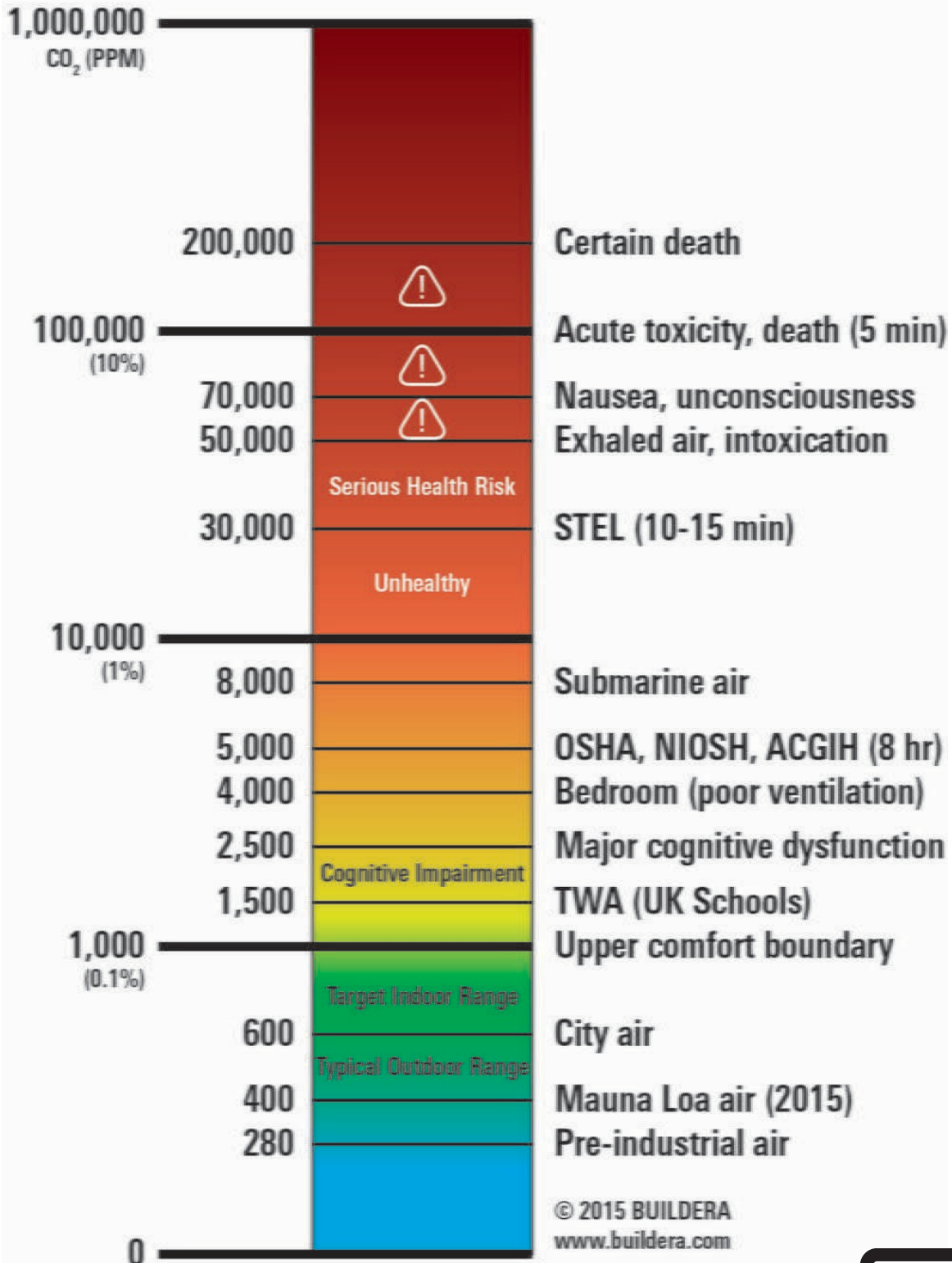


# Carbon Dioxide (CO<sub>2</sub>) Hazard Scale



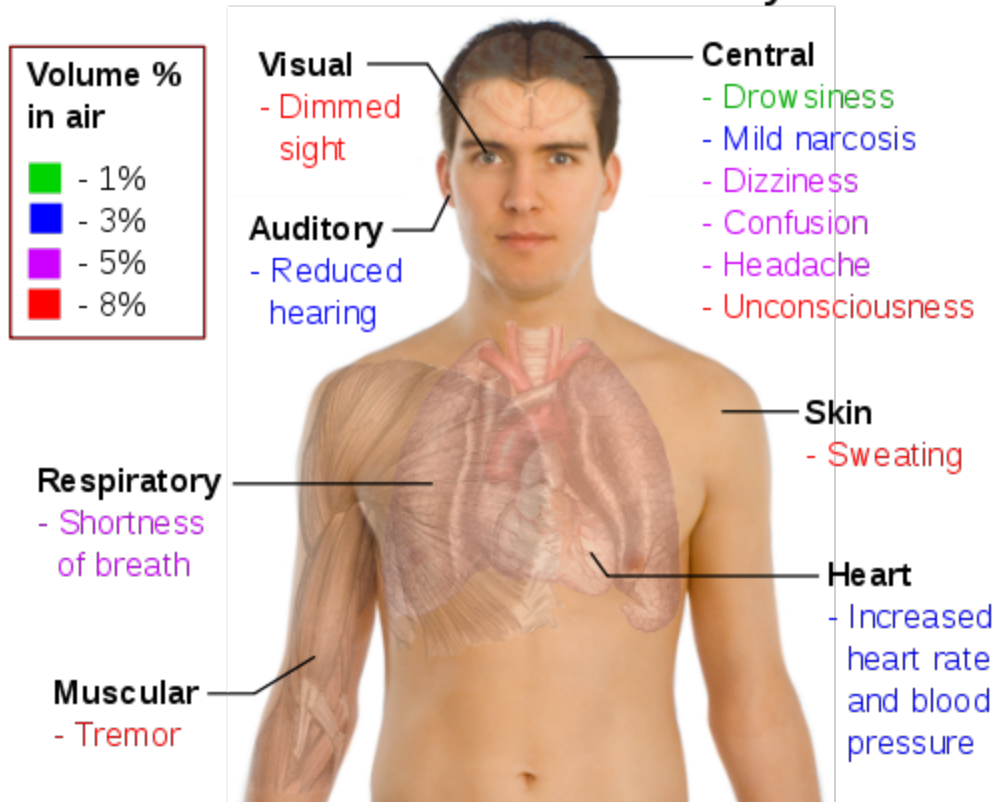
**EXHIBIT**  
**LO164**

## Effects of CO at Different Concentrations

12,800 ppm	Immediate effect; unconsciousness and danger of death in 1 to 3 minutes.
6,400 ppm	Headache and dizziness in 1 to 2 minutes; unconsciousness and possible death in 10 to 15 minutes.
3,200 ppm	Headache and dizziness in 5 to 10 minutes; unconsciousness and possible death in 10 to 15 minutes.
1,500 ppm	Headache, dizziness and nausea, collapse in 20 minutes; unconsciousness and possible death in 2 hours.
800 ppm	Headache, dizziness and nausea in 45 minutes; collapse, and possible death in 2 hours.
400 ppm	Frontal headache and nausea after 1 to 2 hours. Life threatening after 3 hours.
200 ppm	Should not be exposed to this level. Possible mild frontal headache in 2 to 3 hours.
100 ppm	No poisoning symptoms for long time period. Allowable for several hours.
35 ppm	Permissible exposure level. No apparent toxic symptoms

Information from  
Boiler and Machinery  
Engineering Bulletin,  
Federal Register,  
Vol 45 and Industrial  
Toxicology,  
3rd. Edition.

Main symptoms of  
