

Improving Medical Gas System Manipulation Safety While Minimizing Downtime

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- **BSME Virginia Polytechnic and State University 1986**
- **Hired by LOKRING 1993**
- **Helped write NFPA 99 proposal for “Axially Swaged Fittings” for 2005 Edition.**
- **Attended meeting where proposal was unanimously adopted.**
- **Leading LOKRING medical gas fitting supplier and technical support expert.**

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Safety concerns facilities face when completing pipe work in working hospitals

PATIENT SAFETY

- Cleanliness
- Smoke/Ventilation
- FIRE!!!!!!
- System downtime
- Purge



Medical Gas Systems

- Oxygen
- Nitrogen
- Medical Air
- Vacuum
- WAGD

Support Piping Systems

- Steam/Condensate
- Emergency Diesel
- Natural Gas

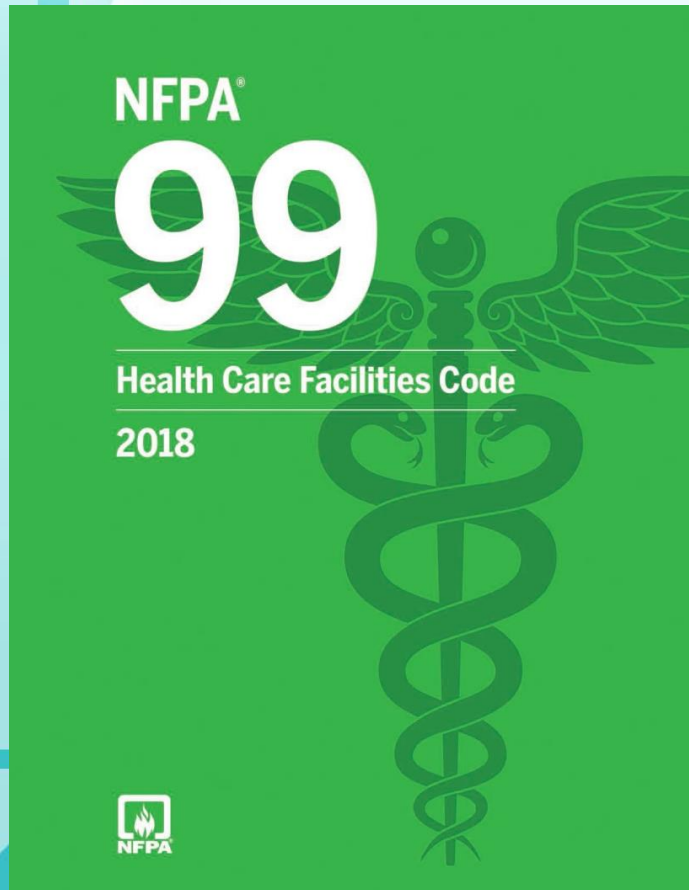
Medical Gas Systems



5.1.10.6 Memory Metal Fittings

5.1.10.7 Axially Swaged Fittings

Medical Gas Systems



5.1.10.6 Memory Metal Fittings

5.1.10.6.1 Memory metal fittings having a temperature rating not less than 538C (1000F) and a pressure rating not less than 2070 kPa (300 psi) shall be permitted to be used to join copper or stainless steel tube.

5.1.10.6.2 Memory metal fittings shall be installed by qualified technicians in accordance with the manufacturer's instructions.

AKA – SMARTTAP

Memory Metal Fittings

- Cleanliness ✓
- Smoke/Ventilation ✓
- FIRE!!!!!! ✓
- System downtime ✓
- Purge ✓

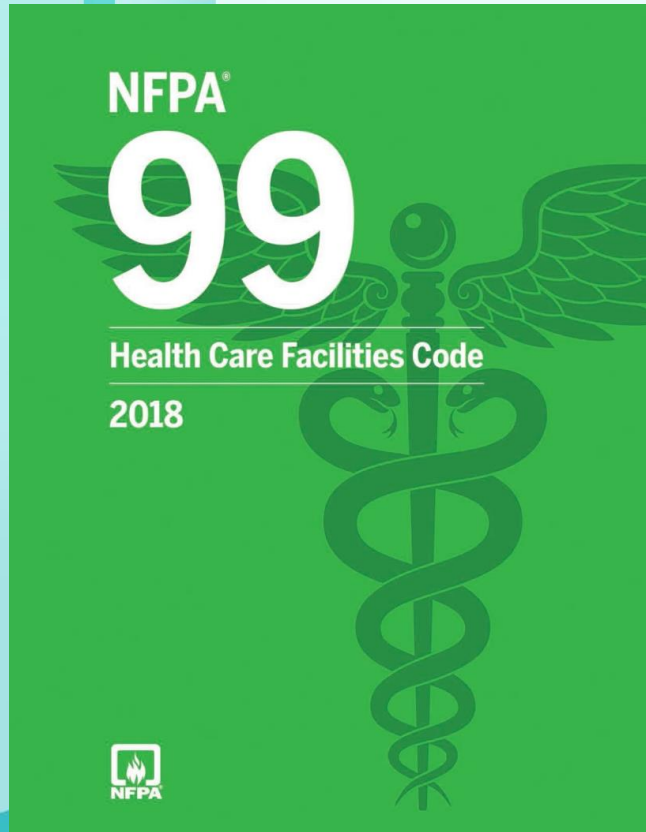


Memory Metal Fittings

Negatives?

- NiTi alloy is expensive
- Must be installed by manufacturer or representative
- Couplings only
- Liquid Nitrogen on site
- Potential contamination

Medical Gas Systems



5.1.10.7 Axially Swaged Fittings

5.1.10.7.1 Axially swaged, elastic strain preload fittings providing metal-to-metal seals, having a temperature rating not less than 538C (1000F) 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 tube.

5.1.10.7.2 Axially swaged, elastic strain preload fittings shall be installed by qualified technicians in accordance with the manufacturer's instructions.

Axially Swaged ESP Fittings

- Cleanliness ✓
- Smoke/Ventilation ✓
- FIRE!!!! ✓
- System downtime ✓
- Purge ✓
- Can be installed by LOKRING trained 6010 MedGas Installers
- Couplings, Caps, Reducers, Tees, Elbows, Gage Port fittings ...



Axially Swaged ESP Fittings

Negatives?

- Secure the system
- Fittings cost more than wrought copper fittings
- Tooling
- Shapes only available 1" and smaller



O₂ Service
1-1/2" Type "L" Copper
Three Locations

11:13 am – line cut, first location (outside, below grade)

11:20 am – coupling completed, first location



**11:22 am – line cut,
second location
(inside, mech room)**

**11:29 am – coupling
completed, second
location**



11:30 am – line cut, third location (inside, mech room, two cuts)

11:36 am – two couplings completed, tee and valve cut into line.



11:45 am – leak testing complete, system operational and control returned to hospital.



Support Piping Systems

- Steam/Condensate
- Emergency Diesel
- Natural Gas

ASME PRESSURE VESSEL
SECTION IX ,
PRESSURE PIPING
B31.1 AND B31.3

PIPE SOLUTIONS

PATENTED WELD EQUIVALENT Pipe Solutions™



PERMANENT
Cold Weld Alternative



ASSEMBLED
Within Minutes



ANSI/ASME
B31.1 B31.3



- Stainless Steel
Pipe sizes 1/4" NPS – 3" NPS
Tube sizes 1/4" OD – 2-1/2" OD
- Carbon Steel
Pipe sizes 1/2" NPS – 4" NPS





