CHEMICAL SAFETY REPORT

Part B section 9 and 10

Legal name of applicant(s):	Tyco Electronics UK Ltd
Submitted by:	Tyco Electronics UK Ltd
Substance:	Chromium trioxide EC 215-607-8, CAS 1333-82-0
Use title:	Industrial use of a mixture containing hexavalent chromium compounds in conversion coating and passivation of circular and rectangular connectors in order to meet the requirements of international standards and special requirements of industries subject to harsh environments
Use number:	Use 2

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9. EXPOSURE ASSESSMENT (and related risk characterisation)

9.1 Introduction

Tyco Electronics UK Ltd is a downstream user of chromium trioxide.

This substance is used in conversion coating and passivation of circular and round connectors manufactured at the Tyco Electronics UK Ltd. site in Hastings, East Sussex.

The environmental exposure assessment and risk characterisation has been performed in accordance with the relevant guidance for the production of a Chemical Safety Report (CSR) under the REACH Regulation considering the specific aspects relating to the applicant's use of the substance.

Surveillance programs of the processes, including maintenance operation, are performed at the Hasting site. Emergency procedures are in place in case of accidental release, malfunctioning of ventilation or other accidental events.

Workers involved in the activities using this substance are specifically trained and made aware of the specific hazards. Health surveillance programs are in place in order to ensure the complete safety of each worker. The chromium baths are located in restricted areas where only qualified workers are allowed.

9.1.1 Overview of uses and Exposure Scenarios

Tyco Electronics UK Ltd.'s Authorisation and the Exposure Scenario described covers the activities at the Hastings site.

Identified Use ID	Identified Use Description	Exposure Scenario
Use 2	Industrial use of a mixture containing hexavalent chromium compounds in conversion coating and passivation of circular and rectangular connectors in order to meet the requirements of international standards and special requirements of industries subject to harsh environments	ES1: Industrial use of hexavalent chromium in bath for the surface treatment of connectors

Table 1: Identified Uses and Exposure Scenarios

9.1.1.1 Process explanation

This Chemical Safety Report (CSR) discusses the use of hexavalent chromium in baths for the surface treatment of connectors.

Presentation of baths treatment line

The surface treatment of connectors' parts is performed on bath treatment lines. Connector parts are articles dipped in successive baths, including chromium bath.

The Hastings site has a manual dipping treatment line.

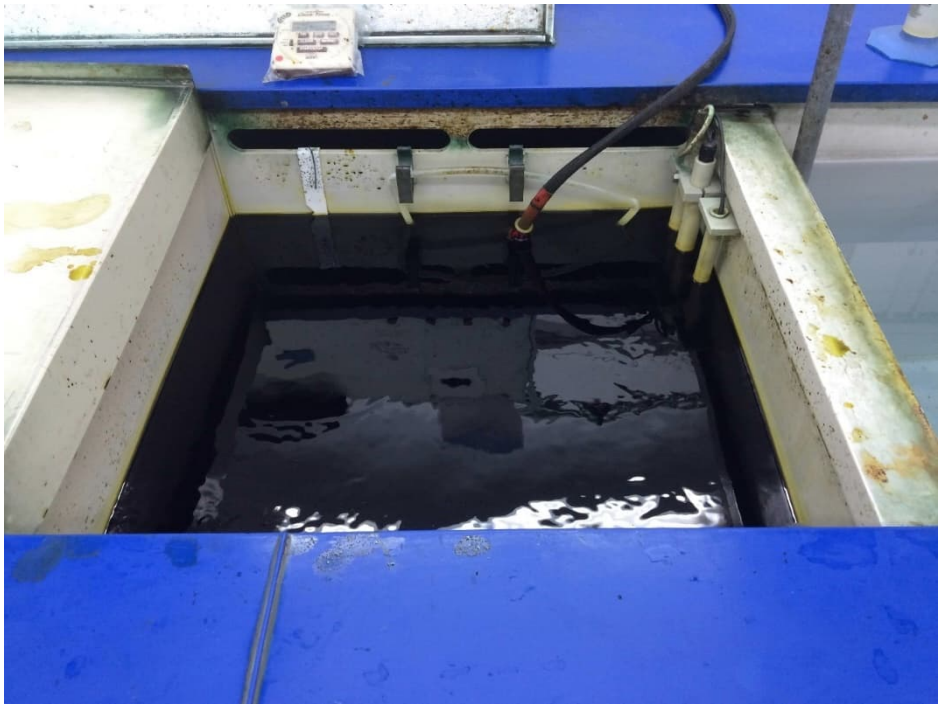

Figure 1: Passivation bath containing hexavalent chromium (manual treatment line)

The treatment line is composed of several baths, but a bath containing hexavalent chromium is always followed by at least one rinsing bath.

On this manual treatment line, the workers handle a frame or jig on which connector parts are mounted. Workers then use the frame or jig to manually dip the articles in the successive baths for treatment.

The process baths containing solutions with chromium compounds have local exhaust extraction. Figure 1 (above) shows the lip extraction ports. Figure 2 shows air flow. The air that may be contaminated is drawn away from the operator. The exhausted air is replaced using a fresh air intake system.

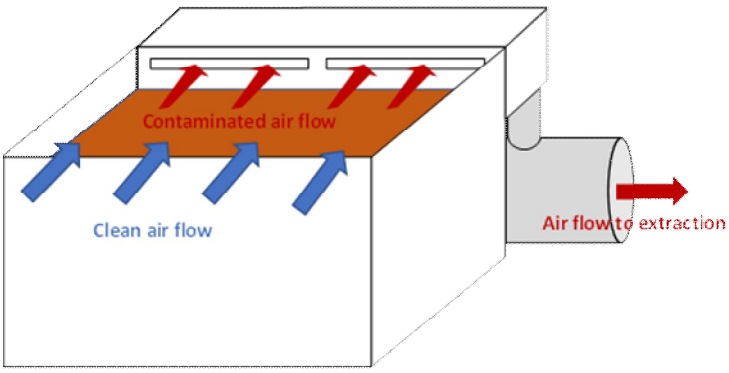

Figure 2: Air flow on extracted bath

- ***Sampling of bath and lab analysis***

A small amount (typically 100 ml) of the mixture is transferred into small lidded vessels, in order to perform a titration of hexavalent chromium or pH measurements on the solution contained in the bath.

The titration of hexavalent chromium or other analyses are performed in the on site laboratory. The laboratory is a separate room, adjacent to the plating shop. The lab operator is subject to exposure to hexavalent chromium only during these tasks.

The pH measurement is a specific consideration because it can be performed at the bath directly during the sampling, by using a portable pH meter, which the platers just immerse into the solution. Consequently, the pH measurement is considered in the same contributing scenario with sampling activity.

- ***Drainage of baths***

A waste treatment plant is located in a separate and dedicated room on the industrial site, for the water treatment in an enclosed system. The treatment of liquid effluent is considered in the environmental contributing scenario 1. When a chromium bearing bath on the plating line needs to be emptied, it is transferred to storage drums (200 litre L ring Drums) using an air diaphragm pump. The drum is moved to storage area to await off site disposal. During this operation the operator is located next to the bath for a maximum of 30 minutes. This is the total duration of the transfer.

Once full the drums are lidded, therefore, there is no possibility of exposure after the transfer of hexavalent chromium bearing solutions. The exposure considered during this task will be inhalation exposure due to the presence of open chromium baths next to the worker.

This Chemical Safety Report (CSR) discusses the use of hexavalent chromium in baths for the surface treatment of connectors.

- ***Visual control and maintenance operations***

A visual routine control on the bath or maintenance operation can be performed by one worker. Maintenance operations are operations involved directly on the installation. If maintenance of the tank hardware is required the plating solution is pumped out prior to any work.

The exposure considered during these tasks will be inhalation exposure due to the presence of open chromium baths next to the worker.

This task is considered in the estimation of exposure to hexavalent chromium. It is treated in this CSR in the Contributing Scenario 4 (CS-4).

- ***Repackaging of hexavalent chromium***

When hexavalent chromium is supplied in 25 litre containers, the volume of product to add to the treatment bath cannot be accurately controlled at the bath if poured directly from a large container. Thus, the quantity to be added to the bath is transferred to a smaller container in order to quantify the amount of product needed and facilitate the addition into the bath. This transfer is manually performed by one worker and it can involve liquid or solid products.

This task is considered in the estimation of exposure to hexavalent chromium. It is treated in this CSR in the Contributing Scenarios CS-8

- ***Manual addition of mixture to bath***

The hexavalent chromium compounds are in liquid form and in a mixture or as a pure material. It is added by one worker directly to the chromium treatment bath by pouring it from the container as supplied or transferred according to the condition described in the previous section. Routine additions are typically 40 – 80ml and additions as a result of analysis between 60 – 120ml/day

The hexavalent chromium is diluted in the liquid contained in the bath. Thus, the bath concentration of hexavalent chromium compound does not exceed 10% (w/w). It will be considered as Minor (in the range of 5 to 10%) in this CSR.

This task is considered in the estimation of exposure to hexavalent chromium. It is treated in this CSR in the Contributing Scenario 9 (CS-9) for liquid products

- ***Assembling and dismantling of connector parts***

Before and after the dipping process performed on the treatment line, connector parts must be placed on/in or attached and then removed from a frame or a jig, in the case of manual dipping,

Therefore, at the beginning and at the end of treating articles by immersion, workers are handling the connector parts. This task is presented on the following figure.

Figure 1: Handling of articles

This frame or fixture is commonly called a jig. During the assembly of connector parts on the jig, before the chromium treatment, the parts have not yet been in contact with hexavalent chromium. Consequently, there is no possible exposure to hexavalent chromium from handling these articles.

When removing connector parts from the jigs after the treatment process, the parts have been rinsed in water and further treated. Consequently, the remaining hexavalent chromium on the article is included into a matrix composed of the formation of oxidized surface of the article. Chromate is therefore contained in this matrix, and cannot evaporate. Thus, for exposure by inhalation route, these articles are not the main emission source of hexavalent chromium.

Dermal exposure to hexavalent chromium during this task will be treated in this CSR in the Contributing Scenario 12 (CS-12).

There is no direct inhalation exposure to hexavalent chromium during this task when it is performed next to the treatment line. However, indirect exposure due to the immersion in bath on the treatment line will be considered during this activity in the Contributing Scenario 15 (CS-15).

- ***Dipping connectors in treatment baths***

The dipping of jigs or racks holding connector parts in successive baths treatment is manually carried out by one worker located in front of the bath

Exposure due to the presence of a chromium bath or rinsing bath in the near field will be considered in the contributing scenario 13 & 14 (CS-13 & CS-14).

This task is considered in the estimation of exposure to hexavalent chromium. It is treated in this CSR in the Contributing Scenarios 13&14 (CS-13 & 14) for manual operations. Scenario CS-15 considers far field exposure to operators

- ***Drying of connectors***

Connector parts can be dried automatically by placing the jigs carrying the connector parts in the auto drier, which is a closed unit. These tasks do not involved additional exposure for workers since the potential emission source is confined within a cabinet. Furthermore, the main source of exposure considered in the ambient air of the plating shop is the open baths containing chromium compounds.

This task is considered in the estimation of exposure to hexavalent chromium. It is treated in this CSR in the Contributing Scenario 16 (CS-16).

- ***Wastewater treatment plant***

The wastewater treatment plant (WTP) on the site is an installation designed specifically to treat effluents containing hexavalent chromium.

All the rinse waters containing hexavalent chromium are treated in the WTP by passing through the chromium reduction, pH correction, flocculation, settlement and cation polish stages prior to the water being discharged to sewer. The settlement sludge is passed through a filter press. The extracted water is passed back through the WTP. The sludge compacted into a cake is sent offsite to specialist contractor for metals recovery.

Spent plating solutions containing chromium are transferred to storage drums for offsite disposal.

This step on the process is considered in the estimation of environmental exposure to hexavalent chromium. It is treated in this CSR in the Contributing Scenario 1 (CS-1).

9.1.1.2 Tonnage information / Number of worker exposed:

Tonnage information:

Assessed tonnage: 0.3 to 1.2 tonnes/year based on tonnes/year used

Tonnage supplied per market sector:

Past consumption until the year 2015 and the estimated consumption of hexavalent chromium compounds (chromium trioxide) on the Hastings site of Tyco Electronics UK Ltd is shown in Table 2.

		2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Quantity (tons)	**Forecast**	0.21	1.01	0.65	0.90	1.10	1.05	1.00	0.95	0.93	0.90	0.80	0.70
	Actual				0.77	0.93	0.29	0.40	0.35	0.51			

Table 2: Past and future estimated consumption on the Hastings site

The number of workers within the Plating room carrying out plating activities is 12. There are also 2 lab technicians who frequently enter the room for sample taking, monitoring, and making additions.

Annual health screening of employees within the area and ancillary staff, such as maintenance engineers, is performed.

An external company carries out Local Exhaust Ventilation (LEV) testing throughout the site including the plating tank extraction and laboratory fume cabinets. This is to ensure that the extraction systems are functioning correctly and extracting at the correct air velocities and volumes. See Annex IV for test results of plating tank extraction.

An external company also carries out air monitoring throughout the site, including the plating and effluent treatment rooms using static sampling. Table 3 below shows most recent results regarding chromium (Aug 2022).

Sample Ref	Start Time	End Time	Static Location	Average Flow Rate (L min-1)	Sampled Volume (L)	Analyte	Mass of Analyte (mg)	Concentration in Air (mg m-3)
32	08:34	13:31	Plating Shop - Behind Chromium Tank 56B (PP865.6B)	1.95	579.15	Chromium	<0.001	<0.002
33	08:00	12:35	Plating Shop - Behind Tank 54 (PP865.8A)	1.95	536.25	Chromium	<0.001	<0.002
40	09:34	13:38	Effluent Plant - In Corner of Area Between Chromium Pump & Chromium Reduction Tank (PP865.69)	2	488	Chromium	<0.001	<0.002

Table 3: Static chromium monitoring results

Sampling of extracted air is carried out annually and the scrubber reservoir is checked quarterly testing for various metals including chromium. Table 4 is extract of results showing chromium data.

			Results										Mass Balance									
			Scrubber Reservoir mg/L					Discharge Air / ppm					Reservoir (ppm)					Air (g/day)				
Date	Optr	Reason					Cr					Cr					Cr					Cr
10/09/2014	DT	Qtr check					0.0						0	0	0	0	0.086					
06/01/2015	DT	Annual Check										0	0	0	0	0	0					0.00000
06/01/2015	DT	Qtr check					0.2						0	0	0	0	0.473					
20/04/2015	DT	Qtr check					0.1						0	0	0	0	0.218					
23/07/2015	DT	Qtr check					0.6						0	0	0	0	1.402					
20/10/2015	DT	Qtr check					0.3						0	0	0	0	0.675					
18/01/2016	DT	Annual Check										8E-04	0	0	0	0	0					0.00011
01/04/2016	DT	Qtr check					0.3						0	0	0	0	0.754					
22/07/2016	DT	Qtr check					0.1						0	0	0	0	0.241					
26/10/2016	DT	Qtr check					0.1						0	0	0	0	0.263					
12/01/2017	DT	Annual check										9E-04	0	0	0	0	0					0.00012
29/03/2017	DT	Qtr check					0.2						0	0	0	0	0.385					
12/05/2017	DT	Qtr check					0.5						0	0	0	0	1.143					
29/08/2017	DT	Qtr check/Maintenance					2.5						0	0	0	0	5.625					
08/01/2018	DT	Qtr check					2.5						0	0	0	0	5.625					
25/06/2018	DT	Annual check					0.1					7E-04	0	0	0	0	0.32					0.00009
20/09/2018	MZ	Qtr check					0.3						0	0	0	0	0.765					
19/02/2019	DT	Qtr check					1.0						0	0	0	0	2.25					
22/05/2019	DT	Qtr check					0.7						0	0	0	0	1.575					
11/10/2019	DT	Annual check					0.4					8E-04	0	0	0	0	0.835					0.00011
13/01/2020	DT	Qtr check					0.4						0	0	0	0	0.907					
29/04/2020	DT	Qtr check					1.6						0	0	0	0	3.578					
04/09/2020	DT	Qtr check					0.4						0	0	0	0	0.9					
14/12/2020	MZ	Annual check					0.6					9E-04	0	0	0	0	1.395					0.00012
12/04/2021	MZ	Qtr check					0.5						0	0	0	0	1.121					
27/05/2021	DT	Check/Maintenance					0.2						0	0	0	0	0.473					
19/08/2021	MZ	Qtr check					0.2						0	0	0	0	0.5					
30/11/2021	MZ	Qtr check					0.1						0	0	0	0	0.335					
18/01/2022	MZ	Annual check					0.3					0.241	0	0	0	0	0.785					0.03238
19/04/2022	MZ	Qtr check					0.4						0	0	0	0	0.884					
19/07/2022	MZ	Qtr check					0.1						0	0	0	0	0.277					
18/10/2022	MZ	Qtr check					0.0						0	0	0	0	0.02					

Table 4: Chromium data – extracted air sample data

Throughout the year, air sampling of individuals undertaking the various activities associated with plating, and static samples of the main areas where operators work, wire shop and lab are taken. Table 5 extract of monitoring results.

The extracted air sampling is done by taking samples as per MDHS14/4 *General Methods for sampling and gravimetric analysis of respirable thoracic and inhalable aerosols*. The determination of chromium is as per NIOSH 7024. The sample is taken from an extraction point between the scrubber and the exhaust port.

The chromium content of individuals is measured by an occupational health company and they have results tested by an independent lab.

Static and individuals monitoring is also done as per MDHS14/4 *General Methods for sampling and gravimetric analysis of respirable thoracic and inhalable aerosols. The determination of chromium is as per NIOSH 7024.*

