

# OSHA's Hex Chrome Rule – How It Affects Your Business

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# Applicability

- Any employer whose employees could be exposed to hexavalent chromium (Cr VI)
  - General industry (1910.1026)
  - Construction (1926.1126)
  - Shipyards (1915.1026)

# Key Requirements

- Initial monitoring required (with few exceptions)
- Training, housekeeping, wash facilities
- May need PPE, change rooms, hygiene practices
- Recordkeeping
- If  $>$  Action Limit
  - Air monitoring every 6 months
  - Medical surveillance (if  $>30$  days/yr)
- If  $>$  PEL
  - Air monitoring every 3 months
  - Respirators
  - Engineering & work practice controls (if  $>30$  days/yr)

# Hex Chrome Exposure Limits

- PEL = 5 micrograms per cubic meter (ug/m<sup>3</sup>) as an 8 hour time weighted average (TWA)
- Action Level = 2.5 ug/m<sup>3</sup> TWA

# Top 3 Affected Industries

1. Welding - 269,380 (48%)
2. Painting - 81,893 (15%)
3. Electroplating - 66,857 (12%)\*

\* % of total employees (558,451) covered by the standard

# Welding breakdown by industry

Steel type	General Industry	Construction	Shipyards	Gov't
Stainless	45,326	60,449	21,029	943
Carbon	60,600	80,404	629	
	<i>105,926</i>	<i>140,853</i>	<i>21,658</i>	<i>943</i>
<b>Total</b>			<b>269,380</b>	

# Quick Background on OSHA & Industrial Hygiene

- Permissible Exposure Limits (PEL)
  - Table Z
  - Time Weighted Average (TWA) – 8 hours
  - Short Term Exposure Limit (STEL) – 15 min
- Regulations for specific chemicals (asbestos, lead, cadmium, Cr VI...)
- Hazard Communication
  - MSDS
  - Labels
  - Training

Analyte	OSHA PEL		ACGIH TLV or AIHA WEEL(*)		OEL	Units
	TWA (8 hr)	C or STEL	TWA (8 hr)	STEL		
Beryllium	0.002	0.005	0.00005	n/a	0.002	mg/m3
Cadmium	0.005	n/a	0.002	(resp)	0.005	mg/m3
Chromium VI	0.005	n/a	0.001	n/a	0.005	mg/m3
Silver	0.01	n/a	0.01	n/a	0.01	mg/m3
Lead	0.05	n/a	0.05	n/a	0.05	ug/m3
Cobalt	0.1	n/a	0.02	n/a	0.1	mg/m3
Copper	0.1	n/a	0.2	n/a	0.1	mg/m3
Manganese	n/a	5	0.2	n/a	0.2	mg/m3
Antimony	0.5	n/a	0.5	n/a	0.5	mg/m3
Chromium III	0.5	n/a	0.5	n/a	0.5	mg/m3
Nickel	1	n/a	1.5	n/a	1	mg/m3
Tin	2	n/a	2	n/a	2	mg/m3
Zinc Oxide	5	n/a	2	(resp)	5	mg/m3
Iron Oxide	10	n/a	5	n/a	10	mg/m3
Magnesium oxide	15	n/a	10	n/a	15	mg/m3
Molybdenum	15	n/a	3	(resp)	15	mg/m3
Titanium dioxide	15	n/a	10	n/a	15	mg/m3
Vanadium	n/a	n/a	n/a	n/a	15	mg/m3

