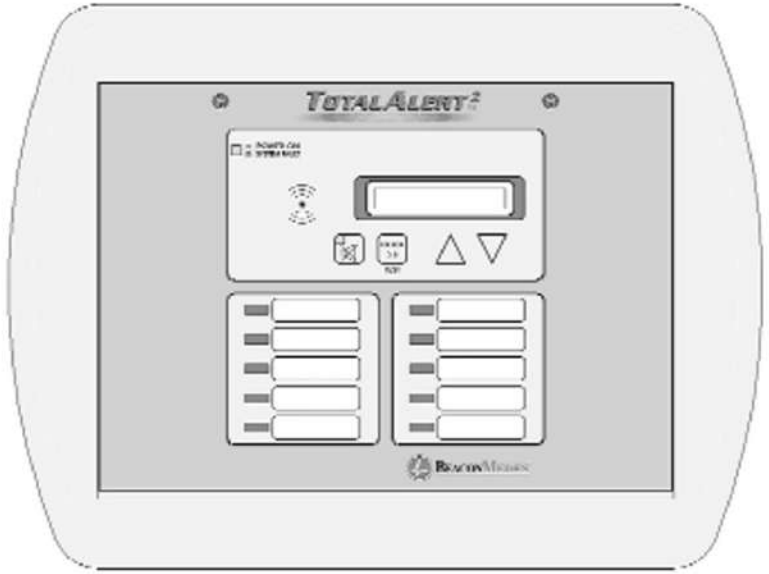

Alarms

- Master Alarms
  - Monitors the central supply systems and main line pressures

Alarms

- Master Alarms
  - Monitors the central supply systems and main line pressures
- Area Alarms
  - Monitors individual rooms / areas

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Outlets (Patient Terminals)

- Located within the patient care spaces
- Update this inventory often
- Physical changes
  - Construction & Renovation
- Logistical changes
  - Areas renamed
  - Change of use not involving construction

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Booms & Articulating Assemblies

- Complete list of any booms in facility

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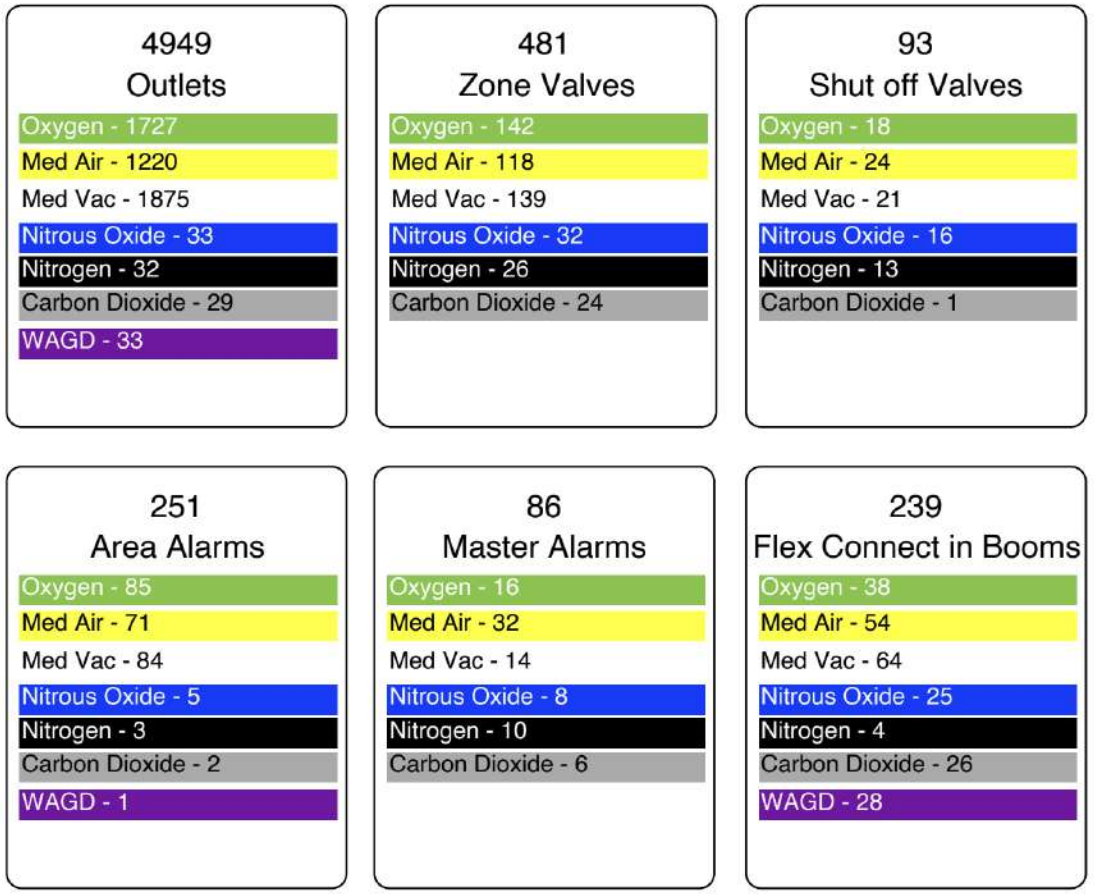
RECAP # 1



- Identify your inventory
- Organize by equipment type
- Update any time alterations are made
  - Physical alterations
  - Logistical alterations (decommissioning)

