

## E-mail

**Verzonden:** vrijdag 22 januari 2016 16:35

**Aan:** GR\_draftOSH@gr.nl

**Onderwerp:** chromium (VI) compounds

Hoi Stefan

Hierbij een reactie op het Chroom (VI) rapport. Slechts een paar kleine maar mogelijk wel belangrijke opmerkingen:

- Pagina 4 en 5, en pagina 74. Hier wordt gemeld dat de classificatie voor fertiliteit zou moeten zijn: Cat. 1B, H361f. Dit moet dan echter wel zijn H360f (wel correct op pagina 73).
- Pagina 10 en 11. Doordat op pagina 11 de relatieve dichtheid van ammonium chromaat wordt aangegeven met 1,9 g/cm<sup>3</sup> (dus met een komma), lijkt het alsof alle getallen genoemd op pagina 10 (bij wateroplosbaarheid) ook gelezen moeten worden met een komma, dus 1,667 g/L in plaats van 1667 g/L. Om verwarring te voorkomen zou de komma beter weggelaten kunnen worden.

Hartelijke groet,  
Josje Arts  
AkzoNobel NV



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February 25, 2016

The Health Council of the Netherlands  
**Attn: Mr. S.R. Vink/Cie543**  
PO Box 16052  
NL-2500 BB The Hague  
the Netherlands

Dear Mr. Vink:

Thank you for the opportunity to review the draft report on *Chromium (VI) compounds* prepared by the Subcommittee on the Classification of Reproduction Toxic Substances, a Committee of the Health Council of the Netherlands. Comments are enclosed that were prepared by Lee Greenawald, Physical Science Student Trainee, NIOSH/National Personal Protective Technology Laboratory and Stephen S. Leonard, Research Biologist, NIOSH/Health Effects Laboratory Division, 1095 Willowdale Road, Morgantown, WV 26505-2888.

If you have any questions regarding the comments, please contact me at 513-533-8260 (telephone) or by Email at [tbl7@cdc.gov](mailto:tbl7@cdc.gov).

Sincerely yours,

Thomas J. Lentz, Ph.D., M.P.H.  
Branch Chief  
Document Development Branch  
Education and Information Division

1 Enclosure

**Comments on DECOS draft document on Chromium (VI) Compounds**  
**By: Lee Greenawald, Physical Science Student Trainee, NIOSH/National Personal Protective Technology Laboratory, and Stephen S. Leonard, PhD, Research Biologist, NIOSH/Health Effects Laboratory Division, 1095 Willowdale Road, Morgantown WV 26505**

SECTION & PARAGRAPH	COMMENT
<b>General Comments</b>	<ul style="list-style-type: none"> <li>•The Committee's recommendations and conclusions are appropriate.</li> <li>•The document is complete, well-supported and has clear conclusions.</li> <li>•The references valuable to this health risk assessment document were included in the document, or presented below.</li> <li>•Consider including more summarizing paragraphs early in the section to condense information. This depends on your intended audience.</li> <li>•Many sections did not include references where data/specific information was discussed. Need references in these places.</li> <li>•Recommend including a table of abbreviations in the beginning of the document.</li> <li>•Within the draft document NTP is listed as the National Toxicity Program, it should read National Toxicology Program.</li> </ul>
<b>Specific Comments</b>	
<b>Pg. 2, general table of contents</b>	Recommend including a third subclass in the table of contents (e.g., 5.1.1 for non-human vs. human information) or re-label the second subclass sections to denote animal or human studies (e.g., 5.1 – Effects on fertility in non-human studies).
<b>Pg. 8, line 5 in chart</b>	Suggestion: include oxidation states for clarity.
<b>Pg. 8, line 9 in chart</b>	Include units for molecular weight (i.e. g/mol).
<b>Pg. 9, line 5, column 6</b>	Correct subscripts for Chromic acid (to H <sub>2</sub> CrO <sub>4</sub> ) to maintain consistency.
<b>Pg. 9 line 5, columns 2 and 5</b>	Correct capitalization on ammonium chromate (to Ammonium) and potassium chromate (to Potassium) to maintain consistency.
<b>Pg. 10, line 4, columns 2-6</b>	Include units for relative density (like on page 11).
<b>Pg. 11, line 4, column 2; /2-6</b>	Correct 1,9 to 1.9 ; apply superscript to g/cm <sup>3</sup> (to g/cm <sup>3</sup> ).
<b>Pg. 13, line 22</b>	Change "corrotion" to "corrosion", as done in line 18.
<b>Pg. 14, line 6</b>	Rephrase "The absorption data have been considered relevant for humans, also the oral absorption data." Should "dermal" be in front of the first absorption?
<b>Pg. 14, lines 10-11</b>	Why do most toxicity data for chromium VI compounds involve the compounds listed? Can you provide an explanation with a reference or is this just an observed opinion?
<b>Pg. 14, lines 16-18</b>	What concentrations of inhalation exposure and oral exposure were performed to cause these effects?
<b>Pg. 14, line 21</b>	What type of reactive intermediates?
<b>Pg. 14, line 35</b>	In what quantities?
<b>Pgs. 15-24</b>	General comment: Include references for all data listed.

