

Exposure Scenario (ES) for Use 1: "Use of wash primers containing pentazinc chromate octahydroxide or potassium hydroxyoctaoxodizincate dichromate in aerospace and defence industry and its supply chains

ECS and WCS	Task (ERC/ spERC or PROC)	Annual amount per site (kg Cr(VI)/ year)	Technical RMMs, including: *Containment, *Ventilation (general, LEV...) *customized technical installation, etc	Organisational RMMs, including: *Duration and Frequency of exposure *OSH management system *Supervision *Monitoring arrangements *Training, etc	PPE (characteristics)	Other conditions	Effective-ness of waste water and waste air treatment (for ERC)	Release factors: water, air and soil (for ERC)	Detailed info. in CSR (section)
ECS 1	ERC 5	0.1 to 7.8	<p>Air</p> <ul style="list-style-type: none"> - Spray booths/rooms/ hangars and machining/ sanding/media blasting workplaces equipped with LEV - Air abatement by air filters or wet scrubbers <p>Wastewater</p> <ul style="list-style-type: none"> - Either sent to external company certified for disposing of liquid hazardous waste, - or treated onsite by reduction (reduced wastewater sent to external STP or WWTP) - Cr(VI)-containing particles in wastewater are separated from water phase and disposed of as hazardous waste <p>Soil</p>	<ul style="list-style-type: none"> - Up to 365 days/year - Emissions to air and water monitored regularly 	n.a.	<p>Air</p> <ul style="list-style-type: none"> - Process temperature: RT <p>Water</p> <ul style="list-style-type: none"> - STP removal rate: 50% to sludge assumed 	n.a.	<p>Air</p> <p>6.92E-03 – 8.69 kg/a^a</p> <p>Water</p> <p>0 - 0.00510 kg/a^a</p> <p>Soil:</p> <p>0 kg/a (no release to soil)</p>	Section 9.2.3.1

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			<p>- Surfaces where chemicals are handled are sealed</p> <p>- Chemicals/ solid waste containing Cr(VI) stored outside in closed containers</p> <p>Waste</p> <p>- solid Cr(VI) waste collected and forwarded to external company certified for disposal as hazardous waste</p>						
WCS 1 - Spray operators for manual spraying in spray room/ booth	PROC 5, PROC 7, PROC 8b, PROC 9, PROC 28	n.a.	<p>- Spraying in spray room/ booth with LEV</p> <p>- During spray gun cleaning blow-out and removal of extensive contamination performed under LEV</p> <p>- Mechanical ventilation for all tasks except spraying outside spray room/booth/hangar</p> <p>- In spray areas technological installations are in place that in case of malfunction/ breakdown of the extraction system either immediately stop the</p>	<p>- Duration and frequency task-dependent:</p> <ul style="list-style-type: none"> • Duration: 5 – 480 min/shift • Frequency: <1 – 240 days/year <p>- Access restriction by means of signage or physical segregation or through strict procedure to all areas where spraying is performed</p> <p>- During spraying, only persons involved in the spraying process are allowed in the spray room</p> <p>- At spray rooms, controls are in place to ensure access is restricted when the system is</p>	<p>- Chemical resistant gloves according to EN 374 as per relevant risk assessment</p> <p>- RPE ^b</p> <p>- Eye protection as per relevant risk assessment</p> <p>- Chemical protective clothing or coverall ^c</p>	<p>- Up to 6% Cr(VI)</p> <p>- Indoors</p> <p>- RT</p>	n.a.	n.a.	9.2.3.2