# Primary forms of chromium

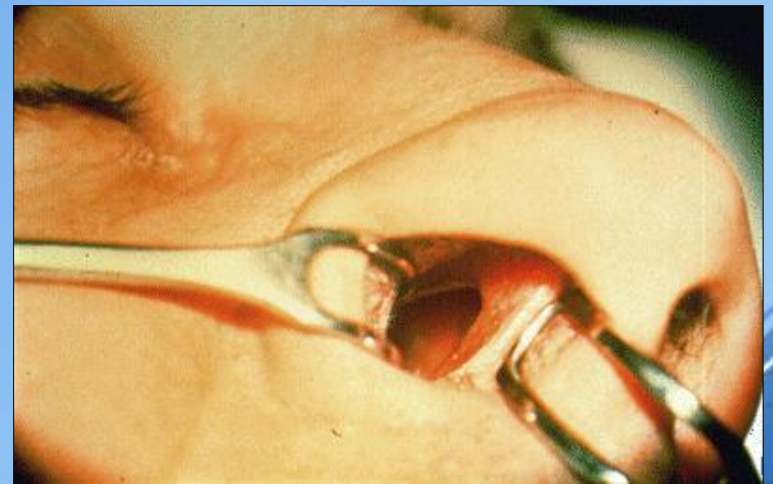
- Chromium metal
- Trivalent Chromium III (Cr III)
- Hexavalent Chromium VI (Cr VI)
- Chromic Acid

•Melting, welding, or torch cutting of stainless steel or other alloys containing chromium produces hex chrome



# Why the hex is this a problem?

- Skin, nasal, and respiratory irritation
- Allergic dermatitis (allergic skin rashes)
- Nasal ulcerations
- Nasal perforations (holes in the septum)
- Asthma
- Lung Cancer



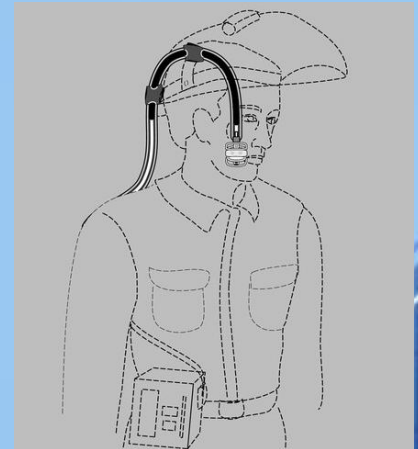
# Important Dates



- 1943 – ANSI recommends 52 ug/m<sup>3</sup> limit
- 1971 – Table Z, 52 ug/m<sup>3</sup>
- October 4, 2004 – Proposed Rule
- February 28, 2006 - Published Rule, 5 ug/m<sup>3</sup>
- November 27, 2006 – Took effect for employers with 20 or more employees
- May 30, 2007 – Took effect for employers with < 20 employees
- **May 31, 2010 – Engineering controls must be in place**

