



New Med Gas Code Requirements



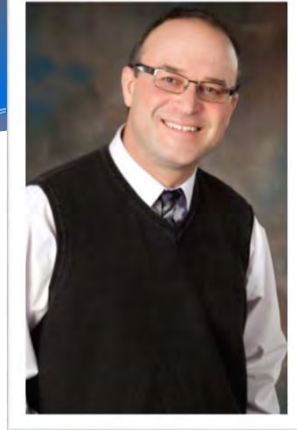
Tom Spremo
President / Founder
Purely Med Gas, Inc.

*Thursday August 14, 2014
11:30am-1:00pm*

*Precursor Program to upcoming
ALL DAY WHEA Seminar:
November 11, 2014
Wisconsin Dells*

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Our Presenter



- Owner & founder of Purely Med Gas, Inc.
- Actively involved in the Medical Gas and Vacuum field for 35 yrs
- Instructor NFPA 99 & ASSE 6000 credentialing courses since 1994
- Credentialed ASSE 6010 Installer, ASSE 6020 Inspector, ASSE 6030 Verifier, ASSE 6040 Service Tech, ASSE 6050 Instructor
- Licensed Master Plumber
- Member of WHEA Code Committee
- Member of ASSE 6000 & CGA M-1 Technical Committees
- Member of ASHE, NFPA, ASSE, ASPE, WHEA, UA and MGPHO
- Consultant to facilities, engineers, architectural firms, regulatory agencies and contractors



Program Agenda

- NFPA 99 2012 Document Navigation
- Key Differences: 1999 vs. 2012
- New Technologies & Design Tips

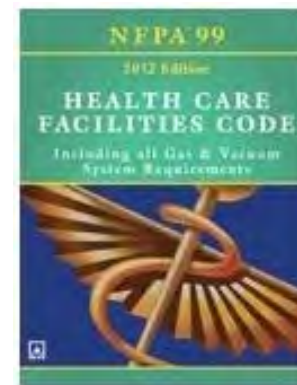
Document Navigation



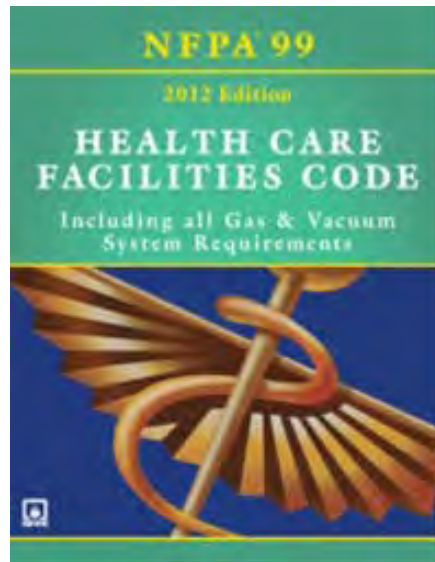
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NFPA 99

- National Fire Protection Association
- Periodically Revised (1999, 2002, 2005, 2012)
- NFPA 99, Handbook, *NFPA 99C*



NFPA 55 & NFPA 45



NFPA 55
Compressed
Gases and
Cryogenic
Fluids Code



NFPA 45
Standard on
Fire Protections
for Laboratories
Using
Chemicals



Contents

Chap 1: Administration

Chap 2: Referenced Publications

Chap 3: Definitions

Chap 4: Fundamentals

Chap 5: Gas and Vacuum Systems

Chap 6: Electrical Systems

Chap 7: Information Technology
and Communications Systems for
HC Facilities

Chap 8: Plumbing

Chap 9: HVAC

Chap 10: Electrical Equipment

Chap 11: Gas Equipment

Chap 12: Emergency Management

Chap 13: Security Management

Chap 14: Hyperbaric Facilities

Chap 15: Features of Fire
Protection



1.1.3 Gas and Vacuum Systems

1.1.3.1 Chapter 5 covers the performance, maintenance, installation, and testing of the following:

- 1) Nonflammable medical gas systems with operating pressure below a gauge pressure of 2068 kPa (300 psi)
- 2) Vacuum systems in health care facilities
- 3) Waste anesthetic gas disposal (WAGD) systems, also referred to as scavenging
- 4) Manufactured assemblies that are intended for connection to the medical gas, vacuum, or WAGD systems (also referred to as scavenging)



1.3 Application

1.3.2.1 Only the altered, renovated, or modernized portion of an existing system or individual component shall be required to meet the installation and equipment requirements stated in this code.