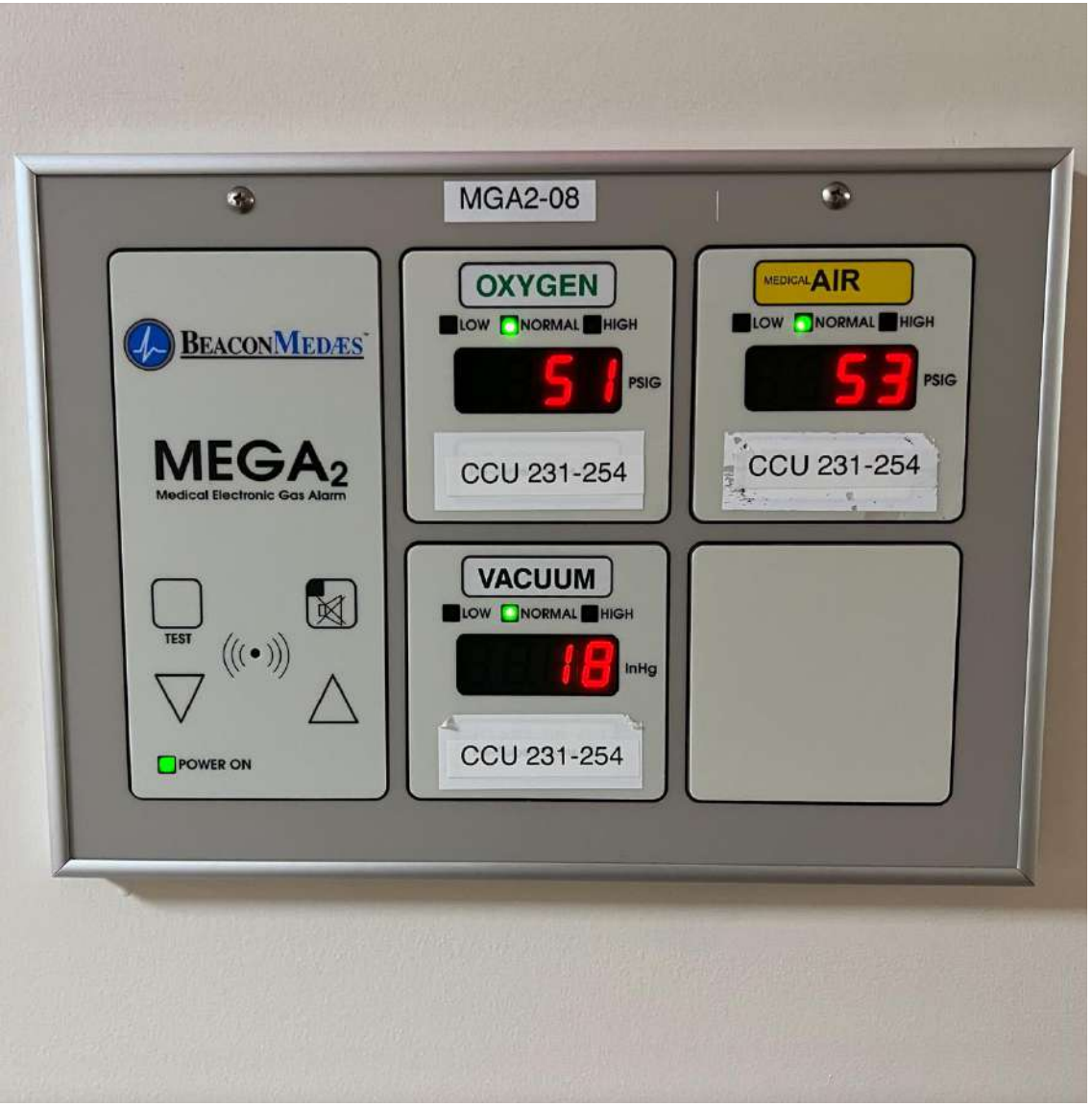
Poll Question

- How must zone valves & area alarms be labeled according to NFPA 99?

A. With every individual room number listed

B. With room ranges & areas served

C. Determined by facility's risk assessment



Area Alarm & Zone Valve Labeling

- There is no requirement within NFPA 99 to list every individual room number.
- NFPA 99 added an annex reference in the 2015 edition to help clear up this confusion
- A.5.1.11.2.7 (2015 & 2018 editions)
- A.5.1.11.2.8 (2021 edition)

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NFPA 99 – 2015 & 2018 edition

A.5.1.11.2.7

It is not intended that every room be listed on the label, but an area that is easily identifiable by staff needs to be indicated. This can be accomplished with text or by graphical means such as a map or color coding. The label should be permanently affixed outside and near valve box. The label should not be affixed to a removable cover.

WHEN MUST MED GAS SYSTEMS BE TESTED OR MAINTAINED?

Primary determining factors:

1. NFPA 99 existing facility requirements
2. Facility's definition of "periodic"
3. Manufacturer recommendations

Poll Question

- How often must medical gas outlets & inlets be tested?

A. Only when the piping is altered or changed
B. Annually
C. Determined by facilities risk assessment

Testing & PM Frequencies

- NFPA 99 doesn't **mandate** exactly how often medical gas outlets must be tested
- Determined via risk assessment & manufacturer's recommendations – NFPA 99
  - NFPA 99 – 2012
  - 5.1.14.2.2.2 – inspection schedules
  - 5.1.14.2.2.4 – maintenance schedules

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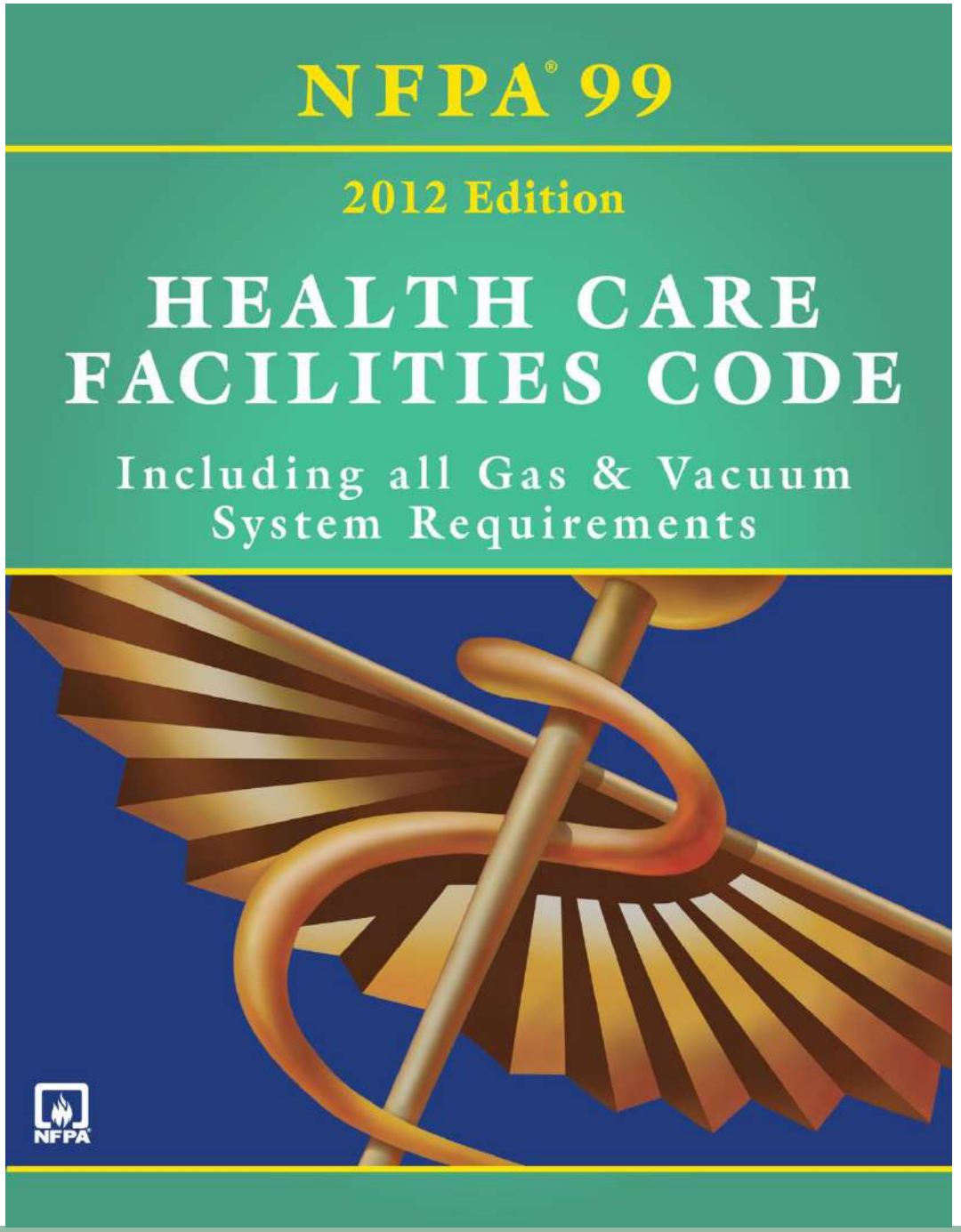

