

ES FOR COMMUNICATION

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Use 2: Industrial application of paints on metal surfaces (such as machines vehicles, structures, signs, road furniture, coil coating etc.)

Authorisation Number: REACH/16/3/7

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Appendix: Verification of DCC PY.34 & PR.104 RMM and OC

Reader guide

Pigment Yellow 34 (PY.34) and Pigment Red 104 (PR.104) are restricted to industrial and professional uses within the paints/coatings and plastics sector as listed in the exposure scenarios (ES) for communication. The pigments must not be used for decorative coatings, children's articles (including toys, paints, jewelry and equipment), consumer products, printing inks for consumer products, food and food packaging, drugs and medical devices, ceramics and glassware, cosmetics and tattoos.

This document provides an overview of activities or contributing scenarios (CS) and exposure scenarios (ES) related to:

Use 2: Industrial use of paints (including service life)

- ES 2: Use at industrial site; Industrial application of paints on metal surfaces (machines, vehicles, structures, signs, road furniture, coil coating).
- ES 4: Service life (worker at industrial site); Service life of coated articles.

Similar documents are also available for the following activities:

Use 1: Formulation of paints

- ES 1: Formulation; Distribution and mixing pigment powder in an industrial environment into solvent-based paints for non-consumer use.

Use 3: Professional use of paints (including service life) including road marking

- ES 3: Use by professional worker; Professional, non-consumer application of paints on metal surfaces (machines, vehicles, structures, signs, road furniture) or as road marking.
- ES 5: Service life (professional worker); Service life of coated articles.

Use 4: Formulation of plastics

- ES 6: Formulation; Distribution and mixing pigment powder in an industrial environment into liquid or solid premix to colour plastic/plasticised articles.

Use 5: Industrial use of plastics (including service life and the use of plastic covered materials and articles)

- ES 7: Use at industrial site; Use of colour premixes and pre-compounds to colour plastic or plasticised articles for non-consumer use.
- ES 9: Service life (worker at industrial site); Service life of coloured plastic or plasticised articles.

Use 6: Professional use of plastics (including service life) including hotmelt road marking

- ES 8: Use by professional worker; Use of colour premixes and pre-compounds in the application of hotmelt road marking.
- ES 10: Service life (professional worker); Service life of coloured plastic or plasticised articles.

DCC in collaboration with its customers, identified the various exposure scenarios for each of these uses throughout the supply chain. This document serves to highlight the recommended operational conditions and risk management measures for the above uses to ensure these pigments are handled in a safe and responsible manner.

The risk management measures and operational conditions may vary from site to site; however, the objective is to achieve the DMELs assigned to these pigments (see section 4 of eSDS & section 8 of SDS). Each site handling PY.34 and PR.104 must ensure workplace exposures are adequately controlled and proper risk assessments are carried out regularly.

Prior to using DCC PY.34 and PR.104, it is important to verify that the intended use of these pigments falls within the scope of the permitted uses as described within this document and that the listed measures are in place to protect the worker and the environment.

This Appendix to the Safety Data Sheet (SDS) lists the operational conditions and risk management measures that are required for the use of DCC PR.104 under Use 2: Industrial use of paints (including service life). The details are summarised in Section 1.

The Workplace Instruction Cards (WICs) contained within Section 2 of this document are guidelines for specific worker functions. These WICs are intended to be posted or readily accessible at the various worker stations.

The detailed explanations of the conditions of use, exposure scenarios (ES) and relevant contributing scenarios (CS) are contained within Section 3, 4 and 5. These sections provide important information on the risk management measures, how to implement them and how to ensure their effectiveness.

Finally, the Appendix is the risk management measures and operational conditions verification form, to be completed for each worker handling or using DCC PY.34 or PR.104. The form needs to be completed with data on biomonitoring (blood lead) and air monitoring for each worker which is in line with the requirements of the final authorisation decision (Commission Implementing Decision C(2016) 5644 of 07.09.2016).

It is recommended to provide DCC with a copy of the completed Verification of DCC PY.34 & PR.104 RMM and OC forms on an annual basis, every March summarising the results of previous year. This form can also be the basis for the submission requirement to ECHA.

1. Summary of related worker functions

This section summarizes the worker functions that were identified within the use applied for. The table further indicates the specific activities that a worker is expected to perform within the defined function and the technical, organisational and risk management measures that are applicable for that worker. This section can be used to quickly identify the requirements as set for your workers to work safely. Also it enables you to directly refer to the applicable Workplace Instruction Card (WIC) in Section 2, using the “WICxx” code.

Table 1 provides an overview of activities (contributing scenarios) that are covered for Use 2. The activities are grouped per function. The table contains the following information:

- Tasks: a short description of the contributing scenario. Please refer to Section 4 and 5 of this Annex to the SDS for a further explanation on the contributing scenarios.
- Process category (PROC): a description of the activity in terms of the ECHA use descriptor system.
- Technical risk management measures (RMM) to be implemented per function for safe use. Please refer to Section 3 of this Annex to the SDS for a further explanation on the measures.
- Organisational risk management measures (RMM) to be implemented per function for safe use. The maximum duration per week is represented for each scenario and function.

Personal protective equipment (PPE): the minimum respiratory protective equipment to be used per function for safe use. Generic information on the use of gloves is included in Section 3 of this Annex to the SDS.

Please note the prescribed risk management measures shown in Table 1 are for guidance where the overall objective is to achieve the required DMELs.

Table 1. Overview of tasks per function for Use 2 (ES2 + ES4)

Function	Workplace instruction card (WIC)	Contributing scenario (CS)	Tasks (description of Contributing Scenario)	Process category (PROC)	Technical RMM			Organisational RMM	RPE
					Containment of source	Personal enclosure (PE) / segregation (SEG)	Local exhaust ventilation (LEV)	Hours per week	Minimum Respiratory protective equipment (APF ¹)
Spray painter manual	WIC07	CS3	Handling of packaged colour paste and/or paint, including distribution	PROC-2	Y			5	-
		CS7	Mixing of paste and/or coating with extra solvents or additives before use	PROC-5	Y			5	20
		CS8	Filling of spray equipment with pigment paints in dedicated settings	PROC-8a				5	20
		CS12	Manual pigment paint spray application in an industrial booth	PROC-7			Y (spray room)	25	400
			Total					40	
Spray painter automated spray booth	WIC08	CS3	Handling of packaged colour paste and/or paint, including distribution	PROC-2				5	-
		CS9	Filling of spray equipment with pigment paints in dedicated settings	PROC-8b		-	-	5	20
		or CS8	Filling of equipment with pigment paint	or PROC 8a		-	-	5	20
		or CS10	Transfer of pigment paint to/from drums/cans e.g. at a filling line before application	or PROC 9		Y (SEG)	Y	5	20
		CS11	Automated pigment paint spray application in an industrial booth	PROC-7		Y (PE / SEG)		30	10
	Total					40			
Lab worker / Quality control	WIC09	CS2	Laboratory handling of pigment paste and/or paints	PROC-15			Y	10	-
		CS14	Pigment paint testing by brushing/rolling	PROC-10			Y	20	-
			Total					30	
Heat Curing paint	WIC10	CS3	Handling of packaged colour paste and/or paint, including distribution	PROC-2				5	-

¹ Level of respiratory protection that can realistically be expected to be achieved in the workplace by 95% of adequately trained and supervised wearers using a properly functioning and correctly fitted respiratory protective device.

Function	Workplace instruction card (WIC)	Contributing scenario (CS)	Tasks (description of Contributing Scenario)	Process category (PROC)	Technical RMM			Organisational RMM	RPE
					Containment of source	Personal enclosure (PE) / segregation (SEG)	Local exhaust ventilation (LEV)	Hours per week	Minimum Respiratory protective equipment (APF ¹)
applicator		CS9	Filling of spray equipment with pigment paints in dedicated settings	PROC-8b		-	-	5	20
		or CS8	filling of equipment with pigment paint	or PROC 8a		-	-	5	20
		or CS10	Transfer of pigment paint to/from drums/cans e.g. at a filling line before application	or PROC 9		Y (SEG)	Y	5	20
		CS15	Pigment paint application and heat curing	PROC-6				30	-
		Total					40		
Mixer	WIC11	CS4	Mixing colour paste with paint in closed mixing machine with automated dosing of paste	PROC-3	Y (SEG)	Y		35	-
		CS5	Equipment cleaning: scraping, brushing and wiping	PROC-10	Y			5	-
		Total					40		
Filler	WIC12	CS6	Dried pigment paste and/or paint cleaning	PROC-21				5	20
		CS13	Handling and manipulation of dried painted articles	PROC-21				35	-
		Total					40		
Service life or painted articles in an industrial setting									
Maintenance worker in industrial setting	WIC13	CS2	Cutting painted metal sheet (dry)	PROC-21				40	10
		CS3	Sanding of dried paint on machines, vehicles, other metal articles etc.	PROC-24			Y	6	30
		CS4	Welding, torch cutting of painted metal (dry)	PROC-25			Y	6	100
		Total					40²		

² The limit value for the two pigments is based on an exposure duration of 40 hours per working week. Therefore the maximum duration for any function is 40 even though for this function the summed duration per task can be over 40 hours.

