

Summary of representative risk management measures (RMMs) and operational conditions (OCs)

Public version

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Substance:	Chromium trioxide (EC no. 215-607-8, CAS no. 1333-82-0)
Use title:	Industrial use of chromium trioxide for functional chrome plating with decorative character for sanitary applications
Use number:	1

ES1: Industrial use of chromium trioxide for functional chrome plating with decorative character for sanitary applications.

ECS and WCS	Task (ERC/spERC or PROC)	Annual amount per site	Technical RMMs	Organisational RMMs	PPE (characteristics)	Other conditions	Effectiveness of wastewater and waste air treatment (for ERC)	Release factors: water, air and soil (for ERC)	Detailed info. in CSR (section)
ECS-1	ERC 6b	<p>■ kg/year CrO₃</p> <p>■ kg/year Cr(VI)</p>	<p>Air:</p> <p>Mist suppressant.</p> <p>Local exhaust ventilation system with air passing to atmosphere via a scrubber for treatment.</p> <p>Wastewater:</p> <p>By design, no release of Cr(VI) to surface water.</p> <p>On-site waste water treatment facility which reduces Cr(VI) to Cr(III).</p> <p>pH & dosing alarms.</p> <p>Waste:</p> <p>Solid waste is collected and disposed of by a certified waste handler.</p>	<p>Air:</p> <p>Confirmatory air measurements verifying effectiveness of mist suppressant and scrubber.</p> <p>Wastewater:</p> <p>Regular sampling of wastewater from the final discharge point.</p> <p>Emergency procedures should untoward results be identified.</p> <p>Employee training.</p> <p>Procedures.</p>	Not applicable	Not applicable	<p>Wastewater:</p> <p>The on-site waste water treatment facility reduces Cr(VI) to trivalent chromium [Cr(III)] via a series of reactions, such that residual concentrations of Cr(VI) in effluent may be considered negligible.</p> <p>Probes control the automated dosing of sulphuric acid and sodium metabisulphite into the chromium reduction tank to ensure complete reduction.</p>	<p>Water: 0%</p> <p>Complete reduction of Cr(VI) to Cr(III).</p> <p>Air: 0.006%</p> <p>Concentration of Cr(VI) from the stack determined to be <0.0003 mg/m³ which equates to an annual release of 11 g/year.</p> <p>Soil: 0%</p> <p>Cr(VI) in wastewater is reduced to Cr(III), all solid and liquid waste is collected and disposed of as hazardous waste by an external waste contractor.</p>	Section 9.1.3.1 & 9.2.1

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WCS 1	PROC 1 Delivery of raw materials	-	Primary containment: CrO ₃ containers are sealed and arrive on shrink wrapped pallets upon receipt. There is no handling of the containers by workers. The containers are transferred using a forklift truck. General ventilation	Duration/frequency is limited: 15 minutes, received 5-6 times per year. The containers are only received and handled by authorised personnel. Employee training. Procedures.	Safety boots High vis jacket Protective eyewear	Not applicable	Not applicable	Not applicable	9.2.2
WCS 2	PROC 1 Storage of raw materials	-	Primary containment. All containers are sealed. Secondary containment: containers are stored in a dedicated bund area (maximum of 2 drums at one time) sealed with Robex paint. General ventilation	Access to the storeroom is restricted to trained personnel only using a keypad lock. Limited exposure time of up to 15 minutes. Employee training. Procedures.	Safety boots High vis jacket Protective eyewear	Not applicable	Not applicable	Not applicable	9.2.3
WCS 3	PROC 8b Decanting and weighing	-	A fume cupboard has recently been installed in the chemical store room	Only conducted once a week when the plating line is not in operation.	Safety footwear Gloves	Not applicable	Not applicable	Not applicable	9.2.4

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	of raw material to replenish bath		<p>and the weighing activity is carried out within this enclosed and extracted area.</p> <p>Lip extraction on the plating tank.</p> <p>A mist suppressant is used to limit emissions from the plating tank.</p> <p>Restricted access areas.</p> <p>CrO₃ supplied as flake, limiting dust formation and exposure when compared to powder.</p>	<p>Duration of exposure is limited to approximately 15 minutes.</p> <p>Performed only by authorised, dedicated personnel.</p> <p>Employee training.</p> <p>Procedures, including requirement to ensure slow and steady addition to the plating bath to minimise dust formation.</p>	<p>Safety goggles</p> <p>Protective overalls</p> <p>Face shield</p> <p>RPE: Half mask, P3 filter (APF=20)</p>				
WCS 4	PROC 9 Sampling of chromium solution	-	<p>Lip extraction on the plating tank.</p> <p>A mist suppressant is used to limit emissions from the plating tank.</p>	<p>Limited exposure time as there is only twice weekly monitoring of the Cr(VI) content of the tank and twice weekly monitoring of the surface tension of the tank. Each sample takes less than 15 minutes to collect.</p> <p>Performed only by authorised, dedicated personnel.</p>	<p>Safety footwear</p> <p>Gloves</p> <p>Safety goggles</p> <p>Protective overalls</p> <p>Face shield</p> <p>RPE: Half mask, P3 filter (APF=20)</p>	Not applicable	Not applicable	Not applicable	9.2.5