Testing & PM Frequencies

- There are only (4) items with a specified time requirement (within NFPA 99 – 2012)
- All other frequencies are established via:
  - risk assessment
  - manufacturer's recommendations

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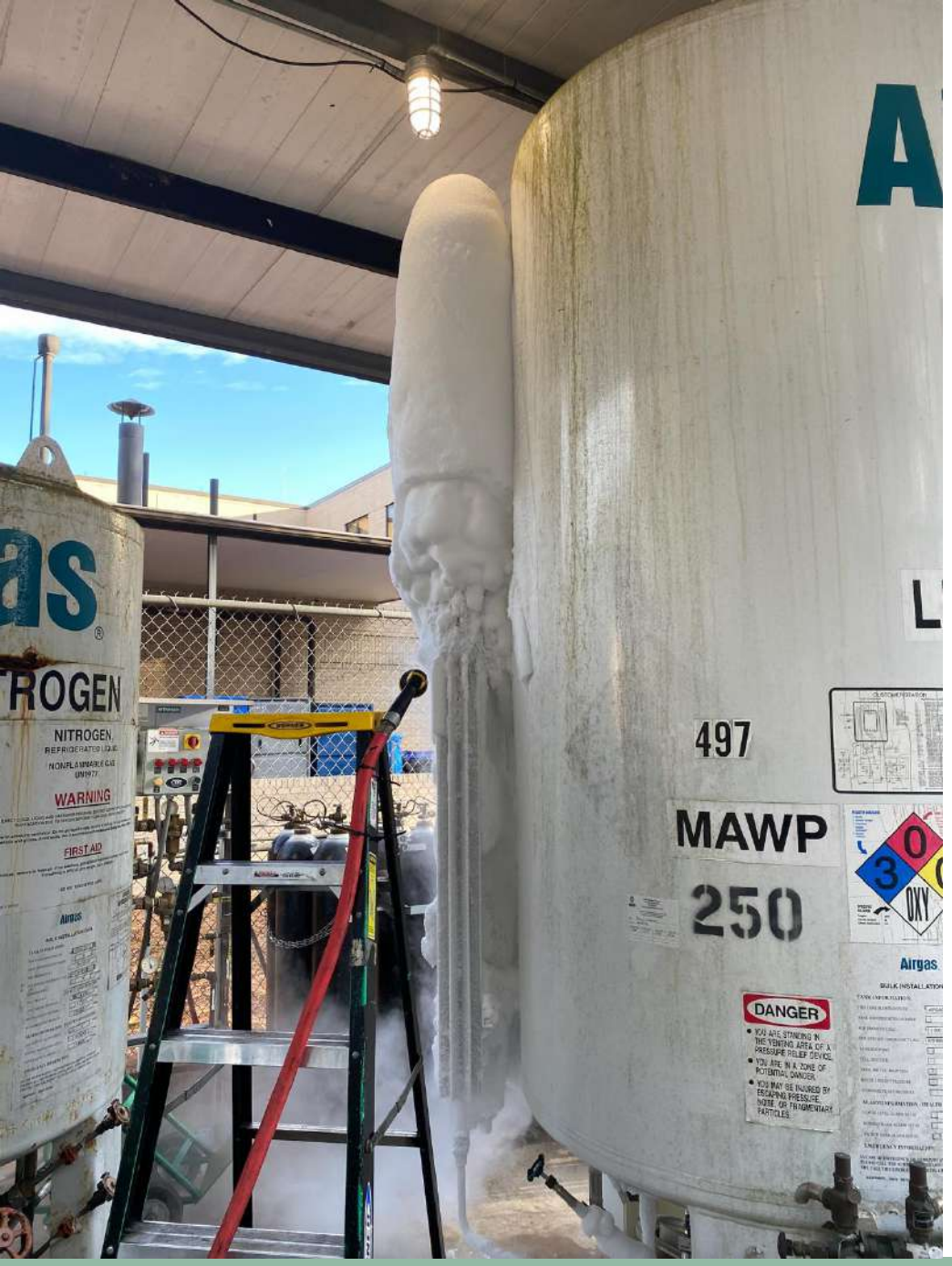
NFPA 99 Testing & PM Frequencies - 1

- Boom testing frequency
  - Every 18 months
  - Per manufacturer's recommendations
  - Determined by risk assessment



NFPA 99 Testing & PM Frequencies - 2

- Bulk system capacity
  - Annually
- Vaporizer sizing – UPON THE REQUEST OF THE FACILITY
- Coordinate these with your bulk system supplier

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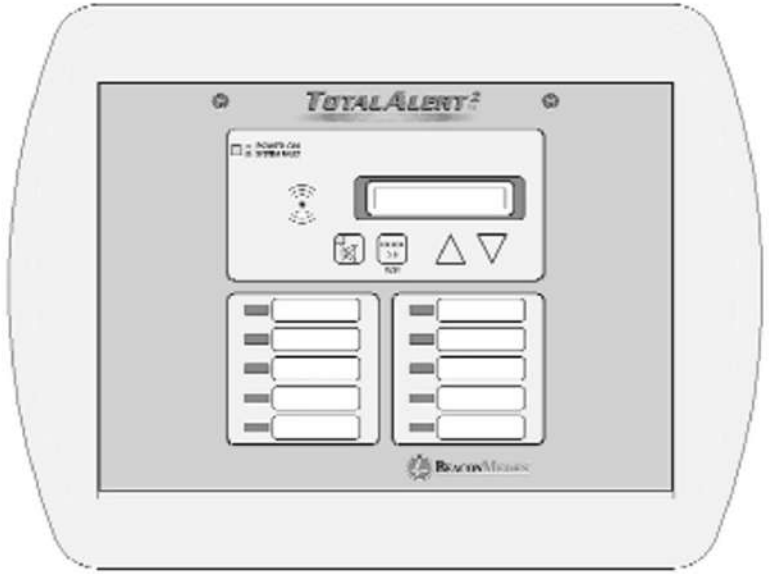
NFPA 99 Testing & PM Frequencies - 3

- Central supply systems
  - Inspected annually



NFPA 99 Testing & PM Frequencies – CENTRAL SUPPLY SYSTEMS

- Master Alarms
  - Check these annually along with your central supply systems

NFPA 99 Testing & PM Frequencies - 4

- Med Air CO monitor calibration
  - Annually ***OR***
  - More often if manufacturer recommends it