2. Workplace Instruction Cards

This section contains the applicable Workplace Instruction Cards (WIC) for this use. These cards describe the risk management measures from a worker point of view. It lists all the risk management measures that need to be in place to allow the worker to perform his tasks with the pigments safely. It is recommended to provide these documents to your workers and implement the use in their daily routine to ensure responsible handling of DCC PY.34 and PR.104.

The WICs contain information on the following:

- Organisational measures: maximum duration of use per week.
- Risk management measures: technical and personal, including the minimum Assigned Protection Factor (APF) for respiratory protective equipment (RPE).
- Good practice advice.
- Hazard properties of the substance: signal words, hazard symbols and hazard statements.

In the WIC the APF's were consolidated wherever possible to reduce the different respirators required at hand. The exact values needed can be found in Table 1 and Section 4 and 5 of this document. In case of consolidation of RPE for a worker with multiple activities, we selected the highest APF. The pictures of respirators are exemplary.

Note: prior to working with PY.34 and PR.104, ensure workers have completed:







- Proper training on the risk of the substances.
- Proper training on the use and maintenance of personal protective equipment.
- Fit testing of RPE.
- Medical fitness test.

WORKPLACE INSTRUCTION CARD (WIC07)

Version 1.0

SPRAY PAINTER MANUAL

Manual spraying of paint containing DCC PY.34 / PR.104 in an industrial spray booth including preparatory work




Operation conditions and risk management measures needed to ensure worker protection		
Maximum duration	Total 40 hours per week	
Risk management measures (RMM)		
Technical RMM	Closed containers: Handling and distribution	
	Closed vessels: Mixing of paste and/or coating with extra solvents or additives	
	Spray booth: spraying of paint	
	Good general ventilation: 3 air changes per hour	
Conditions and measures related to personal protection equipment (PPE), hygiene and health evaluation	Demand valve breathing apparatus with positive pressure self-contained demand – full face mask, minimum assigned protection factor of 400: <ul style="list-style-type: none"> • Spray painting (manual) 	
	Half face mask P3, minimum assigned protection factor 20: <ul style="list-style-type: none"> • Mixing of paste and/or coatings with additives or solvents • Filling of equipment with pigment paint 	
	A powered respirator is needed, if it is used for more than 60 minutes at a time	
	Use chemically impervious gloves; take into account other substances used (e.g. solvents)	
Good practice advice (please refer to SDS section 1-16 for additional information)		
Do not eat, drink or smoke at workplace	 	
Wash hands after use		
Environmental / Spillage instructions	Use gloves. Scoop up and store in suitable container. Absorb residual material. Flush spill area with water spray. Do not flush to sewer. Prevent run-off from entering drains, sewers or waterways. Dispose of collected material as hazardous waste. Dispose of contents/container in accordance with local, national and international regulation	
Properties of the substance, hazard and precautionary statements		
Signal word & hazard symbols	Danger  	
Hazard statements	H317: May cause an allergic skin reaction H334: May cause allergy or asthma symptoms or breathing difficulties if inhaled H350: May cause cancer H360Df: May damage the unborn child. Suspected of damaging fertility H373: May cause damage to organs through prolonged inhalation H410: Very toxic to aquatic life with long lasting effects	

WORKPLACE INSTRUCTION CARD (WIC08)

Version 1.0

SPRAY PAINTER AUTOMATED SPRAY BOOTH

Spraying of paint containing DCC PY.34 / PR.104 in an automated spray booth in an industrial setting including preparatory work



Operation conditions and risk management measures needed to ensure worker protection		
Maximum duration	Total 40 hours per week	
Risk management measures (RMM)		
Technical RMM	Closed containers: handling and distribution of paint	
	Complete segregation with ventilation and filtration of recirculated air and Complete personal enclosure with ventilation: automated pigment spray painting	
	Spray booth : spraying of paint (automated)	
	Good general ventilation: 3 air changes per hour	
	Partial segregation: filling and transfer equipment and Local Exhaust Ventilation (LEV), fixed capturing hood Transfer of 10 - 100 L/minute (filling line)	
Conditions and measures related to personal protection equipment (PPE), hygiene and health evaluation	Half face mask P3, minimum assigned protection factor 20 <ul style="list-style-type: none"> • Transfer of pigment paint (all speeds) 	
	Half face mask P2, minimum assigned protection factor 10 <ul style="list-style-type: none"> • Pigment paint spraying (automated) 	
	A powered respirator is needed, if it is used for more than 60 minutes at a time	
	Use chemically impervious gloves; take into account other substances used (e.g. solvents)	
Good practice advice (please refer to SDS section 1-16 for additional information)		
	Do not eat, drink or smoke at workplace	
	Wash hands after use	
Environmental measures / Spillage instructions	Use gloves. Scoop up and store in suitable container. Absorb residual material. Flush spill area with water spray. Do not flush to sewer. Prevent run-off from entering drains, sewers or waterways. Dispose of collected material as hazardous waste. Dispose of contents/container in accordance with local, national and international regulation.	
Properties of the substance, hazard and precautionary statements		
Signal word & hazard symbols	Danger	
Hazard statements	H317: May cause an allergic skin reaction H334: May cause allergy or asthma symptoms or breathing difficulties if inhaled H350: May cause cancer H360Df: May damage the unborn child. Suspected of damaging fertility H373: May cause damage to organs through prolonged inhalation H410: Very toxic to aquatic life with long lasting effects	

WORKPLACE INSTRUCTION CARD (WIC09)

Version 1.0

LAB AND QUALITY CONTROL WORKER

Laboratory work or quality control with pastes or paints containing DCC PY.34 / PR.104 in an industrial setting





Operation conditions and risk management measures needed to ensure worker protection		
Maximum duration	Total 30 hours per week	
Risk management measures (RMM)		
Technical RMM	Fume cupboard: handling paste and/or paint Good general ventilation: 3 air changes per hour	
Conditions and measures related to personal protection equipment (PPE), hygiene and health evaluation	Use chemically impervious gloves; take into account other substances used (e.g. solvents)	
Good practice advice (please refer to SDS section 1-16 for additional information)		
	Do not eat, drink or smoke at workplace Wash hands after use	
Environmental measures / Spillage instructions	Use gloves. Scoop up and store in suitable container. Absorb residual material. Flush spill area with water spray. Do not flush to sewer. Prevent run-off from entering drains, sewers or waterways. Dispose of collected material as hazardous waste. Dispose of contents/container in accordance with local, national and international regulation	
Properties of the substance, hazard and precautionary statements		
Signal word & hazard symbols	Danger	
Hazard statements	H317: May cause an allergic skin reaction H334: May cause allergy or asthma symptoms or breathing difficulties if inhaled H350: May cause cancer H360Df: May damage the unborn child. Suspected of damaging fertility H373 May cause damage to organs through prolonged inhalation H 410: Very toxic to aquatic life with long lasting effects	

WORKPLACE INSTRUCTION CARD (WIC10)

Version 1.0

HEAT CURING PAINT APPLICATOR

Application of heat curing paint containing DCC PY.34 / PR.104 in an industrial setting, including preparation





Operation conditions and risk management measures needed to ensure worker protection	
Maximum duration	Total 40 hours per week
Risk management measures (RMM)	
Technical RMM	Closed containers: handling and distribution of paint
	Good general ventilation: 3 air changes per hour
	Application of paint by dipping
	Partial segregation: filling and transfer equipment and Local Exhaust Ventilation (LEV), fixed capturing hood Transfer of 10 - 100 L/minute (filling line)
Conditions and measures related to personal protection equipment (PPE), hygiene and health evaluation	Half face mask P3, minimum assigned protection factor 20 <ul style="list-style-type: none"> • Filling of (spray) equipment with pigment paint • Transfer of pigment paint at a filling line before application
	
	A powered respirator is needed, if it is used for more than 60 minutes at a time Use chemically impervious gloves; take into account other substances used (e.g. solvents)
Good practice advice (please refer to SDS section 1-16 for additional information)	
	Do not eat, drink or smoke at workplace
	Wash hands after use
	
Environmental measures / Spillage instructions	Use gloves. Scoop up and store in suitable container. Absorb residual material. Flush spill area with water spray. Do not flush to sewer. Prevent run-off from entering drains, sewers or waterways. Dispose of collected material as hazardous waste. Dispose of contents/container in accordance with local, national and international regulation.
Properties of the substance, hazard and precautionary statements	
Signal word & hazard symbols	Danger <div style="display: flex; justify-content: space-around; margin-top: 10px;">   </div>
Hazard statements	H317: May cause an allergic skin reaction H334: May cause allergy or asthma symptoms or breathing difficulties if inhaled H350: May cause cancer H360Df: May damage the unborn child. Suspected of damaging fertility H373: May cause damage to organs through prolonged inhalation H 410: Very toxic to aquatic life with long lasting effects

WORKPLACE INSTRUCTION CARD (WIC11)

Version 1.0

MIXING OPERATOR

Mixing of pigment paste containing DCC PY.34 / PR.104 into paint in an industrial setting, including cleaning activities