ECS and WCS	Task (ERC/spERC or PROC)	Annual amount per site	Technical RMMs	Organisational RMMs	PPE (characteristics)	Other conditions	Effectiveness of wastewater and waste air treatment (for ERC)	Release factors: water, air and soil (for ERC)	Detailed info. in CSR (section)
				Employee training. Procedures.					
WCS 5	PROC 3 Operation of plating line	-	Automated rather than manual plating process. Lip extraction on the plating tank The air is sent through baffles before being released to atmosphere. A mist suppressant is used to limit emissions from the plating tank.	Limited exposure: The technicians walk the plating line once per hour to perform brief checks. The plating area is restricted to authorised staff only. Employee training. Procedures.	Safety footwear Gloves Safety goggles Protective overalls	Not applicable	Not applicable	Not applicable	9.2.6
WCS 6	PROC 15 Laboratory Analysis	-	General ventilation. Restricted access to lab while activity is being performed.	<15 minutes exposure. The analysis is performed only four times a week. Performed only by authorised, dedicated personnel. Employee training. Procedures.	Safety footwear Gloves Safety goggles Protective overcoat Face shield RPE: Half mask, P3 filter (APF=20)	Not applicable	Not applicable	Not applicable	9.2.7

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WCS 7	PROC 4 Loading / unloading of parts	-	<p>No direct exposure to Cr(VI).</p> <p>Indirect exposure is also unlikely as all parts have been through an extensive post treatment process involving various washing steps and a drying step.</p> <p>Separation: jigging and unjigging occurs in a separate area to the chromium plating line.</p> <p>General ventilation.</p>	<p>Performed only by authorised, dedicated personnel.</p> <p>Employee training.</p> <p>Procedures.</p>	<p>Safety footwear</p> <p>Gloves</p> <p>Safety goggles</p> <p>Protective overalls</p>	Not applicable	Not applicable	Not applicable	9.2.8
WCS 8	PROC 28 Maintenance	-	<p>Maintenance activities occur when the plating baths are switched off.</p> <p>When emptying and cleaning tanks, the task is mainly automated and the tanks emptied and rinsed via sealed pipes to the wastewater treatment process.</p>	<p>Exposure is limited to a Saturday morning.</p> <p>Performed only by authorised, dedicated personnel.</p> <p>Employee training.</p> <p>Procedures.</p>	<p>Safety footwear</p> <p>Gloves</p> <p>Safety goggles</p> <p>Protective overalls</p>	Not applicable	Not applicable	Not applicable	9.2.9

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WCS 9	PROC 8b Treatment of wastewater	-	<p>The wastewater treatment process is almost entirely enclosed.</p> <p>Wastewater treatment plant is fully automated and results in almost all Cr(VI) being reduced to Cr(III).</p> <p>The collection of wastewater sample occurs outside at discharge point with natural ventilation.</p>	<p>Sampling is limited to <15 minutes exposure time, four times a day.</p> <p>Performed only by authorised, dedicated personnel.</p> <p>Employee training.</p> <p>Procedures.</p>	<p>Safety footwear</p> <p>Gloves</p> <p>Safety goggles</p> <p>Protective overalls</p>	Not applicable	Not applicable	Not applicable	9.2.10
WCS 10	PROC 8b Maintenance: cleaning of filter press	-	<p>Residual concentrations of Cr(VI) in the sludge, if any, are negligible.</p> <p>General ventilation.</p> <p>The filter is removed and collected in sealed filter bags ready for disposal by a specialist waste carrier.</p>	<p>The collection of the sludge occurs every 4 months only.</p> <p>Performed only by authorised, dedicated personnel.</p> <p>Employee training.</p> <p>Procedures.</p>	<p>Safety footwear</p> <p>Gloves</p> <p>Safety goggles</p> <p>Protective overcoat</p> <p>Face shield</p> <p>RPE: Half mask, P3 filter (APF=20)</p>	Not applicable	Not applicable	Not applicable	9.2.11

Abbreviations: RMM=Risk Management Measures, OC=Operational Conditions, ES=Exposure Scenario, WCS=Worker contributing scenario, ECS=Environmental Contributing Scenario, ERC=Environmental Release Category (or spERC if available), PROC= Process category, LEV=Local Exhaust Ventilation, PPE=Personal Protective Equipment