

Determination of hexavalent chromium in workplace air

HEXAVALENT CHROMIUM

Chromium can be found in workplaces in the metallic form and in various oxidation states (+2, +3, +6). Several hexavalent chromium (Cr(VI)) are **carcinogenic** and a few are **allergenic**. Workers in many industries can be exposed to Cr(VI). Exposure occurs by **inhalation** when Cr(VI) is suspended in the air, and by **skin contact**.

The standards relating to Cr(VI), presented in the latest edition of the **Regulation respecting occupational health and safety (RROHS)**, take into account the **solubility** of the compounds or their **nature**.

Standards relating to solubility

Inorganic Cr(VI) compounds ¹	mg/m ³
Water insoluble	0,01
Water soluble	0,05

Standards relating to the nature of the compounds

Cr(VI) ¹ compounds	mg/m ³
Chromite ore processing (chromate) (as Cr) (Water insoluble)	0,05
Calcium chromate (Water soluble)	0,001
Lead chromate (Water insoluble)	0,012
Strontium chromate (Water insoluble)	0,0005
Zinc chromate (Water insoluble)	0,01

¹Expressed as Cr.

Supporting document
SAC-LABO 2008-06 communiqué.

ANALYTICAL CHALLENGES

Until 2008, **IRSST analytical method 271** was used only to determine **total Cr(VI)** without differentiating between the **water soluble** and **water insoluble** fractions. As well, this method did not allow the **dusts on the inside wall** of the cassette to be recovered when the sample was processed.

SOLUTION DEVELOPED

Two sampling mediums were developed:

1- IRSST cassette #927

Used for sampling for processes generating acid aerosols (for example, plating baths). The filter impregnated with NaOH in this cassette ensures greater stability of the Cr(VI). This method **applies only to water soluble Cr(VI) compounds**.

2- IRSST cassette #926

Used for sampling **water soluble** and **water insoluble** Cr(VI) compounds in the case of other work processes.

When the sample is processed, **desorption** is carried out **inside the cassettes**, thus allowing the dusts deposited on the inside wall to be recovered. This step avoids possible underestimations during analysis.