NFPA 99 Testing & PM Frequencies – CO MONITOR CAL

MANUFACTURER:	MODEL:	FREQUENCY OF CALIBRATION PER O&M:	CAL GAS REQUIRED:
Amico / KWJ	A310 / A316	Every 3 months	100 PPM
Enmet	CO-Guard	Every 3 months	20 PPM
Enmet	MedAir 2200	Every 3 months	20 PPM
Enmet	ISA-RAL-M	Every 3 months	20 PPM
GFG	ABL-50 / RAM-50	Every month	20 PPM
GFG	ABL-4021 / RAM-4021 / 4021-DPX	Every month	20 PPM
GFG	4035 / 4035-22	Every month	20 PPM

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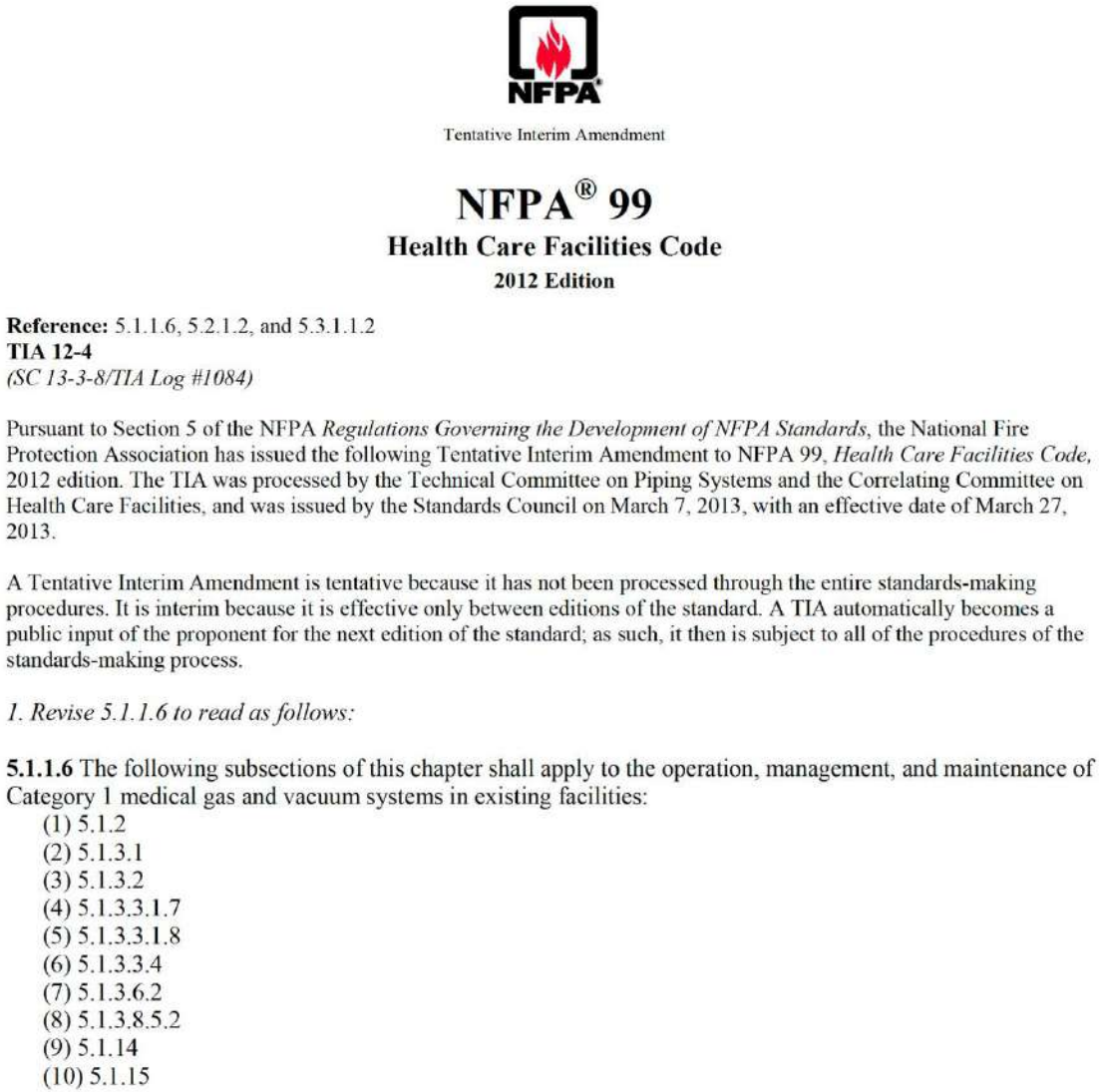
HOW MUST MED GAS SYSTEMS BE TESTING OR MAINTAINED?

Primary determining factors:

1. NFPA 99 existing facility requirements
2. Facility's risk assessment
3. Manufacturer recommendations



Tentative Interim Amendment

NFPA® 99

Health Care Facilities Code

2012 Edition

Reference: 5.1.1.6, 5.2.1.2, and 5.3.1.1.2
TIA 12-4
(SC 13-3-8/TIA Log #1084)

Pursuant to Section 5 of the NFPA *Regulations Governing the Development of NFPA Standards*, the National Fire Protection Association has issued the following Tentative Interim Amendment to NFPA 99, *Health Care Facilities Code*, 2012 edition. The TIA was processed by the Technical Committee on Piping Systems and the Correlating Committee on Health Care Facilities, and was issued by the Standards Council on March 7, 2013, with an effective date of March 27, 2013.

A Tentative Interim Amendment is tentative because it has not been processed through the entire standards-making procedures. It is interim because it is effective only between editions of the standard. A TIA automatically becomes a public input of the proponent for the next edition of the standard; as such, it then is subject to all of the procedures of the standards-making process.

1. Revise 5.1.1.6 to read as follows:

5.1.1.6 The following subsections of this chapter shall apply to the operation, management, and maintenance of Category 1 medical gas and vacuum systems in existing facilities:

(1) 5.1.2
(2) 5.1.3.1
(3) 5.1.3.2
(4) 5.1.3.3.1.7
(5) 5.1.3.3.1.8
(6) 5.1.3.3.4
(7) 5.1.3.6.2
(8) 5.1.3.8.5.2
(9) 5.1.14
(10) 5.1.15

Proper application of NFPA 99

- 5.1.1.5 – applies to new work that alters piping
  - Includes most of chapter 5
- 5.1.1.6 (TIA 12-4) – applies to existing facilities
  - TIA 12-4 lists just (10) paragraphs that apply to existing facilities

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(1) 5.1.2
(2) 5.1.3.1
(3) 5.1.3.2
(4) 5.1.3.3.1.7
(5) 5.1.3.3.1.8
(6) 5.1.3.3.4
(7) 5.1.3.6.2
(8) 5.1.3.8.5.2
(9) 5.1.14
(10) 5.1.15

Existing Facility Requirements

- 5.1.1.6 as modified by TIA 12-4
- Use these (10) references as the guide for building your medical gas compliance policy
- Scan QR code to see copy of TIA 12-4

5.1.14.2.3 Inspection and Testing Operations.

5.1.14.2.3.1 General.

The elements in 5.1.14.2.2.2 through 5.1.15 shall be inspected or tested as part of the maintenance