Pg. 16, line 6	Remove comma between “exhausted” and “has” or rephrase this sentence.
Pg. 17, line 32	Stay consistent with indenting new paragraphs
Pg. 18, line 3	“6 for hours/day” should be “for 6 hours/day”
Pg. 19, lines 34-35	This sentence reads strangely and seems redundant. It seems obvious that the absorption fraction of <b>soluble</b> compounds would be higher than insoluble. Could you provide more quantitative data for chromium (III) and compare it to the data you discuss for chromium (VI) (pg. 20 lines 1-19) as a comparison for the <b>insoluble</b> compounds?
Pg. 20, lines 34-41 + Pg. 21, lines 26-40	These paragraphs should include more data/information because the inhalation of chromium compounds should be highlighted more in this document. Include references. These can be national and international references from sources such as IARC, U.S.EPA Integrated Risk Information System (IRIS), NIOSH, NTP, and the California Environmental Protection Agency: <a href="http://www.oehha.ca.gov/prop65/prop65_list/files/P65single080108.pdf">http://www.oehha.ca.gov/prop65/prop65_list/files/P65single080108.pdf</a> .
Pg. 21, row 3 in chart	Watch significant figures. Standard deviation has one more digit than the number. Should be 55.5x or 55.5 +/- 3.0
Pg. 21, lines 29-35	Rephrase this paragraph. Reads awkwardly and a run-on sentence.
Pgs. 25–43	<ul style="list-style-type: none"> <li>•Consider having a summarizing beginning paragraph or summarizing ending paragraph. If a summarizing paragraph is in the beginning, it can state something like “the following data tables support this conclusion...” etc. It is difficult to draw conclusions in this section.</li> <li>•Also consider summarizing the nonhuman information separately (in paragraphs) for males and females.</li> <li>•If possible, make the tables in “landscape” form for easier visualization.</li> <li>•Stay consistent with “et al” vs. “et al.,” vs. “et al.,”. It may be “<i>et al.</i>,” depending on what style you are using.</li> </ul>
Pg. 25	Be sure to identify each abbreviation (mg, kg, bw/d, h, n, etc.). This may be obvious and depends on your intended audience. A table of abbreviations could be included in the front of this document.
Pg. 38, line 20 Row 2 (in chart)	Include units for “Control”
Pg. 43, line 37	The same time period noted (i.e. 1977-1980) was when another study was performed (Aschengrau et al.) from drinking water in Boston, MA on the effects of late adverse pregnancy outcomes. This can be included in this section or Developmental Human Studies section (page 52, line 29). Reference below: <ul style="list-style-type: none"> <li>• Aschengrau, A., S. Zierler and A. Cohen (1993). Quality of community drinking water and the occurrence of late adverse pregnancy out comes. <i>Arch Environ Health</i> 48(2): 105-13.</li> </ul>
Pg. 67, line 17	Remove redundant reference (#27)
Pg. 68, chart & Pg. 69 chart	I like these summarizing tables. Stay consistent with et al. as noted in previous comment.

<p><b>Toxicokinetics section and/or Metabolism section</b></p>	<p>There needs to be something in the “Toxicokinetics” section (page 14) or “Metabolism” (page 18) about Chromium (VI) cycling. Chromium (VI) can be cycled (oxidized/reduced) through several oxidation states and therefore presents some unique problems with radical generation. I found nothing in the sections mentioned above on Cr cycling. Please consider adding materials on this subject, some suggested references to consider:</p> <ul style="list-style-type: none"> <li>•<i>Role of molecular oxygen in the generation of hydroxyl and superoxide anion radicals during enzymatic Cr(VI) reduction and its implication to Cr(VI)-induced carcinogenesis.</i> Leonard S, Wang S, Zang L, Castranova V, Vallyathan V, Shi X. J Environ Path, Tox, Onco. 2000; 19(1&amp;2): 49-60.</li> <li>•<i>Reduction of chromium (VI) and its relationship to carcinogenesis.</i> Shi X, Chiu A, Halliwell B, Castranova V, Vallyathan V. J Toxicol Environ Health. 1999; 2:101-118.</li> <li>•<i>The role of superoxide radical in chromium (VI) generated hydroxyl radical: the Haber-Weiss cycle.</i> Shi X, Dalal NS. Arch Biochem Biophys. 1992; 292:323-327.</li> <li>•<i>J Review of chromium (VI) apoptosis, cell-cycle-arrest, and carcinogenesis.</i> Environ Sci Health C Environ Carcinog Ecotoxicol Rev. 2010 Jul;28(3):188-230. Chiu A1, Shi XL, Lee WK, Hill R, Wakeman TP, Katz A, Xu B, Dalal NS, Robertson JD, Chen C, Chiu N, Donehower L.</li> </ul>
<p><b>Final general comment, on all charts throughout document</b></p>	<p>I am not sure if I missed a clear explanation in the text, but I am assuming all data in all tables throughout the document are for chromium (VI), correct? This is the objective of the document, but perhaps a statement to clarify can be included.</p>