**Carbon dioxide toxicity**



High CO2 levels can result in drowsiness, headaches, high blood pressure, and more.

CO2 CONCENTRATION (PPM LEVELS)



PHYSIOLOGICAL IMPACT / HEALTH EFFECT

What are the symptoms of different levels of CO <sub>2</sub> exposure?					
CO <sub>2</sub> Levels		Symptoms	Recommended Limitations on Activity	Exposure Limit	
parts per million (ppm)	%			At rest	At extremely high work rates
10,000 ppm	1.0 %	Typically no effects, possible drowsiness	No restrictions	Indefinite Exposure	-
15,000 ppm	1.5 %	Mild respiratory stimulation for some people			
25,000 ppm	2.5%		-	-	2 hours
30,000 ppm	3.0 %	<b>Short Term Exposure Limit (TLV-STEL)</b> - Moderate respiratory stimulation, increased heart rate and blood pressure.	No restrictions within the exposure limit	15 hours	30 minutes
40,000 ppm	4.0%	<b>Immediately Dangerous to Life or Health (IDLH)</b>			
50,000 ppm	5.0%	Strong respiratory stimulation, dizziness, confusion, headache, shortness of breath	No restrictions within the exposure limit	8 hours	15 minutes
70,000 ppm	7.0%		Severe limitations on activity	< 30 minutes	n/a
80,000 ppm	8.0 %	Dimmed sight, sweating, tremor, unconsciousness, and possible death	-	-	
10,000 ppm	10 %		-	< 2 minutes	