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Control Banding for Welding

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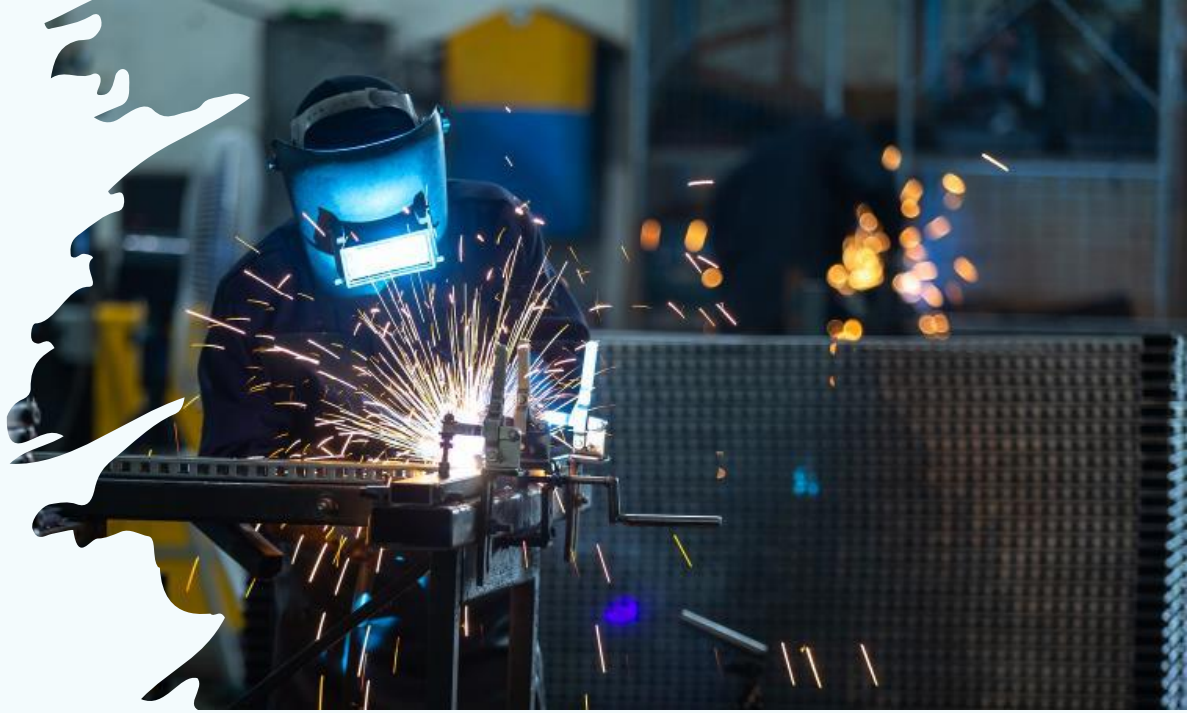
Welding occurs across many different industries.



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Did you know?

There are 30 different welding processes including construction, fabrication and repair.

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Today we will focus on welding tasks – when the health hazard is within arm's length of the worker.

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Individual Exposure varies by:

- Welding process & task
- Base metal
- Filler metals & flux
- Human factors (body position, eyesight, habits, experience)
- Work environment (room size & ventilation, confined work, wet work, Simultaneous Operations at a site)

Air Contaminants of Concern

- Iron oxide fumes
- Manganese, nickel, chrome VI fumes
- Ozone
- Carbon monoxide
- Nitrogen oxides
- Fluorides
- Decomposition products or residues - isocyanates, aldehydes, VOCs
- Argon, helium or carbon dioxide shielding gases

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Health Effects of Welding Fumes

Short-term exposure	Long-term exposure
Eye, nose and throat irritation	Occupational asthma
Dizziness	Pneumonia
Nausea	Metal fume fever
	Reduced lung function
	Stomach ulcers
	Kidney damage
	Nervous system damage
	Prolonged manganese exposure can cause Parkinson's-like symptoms
	Cancer of the lungs, larynx and urinary tract

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Common Welding Processes and Emissions

- **High-fume** emission: SMAW, GMAW, FCAW, Arc cutting and gouging
- **Low-fume** emission: GTAW, SAW, RW

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Traditional Method: Air monitoring of Welding Fumes during work task on specific workers

Control Banding Approach: predicts concentrations of welding fumes in the air based on the control approach used.

Cost for traditional measurement is directed to control and validation.