1.3.2.3 An existing system that is not in strict compliance with the provisions of this code shall be permitted to be continued in use, unless the authority having jurisdiction has determined that such use constitutes a distinct hazard to life.

3.3.63 General Anesthesia and Levels of Sedation / Analgesia

- Deep Sedation / Analgesia
- General Anesthesia
- Minimal Sedation
- Moderate Sedation / Analgesia (Conscious Sedation)



3.3.138 Patient Care Room

- 3.3.138.1 Basic Care Room
- 3.3.138.2 Critical Care Room
- 3.3.138.3 General Care Room
- 3.3.138.4 Support Room

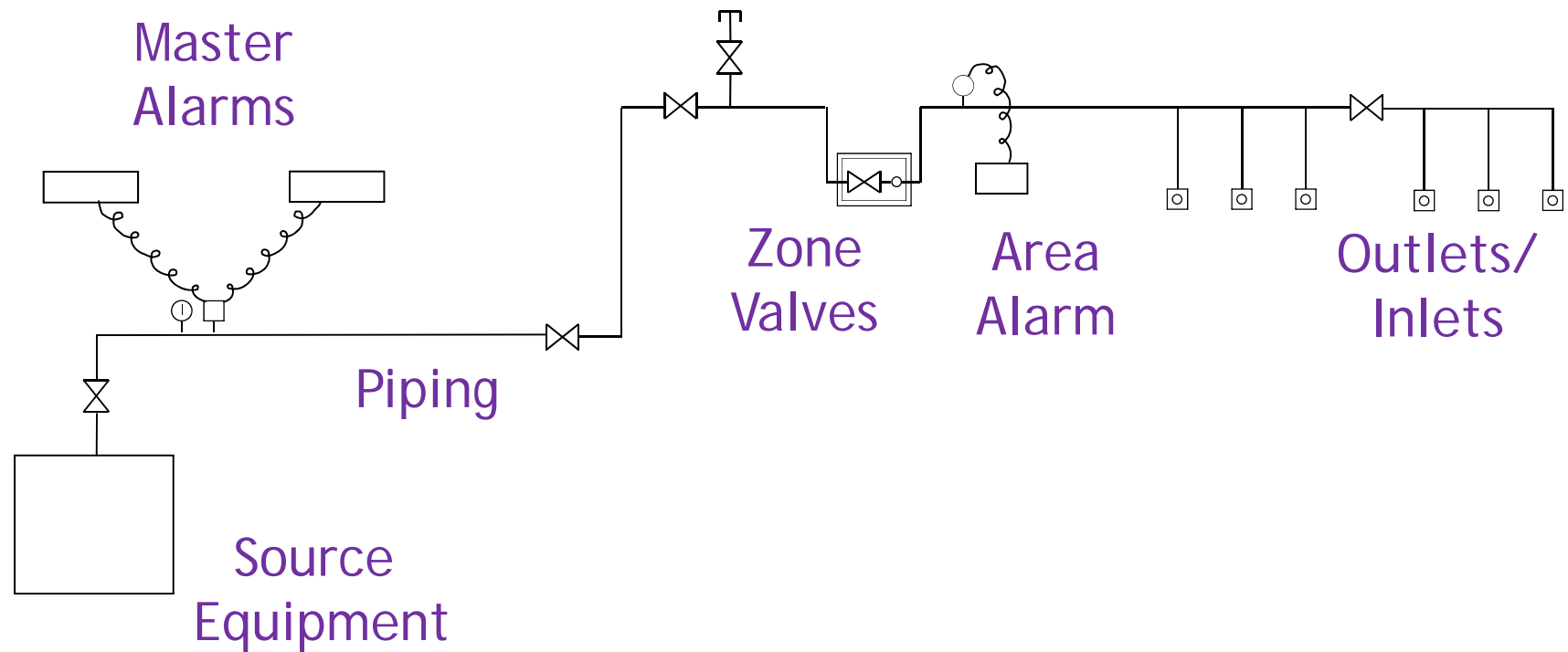




4.1 Building System Categories

- **4.1.1 Category 1** - Facility systems in which failure of such equipment or system is likely to cause *major injury or death* to patients or caregivers...
- **4.1.2 Category 2** - Facility systems in which failure of such equipment is likely to cause *minor injury* to patients or caregivers...
- **4.1.3 Category 3** - Facility systems in which failure of such equipment is *not likely to cause injury* to patients or caregivers, but can cause patient discomfort...
- **4.1.4 Category 4** - Facility systems in which failure of such equipment would have *no impact* on patient care...