Workplace Air Sampling - Cr Total Metal

						Sampling								Metals Concentration (mg/m3)	Exposure Limits (8hr TWA) 0.05 (mg/m3) Exposure Variance	Exposure %age of Limits (8hr TWA)	Comments
Sample	Date	Start Time	End Time	Operator	Process(es)	Duration	Duration (m)	Flow Rate (l/min)	Volume air sampled (m^3)	Filter mass before (g)	Filter mass after (g)	Filter mass difference (mg)	Aerosol conc. (mg/m^3)	Cr	Cr	Cr	
1	20/06/2016	10:40:00	12:46:00	✓	E, A, J	02:06:00	126	2	0.252	4.4988	4.4996	0.8	3.1746	0	-0.05	0	
2	20/06/2016	12:55:00	16:50:00	✓	E, P, A. J	03:55:00	235	2	0.47	4.6142	4.61549	1.29	2.7447	0.0005	-0.0495	1	
3	27/06/2016	10:40:00	12:46:00	✓	E, P, A. J	02:06:00	126	2	0.252	4.6107	4.7683	157.6	625.3968	0.00061	-0.04939	1.22	
4	27/06/2016	13:10:00	16:50:00	✓	E, A, J	03:40:00	220	2	0.44	4.6145	4.6269	12.4	28.1818	0.00058	-0.04942	1.16	
5	28/06/2016	09:00:00	12:45:00	wire shop	static	03:45:00	225	2	0.45	4.4861	4.4883	2.2	4.8889	0	-0.05	0	
6	28/09/2017	14:00:00	17:19:00	✓	E,P,J,A	03:19:00	199	2	0.398	4.4853	4.4886	3.3	8.2915	0.013554	-0.03645	27.108	
7	29/09/2017	09:30:00	13:03:00	✓	E,P,J,A	03:33:00	213	2	0.426	4.47742	4.47811	0.69	1.6197	0.11795	0.06795	235.9	
8	03/10/2017	08:30:00	12:30:00	✓	C	04:00:00	240	2	0.48	4.47345	4.47394	0.49	1.0208	0.012709	-0.03729	25.418	
9	05/10/2017	09:00:00	16:10:00	✓	static	07:10:00	430	2	0.86	4.49016	4.49048	0.32	0.3721	0.009546	-0.04045	19.092	
10	09/10/2017	12:45:00	16:50:00	✓	E,P,J,A	04:05:00	244	2	0.488	4.4776	4.47819	0.59	1.2090	0.019508	-0.03049	39.016	
11	09/10/2017	08:45:00	11:11:00	✓	H,T	02:26:00	266	2	0.532	4.48438	4.4872	2.82	5.3008	0.01869	-0.03131	37.380	
12	10/10/2017	08:30:00	12:39:00	✓	E,P,J,A	04:09:00	249	2	0.498	4.47395	4.47451	0.56	1.1245	0.020347	-0.02965	40.694	
13	10/10/2017	13:15:00	17:14:00	✓	E,P,J,A	03:59:00	239	2	0.478	4.49047	4.49048	0.01	0.0209	0.004473796	0.00682	8.948	
14	11/10/2017	09:50:00	16:55:00	Extraction	A1	0.295139	475	2.2	1.045	4.61543	4.61551	0.08	0.0766	0.05682	-0.04553	113.640	Sample point on extraction
15	30/07/2018	09:00:00	16:32:00	LAB	static	07:32::00	452	2	0.904	4.4635	4.6269	163.4	180.7522	0.00001	-0.04999	0.015	
16	31/07/2018	12:10:00	16:46:00	✓	E, P,A ,J	04:46	286	2	0.572	4.6145	4.6168	2.3	4.0210	0.00062	-0.04938	1.244	
17	14/08/2018	12:20:00	16:52:00	✓	E, P,A ,J	04:52	292	2	0.584	4.6104	4.6126	2.2	3.7671	0.00219	-0.04781	4.376	
18	19/09/2018	09:00:00	16:54:00	wire shop	static	07:54	472	2	0.944	4.49124	4.49136	0.12	0.1271	0	-0.05	0.000	
19	11/10/2018	08:30:00	12:50:00	✓	E, P,A ,J	04:30	260	2	0.52	4.78423	4.78438	0.15	0.2885	0.00002692	-0.04997	0.054	
20	04/12/2018	08:40:00	12:35:00	✓	E, P,A ,J	3.8	240	2	0.48	4.78394	4.78462	0.68	1.4167	0	-0.05	0.000	
21	05/12/2018	12:50:00	16:50:00	✓	E, P,A ,J	4	240	2	0.48	4.4516	4.4572	5.6	11.6667	0	-0.05	0.000	
22	22/01/2019	09:00:00	15:00:00	wire shop	static	06:00:00	360	2	0.72	4.486	4.4875	1.5	2.0833	0.01869	-0.03131	37.380	
23	14/03/2019	12:55:00	16:49:00	✓	E, P,A ,J	03:54:00	475	2	0.95	4.61543	4.61551	0.08	0.0842	0.020347	-0.02965	40.694	
24	08/05/2019	09:00:00	12:45:00	✓	E, P,A ,J	03:45:00	452	2	0.904	4.4635	4.6269	163.4	180.7522	0.005682	-0.04432	11.364	
25	17/06/2019	09:00:00	12:50:00	✓	E, P,A ,J	03:50:00	286	2	0.572	4.6145	4.6295	15	26.2238	0.004423796	-0.04558	8.848	
26	22/08/2019	09:00:00	12:55:00	Lab	static	03:55:00	292	2	0.584	4.6104	4.6126	2.2	3.7671	9.65E-06	-0.04999	0.019	
27	04/09/2019	09:00:00	16:50:00	✓	E, P,A ,J	07:50:00	472	2	0.944	4.49124	4.49136	0.12	0.1271	0.000682615	-0.04932	1.365	
28	12/11/2019	12:25:00	16:00:00	✓	E, P,A ,J	03:35:00	260	2	0.52	4.78423	4.78438	0.15	0.2885	0.004187924	-0.04581	8.376	
29	22/08/2019	13:10:00	16:50:00	✓	E, P,A ,J	03:40:00	240	2	0.48	4.78394	4.78462	0.68	1.4167	0.01869	-0.03131	37.380	
30	18/02/2020	08:30:00	16:30:00	Extraction	static	08:00:00	240	2	0.48	4.4516	4.4572	5.6	11.6667	0.05882	-0.03065	117.640	Sample point on extraction
31	21/04/2020	08:45:00	12:00:00	✓	E, P,A ,J	03:15:00	195	2	0.39	4.49016	4.49126	1.1	2.8205	0.019347	0.00882	38.694	
32	06/05/2020	12:55:00	16:50:00	✓	E, P,A ,J	03:55:00	235	2	0.47	4.4746	4.4759	1.3	2.7660	0.004473796	-0.04553	8.948	
33	22/10/2020	09:00:00	16:00:00	✓	E, P,A ,J	07:00:00	420	2	0.84	4.48438	4.4852	0.82	0.9762	1.16E-05	-0.04999	0.023	
34	27/10/2020	08:40:00	16:45:00	Lab	static	08:05:00	485	2	0.97	4.7853	4.7869	1.6	1.6495	9.59E-06	-0.04999	0.019	
35	03/11/2020	08:30:00	16:25:00	Wire shop	static	07:55:00	475	2	0.95	4.62041	4.62152	1.11	1.1684	0	-0.05	0.000	
36	17/02/2021	08:45:00	16:40:00	wire shop	static	07:55:00	475	2	0.95	4.6286	4.6298	1.2	1.2632	0	-0.05	0.000	
37	03/03/2021	08:30:00	12:30:00	✓	E, P,A ,J	04:00:00	242	2	0.484	4.6089	4.6147	5.8	11.9835	0.00236	-0.04764	4.720	
38	03/03/2021	12:40:00	16:40:00	✓	E, P,A ,J	04:00:00	246	2	0.492	4.6039	4.6052	1.3	2.6423	0.00267	-0.04733	5.340	
39	04/03/2021	08:30:00	16:30:00	Lab	static	08:00:00	480	2	0.96	4.6327	4.6337	1	1.0417	0.0002	-0.0498	0.400	
40	02/02/2022	05:45:00	13:45:00	Extraction	static	08:00:00	478	2	0.956	1.2827	1.29	7.3	7.6360	0.0241	-0.0259	48.200	
41	03/08/2022	09:00:00	16:00:00	ab/titratior	static	07:00:00	482	2	0.964	4.6269	4.6279	1	1.0373	0.002	-0.048	4.000	

Process(es)	
E	Env plating
P	Passivation
J	Jig stripping
A	Additions
M	Solution makeup
C	Contact plating
H	Hermetic plating
T	ETP activities

Table 5: Air sampling

Note: samples 14, 30 & 40 are from the extraction exhaust, not the plating or ETP room

9.1.1.3 Overview of exposure scenarios

The following table lists all the exposure scenarios (ES) assessed in this CSR.

Identifiers*	Market Sector	Titles of exposure scenarios and the related contributing scenarios	Tonnage of chromium trioxide (tonnes per year)
IW-1		**ECS1- Industrial use of a mixture of chromic acids for chromium plating.**	1.2
IW-1.2		**Sampling of bath (PROC 8a)**	
IW-1.3		**Lab analysis (PROC 15)**	
IW-1.4		**Other activities next to the bath (PROC 28)**	
IW-1.8		**Repackaging of liquid (PROC 8a)**	
IW-1.9		**Addition of liquid to bath (PROC 8a)**	
IW-1.12		**Handling of articles (PROC 21)**	
IW-1.13		**Dipping connector parts in treatment bath, in the worker's near field (PROC 13)**	
IW-1.14		**Dipping connector parts in rinsing baths, in the worker's near field (PROC 13)**	
IW-1.15		**Treatment baths in the workers' far field (PROC 13)**	
IW-1.16		**Drying connector parts (PROC 7)**	

Table 6: Overview of exposure scenarios and contributing scenarios

* IW = Industrial end use at site.

The following table lists all the exposure scenarios (ES) assessed in this CSR.

Identifiers*)	Market Sector	Titles of exposure scenarios	Tonnage (tonnes per year)
ECS 1 (IW-1)		Industrial use of hexavalent chromium in bath for the surface treatment of connectors	0.3 to 1.2
***) Manufacture: M-#, Formulation: F-#, Industrial end use at site: IW-#, Professional end use: PW-#, Consumer end use: C-#, Service life (by workers in industrial site): SL-IW-#, Service life (by professional workers): SL-PW-#, Service life (by consumers): SL-C-#.)**			

Table 7a: Overview of exposure scenarios

Contributing scenario	ERC / PROC	Name of the contributing scenario	Size of the exposed population
ECS 1: Industrial use of hexavalent chromium in bath for the surface treatment of connectors			
ECS1			Regional: Local:
WCS 1 (IW-1.2)	PROC 8a	Sampling of bath	
WCS 2 (IW-1.3)	PROC 15	Lab Analysis	
WCS 3 (IW-1.4)	PROC 28	Other activities next to the bath	
WCS 4 (IW-1.8)	PROC 8a	Repackaging of the liquid	
WCS 5 (IW-1.9)	PROC 8a	Addition of the liquid to the bath	
WCS 6 (IW-1.12)	PROC 21	Handling of articles	
WCS 7 (IW 1-13)	PROC 13	Dipping connector parts in treatment bath, in the worker's near field	
WCS 8 (IW-1.14)	PROC 13	Dipping connector parts in rinsing bath, in the worker's near field	
WCS 9 (IW-1.15)	PROC 13	Treatment baths in the worker's far field	
WCS 10 (IW-1.16)	PROC 7	Drying connector parts	

Table 7b: Overview of Contributing Scenarios

9.1.2 Introduction to the assessment

9.1.2.1 Environment

Following REACH, Article 62(4)(d), the CSR supporting an AfA needs to cover only those potential risks arising from the intrinsic properties specified in Annex XIV. Accordingly, only the potential human health risks related to the classification of chromium trioxide as a carcinogenic and mutagenic toxicant are considered in the current CSR.

At the end of the process, all waste is managed by a specialised waste management company that also collects all waste (filters, PPE, packaging etc.), except liquid waste which is treated onsite.

Nevertheless, in the environmental contributing scenarios, the applicant will analyse and discuss the possible release and risk for the general population.

9.1.2.2 Human via environment

Risk analysis for man via environment will be performed according to the conclusions of the environmental release identified in the environmental contributing scenario.

9.1.2.3 Workers

The excess risk calculation will be based on RAC/27/2013/06 Rev.1 which establishes a reference dose response relationship for carcinogenicity of hexavalent chromium.

Regarding the publication of the RAC, no data clearly indicate that dermal exposure to Cr(VI) compounds presents a risk of cancer to humans. As a consequence, the risk induced via dermal exposure will not be considered in what follows, especially taking into account the dermal protections used when the substance is handled.

Moreover, we will estimate the cancer risk mainly due to volatility of the substance, for lung cancer, and maximize excess of cancer risk by not taking into account the small intestine cancer risk.

Monitoring measurement campaign are planned on site for exposure assessment of the entire process.

For the description of each contributing scenario, we will use the ART 1.5 software to calculate an associated value of exposure. In the modelling process, we will use **the Long-term value at 90th percentile** for the entire contributing scenario. ART modelling reports are given in Annex III. It has to be stressed that, in the ART model, the duration of activity does not impact the results of the raw exposure estimated for one task. Thus, the duration can be adjusted for each member for the estimation of the global exposure (made in section 10 and duration presented in Annex I). The results of the modelling approach will be compared to monitoring measurements. Nevertheless, to calculate the excess risk of cancer (section 10) we will use the estimation value from ART to assess a quantitative analysis.

Considering reprotoxic effects, as mentioned in section 5, this Chemical Safety Report focuses on the use of hexavalent chromium for the carcinogenic/mutagenic effects. RMM are in place to reduce the risk as low as possible in the framework of the non-threshold effects (cancer) of the substances. Consequently, as explained in section 5, it is deemed that these measures also cover the risk due to threshold effects for reproduction. Finally, when threshold effects are adequately controlled, they must not be taken into account in the excess risk calculation.

Thus, exposures and excess risk calculation will be developed considering only carcinogenic effects.

It has to be stressed that the estimated exposures presented for each contributing scenario in the section 9 are based on the worst case according to the description of the site, as presented in Annex I.

9.1.2.4 Consumers

This section is not relevant since no consumer will use the final manufactured articles because they are high technology equipment and they are not intended to be used by consumers.

Only professional workers use the treated connector parts.

9.2 Exposure scenario 1 for workers

Sector of use: Industrial use: Uses of substances as such or in preparations at industrial sites **(SU 3)**

Article categories: Metals articles **(AC 7)**

Environment contributing scenario(s): ECS1 - Industrial use resulting in inclusion onto a matrix **(ERC 5)**

Worker/Consumer contributing scenario(s):

CS 2 - Sampling of bath (**PROC 8a)**

CS 3 - Lab analysis (**PROC 15)**

CS 4 - Other activities next to the bath **(PROC 28)**

CS 8 - Repackaging of liquid **(PROC 8a)**

CS 9 - Addition of liquid to bath **(PROC 8a)**

CS 12 - Handling of articles (**PROC 21)**

CS 13 - Dipping connector parts in treatment bath, in the worker's near field **(PROC 13)**

CS 14 - Dipping connector parts in rinsing baths, in the workers' near field **(PROC 13)**

CS 15 - Treatment baths in the workers' far field **(PROC 13)**

CS 16 - Drying connector parts (**PROC 7)**

Subsequent service life exposure scenario(s): not applicable

Exposure scenario(s) of the uses leading to the inclusion of the substance into the article(s): not applicable

Description of the activities and technical processes covered in the exposure scenario:

The different tasks and various conditions are described within Contributing Scenarios.

Explanation on the approach taken for the ECS:

The exposure scenario concerns the immersion of connector parts in bath treatment for chromium treatment. Only the tasks which lead to exposure of hexavalent chromium, as identified in section 9.1.1 are analysed as Contributing Scenarios. For all the Contributing Scenarios concerning the exposure at the workplace, detailed conditions of use at the site are presented in Annex I.

Efficiency of respiratory protective equipment

When it is described in the Contributing Scenario, wearing respiratory protective equipment (RPE) is mandatory. Thus, to estimate exposure of workers at the workplace, it is necessary to determine the effectiveness of the respiratory protection. The result is the assigned protection factor (APF). The choice of this factor may vary, depending on the country for which it is used. **Error! Reference source not found.** presents the protective factors assigned to the breathing equipment used in this exposure scenario. It is a half mask which has been tested to European Standard EN 143, EN 140 or EN 405 and has met the relevant requirements of the category P3.

	Assigned protection factors (APF)	
Nominal protection factor	**EN 140/143**	**EN 405**
United Kingdom	20	10

APF presented in annex C of the NF EN 529 standard

Table 8 Assigned Protection Factor for United Kingdom

The decision was made to use an APF of 10. This ties in with a precautionary approach and with the methodology of the modelling approaches of *MEASE*[1]*, recommended in the technical guidance of ECHA (ECHA 2016*[2]*).*

Exposure Limits

Substance	**Long-term exposure limit (8-hr TWA reference period)**		**Short-term exposure limit (15-minute reference period)**		**Comments**
	ppm	Mg.m^3	ppm	Mg.m^3	The Carc, Sen and Sk notations are not exhaustive.
Chromium (VI) compounds (as Cr)		0.01 0.025 (process generated)			Carc, sen, BMGV

Table 9: List source(s)

[1] MEASE is a modelling tool for exposure estimation at the workplace. As described in the section 9.1.2.3, the modelling approach of this CSR , is based on the ART Tool for a Tier 2 exposure estimation. MEASE is not used because it is a Tier 1 exposure estimation. However, the present version of ART cannot estimate the exposure with respiratory protective equipment and consequently an assigned protection factor needs to be determined.

[2] Guidance on information requirements and chemical safety assessment, Chapter R.14 : Occupational exposure estimation.

9.2.1 Environmental contributing scenario 1

Industrial use resulting in inclusion onto a matrix

9.2.1.1 Conditions of use

Parameter	Information
Product characteristics	
• Product	*Hexavalent chromium in a mixture.*
• Physical form	*Solid dissolved in a liquid*
• Amount	*0.3 to 1.2 t / year*
• Weight fraction of the substance in the liquid mixture	*Concentration of substance in a bath is in the range 0.12 to 10 % (w/w)*
Operational conditions	
• Emission Sources	*No release is expected on the process, except for:* - *Air extraction from the baths treatment* - *Waste production during the treatment of liquid effluents* *The integrity of the process circuit is regularly monitored.* *The possibilities of release are detailed below.*
• Atmospheric emissions	*Air from local extraction of the baths in the plating shop is collected through a specific system. The air is then evacuated through a chimney on the roof of the plating shop.* *The possible atmospheric emissions will be considered in the following part of the CSR.*
• Liquid effluents	*All the liquid effluents containing hexavalent chromium on the industrial site are collected in specific wastewater pipe/sump and treated with a specific treatment in the wastewater treatment plant (WTP) of the site.* *Water used in the rinsing baths is recycled by using a treatment with ion exchange resin and active carbon. This treatment produces demineralized water. Chromium is consequently eliminated from water. The water is recycled to the plating shop.* *Mixture drained from the used chromium tanks is collected by authorized waste contractor and taken off site for treatment. Water from DI plant regeneration process containing hexavalent chromium is processed through the WTP. The hexavalent chromium is reduced with sodium metabisulphite. Then a flocculation is performed, followed by settlement through a lamella clarifier, then filtration. The water is then passed through a carbon filter and final cation polish before entering holding tank. The water in tank is tested for compliance to discharge limits and then sent to sewer.*
• Waste production	*All the waste (sludge and used materials) produced during these treatments is managed by a specialized certified waste company.*

Table 10: condition of use for the contributing scenario 1

9.2.1.2 Releases

Considering the data presented in Table 10, only atmospheric release could be considered. The air emissions are treated through a specific process, which reduces hexavalent chromium.

Experts considered in different official reports on possible exposure to hexavalent chromium[3,4], that the most probable risk would be in the local air compartment. Indeed, on water and soil, hexavalent

[3] European Union Risk Assessment Report on hexavalent chromium substances (Volume 53 3rd priority list)

[4] INERIS - Fiche de données toxicologiques et environnementales du chrome et de ses dérivés

chromium is transformed into trivalent chromium via redox reaction[5].

Moreover, in the EU RAR about release of hexavalent chromium compounds from use in metal treatment, no air release was considered (except during formulation of products)[6].

In order to provide more information on possible atmospheric release, the following table (11) presents the maximum tonnage of substances considered and the distance between the emission source located on the plating shop and the first home.

Company	Site	Distance	Total Tonnage
Tyco Electronics UK Ltd	Hastings	= 135 m	1.2

Table 11: Distance from point of release and tonnage of substance

The applicants estimated the release based on modelling exposure. Based on the Table 41, two worst cases are considered:

- Worst case: an atmospheric release of 1.2 tons per year with a distance of 100m.

The technical guidance document part II[7] proposes estimated release factors depending on the activity type.
The associated release factor is determined by the following parameters:

- o IC 16 (Industrial category: engineering industry),
- o Solubility > 1g/L,
- o Vapor pressure <10 Pa,
- o MC=3 (Main category: Non-dispersive use)

Thus, the release factor is determined at **0.00001.**

Based on this release estimation and the Doury abacus[8] (which estimates the dispersion speed), we calculated the exposure of the general population around the site for the worst case and the associated risk.

Worst case (1.3 tons/100m):
Release per working day is estimated (considering 365 working days per year):

$$\text{Daily release, worst case} = \frac{1200 \times 1\,000\,000}{365} \times 0.00001$$

= 32.87 mg per day
Worst case, release per day: 32.87 mg/day (average of 0.38 µg/s on 24h)
For the assessment, we took the nearest house at approximately 100m for the worst case.
Atmospheric transfer coefficient (at 100m) from Doury Abacus: 1.87×10^{-3} s/m^3

The release in air adjusted on 24h is:

Release (0.38 µg/s)	**X**	Atmospheric transfer coefficient (at 100m) from Doury Abacus (1.87×10^{-3} s/m^3)	=	7.12E	x	10^{-4} µg/m^3

[5] EPA Ground Water Issue, Natural Attenuation of Hexavalent Chromium in Groundwater and Soils, EPA154015-941505, 1994
[6] EU RAR (European Union Risk Assessment Report); *Chromium trioxide, Sodium chromate, sodium dichromate, ammonium dichromate and potassium dichromate Risk Assessment.* 3rd priority list volume 53. 2005

[7] Technical Guidance Document on risk assessment, part II about environmental risk assessment
[8] Abaques d'evaluation directe des transferts atmospheriques d'effluents gazeux, Doury et al, February 1980

9.2.1.3 Exposure and risks for the environment and man via the environment

As described above, release of hexavalent chromium in the environment via soil and water are negligible. No exposure to the substance of man via environment is therefore considered in this exposure scenario via these compartments.

Considering the release in the atmospheric compartment, after calculation, the exposures for general population are:

o 1.03 x 10-3 µg/m3 per 24h and considering 365 working days for the worst case 2.

The excess of risk of lung cancer for the general population will be adjusted to the review period.