Operation conditions and risk management measures needed to ensure worker protection				
Maximum duration	Total 40 hours per week			
Risk management measures (RMM)				
Technical RMM	Local exhaust ventilation: handling of opened vessels			
	Closed system: paint mixing			
	Complete segregation: paint mixing			
	Good general ventilation: 3 air changes per hour			
Conditions and measures related to personal protection equipment (PPE), hygiene and health evaluation	Use chemically impervious gloves; take into account other substances used (e.g. solvents)			
Good practice advice (please refer to SDS section 1-16 for additional information)				
	<table border="0" style="width: 100%;"> <tr> <td style="width: 50%;">Do not eat, drink or smoke at workplace</td> <td rowspan="2" style="text-align: center;">  </td> </tr> <tr> <td>Wash hands after use</td> </tr> </table>	Do not eat, drink or smoke at workplace		Wash hands after use
Do not eat, drink or smoke at workplace				
Wash hands after use				
Environmental measures / Spillage instructions	Use gloves. Scoop up and store in suitable container. Absorb residual material. Flush spill area with water spray. Do not flush to sewer. Prevent run-off from entering drains, sewers or waterways. Dispose of collected material as hazardous waste. Dispose of contents/container in accordance with local, national and international regulation.			
Properties of the substance, hazard and precautionary statements				
Signal word & hazard symbols	<p>Danger</p> 			
Hazard statements	<p>H317: May cause an allergic skin reaction H334: May cause allergy or asthma symptoms or breathing difficulties if inhaled H350: May cause cancer H360Df: May damage the unborn child. Suspected of damaging fertility H373: May cause damage to organs through prolonged inhalation H 410: Very toxic to aquatic life with long lasting effects</p>			

WORKPLACE INSTRUCTION CARD (WIC12)

Version 1.0

FILLER

Handling of dried painted articles and cleaning of residues of paste or pigments containing DCC PY.34 / PR.104 in an industrial facility






Operation conditions and risk management measures needed to ensure worker protection		
Maximum duration	Total 40 hours per week	
Risk management measures (RMM)		
Technical RMM	Good general ventilation: 3 air changes per hour	
Conditions and measures related to personal protection equipment (PPE), hygiene and health evaluation	Half face mask P3, minimum assigned protection factor 20: <ul style="list-style-type: none"> • Dried pigment paste and/or paint cleaning 	
	A powered respirator is needed, if it is used for more than 60 minutes at a time	
	Use chemically impervious gloves; take into account other substances used (e.g. solvents)	
Environmental measures	Material must not be flushed down the drain	
	Waste water & emptied containers have to be disposed of to a waste collector with the proper certificate	
Good practice advice (please refer to SDS section 1-16 for additional information)		
	Do not eat, drink or smoke at workplace	
	Wash hands after use	
Environmental measures /Spillage instructions	Use gloves. Scoop up and store in suitable container. Absorb residual material. Flush spill area with water spray. Do not flush to sewer. Prevent run-off from entering drains, sewers or waterways. Dispose of collected material as hazardous waste. Dispose of contents/container in accordance with local, national and international regulation.	
Properties of the substance, hazard and precautionary statements		
Signal word & hazard symbols	Danger	
Hazard statements	H317: May cause an allergic skin reaction H334: May cause allergy or asthma symptoms or breathing difficulties if inhaled H350: May cause cancer H360Df: May damage the unborn child. Suspected of damaging fertility H373: May cause damage to organs through prolonged inhalation H410: Very toxic to aquatic life with long lasting effects	

WORKPLACE INSTRUCTION CARD (WIC13)

Version 1.0

MAINTENANCE WORKER IN INDUSTRIAL SETTING

Handling/processing articles containing DCC PY.34 / PR.104 by maintenance workers in an industrial setting

Operation conditions and risk management measures needed to ensure worker protection		
Maximum duration	Total 40 hours per week	
Risk management measures		
Technical RMM	Integrated Local Exhaust Ventilation Good general ventilation: 3 air changes per hour	
Conditions and measures related to personal protection equipment (PPE), hygiene and health evaluation	Half face mask P2, minimum assigned protection factor 10: <ul style="list-style-type: none"> Cutting painted metal sheet (dry) 	
	Full face mask P3, Minimum assigned protection factor 30: <ul style="list-style-type: none"> Sanding of dried paint on machines, vehicles, other metal articles etc. 	
	Welding hood with independent air supply, with minimum assigned protection factor 100: <ul style="list-style-type: none"> Welding, torch cutting of painted metal (dry) 	
	A powered respirator is needed, if it is used for more than 60 minutes at a time Use chemically impervious gloves; take into account other substances used (e.g. solvents)	
Good practice advice (please refer to SDS section 1-16 for additional information)		
	Do not eat, drink or smoke at workplace Wash hands after use	
Environmental measures / Spillage instructions	Vacuum with industrial vacuum cleaner fitted with HEPA filter, dispose of dust bag as hazardous waste. Dispose of contents/container in accordance with local, national and international regulation.	
Properties of the substance, hazard and precautionary statements		
Signal word & hazard symbols	Danger	
Hazard statements	H317: May cause an allergic skin reaction H334: May cause allergy or asthma symptoms or breathing difficulties if inhaled H350: May cause cancer H360Df: May damage the unborn child. Suspected of damaging fertility H373: May cause damage to organs through prolonged inhalation H410: Very toxic to aquatic life with long lasting effects	

3. Explanation on workplace instruction cards

This section explains how to interpret, implement and monitor the use of the risk management measures as prescribed in the Workplace Instruction Cards (Section 2). This section is aimed at line management and HSE personnel.

In selecting risk management measures (RMM) the hierarchy of control needs to be applied. This means that risk management measures must be selected based on the order of priority listed below:

1. Elimination
2. Substitution
3. Engineering controls
4. Administrative controls
5. Personal protective clothes and equipment

Risk management must provide effective worker protection while taking into consideration the economic feasibility. As such, measures of a lower order are only allowed if the higher order RMM do not result in adequate protection or if these RMM are not possible or not feasible from an economic point of view.


Over the years, the use of PY.34 and PR.104 has declined. However, the permitted use of PY.34 and PR.104 remains where technical performance and economic feasibility cannot be met by elimination and/or substitution.

3.1 Engineering controls - Technical risk management measures

Table 2 provides an overview of the technical risk management measures that have been applied in the exposure models. The user must check the description to confirm that the RMM complies with the listed values. For technical RMM which are dependent on maintenance, proper installment and correct use, the user must ensure that following conditions are met:

- Equipment is designed for a specific workplace and the equipment is used within the boundaries set by the manufacturer;
- Maintenance is performed according to the manufacturers instructions and documentation on the maintenance is kept;
- Workers are instructed in the proper use of the technical risk management measures. Training needs to be documented;
- Management supervision on the proper use of technical risk management measures is in place.

Table 2. Overview of technical risk measurement measures used in modelling and their effectiveness

Type of RMM	Description	Effectiveness ³
Containment of source (Advanced REACH Tool)		
Low level containment	<p>Physical containment or enclosure of the source of emission. The air within the enclosure is not actively ventilated or extracted. The enclosure is not opened during the activity. The process is performed in a vessel with a loose lid or cover, which is not air tight.</p>  <p>This class also includes bags or liners fitted around transfer points from source to receiving vessel. These include Muller seals, Stott head and single bag, and associated clamps and closures.</p>	90%

³ The listed effectiveness is the effectiveness used in the models. This effectiveness may be assumed to be present if the actual risk management measure at the workplace fulfils the description. For the technical RMM they should be designed and installed by qualified companies and staff, maintenance and periodic checks need to be performed according to the manufacturers' instruction. It is advised that these are documented.

Type of RMM	Description	Effectiveness ³
Medium level containment	<p>Physical containment or enclosure of the source of emission. The air within the enclosure is not actively ventilated or extracted. The enclosure is not opened during the activity.</p> <p>The material transfer is enclosed with the receiving vessel being docked or sealed to the source vessel.</p> <p>Examples include sealing heads, transfer containers and multiple o-rings. Inflatable packing head with continuous liner ensures a seal is maintained during the powder transfer and the continuous plastic liner prevents direct contact with the product. The correct type of tie off must be used.</p>	99%
High level containment	<p>Physical containment or enclosure of the source of emission. The air within the enclosure is not actively ventilated or extracted. The enclosure is not opened during the activity.</p> <p>The substance is contained within a sealed and enclosed system. This class includes metal smelting furnaces or atomisation units.</p> <p>The material transfer is entirely enclosed with high containment valves (e.g. split butterfly valves and direct couplings, which consist of two sections which connect together to allow the opening of the valve). At the end of the material transfer the two halves are separated, forming a seal on both the process equipment and the material container. The system is designed to minimise the surface area which can contact the material or pairs of valves with wash space between them.</p>	99.90%
<u>Segregation or personal enclosure (Advanced REACH Tool)</u>		
Partial segregation without ventilation	Sources are partially segregated from the work environment by isolating the source in a separate room (e.g. with open doors and/or windows to the adjacent area). This segregated area is generally not entered by the worker during a given activity or working shift. The air within the separate room is not actively ventilated.	30%
Partial segregation with ventilation and filtration of recirculated air	Sources are partially segregated from the work environment by isolating the source in a separate room (with open doors and/or windows). This segregated area is generally not entered by the worker during a given activity or working shift. The air within the separate area is actively ventilated and the recirculated air is filtered or there is no air recirculation.	70%
Complete segregation without ventilation	Sources are partially segregated from the work environment by isolating the source in a separate room (e.g. with open doors and/or windows to the adjacent area). This segregated area is generally not entered by the worker during a given activity or working shift. The air within the separate room is not actively ventilated.	70%
Complete personal enclosure without ventilation	Worker resides inside an enclosed cabin or room (door & windows closed) for the entire duration of the activity. The air within the separate room is not actively ventilated.	70%
Complete personal enclosure with ventilation	Worker resides inside an enclosed cabin or room (door & windows closed) for the entire duration of the activity. The air within the separate room is not actively ventilated.	90%
Complete segregation with ventilation and filtration of recirculated air	Sources are completely segregated from the work environment by isolating the source in a fully enclosed and separate room (incl. closed doors & windows). The air within the separate area is actively ventilated and the recirculated air is filtered or there is no air recirculation. The segregated area is generally not entered by the worker during a given activity or working shift.	90%