(1)* Medical air source, as follows:
  (a) Room temperature
  (b) Shaft seal condition
  (c) Filter condition
  (d) Presence of hydrocarbons
  (e) Room ventilation
  (f) Water quality, if so equipped
  (g) Intake location
  (h) Carbon monoxide monitor calibration
  (i) Air purity
  (j) Dew point

(2)* Medical vacuum source — exhaust location

(3) WAGD source — exhaust location

(4)* Instrument air source — filter condition

(5)* Manifold sources (including systems complying with 5.1.3.5.10, 5.1.3.5.11, 5.1.3.5.12, and 5.1.3.5.13), as follows:
  (a) Ventilation
  (b) Enclosure labeling

(6) Bulk cryogenic liquid source inspected in accordance with NFPA 55, *Compressed Gases and Cryogenic Fluids Code*

(7) Final line regulation for all positive pressure systems — delivery pressure

(8)* Valves — labeling

(9)* Alarms and warning systems — lamp and audio operation

(10) Alarms and warning systems, as follows:
  (a) Master alarm signal operation
  (b) Area alarm signal operation
  (c) Local alarm signal operation

(11)* Station outlets/inlets, as follows:
  (a) Flow
  (b) Labeling
  (c) Latching/delatching
  (d) Leaks

How to test equipment – NFPA 99 requirements

- Section 5.1.14.2.3.1 gives specifics for each category of equipment
- Pay attention to annex material! (*)

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Booms & Articulating Assemblies

- Testing complies with NFPA 99 – 2012 edition ref. 5.1.14.2.3.2
- Separate report (or section) showing where they have been tested

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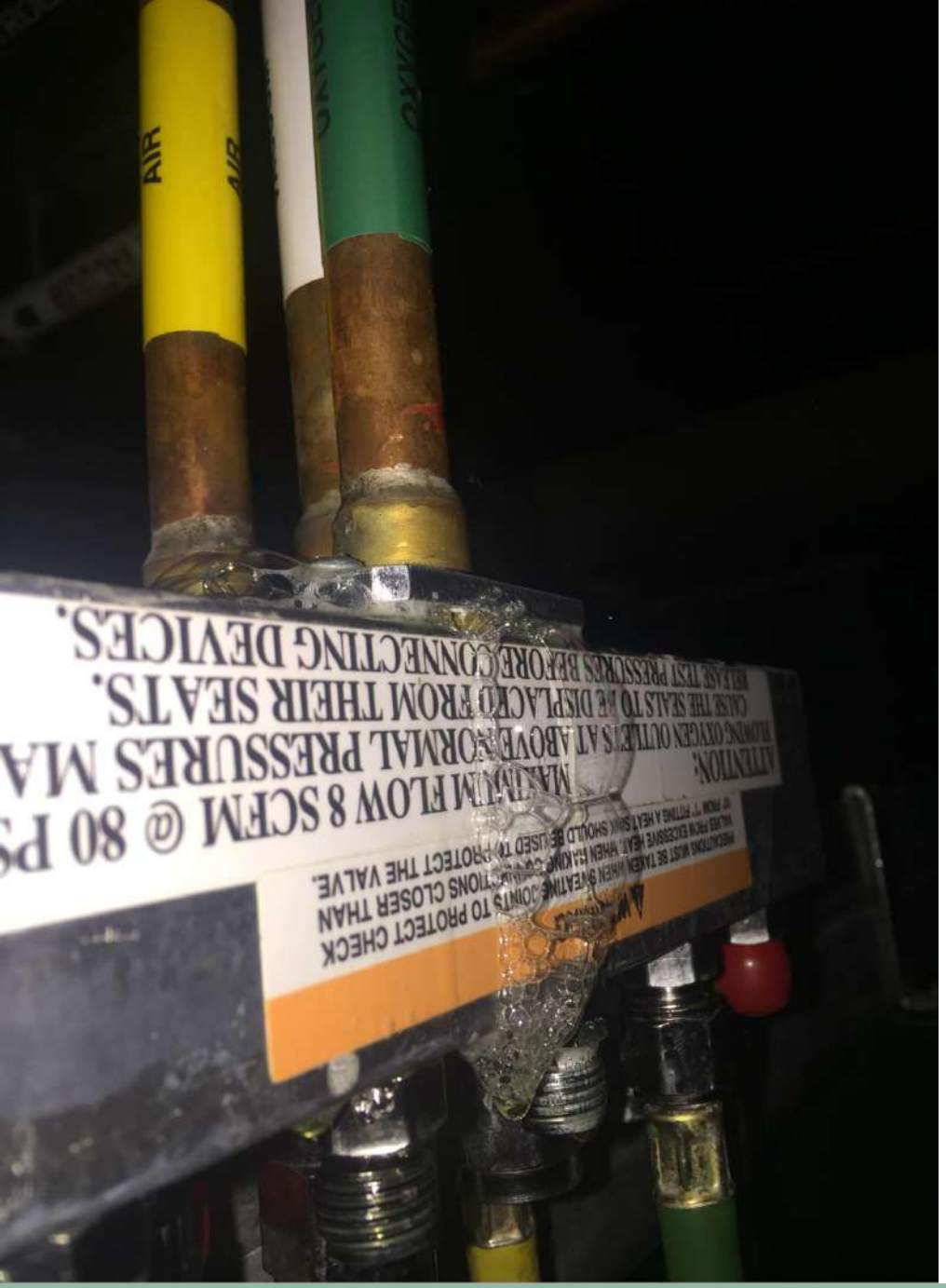
Booms & Articulating Assemblies

- Separate report (or section) showing where they have been tested for:
  - Leaks



