

AIR QUALITY IN CLARIFIERS, TANKS, AND OTHER CONFINED SPACES

a.k.a. raising shrimp in Ohio



Ohio Environmental
Protection Agency

P.O. Box 1049 Columbus, OH 43216-1049

OPERATOR CERTIFICATION

Gregory M Black

WS1-1065555-98

Certification Number

May 29, 1998

Issue Date

Cory W. Butts

Director

December 31, 2018

Expiration Date

has met the requirements of the law, is duly certified and is entitled to operate water or wastewater facilities in the State of Ohio until the expiration date.















18 CANS

ROCKIES
-ESTD 1978-





- Work performed within a confined space poses hazards beyond those encountered at normal industrial or construction locations. In addition to an increased risk of physical trauma caused by restricted work areas, a confined space may present hazards of:

- Oxygen deficiency or enrichment,
- Combustible atmospheres,
- Toxic contaminants,
- Caught in/Crushed/Engulfment

- A high number of accidents and fatalities occur in confined spaces because these hazards are not anticipated and precautionary measures are not taken prior to entering a confined space.

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- Even work performed can change the atmosphere in the confined space. Welding or painting can produce toxic fumes and even regular breathing may deplete the oxygen levels within the confined space.

Definitions

Confined Space - An enclosed space that is :

Large enough to enter and work.

Limited means of entry/exit.

Not designed for continuous employee occupancy.



Permit Required Confined Space

A confined space that may :

Contain or have the potential to contain a hazardous atmosphere.

Have potential for engulfment.

Be configured so as to trap or asphyxiate an entrant.

Contain any other serious hazard.





Hazardous Atmospheres

Flammable gas, vapor, mist in excess of 10% of the LEL, LFL.

Combustible Dust

Oxygen concentration $< 19.5\%$ or $>23.5\%$.

Toxic Atmosphere : excess of the PEL (29 CFR 1910 subpart Z)

Air Monitoring

Meters must remain calibrated.

No entry without prior testing for Oxygen, Combustible Gases and/or toxic.

Initial monitoring from outside the space for 5 minutes (O₂ & Comb.).

Follow manufacturers guidelines for entry required testing.

“Never trust your senses”.

Priority : Oxygen deficiency, Flammable atmosphere, Toxic atmosphere.

Ventilation- Exhaust or dilution

Typical Four Gas Meter

Oxygen - 19.5-23.5%
Atmosphere

Combustibles- 10% of LEL.

CO - 35 PPM

H₂S - 10 PPM



Definitions

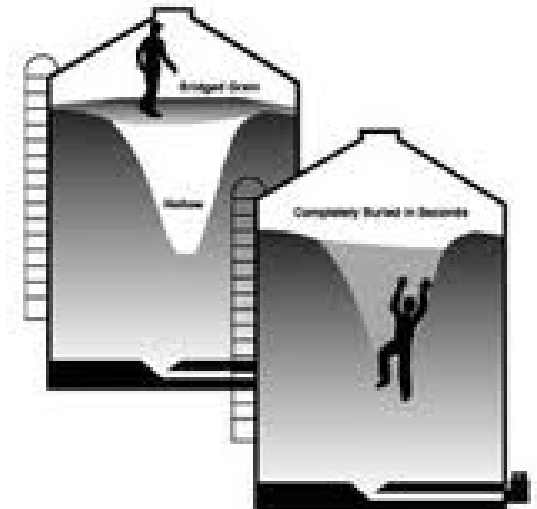
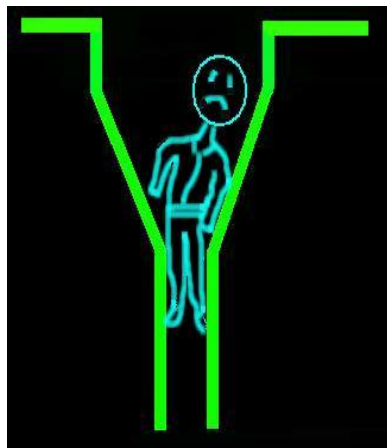
Controlling Contractor - is the employer having overall responsibility for the project.

