



Risk Evaluation Determining Whether Environmental Emergency Planning is Required Under the  
***Environmental Emergency Regulations*** set under the  
***Canadian Environmental Protection Act, 1999***  
(CEPA 1999)

**Potassium Chromate (CAS #: 7789-00-6)**  
(Hexavalent Chromium Compounds)  
(CEPA, 1999 – Schedule 1, #33)

### Summary of Risk Evaluation Analysis

The Risk Evaluation Framework (REF), developed by Environment Canada, is applied to chemical substances in order to determine whether or not an environmental emergency (E2) plan should be required. For those substances that are evaluated as requiring an E2 plan, the next step is to determine a threshold quantity for the total quantity of the substance and the maximum storage container size on site. Within the REF, three categories are used to evaluate chemicals and assign threshold quantities. Shown below are the details within the three categories for *potassium chromate*:

#### 1. Environment Hazard

##### (Persistence, Bioaccumulation and Aquatic Toxicity Analysis)

- According to Mackay *et al.* (2003), nickel, chromium, arsenic, and cadmium are classified as indefinitely persistent. As a result, *potassium chromate* is also classified as indefinitely persistent in the environment.
- No data are available to determine the bioaccumulation potential.
- For aquatic toxicity, it was determined that *potassium chromate* is slightly toxic (LC<sub>50</sub> at 96 hrs between 10 and 100 mg/L) based on the most sensitive species, Atlantic salmon (Grande *et al.*, 1983).

## 2. Human Hazard

### (Inhalation Toxicity and Carcinogenicity Analysis)

- Since *potassium chromate* has a vapour pressure below 1.33 kPa at 20°C (HSDB 2002), there is insufficient vapour from the substance to cause an inhalation problem.
- *Potassium chromate* is categorized as an International Agency for Research on Cancer (IARC) carcinogen with a classification rating of '1' (EMD Chemicals Inc., 2006).

## 3. Physical Hazard

### (Flammability and Combustibility Analysis)

- *Potassium chromate* is considered stable. Hazardous polymerization will not occur. Contact with other material may cause fire (EMD Chemicals Inc., 2006).

### Flammability and Combustibility Analysis Table

	Value	Vapour Cloud Explosion (Yes/No)	Combustible (Yes/No)	References
Boiling point (°C)	N/A	No	No	(CHRIS, 2003)
Flash point (°C)	N/A			(EMD Chemical Inc., 2006; CHRIS, 2003)

## Threshold

The data from the above mentioned categories were used to determine the various environmental/human thresholds. The threshold quantities relate to: carcinogenicity, aquatic toxicity, inhalation toxicity, vapour cloud explosion, combustibility, and reactivity.

The threshold quantity for carcinogenicity is defaulted to 0.22 tonnes, if it meets the following criteria:

- 1) have an IARC rating of 1, 2A or 2B, or have a US EPA rating of A, B1, or B2;
- 2) be persistent in any media for greater than 5 years.

Threshold quantities assigned as a result of aquatic toxicity are based on the following table:

### Threshold Quantities Assigned as a Result of Aquatic Toxicity

Criteria	Extremely Toxic	Highly Toxic	Moderately Toxic	Slightly Toxic
Persistence (water)	≥ 6 months	≥ 2 months to < 6 months	N/A	N/A
Bioaccumulation	BCF ≥ 5000 or Log Kow ≥ 5	BCF ≥ 500 to < 5000 or Log Kow ≥ 4 to < 5 (unless BCF < 500)	N/A	N/A
Acute Aquatic Toxicity (96 hrs LC <sub>50</sub> – mg/L)	≤ 0.1	> 0.1 to ≤ 1	> 1 to ≤ 10	> 10 to ≤ 100
Threshold Quantity Tonnes (lbs)	0.22 (500 lbs)	1.13 (2 500 lbs)	4.50 (10 000 lbs)	9.10 (20 000 lbs)

A substance is a candidate for a vapour cloud explosion if its flash point is < 23°C and its boiling point is < 35°C. A substance is considered combustible if its flash point is < 23°C or its boiling point is < 35°C. In accordance with the precautionary principle, the category with the lowest threshold will be used. For further explanation, please refer to the *Implementation Guidelines for Part 8 of the Canadian Environmental Protection Act, 1999 – Environmental Emergency Plans* (<http://www.ec.gc.ca/ee-ue/>).

### Conclusion

For *potassium chromate* # 33, the E2 hazard threshold was triggered by:

- 1) Aquatic toxicity at 0.22 tonnes;
- 2) Carcinogenicity at 0.22 tonnes.

Therefore, *potassium chromate* # 33 is recommended for addition to Schedule 1 of the *Environmental Emergency Regulations* under Part 3 with a threshold quantity of 0.22 tonnes.

## References

CHRIS (Chemical Hazards Response Information System). *Potassium Chromate*. Canadian Centre for Occupational Health and Safety. 2003. World Wide Web accessed October 2004.

<http://ccinfoweb.ccohs.ca/chempendium/search.html>

EMD Chemicals Inc. "Material Safety Data Sheet – Potassium Chromate". Product Code: PX1421. EMD Chemicals Inc. Gibbstown, NJ. 2006. World Wide Web accessed November 2011.

[http://umanitoba.ca/faculties/science/microbiology/MSDS/Potassium\\_chromate.pdf](http://umanitoba.ca/faculties/science/microbiology/MSDS/Potassium_chromate.pdf)

Grande, M. and S. Andersen. "Lethal Effects of Hexavalent Chromium, Lead, and Nickel on Young Stages of Atlantic Salmon (*Salmo salar* L.) in Soft Water". 1983. *Vatten*. 29(4):405-416.

HSDB (Hazardous Substances Data Bank). *Potassium Chromate*. Canadian Center for Occupational Health and Safety. U.S National Library of Medicine. Last updated June 2004. World Wide Web accessed October 2004.

<http://toxnet.nlm.nih.gov/cgi-bin/sis/htmlgen?HSDB>

Mackay, D., E. Webster, D. Woodfine, T.M. Cahill, P. Doyle, Y. Couillard, and D. Gutzman.

"Contributed Articles Towards Consistent Evaluation of the Persistence of Organic, Inorganic and Metallic Substances". 2003. ASP. Canadian Environmental Modelling Centre and Environment Canada. *Human and Ecological Risk Assessment* 9:1445-1474. ISSN: 1080-7039.

Cat. No.: En14-55/23-2011E-PDF  
ISBN: 978-1-100-19712-8

For information regarding reproduction rights, please contact Public Works and Government Services Canada at 613-996-6886 or at [droitdauteur.copyright@tpsgc-pwgsc.gc.ca](mailto:droitdauteur.copyright@tpsgc-pwgsc.gc.ca)

© Her Majesty the Queen in Right of Canada, represented by the Minister of the Environment, 2011

Aussi disponible en français