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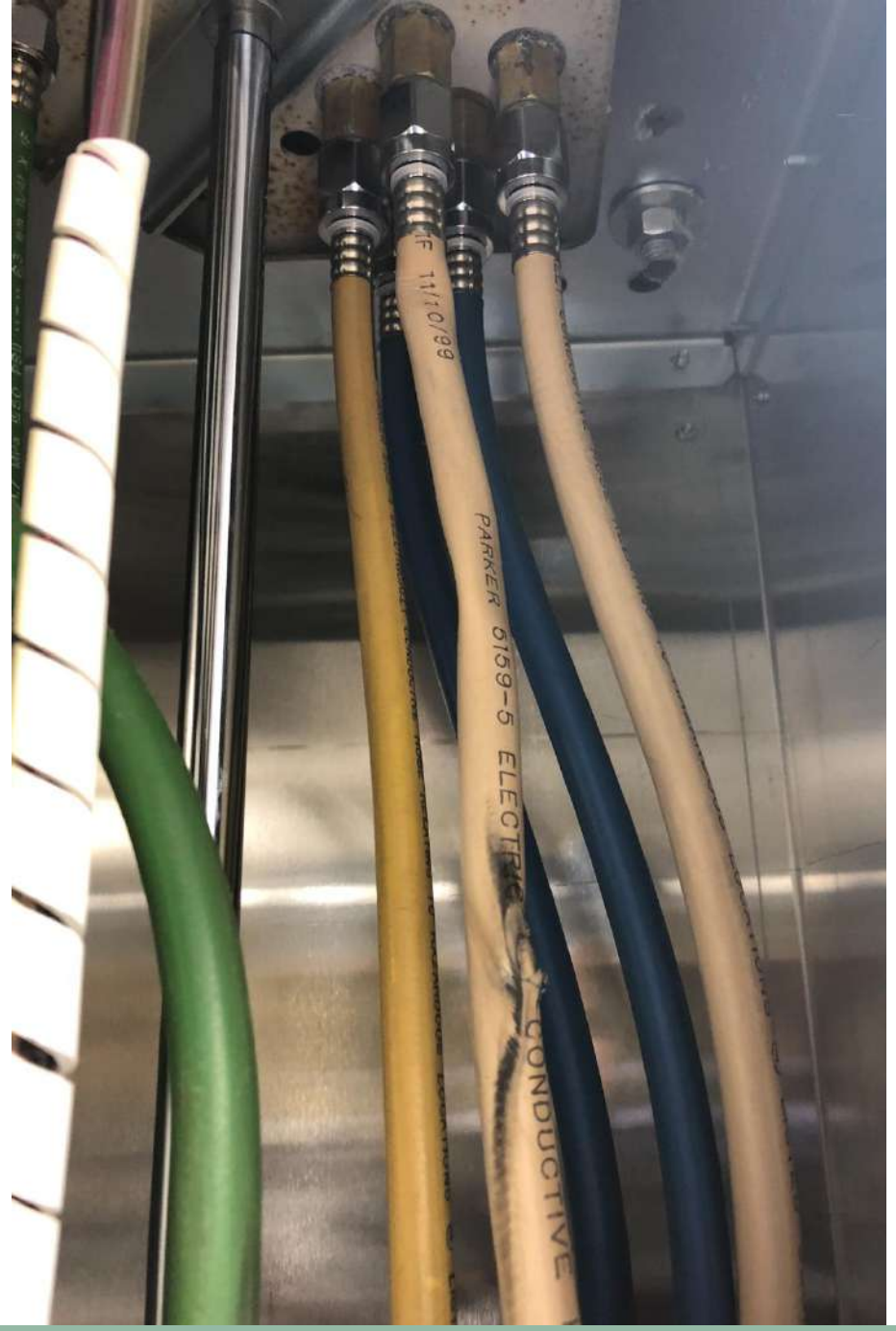
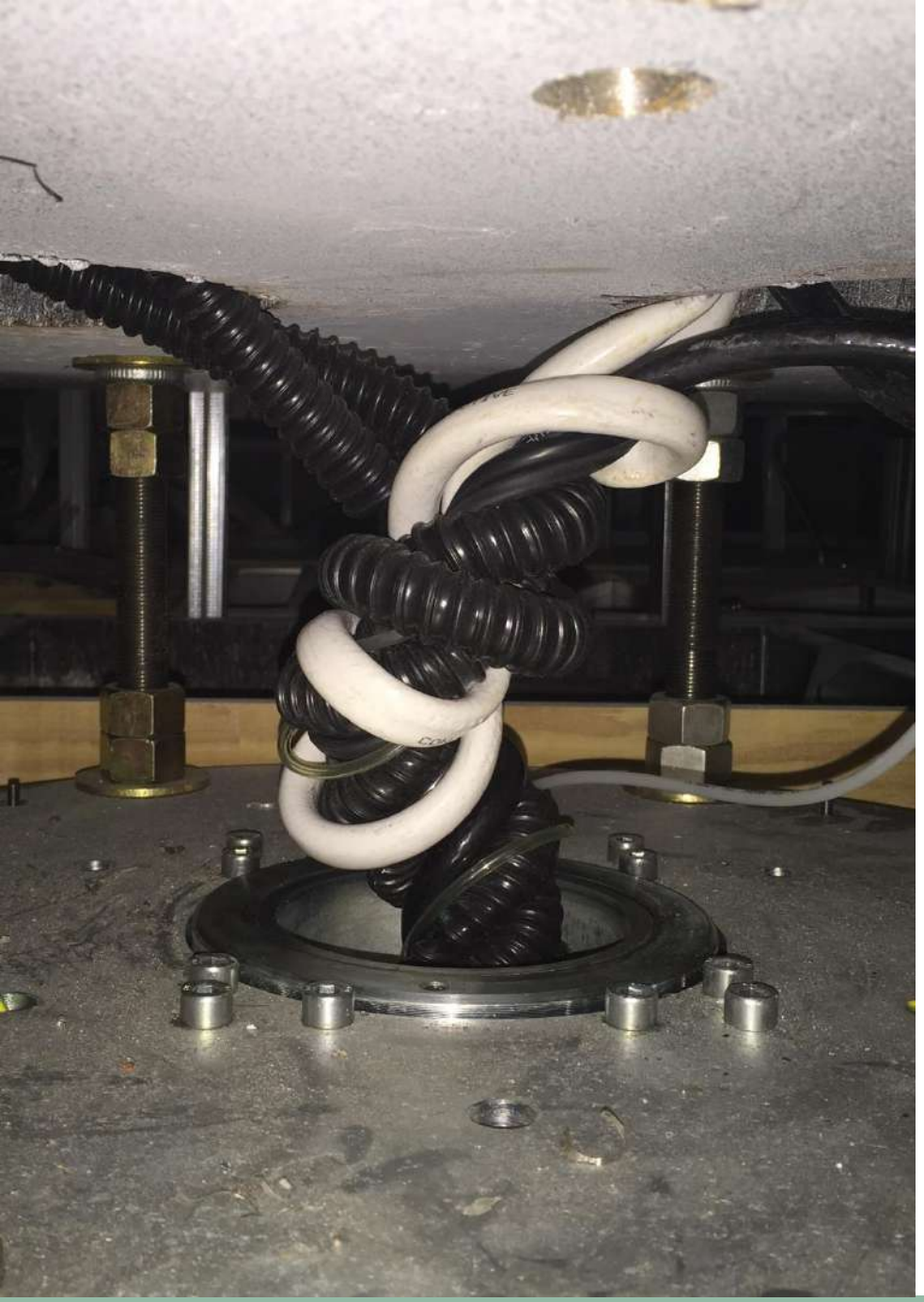


Booms & Articulating Assemblies

- Separate report showing where they have been tested for:
  - Leaks
  - Hose condition