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Example of Exposure Band Risk Matrix: Concentration vs Control Approaches

Predicted Concentrations of Dust in air (mg/m³) by EP and Control Approach (CA)			
Exposure Predictor Band (quantity/day dustiness category)	**CA1 General Ventilation**	**CA2 Local Exhaust Ventilation** (LEV)	**CA3 Containment or Isolation**
EP1 (grams: medium or low dustiness)	0.01 to 0.1	0.001 to 0.01	<0.001
EP2 (grams high dusty, kg & tonnes: low dusty)	0.1 to 1	0.01 to 0.1	0.001 to 0.01
EP3 (kg: medium & high dusty)	1 to 10	0.1 to 1	0.01 to 0.1
EP4 (tonnes: medium & high dusty)	>10	1 to 10	0.1 to 1

Tables come from COHSS Essentials, validated by German Baua

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CONFIRM

- Use measurements to determine the effectiveness of controls.
- The concentration out of previous matrix is your goal.

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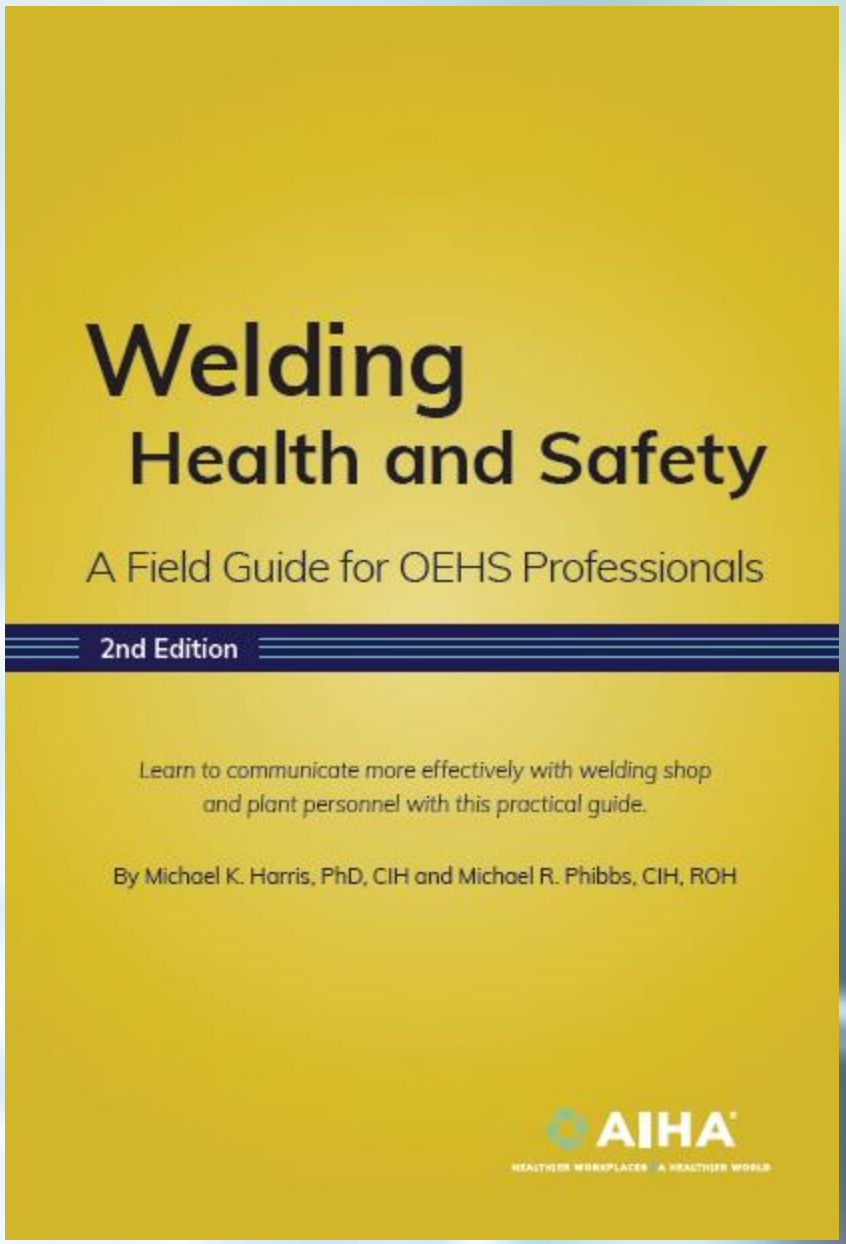
For detailed information:

- Visit AIHA Bookstore

Michael K. Harris, PhD, CIH and Chemscape's Mike Phibbs, CIH, ROH have written a practical field guild to help you communicate more effectively with welding shop and plant personnel.



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