Local exhaust ventilation (Advanced REACH Tool)		
Fume cupboard	Any form of permanent encapsulation or encasing of the source of which maximally one side is open with a well designed local exhaust ventilation system (e.g. laminar air flow). The design of both the enclosure and the ventilation system is such that the influence of worker behaviour is minimal (e.g. an alarm system prevents the worker from using the fume cupboard in case the system is not working properly).	99%
Fixed capturing hood	Fixed capturing hoods located in close proximity of and directed at the source of emission. The design is such that the work is performed in the capture zone of the ventilation system and the capture is indicated at the workplace.	90%
Cross-flow spray room	The spray room must meet the following conditions: <ul style="list-style-type: none"> • The spray room is a fully enclosed, unidirectional spray room of volume between 30 and 1000 m³ with at least 10 air changes per hour • The spray room has been designed by a competent ventilation engineer, the airflow performance is regularly checked and the ventilation system is maintained. • The spray room needs to run under negative pressure (i.e. so any air leakage is inward). • The workers in the spray room must be properly trained in correctly using the room (e.g. operation of the ventilation system, good positioning of the worker relative to the source and the ventilation, knowing the ventilation clearance time of the room). 	30%
Other measures (MEASE model)		
Partial segregation without ventilation	Sources are partially segregated from the work environment by isolating the source in a separate room (e.g. with open doors and/or windows to the adjacent area). This segregated area is generally not entered by the worker during a given activity or working shift. The air within the separate room is not actively ventilated.	70%
Other LEV systems	Local exhaust ventilation not fulfilling the definition of exterior LEV and Integrated LEV	50%
Exterior LEV	Fixed capturing hoods located in close proximity of and directed at the source of emission. The design is such that the work is performed in the capture zone of the ventilation system and the capture is indicated at the workplace.	75%
Integrated LEV	Local exhaust ventilation which is integrated into the equipment used to perform the task.	84%/80%

3.2 Administrative controls - Organisational risk management measures

The organisational risk management measures are not listed in the WICs. The main organisational risk management measures are:

- Prevention of exposure to workers not performing tasks with the pigments
- Prevention of exposure for specific groups (pregnant and breastfeeding women, young workers)
- Time constraints per type of activity

Based on the current Directives on the protection of the health and safety of workers, the use of the PY.34 and PR.104 by pregnant workers or breastfeeding women is not allowed. It is recommended that they are relocated to other tasks. Based on the same directives, working with these pigments is forbidden for workers which are not 18 years old.

The time constraints per type of activity can be found in Table 1. It is important to assess and document the maximum average duration of each listed activity with PY.34 and PR.104. Documentation regarding exposure is to be kept until 50 years after the last use of the pigments. This information needs to be added to the individual files of the worker and be provided to their company physician.

Emptied bags with residual pigment powder should be collected in airtight containers or plastic bags to prevent dust exposure.

3.3 Personal protective clothes and equipment - PPE

Use of dermal protection

When working with DCC PY.34 or PR.104 products, workers should wear tight fitting long sleeved work clothes. Work clothes need to be washed by the employer and not by workers at home. Work clothes need to be stored in separate lockers.

Based on the risk assessment use of gloves is mandatory when manually handling powder pigments or paint. In the Workplace Instruction Cards gloves are prescribed as a risk management measure. These gloves must be 0.5 mm thick and made from chemically impervious materials such as:

- Nitrile rubber/Nitrile latex – NBR;
- Polychloroprene – CR;
- Polyvinyl chloride – PVC.

When DCC PY.34 or PR.104 are included into a paint, the solvents and other substances used within the paint may lead to a different selection of glove material. If chemically impervious gloves are used dermal exposure is minimised. However some dermal exposure may still arise if not adequately protected.

The use of chemically impervious gloves with 95% efficiency is required for workers where skin contact cannot be excluded. The following provisions for training are required to ensure the prescribed efficiency can be reached:

- Information on the hazard that requires the use of the gloves and the respective hazards of the substance. The training should address the correct way to put on, wear and take off protective gloves in order to ensure maximum protection.
- Testing for leakage (i.e. visual inspection or trapping air in the glove and tightly rolling the cuff towards the fingers).
- Instruction on when to use glove (which specific activities).
- Proper washing of reusable gloves.
- How and when to discard the used gloves (preferably after each use, but at a minimum at end of shift).
- Limitations of gloves as a control measure.
- Conduct training annually and maintain PPE training records.

Use of respiratory protective equipment (RPE)

In order to assess effectiveness of respiratory protection, the two values typically seen in literature, technical data and RPE user manuals are the nominal protection factor (NPF) and the Assigned Protection Factor (APF).

The NPF provides information on the maximum inward leakage of RPE when it is being worn in an optimised static setting. This value determines if a respirator fulfils the requirement of the European harmonised standard it adheres to and allows the manufacturer to place a CE mark on the RPE. The NPF **is not to be used in selecting RPE** when it is introduced in order to protect the workers' health. The proper value to use in selecting RPE used for the protection of the worker is the Assigned Protection Factor (APF), as it provides information on the level of protection one can confidently aspire to achieve. Furthermore, proper training, supervision, maintenance and fit testing are essential contributing factors.

The downstream users are advised to select RPE using the manual published by the British Health and Safety Authority (HSE) in December 2013⁴ to determine if training, supervision, and fit testing programs are sufficient. They are also urged to take notice of other advice provided in this document. The British HSE Authority also hosts a website that helps downstream users in selecting the most appropriate RMM option (<http://www.healthyworkinglives.com/rpe-selector>). The use of this website is strongly recommended. The user can also use EN 529 to ensure the effectiveness of their respiratory protection program. The following needs to be included in the respiratory protection policies:

- Training of the worker prior to first use of the respirator;
- Testing of the fit of the respirator face of the user prior to first use;
- Testing of the fit of the respirator after donning the respirator;
- Training on proper maintenance of the respirator;

4 Health and Safety Guidance 53, Respiratory protective equipment at work, A practical guide, Fourth editions, December 2013.

- Testing of the medical fitness of the worker prior to first use;
- Management supervision and maintenance procedures;
- Training and testing should be repeated annually and documented.

Currently, there is no harmonised approach within the EU on the appropriate application of Assigned Protection Factors (APF) for respiratory protective equipment. Each user of DCC PY.34 or PR.104 needs to verify which RPE will provide the suitable APF for their jurisdiction. If no APF is established within a given jurisdiction, the UK standards should be considered as the minimum requirement. In the WICs the use of respirators is consolidated in order to prevent several different respirators during the performance of his tasks. If the risk assessment demonstrated that an APF of 4 would be sufficient, we have set the minimal APF at 10 because of the classification of the substance.

Table 3. Overview of APF and associated RPE in various jurisdictions






Assigned protection factor used in CSA	Description of RPE based on EN 529 (Appendix C)			
	Country	Standard*	Description of RPE	Class
10	Fin, D, I, S, UK	EN 149	Filtering half mask	FF P2
	Fin, D, I, S, UK	EN 140	Half mask and quarter mask with filter	P2
20	Fin, S, UK	EN 149	Filtering half mask	FF P3
	UK	EN 136	Full Face mask, all classes	GasX P3
	Fin, D, I, S, UK	EN 12941	Powered filtering device incorporating a hood or a helmet	TH2
30	D, I	EN 149	Filtering half mask	FF P3
	D, I	EN 140	Half mask and quarter mask with filter	P2
	D	EN 140	Half mask and quarter mask with filter	GasX P3
	Fin, D, I, S	EN 12942	Powered assisted filtering device incorporating full face mask, half mask or quarter mask	TM2
	UK	EN 12942	Powered assisted filtering device incorporating full face mask, half mask or quarter mask	TM3
	Fin, D, I, S, UK	EN 136	Full face mask (all classes)	P3
40	Fin, D, I, S, UK	EN 136	Full face mask (all classes)	P3
	Fin, D, I, S, UK	EN 12941	Powered filtering device incorporating a hood or a helmet	TH3
	Fin, D, I, S, UK	EN 12942	Powered assisted filtering device incorporating full face mask, half mask or quarter mask	TM3
	Fin, D, I, S, UK	EN 138	Fresh air hose breathing apparatus	Full face mask
100	Fin, D, I, S	EN 136	Full face mask (all classes)	P3
	Fin, D, I, S	EN 12941	Powered filtering device incorporating a hood or a helmet	TH3
	Fin, D, I, S	EN 138	Fresh air hose breathing apparatus	Full face mask
	UK	EN 137	Self-contained open circuit compressed air breathing apparatus	Positive pressure demand
200	Fin, D, I, S	EN 136	Full face mask (all classes)	P3
	Fin, I, S	EN 12941	Powered filtering device incorporating a hood or a helmet	TH3
	Fin, D, I, S	EN 138	Fresh air hose breathing apparatus	Full face mask
	UK	EN 137	Self-contained open circuit compressed air breathing apparatus	Positive pressure demand

