

# Underground Construction & Tunneling Safety

Guy's Construction  
123 Main Street, Anytown, CA 90210

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29 CFR 1926.800 (Subpart S) - Underground Construction  
T8 CCR 1560+

Effective Date: June 08, 2026

**SAMPLE DOCUMENT - NOT FOR COMPLIANCE USE**

## JURISDICTION AND REGULATORY FRAMEWORK

Underground construction is one of the most heavily regulated construction activities:

- 29 CFR 1926.800 (Subpart S): comprehensive standard for tunnels, shafts, chambers, and passageways
- 29 CFR 1926.803: compressed air work (caissons, hyperbaric)
- MSHA: if the operation transitions to mining, MSHA jurisdiction may apply

### STATE-SPECIFIC: California has additional requirements:

- T8 CCR 1560+: Cal/OSHA tunnel safety orders per T8 CCR 1560+: ventilation, atmospheric monitoring, emergency provisions, fire prevention, ground support
- tunnel construction
- fire-resistant materials
- construction with fire-resistant materials
- Project Permit
- contained in Construction Safety Standard Part 32 "Aerial Work Platforms"
- the outside rail of the curve
- effective separation by suitable partition, fence, or screen from exposed live parts or wiring over 600 volts
- 120,000 mg/kg
- The reinforcing steel contractor must flag specific areas of the erection level for their work activity. The guying and/or bracing must be i
- casing and casing seat tests by use of a surface readout pressure gauge and a chart or a digital recorder
- tanks or closed containers
- §508.A
- adequate lighting for nighttime transfer operation
- a torque prescribed by the closure manufacturer, using a properly calibrated device that is capable of measuring torque
- construction of tunnels, shafts, chambers, and passageways; underground work in mines (MSHA has primary jurisdiction); caissons, cofferdams,
- construction of tunnels, shafts, chambers, and passageways
- underground work in mines (MSHA has primary jurisdiction)
- caissons, cofferdams, and compressed air work under 1926.801-803
- 1926.800(t)(4)(i) for personnel hoists
- each 10 employees of each sex, or numerical fraction thereof, who are required to shower during the same shift
- adequate handwashing facilities for use by employees exposed to lead in accordance with 29 CFR 1926.51(f)
- an accurate record documenting relevancy of objective data in assessing exposure levels for current job conditions
- 150 feet per minute
- hot and cold water feeding a common discharge line

## TABLE OF CONTENTS

- 1.0 Purpose and Scope
- 2.0 Safety Program Requirements
- 3.0 Access and Egress
- 4.0 Check-In / Check-Out System
- 5.0 Atmospheric Monitoring and Ventilation
- 6.0 Gassy Operations Classification
- 7.0 Fire Prevention and Protection
- 8.0 Ground Support and Stability
- 9.0 Drilling and Blasting Underground
- 10.0 Electrical Safety Underground
- 11.0 Compressed Air Work (Hyperbaric)
- 12.0 Emergency Response and Rescue
- 13.0 Training Requirements
- 14.0 Recordkeeping
- Appendix A: Underground Entry Permit

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## 1.0 PURPOSE AND SCOPE

This Underground Construction & Tunneling Safety Program covers all tunnel, shaft, chamber, and passageway construction on Guy's Construction projects per 29 CFR 1926.800.

*29 CFR 1926.800(a)(1)*

## 2.0 SAFETY PROGRAM REQUIREMENTS

- Written safety program specific to the underground project
- Competent person designated for underground work
- Pre-construction geological survey and hazard assessment

*29 CFR 1926.800(b)*

## 3.0 ACCESS AND EGRESS

- 10 foot-candles

*29 CFR 1926.56(a)*

- minimum 10 foot-candles
- 10 foot-candles minimum illumination
- staircase or ladders with landing platforms not more than 20 feet apart

*29 CFR 1926.801(c)*

- Minimum two means of egress from each underground work area
- Shafts: ladders or mechanical hoisting with emergency backup
- Emergency escape routes clearly marked and illuminated

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## 4.0 CHECK-IN / CHECK-OUT SYSTEM

**An accurate count of all persons underground must be maintained at all times. This is non-negotiable.**

- Tag board or electronic system at every portal/shaft entry
- Every person entering and exiting checks in and out
- Designated person responsible for maintaining the count
- Count verified at each shift change

29 CFR 1926.800(c)

## 5.0 ATMOSPHERIC MONITORING AND VENTILATION

- procedures to ensure adequate air quality, quantity, and flow of breathing air for atmosphere-supplying respirators

29 CFR 1910.134(c)(1)(vi)

- PEL 50 ppm (8-hour TWA). Engineering controls (ventilation), monitoring, and respiratory protection when exceeded.