Weighted excess of lung cancer risk for general population	**Value**
Excess risk of lung cancer, per µg/m^3 of Cr(VI) based on **70 years**, **365 days per year**, 24h per day (RAC 2013)	2.9x10^{-2}
Excess risk of lung cancer, per µg/m^3 of Cr(VI) based on **1 year**, **365 days per year**, 24h per day	4.1x10^{-4}
Excess risk of lung cancer, per µg/m^3 of Cr(VI) based on **7 years (original review period for Use-2)**, **365 days per year**, 24h per day	2.9x10^{-3}
Excess risk of lung cancer, per µg/m^3 of Cr(VI) based on **12 years 365 days per year**, 24h per day	5.0x10^{-3}

Table 12: RAC adjusted excess of risk calculation for general population

Excess risk	**Worst case**	**Value**
Final individual excess risk of lung cancer based on 7 years (review period for Use-2), 365 days per year, 24h per day	**(1.2 tons & 100m)**	**2.06x10^{-6}**

Table 13: Risk calculation for general population

All the calculated excess risks presented in the above table are in the order of magnitude of 10^{-6}. The approach used is a generic approach with several uncertainties which lead to an over-estimation of the exposure:

- The results presented above are based on worst case scenario (in terms of tonnage of substance and distance from the source of emission).
- The air extraction is evacuated from the plating shop through a chimney located on the roof of the plating shop. This chimney is not located high enough to consider a wide atmospheric dispersion.
- Specific treatment process for treating the air extracted from the process, before evacuating it in the atmosphere (acido-basic scrubber, mist eliminator…) are not considered in the generic estimation presented above.
- In order to respect a short and simple methodology, the quantities used for the exposure calculations for each worst case scenarios are the global quantities used on site (for the uses 1 & 2). Consequently, the excess risks presented for Use-2 take into account the global quantities involved for both uses. Thus, there is a double count in the excess risk presented. A more detailed estimation of exposure is not presented in order to keep the simplest calculation method.
- This estimation does not take into account the degradation/transformation reaction of hexavalent chromium. In the environment, including in the air compartment, hexavalent chromium is a strong oxidising agent which can react with a wide range of reducing agents to form chromium (III)16. It has also been shown that chromium (VI) can be photochemically reduced by UV-light to chromium (III).

Conclusion

Compared to the worker's excess risk of lung cancer

Considering the risk management measures implemented

Considering the level of containment of the process

Considering the uncertainties which lead our calculation to an over-estimation

Considering that the decision point for "acceptable" lifetime cancer risk levels used for general population are generally around 10^{-5} *

The risk for general population is considered as negligible.

* *This decision point is presented in the technical guidance of ECHA*

9.2.2 Worker contributing scenario 2 (sampling of bath)

This contributing scenario deals with the exposure of workers during the sampling of the mixture containing hexavalent chromium in the bath treatment, as described in paragraph 9.1.1.1.

9.2.2.1 Conditions of use

In this contributing scenario, exposure is estimated with the modelling approach of ART (Advanced REACH Tool) version 1.5. The conditions of use described in Table 14 present the information required for this estimation.

Parameters	Information for modelling
Product characteristic	
• Product	*Mixture*
• Physical form	*Powder dissolved in a liquid matrix*
• Weight fraction	*Minor (5-10%)*
• Viscosity	*low viscosity (like water)*
Operating condition	
• Activity class	*Transfer of liquid products.*
	Falling liquids.
• Loading type	*Submerged loading (where the amount of aerosol formation is reduced).*
• Flow of transfer	*<0.1l/minute*
• Duration	*2min*
• Primary emission source proximity	*<1m*
Risk management measures	
• General ventilation	*3 ACH*
• General control Measures	*No localised control*
• Level of containment	*Open process*
• Demonstrable and effective housekeeping practices in place	*No*
• General housekeeping practices in place	*Yes*
• Work area	*Indoors*
• Size of the work area	*3000m^3*
Version of the modelling tool: ART (Advanced REACH Tool) version 1.5	

Table 14: Conditions of use of Contributing Scenario 2 – modelling

The ART modelling tool does not take into account all the necessary information for the risk assessment as required in the CSR. Table 15 presents the necessary information that does not affect the modelling results.

Parameters	Information
Personal protective equipment	
• Respiratory protective equipment (RPE)	*No RPE*
• Other personal protective equipment	*Protective gloves (chemical gloves approved according to EN 374) and Protective clothes. Technical data sheet in annex.*
Exposure value will be validated by working air measure campaign (monitoring). Level of exposure lower than the estimated level will confirm the risk assessment performed in this CSR.	

Table 15: Condition of use for the contributing scenario 2 - other conditions

The estimated exposure for this contributing scenario is presented in the Table 16. The exposures are presented without respiratory protective equipment (RPE).

Type of exposure	Raw exposure concentration estimation	Duration of work
Short term, ART estimation - Without RPE	0.0037 $mg.m^{-3}$	2 min

Table 16: Exposure estimation - contributing scenario 2

9.2.3 Worker contributing scenario 3 (lab analysis)

This contributing scenario deals with the exposure of workers during the titration of the mixture containing hexavalent chromium, performed on a laboratory bench, in a dedicated area separate from the plating shop, as described in paragraph 9.1.1.1.

9.2.3.1 Conditions of use

In this contributing scenario, exposure is estimated with the modelling approach of ART (Advanced REACH Tool) version 1.5. The conditions of use described in Table 17 present the information required for this estimation.

Parameters	**Information for modelling**
Product characteristic	
• Product	*Mixture*
• Physical form	*Powder dissolved in a liquid matrix*
• Weight fraction	*Minor (5-10%)*
• Viscosity	*low viscosity (like water)*
Operating condition	
• Activity class	*Activities with open liquid surfaces or open reservoirs.*
	Activities with undisturbed surfaces (no aerosol formation).
• Duration	*10 mins*
• Primary emission source proximity	*<1m*
• Open surface	*<0,1m²*
Risk management measures	
• General ventilation	*No restriction on general ventilation characteristics*
• General control Measures	*Enclosing hood, fume cupboard.*
• Demonstrable and effective housekeeping practices in place	*No*
• General housekeeping practices in place	*Yes*
• Work area	*Indoors*
• Size of the work area	*100m³*
Version of the modelling tool: ART (Advanced REACH Tool) version 1.5	

Table 17: Condition of use of the contributing scenario 3 – modelling

The ART modelling tool does not take into account all the necessary information for the risk assessment as required in the CSR. Table 18 presents the necessary information that does not affect the modelling results.

Parameters	Information
Personal protective equipment	
• Respiratory protective equipment	*No RPE*
• Other personal protective equipment	*Protective gloves (chemical gloves approved according to EN 374) and Protective clothes. Technical data sheet in annex.*
Exposure value will be validated by working air measure campaign (monitoring). Level of exposure lower than the estimated level will confirm the risk assessment performed in this CSR.	

Table 18: Condition of use for the contributing scenario 3 - other conditions

9.2.3.2 Exposure and risks for workers

The estimated exposure for this contributing scenario is presented in the Table 19*. The exposures are presented without respiratory protective equipment (RPE).*

Type of exposure	Raw exposure concentration estimation	Duration of work
Short term, ART estimation - **Without RPE**	**0.00069 mg.m^{-3}**	**10 min**

Table 19: Exposure estimation - contributing scenario 3

9.2.4 Worker contributing scenario 4: Other activities next to the bath

This contributing scenario deals with the exposure of workers during the activities performed next to the chromium bath, as described in paragraph 9.1.1.1.

9.2.4.1 Conditions of use

In this contributing scenario, exposure is estimated with the modelling approach of ART (Advanced REACH Tool) version 1.5. The conditions of use described in the Table 20 present the information required for this estimation.

Parameters	Information for modelling
Product characteristic	
• Product	*Powders dissolved in a liquid matrix*
• Physical form	*Liquid matrix*
• Weight fraction	*Minor (5-10%)*
• Viscosity	*Liquids with low viscosity (like water)*
Operating condition	
• Activity class	*Activities with open liquid surfaces or open reservoirs.*
	Activities with undisturbed surfaces (no aerosol formation).
• Duration	*10 mins*
• Primary emission source proximity	*<1m*
• Open surface	*0.3 – 1m²*
Risk management measures	
• General ventilation	*3 ACH*
• General control Measures	*No localised control*
• Demonstrable and effective housekeeping practices in place	*No*
• General housekeeping practices in place	*Yes*
• Work area	*Indoors*
• Size of the work area	*3000m³*
Version of the modelling tool: ART (Advanced REACH Tool) version 1.5	

Table 20: Condition of use of the contributing scenario 4 – modelling

The ART modelling tool does not take into account all the necessary information for the risk assessment as required in the CSR. Table 21 presents the necessary information that does not affect the modelling results.

Parameters	Information
Personal protective equipment	
• Respiratory protective equipment (RPE)	*No RPE*
• Other personal protective equipment	*Protective gloves (chemical gloves approved according to EN 374) and Protective clothes. Technical data sheet in annex.*
Exposure value will be validated by working air measure campaign (monitoring). Level of exposure lower than the estimated level will confirm the risk assessment performed in this CSR.	

Table 21: Condition of use for the contributing scenario 4 - other conditions

9.2.4.2 Exposure and risks for workers

The estimated exposure for this contributing scenario is presented in the Table 22. The exposures are presented without respiratory protective equipment (RPE).

Type of exposure	Raw exposure concentration estimation	Duration of work
Short term, ART estimation - **Without RPE**	**0.0033 mg.m^{-3}**	**300 min**

Table 22: Exposure estimation - contributing scenario 4

9.2.5 Worker contributing scenario 8: Repackaging of liquid

This contributing scenario deals with the exposure of workers during the transfer from one container to another, as described in paragraph 9.1.1.1.

9.2.5.1 Conditions of use

In this contributing scenario, exposure is estimated with the modelling approach of ART (Advanced REACH Tool) version 1.5. The conditions of use described in Table 23 present the information required for this estimation.

Parameters	**Information for modelling**
Product characteristic	
• Product	*Liquid*
• Physical form	*Powder dissolved in a liquid matrix*
• Weight fraction	*Substantial (10-50%)*
Operating condition	
• Activity class	*Transfer of liquid*
	Falling liquid.
• Type of handling	*Splash loading*
• Flow of transfer	*1 - 10 l/minute*
• Duration	*5 min*
• Primary emission source proximity	*<1m*
Risk management measures	
• General ventilation	*No restriction on general ventilation*
• Level of containment	*Handling that reduces contact between product and adjacent air*
• Demonstrable and effective housekeeping practices in place	*No*
• General housekeeping practices in place	*Yes*
• Work area	*Indoors*
• Size of the work area	*1000m^3*
Version of the modelling tool: ART (Advanced REACH Tool) version 1.5	

Table 23: Condition of use of the contributing scenario 8 – modelling

The ART modelling tool does not take into account all the necessary information for the risk assessment as required in the CSR. Table 24 presents the necessary information that does not affect the modelling results.

Parameters	Information
Personal protective equipment	
• Respiratory protective equipment	*P3 half mask which has been tested to European Standard EN 143, EN 140 or EN 405*
• Other personal protective equipment	*Protective gloves (chemical gloves approved according to EN 374) and Protective clothes. Technical data sheet in annex.*
Exposure value will be validated by working air measure campaign (monitoring). Level of exposure lower than the estimated level will confirm the risk assessment performed in this CSR.	

Table 24: Condition of use for the contributing scenario 8 - other conditions

9.2.5.2 Exposure and risks for workers

The estimated exposure for this contributing scenario is presented in the Table 25. The exposures are presented with and without respiratory protective equipment (RPE). The description of the RPE used is given at the beginning of the section 9.2.

Type of exposure	Raw exposure concentration estimation	Duration of work
Short term, ART estimation - **Without RPE**	**0.053 mg.m^{-3}**	**5 min**
Short term, ART estimation - **With RPE**	**0.0053 mg.m^{-3}**	**5 min**

Table 25: Exposure estimation - contributing scenario 8

9.2.6 Worker contributing scenario 9: Addition of liquid to bath

This contributing scenario deals with the exposure of workers during the addition of mixture in the bath treatment, as described in paragraph 9.1.1.1.

9.2.6.1 Conditions of use

In this contributing scenario, exposure is estimated with the modelling approach of ART (Advanced REACH Tool) version 1.5. The conditions of use described in the Table 26 present the information required for this estimation.

Parameters	**Information for modelling**
Product characteristic	
• Product	*Mixture*
• Physical form	*Powder dissolved in a liquid matrix*
• Weight fraction	*Substantial (10 - 50%)*
• Viscosity	*Low viscosity (like water)*
Operating condition	
• Activity class	*Transfer of liquid products*
	Falling liquids, Splash loading
• Flow of transfer	*1-10 l/minute*
• Duration	*15 mins*
• Primary emission source proximity	*<1m*
Risk management measures	
• General ventilation	*3 ACH*
• General control Measures	*No localised control*
• Level of containment	*Handling that reduces contact between product and adjacent air*
• Demonstrable and effective housekeeping practices in place	*No*
• General housekeeping practices in place	*Yes*
• Work area	*Indoors*
• Size of the work area	*3000m^3*
Version of the modelling tool: ART (Advanced REACH Tool) version 1.5	

Table 26: Condition of use of the contributing scenario 9 – modelling

The ART modelling tool does not take into account all the necessary information for the risk assessment as required in the CSR. Table 27 presents the necessary information that does not affect the modelling results.

Parameters	Information
Personal protective equipment	
• Respiratory protective equipment	*P3 half mask which has been tested to European Standard EN 143, EN 140 or EN 405*
• Other personal protective equipment	*Protective gloves (chemical gloves approved according to EN 374) and Protective clothes. Technical data sheet in annex.*
Exposure value will be validated by working air measure campaign (monitoring). Level of exposure lower than the estimated level will confirm the risk assessment performed in this CSR.	

Table 27: Condition of use for the contributing scenario 9 - other conditions

9.2.6.2 Exposure and risks for workers

The estimated exposure for this contributing scenario is presented in the Table 28. The exposures are presented with and without respiratory protective equipment (RPE). The description of the RPE used is given at the beginning of the section 9.2.

Type of exposure	Raw exposure concentration estimation	Duration of work
Short term, ART estimation - **Without RPE**	**0.015mg.m^{-3}**	**60 min**
Short term, ART estimation - **With RPE**	**0.0015mg.m^{-3}**	**60 min**

Table 28: Exposure estimation - contributing scenario 9

9.2.7 Worker contributing scenario 12: Handling of articles

This contributing scenario deals with the dermal exposure of workers during the disassembly of connector parts on the structure, at the end of treatment process, as described in paragraph 9.1.1.1.

9.2.7.1 Conditions of use

In this contributing scenario, dermal exposure is quantitatively analysed. The conditions of use are described in the Table 29

Parameters	Condition of use on site
Product characteristic	
• Product	*Articles with hexavalent chromium included into a matrix*
Operating condition	
• Activity class	Handling of articles
Risk management measures	
• General ventilation	Good general ventilation
• Personal protective equipment	Protective gloves (chemical gloves approved according to EN 374). Technical data sheet in annex.
• Demonstrable and effective housekeeping practices in place	No
• General housekeeping practices in place.	Yes
• Work area	Indoors
Other parameters	
• Quantity	<0.01% per article
3 Frequency	Every day

Table 29: Condition of use for the contributing scenario 12

9.2.7.2 Exposure and risks for workers

Considering that:

- there is no liquid form of the mixture of hexavalent chromium remaining on the article (they have been rinsed, further treated without hexavalent chromium and then dried);
- the remaining hexavalent chromium on the article is included into a matrix composed of the oxidized surface of the article;
- the remaining hexavalent chromium is lower than 0.01% for each article (RoHS compliant);
- protective gloves are used to avoid any potential contact with chemicals, including hexavalent chromium;

The cutaneous route of exposure is considered negligible.
Furthermore, as indicated by RAC, there is no data to indicate that dermal exposure to Cr(VI) compounds presents a cancer risk to humans. NIOSH[9] reports that some data indicates that CrVI is reduced prior to systemic uptake (Corbett GE et al. 1997 ; Liu KJ et al. 1997).
The cancer risk to workers via dermal route, in the case of Tyco Electronics is therefore considered negligible.

[9] National Institute for Occupational Safety and Health, Occupational Safety and Health Administration Request for information Occupational Exposure to Hexavalent Chromium (CrVI); September 2013

9.2.8 Worker contributing scenario 13: Dipping connector parts in treatment bath, in the worker's near field

This contributing scenario deals with the exposure of workers during the dipping of article in the bath with local exhaust ventilation (LEV), as described in paragraph 9.1.1.1.

9.2.8.1 Conditions of use

In this contributing scenario, exposure is estimated with the modelling approach of ART (Advanced REACH Tool) version 1.5. The conditions of use described in the Table 30 present the information required for this estimation.

Parameters	Information for modelling
Product characteristic	
• Product	*Powders dissolved in a liquid matrix*
• Physical form	*Liquid matrix*
• Weight fraction	*Minor (5-10%)*
• Viscosity	*Liquids with low viscosity (like water)*
Operating condition	
• Activity class	*Activities with open liquid surfaces or open reservoirs.*
	Activities with undisturbed surfaces (no aerosol formation).
• Duration	*15 mins*
• Primary emission source proximity	*<1m*
• Open surface	*0.1 – 0.3m²*
Risk management measures	
• General ventilation	*3 ACH*
• General control Measures	*Local exhaust ventilation (LEV), fixed capturing hood.*
• Demonstrable and effective housekeeping practices in place	*No*
• General housekeeping practices in place	*Yes*
• Work area	*Indoors*
• Size of the work area	*3000m³*
Version of the modelling tool: ART (Advanced REACH Tool) version 1.5	

Table 30: Condition of use of the contributing scenario 13 – modelling

The ART modelling tool does not take into account all the necessary information for the risk assessment as required in the CSR. Table 31 presents the necessary information that does not affect the modelling results.

Parameters	Information
Personal protective equipment	
• Respiratory protective equipment (RPE)	*No RPE*
• Other personal protective equipment	*Protective gloves (chemical gloves approved according to EN 374) and Protective clothes. Technical data sheet in annex.*
Exposure value will be validated by working air measure campaign (monitoring). Level of exposure lower than the estimated level will confirm the risk assessment performed in this CSR.	

Table 31: Condition of use for the contributing scenario 13 - other conditions

9.2.8.2 Exposure and risks for workers

The estimated exposure for this contributing scenario is presented in the Table 32. The exposures are presented without respiratory protective equipment (RPE).

Type of exposure	Raw exposure concentration estimation	Duration of work
Short term, ART estimation - **Without RPE**	**0.00019mg.m^{-3}**	**15 min**

Table 32: Exposure estimation - contributing scenario 13

9.2.9 Worker contributing scenario 14: Dipping connector parts in rinsing baths, in the worker's near field

This contributing scenario deals with the exposure of workers during the dipping of article in the bath treatment line, as described in paragraph 9.1.1.1.

9.2.9.1 Conditions of use

In this contributing scenario, exposure is estimated with the modelling approach of ART (Advanced REACH Tool) version 1.5. The conditions of use described in the Table 33 present the information required for this estimation.

Parameters	**Information for modelling**
Product characteristic	
• Product	*Powders dissolved in a liquid matrix*
• Physical form	*Liquid matrix*
• Weight fraction	*Very small (0.5-1%)*
• Viscosity	*Liquids with low viscosity (like water)*
Operating condition	
• Activity class	*Activities with open liquid surfaces or open reservoirs.*
	Activities with undisturbed surfaces (no aerosol formation).
• Duration	*30 mins*
• Primary emission source proximity	*<1m*
• Open surface	*0.3 – 1m²*
Risk management measures	
• General ventilation	*3 ACH*
• General control Measures	*No localised control*
• Demonstrable and effective housekeeping practices in place	*No*
• General housekeeping practices in place	*Yes*
• Work area	*Indoors*
• Size of the work area	*3000m³*
Version of the modelling tool: ART (Advanced REACH Tool) version 1.5	

Table 33: Condition of use of the contributing scenario 14 – modelling

The ART modelling tool does not take into account all the necessary information for the risk assessment as required in the CSR. Table 34 presents the necessary information that does not affect the modelling results.

Parameters	Information
Personal protective equipment	
• Respiratory protective equipment (RPE)	*No RPE*
• Other personal protective equipment	*Protective gloves (chemical gloves approved according to EN 374) and Protective clothes. Technical data sheet in annex.*
Exposure value will be validated by working air measure campaign (monitoring). Level of exposure lower than the estimated level will confirm the risk assessment performed in this CSR.	

Table 34: Condition of use for the contributing scenario 14 - other conditions

9.2.9.2 Exposure and risks for workers

The estimated exposure for this contributing scenario is presented in the Table 35. The exposures are presented without respiratory protective equipment (RPE).

Type of exposure	Raw exposure concentration estimation	Duration of work
Short term, ART estimation - **Without RPE**	**0.000019mg.m^{-3}**	**30 min**

Table 35: Exposure estimation - contributing scenario 14

9.2.10 Worker contributing scenario 15: Treatment baths in the workers' far field

This contributing scenario deals with the exposure of workers when they are present in the plating shop, as described in paragraph 9.1.1.1.

9.2.10.1 Conditions of use

In this contributing scenario, exposure is estimated with the modelling approach of ART (Advanced REACH Tool) version 1.5. The conditions of use described in the Table 36 present the information required for this estimation.