General System Flow



Key Differences:

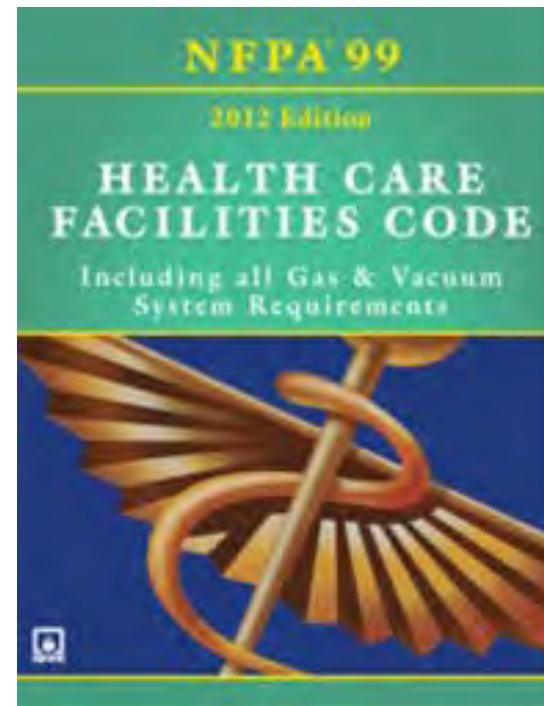
NFPA 99 1999 vs 2012



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Key Differences

- 1999: Standard
- **2012: CODE**



Key Differences

- 1999: Occupancy Based
- **2012: Risk Based**





Key Differences

- 1999: Separate Pressure and Vacuum Sections
- **2012: Sections weaved together**



Key Differences

5.1.3.5.2 Permitted Locations for Medical Gases

- (1) Direct respiration by patients
- (2) Clinical application of the gas to a patient, such as the use of an insufflator...
- (3) Medical device applications directly related to respiration
- (4) Power for medical devices used directly on patients
- (5) Calibration of medical devices intended for (1) through (4)

Key Differences

Acceptable locations of Central Supply Systems



Key Differences

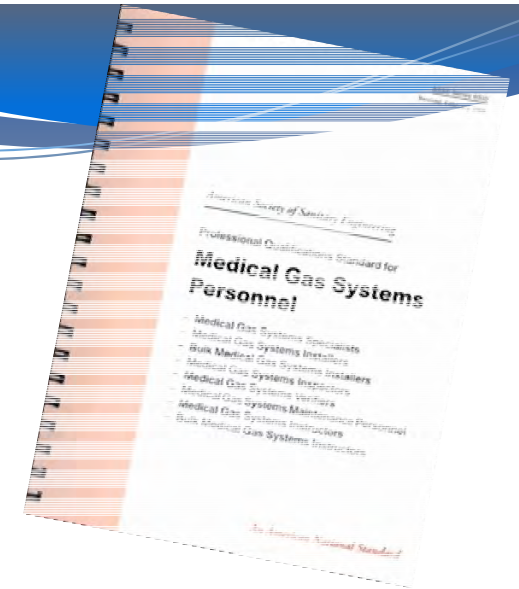
- Gas Purity & Particulate Requirements



| | 1999 | 2012 |
|------------------------------------|--------|-------|
| Medical Air Dew Point High Alarm | 39°F | 35°F |
| Allowable Particulate Matter | 0.1 mg | 1 mg |
| Allowable Halogenated Hydrocarbons | 1 ppm | 5 ppm |