Engulfment- Capture in flowable solid.

Oxygen Deficient Atmosphere- Less than 19.5% Oxygen.

Oxygen Enriched Atmosphere- Greater than 23.5 % Oxygen.

IDLH- Immediate threat to life and health; causes inability to escape.



Allowable Conditions for Alternate Procedures

Demonstration that the only hazard is that of *hazardous atmosphere*.

Demonstrates that **continuous** forced air ventilation will maintain a safe space.

Monitoring data must support the above demonstration and **provided to entrants** or their representative.

Constant monitoring of atmosphere.

Employees provided opportunity to observe tests.





**RESPIRATORS ARE A LAST LINE OF
DEFENSE!!!**











SENSIDYNE, INC.

CALIBRATION CERTIFICATE

CELL S/N: 21190-S

DATE: 10 - 05 - 2007

This is to certify that the above referenced Gilibrator Flow Cell was calibrated using film flowmeter MCS-102-A, which has been calibrated by instruments directly traceable to the National Institute of Standards and Technology, NIST Report 8361604.

Results:

REFERENCE	S/N	RELATIVE	PERCENT
MCS-102-A	21190-S	DIFF.	DIFF
cc/min	cc/min	cc/min	
2009	2010	1	0.05
2009	2013	4	0.2
2008	2009	1	0.05
2008	2010	2	0.1
2008	2010	2	0.1
2000	2001	1	0.05
2005	2009	4	0.2
2010	2009	-1	-0.05
2010	2012	2	0.1
2014	2018	4	0.2

MAX

4

0.2

MEAN 2008.1

2010.1

CALIBRATED BY

Apoc Bayfield

DATE: 10 - 05 - 2007

CODE 000





SAFER • HEALTHIER • PEOPLE™



NIOSH

POCKET GUIDE TO CHEMICAL HAZARDS

Additional Databases Included
IDLH Database
International Chemical Safety Cards
NIOSH Manual of Analytical Methods
2004 Emergency Response Guidebook
OSHA Sampling and Analytical Methods
Toxicology Review of Selected Chemicals
Recommendations for Chemical Protection
Chemicals Cited by RCSC and NPG - MCLs and PELs
Specific Medical Tests for OSHA-Regulated Air Pollutants



DHHS (NIOSH) Publication No. 2005-151

DEPARTMENT OF HEALTH AND HUMAN SERVICES
Centers for Disease Control and Prevention
National Institute for Occupational
Safety and Health
September 2005

Phone: 1-800-35-NIOSH

www.cdc.gov/niosh



EXTECH
INSTRUMENTS

45170CM

5-in-1 Environmental Meter

- 5-in-1 Umweltmessgerät
- Mesureur de conditions ambiantes 5 en 1
- Medidor Ambiental 5 en 1
- Misuratore ambientale 5 in 1
- Medidor Ambiental 5-em-1

- ▶ **5-in-1 meter measures:**
 - Air Flow
 - Air Velocity
 - Relative Humidity
 - Temperature
 - Light Level
- ▶ **Reading on display rotates depending on measurement mode**