Parameters	Information for modelling
Product characteristic	
• Product	*Powders dissolved in a liquid matrix*
• Physical form	*Liquid matrix*
• Weight fraction	*Minor (5-10%)*
• Viscosity	*Liquids with low viscosity (like water)*
Operating condition	
• Activity class	*Activities with open liquid surfaces or open reservoirs.*
	Activities with undisturbed surfaces (no aerosol formation).
• Duration	*420 mins*
• Primary emission source proximity	*>1m*
• Treated surface	*0.1 – 0.3m²*
Risk management measures	
• General ventilation	*3 ACH*
• General control Measures	*Fixed capturing hood*
• Demonstrable and effective housekeeping practices in place	*No*
• General housekeeping practices in place	*Yes*
• Work area	*Indoors*
• Size of the work area	*3000m³*
Version of the modelling tool: ART (Advanced REACH Tool) version 1.5	

Table 36: Condition of use of the contributing scenario 15 – modelling

The ART modelling tool does not take into account all the necessary information for the risk assessment as required in the CSR. Table 37 presents the necessary information that does not affect the modelling results.

Parameters	Information
Personal protective equipment	
• Respiratory protective equipment (RPE)	*No RPE*
• Other personal protective equipment	*Protective gloves (chemical gloves approved according to EN 374) and Protective clothes. Technical data sheet in annex.*
Exposure value will be validated by working air measure campaign (monitoring). Level of exposure lower than the estimated level will confirm the risk assessment performed in this CSR.	

Table 37: Condition of use for the contributing scenario 15 - other conditions

9.2.10.2 Exposure and risks for workers

The estimated exposure for this contributing scenario is presented in the Table 38. The exposures are presented without respiratory protective equipment (RPE).

Type of exposure	Raw exposure concentration estimation	Duration of work
Short term, ART estimation - **Without RPE**	**0.0000057 mg.m^{-3}**	**420 min**

Table 38: Exposure estimation - contributing scenario 15

9.2.11 Worker contributing scenario 16: Drying connector parts

This contributing scenario deals with the exposure of workers when they are present in the plating shop, as described in paragraph 9.1.1.1.

9.2.11.1 Conditions of use

In this contributing scenario, exposure is estimated with the modelling approach of ART (Advanced REACH Tool) version 1.5. The conditions of use described in the Table 39 present the information required for this estimation.

Parameters	Information for modelling
Product characteristic	
• Product	*Powders dissolved in a liquid matrix*
• Physical form	*Liquid matrix*
• Weight fraction	*Extremely small (0.1 – 0.5%)*
• Viscosity	*Liquids with low viscosity (like water)*
Operating condition	
• Activity class	*Spray application of liquids (this activity class is considered in a precautionary approach, in order to consider evaporation and impaction as emission generation mechanisms)* *Surface spraying liquids.*
	Horizontal or downward spraying *Spraying with no or low compressed air use*
• Duration	*45 min*
• Primary emission source proximity	*3m*
• Application rate	*Very low application rate (< 0.03 l/minute is considered as the rate of aerosol formation due to the use of air gun)*
Risk management measures	
• General ventilation	*3 ACH*
• General control Measures	*Enclosed cabinet (not airtight)*
• Demonstrable and effective housekeeping practices in place	*No*
• General housekeeping practices in place	*Yes*
• Work area	*Indoors*
• Size of the work area	*3000m^3*
Version of the modelling tool: ART (Advanced REACH Tool) version 1.5	

Table 39: Condition of use of the contributing scenario 17 – modelling

The ART modelling tool does not take into account all the necessary information for the risk assessment as required in the CSR. Table 40 presents the necessary information that does not affect the modelling results.

Parameters	Information
Personal protective equipment	
• Respiratory protective equipment (RPE)	*P3 half mask which has been tested to European Standard EN 143, EN 140 or EN 405.*
• Other personal protective equipment	*Protective gloves (chemical gloves approved according to EN 374) and Protective clothes. Technical data sheet in annex.*
Exposure value will be validated by working air measure campaign (monitoring). Level of exposure lower than the estimated level will confirm the risk assessment performed in this CSR.	

Table 40: Condition of use for the contributing scenario 17 - other conditions

9.2.11.2 Exposure and risks for workers

The estimated exposure for this contributing scenario is presented in the Table 41. The exposures are presented with and without respiratory protective equipment (RPE). The description of the RPE used is given at the beginning of the section 9.2.

It has to be stressed that the estimation of exposure for this contributing scenario is an over-estimation since the activity class considered is a spray application of liquids whereas the potential formation of aerosol by using the airgun cannot be considered as important as a spraying activity. However, this activity class was used in order to consider evaporation and impaction as emission generation mechanisms in order to ensure the suitability of the precautionary approach used in this CSR and to take into account all the potential emission mechanisms which could lead to an exposure. Consequently, the exposure estimation presented in this contributing scenario is particularly an over estimation, but this contribute to take into account all the potential exposure of workers.

Type of exposure	Raw exposure concentration estimation	Duration of work
Short term, ART estimation - **Without RPE**	**0.0012 mg.m^{-3}**	**3 min**

Table 41: Exposure estimation - contributing scenario 17

9.3 Exposure scenario 2 for consumers:

This section is not relevant since no consumers will use the final manufactured articles because these are high technology equipment and they are not intended to be used by consumers. Only professional workers use the treated connector parts.

Considering that there is no liquid form of the mixture of hexavalent chromium remaining on the article, there is no possibility of exposure to hexavalent chromium via inhalation route.

Considering that:

- the remaining hexavalent chromium on the article is included into a matrix composed of the formation of oxidized surface of the article;

- the thick layer of this matrix is in the order of magnitude of micrometer;

- the remaining hexavalent chromium is lower than 0.01% for each article;

The cutaneous route of exposure is considered negligible.

Furthermore, as indicated by RAC, there is no data to indicate that dermal exposure to Cr(VI) compounds presents a cancer risk to humans. NIOSH[i] reports that some data indicates that CrVI is reduced prior to systemic uptake (Corbett GE et al. 1997; Liu KJ et al. 1997).

The cancer risk to workers via dermal route in the case of the use of connectors produced is therefore considered negligible.

10. RISK CHARACTERISATION RELATED TO COMBINED EXPOSURE

10.1. Human health (related to combined, shift-long exposure)

This CSR analyses only hexavalent chromium exposure at the workplace for an industrial use. There is no possibility of exposure for professional use. The risk characterisation is performed for the Hastings site for the Authorised use of the substance.

It should be noted that the contributing scenario 12 (Handling of articles) is focussed on the dermal route and a qualitative approach has been used. Thus, the risk characterisation presented in this section focuses on the inhalation exposure.

10.1.1. Workers

Two different common assumptions are made in order to estimate the frequencies of exposure during one typical year. The plating shop is considered open during 1 week per year. Each individual employee only works 44 weeks a year.

The distribution of workers' tasks involves the contributing scenarios

- CS 2 Sampling of bath
- CS 3 Lab analysis
- CS 4 Other activities next to the bath
- CS 8 Repacking of liquid
- CS 9 Addition of liquid to bath
- CS 12 Handling of Articles
- CS 13 Dipping connector parts in treatment bath, in the worker's near field
- CS 14 Dipping connector parts in rinsing baths, in the worker's near field
- CS 15 Treatment baths in the workers' far field
- CS 16 Drying Connector Parts

It should be noted that partial drain of bath and maintenance are performed every day and they are grouped into contributing scenario 4. All these operations are included in the 10 minutes presented below.

10.1.2. Exposures Estimations for Workers

The exposures are presented as follows:

	Time/frequency		
	Duration of the task	**Frequency (for 12 workers of the plating shop)**	**Frequency (for 1 of the workers of the plating shop)**
CS 2 - Sampling of bath	2 min	1 per day	(1*5*44)/12 per year
CS 3 - Lab analysis	10 min	1 per day	(1*5*44)/12 per year
CS 4 - Other, next to the bath	10 min	1 per day	(1*5*44)/12 per year
CS 8 - Repackaging of liquid	5 min	1 per day	(1*5*44)/12 per year
CS 9 - Manual addition, liquid	15 min	1 per day	(1*5*44)/12 per year
CS 13 - Manual dipping in chromium bath, near field	15 min for a whole day	1 per day	(1*5*44)/12 per year
CS 14 - Manual dipping in rinsing bath, near field	30 min for a whole day	1 per day	(1*5*44)/12 per year
CS 15 - Treatment bath, far field	420 min	1*44 per year/ worker	5*44 per year

10.1.3 Comparison Between Modelling and Monitoring

Air monitoring is carried out at the Hastings site, and this includes the monitoring of chromium. Static monitoring has been carried out by external body and internally. External sampling involved placement of static pump in various locations; adjacent to each of the two passivate tanks (containing hexavalent chromium chemistry) and adjacent to the chromium reduction stage in the wastewater treatment plant. Operator worn pump have also been used to monitor personal samples. These are attached to the operator(s) for several hours as they carry out their various tasks, specifically:

- Addition of liquid to the bath
- dipping in chromium bath
- dipping in rinsing bath
- treatment bath in the worker's far field
- drying of connector parts
- Sampling & analysing

The measured and modelled exposures are as follows:

<table>
<tr><th colspan="2">Monitoring Results mg/m³</th><th colspan="3">Modelling Results mg/m³</th></tr>
<tr><td>Static measurement far field (298 mins)</td><td><0.002 (DL*)</td><td colspan="2">Worker far field</td><td>0.00033</td></tr>
<tr><td>Static measurement adjacent to bath (242 mins)</td><td><0.002 (DL*)</td><td colspan="2">Other activities next to bath</td><td>0.0036</td></tr>
<tr><td rowspan="3">Personal measurement (267 mins)</td><td rowspan="3">0.00577</td><td>Dipping</td><td>0.0036</td><td rowspan="3">0.006567</td></tr>
<tr><td>Rinsing</td><td>0.0011</td></tr>
<tr><td>Additions</td><td>0.015</td></tr>
</table>

Table 42: Measured and modelled results

*DL = Detection Limit (used by the laboratory that is carrying out the analysis)

These measurements are for total chromium metal, regardless of oxidation state i.e. hexavalent and trivalent, along with all other states are included in the values of the results monitored. The measurements are similar, but slightly lower than the modelling results.

10.1.4 Risk characterisation

As discussed previously in chapter 9.1.2.3, the risk characterisation will be based on the RAC/27/2013/06 Rev.1, which establishes a reference dose response relationship for the carcinogenicity of hexavalent chromium.

Excess of lung cancer risk: 4*10-3 per µg Cr(VI)/m3 based on a 40-year working life (8h/day, 220 days per year).

Moreover, and since chromium exposures are due to the volatility of a liquid mixture, we estimated the cancer risk mainly for lung cancer and maximised the excess of cancer risk without considering the risk for small intestine cancer.

Based on all of this information, the tables below show the calculation of the excess risk for lung cancer weighted by the working conditions on the industrial site.

Weighted excess risk of lung cancer	Value
Excess risk of lung cancer. per µg/m3 of Cr(VI) based on **40 working years**. **220 days per year**. 8h per day (RAC 2013)	**$4x10^{-3}$**
Excess risk of lung cancer. per µg/m3 of Cr(VI) based on **1 working year**. **220 days per year**. 8h per day	**$1x10^{-4}$**
Excess risk of lung cancer. per µg/m3 of Cr(VI) based on **4 working years**. **220 days per year**. 8h per day	**$4x10^{-4}$**
Excess risk of lung cancer. per µg/m3 of Cr(VI) based on **7 working years**. **220 days per year**. 8h per day	**$7x10^{-4}$**
Excess risk of lung cancer. per µg/m3 of Cr(VI) based on **12 working years**. **220 days per year**. 8h per day	**$1.2x10^{-3}$**

Table 43: Excess risk of lung cancer calculation

Considering the data presented in the above table and the exposure estimations based on the modelling approach, the excess risks are calculated in the following tables.

In the following sections the global exposure and risks are considered. It has to be stressed that the average of exposure is calculated by taking into account the respiratory protective equipment (RPE) if it is used as indicated in the previous sections.

The raw exposure estimations considered for each contributing scenario are summarised in the following table:

Contributing Scenario	Raw exposure without RPE ($\mu g.m^{-3}$)	Raw exposure with RPE ($\mu g.m^{-3}$)
CS 2 - Sampling of bath	3.7	No RPE used
CS 3 - Lab analysis	0..69	No RPE used
CS 4 - Other activities next to the bath	3.3	No RPE used
CS 8 - Repackaging of liquid	53	5.3
CS 9 - Addition of liquid to bath	15	1.5
C 12 - Handling of articles	Not for inhalation exposure (Dermal exposure only)	Not for inhalation exposure (Dermal exposure only)
CS 13 - Dipping connector parts in treatment bath, in the worker's near field	0.19	No RPE used
CS 14 - -Dipping connector parts in rinsing baths, in the worker's near field	0.019	No RPE used
CS 15 - Treatment baths in the workers' far field	0.0057	No RPE used
Cs 16 - Drying connector parts	1.2	No RPE used

Table 44: Summary of the raw exposures (modelled concentrations)

10.1.4.1 General conclusion

All the individual excess of risk for all the workers involved in the operations using hexavalent chromium as described in this CSR does not exceed the order of magnitude of 10^{-5}.

The decision point for "acceptable" lifetime (i.e., a working life of 40 years) cancer risk levels used for individual risk levels for workers are generally around 10^{-5} but higher or lower levels have been considered to be tolerable under certain circumstances[10].

Workers in the Plating Shop		
Average of exposure (µg.m-3)	**Individual excess risk of lung cancer (µg.m-3)**	**Total excess risk of lung cancer (µg.m-3)**
2.46E-02	6.60E-05	7.92E-04

Table 45: Workers excess risk to lung cancer

10.1.5 Analysis of uncertainties and improvement of management

The exposures considered in this CSR are based on several hypotheses. They were made in order to respect a conservative approach and consequently, led to an overestimation of the exposure.

They mainly concern the following items:

1) ***Definition of the APF:***
   The applicant made the choice to tie in with a precautionary approach by using an APF of 10 for all the RPE used.

2) ***Modelling approach***
   All measurements performed on site and presented in this CSR show lower values than the modelling estimations. Consequently, modelling estimations are considered as the maximum level of exposures at the workplace. Even if the modelling approach is demonstrated to be an over estimation, the applicant made the choice to use this approach in order to be sure that the assessment is covering all the tasks involved in the use of hexavalent chromium.

3) ***Inputs for modelling***
   The inputs used for modelling cannot be strictly representative of the realistic use performed on site. In order to be completely transparent, for all the contributing scenarios, the inputs used are compared to the condition of use on site in tables in Annex I. All the inputs have been chosen in order not to over-estimate the exposure estimation for each contributing scenario and to consider the worst-case scenario. Consequently, the inputs for each contributing scenarios are the worst inputs to be considered and thus lead to an over-estimation.

4) ***Duration of tasks and frequency used***
   The duration and the frequencies of the tasks were considered by taking into account the maximum possible increase of activity presented in accordance with the tonnage estimation. It does not probably reflect the exact frequencies and duration involved during the review period, but the applicant made the choice to present the maximum realistic estimation in order to cover potential future activities.

Hence, the excess risk previously presented can be considered as the maximum consideration, taking into account all uncertainties.

Furthermore, the compliance with the operating conditions described in this CSR will be periodically controlled and the efficiency of the risk management measures (mainly ventilations and RPE) will be

[10] ECHA Guidance on information requirements and chemical safety assessment, chapter R8, Appendix R. 8-14 page 141. R8, Appendix R. 8-14 page 140

regularly verified according to a written procedure for the site. New protective equipment is available for all workers in order to maintain the possibility to change them easily.

All workers involved are made aware of the best practices of work to ensure that the level of exposure is as low as possible. They are also trained adequately to the identification of the hazardous substances and associated practices through a formal education procedure.

The applicant will furthermore perform measurements adapted to the contributing scenarios in order to confirm that the measured level of exposure will be lower than the levels estimated in this CSR by modelling approach. Consequently, measurement at the workplace will be regularly performed in order to verify the main raw exposures estimated with the modelling approach.

11 REFERENCES

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National Institute for Occupational Safety and Health, Occupational Safety and Health Administration Request for information Occupational Exposure to Hexavalent Chromium (CrVI); September 2013

ECHA Guidance on information requirements and chemical safety assessment, chapter R8, Appendix R. 8-14 page 141. R8, Appendix R. 8-14 page 140
https://echa.europa.eu/documents/10162/23036412/ircsa_r8_appendix_oels_en.pdf/f1d45aca-193b-a7f5-55ce-032b3a13f9d8

ANNEX I: DETAILED DESCRIPTION OF THE CONDITIONS OF USE

Contributing scenario 2: Sampling of bath - Condition of use on the Hastings site		
Parameters	**Tyco Electronics UK Ltd**	**Information for modelling**
Product characteristic		
• Product	*Mixture containing hexavalent chromium in treatment baths*	*Mixture*
• Physical form	*Hexavalent chromium dissolved in the treatment bath*	*Powder dissolved in a liquid matrix*
• Weight fraction	*5 to 10%*	*Minor (5-10%)*
• Viscosity	*Low viscosity (like water)*	*Low viscosity (like water)*
Operating condition		
• Activity class	*Sampling of bath by transferring the mixture in a vessel*	*Transfer of liquid products.* *Falling liquids.*
• Loading type	*Sampling is performed by extracting sample of solution using glass draw tube of the solution up in a small lidded vessel (plastic pot)*	*Submerged loading (where the amount of aerosol formation is reduced).*
• Flow of transfer	*100ml in less than 2 minute*	*<0.1l/minute*
• Type of transfer	*Small vessel dipped into the bath*	*Submerged loading*
• Duration	*Less than 2 minutes (scooping some of the solution up)*	*2 min*
• Primary emission source proximity	*At arm's length.*	*<1m*
Risk management measures		
• General ventilation	*3 ACH*	*3 ACH*
• General control Measures	*Fixed capturing hood*	*No localised control (To tie in with a precautionary approach)*
• Level of containment	*Open process*	*Open process*
• Demonstrable and effective housekeeping	*Yes*	*No*
• General housekeeping	*Yes*	*Yes*
• Work area	*Indoors*	*Indoors*
• Size of the work area	*2950m^3*	*3000m^3*
Version of modelling tool: ART (Advanced REACH Tool) version 1.5		

Contributing scenario 3: Lab analysis - Condition of use on the Hastings site		
Parameters	**Tyco Electronics UK Ltd**	**Information for modelling**
Product characteristic		
• Product	*Mixture containing hexavalent chromium*	*Mixture*
• Physical form	*Hexavalent chromium dissolved in the bath treatment and then in laboratory reagents*	*Powder dissolved in a liquid matrix*
• Weight fraction	*5 to 10%*	*Minor (5-10%)*
• Viscosity	*Low viscosity (like water)*	*Low viscosity (like water)*
Operating condition		
• Activity class	*Titration of hexavalent chromium in the mixture contained in the bath treatment*	*Activities with open liquid surfaces or open reservoirs.*
		Activities with undisturbed surfaces (no aerosol formation).
• Duration	*10 min*	*5 to 120 min*
• Primary emission source proximity	*At arm's length.*	*<1m*
• Open surface	*Laboratory vessel with open surface of approximately 100cm² (0.01m²) maximum*	*<0.1m²*
Risk management measures		
• General ventilation	*No restriction on general ventilation characteristics*	*No restriction on general ventilation characteristics*
• General control Measures	*Titration is performed under a fume cupboard.*	*Enclosing hood, fume cupboard.*
• Demonstrable and effective housekeeping	*Yes*	*No*
• General housekeeping	*Yes*	*Yes*
• Work area	*Indoors*	*Indoors*
• Size of the work area	*>100m^3*	*100m^3*
Version of modelling tool: ART (Advanced REACH Tool) version 1.5		

Contributing scenario 4: Other activities next to the bath - Condition of use on the Hastings site		
Parameters	**Tyco Electronics UK Ltd**	**Information for modelling**
Product characteristic		
• Product	*Mixture containing hexavalent chromium*	*Mixture*
• Physical form	*Hexavalent chromium dissolved in the bath treatment*	*Powder dissolved in a liquid matrix*
• Weight fraction	*5 to 10%*	*Minor (5-10%)*
• Viscosity	*Low viscosity (like water)*	*Low viscosity (like water)*
Operating condition		
• Activity class	*Activities performed next to the opened bath treatment, but not directly related to dipping connector parts in the bath.*	*Activities with undisturbed surfaces (no aerosol formation)*
• Duration	*10 min*	*2 to 15 min*
• Primary emission source proximity	*Activities performed just next to the bath, at less than 1m*	*<1m*
• Open surface (considered for one bath in the worker near field)	*0.3m²*	*0.3 – 1m²*
Risk management measures		
• General ventilation	*3 ACH*	*3 ACH*
• General control Measures	*Fixed capturing hood*	*No localised control (To tie in with a precautionary approach)*
• Demonstrable and effective housekeeping	*Yes*	*No*
• General housekeeping	*Yes*	*Yes*
• Work area	*Indoors*	*Indoors*
• Size of the work area	*2950m^3*	*3000m^3*
Version of modelling tool: ART (Advanced REACH Tool) version 1.5		