400	Fin, D, I, S	EN 136	Full face mask (all classes)	P3
	Fin, D, I, S	EN 12942	Powered assisted filtering device incorporating full face mask, half mask or quarter mask	TM3
	Fin, D, I, S	EN 14593-1	Compressed air line breathing apparatus with demand valve - Part 1: Apparatus with a full face mask	-
	Fin, D, I, S	EN 138	Fresh air hose breathing apparatus	Full face mask
	UK	EN 137	Self-contained open circuit compressed air breathing apparatus	Positive pressure demand
1000	Fin, S	EN 12942	Powered assisted filtering device incorporating full face mask, half mask or quarter mask	TM3
	Fin, D, I, S	EN 14593-1	Compressed air line breathing apparatus with demand valve - Part 1: Apparatus with a full face mask	-
	D	EN 138	Fresh air hose breathing apparatus	Full face mask
	D, I, UK	EN 137	Self-contained open circuit compressed air breathing apparatus	Positive pressure demand

*Explanatory table with reference and title of abovementioned standards:

Standard number	Standard title
EN 136:1998	Respiratory protective devices. Full face masks. Requirements, testing, marking
EN 137:2006	Respiratory protective devices. Self-contained open-circuit compressed air breathing apparatus with full face mask. Requirements, testing, marking
EN 138:1995	Respiratory protective devices - fresh air hose breathing apparatus for use with full face mask, half mask or mouthpiece assembly. Requirements, testing, marking
EN 140:1998	Respiratory protective devices. Half masks and quarter masks. Requirements, testing, marking
EN 149:2001 + A1:2009	Respiratory protective devices. Filtering half masks to protect against particles. Requirements, testing, marking
EN 529:2005	Respiratory protective devices. Recommendations for selection, use, care and maintenance. Guidance document
EN 12941:1998	Respiratory protective devices. Powered filtering devices incorporating a helmet or a hood. Requirements, testing, marking
EN 12942:1998	Respiratory protective devices. Power assisted filtering devices incorporating full face masks, half masks or quarter masks. Requirements, testing, marking
EN 14593-1:2005	Respiratory protective devices. Compressed air line breathing apparatus with demand valve. Apparatus with a full mask. Requirements, testing, marking




Table 4. Overview of RPE and assigned protection factors (APF) as set by the British HSE Authority

Adequacy/suitability	Respirators				
RPE type					
	Disposable half mask – particle filter*	Reusable half mask – particle filter	Full face mask – particle filter	Powered mask	Powered hoods/helmets
Effective for particles	Yes	Yes	Yes	Yes **	4 **
Continuous wear time	Less than 1 hr	Less than 1 hr	Less than 1 hr	More than 1 hr	More than 1 hr
APF4	Yes	Yes	Yes	No	8
APF10	Yes	Yes	Yes	Yes	4
APF20	Yes	Yes	No	Yes	4
APF40	No	No	Yes	Yes	4
Table reference	3	4	5	6	7

*Sometimes referred to as a filtering facepiece or nasal respirator.

**Only protects against particle or gas/vapour when the appropriate filter is fitted.

Table 4 cont. Overview of RPE and assigned protection factors (APF) as set by the British HSE Authority

Adequacy/suitability	Breathing apparatus		
RPE type			
	Fresh air hose	Constant flow airline	Demand valve
Effective for particles	Yes	Yes	Yes
Continuous wear time	Unassisted less than 1 hr Assisted/powered more than 1 hr	More than 1 hr	More than 1 hr
APF4 types	No	No	No
APF10 types	Yes	Yes	No
APF20 types	No	Yes	No
APF40 types	Yes	Yes	No
APF200 types	No	Yes	No
APF2000 types	No	No	Yes
Table reference	8	9	14

4. ES 2: Use at industrial site; Industrial application of paints on metal surfaces (machines, vehicles, structures, signs, road furniture, coil coating). Pigment choice is governed by end product specifications on visibility, colour, durability, other technical requirements and Regulations.; Coatings; PC 9a

This section is aimed at HSE specialists and details the exposure scenario and its contributing scenarios as is required within the REACH Regulation (1907/2006/EC). Detailed information is presented on the worker and environmental exposure estimation and risk characterisation which are in line with the Chemical Safety Report that was submitted in the registration dossiers of DCC PY.34 and PR.104.

Section 4.1 provides an overview of the activities (contributing scenarios, CS) relevant for Use 2 with the related use descriptors. The contributing scenarios describe all activities that have a potential exposure to human and the environment. Multiple activities can be performed by one worker per day.

The table includes the following information:

- Subsection number: the same as the contributing scenario number listed in Table 1 of this document.
- Use descriptors: defined by the European Chemicals Agency (ECHA) (please refer to ECHA Guidance R.12 for a further explanation).
- Environmental Release Categories (ERCs): describe the emission from an environmental point of view.
- Process Categories (PROCs): describe exposure from a worker point of view.

Section 4.2 describes all conditions under which the activities of DCC PY.34 or PR.104 are in line with the permitted uses. Here you will find detailed information on the activities, the operational conditions and risk management measures for the environment and the workers.

For the environmental assessment the following information is outlined:

- Maximum amount of pigment to be used per site (both daily and per year).
- Maximum number of emission days per year (operating / use days).
- Minimum flow of a river to which the waste water is shed.
- Information regarding the treatment of sewage.

For the worker exposure the following information for each activity is described:

- The form of the mixture in which the pigments are used (i.e. powder, paste, slurry).
- Dustiness of the pigment and the respirable fraction.
- Concentration (%) of the pigments in any mixtures used.
- Average duration of use per week and maximum duration of use per shift (recalculated to maximum hours/week).
- Amounts of the pigment / paste / paint / pellets handled by users.
- Technical and organizational risk management measures (i.e. ventilation rate, local exhaust ventilation, good housekeeping).
- Required personal protective equipment (including gloves and respirator).
- Type of activity that is being performed (in line with the input of the exposure models used).

Corresponding information that is to be used by the worker itself is summarized in the Workplace Instruction Cards (see Section 2 of this document).

Section 4.3 provides information on the exposure and risk including the methods (e.g. models) used to estimate the exposure, the estimated exposure value and the ratio of this value with regard to the defined exposure limits (Exposure / DMEL ratio) for each contributing scenario.

Section 4.4 provides guidance to the downstream user regarding the boundaries of the exposure scenario, its contributing scenarios and the defined functions. It provides information on the effectiveness of risk management measures.

Please note that any other activity than the ones described in this Annex are not permitted. In case any doubt exists regarding the allowed uses, please contact DCC or HMG Paints Limited without undue delay.

4.1. Title section

Coatings and Paints, Thinners, paint removers (PC 9a)	
Environment	
CS 1: Industrial application of paints on metal surfaces (machines, vehicles, structures, signs, road furniture, coil coating)	ERC 5
Worker	
CS 2: Laboratory handling of pigment paste and/or paints	PROC 15
CS 3: Handling of packaged colour paste and/or paint, including distribution	PROC 2
CS 4: Mixing colour paste with paint in closed mixing machine with automated dosing of paste	PROC 3
CS 5: Equipment cleaning: scraping, brushing and wiping	PROC 10
CS 6: Dried pigment paste and/or paint cleaning	PROC 21
CS 7: Mixing of paste and/or coating with extra solvents or additives before use	PROC 5
CS 8: Filling of equipment with pigment paint	PROC 8a
CS 9: Filling of spray equipment with pigment paints in dedicated settings	PROC 8b
CS 10: Transfer of pigment paint to/from drums/cans e.g. at a filling line before application	PROC 9
CS 11: Automated pigment paint spray application in an industrial booth	PROC 7
CS 12: Manual pigment paint spray application in an industrial booth	PROC 7
CS 13: Handling and manipulation of dried painted articles	PROC 21
CS 14: Pigment paint testing by brushing/rolling	PROC 10
CS 15: Pigment paint application and heat curing	PROC 6
Subsequent service life exposure scenario(s)	
ES 4: Service life (worker at industrial site); Service life of coated articles. Performance and longevity depend on the pigment quality for bright lasting colours improving visibility and safety, light and weather fastness (durability), chemical fastness, impact resistance and heat stability.; Coatings; PC9a	
ES 5: Service life (professional worker); Service life of coated articles. Performance and longevity depend on the pigment quality for bright lasting colours improving visibility and safety, light and weather fastness (durability), chemical fastness, impact resistance and heat stability.; Coatings; PC9a	

