



## HEXAVALENT CHROMIUM EXPOSURE DETERMINATION

Prepared By	Date	Area/Unit	Equipment #	Description

<b>A) Hot Work Method – Select only ONE below</b>			
Hot Work Process	Fume Level	Score	
Stick Welding, Arc Gouging, Torch Cutting	High Fume Producing	9	<input type="checkbox"/>
MIG Welding, Plasma Cutting	Medium Fume Producing	3	<input type="checkbox"/>
TIG Welding, Grinding	Low Fume Producing	1	<input type="checkbox"/>

<b>B) Base Metal Chrome Content (refer to attached Cr content table) Select only ONE below</b>			
Percentage of Chrome in Base Metal or Filler Rod/Wire	Chrome Content	Score	
17% - >	High Chrome Content	9	<input type="checkbox"/>
9% - 17%	Medium Chrome Content	3	<input type="checkbox"/>
0.5 – 9%	Low Chrome Content	1	<input type="checkbox"/>
Less than 0.5% Chrome (Carbon Steel & Galvanized)	Very Low Chrome Content	-5	<input type="checkbox"/>

<b>C) Work Area (Select only ONE below)</b>			
Type of Space	Description	Score	
Confined Space	Includes all small confined spaces. For large confined spaces consult the safety coordinator for determination.	9	<input type="checkbox"/>
Semi-Enclosed	Includes Weld Bays, Spark Enclosures and Indoor Shops without local exhaust ventilation.	3	<input type="checkbox"/>
Open Air Location	Includes only open air welding without any barriers i.e. no fire blanket or other such materials that may block air flow.	1	<input type="checkbox"/>

<b>D) Duration Per Shift (Time spent actually performing fire work)</b>			
Length of Hot	Description	Score	
Long (Full Shift)	More than 6 hours of actual time creating emission	4	<input type="checkbox"/>
Moderate (Half Shift)	Between 4 and 6 hours of actual fire work (emission)	3	<input type="checkbox"/>
Short	Between 2 and 4 hours of actual fire work	2	<input type="checkbox"/>
Very Short	Less than 2 Hours of actual fire work	1	<input type="checkbox"/>

<b>E) Ventilation (Subtract from total score)</b>			
Type of Ventilation	Description	Score	
Local Exhaust	Local Ventilation that captures the point source of the emission	-8	<input type="checkbox"/>
Dilution Ventilation	General dilution ventilation (i.e. Copus Blower, Air Horn)	-4	<input type="checkbox"/>
Open Air	Natural ventilation (no obstructions between emission and air) No fire blankets, plastic or other structure blocking natural ventilation (wind)	-2	<input type="checkbox"/>

<b>See description of compliance method (back pg.) based on score</b>	<b>Total</b>	
The use of monitoring data may override this determination as it may provide additional data.	<b>Score</b>	



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### **15 points or Greater: CrVI Regulated Tasks or "Hot Zones":**

- **Employee Awareness:** Demarcate areas with Danger Tape, CrVI warning tags and signs. All personnel inside Hot Zone area must wear required PPE.
- **Respiratory Protection:** A minimum of a P100, or HEPA, 1/2 mask Air Purifying Respirator (APR). Higher protection factor respirators may be needed in some other instances. Persons performing alloy fire work inside a confined space shall wear supplied air respiratory protection. Contact a Safety Coordinator for assistance.
- **Outer Clothing:** Workers performing fire work must wear an outer layer of clothing, or other protective suit, that is properly layered or discarded after each shift or at the end of the job; whichever comes sooner.
- **Hygiene:** Hand and face washing facilities are to be readily available. Workers shall not eat, drink, smoke or use smokeless tobacco until after removing the outer layer of clothing and washing their hands and face.
- **Decontamination:**
  - All contaminated materials shall be bagged and sealed, and labeled with a "Hexavalent Chromium" warning label either for waste or laundry service.
  - All surfaces should be maintained as free as practical of CrVI accumulations. Wet or HEP A vacuuming methods should be utilized for decon. Compressed air blowing shall not be used. Areas that do not need to be decontaminated include: confined spaces that will return to process service and open air locations such as pipe racks, gravel areas, etc.
- **Monitoring:** All tasks with duration greater than 3 hours must be monitored with CrVI sampling medium. Contact the Safety Coordinator for sampling advice and scheduling.

### **10 to 14 points: CrVI Controlled Tasks:**

- **Employee Awareness:** Training required for all personnel participating in all work
- **Exposure Monitoring:** Monitoring should be performed on alloy work greater than 2 hours in length total fume producing time. For carbon steel, monitoring should be considered for further evaluation, contact Industrial Hygiene or Safety for guidance.
- **Objective Data may be used in place of monitoring** - The data must reflect workplace conditions closely resembling the processes, types of material, control methods, work practices, and environmental conditions in the current operations.

### **Less than or equal to 9 Points: Tasks Not Regulated:**

No additional control measures beyond standard fire work protocols and personal hygiene methods.

<b>Low Chrome Content      0.5-9%</b>	
<b>Material Type</b>	<b>Chrome Content (%)</b>
1Cr	0.8 - 1.25
1 1/4 Cr	1.0 - 1.5
2 1/4 Cr	1.9 - 2.6

<b>Medium Chrome Content      &gt;9-17%</b>	
<b>Material Type</b>	<b>Chrome Content (%)</b>
9 Cr	8.0 - 10.0
405 Stainless (ss)	11.5 - 14.5
410/410S ss	11.5 - 13.0
17-4 PH ss	15.5 - 17.5
Alloy600	14.0 - 17.0
Alloy C-276	14.5 - 16.5

<b>Welding Filler Material Not Included Above</b>	
<b>Material Type</b>	<b>Chrome Content (%)</b>
Inconel 117 Electrode	21.0 - 26.0
Inconel 617	20.0 - 24.0
Inconel 82	20.0 average
Inconel 182	14.0 average
Inconel A	15.0 average
Inconel 112	21.5 average

<b>High Chrome Content      &gt;17%</b>	
<b>Material Type</b>	<b>Chrome Content</b>
304/304L ss	18.0 - 20.0
308 ss	19.0 - 21.0
309 ss	22.0 - 24.0
310 ss	24.0 - 26.0
316/316L ss	16.0 - 18.0
317/317L	18.0 - 20.0
321 ss	17.0 - 19.0
347 ss	17.0 - 19.0
904Lss	19.0 - 23.0
Alloy 20	19.0 - 21.0
AL-6Xss	20.0 - 22.0
Nitronic50	20.5 - 23.5
Nitronic60	16.0 - 18.0
Duplex 2205 ss	21.0 - 23.0
Alloy 800/800H	19.0 - 23.0
Inconel 625	20.0 - 23.0
Alloy 825	19.5 - 23.0