Contributing scenario 8: Repackaging of liquid - Condition of use on the Hastings site		
Parameters	**Tyco Electronics UK Ltd**	**Information for modelling**
Product characteristic		
• Product	*Mixture containing hexavalent chromium*	*Liquid*
• Physical form	*Hexavalent chromium dissolved in the mixture as supplied*	*Powder dissolved in a liquid matrix*
• Weight fraction (of the product as supplied)	*10 to 50%*	*Substantial (10-50%)*
• Viscosity	*Low viscosity (like water)*	*Low viscosity (like water)*
Operating condition		
• Activity class	*Addition of mixture containing hexavalent compound in the bath treatment.*	*Transfer of liquid*
		Falling liquid.
• Duration	*Activities are considered with two type of duration and frequencies:* *- Addition after drainage of bath (making up new solution or partial drainage):*	*5 min*
	15 min	*<1 m*
• Primary emission source proximity	*Activities performed at the bath*	*1 - 10l/minute*
• Flow of transfer	*Pouring of small container or large container in a cautious manner.*	*Splash loading*
• Type of handling	*Careful transfer involves workers showing attention to potential danger of splashing*	
Risk management measures		
• General ventilation	*3 ACH*	*No restriction on general ventilation*
• Level of containment	*Small opening on the container*	*Handling that reduces contact between product and adjacent air*
• Demonstrable and effective housekeeping	*Yes*	*No*
• General housekeeping	*Yes*	*Yes*
• Work area	*Indoors*	*Indoors*
• Size of the work area	*2950 m^3*	*100m^3*
Version of modelling tool: ART (Advanced REACH Tool) version 1.5		

Contributing scenario 9: Addition of liquid to bath - Condition of use on the Hastings site		
Parameters	**Tyco Electronics UK Ltd**	**Information for modelling**
Product characteristic		
• Product	*Mixture containing hexavalent chromium*	*Mixture*
• Physical form	*Hexavalent chromium dissolved in the mixture as supplied*	*Powder dissolved in a liquid matrix*
• Weight fraction (of the product as supplied)	*10 to 50%*	*Substantial (10-50%)*
• Viscosity	*Low viscosity (like water)*	*Low viscosity (like water)*
Operating condition		
• Activity class	*Addition of mixture containing hexavalent compound in the bath treatment.*	*Transfer of liquid*
		Falling liquid.
• Duration	*Activities are considered with two type of duration and frequencies:* *- Addition after drainage of bath (making up new solution or partial drainage):*	*60 min (max)*
	15 min	*5 to 60 min*
• Primary emission source proximity	*Activities performed at the bath*	*<1m*
• Flow of transfer	*Pouring of small container or large container in a cautious manner.*	*1 - 10 l/minute*
• Type of handling	*Careful transfer involves workers showing attention to potential danger of splashing*	*Splash loading*
Risk management measures		
• General ventilation	*3 ACH*	*3 ACH*
• General control Measures	*Fixed capturing hood*	*No localised control (To tie in with a precautionary approach)*
• Level of containment	*Small opening on the container*	*Handling that reduces contact between product and adjacent air*
• Demonstrable and effective housekeeping	*Yes*	*No*
• General housekeeping	*Yes*	*Yes*
• Work area	*Indoors*	*Indoors*
• Size of the work area	*2950m^3*	*3000m^3*
Version of modelling tool: ART (Advanced REACH Tool) version 1.5		

Contributing scenario 13: Dipping connector parts in treatment, in the workers' near field - Condition of use on the Hastings site		
Parameters	**Tyco Electronics UK Ltd**	**Information for modelling**
Product characteristic		
• Product	*Mixture containing hexavalent chromium*	*Mixture*
• Physical form	*Hexavalent chromium dissolved in the bath treatment*	*Powder dissolved in a liquid matrix*
• Weight fraction	*5 to 10%*	*Minor (5-10%)*
• Viscosity	*Low viscosity (like water)*	*Low viscosity (like water)*
Operating condition		
• Activity class	*Dipping of connector parts in the bath treatment.*	*Activities with open liquid surfaces or open reservoirs.*
		Activities with undisturbed surfaces (no aerosol formation).
• Duration	*15 min*	*5 to 50 min*
• Primary emission source proximity	*Activities performed at the bath treatment, during the dipping of connector parts in the bath.*	*<1m*
• Open surface (considered for one bath in the worker near field)	*0.3m²*	*0.3 – 1m²*
Risk management measures		
• General ventilation	*3 ACH*	*3 ACH*
• General control Measures	*Fixed capturing hood*	*Fixed capturing hood*
• Demonstrable and effective housekeeping	*Yes*	*No*
• General housekeeping	*Yes*	*Yes*
• Work area	*Indoors*	*Indoors*
• Size of the work area	*2950m³*	*3000m³*
Version of modelling tool: ART (Advanced REACH Tool) version 1.5		

Contributing scenario 14: Dipping connector parts in rinsing bath, in the workers' near field - Condition of use on the Hastings site		
Parameters	**Tyco Electronics UK Ltd**	**Information for modelling**
Product characteristic		
• Product	*Mixture containing hexavalent chromium*	*Mixture*
• Physical form	*Hexavalent chromium dissolved in the bath treatment.*	*Powder dissolved in a liquid matrix*
• Weight fraction	*Very small (0.5-1%)*	*Very small (0.5-1%)*
• Viscosity	*Low viscosity (like water)*	*Low viscosity (like water)*
Operating condition		
• Activity class	*Dipping of connector parts in the rinsing bath.*	*Activities with open liquid surfaces or open reservoirs.*
		Activities with undisturbed surfaces (no aerosol formation).
• Duration	*30 min*	*5 to 30 min*
• Primary emission source proximity	*Activities performed at the rinsing bath treatment, during the dipping of connector parts in the bath.*	*<1m*
• Open surface (considered for one bath in the worker near field)	*0.3 – 1m². The open surface of the rinsing bath does not exceed 1m².*	*0.3 – 1m²*
Risk management measures		
• General ventilation	*3 ACH*	*3 ACH*
• General control Measures	*No localised control*	*No localised control*
• Demonstrable and effective housekeeping	*Yes*	*No*
• General housekeeping	*Yes*	*Yes*
• Work area	*Indoors*	*Indoors*
• Size of the work area	*2950m^3*	*3000m^3*
Version of modelling tool: ART (Advanced REACH Tool) version 1.5		

Contributing scenario 15: Treatment baths in the workers' far field - Condition of use on the Hastings site		
Parameters	**Tyco Electronics UK Ltd**	**Information for modelling**
Product characteristic		
• Product	*Mixture containing hexavalent chromium*	*Mixture*
• Physical form	*Hexavalent chromium dissolved in the bath treatment.*	*Powder dissolved in a liquid matrix*
• Weight fraction	*5 to 10%*	*Minor (5-10%)*
• Viscosity	*Low viscosity (like water)*	*Low viscosity (like water)*
Operating condition		
• Activity class	*Dipping of connector parts in baths*	*Activities with open liquid surfaces or open reservoirs.* *Activities with undisturbed surfaces (no aerosol formation).*
• Duration	*420 min*	*60 to 420 min*
• Primary emission source proximity	*Activities performed in the workshop, but not next to the bath.*	*>1m*
• Open surface (considered for one bath in the worker near field)	*The sums of surface of baths containing hexavalent chromium do not exceed 3m².*	*0.30-1m²*
Risk management measures		
• General ventilation	*3 ACH*	*3 ACH*
• General control Measures	*Fixed capturing hood*	*Fixed capturing hood*
• Segregation or personal enclosure	No segregation or personal enclosure	No segregation or personal enclosure
• Demonstrable and effective housekeeping	*Yes*	*No*
• General housekeeping	*Yes*	*Yes*
• Work area	*Indoors*	*Indoors*
• Size of the work area	*2950m³*	*3000m³*
Version of modelling tool: ART (Advanced REACH Tool) version 1.5		

Contributing scenario 16: Drying of Components - Condition of use on the Hastings site		
Parameters	**Tyco Electronics UK Ltd**	**Information for modelling**
Product characteristic		
• Product	*Mixture containing hexavalent chromium*	*Mixture*
• Physical form	*Hexavalent chromium dissolved in the bath treatment.*	*Powder dissolved in a liquid matrix*
• Weight fraction	*Extremely Small (0.1-0.5%)*	*Extremely Small (0.1-0.5%)*
• Viscosity	*Low viscosity (like water)*	*Low viscosity (like water)*
Operating condition		
• Activity class	*Horizontal or downward spraying* *Spraying with no or low compressed air use*	*Spray application of liquids*
• Duration	*45 min*	*45 min*
• Primary emission source proximity	*Activities performed in the workshop, but not next to the bath.*	*3m*
Risk management measures		
• General ventilation	*3 ACH*	*3 ACH*
• General control Measures	*None*	*Fixed capturing hood*
• Segregation or personal enclosure	No segregation or personal enclosure	No segregation or personal enclosure
• Demonstrable and effective housekeeping	*Yes*	*No*
• General housekeeping	*Yes*	*Yes*
• Work area	*Indoors*	*Indoors*
• Size of the work area	*2950m^3*	*3000m^3*
Version of modelling tool: ART (Advanced REACH Tool) version 1.5		

ANNEX II: Technical Data Sheets – Personal Protective Equipment

3M

6000 Series Half-Mask Respirators

Data Sheet

Main Features

The 6000 Series Respirators are used with twin lightweight filters which are fitted by a simple bayonet attachment system, providing an economical and flexible choice. The respirators can also be used with the 3M S-200 Supplied-Air System for increased convenience and flexibility.

- Lightweight
- Flexible system (gas / vapour and / or particulate filters plus Supplied-Air option)
- Hypo-allergenic facepiece material
- Easy to use
- Well balanced
- 3 sizes (6100 - small, 6200 - medium, 6300 - large)
- Low maintenance
- Economical

Applications

Particulates

FILTER	HAZARD	INDUSTRY
5911 P1 R 5925 P2 R 5935 P3 R 2125 P2 R 2135 P3 R 6035 P3 R (EN143:2000)	Particulates (Fine Dusts and Mists)	Pharmaceutical Powdered Chemicals Construction, Quarrying Ceramics Refractory Materials Foundries, Agriculture Woodworking, Food Industry
2128 P2 R 2138 P3 R (EN143:2000)	Particulates and nuisance levels of Organic Vapours and Acid Gases	Welding, Paper Industry Brewing, Chemical Processing Typical Smog, Inks and Dyes
6038 P3 R (EN143:2000)	Particulates, Hydrogen Fluoride Gas up to 30ppm and relief from Ozone, Organic Vapours and Acid Gases below WEL	Aluminium Welding Agriculture Pharmaceutical

Gas/vapour

FILTER	HAZARD	INDUSTRY
6051 A1 6055 A2 (EN14387:2004)	Organic Vapours	Anywhere conventional paints are used (subject to usage conditions) Vehicle manufacture Aircraft manufacture and refurbishment Boat building Ink and Dye manufacture and use Adhesive manufacture and use Paint and varnish manufacture Resin manufacture and use
6054 K1 (EN141:2000)	Ammonia	Manufacture and Maintenance of refrigeration equipment Agrochemicals
6057 ABE1 (EN141:2000)	Organic Vapours, Inorganic and Acid Gases	As 6051 but also: Electrolytic processes Acid cleaning Metal Pickling Metal Etching
6059 ABEK1 (EN141:2000)	Organic Vapours, Inorganic Gases, Acid gases and Ammonia	As 6057 and 6054
6075 A1 & formaldehyde (EN141:2000)	Organic Vapours and Formaldehyde	As 6051 but also: Hospitals and Laboratories
6096 HgP3 (EN141:2000)	Mercury and particulates	Laboratories and particulate applications

The table above lists the filters and typical industrial applications.

The 6000 Series half masks can be used in a variety of different filter / product options :

- **Gas and vapour filters** - The 6000 Series filters fit directly onto the 6000 Series half masks.
- **Particulate filters** - The 2000 Series particulate filters fit directly on to the 6000 Series half masks. The 5911 / 5925 / 5935 particulate filters may be used on their own with platform 603 & retainer 501.

- **A combination of gas / vapour and particulate filters** - The 5911 / 5925 / 5935 particulate filters can be used with 6000 Series gas / vapour filters using retainer 501.
  Note: the 6098 or 6099 filters should not be used with the 6000 Series half masks.

- **Supplied-air mode using the 3M S-200 Respirator System**
  (For information on the Supplied-Air System and applications please see the 3M S-200 Data Sheet).

Approvals

The 3M 6000 Series half masks and 6000/5000/2000 Series filters have been shown to meet the Basic Safety Requirements under Article 10 and 11 B of the European Community Directive 89/686, and are thus CE-marked.

- Approval body for the facepieces:
  DANTEST identification number 0200
- Body involved in Quality Assurance Assessment:
  BSI/UL identification number 0086

Materials

• Facepiece	-	Thermoplastic Elastomer
• Head Harness	-	Polyester / Cotton Elastic
• Inhale Valve	-	Natural Rubber
• Exhale Valve	-	Silicone Rubber
• Gasket	-	Silicone Rubber
• Filter Body (6000)	-	Polystyrene
• Filter Element (6000)	-	Activated/Treated Carbon
• Filter Material (5911 / 5925 / 5935 and 2000 Series)	-	Polypropylene

Maximum Product Weight:	
- With filters	355 grams
- Without filters	85 grams

Standards

These products have been tested to the relevant European Standards as shown below:

Facepiece	EN140:1998 (6100, 6200, 6300)
Filter	EN141:2000 (6054, 6057, 6059, 6075 & 6096)
	EN14387:2004 (6051, 6055)
	EN 143:2000 (2125, 2128, 2135, 2138, 5911, 5925, 5935, 6035, 6038)

Correct Usage

The 6000 Series facepieces when fitted with 6000 Series gas/vapour filters may be used in concentrations of gases or vapours (types specified by 3M) up to 10 times WEL or 1000 ppm (5000 ppm for 6055) whichever value is lower (APF = 10)*. Gas/vapour filters should not be used to protect the wearer against a gas or vapour that has poor warning properties (smell or taste).

- The 6000 Series facepieces when used in conjunction with the 5911 filter may be used in concentrations of solid and aqueous aerosols up to 4 times WEL (APF = 4)*.

- The 6000 Series facepieces when used in conjunction with the 5925, 2125, or 2128 filters may be used in concentrations of particulates up to 10 times WEL (APF = 10)*.

- The 6000 Series facepieces when used in conjunction with the 5935, 2135, 6038, 6035, or 2138 may be used in concentrations of particulates up to 20 times WEL (APF = 20)*.

- The 6000 Series facepieces when used in conjunction with the 2128 and 2138 may be used to protect against ozone up to 10 times WEL (APF = 10)* and offer relief from nuisance odours below the WEL.

- The 6000 Series facepieces when used in conjunction with the 2128 and 2138 may be used to offer relief from acid gases below the WEL.

- The 6000 Series facepieces when used with the 6038 filter may be used to protect against Hydrogen Fluoride gas up to 30ppm and offer relief from Ozone, Organic Vapours and acid gases below WEL.

*WEL - Workplace Exposure Limit.

Cleaning and Storage

1. Cleaning is recommended after each use. Remove the gas/vapour and/or particulate filters.
2. Clean the facepiece (excluding filters) with 3M 105 face seal cleaners or by immersing in warm cleaning solution, water temperature not to exceed 50°C and scrub with soft brush until clean. Add neutral detergent if necessary.
   Do not use cleaners containing lanolin or other oils.
3. Rinse in fresh, warm water and air dry in a non-contaminated atmosphere.
4. Respirator components, especially exhalation valve and seat, should be inspected prior to each use. A respirator with any damaged or deteriorated components should be discarded.
5. The cleaned respirator should be stored away from contaminated areas when not in use.

Fitting Instructions

Fitting instructions must be followed each time the respirator is worn.

1. Place the respirator over the mouth and nose, then pull the harness over the crown of the head.

2. Take the bottom straps in both hands, place them at the back of the neck and hook them together.

3. Tighten the top straps first by pulling on ends to achieve a comfortable and secure fit.

4. Tighten bottom straps using either front or rear adjustments. (Strap tension may be decreased by pushing out on back side of buckles).

5. Perform a positive and/or negative pressure fit check (see overleaf).

Face Fitting

The negative pressure fit check is recommended when using the 6035, 6038 and 2000 Series filters; the positive pressure fit check is recommended when using other filters.

Positive Pressure Facefit Check

Place the palm of the hand over the exhalation valve cover and exhale gently.

If the facepiece bulges slightly and no air leaks between the face and the facepiece are detected, a proper fit has been achieved.

If air leakage is detected, reposition the respirator on the face and/or readjust the elastic strap to eliminate the leakage.

Repeat the above facefit check.

Negative Pressure Facefit Check

For the 2000 Series filters, press your thumbs into the central indentation of the filters, inhale gently and hold your breath for five or ten seconds.

For the 6035 and 6038 filters, pinch the filter between thumb and fingers to seal the filter cover to the body of the filter, inhale gently and hold your breath for five or ten seconds.

If the facepiece collapses slightly a proper fit has been achieved.

If air leakage is detected, reposition the respirator on the face and/or readjust the elastic strap to eliminate the leakage.

Repeat the above facefit check.

If you cannot achieve a proper fit, do not enter the contaminated area. See your supervisor.

Respiratory protection is only effective if it is correctly selected, fitted and worn throughout the time when the wearer is exposed to respiratory contaminants.

3M offers advice on the selection of products, and training in the correct fitting and usage.

For advice on 3M Product Selection, ring the 3M Health and Safety Helpline on 0870 60 800 60. For callers within the Republic of Ireland, call 1-800-320 500.

3M Spare Parts and Accessories

Part No.	Description
6895	6000 Series gaskets
501	Filter retainer for 5911, 5925 or 5935
603	Particulate filter platform
105	Facepiece cleaner

Use Limitations

1. These respirators do not supply oxygen.
   Do not use in oxygen deficient atmospheres *
2. Do not use for respiratory protection against atmospheric contaminants which have poor warning properties, are unknown or immediately dangerous to life and health or against chemicals which generate high heats of reaction with chemical filters.
   (The 3M S-200 Supplied-Air Respirator System can be used against contaminants with poor warning properties, subject to other use limitations).
3. Do not modify or alter this device.
4. The assembled respirator may not provide a satisfactory face seal with certain physical characteristics (such as beards or large side burns) resulting in leakage between the facepiece and the face, the user assumes all risks of bodily injury which may possibly result.
5. Do not use with unknown concentrations of contaminants.
6. Do not use for escape purposes.
7. Leave the work area immediately and check the integrity of the respirator and replace facepiece and/or filters if:
   i) Damage has occurred or is apparent.
   ii) Breathing becomes difficult or increased breathing resistance occurs.
   iii) Dizziness or other distress occurs.
   iv) You taste or smell the contaminant or an irritation occurs.
8. Store this device in a sealed container away from contaminated areas when not in use.
9. Use strictly in accordance with face piece and filter instruction leaflet.

* 3M definition minimum 19.5% by volume oxygen.