Booms & Articulating Assemblies

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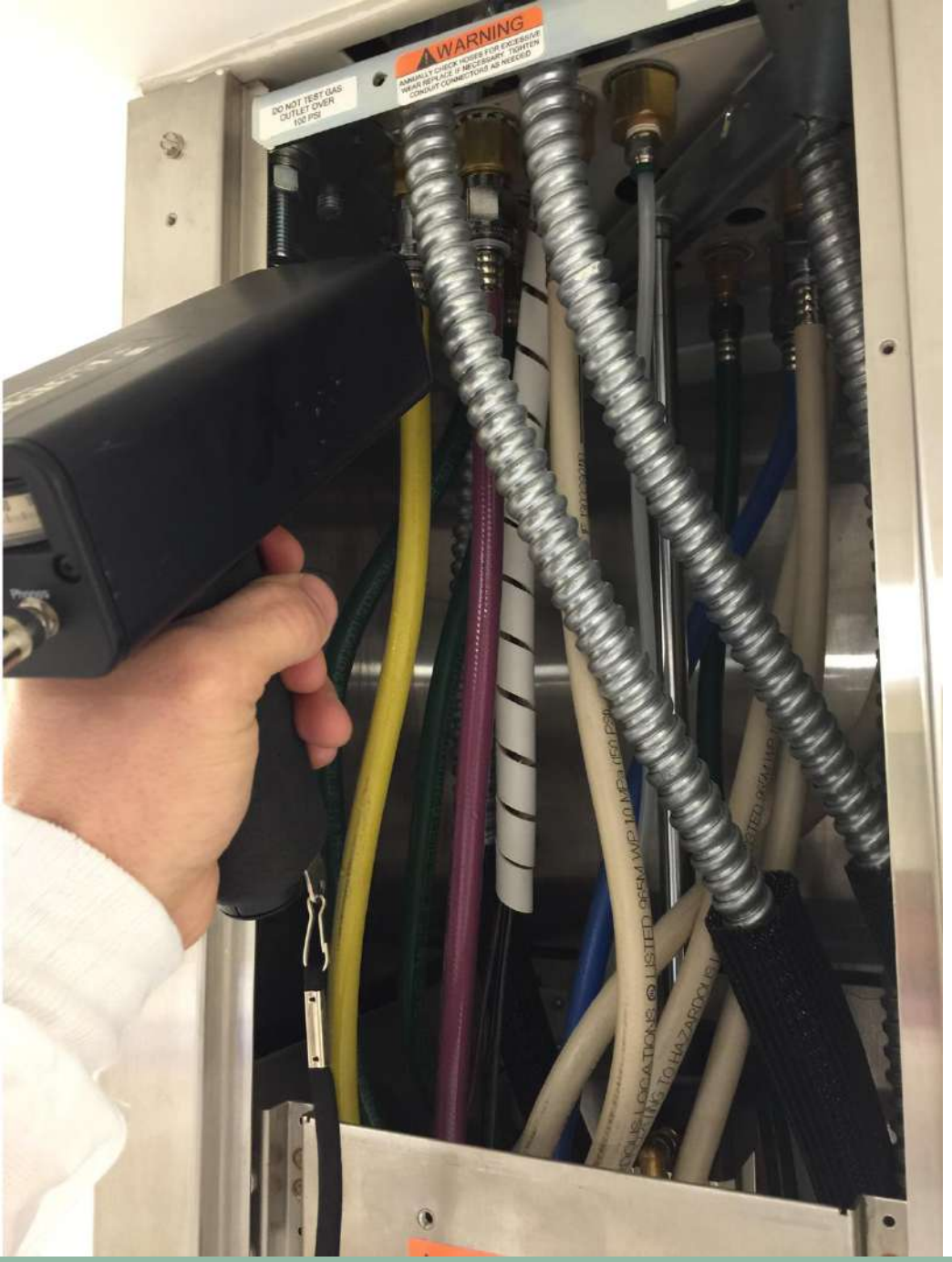
Booms & Articulating Assemblies

- Separate report showing where they have been tested for:
  - Leaks
  - Hose condition
  - DISS connections internal to boom have been checked (ceiling and at the back of user terminal)



Booms & Articulating Assemblies

- Separate report showing where they have been tested for:
  - Leaks
  - Hose condition
  - DISS connections internal to boom have been check (ceiling and at the back of user terminal)

Manufacturer's Recommendations

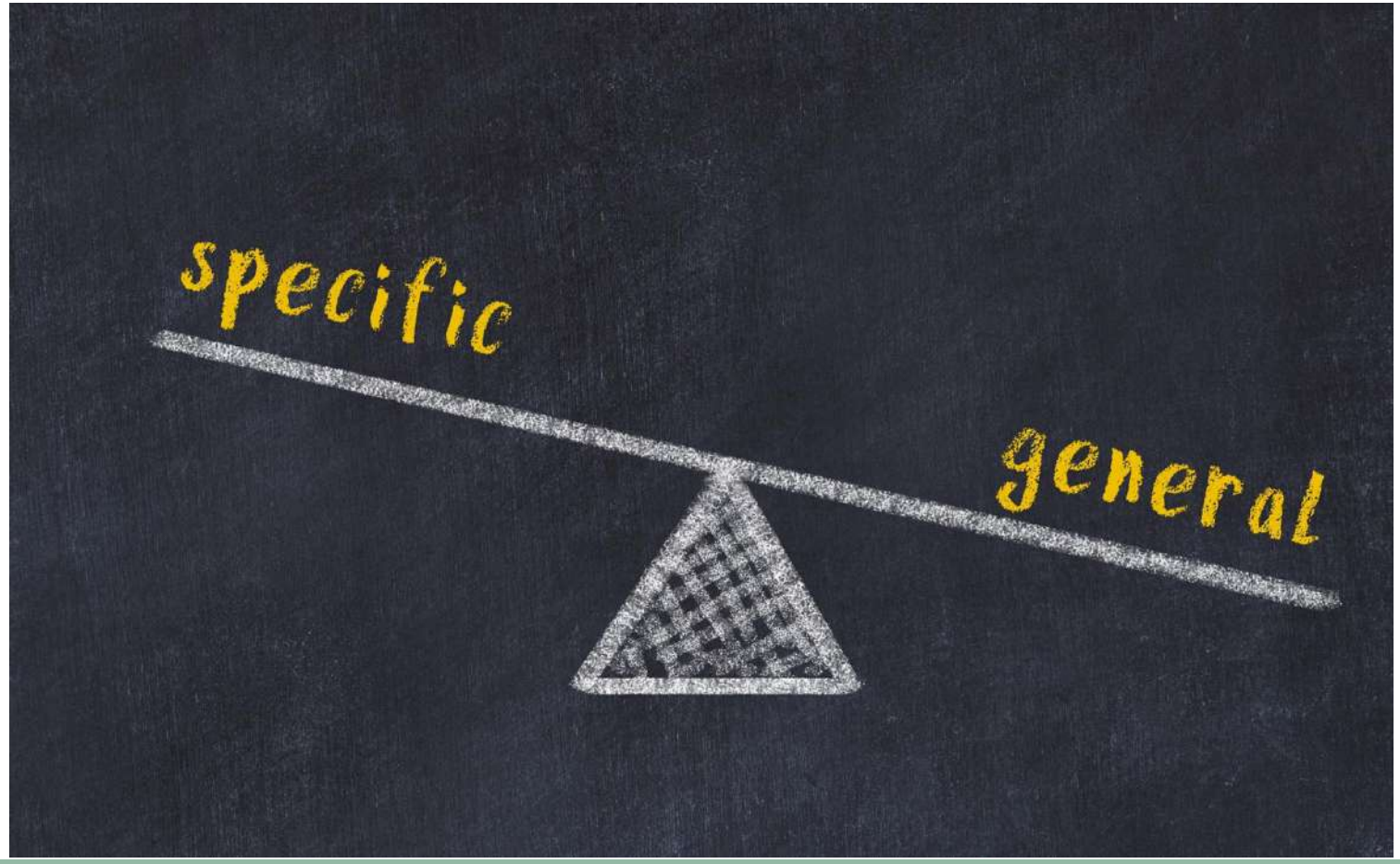
- Maintenance programs for piped medical gas systems must follow the manufacturer's recommendations

AO Specific Requirements?