ECS and WCS	Task (ERC/ spERC or PROC)	Annual amount per site (kg Cr(VI)/ year)	Technical RMMs, including: *Containment, *Ventilation (general, LEV...) *customized technical installation, etc	Organisational RMMs, including: *Duration and Frequency of exposure *OSH management system *Supervision *Monitoring arrangements *Training, etc	PPE (characteristics)	Other conditions	Effectiveness of waste water and waste air treatment (for ERC)	Release factors: water, air and soil (for ERC)	Detailed info. in CSR (section)
			spraying process or indicate the malfunction - In all spray rooms negative pressure during spraying process, preventing spreading of particles in case the door is opened	operational to prevent other workers from entering - In case spraying outside spray room/booth/hangar is performed indoors, physical segregation from other work areas - Advanced occupational health and safety management system ^d					
WCS 2 - Spray operators for manual spraying in a dedicated spray hangar	PROC 5, PROC 7, PROC 8b	n.a.	- Spraying in spray hangar with LEV - Mechanical ventilation for mixing - In spray areas technological installations are in place that in case of malfunction/ breakdown of the extraction system either immediately stop the spraying process or indicate the malfunction	- Duration and frequency task-dependent: <ul style="list-style-type: none"> • Duration: 5 – 240 min/shift • Frequency: 2 – 240 days/year - Access restriction by means of signage or physical segregation or through strict procedure to all areas where spraying is performed. - During spraying, only persons involved in the spraying process are allowed	- Chemical resistant gloves according to EN 374 as per relevant risk assessment - RPE ^e - Eye protection as per relevant risk assessment	- Up to 6% Cr(VI) - Indoors - RT	n.a.	n.a.	9.2.3.3

ECS and WCS	Task (ERC/ spERC or PROC)	Annual amount per site (kg Cr(VI)/ year)	Technical RMMs, including: *Containment, *Ventilation (general, LEV...) *customized technical installation, etc	Organisational RMMs, including: *Duration and Frequency of exposure *OSH management system *Supervision *Monitoring arrangements *Training, etc	PPE (characteristics)	Other conditions	Effectiveness of waste water and waste air treatment (for ERC)	Release factors: water, air and soil (for ERC)	Detailed info. in CSR (section)
			- In all dedicated spray hangars negative pressure during spraying process, preventing spreading of particles in case the door is opened.	- Advanced occupational health and safety management system ^d	- Chemical protective coverall or apron ^c				
WCS 3 - Operators performing brushing/rolling	PROC 10	n.a.	- Natural ventilation	- Duration and frequency task-dependent: <ul style="list-style-type: none"> • Duration: <5 – 480 min/shift • Frequency: <1 – 240 days/year - Advanced occupational health and safety management system ^d	- Chemical resistant gloves according to EN 374 as per relevant risk assessment - Eye protection as per relevant risk assessment - Chemical protective clothing (except where use of small volumes makes skin contact unlikely) ^c	- Up to 6% Cr(VI) - Indoors - RT	n.a.	n.a.	9.2.3.4

ECS and WCS	Task (ERC/ spERC or PROC)	Annual amount per site (kg Cr(VI)/ year)	Technical RMMs, including: *Containment, *Ventilation (general, LEV...) *customized technical installation, etc	Organisational RMMs, including: *Duration and Frequency of exposure *OSH management system *Supervision *Monitoring arrangements *Training, etc	PPE (characteristics)	Other conditions	Effectiveness of waste water and waste air treatment (for ERC)	Release factors: water, air and soil (for ERC)	Detailed info. in CSR (section)
WCS 4 - Machinists	PROC 21, PROC 24	n.a.	<p>- Either dedicated bench/room/booth with LEV or on-tool extraction or mobile extraction (including vacuum cleaner) or wetting at the point of release</p> <p>- Mechanical ventilation unless use of mechanical ventilation would introduce risks or would otherwise not be technically and practically possible</p>	<p>- Duration and frequency task-dependent:</p> <ul style="list-style-type: none"> • Duration: 5 - 480 min/shift • Frequency: <1 - 240 days/year <p>- Access restriction by means of signage or physical segregation or through strict procedure</p> <p>- Advanced occupational health and safety management system ^d</p>	<p>- Gloves to protect against mechanical injury as per relevant risk assessment</p> <p>- RPE for all tasks related to machining on surfaces ^e</p> <p>- Eye protection as per relevant risk assessment</p> <p>- Chemical protective clothing as per relevant risk assessment</p>	<p>- Surface-treated parts</p> <p>- Indoors</p> <p>- RT</p>	n.a.	n.a.	9.2.3.5
WCS 5 - Sanders in a dedicated hangar	PROC 21, PROC 24	n.a.	<p>- Sanding in a dedicated hangar with LEV</p> <p>- Either on-tool extraction or a vacuum cleaner or wetting/lubrication at the point of release during sanding. For sanding of small areas (e.g. around</p>	<p>- Duration and frequency task-dependent:</p> <ul style="list-style-type: none"> • Duration: up to 240 min/shift • Frequency: <1 - 96 days/year <p>- Access restriction by means of signage or physical segregation or through strict procedure</p>	<p>- Gloves to protect against mechanical injury as per relevant risk assessment</p> <p>- RPE ^e</p>	<p>- Surface-treated parts</p> <p>- Indoors</p> <p>- RT</p>	n.a.	n.a.	9.2.3.6