3M

Occupational Health Group
3M United Kingdom PLC
3M Centre
Cain Road, Bracknell
Berkshire RG12 8HT
Tel: 0870 60 800 60

www.3m.com/uk/ohes
ohes.helpline.uk@mmm.com

Occupational Health Group
3M Ireland
3M House, Adelphi Centre,
Upper Georges St.
Dun Laoghaire, Co. Dublin, Ireland
Tel: 1 800 320 500

05/2007 CH6000/MDS

3M™ P3 Particulate Filters, 5935

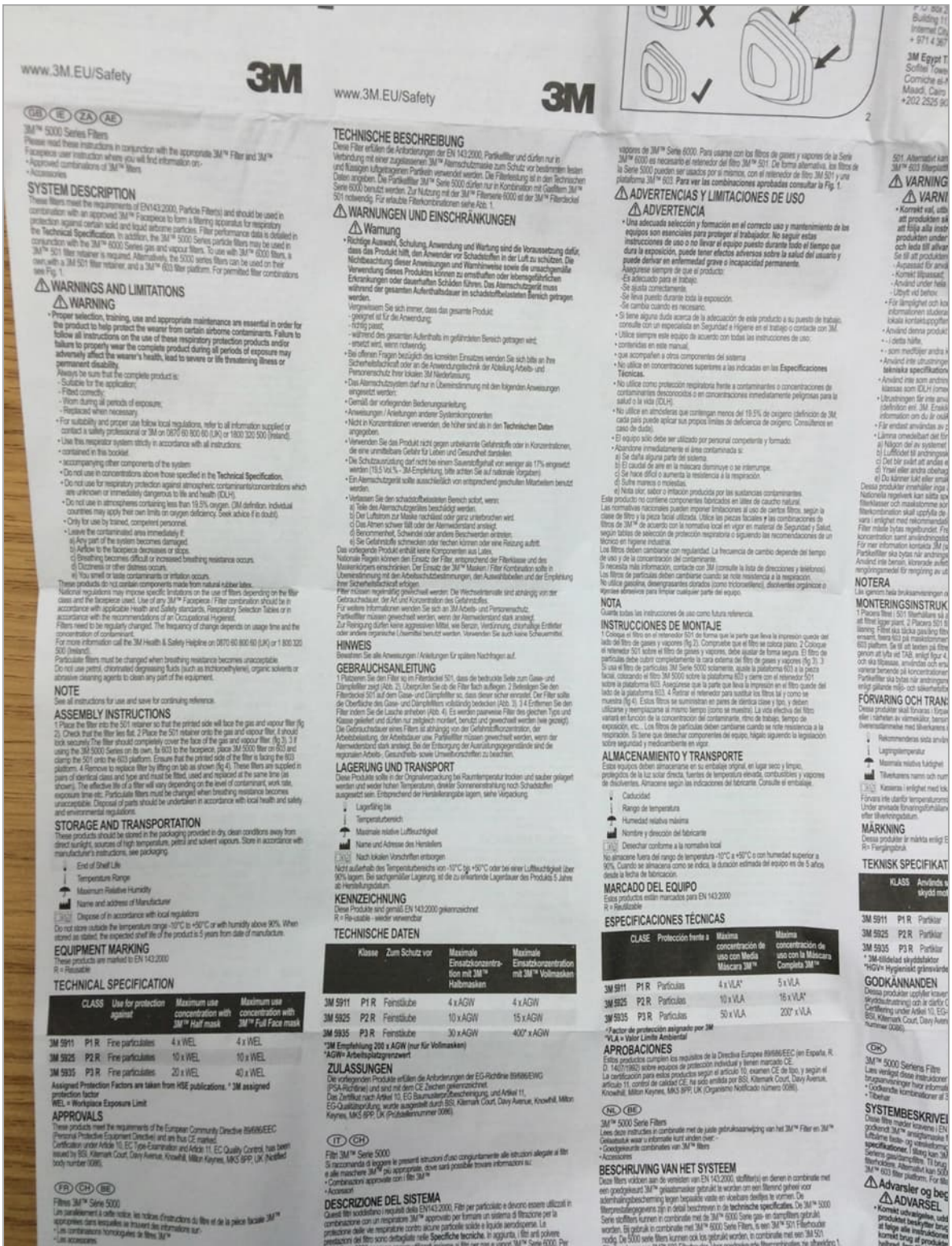
3M ID TI551152356

Particulate Filter 5935 protects against solids and liquid particles, for use with 3M™ 6000 and 3M™ 7000 Series Half Face Masks.

- Particulate Filter 5935 protects against solids and liquid particles.
- Suitable for use with 3M™ 6000 and 3M™ 7000 Series Half Face and Full Face Masks
- Bayonet fitting allows filters to be clicked into place for ease of fitting

Specifications

Cartridge or Filter Type	P3 R
Filter Type	Particulate Filters
Gas & Vapour Protection Type	Solid and liquid particles
Product Series	5000 Series
Product Type	Accessories and Spare Parts
Standards/Approvals	EN143 : 2000, CE Approved



www.3M.EU/Safety

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3M™ 5000 Series Filters

Please read these instructions in conjunction with the appropriate 3M™ Filter and 3M™ Facepiece user instruction where you will find information on:-
• Approved combinations of 3M™ filters
• Accessories

SYSTEM DESCRIPTION

These filters meet the requirements of EN143:2000, Particle Filter(s) and should be used in combination with an approved 3M™ Facepiece to form a filtering apparatus for respiratory protection against certain solid and liquid airborne particles. Filter performance data is detailed in the Technical Specification. In addition, the 3M™ 5000 Series particle filters may be used in conjunction with the 3M™ 6000 Series gas and vapour filters. To use with 3M™ 6000 filters, a 3M™ 501 filter retainer is required. Alternatively, the 5000 series filters can be used on their own,with a 3M 501 filter retainer, and a 3M™ 603 filter platform. For permitted filter combinations see Fig. 1.

⚠ WARNINGS AND LIMITATIONS

⚠ WARNING

• Proper selection, training, use and appropriate maintenance are essential in order for the product to help protect the wearer from certain airborne contaminants. Failure to follow all instructions on the use of these respiratory protection products and/or failure to properly wear the complete product during all periods of exposure may adversely affect the wearer's health, lead to severe or life threatening illness or permanent disability.
Always be sure that the complete product is:
- Suitable for the application;
- Fitted correctly;
- Worn during all periods of exposure;
- Replaced when necessary.
• For suitability and proper use follow local regulations, refer to all information supplied or contact a safety professional or 3M on 0870 60 800 60 (UK) or 1800 320 500 (Ireland).
• Use this respirator system strictly in accordance with all instructions:
• contained in this booklet
• accompanying other components of the system
• Do not use in concentrations above those specified in the **Technical Specification.**
• Do not use for respiratory protection against atmospheric contaminants/concentrations which are unknown or immediately dangerous to life and health (IDLH).
• Do not use in atmospheres containing less than 19.5% oxygen. (3M definition. Individual countries may apply their own limits on oxygen deficiency. Seek advice if in doubt).
• Only for use by trained, competent personnel.
• Leave the contaminated area immediately if:
a) Any part of the system becomes damaged.
b) Airflow to the facepiece decreases or stops.
c) Breathing becomes difficult or increased breathing resistance occurs.
d) Dizziness or other distress occurs.
e) You smell or taste contaminants or irritation occurs.
These products do not contain components made from natural rubber latex.
National regulations may impose specific limitations on the use of filters depending on the filter class and the facepiece used. Use of any 3M™ Facepiece / Filter combination should be in accordance with applicable Health and Safety standards, Respiratory Selection Tables or in accordance with the recommendations of an Occupational Hygienist.
Filters need to be regularly changed. The frequency of change depends on usage time and the concentration of contaminant.
For more information call the 3M Health & Safety Helpline on 0870 60 800 60 (UK) or 1 800 320 500 (Ireland).
Particulate filters must be changed when breathing resistance becomes unacceptable.
Do not use petrol, chlorinated degreasing fluids (such as trichloroethylene), organic solvents or abrasive cleaning agents to clean any part of the equipment.

NOTE

See all instructions for use and save for continuing reference.

ASSEMBLY INSTRUCTIONS

1 Place the filter into the 501 retainer so that the printed side will face the gas and vapour filter (fig 2). Check that the filter lies flat, 2 Place the 501 retainer onto the gas and vapour filter. It should lock securely.The filter should completely cover the face of the gas and vapour filter. If should using the 3M 5000 Series on its own, fix 603 to the facepiece, place 3M 5000 filter on 603 and clamp the 501 onto the 603 platform. Ensure that the printed side of the filter is facing the 603 platform. 4 Remove to replace filter by lifting on tab as shown (fig 4). These filters are supplied in pairs of identical class and type and must be fitted, used and replaced at the same time (as shown). The effective life of a filter will vary depending on the level of contaminant, work rate, exposure time etc. Particulate filters must be changed when breathing resistance becomes unacceptable. Disposal of parts should be undertaken in accordance with local health and safety and environmental regulations.

STORAGE AND TRANSPORTATION

These products should be stored in the packaging provided in dry, clean conditions away from direct sunlight, sources of high temperature, petrol and solvent vapours. Store in accordance with manufacturer's instructions, see packaging.

- End of Shelf Life
- Temperature Range
- Maximum Relative Humidity
- Name and address of Manufacturer
- Dispose of in accordance with local regulations

Do not store outside the temperature range -10°C to +50°C or with humidity above 90%. When stored as stated, the expected shelf life of the product is 5 years from date of manufacture.

EQUIPMENT MARKING

These products are marked to EN 143:2000
R = Reusable

TECHNICAL SPECIFICATION

	CLASS	Use for protection against	Maximum use concentration with 3M™ Half mask	Maximum use concentration with 3M™ Full Face mask
3M 5911	P1 R	Fine particulates	4 x WEL	
3M 5925	P2 R	Fine particulates	10 x WEL	10 x WEL
3M 5935	P3 R	Fine particulates	20 x WEL	40 x WEL

Assigned Protection Factors are taken from HSE publications. * 3M assigned protection factor
WEL = Workplace Exposure Limit

APPROVALS

These products meet the requirements of the European Community Directive 89/686/EEC (Personal Protective Equipment Directive) and are thus CE marked.
Certification under Article 10, EC Type-Examination and Article 11 EC Quality Control, has been issued by BSI, Kitemark Court, Davy Avenue, Knowhill, Milton Keynes, MK5 8PP, UK (Notified body number 0086).

FR CH BE

Filtres 3M™ Série 5000

Lire parallèlement à cette notice, les notices d'instructions du filtre et de la pièce faciale 3M™ appropriées dans lesquelles se trouvent des informations sur:-
• Les combinaisons homologuées de filtres 3M™
• Les accessoires

DESCRIPTION DE L'APPAREIL

www.3M.EU/Safety

3M

TECHNISCHE BESCHREIBUNG

Diese Filter erfüllen die Anforderungen der EN 143:2000, Partikelfilter und dürfen nur in Verbindung mit einer zugelassenen 3M™ Atemschutzmaske zum Schutz vor bestimmten festen Daten angaben. Die Partikelfilter 3M™ Serie 5000 dürfen nur in Kombination mit Gasfiltern 3M™ Serie 6000 benutzt werden. Zur Nutzung mit der 3M™ Filterserie 6000 ist der 3M™ Filterdeckel 501 notwendig. Für erlaubte Filterkombinationen siehe Abb. 1.

⚠ WARNUNGEN UND EINSCHRÄNKUNGEN

⚠ Warnung

• Richtige Auswahl, Schulung, Anwendung und Wartung sind die Voraussetzung dafür, dass das Produkt hilft, den Anwender vor Schadstoffen in der Luft zu schützen. Die Nichtbeachtung dieser Anweisungen und Warnhinweise sowie die unsachgemäße Verwendung dieses Produktes können zu ernsthaften oder lebensgefährlichen Erkrankungen oder dauerhaften Schäden führen. Das Atemschutzgerät muss während der gesamten Aufenthaltsdauer im schadstoffbelasteten Bereich getragen werden.
Vergewissern Sie sich immer, dass das gesamte Produkt:
- geeignet ist für die Anwendung;
- richtig passt;
- während des gesamten Aufenthalts im gefährdeten Bereich getragen wird;
- erneut wird, wenn notwendig.
• Bei offenen Fragen bezüglich des korrekten Einsatzes wenden Sie sich bitte an Ihre Sicherheitsfachkraft oder an die Anwendungstechnik der Abteilung Arbeits- und Personenschutz Ihrer lokalen 3M Niederlassung.
• Das Atemschutzsystem darf nur in Übereinstimmung mit den folgenden Anweisungen eingesetzt werden:
• Gemäß der vorliegenden Bedienungsanleitung.
• Anweisungen / Anleitungen anderer Systemkomponenten.
• Nicht in Konzentrationen verwenden, die höher sind als in den **Technischen Daten** angegeben.
• Verwenden Sie das Produkt nicht gegen unbekannte Gefahrstoffe oder in Konzentrationen, die eine unmittelbare Gefahr für Leben und Gesundheit darstellen.
• Die Schutzwirkung darf nicht bei einem Sauerstoffgehalt von weniger als 17% eingesetzt werden (19,5 Vol.% - 3M-Empfehlung, bitte achten Sie auf nationale Vorgaben).
• Ein Atemschutzgerät sollte ausschließlich von entsprechend geschulten Mitarbeitern benutzt werden.
• Verlassen Sie den schadstoffbelasteten Bereich sofort, wenn:
a) Teile des Atemschutzgerätes beschädigt werden.
b) Der Luftstrom zur Maske nachlässt oder ganz unterbrochen wird.
c) Das Atmen schwer fällt oder der Atemwiderstand ansteigt.
d) Benommenheit, Schwindel oder andere Beschwerden eintreten.
e) Sie Gefahrstoffe schmecken oder riechen können oder eine Reizung auftritt.
Das vorliegende Produkt enthält keine Komponenten aus Latex.
Nationale Regeln können den Einsatz der Filter, entsprechend der Filterklasse und des Maskenkörpers einschränken. Der Einsatz der 3M™ Masken / Filter Kombination sollte in Übereinstimmung mit den Arbeitsschutzbestimmungen, den Auswahltabellen und der Empfehlung Ihrer Sicherheitstechnik erfolgen.
Filter müssen regelmäßig gewechselt werden. Die Wechselintervalle sind abhängig von der Gebrauchsdauer, der Art und Konzentration des Gefahrstoffes.
Für weitere Informationen wenden Sie sich an 3M Arbeits- und Personenschutz.
Partikelfilter müssen gewechselt werden, wenn der Atemwiderstand stark ansteigt.
Zur Reinigung dürfen keine aggressiven Mittel, wie Benzin, Verdünnung, chlorhaltige Entfetter oder andere organische Lösemittel benutzt werden. Verwenden Sie auch keine Scheuermittel.

HINWEIS

Beachten Sie alle Anweisungen / Anleitungen für spätere Nachfragen auf.

GEBRAUCHSANLEITUNG

1 Platzieren Sie den Filter so im Filterdeckel 501, dass die bedruckte Seite zum Gase- und Dämpfefilter zeigt (Abb. 2). Überprüfen Sie ob der Filter flach aufliegen. 2 Befestigen Sie den Filterdeckel 501 auf dem Gase- und Dämpfefilter so, dass dieser sicher einrastet. Der Filter sollte die Oberfläche des Gase- und Dämpfefilters vollständig bedecken (Abb. 3). 3 4 Entfernen Sie den Filter indem Sie die Lasche anheben (Abb. 4). Es werden paarweise Filter des gleichen Typs und Klasse geliefert und dürfen nur zeitgleich montiert, benutzt und gewechselt werden (wie gezeigt). Die Gebrauchsdauer eines Filters ist abhängig von der Gefahrstoffkonzentration, der Arbeitsbelastung, der Arbeitsdauer usw. Partikelfilter müssen gewechselt werden, wenn der Atemwiderstand stark ansteigt. Bei der Entsorgung der Auslaufgegenstände sind die regionalen Gesundheits- sowie Umweltvorschriften zu beachten.

LAGERUNG UND TRANSPORT

Diese Produkte sollte in der Originalverpackung bei Raumtemperatur trocken und sauber gelagert werden und weder hohen Temperaturen, direkter Sonneneinstrahlung noch Schadstoffen ausgesetzt sein. Entsprechend der Herstellerangabe lagern, siehe Verpackung.

- Lagerfähig bis
- Temperaturbereich
- Maximale relative Luftfeuchtigkeit
- Name und Adresse des Herstellers
- Nach lokalen Vorschriften entsorgen

Nicht außerhalb des Temperaturbereichs von -10°C bis +50°C oder bei einer Luftfeuchtigkeit über 90% lagern. Bei sachgemäßer Lagerung, ist die zu erwartende Lagerdauer des Produkts 5 Jahre ab Herstellungsdatum.

KENNZEICHNUNG

Diese Produkte sind gemäß EN 143:2000 gekennzeichnet
R = Re-usable - wieder verwendbar

TECHNISCHE DATEN

	Klasse	Zum Schutz vor	Maximale Einsatzkonzentration mit 3M™ Halbmasken	Maximale Einsatzkonzentration mit 3M™ Vollmasken
3M 5911	P1 R	Feinstäube	4 x AGW	4 x AGW
3M 5925	P2 R	Feinstäube	10 x AGW	15 x AGW
3M 5935	P3 R	Feinstäube	30 x AGW	400* x AGW

***3M Empfehlung 200 x AGW (nur für Vollmasken)**
***AGW= Arbeitsplatzgrenzwert**

ZULASSUNGEN

Die vorliegenden Produkte erfüllen die Anforderungen der EG-Richtlinie 89/686/EWG (PSA-Richtlinie) und sind mit dem CE Zeichen gekennzeichnet.
Das Zertifikat nach Artikel 10, EG Baumusterprüfbescheinigung, und Artikel 11, EG-Qualitätsprüfung, wurde ausgestellt durch BSI, Kitemark Court, Davy Avenue, Knowhill, Milton Keynes, MK5 8PP, UK (Prüfstellennummer 0086).

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Filtri 3M™ Serie 5000

Si raccomanda di leggere le presenti istruzioni d'uso congiuntamente alle istruzioni allegate ai filtri e alle maschere 3M™ più appropriate, dove sarà possibile trovare informazioni su:
• Combinazioni approvate con i filtri 3M™
• Accessori

DESCRIZIONE DEL SISTEMA

Questi filtri soddisfano i requisiti della EN143:2000. Filtri per particolato e devono essere utilizzati in combinazione con un respiratore 3M™ approvato per formare un sistema di filtrazione per la protezione delle vie respiratorie contro alcune particelle solide e liquide aerodisperse. Le prestazioni dei filtro sono dettagliate nelle **Specifiche tecniche.** In aggiunta, i filtri anti polvere 3M™ Serie 5000 possono essere utilizzati insieme ai filtri per gas e vapori 3M™ Serie 6000. Per essere utilizzati insieme ai filtri 3M™ serie 6000 è necessaria la ghiera di fissaggio 501. In

vapores de 3M™ Serie 6000. Para usarse con los filtros de gases y vapores de la Serie 3M™ 6000 es necesario el retenedor del filtro 3M™ 501. De forma alternativa, los filtros de la Serie 5000 pueden ser usados por si mismos, con el retenedor de filtro 3M 501 y una plataforma 3M™ 603. **Para ver las combinaciones aprobadas consultar la Fig. 1.**

⚠ ADVERTENCIAS Y LIMITACIONES DE USO

⚠ ADVERTENCIA

• **Una adecuada selección y formación en el correcto uso y mantenimiento de los equipos son esenciales para proteger al trabajador. No seguir estas instrucciones de uso o no llevar el equipo puesto durante todo el tiempo que dura la exposición, puede tener efectos adversos sobre la salud del usuario y puede derivar en enfermedad grave o incapacidad permanente.**
Asegúrese siempre de que el producto:
-Es adecuado para el trabajo;
-Se ajusta correctamente;
-Se lleva puesto durante toda la exposición.
-Se cambia cuando es necesario.
• Si tiene alguna duda acerca de la adecuación de este producto a su puesto de trabajo, consulte con un especialista en Seguridad e Higiene en el trabajo o contacte con 3M.
• Utilice siempre este equipo de acuerdo con todas las instrucciones de uso.
• contenidas en este manual.
• que acompañen a otros componentes del sistema
• No utilice en concentraciones superiores a las indicadas en las **Especificaciones Técnicas.**
• No utilice como protección respiratoria frente a contaminantes o concentraciones de contaminantes desconocidos o en concentraciones inmediatamente peligrosas para la salud o la vida (IDLH).
• No utilice en atmósferas que contengan menos del 19.5% de oxigeno (definición de 3M, cada país puede aplicar sus propios límites de deficiencia de oxigeno. Consúltenos en caso de duda).
• El equipo sólo debe ser utilizado por personal competente y formado.
• Abandone inmediatamente el área contaminada si:
a) Se daña alguna parte del sistema.
b) El caudal de aire en la máscara disminuye o se interrumpe.
c) Se hace difícil o aumenta la resistencia a la respiración.
d) Sufre mareos o molestias.
e) Nota olor, sabor o irritación producida por las sustancias contaminantes.
Este producto no contiene componentes fabricados en látex de caucho natural.
Las normativas nacionales pueden imponer limitaciones al uso de ciertos filtros, según la clase de filtro y la pieza facial utilizada. Utilice las piezas faciales y las combinaciones de filtros de 3M™ de acuerdo con la normativa local en vigor en material de Seguridad y Salud, según tablas de selección de protección respiratoria o siguiendo las recomendaciones de un técnico en higiene industrial.
Los filtros deben cambiarse con regularidad. La frecuencia de cambio depende del tiempo de uso y de la concentración del contaminante.
Si necesita más información, contacte con 3M (consulte la lista de direcciones y teléfonos).
Los filtros de partículas deben cambiarse cuando se note resistencia a la respiración.
No utilice gasolina, desengrasantes clorados (como tricloroetileno), disolventes orgánicos o agentes abrasivos para limpiar cualquier parte del equipo.

NOTA

Guarde todas las instrucciones de uso como futura referencia.