Key Differences

- **Medical Gas Personnel Credentials**

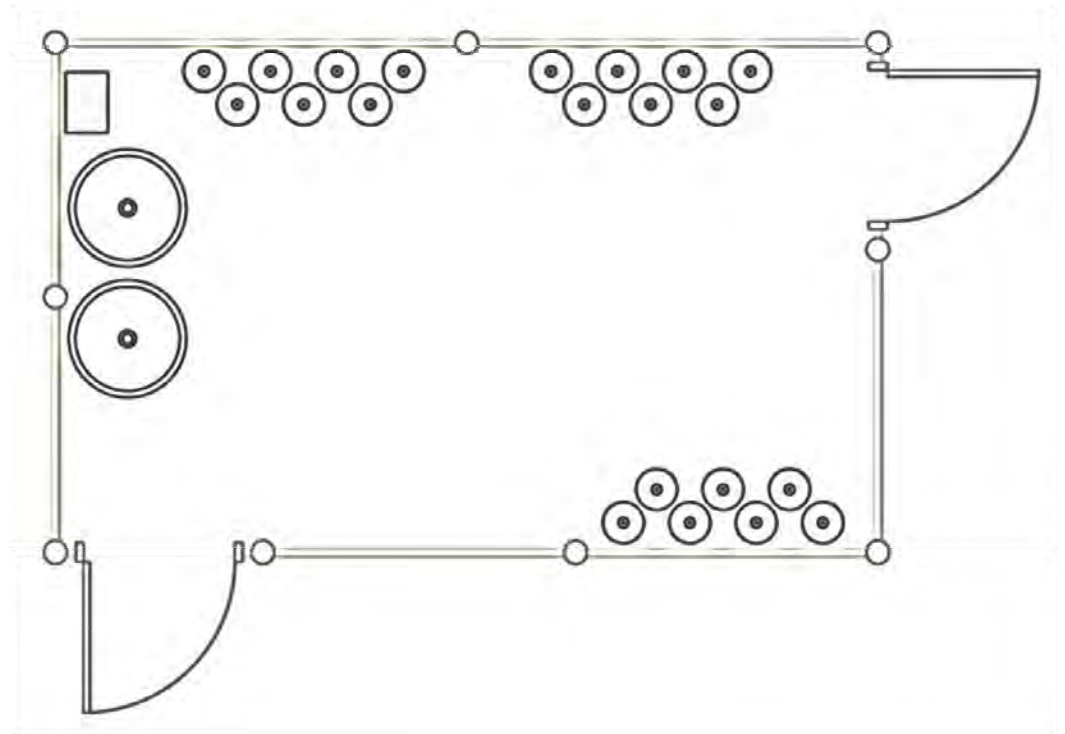


| | 1999 | 2002 | 2012 |
|----------------------------|------|------|------|
| ASSE 6010 Installer | - | X | X |
| ASSE 6030 Verifier | - | X | X |
| ASSE 6040 Maintenance Tech | - | - | X* |

Key Differences

Outdoor Central Supply Systems or Storage

- 1999: One exit
- **2012: Two exits**



Key Differences

- 3'-0" Clearance around all Bulk Cryogenic Liquid systems and in front of EOSC



Key Differences

Emergency Oxygen Supply Connection (EOSC)

- 1999: Required
- **2012: Not Required IF In-Building Reserve is installed**



Key Differences

Manifold / Cylinder Storage Rooms

- 1999: At least 5'-0" above finished floor
- **2012: PROTECTED**





Key Differences

Manifold / Cylinder Storage Rooms

- 1999: Natural Ventilation less than 3000 CF of gas
- **2012: Natural Ventilation – no limit**

Key Differences

- A single high pressure underground Oxygen line to serve both Hyperbaric and the Hospital System