ECS and WCS	Task (ERC/ spERC or PROC)	Annual amount per site (kg Cr(VI)/ year)	Technical RMMs, including: *Containment, *Ventilation (general, LEV...) *customized technical installation, etc	Organisational RMMs, including: *Duration and Frequency of exposure *OSH management system *Supervision *Monitoring arrangements *Training, etc	PPE (characteristics)	Other conditions	Effectiveness of waste water and waste air treatment (for ERC)	Release factors: water, air and soil (for ERC)	Detailed info. in CSR (section)
			windows) no on-tool extraction required	- Advanced occupational health and safety management system ^d	- Eye protection as per relevant risk assessment - Chemical protective overall				
WCS 6 - Workers performing media blasting in closed system	PROC 21, PROC 24	n.a.	- Closed system ^f	- Duration and frequency task-dependent: <ul style="list-style-type: none"> • Duration: up to 270 min/shift • Frequency: <1 – 240 days/year - Access restriction by means of signage or physical segregation or through strict procedure - Advanced occupational health and safety management system ^d	- Gloves to protect against mechanical injury as per relevant risk assessment - Eye protection as per relevant risk assessment - Chemical protective clothing as per relevant risk assessment	- Surface-treated parts - Indoors - RT	n.a.	n.a.	9.2.3.7
WCS 7 - Workers performing media blasting in	PROC 21, PROC 24	n.a.	- Media blasting in a room/hall with LEV - For blasting of medium-sized parts also wall	- Duration and frequency task-dependent: <ul style="list-style-type: none"> • Duration: up to 480 min/shift 	- Gloves to protect against mechanical injury as per	- Surface-treated parts - Indoors	n.a.	n.a.	9.2.3.8

ECS and WCS	Task (ERC/ spERC or PROC)	Annual amount per site (kg Cr(VI)/ year)	Technical RMMs, including: *Containment, *Ventilation (general, LEV...) *customized technical installation, etc	Organisational RMMs, including: *Duration and Frequency of exposure *OSH management system *Supervision *Monitoring arrangements *Training, etc	PPE (characteristics)	Other conditions	Effectiveness of waste water and waste air treatment (for ERC)	Release factors: water, air and soil (for ERC)	Detailed info. in CSR (section)
a room/hall			extraction in the designated blasting area - Mobile LEV for medium-sized parts	<ul style="list-style-type: none"> • Frequency: up to 240 days/year - Access restriction by means of signage or physical segregation or through strict procedure - During media-blasting, only persons involved in the blasting process are allowed in the working hall. - Advanced occupational health and safety management system ^d	relevant risk assessment - RPE ^e - Eye protection as per relevant risk assessment - Chemical protective coverall	- RT			
WCS 8 - Maintenance and/or cleaning workers for spray area(s)	PROC 8b, PROC 28	n.a.	- Natural ventilation	- Duration and frequency task-dependent: <ul style="list-style-type: none"> • Duration: up to 360 min/shift • Frequency: <1 – 240 days/year - Access restriction by means of signage or physical segregation or through strict procedure - Advanced occupational health and safety management system ^d	- Chemical resistant gloves according to EN 374 as per relevant risk assessment - RPE for all tasks related to maintenance and cleaning of spray area(s), including filter change ^e - Eye protection as per relevant	- Up to 6% Cr(VI) - Indoors - RT	n.a.	n.a.	9.2.3.9