INSTRUCCIONES DE MONTAJE

1 Coloque el filtro en el retenedor 501 de forma que la parte que lleva la impresión quede del lado del filtro de gases y vapores (fig 2). Compruebe que el filtro se coloca plano. 2 Coloque el retenedor 501 sobre el filtro de gases y vapores, debe quedar de forma segura. El filtro de partículas debe cubrir completamente la cara externa del filtro de gases y vapores (fig 3). 3 Si usa el filtro de partículas 3M Serie 5000 solamente, ajuste la plataforma 603 a la pieza facial, colocando el filtro 3M 5000 sobre la plataforma 603 y cierre con el retenedor 501 sobre la plataforma 603. Asegúrese que la parte que lleva la impresión en el filtro quede del lado de la plataforma 603. 4 Retirar el retenedor para sustituir los filtros tal y como se muestra (fig 4). Estos filtros se suministran en pares de idéntica clase y tipo, y deben utilizarse y reemplazarse al mismo tiempo (como se muestra). La vida efectiva del filtro variará en función de la concentración del contaminante, ritmo de trabajo, tiempo de exposición, etc... Los filtros de partículas deben cambiarse cuando se note resistencia a la respiración. Si tiene que desechar componentes de equipo, hágalo siguiendo la legislacion sobre seguridad y medioambiente en vigor.

ALMACENAMIENTO Y TRANSPORTE

Estos equipos deben almacenarse en su embalaje original, en lugar seco y limpio, protegidos de la luz solar directa, fuentes de temperatura elevada, combustibles y vapores de disolventes. Almacene segun las indicaciones del fabricante. Consulte el embalaje.

- Caducidad
- Rango de temperatura
- Humedad relativa máxima
- Nombre y dirección del fabricante
- Desechar conforme a la normativa local

No almacene fuera del rango de temperatura -10°C a +50°C o con humedad superior a 90%. Cuando se almacena como se indica, la duración estimada del equipo es de 5 años desde la fecha de fabricación.

MARCADO DEL EQUIPO

Estos productos están marcados para EN 143:2000
R = Reutilizable

ESPECIFICACIONES TÉCNICAS

	CLASE	Protección frente a	Máxima concentración de uso con Media Máscara 3M™	Máxima concentración de uso con la Máscara Completa 3M™
3M 5911	P1 R	Partículas	4 x VLA*	5 x VLA
3M 5925	P2 R	Partículas	10 x VLA	16 x VLA*
3M 5935	P3 R	Partículas	50 x VLA	200* x VLA

***Factor de protección asignado por 3M**
***VLA = Valor Límite Ambiental**

APROBACIONES

Estos productos cumplen los requisitos de la Directiva Europea 89/686/EEC (en España, R. D. 1407/1992) sobre equipos de protección individual y llevan marcado CE.
La certificación para estos productos según el artículo 10, examen CE de tipo, y según el artículo 11, control de calidad CE, ha sido emitida por BSI, Kitemark Court, Davy Avenue, Knowhill, Milton Keynes, MK5 8PP, UK (Organismo Notificado número 0086).

NL BE

3M™ 5000 Serie Filters

Lees deze instructies in combinatie met de juiste gebruiksaanwijzing van het 3M™ Filter en 3M™ Gelaatstuk waar u informatie kunt vinden over:-
• Goedgekeurde combinaties van 3M™ filters
• Accessoires

BESCHRIJVING VAN HET SYSTEEM

Deze filters voldoen aan de vereisten van EN 143:2000, stoffilter(s) en dienen in combinatie met een goedgekeurd 3M™ gelaatsmasker gebruikt te worden om een filtered geheel voor ademhalingsbescherming tegen bepaalde vaste en vloeibare deeltjes te vormen. De filtersprestatiegegevens zijn in detail beschreven in de **technische specificaties.** De 3M™ 5000 Serie stoffilters kunnen in combinatie met de 3M™ 6000 Serie gas- en dampfilters gebruikt worden. Bij gebruik in combinatie met 3M™ 6000 Serie Filters, is een 3M™ 501 Filterhouder nodig. De 5000 serie filters kunnen ook los gebruikt worden, in combinatie met een 3M 501 Filterhouder en een 3M™ 603 Filterhouder. Voor goedgekeurde filtercombinaties zie afbeelding 1.

⚠ WAARSCHUWINGEN EN BEPERKINGEN

501. Alternatief kan

⚠ VARNING

⚠ VARNI

- Korrekt val, utbi
att produkten sk
att följa alla instr
produkten under
och lasta till allvar
Se till att produkten
- Avpassad för anvä
- Korrekt tillpassad;
- Använd under hela
- Utbytt vid behov.
• För tillförlitlighet och kor
informationen studera
lokala kontaktuppgifter
• Använd denna produkt
- i detta häfte.
- som medföljer andra k
• Använd inte utrustningen
tekniska specifikation
• Använd inte som andnin
klassas som IDLH (omed
• Utrustningen får inte anvä
(definition enl. 3M. Enskil
information om du är osäk
• Får endast användas av c
• Lämna omedelbart det för
a) Någon del av systemet
b) Luftflödet till andningsm
c) Det blir svårt att andas e
d) Yrsel eller andra obehag
e) Du känner lukt eller smak
Dessa produkter innehåller inga
Nationella regelverk kan sätta sp
filterklasser och maskintomme
filterkombination skall uppfylla de
vara i enlighet med rekommenda
Filter måste bytas regelbundet. Fre
koncentration samt användningstid
För mer information kontakta 3M (se
Partikelfilter ska bytas när andnings
Använd inte bensin, klorerade avfet
rengöringsmedel för rengöring av ut

NOTERA

Läs igenom hela bruksanvisningen o

MONTERINGSINSTRUK

1 Placera filtret i 501 filterhållare så a
att filtret ligger platt. 2 Placera 501 fi
låsning. Filtret ska täcka gas/ång filtre
ensamt, fixera 603 på maskintomme
603 platform. Se till att texten på filtre
genom att lyfta vid TAB, enligt figur 4.
och ska förpackas, användas och ers
varierar beroende på koncentrationen
Partikelfilter ska bytas när andningsm
enligt gällande miljö- och säkerhetsfö

FÖRVARING OCH TRAN

Dessa produkter skall förvaras i förpac
eller i närheten av värmekällor, bensin
överensstämmelse med tillverkarens a

- Rekommendera sista använ
- Lagringstemperatur
- Maximala relativa fuktighet
- Tillverkarens namn och num
- Kasseras i enlighet med lok

Förvara inte utanför temperaturområ
Under använda förvaringsförhållan
efter tillverkningsdatum.

MÄRKNING

Dessa produkter är märkta enligt E
R= Återgångsbruk

TEKNISK SPECIFIKAT

	KLASS	Används m skydd mot
3M 5911	P1 R	Partiklar
3M 5925	P2 R	Partiklar
3M 5935	P3 R	Partiklar

* 3M-tilldelad skyddsfaktor
*HGV= Hygieniskt gränsvärde

GODKÄNNANDEN

Dessa produkter uppfyller kraven
Myndighetsintyg och är därför C
Certifiering under Artikel 10, EG-
BSI, Kitemark Court, Davy Aven
Nummer 0086).

DK

3M™ 5000 Seriens Filtre

Læs venligst disse instruktioner
brugsanvisninger hvor informati
• Godkendte kombinationer af 3
• Tilbehør

SYSTEMBESKRIVEL

Disse filtre møder kravene i EN
godkendt 3M™ ansigtsmaske
Ydelse finde i de virksomhe
specifikationer. I tillæg kan 3M
Seriens gas/dampfiltre. Til brug
filterholders. Alternativt kan 500
3M™ 603 filter platform. For ti

⚠ Advarsler og beg

⚠ ADVARSEL

• Korrekt udvælgelse, udd
produktet beskytter bru
at følge alle instruktione
korrekt brug af produkte
helbred, føre til alvorlig o
Sørg altid for at produkte

NBR
Nitrile

Lab & Utility

TouchNTuff®

ADVANCED PRODUCT & WORKER PROTECTION

92-600 92-605
Nitrile Glove

Proven splash resistance against hazardous chemicals

FEATURES AND BENEFITS:

Outstanding Chemical Resistance
Further testing of the TouchNTuff® by a certified body on an even wider range of chemicals confirms that it resists a greater variety of industrial chemicals for longer periods than any other nitrile disposable gloves.

Excellent puncture resistance
Manufactured from nitrile, TouchNTuff® offers up to four times the puncture resistance of comparable natural rubber latex, and three times the resistance of similar neoprene gloves.

Prevention from Type I Allergy
It contains no natural rubber latex proteins, which prevents from Type I allergies for the wearer. Primary skin irritation studies and Insult Patch tests have also shown no evidence of risk from irritation or allergic contact dermatitis.

Easy Donning and Strong Grip
With a unique "Thin Nitrile Technology" formulation, this glove offers easy donning and strong grip in wet or dry conditions. The glove is highly versatile and suitable for many different uses.

Ansell

TouchNTuff®

92-600 92-605
Nitrile Glove

TECHNICAL DATA SHEET:

PRODUCT INFORMATION:

	92-600	92-605
Material	Nitrile	
Color	Green	
Glove Design	Ambidextrous, Powder Free, Smooth Grip	Ambidextrous, Powder Free, Textured Fingers
Cuff	Beaded Cuff	
Audit Standards	ISO 9001	
Quality Control	EN420, EN374/1,2,3, ASTM D 6319, FDA 21 CFR 177-2600, Arrete 09/11/04, European Regulation 1935/2004, German Recommendation for Food Commodities.	
Packaging	100 gloves per dispensers, 10 dispensers per shipper carton, 1000 gloves per shipper cartons	
Storage	Keep out of direct sunlight; store in a cool and dry place. Keep away from sources of ozone or ignition.	
Country of Origin	Sri Lanka	Thailand

PHYSICAL PROPERTIES:

PROPERTY		TYPICAL VALUES				TESTING METHOD
SIZE		S 6½-7	M 7½-8	L 8½-9	XL 9½-10	ASTM D3767/EN 420
Length (mm)	92-600	240	240	240	240	
	92-605	300	300	300	300	
Average Palm Width (mm)	92-600	85	96	105	111	
	92-605	82	90	99	105	

Freedom from Holes (Inspection level I)	92-600	All regions except North and South America 1.5 AQL North and South America 4.0 AQL	ASTM D5151/EN 374-2
	92-605	1.5 AQL All regions	
Palm Thickness Single Wall	(mm: 0.12) / (mils: 4.7)		ASTM D3767/EN 420
	BEFORE AGING	AFTER AGING	
Ultimate Tensile Strength	> 14 Mpa	> 14 Mpa	ASTM D 412-06a
Elongation at Break (%)	> 500	> 400	ASTM D 412-06a
Force at break (N)	> 6	> 6	EN 455-2

ORDERING INFORMATION:

	SIZE	S 6½-7	M 7½-8	L 8½-9	XL 9½-10
92-600	ASPN US	552822	552823	552824	552825
	ORACLE US	105077	105018	105079	105080
	ASPN OTHERS	552942	552943	552944	522945
92-605	ASPN	588104	588105	588106	588107

(All regions except North & South America)

92-600

92-605

For additional information visit us at www.ansell.com, or call us at
North America, Latin America and Caribbean: +1800 800 0444
Asia Pacific: +852 2185 0600
Europe: +32 2 528 74 00
Australia: +61 3 9270 7270

Ansell

Product Family

PowerCoat® 620

Quality PVC dipped glove to protect in applications in which workers' hands are immersed or splashed with hazardous liquids and chemicals. 620 is a double-dipped, 12 inch glove with a soft, interlock knit liner and pinked edge cuff.

Honeywell

Product Numbers & Ordering Information

Packaging Information

6 Pair per inner bag

12 Inner bags per case

72 Pair per case

Overview

Key Features

- Double-dipped, 12 inch glove is longer to provide more protection the the wrist and forearm
- PVC coating repels liquids and protects hands from a wide variety of chemicals
- Unique PVC compound is soft and supple for greater flexibility and to help reduce hand fatigue from repetitive movements
- Interlock knit liner is soft and wicks away moisture for wearer comfort
- Gloves can be easily laundered for longer glove life and to help decrease bacteria build-up

Recommended Industries/Use

- Agriculture
- Chemical
- Food Services
- Manufacturing
- Utilities

Hazards

- Chemical
- Splash

Regulations

- Abrasion Resistance - EN388 - Measurement of how well the glove material resist loss of material from rubbing on rough surface
- Cut Resistance - EN 388 - Measurement of how the glove material will resist cutting by a sharp edge.

Historical Brand

PowerCoat®

Warranty Information

Honeywell warrants that it's protective gloves are free from defects in material and workmanship. This limited warranty does not cover any product or component found to have been altered, misused, abused, tampered with or improperly maintained or to have deteriorated due to aging of any component made of rubber or any other elastomer. The limited warranty does not cover any damage, loss or expense due to damage caused by accident, abuse, improper maintenance, use or misuse of the product.

Specifications

Material

- PVC (Polyvinyl Chloride)

Supported

- Interlock Knit liner

ANNEX III: ADVANCED REACH TOOL (ART) VERSION 1.5 REPORTS

ART REPORT – CS - 2.2 Sampling of bath (copy) – 23-Dec-22

Taking sample of bath for analysis

Chemical details	
Chemical	Chromium Trioxide
CAS No.	1333-82-0
Scenario details	
Number of activities	1
Total duration (mins)	2
Nonexposure period (mins)	0
Metadata	
ART version	1.5
Creator	pholman@te.com
Date created	19-Dec-22
Date last edited	23-Dec-22

Details for Activity Drawing sample of bath

Emission sources: Near field ✓ Duration (mins): 2

Far field

Near-field exposure

Operational Conditions

Substance emission potential	
Substance product type	Liquids
Process temperature	Room temperature
Vapour pressure	11 Pa
Liquid mole fraction	Minor
Activity coefficient	1
Activity emission potential	
Activity class	Falling liquids
Situation	Transfer of liquid product with flow of < 0.1 l/minute
Containment level	Handling that reduces contact between product and adjacent air. Note: This does not include processes that are fully contained by localised controls (see next questions).
Loading type	Splash loading, where the liquid dispenser remains at the top of the reservoir and the liquid splashes freely
Surface contamination	
Process fully enclosed?	No
Effective housekeeping practices in place?	Yes
Dispersion	
Work area	Indoors
Room size	3000 m³

Risk Management Measures

Localised controls	
Primary	Fixed capturing hood (90.00 % reduction)
Secondary	No localized controls (0.00 % reduction)
Dispersion	
Ventilation rate	3 air changes per hour (ACH)

Predicted exposure levels

ART predicts air concentrations in a worker's personal breathing zone outside of any Respiratory Protection Equipment (RPE). The use of RPE must be considered separately.

Mechanistic model results

The predicted 90th percentile full-shift exposure is 0.0003 mg/m³.

The inter-quartile confidence interval is 0.00015 mg/m³ to 0.00063 mg/m³.

ART REPORT – CS - 3 Lab Analysis – 24-Nov-22

This contributing scenario deals with the exposure of workers during the titration of the mixture containing hexavalent chromium, performed on a laboratory bench, in a dedicated area separate from the plating shop

Chemical details	
Chemical	Chromium Trioxide
CAS No.	1333-82-0

Scenario details	
Number of activities	1
Total duration (mins)	10
Nonexposure period (mins)	0

Metadata	
ART version	1.5
Creator	pholman@te.com
Date created	24-Nov-22
Date last edited	24-Nov-22

Details for Activity (untitled)

Emission sources: Near field ✓ Far field

Duration (mins): 10

Near-field exposure

Operational Conditions

Substance emission potential	
Substance product type	Liquids
Process temperature	Room temperature
Vapour pressure	11 Pa
Liquid mole fraction	Minor
Activity coefficient	1
Activity emission potential	
Activity class	Activities with relatively undisturbed surfaces (no aerosol formation)
Situation	Open surface < 0.1 m²
Surface contamination	
Process fully enclosed?	No
Effective housekeeping practices in place?	Yes
Dispersion	
Work area	Indoors
Room size	100 m³

Risk Management Measures

Localised controls	
Primary	Fume cupboard (99.00 % reduction)
Secondary	No localized controls (0.00 % reduction)
Dispersion	
Ventilation rate	No restriction on general ventilation characteristics

Predicted exposure levels

ART predicts air concentrations in a worker's personal breathing zone outside of any Respiratory Protection Equipment (RPE). The use of RPE must be considered separately.

Mechanistic model results

The predicted 90th percentile full-shift exposure is 0.00069 mg/m³.

The inter-quartile confidence interval is 0.00034 mg/m³ to 0.0014 mg/m³.

ART REPORT – CS - 4 Other activities carried out next to bath – 23-Dec-22

Activities that do not include dipping of jigs or racks of components near to bath.

Chemical details	
Chemical	Hexavalent chromium
CAS No.	1333-82-0

Scenario details	
Number of activities	1
Total duration (mins)	10
Nonexposure period (mins)	0

Metadata	
ART version	1.5
Creator	pholman@te.com
Date created	25-Nov-22
Date last edited	25-Nov-22

Details for Activity Other activities carried out adjacent to bath other than dipping or sampling

Emission sources: Near field ✓ Duration (mins): 10

Far field

Near-field exposure

Operational Conditions

Substance emission potential	
Substance product type	Liquids
Process temperature	Room temperature
Vapour pressure	11 Pa
Liquid mole fraction	Minor
Activity coefficient	1

Activity emission potential	
Activity class	Activities with relatively undisturbed surfaces (no aerosol formation)
Situation	Open surface 0.1 – 0.3 m²

Surface contamination	
Process fully enclosed?	No
Effective housekeeping practices in place?	Yes

Dispersion	
Work area	Indoors
Room size	3000 m³

Risk Management Measures

Localised controls	
Primary	Fixed capturing hood (90.00 % reduction)
Secondary	No localized controls (0.00 % reduction)

Dispersion	
Ventilation rate	3 air changes per hour (ACH)

Predicted exposure levels

ART predicts air concentrations in a worker's personal breathing zone outside of any Respiratory Protection Equipment (RPE). The use of RPE must be considered separately.

Mechanistic model results

The predicted 90th percentile full-shift exposure is 0.0033 mg/m³.

The inter-quartile confidence interval is 0.0016 mg/m³ to 0.0069 mg/m³.

ART REPORT – CS - 8 Repacking of liquid – 25-Nov-22

Transferring additive from 25 litre drum to 2 litre bottle for additions

Chemical details	
Chemical	Hexavalent chromium
CAS No.	1333-82-0
Scenario details	
Number of activities	1
Total duration (mins)	5
Nonexposure period (mins)	0
Metadata	
ART version	1.5
Creator	pholman@te.com
Date created	25-Nov-22
Date last edited	25-Nov-22

Details for Activity Repacking of liquid additive into smaller vessel for subsequent bath additions. Pouring from 25 litre drum into 2 litre bottle

Emission sources: Near field ✓ Far field

Duration (mins): 5

Near-field exposure

Operational Conditions

Substance emission potential	
Substance product type	Liquids
Process temperature	Room temperature
Vapour pressure	11 Pa
Liquid mole fraction	Substantial
Activity coefficient	1
Activity emission potential	
Activity class	Falling liquids
Situation	Transfer of liquid product with flow of 1 - 10 l/minute
Containment level	Handling that reduces contact between product and adjacent air. Note: This does not include processes that are fully contained by localised controls (see next questions).
Loading type	Splash loading, where the liquid dispenser remains at the top of the reservoir and the liquid splashes freely
Surface contamination	
Process fully enclosed?	No
Effective housekeeping practices in place?	Yes
Dispersion	
Work area	Indoors
Room size	1000 m³

Risk Management Measures

Localised controls	
Primary	No localized controls (0.00 % reduction)
Secondary	No localized controls (0.00 % reduction)
Dispersion	
Ventilation rate	1 air changes per hour (ACH)

Predicted exposure levels

ART predicts air concentrations in a worker's personal breathing zone outside of any Respiratory Protection Equipment (RPE). The use of RPE must be considered separately.

Mechanistic model results

The predicted 90th percentile full-shift exposure is 0.053 mg/m³.

The inter-quartile confidence interval is 0.026 mg/m³ to 0.11 mg/m³.

ART REPORT – CS - 9 Additions of liquid to bath – 28-Nov-22

Making routine and analysis based additions to bath and topping up

Chemical details	
Chemical	Hexavalent chromium
CAS No.	1333-82-0

Scenario details	
Number of activities	1
Total duration (mins)	15
Nonexposure period (mins)	0

Metadata	
ART version	1.5
Creator	pholman@te.com
Date created	28-Nov-22
Date last edited	28-Nov-22

Details for Activity Additions and topping up with liquid of bath

Emission sources: Near field ✓ Far field ✓

Duration (mins): 15

Near-field exposure

Operational Conditions

Substance emission potential	
Substance product type	Liquids
Process temperature	Room temperature
Vapour pressure	11 Pa
Liquid mole fraction	Substantial
Activity coefficient	1

Activity emission potential	
Activity class	Activities with relatively undisturbed surfaces (no aerosol formation)
Situation	Open surface 0.1 – 0.3 m²

Surface contamination	
Process fully enclosed?	No
Effective housekeeping practices in place?	Yes

Dispersion	
Work area	Indoors
Room size	3000 m³

Risk Management Measures

Localised controls	
Primary	Fixed capturing hood (90.00 % reduction)
Secondary	No localized controls (0.00 % reduction)

Dispersion	
Ventilation rate	3 air changes per hour (ACH)

Far-field exposure

Operational Conditions

Substance emission potential	
Substance product type	Liquids
Process temperature	Room temperature
Vapour pressure	11 Pa
Liquid mole fraction	Substantial
Activity coefficient	1
Activity emission potential	
Activity class	Activities with relatively undisturbed surfaces (no aerosol formation)
Situation	Open surface 0.1 – 0.3 m²

Risk Management Measures

Localised controls	
Primary	Fixed capturing hood (90.00 % reduction)
Secondary	No localized controls (0.00 % reduction)
Segregation	No segregation (0.00 % reduction)

Predicted exposure levels

ART predicts air concentrations in a worker's personal breathing zone outside of any Respiratory Protection Equipment (RPE). The use of RPE must be considered separately.