4.2. Conditions of use affecting exposure

4.2.1. Control of environmental exposure (CS1): Industrial application of paints on metal surfaces (machines, vehicles, structures, signs, road furniture, coil coating) (ERC 5)

Product (article) characteristics
Correction for Pb content of pigment (60%): Correction applicable (The pigment contains 60% lead) [Effectiveness Water: 40%; Air: 40%]
Correction for water solubility of Pb in paint (0.5%): Correction applicable (Transformation/dissolution tests were carried out with paints containing the pigment. These tests show 0.2% dissolution. Based on the results of these tests, 0.5% dissolution is applied as a worst-case.) [Effectiveness Water: 99.5%]
Amount used, frequency and duration of use (or from service life)
Daily amount per site <= 0.15 tonnes/day
Annual amount per site <= 30.0 tonnes/year
Percentage of EU tonnage used at regional scale: = 100 %
Emission days per year: = 200 days/year
Technical and organisational conditions and measures
Waste water treatment: If any process waste water is generated, this should be treated as hazardous waste

Relevant RMM to achieve emission reduction to air: Direct air emissions should be reduced by implementing RMM
<i>To reduce the emissions to air, one or more of the following RMM may be applied:</i>
<ul style="list-style-type: none"> • <i>Fabric or bag filters</i> • <i>Wet scrubbers</i> • <i>Electrostatic precipitators</i> • <i>Wet electrostatic precipitators</i> • <i>Cyclones as primary collector</i> • <i>Ceramic and metal mesh filters</i>
Conditions and measures related to treatment of waste (including article waste)
Dispose of waste or used sacks/containers according to local regulations.
Particular considerations on the waste treatment operations: No (low risk) (ERC based assessment demonstrating control of risk with default conditions. Low risk assumed for waste life stage. Waste disposal according to national/local legislation is sufficient.)
Other conditions affecting environmental exposure
Receiving surface water flow \geq 18000 m ³ /d

4.2.2. Control of worker exposure (CS2): Laboratory handling of pigment paste and/or paints (PROC 15)

Product (article) characteristics		
Substance product type: Powders incorporated in a liquid matrix		
<ul style="list-style-type: none"> • Limit the substance content in the product to 25 %. • Viscosity: Liquids with medium viscosity (like oil) • Covers solid products only 		
Amount used (or contained in articles), frequency and duration of use/exposure		
Duration of use (hours/week): 10 hours/week		
Technical and organisational conditions and measures		
<i>Advanced (industrial) exposure controls assumed.</i>		
Ventilation rate of the general ventilation system in the work area: 3 ACH (ACH = air changes per hour.)		
Fume cupboard		
Conditions and measures related to personal protection, hygiene and health evaluation		
Wear chemically resistant gloves (tested to EN374) in combination with specific activity training; For further specification, refer to section 8 of the SDS.		
Other conditions affecting workers exposure		
Transfer of liquid products - Falling liquids	Activities with open liquid surfaces or open reservoirs - Activities with agitated surfaces	Spreading of liquid products
<ul style="list-style-type: none"> • Transferring < 0.1 l/minute • Open process • Splash loading <i>Duration: 20% of allowed hours/week for this activity</i>	<ul style="list-style-type: none"> • Open Surface < 0.1 m² <i>Duration: 20% of allowed hours/week for this activity</i>	<ul style="list-style-type: none"> • Spreading of liquids 0.1 - 0.3 m² / hour <i>Duration: 58% of allowed hours/week for this activity</i>
Room size of the work area: Any size workroom		

4.2.3. Control of worker exposure (CS3): Handling of packaged colour paste and/or paint, including distribution (PROC 2)

Product (article) characteristics
Substance product type: Powders incorporated in a liquid matrix
<ul style="list-style-type: none"> • Limit the substance content in the product to 25 %. • Viscosity: Liquids with medium viscosity (like oil) • Covers solid products only (relevant for dermal assessment only).

Amount used (or contained in articles), frequency and duration of use/exposure
Duration of use (hours/week): 5 hours/week
Technical and organisational conditions and measures
<i>Advanced (industrial) exposure controls assumed.</i>
Use in closed, continuous process with occasional controlled exposure
Ventilation rate of the general ventilation system in the work area: 3 ACH (ACH = air changes per hour.)
Medium level containment
Conditions and measures related to personal protection, hygiene and health evaluation
Wear chemically resistant gloves (tested to EN374) in combination with specific activity training; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Activities with open liquid surfaces or open reservoirs - Activities with undisturbed surfaces • Open Surface 0.3 - 1 m ²
Room size of the work area: Any size workroom

4.2.4. Control of worker exposure (CS4): Mixing colour paste with paint in closed mixing machine with automated dosing of paste (PROC 3)

Product (article) characteristics
Substance product type: Powders incorporated in a liquid matrix • Limit the substance content in the product to 25 %. • Viscosity: Liquids with medium viscosity (like oil) • Covers solid products only (relevant for dermal assessment only).
Amount used (or contained in articles), frequency and duration of use/exposure
Duration of use (hours/week): 35 hours/week
Technical and organisational conditions and measures
<i>Advanced (industrial) exposure controls assumed.</i>
Use in closed batch process (synthesis or formulation)
Ventilation rate of the general ventilation system in the work area: 3 ACH (ACH = air changes per hour.)
Medium level containment
Complete segregation without ventilation
Conditions and measures related to personal protection, hygiene and health evaluation
Wear chemically resistant gloves (tested to EN374) in combination with specific activity training; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Activities with open liquid surfaces or open reservoirs - Activities with agitated surfaces • Open Surface 0.1 - 0.3 m ²
Room size of the work area: Any size workroom

4.2.5. Control of worker exposure (CS5): Equipment cleaning: scraping, brushing and wiping (PROC 10)

Product (article) characteristics
Substance product type: Powders incorporated in a liquid matrix • Limit the substance content in the product to 5 %. • Viscosity: Liquids with medium viscosity (like oil) • Covers solid products only (relevant for dermal assessment only).
Amount used (or contained in articles), frequency and duration of use/exposure
Duration of use (hours/week): 5 hours/week

Technical and organisational conditions and measures
<i>Advanced (industrial) exposure controls assumed.</i>
Ventilation rate of the general ventilation system in the work area: 3 ACH (ACH = air changes per hour.)
Low level containment
Conditions and measures related to personal protection, hygiene and health evaluation
Wear chemically resistant gloves (tested to EN374) in combination with specific activity training; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Spreading of liquid products • Spreading of liquids 1 - 3 m ² / hour
Room size of the work area: Any size workroom

4.2.6. Control of worker exposure (CS6): Dried pigment paste and/or paint cleaning (PROC 21)

Product (article) characteristics
Substance product type: Powders • Limit the substance content in the product to 25 %. • Dustiness: Granules, flakes or pellets • Moisture Content of the product: Dry product • Covers solid products only (relevant for dermal assessment only).
Amount used (or contained in articles), frequency and duration of use/exposure
Duration of use (hours/week): 5 hours/week
Technical and organisational conditions and measures
<i>Advanced (industrial) exposure controls assumed.</i>
Ventilation rate of the general ventilation system in the work area: 3 ACH (ACH = air changes per hour.)
Conditions and measures related to personal protection, hygiene and health evaluation
Wear a respirator providing a minimum efficiency of 95.0 % (APF 20)
Wear chemically resistant gloves (tested to EN374) in combination with specific activity training; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Compressing of powders, granules or pelletised material • Compressing 10 – 100 gram/minute • Open process
Room size of the work area: Any size workroom

4.2.7. Control of worker exposure (CS7): Mixing of paste and/or coating with extra solvents or additives before use (PROC 5)

Product (article) characteristics	
Substance product type: Powders incorporated in a liquid matrix • Limit the substance content in the product to 25 %. • Viscosity: Liquids with medium viscosity (like oil) • Liquid Weight Fraction: Minor (5 - 10%) • Covers solid products only (relevant for dermal assessment only). <i>Applicable to activity with agitated liquid surface</i>	Substance product type: Paste (not contaminated with powder) • Limit the substance content in the product to 25 %. • Viscosity: Liquids with medium viscosity (like oil) • Liquid Weight Fraction: Minor (5 - 10%) • Covers solid products only (relevant for dermal assessment only). <i>Applicable to handling of contaminated objects activity.</i>
Amount used (or contained in articles), frequency and duration of use/exposure	
Duration of use (hours/week): 5 hours/week	

Technical and organisational conditions and measures	
<i>Advanced (industrial) exposure controls assumed.</i>	
Ventilation rate of the general ventilation system in the work area: 3 ACH (ACH = air changes per hour.) <i>Applicable to activity with agitated liquid surface</i>	
Low level containment <i>Applicable to activity with agitated liquid surface</i>	
Conditions and measures related to personal protection, hygiene and health evaluation	
Wear a respirator providing a minimum efficiency of 95.0 % (APF 20)	
Wear chemically resistant gloves (tested to EN374) in combination with specific activity training; For further specification, refer to section 8 of the SDS.	
Other conditions affecting workers exposure	
Activities with open liquid surfaces or open reservoirs - Activities with agitated surfaces • Open Surface 1 - 3 m ² <i>Duration: 96% of allowed hours/week for this activity</i>	Handling of paste • Handling of apparently clean paste • Normal handling <i>Duration: 4% of allowed hours/week for this activity</i>
Room size of the work area: Any size workroom	