29 CFR 1910.1000 Table Z-1

- written safety program, check-in/check-out system, atmospheric monitoring (O2, flammable gas, toxic gas), ventilation, emergency provisions, communication system per 1926.800

29 CFR 1926.800

- Fire-Resistant Ventilation Systems

1926.800(k)(11)

### 5.1 Atmospheric Limits

Gas/Condition	Action Level	Danger Level	Action Required
Oxygen	<19.5% or >22%	<16%	Evacuate at danger; ventilate and retest at action
Methane (CH4)	>0.25% (5% LEL)	1% (20% LEL)	De-energize at 20% LEL; evacuate at danger
Carbon Monoxide	>25 ppm	200 ppm	Ventilate; evacuate at danger
Hydrogen Sulfide	>10 ppm	50 ppm	Ventilate; evacuate at danger
Nitrogen Dioxide	>1 ppm	5 ppm STEL	Ventilate; evacuate at danger
Dust	visible dust	N/A	Increase ventilation, wet methods

## 6.0 GASSY OPERATIONS CLASSIFICATION

29 CFR 1926.800(h) classifies underground operations based on gas hazard:

Category	Criteria	Additional Requirements
Non-gassy	No history of hazardous gas, geological assessment indicates low risk	Standard monitoring
Gassy Cat. 1	Tested and found to contain >10% LEL, or history of gas in the area	Continuous monitoring, automatic alarm, fire suppression, restricted ignition sources
Gassy Cat. 2	Contains or is likely to contain >10% LEL and flammable gas has ignited or rapid gas inflow	All Cat. 1 + additional ventilation, explosion-proof equipment

## 7.0 FIRE PREVENTION AND PROTECTION

- TBM operations: workers behind shield head during boring; emergency refuge chamber or secondary escape route; fire suppression system on TBM; communication between TBM head and surface; conveyor belt

29 CFR 1926.800 + industry practice (ITA guidelines)

- Fire-Resistant Ventilation Systems

1926.800(k)(11)

- misfires
- Fire extinguishers at each portal/shaft and every 100 feet underground
- No open flames in gassy operations
- Diesel equipment: fire suppression system, catalytic converter or scrubber

## 8.0 GROUND SUPPORT AND STABILITY

- Ground conditions assessed continuously by competent person
- Support installed as close to the face as practicable
- Scaling loose rock before support installation

## 9.0 DRILLING AND BLASTING UNDERGROUND

- All Subpart U (1926.900-914) requirements apply underground plus additional precautions
- Ventilation must clear blast fumes before re-entry (test atmosphere)
- No re-entry until competent person verifies safe atmosphere
- Misfires: 30-minute minimum wait (electric), 60 minutes (fuse)

## 10.0 ELECTRICAL SAFETY UNDERGROUND

- GFCI protection on all 120V circuits underground
- Trailing cables protected from mechanical damage
- In gassy operations: explosion-proof or intrinsically safe equipment
- Emergency lighting: battery-powered backup illumination

## 11.0 COMPRESSED AIR WORK (HYPERBARIC)

- use with approved cylinders from other approved self-contained compressed air breathing apparatus when deemed necessary
- essential electrical system
- conditions listed in Appendix A identical to appendix A to 29 CFR 1910 Subpart T
- hyperbaric exposure due to increased risk of barotrauma or decompression sickness
- Medical examinations for all compressed air workers
- Decompression tables strictly followed
- Medical lock on site when pressure exceeds 15 psig

29 CFR 1926.803

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## 12.0 EMERGENCY RESPONSE AND RESCUE

**Underground rescue is specialized. Do not enter to rescue without training, equipment, and a plan.**

- Written emergency plan specific to the underground project
- Rescue team trained in underground rescue (mine rescue or equivalent)
- Self-rescuer devices available for all underground workers (in gassy operations)
- Communication system that functions underground (phone line, radio repeater, leaky feeder)
- Refuge station or safe haven for extended underground projects
- Emergency evacuation drill before production work begins

## 13.0 TRAINING REQUIREMENTS

- All underground workers: this program, hazards, atmospheric monitoring, emergency procedures
- Competent person: ground conditions, support systems, atmospheric testing
- Blasters: underground blasting (Subpart U + underground-specific)
- Compressed air workers: hyperbaric hazards, decompression, medical requirements
- Rescue team: underground rescue techniques, equipment, communications

## 14.0 RECORDKEEPING

Record	Retention	Notes
Atmospheric monitoring logs	Project duration + 3 years	Continuous during work
Check-in/check-out records	Project duration + 1 year	Daily
Ground condition assessments	Project duration + 5 years	Per shift
Gassy classification records	Project duration + 5 years	Initial + changes
Training records	Duration of employment	All personnel
Medical records (compressed air)	Duration of employment + 30 years	Per 1926.803
Emergency drill records	Project duration + 3 years	Per drill
Blast records (underground)	Project duration + 5 years	Per blast

## California STATE-SPECIFIC REQUIREMENTS

- Cal/OSHA tunnel safety orders per T8 CCR 1560+: ventilation, atmospheric monitoring, emergency provisions, fire prevention, ground support

### *T8 CCR 1560+*

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## APPENDIX A: UNDERGROUND ENTRY PERMIT

Date: \_\_\_\_\_  
 Issued By: \_\_\_\_\_

Project/Tunnel: \_\_\_\_\_  
 Shift: \_\_\_\_\_

Item	Readings/Notes	OK	N/A
Atmospheric testing completed (O2, CH4, CO, H2S, NO2)	O2:___% CH4:___% CO:___ H2S:___ NO2:___		
Ventilation operating and adequate	CFM: ___		
Ground conditions inspected by competent person			
Check-in board operational	Count: ___		
Emergency communication tested			
Fire extinguishers in place			
Self-rescuers available (if gassy)			
Lighting adequate			
Dewatering operational (if needed)			
Rescue team on standby (if required)			

Entry Authorized: [ ] Yes [ ] No (If No, state reason: \_\_\_\_\_)

Competent Person: \_\_\_\_\_

Date: \_\_\_\_\_

Superintendent: \_\_\_\_\_

Date: \_\_\_\_\_

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