Mechanistic model results

The predicted 90th percentile full-shift exposure is 0.015 mg/m³.

The inter-quartile confidence interval is 0.0071 mg/m³ to 0.03 mg/m³.

ART REPORT – CS - 13 Dipping connector parts in treatment, in the workers' near field (copy) – 03-Jan-23

Dipping connectors on jigs/racks in the passivation baths

Chemical details	
Chemical	Chromium trioxide
CAS No.	1333-82-0

Scenario details	
Number of activities	1
Total duration (mins)	15
Nonexposure period (mins)	0

Metadata	
ART version	1.5
Creator	pholman@te.com
Date created	28-Nov-22
Date last edited	03-Jan-23

Details for Activity Dipping connector parts in treatment (passivation) tanks during processing

Emission sources: Near field ✓ Duration (mins): 15

Far field

Near-field exposure

Operational Conditions

Substance emission potential	
Substance product type	Powders dissolved in a liquid or incorporated in a liquid matrix
Liquid matrix weight fraction	Minor
Viscosity	Low

Activity emission potential	
Activity class	Activities with relatively undisturbed surfaces (no aerosol formation)
Situation	Open surface 0.1 – 0.3 m²

Surface contamination	
Process fully enclosed?	No
Effective housekeeping practices in place?	Yes

Dispersion	
Work area	Indoors
Room size	3000 m³

Risk Management Measures

Localised controls	
Primary	Fixed capturing hood (90.00 % reduction)
Secondary	No localized controls (0.00 % reduction)

Dispersion	
Ventilation rate	3 air changes per hour (ACH)

Predicted exposure levels

ART predicts air concentrations in a worker's personal breathing zone outside of any Respiratory Protection Equipment (RPE). The use of RPE must be considered separately.

Mechanistic model results

The predicted 90th percentile full-shift exposure is 0.00019 mg/m³.

The inter-quartile confidence interval is 0.000087 mg/m³ to 0.00045 mg/m³.

ART REPORT – CS - 14 Dipping connector parts in rinse waters – 03-Jan-23

Dipping of racks/jigs in water rinses after passivation stage

Chemical details	
Chemical	Chromium Trioxide
CAS No.	1333-82-0
Scenario details	
Number of activities	1
Total duration (mins)	30
Nonexposure period (mins)	0
Metadata	
ART version	1.5
Creator	pholman@te.com
Date created	28-Nov-22
Date last edited	28-Nov-22

Details for Activity Dipping racks/jigs of components in rinse waters after passivation stage to remove passivate chemistry

Emission sources: Near field ✓ Far field

Duration (mins): 30

Near-field exposure

Operational Conditions

Substance emission potential	
Substance product type	Powders dissolved in a liquid or incorporated in a liquid matrix
Liquid matrix weight fraction	Very small
Viscosity	Low
Activity emission potential	
Activity class	Activities with relatively undisturbed surfaces (no aerosol formation)
Situation	Open surface 0.3 - 1 m²
Surface contamination	
Process fully enclosed?	No
Effective housekeeping practices in place?	Yes
Dispersion	
Work area	Indoors
Room size	3000 m³

Risk Management Measures

Localised controls	
Primary	Fixed capturing hood (90.00 % reduction)
Secondary	No localized controls (0.00 % reduction)
Dispersion	
Ventilation rate	3 air changes per hour (ACH)

Predicted exposure levels

ART predicts air concentrations in a worker's personal breathing zone outside of any Respiratory Protection Equipment (RPE). The use of RPE must be considered separately.

Mechanistic model results

The predicted 90th percentile full-shift exposure is 0.000019 mg/m³.

The inter-quartile confidence interval is 0.0000086 mg/m³ to 0.000044 mg/m³.

ART REPORT – CS - 15 Treatment bath far field (copy) – 21-Dec-22

Consideration to exposure from process tanks in operators far field

Chemical details	
Chemical	Hexavalent chromium
CAS No.	(unknown)

Scenario details	
Number of activities	1
Total duration (mins)	420
Nonexposure period (mins)	0

Metadata	
ART version	1.5
Creator	pholman@te.com
Date created	28-Nov-22
Date last edited	21-Dec-22

Details for Activity Consideration of process solutions in operators far field

Emission sources: Near field

Far field ✓

Duration (mins): 420

Far-field exposure

Operational Conditions

Substance emission potential	
Substance product type	Powders dissolved in a liquid or incorporated in a liquid matrix
Liquid matrix weight fraction	Minor
Viscosity	Low
Activity emission potential	
Activity class	Activities with relatively undisturbed surfaces (no aerosol formation)
Situation	Open surface 0.3 - 1 m^2
Surface contamination	
Process fully enclosed?	No
Effective housekeeping practices in place?	Yes
Dispersion	
Work area	Indoors
Room size	3000 m^3

Risk Management Measures

Localised controls	
Primary	Fixed capturing hood (90.00 % reduction)
Secondary	No localized controls (0.00 % reduction)
Segregation	No segregation (0.00 % reduction)
Personal enclosure	No personal enclosure (0.00 % reduction)
Dispersion	
Ventilation rate	3 air changes per hour (ACH)

Predicted exposure levels

ART predicts air concentrations in a worker's personal breathing zone outside of any Respiratory Protection Equipment (RPE). The use of RPE must be considered separately.

Mechanistic model results

The predicted 90th percentile full-shift exposure is 0.0000057 mg/m^3.

The inter-quartile confidence interval is 0.0000026 mg/m^3 to 0.000013 mg/m^3.

ART REPORT – CS - 16 Drying of components 2 – 03-Jan-23

Drying of components through auto dryer (blown air air knife)

Chemical details	
Chemical	Chromium Trioxide
CAS No.	1333-82-0

Scenario details	
Number of activities	1
Total duration (mins)	45
Nonexposure period (mins)	0

Metadata	
ART version	1.5
Creator	pholman@te.com
Date created	28-Nov-22
Date last edited	03-Jan-23

Details for Activity Automated air knife dryer unit for drying rinse water from jigs/racks holding components post processing

Emission sources: Near field

Far field ✓

Duration (mins): 45

Far-field exposure

Operational Conditions

Substance emission potential	
Substance product type	Powders dissolved in a liquid or incorporated in a liquid matrix
Liquid matrix weight fraction	Small
Viscosity	Low
Activity emission potential	
Activity class	Surface spraying of liquids
Situation	Very low application rate (< 0.03 l/minute)
Spray direction	Only horizontal or downward
Spray technique	Spraying with no or low compressed air use
Surface contamination	
Process fully enclosed?	No
Effective housekeeping practices in place?	Yes
Dispersion	
Work area	Indoors
Room size	3000 m³

Risk Management Measures

Localised controls	
Primary	No localized controls (0.00 % reduction)
Secondary	No localized controls (0.00 % reduction)
Segregation	No segregation (0.00 % reduction)
Personal enclosure	No personal enclosure (0.00 % reduction)
Dispersion	
Ventilation rate	3 air changes per hour (ACH)

Predicted exposure levels

ART predicts air concentrations in a worker's personal breathing zone outside of any Respiratory Protection Equipment (RPE). The use of RPE must be considered separately.

Mechanistic model results

The predicted 75th percentile full-shift exposure is 0.0012 mg/m³.

The inter-quartile confidence interval is 0.00057 mg/m³ to 0.0026 mg/m³.

ANNEX IV: LEV TEST RESULTS (SURVEY MARCH 2021)

VENTILATION TEST DETAILS
Test Equipment: VA = Vane Anemometer Measurements: Velocity (m/s)
HWA = Hot Wire Anemometer Air Volume (m3/s)
PST = Pitot Static Tube Static Pressure (Pa)

TEST RESULTS DATE OF TEST**: 24-03-21**

No	Substance	Equip	Test	Reading m/s	Volume m3/s	Design m/s
A1	HWR	HWA	Velocity	5.1	N/A	0.25-0.50
A3B	HWR	HWA	Velocity	3.4	N/A	0.25-0.50
A4	Potassium permanganate	HWA	Velocity	5.2	N/A	0.25-0.50
A6	Alkaline cleaner	HWA	Velocity	3.5	N/A	0.25-0.50
A8	Hydrochloric dip	HWA	Velocity	5.6	N/A	0.25-0.50
A10	Electro polish	HWA	Velocity	6.3	N/A	0.25-0.50
A12	HWR	HWA	Velocity	3.9	N/A	0.25-0.50
A13	Andic etch	HWA	Velocity	6.5	N/A	0.25-0.50
A15	Acid dip	HWA	Velocity	6.6	N/A	0.25-0.50
A18	Sulphamate nickel	HWA	Velocity	5.9	N/A	0.25-0.50
A20	Woods nickel	HWA	Velocity	8.5	N/A	0.25-0.50
A22	Cold cleaner	HWA	Velocity	9.1	N/A	0.25-0.50
A24	Gold strip	HWA	Velocity	8.2	N/A	0.25-0.50
A25/26	Zinc nickel plate	HWA	Velocity	7.9	N/A	0.25-0.50

DOES PLANT ACHIEVE REQUIRED PERFORMANCE: **PASS**
Extraction rates at most tanks were good; mists were shown to be drawn towards high velocity slots.
Consider placing more hazardous chemicals within highest performing dip tank or consider rebalancing of respective dampers to balance flow rates more evenly.

VENTILATION TEST DETAILS
Test Equipment: VA = Vane Anemometer Measurements: Velocity (m/s)
HWA = Hot Wire Anemometer Air Volume (m3/s)
PST = Pitot Static Tube Static Pressure (Pa)

TEST RESULTS DATE OF TEST**: 24-03-21**

No	Substance	Equip	Test	Reading m/s	Volume m3/s	Design m/s
B28	Silver strike	HWA	Velocity	11.4	N/A	0.25-0.50
B30	Silver plate	HWA	Velocity	7.9	N/A	0.25-0.50
B33	Acid dip	HWA	Velocity	6.2	N/A	0.25-0.50
B35	Gold strike	HWA	Velocity	7.1	N/A	0.25-0.50
B36	Gold plate	HWA	Velocity	7.6	N/A	0.25-0.50
B39	Gold plate	HWA	Velocity	7.0	N/A	0.25-0.50
B41	Gold plate	HWA	Velocity	4.2	N/A	0.25-0.50
B43	Zinc nickel plate	HWA	Velocity	5.0	N/A	0.25-0.50
B46	Alkaline cleaner	HWA	Velocity	7.2	N/A	0.25-0.50
B48	Chemical polish	HWA	Velocity	5.9	N/A	0.25-0.50
B49	Warm acid dip	HWA	Velocity	5.2	N/A	0.25-0.50

DOES PLANT ACHIEVE REQUIRED PERFORMANCE: **PASS**
Extraction rates at most tanks were good; mists were shown to be drawn towards high velocity slots.
Consider placing more hazardous chemicals within highest performing dip tank or consider rebalancing of respective dampers to balance flow rates more evenly.

VENTILATION TEST DETAILS
Test Equipment: VA = Vane Anemometer Measurements: Velocity (m/s)
HWA = Hot Wire Anemometer Air Volume (m3/s)
PST = Pitot Static Tube Static Pressure (Pa)

TEST RESULTS DATE OF TEST**: 24-03-21**

No	Substance	Equip	Test	Reading m/s	Volume m3/s	Design m/s
C51	Post dip	HWA	Velocity	6.1	N/A	0.25-0.50
C52	Olive drab	HWA	Velocity	7.0	N/A	0.25-0.50
C54	Black passive	HWA	Velocity	8.3	N/A	0.25-0.50
C56B	Black passive zinc	HWA	Velocity	6.8	N/A	0.25-0.50
C59	Copper plate	HWA	Velocity	7.4	N/A	0.25-0.50
C61	Copper plate	HWA	Velocity	7.9	N/A	0.25-0.50
C63	Tin plate	HWA	Velocity	6.3	N/A	0.25-0.50
C66	Acid dip	HWA	Velocity	8.8	N/A	0.25-0.50
C67	Sulphamate nickel	HWA	Velocity	9.2	N/A	0.25-0.50
C68	Sulphamate nickel	HWA	Velocity	3.9	N/A	0.25-0.50
C70	Sulphamate nickel	HWA	Velocity	4.3	N/A	0.25-0.50
C72A	Etch drag out	HWA	Velocity	10.3	N/A	0.25-0.50
C72B	Alkaline etch	HWA	Velocity	9.3	N/A	0.25-0.50

DOES PLANT ACHIEVE REQUIRED PERFORMANCE: **PASS**
Extraction rates at most tanks were good; mists were shown to be drawn towards high velocity slots.
Consider placing more hazardous chemicals within highest performing dip tank or consider rebalancing of respective dampers to balance flow rates more evenly.

VENTILATION TEST DETAILS
Test Equipment: VA = Vane Anemometer Measurements: Velocity (m/s)
HWA = Hot Wire Anemometer Air Volume (m3/s)
PST = Pitot Static Tube Static Pressure (Pa)

TEST RESULTS DATE OF TEST**: 24-03-21**

No	Substance	Equip	Test	Reading m/s	Volume m3/s	Design m/s
D74	Soak cleaner	HWA	Velocity	2.8	N/A	0.25-0.50
D75	Alkaline etch	HWA	Velocity	5.9	N/A	0.25-0.50
D77	Desmut	HWA	Velocity	5.5	N/A	0.25-0.50
D78	Desmut drag out	HWA	Velocity	5.5	N/A	0.25-0.50
D79	Dezincate	HWA	Velocity	5.2	N/A	0.25-0.50
D81	Zincate	HWA	Velocity	1.6	N/A	0.25-0.50
D82	Zincate drag out	HWA	Velocity	1.7	N/A	0.25-0.50
D84/85	RoHs Nip	HWA	Velocity	8.3	N/A	0.25-0.50
D86/87	RoHs Nip	HWA	Velocity	8.6	N/A	0.25-0.50
D90	Zinc plate	HWA	Velocity	5.7	N/A	0.25-0.50
D94	Zinc plate	HWA	Velocity	1.5	N/A	0.25-0.50
D95	Zinc plate	HWA	Velocity	1.8	N/A	0.25-0.50

DOES PLANT ACHIEVE REQUIRED PERFORMANCE: **PASS**
Extraction rates at most tanks were good; mists were shown to be drawn towards high velocity slots.
Consider placing more hazardous chemicals within highest performing dip tank or consider rebalancing of respective dampers to balance flow rates more evenly.

VENTILATION TEST DETAILS
Test Equipment: VA = Vane Anemometer Measurements: Velocity (m/s)
HWA = Hot Wire Anemometer Air Volume (m3/s)
PST = Pitot Static Tube Static Pressure (Pa)

TEST RESULTS DATE OF TEST**: 24-03-21**

No	**Substance**	**Equip**	**Test**	**Reading m/s**	**Volume m3/s**	**Design m/s**
E96	Cadmium plate	HWA	Velocity	6.6	N/A	0.25-0.50
E97	Cadmium plate	HWA	Velocity	3.9	N/A	0.25-0.50
E102	Cadmium plate	HWA	Velocity	10.9	N/A	0.25-0.50
E104	Kadip	HWA	Velocity	3.8	N/A	0.25-0.50
E108	Olive drab	HWA	Velocity	1.6	N/A	0.25-0.50
E110	Olive drab	HWA	Velocity	4.5	N/A	0.25-0.50
E112	Nitric stripper	HWA	Velocity	2.7	N/A	0.25-0.50
E113	Nitric stripper	HWA	Velocity	5.8	N/A	0.25-0.50
No	**MAIN TRAVERSES**	**Equip**	**Test**	**Reading m/s**	**Pressure**	**Design m/s**
TPA	Main Duct Line A 500mm dia	PST	Velocity	6.3	-132pa	Up to 10
TPB	Main Duct Line B 500mm dia	PST	Velocity	5.7	-120pa	Up to 10
TPC	Main Duct Line C 500mm dia	PST	Velocity	5.7	-146pa	Up to 10
TPD	Main Duct Line D 500mm dia	PST	Velocity	5.4	-139pa	Up to 10
TPE	Main Duct Line E 500mm dia	PST	Velocity	4.2	-144pa	Up to 10

DOES PLANT ACHIEVE REQUIRED PERFORMANCE: **PASS**
Extraction rates at most tanks were good; mists were shown to be drawn towards high velocity slots.
Consider placing more hazardous chemicals within highest performing dip tank or consider rebalancing of respective dampers to balance flow rates more evenly.

ANNEX V: LABORATORY FUME CUPBOARD & EXTRACTION SYSTEM (SURVEY MARCH 2021)

LOCAL EXHAUST VENTILATION
(LEV) PLANT TEST CERTIFICATE

airisQ

COMPANY	TE CONNECTIVITY	LEV No: 29-A
ADDRESS	Building K19 4 Stanier Road St Leonards-on-Sea East Sussex	
LOCATION OF LEV	Electroplating Shop Twin Laboratory fume cupboards.	
PROCESS / SUBSTANCE CONTROLLED	Extraction of various solvent vapours & fumes generated within cabinet.	
FAN DETAILS	MANUF: - Not known TYPE: - centrifugal PVC SER.No: - Not known DRIVE: - Direct driven in roof void	
FILTER / COLLECTOR DETAILS	MANUF: - Fumair Ltd TYPE: - SER.No: - FC01 & FC02	
BAG CLEANING:	- Not applicable	
MAX. No. OF HOODS / ENCLOSURES:	- 1-no cabinet	
CONDITION OF LEV PLANT	Satisfactory, sash alarms, stops and airflow alarms were working.	

VENTILATION TEST DETAILS

Test Equipment: VA = Vane Anemometer; HWA = Hot Wire Anemometer; PST = Pitot Static Tube

Measurements: Velocity (m/s); Air Volume (m^3/s); Static Pressure (Pa)

TEST RESULTS DATE OF TEST: **24-03-21**

No	Location / Size	Equip	Test	Reading m/s	Air Volume m^3/s	Design m/s
A	FC01 Sash at 500mm height	HWA	Velocity	0.62	0.372	0.50
	1200mm wide					

DOES PLANT ACHIEVE REQUIRED PERFORMANCE: PASS

Tested with equipment in unit.

0.67	0.63	0.61	0.59
0.69	0.67	0.61	0.58
0.69	0.60	0.53	0.52

Average face velocity =0.62m/s

(x) denotes equipment at this location

VENTILATION TEST DETAILS

Test Equipment: VA = Vane Anemometer; HWA = Hot Wire Anemometer; PST = Pitot Static Tube

Measurements: Velocity (m/s); Air Volume (m^3/s); Static Pressure (Pa)

TEST RESULTS DATE OF TEST: **24-03-21**

No	Location / Size	Equip	Test	Reading m/s	Air Volume m^3/s	Design m/s
B	FC02 Sash at 500mm height	HWA	Velocity	0.52	0.312	0.50
	1200mm unit					

DOES PLANT ACHIEVE REQUIRED PERFORMANCE: PASS

Tested with equipment in unit.

0.57	0.48	0.54	0.51
0.57	0.50	0.53	0.51
0.50	0.48	0.50	0.52

Average face velocity =0.52m/s

(x) denotes equipment at this location

LOCAL EXHAUST VENTILATION (LEV) PLANT TEST CERTIFICATE

COMPANY	TE CONNECTIVITY	LEV No: 32-A
ADDRESS	Building K19 4 Stanier Road St Leonards-on-Sea East Sussex	
LOCATION OF LEV	Electroplating Shop Electroplating dip tanks served by fume scrubber extraction plant	
PROCESS / SUBSTANCE CONTROLLED	Extraction of acid/caustic fumes from various substances	
FAN DETAILS	MANUF: - Not known TYPE: - Centrifugal SER.No: - Not known DRIVE: - Belt driven	
FILTER / COLLECTOR DETAILS	MANUF: - Not known TYPE: - Wet spray scrubber SER.No: - Not known	
	BAG CLEANING: - Not applicable	
MAX. No. OF HOODS / ENCLOSURES:	- Extraction from 5 banks of tanks	
CONDITION OF LEV PLANT	Plant appears to be in good condition, with all controls operating satisfactorily. Site carry out their own basic but reasonable daily airflow checks.	

SCHEMATIC LAYOUT OF SYSTEM