

Results for the dentistry sector

Situation related to the use of alloys containing Be	Wipe sample results according to the establishment's situation				Decontamination Activity Follow-up		
	Where the wipe samples were taken	Establishments		Where results > 0.2 µg/100 cm²	Establishments		
		With all results under the MRV	With all results between the MRV and 0.2 µg/100 cm²		With wipe samples > 0.2 µg/100 cm²	Where decontamination has been recommended	Where post-decontamination wipe samples are planned
With current presence	10	0	0	10	10	10	8
With past presence	9	4	2	3	3	3	3
Unknown	13	10	2	1	1	1	1
Without information leading to believe in current or past presence	6	4	2	0			
TOTAL	38	17	7	14			

Positivity threshold: 0,2 µg/100 cm²
MRV: 0,05 µg/100 cm²

- 326 establishments targeted
- 280 questionnaires sent
- 250 questionnaires completed
- 38 situations requiring surface wipe samples

Results analysis

- Most positive wipe samples were found in locations where machining, molding, sanding, or scraping operations take place. Values as high as 13 and 20 µg/100 cm² were measured.
- Positive wipe samples were also found in centrifuges, one value even reaching 27 µg/100 cm².
- We also found positive wipe samples in departments where alloy casting, preparation of plaster molds and porcelain colouring operations are carried out, as well as in locations liable to accumulate dust.
- The results of positive wipe samples vary from 0.2 to 27 µg/100 cm², the most significant having been measured in the bottom of a centrifuge.

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Operation Beryllium Report

Highlights

- 1,533 establishments employing some 70,000 workers were targeted for a visit.
- 14,000 wipe surface samplings were used to identify the presence of Beryllium (Be) and 1,300 air samples served to estimate the workers' exposure.
- An estimated 569 workers in 44 institutions, particularly in the foundry sector, were exposed to levels above the injury threshold at the time of the visits.
- The situation is less disconcerting than expected, particularly in the machining sector.
- Intervention and prevention tools as well as reports for every sectors are available at www.csst.qc.ca

Context

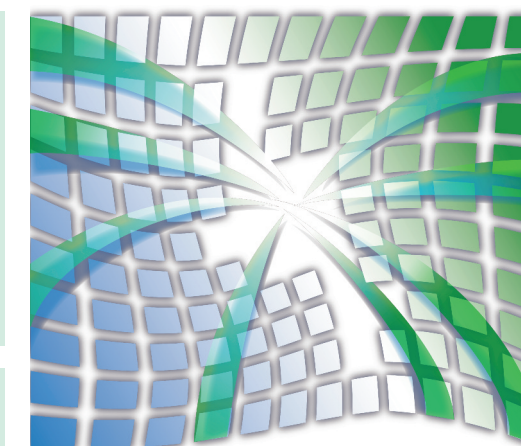
Following the diagnosis of chronic berylliosis and the sensitization of a number of employees working in the same foundry in 1998, it is clear that the Quebec standard for Be levels in the air does not provide adequate protection for workers. A joint request by the employer and the company's union was filed with the *Commission de la santé et de la Sécurité du Travail* - CSST (occupational health and safety commission) to obtain a scientific opinion about the acceptable level of Be present in the ambient air and for awareness training for workers. We know that other establishments use alloys containing Be but the number of exposed workers and their level of exposure is unknown. Therefore, the situation in Quebec must be clarified.

Resolution:

- Draw up an inventory of the companies possibly using Be: 2,800 establishments spanning 10 economic industry sectors.
- Set up *Operation Beryllium* with the CSST in partnership with the *Réseau de santé publique en santé au travail*.
- Visit each establishment in order to identify the presence of Be and assess the workers' level of exposure and the preventive measures already in place.
- Develop intervention tools, criteria identifying the presence of Be in establishments and select a reference value for Be in the air while awaiting the revision of the standard.