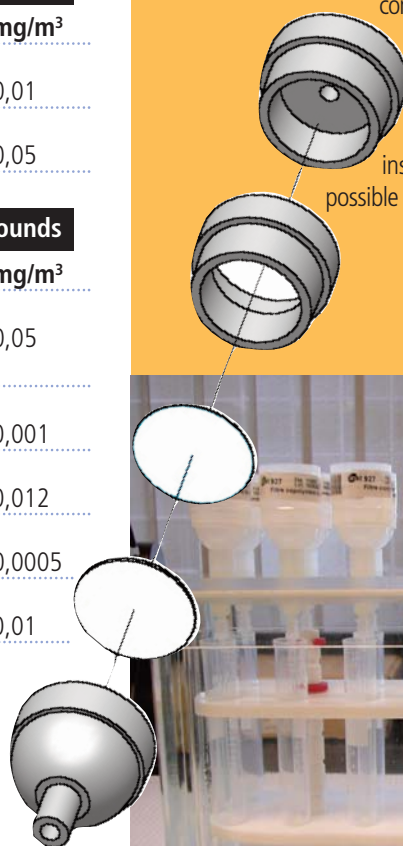
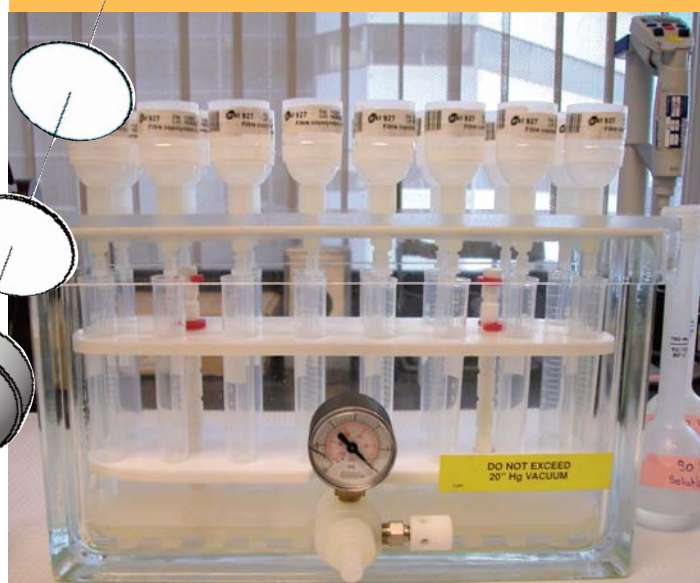
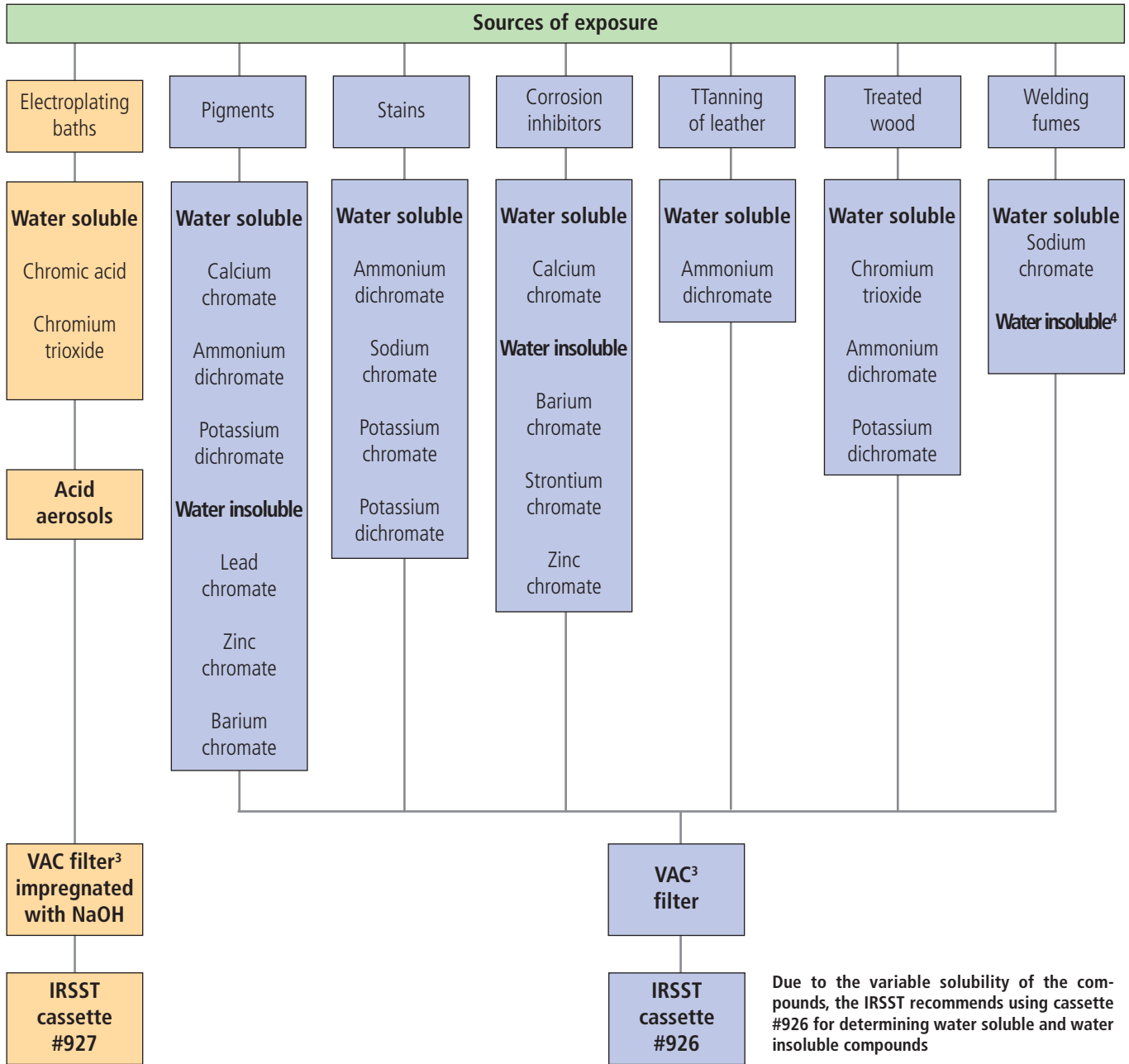


TABLE OF SOME SOURCES OF EXPOSURE TO CR(VI) AND CORRESPONDING SAMPLING EQUIPMENT²



² The information on Cr(VI) compounds is presented for information purposes and is not limited to these compounds.

³ Vinyl/Acrylic Copolymer.

⁴ Water insoluble compounds present but not identified..