Key Differences

Medical Air Systems

- New Medical Air compressor activation run-time reduced from 24 hours to 12 hours
- Medical Air Intakes – Distances & Locations
- Medical Air Liquid Ring Compressors
 - Treated Water & Cylinder Reserve



Key Differences

Master Alarm Systems

- One Master Alarm can be Computer
- Dedicated low voltage wiring
- Simplex low voltage wiring to Bulk Oxygen site
- In-line Splices, No Commons, Normally Closed
- Wireless applications



Key Differences

Piping Distribution

- 3-piece check valves with copper extensions, no threads
- Dielectric unions acceptable
- No Soldered Joints for Vacuum Systems
- Deburring & Dimpling
- Not Allowed: Galvanized Steel Piping for Vacuum
- Allowed: Stainless Steel piping for Vacuum



Key Differences

WAGD Inlet required where Nitrous Oxide or Halogenated Anesthetic Gas is administered

- 5 feet of Vacuum piping before WAGD connects

Dedicated WAGD producer:

- Oil-less or Inert Oil

Combined WAGD/Vacuum producer:

- Oxidizers below 23.6%
- Or Oil-less or Inert Oil





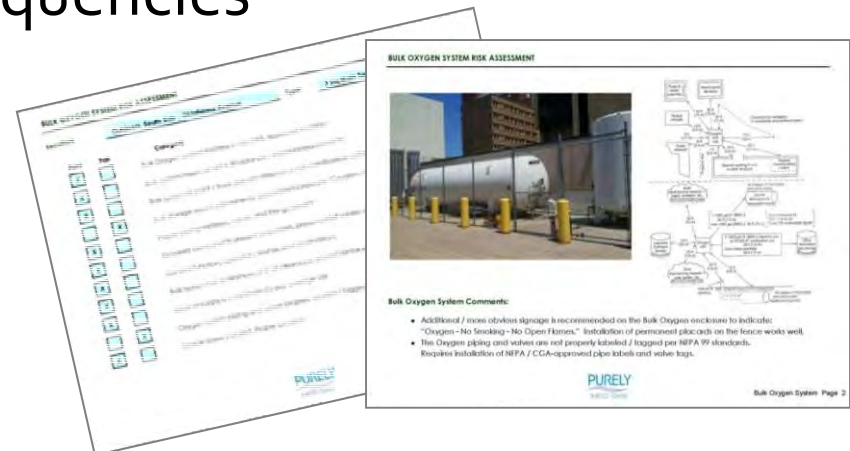
Risk Assessment

- Patient Type
- Building System Category
- Regulations / Codes Apply

Med Gas Risk Assessment - Outcomes

- Accurate Inventory / Documentation
- Corrective Actions / Improvements
- Policies & Procedures
- Emergency Preparedness
- Proactive Management
- Training
- Determine PM Tasks / Frequencies

| FACILITY I.D. | LOCATION | AREA SERVED | MFG / MODEL | GAS / VAC | PHOTO |
|---------------|-----------------------------------|--|---------------|--|-------|
| CI-AUG-01 | Corr. Adjacent to Patient Holding | Procedure Rm 1, E-3 | AHC Digital 2 | Oxygen Medical Air Bleed Out Vacuum WFOE | |
| CI-AUG-02 | Corr. Adjacent to Patient Holding | Holding Rm 1, E-3 | AHC Digital 2 | Oxygen Medical Air Vacuum | |
| CI-AUG-03 | 4th Fl. Urgency Area Desk | Observation Rm, Minor Test 1 & 2, Isolated Utility | AHC Digital 2 | Oxygen Medical Air Bleed Out Vacuum WFOE | |
| CI-AUG-04 | 5th Fl. Drivell | 5th Fl. J-Ling, Rms 504(1), 504(2) & 506(3)-N | AHC Digital 2 | Oxygen Vacuum | |



Key Differences

MAINTENANCE

- Maintenance replaces New Construction as problematic
- PM Categories to include Source Equip, Alarms, Zone Valves, Outlets / Inlets, etc.
- Current Policies / Procedures and documentation methods
- ASSE 6040 Maintenance Technician Credentials has been inserted into body of code



Maintenance – Why?