4.2.8. Control of worker exposure (CS8): Filling of equipment with pigment paint (PROC 8a)

Product (article) characteristics	
Substance product type: Powders incorporated in a liquid matrix • Limit the substance content in the product to 25 %. • Viscosity: Liquids with medium viscosity (like oil) • Covers solid products only (relevant for dermal assessment only).	
Amount used (or contained in articles), frequency and duration of use/exposure	
Duration of use (hours/week): 5 hours/week	
Technical and organisational conditions and measures	
<i>Advanced (industrial) exposure controls assumed.</i>	
Ventilation rate of the general ventilation system in the work area: 3 ACH (ACH = air changes per hour.)	
Conditions and measures related to personal protection, hygiene and health evaluation	
Wear a respirator providing a minimum efficiency of 95.0 % (APF 20)	
Wear chemically resistant gloves (tested to EN374) in combination with specific activity training; For further specification, refer to section 8 of the SDS.	
Other conditions affecting workers exposure	
Transfer of liquid products - Falling liquids • Transferring 1 - 10 l/minute • Handling that reduces contact between product and adjacent air • Splash loading	
Room size of the work area: Any size workroom	

4.2.9. Control of worker exposure (CS9): Filling of spray equipment with pigment paints in dedicated settings (PROC 8b)

Product (article) characteristics	
Substance product type: Powders incorporated in a liquid matrix • Limit the substance content in the product to 25 %. • Viscosity: Liquids with medium viscosity (like oil) • Covers solid products only (relevant for dermal assessment only).	
Amount used (or contained in articles), frequency and duration of use/exposure	
Duration of use (hours/week): 5 hours/week	

Technical and organisational conditions and measures
<i>Advanced (industrial) exposure controls assumed.</i>
Use in semi-closed process with opportunity for exposure
Ventilation rate of the general ventilation system in the work area: 3 ACH (ACH = air changes per hour.)
Conditions and measures related to personal protection, hygiene and health evaluation
Wear a respirator providing a minimum efficiency of 95.0 % (APF 20)
Wear chemically resistant gloves (tested to EN374) in combination with specific activity training; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Transfer of liquid products - Falling liquids <ul style="list-style-type: none"> • Transferring 1 - 10 l/minute • Handling that reduces contact between product and adjacent air • Submerged loading
Room size of the work area: Any size workroom

4.2.10. Control of worker exposure (CS10): Transfer of pigment paint to/from drums/cans e.g. at a filling line before application (PROC 9)

Product (article) characteristics
Substance product type: Powders incorporated in a liquid matrix <ul style="list-style-type: none"> • Limit the substance content in the product to 25 %. • Viscosity: Liquids with medium viscosity (like oil) • Covers solid products only (relevant for dermal assessment only).
Amount used (or contained in articles), frequency and duration of use/exposure
Duration of use (hours/week): 5 hours/week
Technical and organisational conditions and measures
Use in semi-closed process with opportunity for exposure
<i>Advanced (industrial) exposure controls assumed.</i>
Ventilation rate of the general ventilation system in the work area: 3 ACH (ACH = air changes per hour.)
Fixed capturing hood
Partial segregation with ventilation and filtration of recirculated air
Conditions and measures related to personal protection, hygiene and health evaluation
Wear a respirator providing a minimum efficiency of 95.0 % (APF 20)
Wear chemically resistant gloves (tested to EN374) in combination with specific activity training; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Transfer of liquid products - Falling liquids <ul style="list-style-type: none"> • Transferring 10 - 100 l/minute • Open process • Splash loading
Room size of the work area: Any size workroom

4.2.11. Control of worker exposure (CS11): Automated pigment paint spray application in an industrial booth (PROC 7)

Product (article) characteristics
Substance product type: Powders incorporated in a liquid matrix <ul style="list-style-type: none"> • Limit the substance content in the product to 25 %. • Viscosity: Liquids with medium viscosity (like oil) • Covers solid products only (relevant for dermal assessment only).

Amount used (or contained in articles), frequency and duration of use/exposure
Duration of use (hours/week): 30 hours/week
Technical and organisational conditions and measures
<i>Advanced (industrial) exposure controls assumed.</i>
Ventilation rate of the general ventilation system in the work area: 3 ACH (ACH = air changes per hour.)
Complete segregation with ventilation and filtration of recirculated air
Complete personal enclosure with ventilation
Conditions and measures related to personal protection, hygiene and health evaluation
Wear a respirator providing a minimum efficiency of 90.0 % (APF 10)
Wear chemically resistant gloves (tested to EN374) in combination with specific activity training; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Spray application of liquids - Surface spraying of liquids
<ul style="list-style-type: none"> • Low application rate (0.03 - 0.3 l/minute) • Only horizontal or downward spraying • Spraying with no or low compressed air use
Room size of the work area: Any size workroom

4.2.12. Control of worker exposure (CS12): Manual pigment paint spray application in an industrial booth (PROC 7)

Product (article) characteristics
Substance product type: Powders incorporated in a liquid matrix
<ul style="list-style-type: none"> • Liquid Weight Fraction: Minor (5 - 10%) • Viscosity: Liquids with medium viscosity (like oil) • Limit the substance content in the product to 25 % (relevant for dermal assessment only). • Covers solid products only (relevant for dermal assessment only).
Amount used (or contained in articles), frequency and duration of use/exposure
Duration of use (hours/week): 25 hours/week
Technical and organisational conditions and measures
<i>Advanced (industrial) exposure controls assumed.</i>
Cross-flow spray room
Conditions and measures related to personal protection, hygiene and health evaluation
Wear a respirator providing a minimum efficiency of 99.75 % (APF 400)
Wear chemically resistant gloves (tested to EN374) in combination with specific activity training; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Spray application of liquids - Surface spraying of liquids
<ul style="list-style-type: none"> • Low application rate (0.03 - 0.3 l/minute) • Only horizontal or downward spraying • Spraying with no or low compressed air use
Room size of the work area: Any size workroom

4.2.13. Control of worker exposure (CS13): Handling and manipulation of dried painted articles (PROC 21)

Product (article) characteristics
Substance product type: Powders
<ul style="list-style-type: none"> • Limit the substance content in the product to 25 %. • Dustiness: Firm granules, flakes or pellets • Moisture Content of the product: Dry product • Covers solid products only (relevant for dermal assessment only).

Amount used (or contained in articles), frequency and duration of use/exposure
Duration of use (hours/week): 35 hours/week
Technical and organisational conditions and measures
<i>Advanced (industrial) exposure controls assumed.</i>
Ventilation rate of the general ventilation system in the work area: 3 ACH (ACH = air changes per hour.)
Conditions and measures related to personal protection, hygiene and health evaluation
Wear chemically resistant gloves (tested to EN374) in combination with specific activity training; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Handling of pastes <ul style="list-style-type: none"> • Handling of apparently clean pastes • Normal handling
Room size of the work area: Any size workroom

4.2.14. Control of worker exposure (CS14): Pigment paint testing by brushing/rolling (PROC 10)

Product (article) characteristics
Substance product type: Powders incorporated in a liquid matrix <ul style="list-style-type: none"> • Limit the substance content in the product to 25 %. • Viscosity: Liquids with medium viscosity (like oil) • Covers solid products only (relevant for dermal assessment only).
Amount used (or contained in articles), frequency and duration of use/exposure
Duration of use (hours/week): 20 hours/week
Technical and organisational conditions and measures
<i>Advanced (industrial) exposure controls assumed.</i>
Ventilation rate of the general ventilation system in the work area: 3 ACH (ACH = air changes per hour.)
Fume cupboard
Conditions and measures related to personal protection, hygiene and health evaluation
Wear chemically resistant gloves (tested to EN374) in combination with specific activity training; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Spreading of liquid products <ul style="list-style-type: none"> • Spreading of liquids 0.3 - 1 m² / hour
Room size of the work area: Any size workroom

4.2.15. Control of worker exposure (CS15): Pigment paint application and heat curing (PROC 6)

Product (article) characteristics
Substance product type: Powders incorporated in a liquid matrix <ul style="list-style-type: none"> • Limit the substance content in the product to 25 %. • Viscosity: Liquids with medium viscosity (like oil) • Covers solid products only (relevant for dermal assessment only).
Amount used (or contained in articles), frequency and duration of use/exposure
Duration of use (hours/week): 30 hours/week
Technical and organisational conditions and measures
<i>Advanced (industrial) exposure controls assumed.</i>
Ventilation rate of the general ventilation system in the work area: 3 ACH (ACH = air changes per hour.)