Measuring the Air Flow of a kitchen hood insuring proper exhaust

TOUGH TOOLS
FOR TOUGH JOBS





DANGER

DO NOT ENTER

CONFINED SPACE

PERMIT REQUIRED

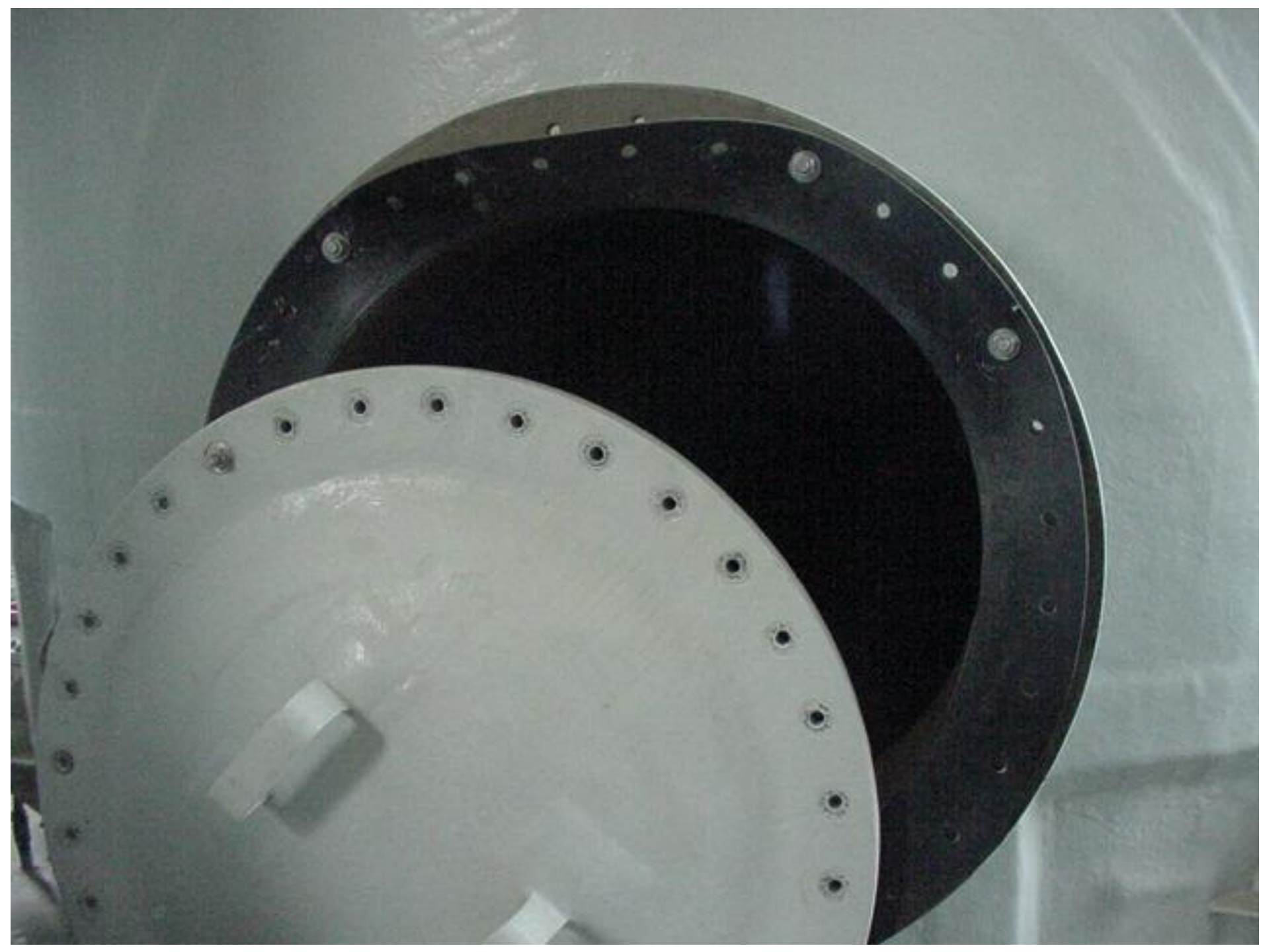
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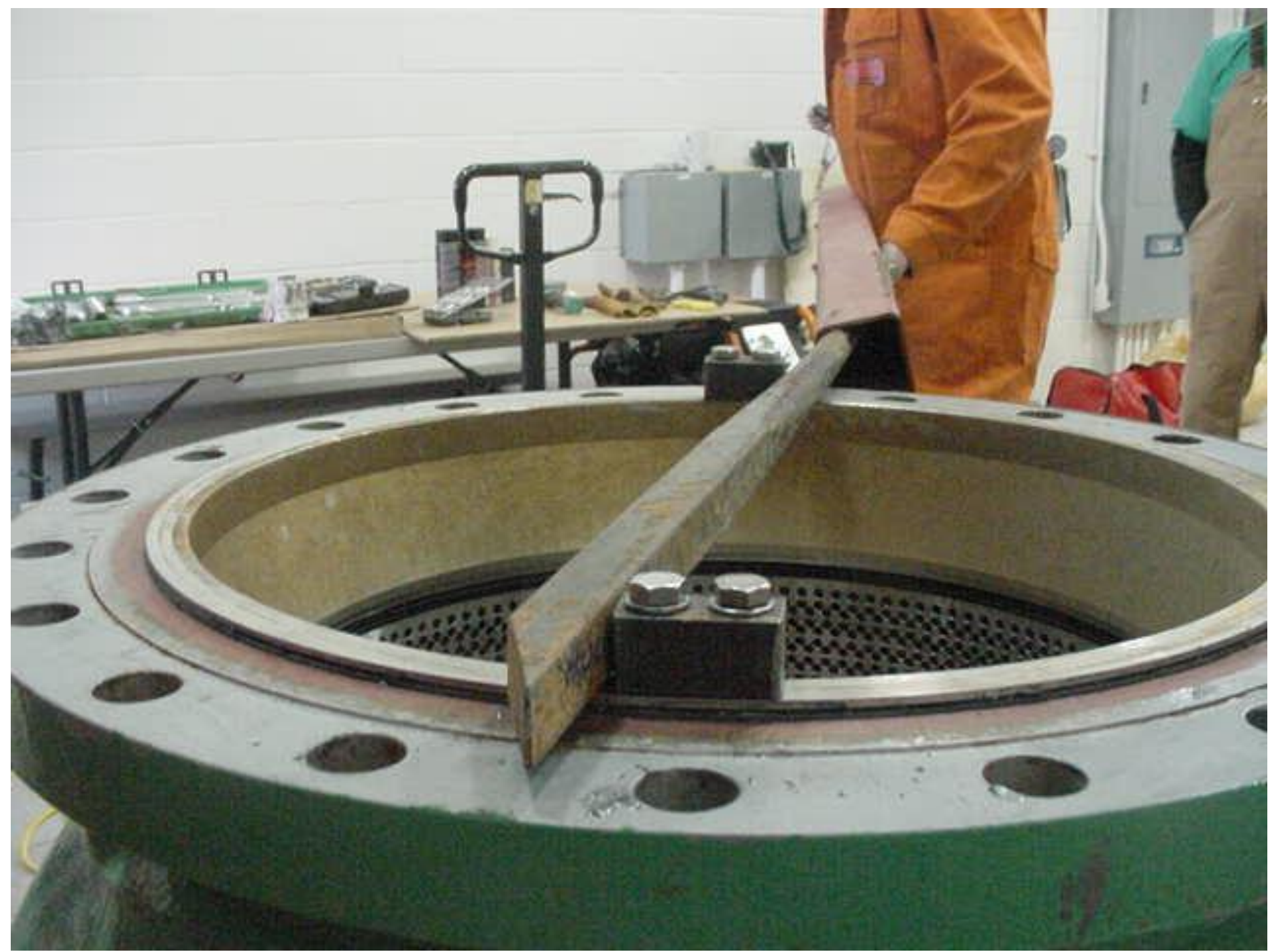