- Safety (Patients & Caregivers)
 - Reduce Emergency Repairs
 - Save Energy Costs
 - Reduce Liability & Risk
 - Manufacturer / Warranty
 - Extend Equipment Life
-
- ***Compliance with NFPA code***

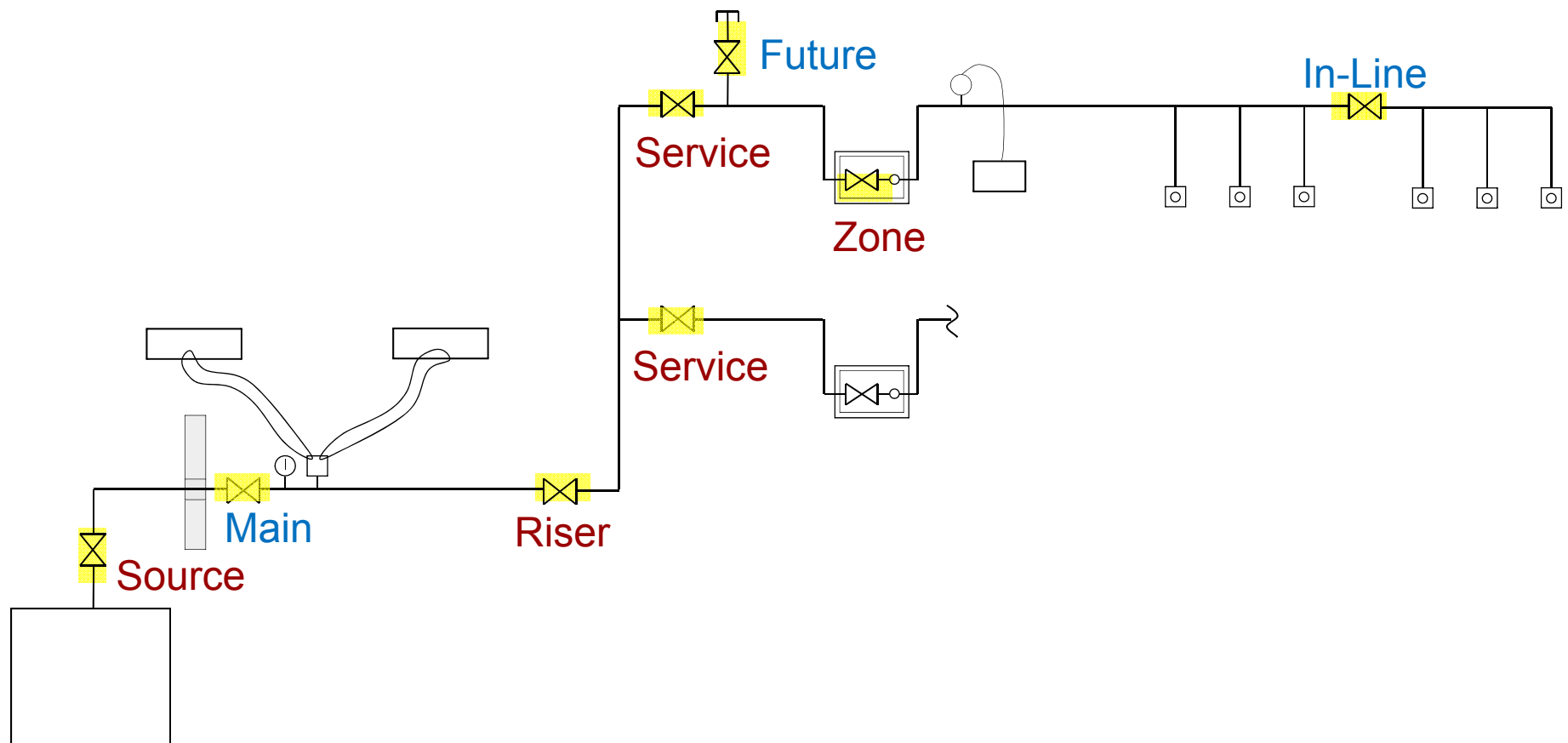


Design Tips and New Technologies



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Typical Valves

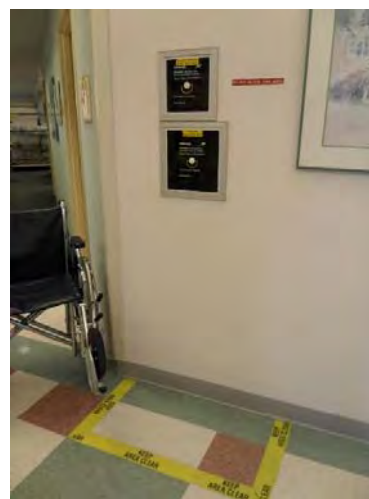


Shutoff Valve Identification

- Name or chemical symbol for the specific medical gas or vacuum system
- Room or areas served
- Caution to not close or open the valve except in emergency