ECS and WCS	Task (ERC/ spERC or PROC)	Annual amount per site (kg Cr(VI)/ year)	Technical RMMs, including: *Containment, *Ventilation (general, LEV...) *customized technical installation, etc	Organisational RMMs, including: *Duration and Frequency of exposure *OSH management system *Supervision *Monitoring arrangements *Training, etc	PPE (characteristics)	Other conditions	Effectiveness of waste water and waste air treatment (for ERC)	Release factors: water, air and soil (for ERC)	Detailed info. in CSR (section)
					risk assessment - Chemical protective overall				
WCS 9 - Maintenance and/or cleaning workers (excluding spray areas)	PROC 28	n.a.	- Natural ventilation	- Duration and frequency task-dependent: <ul style="list-style-type: none"> • Duration: up to 360 min/shift • Frequency: <1 – 96 days/year^g - Access restriction by means of signage or physical segregation or through strict procedure - Advanced occupational health and safety management system ^d	- Chemical resistant gloves according to EN 374 as per relevant risk assessment - Eye protection as per relevant risk assessment - Chemical protective clothing as per relevant risk assessment	- Surface-treated parts - Indoors - RT	n.a.	n.a.	9.2.3.10
WCS 10 - Incidentally exposed workers	PROC 0	n.a.	- Natural ventilation	- Duration and frequency task-dependent: <ul style="list-style-type: none"> • Duration: up to 240 min/shift • Frequency: <1 – 240 days/year - Advanced occupational health and safety management system ^d	- Standard PPE	- Up to 6% Cr(VI) - Indoors - RT	n.a.	n.a.	9.2.3.11

Notes:

^a Share of total release generated by this use per site.

^b RPE according to EN 529:2005 is worn at least for all tasks not performed under LEV for which industrial hygiene exposure assessment confirms RPE use is required. The mask- and filter type requirements are defined task-specifically in the CSR.

^c Depending on task (as defined in the CSR) chemical protective clothing or coverall or apron is worn; for small volume spraying (<100 mL) in a three-sided open spray booth a disposable lab coat can also be used.

^d The advanced occupational health and safety management system includes: a) Regular exposure monitoring, b) Workers' training, c) Instructions available at workplaces, d) PPE management system, e) Maintenance of RPE in accordance with standard procedure and periodical checks of RPE (including fit testing), f) Donning/doffing of protective clothing is organised in a separate changing room, g) Effective cleaning practices are implemented to prevent surface contamination in the vicinity where machining activities take place, h) Inspection and maintenance of LEV, i) Hazardous waste management procedures are in place, j) Chemical products stored in designated area

^e RPE according to EN 529:2005 is worn for all tasks. The mask- and filter type requirements are defined task-specifically in the CSR.

^f Media blasting may be performed in a semi-closed system equipped with LEV, in that case the workers wear respiratory protection (at least half mask with P3 filter) during the activity.

^g May be performed up to 480 min/shift, but with a lower frequency (< 1x/week to 1x/month) or with a lower duration (max. 120 min/shift) at a higher frequency (up to everyday).

Abbreviations: WCS=Worker contributing scenario, ECS=Environmental Contributing Scenario, ERC=Environmental Release Category, STP=Sewage Treatment Plant, WWTP=Wastewater Treatment Plant, PROC=Process category, LEV=Local Exhaust Ventilation, PPE=Personal Protective Equipment, RPE=Respiratory Protective Equipment, RT=Room temperature, n.a.=not applicable