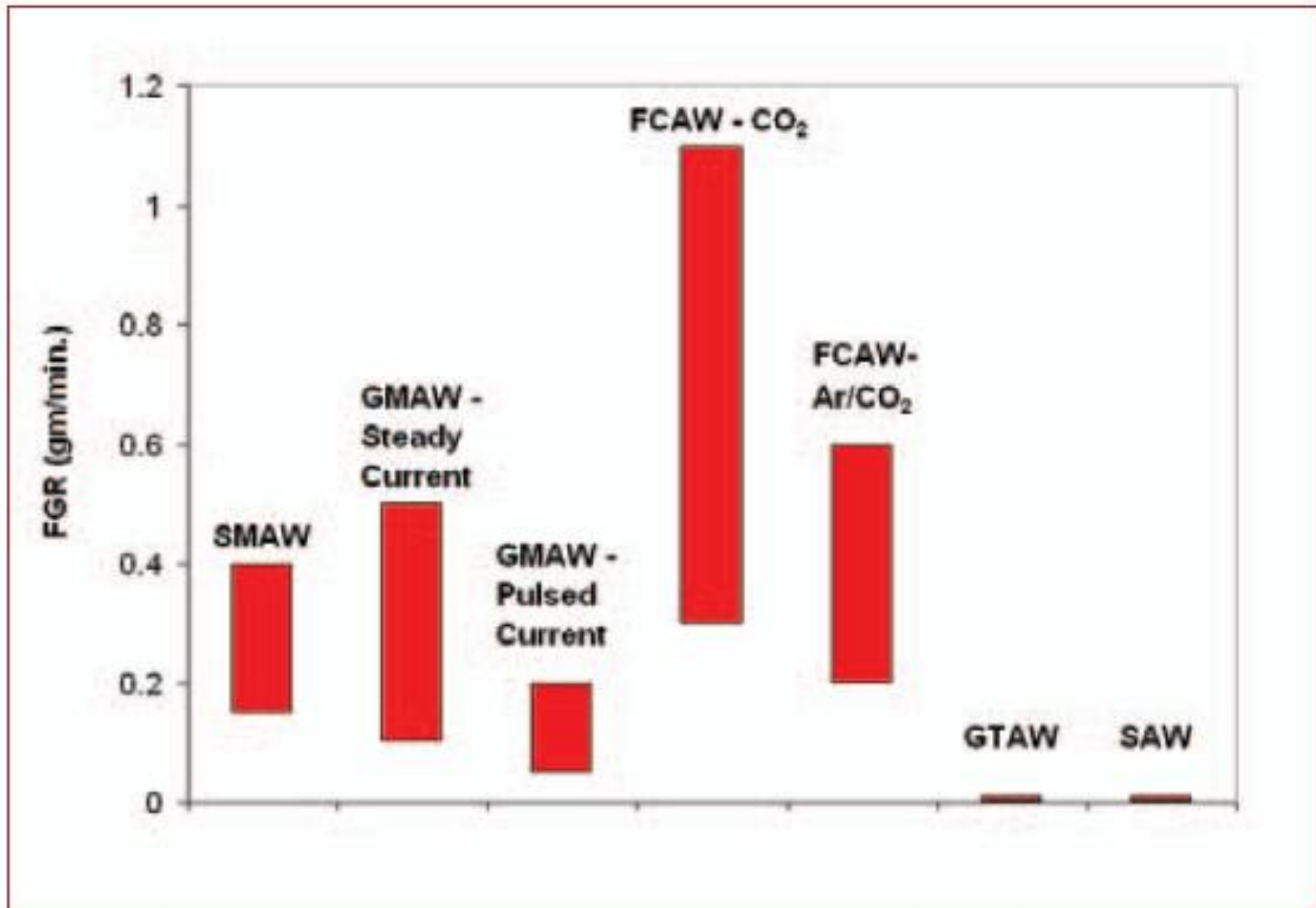
# Air Monitoring

- Initial monitoring required, unless –
  - Historical data or objective data demonstrates below the action level
- Need “sufficient number” of full shift samples
- “Representative sampling” of all exposed employees



