



## Texas Commission on Fire Protection

P.O. Box 2286, Austin, Texas 78701-2286

PH# 512-936-3838

Website: [www.tcfp.texas.gov](http://www.tcfp.texas.gov)

Email: [info@tcfp.texas.gov](mailto:info@tcfp.texas.gov)

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# Breathing Air Quality for Emergency Services Respiratory Protection Guide — NFPA 1989 (2019)

## 1. Understand NFPA 1989 Scope & Purpose

### NFPA 1989-2019:

- ✓ Specifies **minimum breathing air quality requirements** for emergency services using atmosphere-supplying respirators.
- ✓ Applies to compressed normal atmospheric air, compressed synthetic breathing air, and cryogenic air used for respiratory protection.
- ✓ Serves as the breathing air quality component of a respiratory protection program (e.g., NFPA 1500).
- ✓ Does **not** cover medical-grade oxygen or air quality for other non-respiratory applications.

## 2. Integrate Into Your Respiratory Protection Program

Make NFPA 1989 part of your **written respiratory protection program (RPP)**:

- Reference NFPA 1989 explicitly in your RPP.
- Clarify responsibilities: who oversees air quality compliance (e.g., respiratory program manager).
- Ensure your RPP already meets NFPA 1500 requirements and includes breathing air quality practices.

## 3. Establish Breathing Air Quality Standards

Define the **air quality parameters** your breathing air systems must meet based on NFPA 1989:

### Core Air Quality Parameters

Air used for SCBA and SAR must be tested and meet acceptable limits for:



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- **Oxygen content** (must support safe respiration).
- **Carbon monoxide (CO) and carbon dioxide (CO<sub>2</sub>)** (contaminants must be below harmful levels).
- **Particulates and condensed oil** (should be sufficiently removed by purification).
- **Hydrocarbons & odors** (air must be free of unacceptable contaminants).
- **Nitrogen content** (meets normal atmospheric proportions when required).  
*(NFPA 1989 detailing of specific limits and test methods is in Chapters 5–6 of the standard.)*

## 4. Air Sampling & Testing Procedures

### ✓ Regular Air Sampling

- Conduct **breathing air sampling** as part of your QA/QC program.
- Test for contaminants following NFPA 1989 methods (e.g., Section 6 test methods).
- Perform tests **quarterly at minimum** — frequency may increase based on use and risk.  
*(NFPA 1989 specifies sampling procedures and test methods; see Chapter 6.)*

### ✓ After System Changes, Maintenance, or Suspected Contamination

Air systems must be sampled:

- **Before and after** changing purification components (filters, absorbers).
- **After any maintenance, repairs, or system relocation.**
- **When contamination is suspected** (e.g., compressor intake issues).
- **Prior to returning systems to service** if any test fails.

### ✓ Action on Failed Tests

If test results fail:

1. **Take the system out of service.**
2. **Determine and fix the cause of contamination.**
3. **Retest and document results** before resuming use.



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### 5. Compressed Breathing Air System Requirements

NFPA 1989 places requirements on the **air supply system**, not just cylinder air:

#### System Installation & Operation

- Compressors and fill stations must be installed and operated per manufacturer instructions and industry best practices.
- Breathing air compressors should be **operated weekly** (e.g., exercise and condensate drain cycles).
- Intake locations should be carefully selected, clearly marked, and maintained to reduce contamination risk.

#### Oil-Lubricated Compressor Protections

- Systems using oil-lubricated compressors must have **tamper-proof CO monitoring** and automatic shutdown at unsafe levels.
- Monitor resolution (e.g., 1 ppm) should detect dangerous CO before it reaches breathing air distribution.

#### Cylinder Storage & Rotation

- Air stored in steel cylinders should be **refreshed/rotated annually** to maintain quality.
- Maintain clear markings and logs for each cylinder's age and test results.

### 6. Recordkeeping & Documentation

Maintain detailed records to prove compliance:

- ✓ Air quality test results and dates
- ✓ Sampling methods used and labs (if external)
- ✓ Equipment maintenance and purification component changes
- ✓ Corrective actions taken for test failures
- ✓ Compressor weekly run logs and condensate drains
- ✓ Cylinder rotation/refill history



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**Retention requirement:** Keep records **no less than five years** (as recommended for compliance and auditing).

## 7. Posting & Visibility

- Post breathing air quality test results where appropriate (e.g., compressor fill stations).
- Make documentation easily accessible for internal audits and external inspections (e.g., OSHA or AHJ visits).

## 8. Personnel Training

Train your team on:

- **Breathing air quality importance and health impacts.**
- **Sampling procedures** and interpretation of test results.
- **Compressor operation and preventative maintenance.**
- **Recordkeeping requirements and corrective action protocols.**

Even personnel who don't directly manage air systems should understand why clean breathing air matters for safety.

## Compliance Checklist

Requirement	Action
Written respiratory protection program	Includes NFPA 1989 air quality criteria
Air quality test frequency	At least quarterly
Sampling events	After maintenance, system changes, contamination
Compressor & fill station QA	Weekly operation and maintenance
Air contamination alarms	Installed on oil-lubricated compressors
Recordkeeping	All results ≥ 5 years
Training	Personnel trained on program procedures