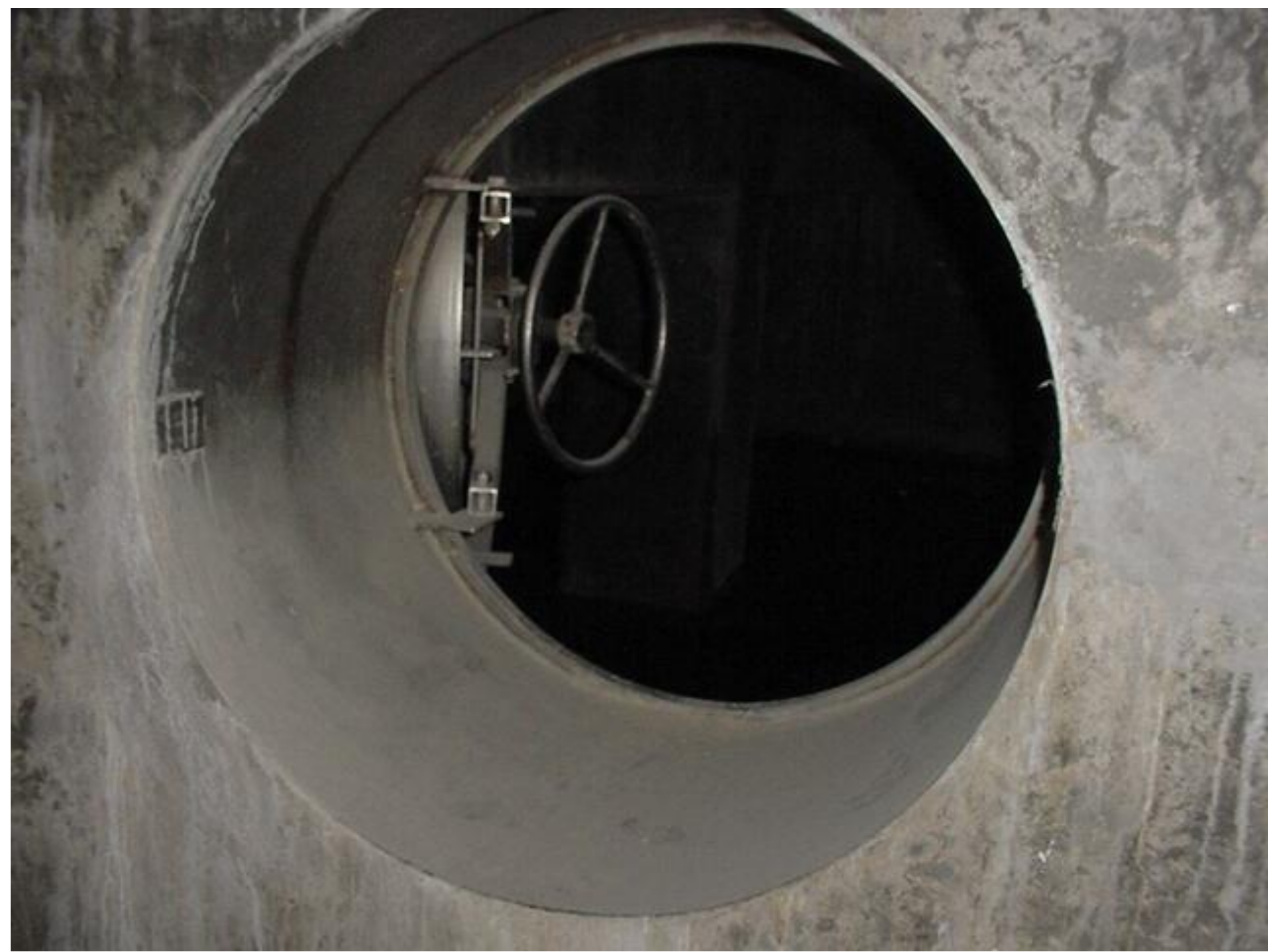


DANGER

DO NOT ENTER

CONFINED SPACE

PERMIT REQUIRED













DANGER

**OXYGEN, NO SMOKING
NO OPEN FLAMES**

32887



21
78
99%

LIQUID
GAS

LOX
SLO
86



CHEMICAL NAME AND NO.

LIQUID OXYGEN

0 FIRE HAZARD

3 HEALTH HAZARD

0 REACTIVITY

PERSONAL PROTECTION



TARGET ORGANS

EYES

SKIN

RESPIR-
ATORY
SYSTEM

LIQUID
OXYGEN

CAUTION
LIQUID OXYGEN
EXTREMELY COLD