- CMS – K-Tag K900-K933
- TJC – EC 02.05.09
- DNV – Individually chaining medical gas cylinders
- CIHQ, ACHC, AAAHC?

Review Your Policy!

- Remove items that aren't required by NFPA 99 or an AHJ
- Avoid being too specific



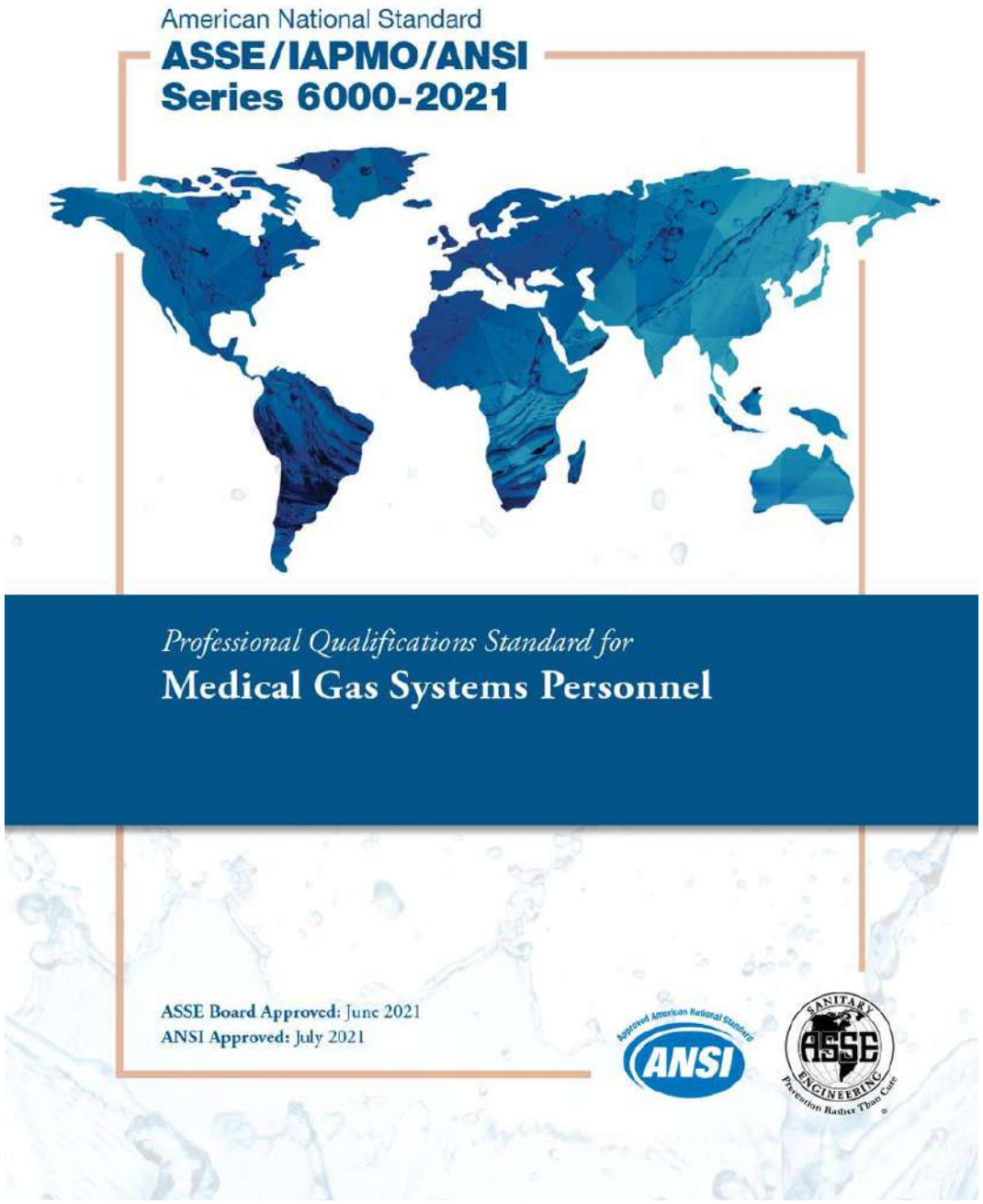
RECAP # 2

- Steps to success

1. Review existing facility requirements from NFPA 99
2. Follow the manufacturer's recommendations when building your PM schedules
3. Include any specific AO requirements
4. Review your policy

WHO CAN INSPECT & MAINTAIN MEDICAL GAS SYSTEMS?

NFPA 99 Qualification Requirements – 5.1.14.2.2.5



Qualifications

- Who can perform these operations?

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Qualifications Option # 1

- Training on specific equipment installed within the facility

Qualifications Option # 2 & 3

- Credentialing to ASSE 6030 (Medical Gas Verifier)
- Credentialing to ASSE 6040 (Medical Gas Maintenance)

SERIES 6000 • STANDARD #6030

Medical Gas Systems Verifiers

SERIES 6000 • STANDARD #6040

Medical Gas Systems Maintenance Personnel

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A Word about the RFA – Responsible Facility Authority

- First appeared within the 2021 edition of NFPA 99
- When CMS adopts a new edition of NFPA 99 this *WILL BE* a requirement
- BEGIN YOUR PREPARATIONS TO COMPLY WITH THIS REQUIREMENT NOW!!!
  - ASSE 6010 – medical gas **installer** credential
  - ASSE 6020 – medical gas **inspector** credential
  - ASSE 6030 – medical gas **verifier** credential
  - ASSE 6040 – medical gas **maintenance** credential

A Word about the Medical Gas Permit to Work System

- First appeared within the 2021 edition of NFPA 99
- When CMS adopts a new edition of NFPA 99 this *WILL BE* a requirement
- BEGIN YOUR PREPARATIONS TO COMPLY WITH THIS REQUIREMENT NOW!!!
  - Communication to clinical staff for impacted area(s)
  - Alterative gas supplies are in place if necessary
  - Qualification check for all involved (installer, verifier, maintenance tech, etc)
  - Shutdown and restoration procedures are documented and fully described
  - Safety measures?
  - NFPA 99 is observed throughout the process
  - Final testing performed and documented

4 KEY QUESTIONS - RECAP

- WHAT must be included?
  - The identified medical gas systems inventory
- WHEN must it be inspected or maintained?
  - Based on NFPA 99, facilities risk assessment & the manufacturer's recommendations
- HOW must it be inspected or maintained?
  - Based on NFPA 99, facilities risk assessment & the manufacturer's recommendations
- WHO can perform these activities?
  - Qualified individuals under 5.1.14.2.2.5

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Thank you!

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