Zone Valve & Area Alarm Locations

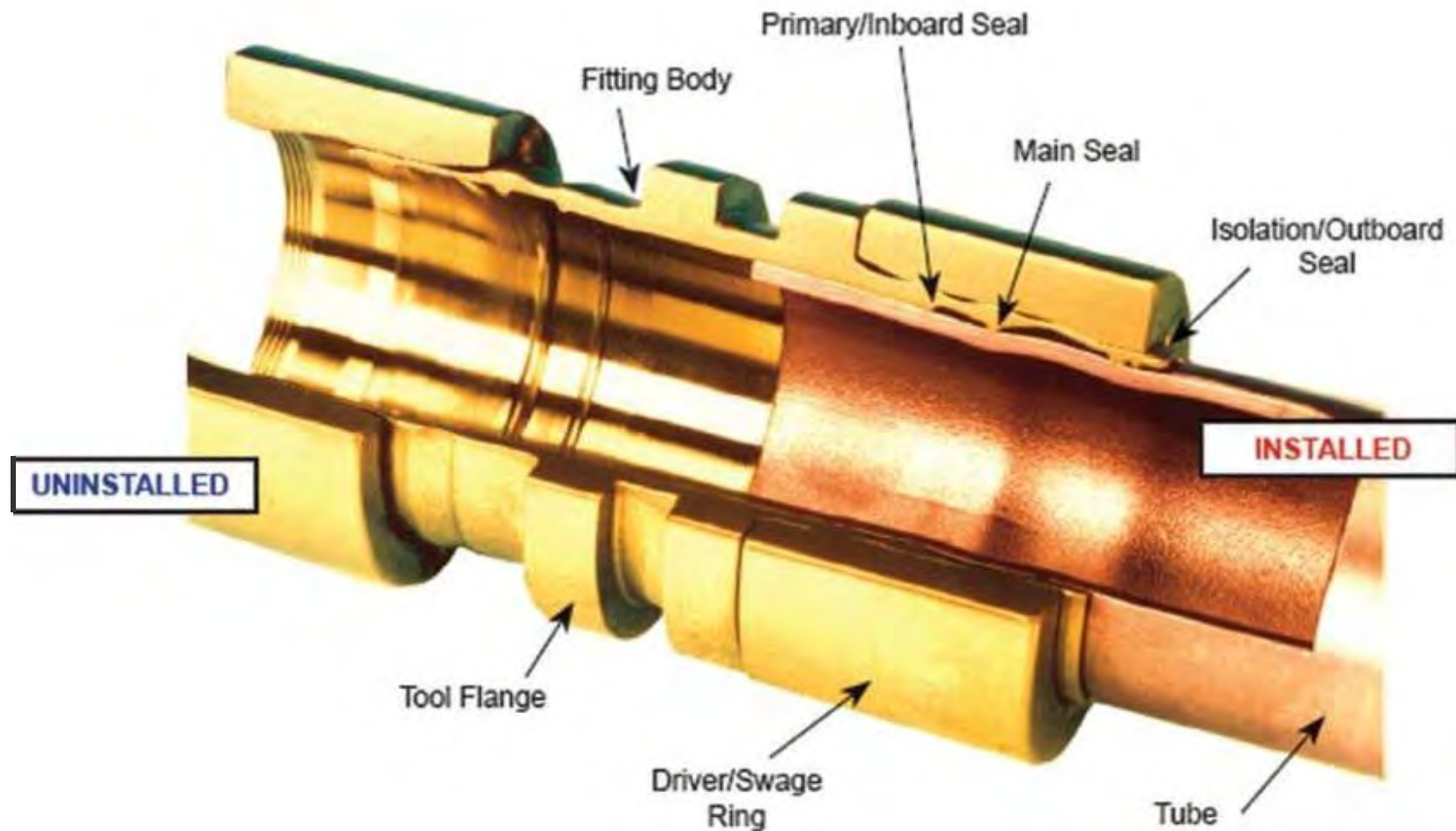


Central Supply Systems

- Instrument Air Systems
- Medical Air Proportioning Systems

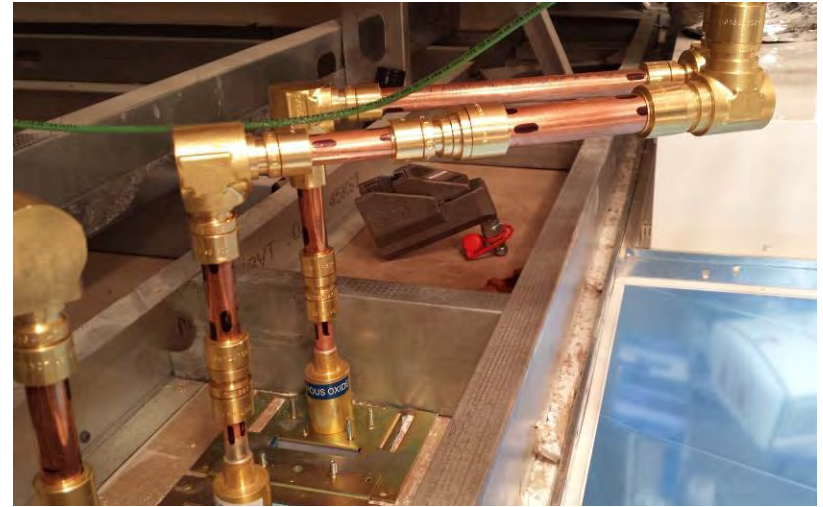


“Flameless” Axially Swaged Fitting



Benefits

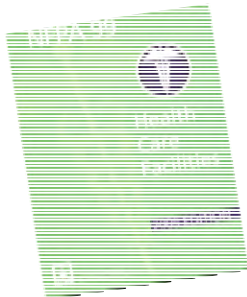
- No Brazing - No Open Flame
- No Flammable Gas in Patient Area
- No Burn Permits / Fire Watch
- Smoke & Fire Alarms Remain On
- Reduce Damage to Surroundings
- No Cool Down
- No Nitrogen Purge
- No Particulate
- Reduced Interruption Time
- Cost Savings
- ***Reduce Risk / Liability***



Ceiling of Existing OR



Code Compliant



NFPA 99 1999 EDITION: 4-3.1.2.7(h)

Listed or approved metallic gas tube fittings that, when made up, provide a permanent joint having the mechanical, thermal, and sealing integrity of a brazed joint shall be permitted to be used in lieu of brazed joints.

NFPA 99 2005 EDITION: 5.1.10.7

The following special fittings shall be permitted to be used in lieu of brazed joints: (4) Axially swaged, elastic strain preload fittings providing metal to metal seal having pressure and temperature ratings not less than that of a brazed joint and when complete are permanent and nonseparable.

NFPA 99 2012 EDITION: 5.1.10.7.1

Axially swaged, elastic strain preload fittings providing metal-to-metal seals, having a temperature rating not less than 538°C (1000°F) and a pressure rating not less than 2070 kPa (300 psi), and that, when complete, are permanent and nonseparable shall be permitted to be used to join copper or stainless steel tube.



Thank You!

*Sign up now for the upcoming
ALL DAY WHEA Seminar!!
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