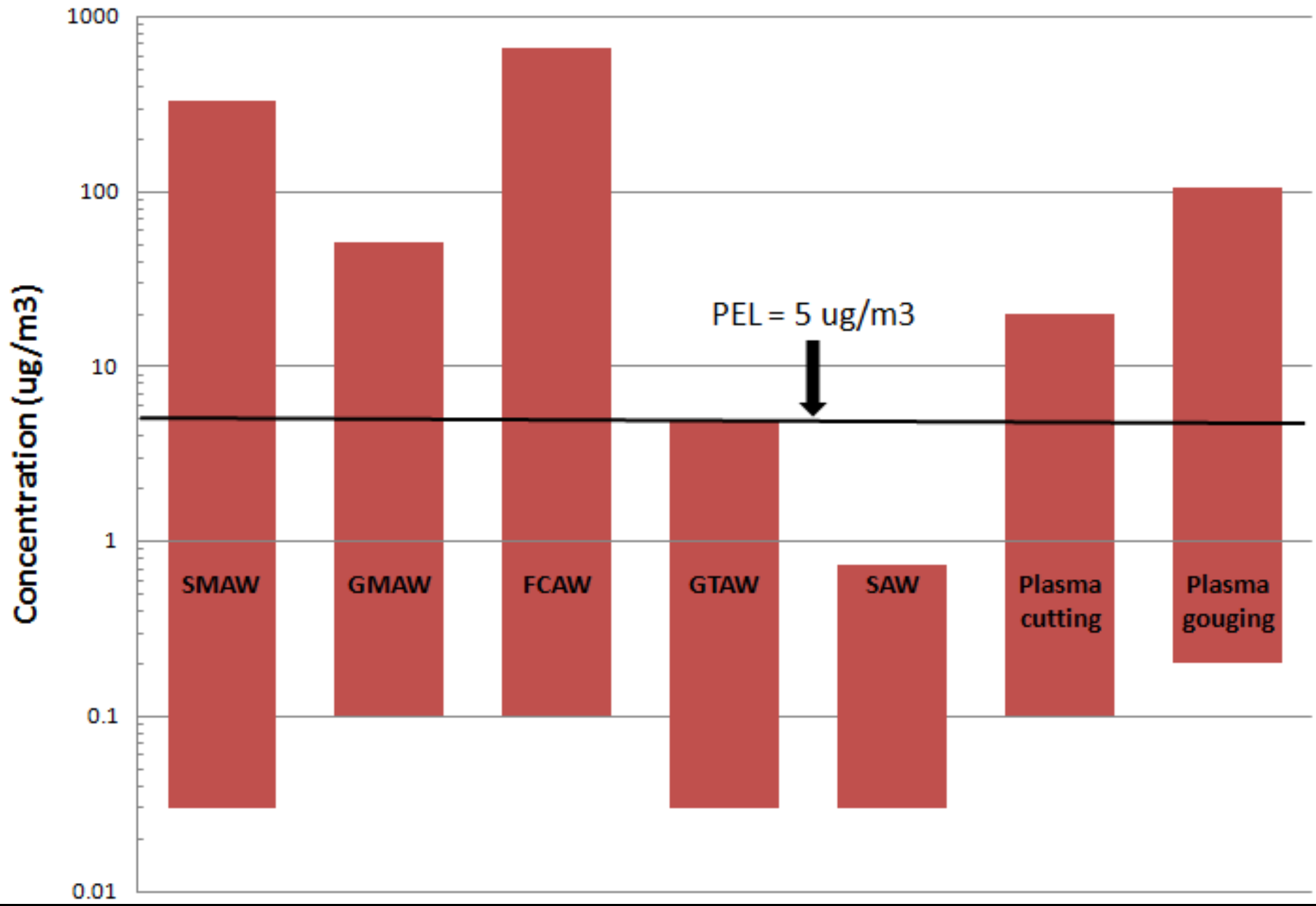
# **Factors affecting exposure**

- Type of welding / fume generation rate
- Chromium content of base metals and consumables
- Ventilation (general and local)
- Arc time, current, voltage
- Work orientation
- Work practices – skill, speed



*Fig. 1 — Approximate fume generation rates for various welding processes.*

# Hexavalent Chromium Exposures Observed during Welding Activities



# **OK...What do I need to do?**

- Conduct initial monitoring
- Train employees
- Housekeeping
- Wash facilities
- Protective work clothing and equipment
- Hygiene practices?
  - Eating and drinking prohibited?
  - Change rooms and required washing?
- Plus...

## **If > Action Limit (2.5 ug/m<sup>3</sup>)**

- Air monitoring every 6 months
- Medical surveillance (if >30 days/yr)

## **If > PEL (5 ug/m<sup>3</sup>)**

- Air monitoring every 3 months
- Establish regulated area
- Respiratory Protection
- Engineering and work practice controls  
(if >30 days/yr)

# Engineering and Work Practice Controls

- Local exhaust ventilation
- General ventilation
- Reduce arc time, current, voltage
- Replace SMAW with GMAW
- Use Pulse-Arc GMAW
- Reduce CO<sub>2</sub> in shielding for FCAW
- Reduce Na and K content in SMAW rods
- No job rotation!

# Respirators

- Required over PEL
- Must comply with 1910.134
- Interim only unless engineering and work practice controls are infeasible, or
- If employees exposed <30 days/yr

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