Sectors Targeted

Sectors Targeted	Date of operation	Procedure preferred
Foundry and first transformation of metals	October 2001 to September 2002	• Visit and wipe surface or dust deposit samples in all establishments targeted.
Aerospatial, aeronautic industries	June 2002 to February 2004	• Sampling in respiratory zones if pertinent. • Recommendations and visit from the CSST inspector if action thresholds are exceeded.
Non-ferrous machining or welding companies	January 2005 to December 2007	
Environmental industries	February 2001 to October 2005	
Manufacturer of dental prostheses; Enterprises casting dental metals	January 2008 to December 2008: Pilot project in 5 regions January 2009 to December 2009: Procedure applied in all regions	• A letter sent to all establishments targeted by the CSST to inform them of the operation's launch. • A letter sent to the establishments by the health and social service centre teams (HSSC) with a questionnaire on the establishment's progress report concerning the use of Be. • If necessary, a telephone reminder. • Depending on the responses to the questionnaires, surface wipe or of dust deposit samples in all the establishments which use or have used Be in the past. • In all cases where alloys with Be are still being used, the substitution of alloys must be recommended. In addition, if positive wipe samples are found, decontamination of the premises must be required and control follow-ups of this decontamination must be offered. • Intervention by the CSST if necessary.
Distributors and manufacturers of welding electrodes	January 2011 to May 2012	• Knowledge assessment of the work environment in order to verify the possible use of Be (present or past).
Manufacturers of material parts of certain electric and electronic components	January 2011 to May 2012	• Wipe surface or dust deposit samples in all establishments identified during the knowledge assessment of the work environment. • Sampling in respiratory zones if pertinent. • Recommendations and visit from the CSST inspector if action thresholds are exceeded.
Metal recycling (2 establishments recycling electronic parts)	January 2011 to May 2012	
Enterprises manufacturing golf clubs		No establishments use Be. Operation cancelled.
Competition bicycles		



Pour des milieux de travail en santé
Réseau de santé publique
en santé au travail

Results for all sector

	Wipe sample results							Air measurements results					
	Establishments targeted	Workers concerned	Establishments with positive beryllium wipe samples	Maximum wipe sampling values obtained ($\mu\text{g}/100\text{cm}^2$)	Number of workers exposed above the action threshold	Establishments with workers exposed above the action threshold	Positivity threshold ($\mu\text{g}/100\text{cm}^2$)	Daily range of exposure ($\mu\text{g}/\text{m}^3$)	Workers potentially exposed	Max. Value measured ($\mu\text{g}/\text{m}^3$)	Action threshold ($\mu\text{g}/\text{m}^3$)	Average exposure value permitted ($\mu\text{g}/\text{m}^3$)	Tasks carried out by these workers
Foundries and primary metal transformation	123	23 270	44	114	506	34	3	0.2-2 >2	478 28	17	0.2	2	<ul style="list-style-type: none"> Maintenance of electrolytic baths Machining/deburring Melting/casting Cutting/polishing Alloys with a high Be content Operating ovens and grinders Cleaning crucibles after using recycled or slag products
Aeronautics and parts machining	117	21 154	28	184	12	4	0.2	0.2-2 >2	10 2	18	0.2	2	<ul style="list-style-type: none"> Deburring Sanding
Environment	83	1 900	26	45	43	4	0.2	0.2-2 >2	11 32	46	0.1	0.15	<ul style="list-style-type: none"> Loader driver Day labourer Screen operator Maintenance mechanic Day labourer
Machining and welding	1 029	11 743	110	400	8	2	0.2	0.2-2	8	2	0.1	0.15	<ul style="list-style-type: none"> Mold adjusters Welder Polisher Day labourer
Other sectors*	181	>11 111	7	92	0	0	0.2	>0.2	0	0.006	0.1	0.15	<ul style="list-style-type: none"> Not applicable
Total	1 533	>69 178	215		569	44			569				

*OTHER SECTORS:
Two establishments in the metal recycling sector (recycling of electronic parts)
Manufacturers of material parts of certain electric, electronic components
Distributors and manufacturers of welding electrodes

Results analysis

- The main sources of Be were mainly copper-beryllium alloys, aluminum oxides and copper-beryllium welding electrodes.
- The prevention measures in place during the operation varied.
- Interventions by the HSSC teams should encourage implementation of the recommended preventive measures.

Main preventive measures recommended

Technical control measures to reduce exposure

- Use alternative products.
 - Confine processes.
 - Install adequate ventilation at the source.
 - Prohibit air recirculation.
- ### Work methods to reduce exposure to Be
- Clean the equipment and work areas using a wet process or vacuum supplied with a high efficiency filter.
 - Never use compressed air to clean parts, equipment and surfaces.
 - Provide and follow a decontamination procedure for equipment which leaves a contaminated area.

Hygiene and personal protective clothing to reduce exposure to Be

- Do not drink or eat in contaminated areas.
- Make a double cloakroom available for workers who could be exposed to Be dust or fumes.
- Never wear work clothing outside the establishment after having worked in contaminated areas.
- Wear gloves to avoid any contact between the Be dust and skin.
- Provide workers exposed to Be dust or fumes with a respiratory protective device if concentration in the workplace is higher than the average exposure level allowed ($0.15 \mu\text{g}/\text{m}^3$) and set up a respiratory protection program.