Conditions and measures related to personal protection, hygiene and health evaluation
Wear chemically resistant gloves (tested to EN374) in combination with specific activity training; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Activities with open liquid surfaces or open reservoirs - Activities with undisturbed surfaces
• Open Surface 1 - 3 m ²
• Room size of the work area: Any size workroom

4.3. Exposure estimation and reference to its source

4.3.1. Environmental release and exposure (CS1): Industrial application of paints on metal surfaces (machines, vehicles, structures, signs, road furniture, coil coating) (ERC 5)

Release route	Release rate	Release estimation method
Water	0 kg/day	Release factor (SpERC CEPE 5.1a.v1)
Air	1.8 kg/day	Release factor (SpERC CEPE 5.1a.v1)
Soil	0 kg/day	Release factor (SpERC CEPE 5.1a.v1)

Protection target	Exposure estimate (based on: EUSES 2.1.2)	RCR
Freshwater	0 mg/L	< 0.01
Sediment (freshwater)	0 mg/kg dw	< 0.01
Marine water	0 mg/L	< 0.01
Sediment (marine water)	0 mg/kg dw	< 0.01
Sewage treatment plant	0 mg/L	< 0.01
Agricultural soil	0.02 mg/kg dw	< 0.01

4.3.2. Worker exposure (CS2): Laboratory handling of pigment paste and/or paints (PROC 15)

Route of exposure and type of effects	Exposure estimate	Exposure / DMEL
Inhalation, systemic, long-term (carcinogenicity, lung)	5.23E-7 mg/m ³ (External Tool: <i>Extended ART v1.5</i>)	0.008
Oral, systemic, long-term (carcinogenicity, intestinal)	3.32E-06 µg/kg bw/day (calculated from exposure value for: Inhalation, systemic, long-term)	2.49E-06
Inhalation, systemic, long-term (neurodevelopmental damage)	4.38E-05 mg/m ³ (External Tool: <i>Extended ART v1.5</i>)	0.004
Dermal, systemic, long-term (neurodevelopmental damage)	0.003 mg/kg bw/day (External Tool: <i>Extended TRA Workers v3</i>)	5E-4
Combined routes, systemic, long-term (neurodevelopmental damage)		0.005

4.3.3. Worker exposure (CS3): Handling of packaged colour paste and/or paint, including distribution (PROC 2)

Route of exposure and type of effects	Exposure estimate	Exposure / DMEL
Inhalation, systemic, long-term	9.08E-8 mg/m ³ (External Tool: <i>Extended ART v1.5</i>)	0.001

Route of exposure and type of effects	Exposure estimate	Exposure / DMEL
(carcinogenicity, lung)		
Oral, systemic, long-term (carcinogenicity, intestinal)	5.76E-07 µg/kg bw/day (calculated from exposure value for: Inhalation, systemic, long-term)	4.32E-07
Inhalation, systemic, long-term (neurodevelopmental damage)	4.13E-06 mg/m³ (External Tool: <i>Extended ART v1.5</i>)	0.001
Dermal, systemic, long-term (neurodevelopmental damage)	0.005 mg/kg bw/day (External Tool: <i>Extended TRA Workers v3</i>)	0.001
Combined routes, systemic, long-term (neurodevelopmental damage)		0.002

4.3.4. Worker exposure (CS4): Mixing colour paste with paint in closed mixing machine with automated dosing of paste (PROC 3)

Route of exposure and type of effects	Exposure estimate	Exposure / DMEL
Inhalation, systemic, long-term (carcinogenicity, lung)	8.47E-7 mg/m³ (External Tool: <i>Extended ART v1.5</i>)	0.013
Oral, systemic, long-term (carcinogenicity, intestinal)	5.38E-06 µg/kg bw/day (calculated from exposure value for: Inhalation, systemic, long-term)	4.03E-06
Inhalation, systemic, long-term (neurodevelopmental damage)	3.85E-05 mg/m³ (External Tool: <i>Extended ART v1.5</i>)	0.007
Dermal, systemic, long-term (neurodevelopmental damage)	0.018 mg/kg bw/day (External Tool: <i>Extended TRA Workers v3</i>)	0.004
Combined routes, systemic, long-term (neurodevelopmental damage)		0.010

4.3.5. Worker exposure (CS5): Equipment cleaning: scraping, brushing and wiping (PROC 10)

Route of exposure and type of effects	Exposure estimate	Exposure / DMEL
Inhalation, systemic, long-term (carcinogenicity, lung)	9.63E-6 mg/m³ (External Tool: <i>Extended ART v1.5</i>)	0.144
Oral, systemic, long-term (carcinogenicity, intestinal)	6.11E-05 µg/kg bw/day (calculated from exposure value for: Inhalation, systemic, long-term)	4.58E-05
Inhalation, systemic, long-term (neurodevelopmental damage)	4.38E-04 mg/m³ (External Tool: <i>Extended ART v1.5</i>)	0.075
Dermal, systemic, long-term (neurodevelopmental damage)	0.034 mg/kg bw/day (External Tool: <i>Extended TRA Workers v3</i>)	0.007
Combined routes, systemic, long-term (neurodevelopmental damage)		0.082

4.3.6. Worker exposure (CS6): Dried pigment paste and/or paint cleaning (PROC 21)

Route of exposure and type of effects	Exposure estimate	Exposure / DMEL
Inhalation, systemic, long-term (carcinogenicity, lung)	8.8E-6 mg/m³ (External Tool: <i>Extended ART v1.5</i>)	0.132
Oral, systemic, long-term (carcinogenicity, intestinal)	5.59E-05 µg/kg bw/day (calculated from exposure value for: Inhalation, systemic, long-term)	4.19E-05
Inhalation, systemic, long-term (neurodevelopmental damage)	4.00E-04 mg/m³ (External Tool: <i>Extended ART v1.5</i>)	0.069

Route of exposure and type of effects	Exposure estimate	Exposure / DMEL
Dermal, systemic, long-term (neurodevelopmental damage)	0.011 mg/kg bw/day (External Tool: <i>Extended TRA Workers v3</i>)	0.002
Combined routes, systemic, long-term (neurodevelopmental damage)		0.071

4.3.7. Worker exposure (CS7): Mixing of paste and/or coating with extra solvents or additives before use (PROC 5)

Route of exposure and type of effects	Exposure estimate	Exposure / DMEL
Inhalation, systemic, long-term (carcinogenicity, lung)	1.51E-6 mg/m³ (External Tool: <i>Extended ART v1.5</i>)	0.023
Oral, systemic, long-term (carcinogenicity, intestinal)	9.61E-06 µg/kg bw/day (calculated from exposure value for: Inhalation, systemic, long-term)	7.20E-06
Inhalation, systemic, long-term (neurodevelopmental damage)	6.88E-05 mg/m³ (External Tool: <i>Extended ART v1.5</i>)	0.012
Dermal, systemic, long-term (neurodevelopmental damage)	0.051 mg/kg bw/day (External Tool: <i>Extended TRA Workers v3</i>)	0.01
Combined routes, systemic, long-term (neurodevelopmental damage)		0.022

4.3.8. Worker exposure (CS8): Filling of equipment with pigment paint (PROC 8a)

Route of exposure and type of effects	Exposure estimate	Exposure / DMEL
Inhalation, systemic, long-term (External Tool: <i>Extended ART v1.5</i>)	1.07E-6 mg/m³ (External Tool: <i>Extended ART v1.5</i>)	0.016
Oral, systemic, long-term (carcinogenicity, intestinal)	6.81E-06 µg/kg bw/day (calculated from exposure value for: Inhalation, systemic, long-term)	5.11E-06
Inhalation, systemic, long-term (neurodevelopmental damage)	4.88E-05 mg/m³ (External Tool: <i>Extended ART v1.5</i>)	0.008
Dermal, systemic, long-term (neurodevelopmental damage)	0.051 mg/kg bw/day (External Tool: <i>Extended TRA Workers v3</i>)	0.01
Combined routes, systemic, long-term (neurodevelopmental damage)		0.019

4.3.9. Worker exposure (CS9): Filling of spray equipment with pigment paints in dedicated settings (PROC 8b)

Route of exposure and type of effects	Exposure estimate	Exposure / DMEL
Inhalation, systemic, long-term (carcinogenicity, lung)	3.58E-7 mg/m³ (External Tool: <i>Extended ART v1.5</i>)	0.005
Oral, systemic, long-term (carcinogenicity, intestinal)	4.27E-06 µg/kg bw/day (calculated from exposure value for: Inhalation, systemic, long-term)	1.70E-06
Inhalation, systemic, long-term (neurodevelopmental damage)	1.63E-05 mg/m³ (External Tool: <i>Extended ART v1.5</i>)	0.003
Dermal, systemic, long-term (neurodevelopmental damage)	0.051 mg/kg bw/day (External Tool: <i>Extended TRA Workers v3</i>)	0.01
Combined routes, systemic, long-term (neurodevelopmental damage)		0.013

4.3.10. Worker exposure (CS10): Transfer of pigment paint to/from drums/cans e.g. at a filling line before application (PROC 9)

Route of exposure and type of effects	Exposure estimate	Exposure / DMEL
Inhalation, systemic, long-term (carcinogenicity, lung)	1.51E-7 mg/m ³ (External Tool: <i>Extended ART v1.5</i>)	0.002
Oral, systemic, long-term (carcinogenicity, intestinal)	9.61E-07 µg/kg bw/day (calculated from exposure value for: Inhalation, systemic, long-term)	7.20E-07
Inhalation, systemic, long-term (neurodevelopmental damage)	6.88E-06 mg/m ³ (External Tool: <i>Extended ART v1.5</i>)	0.001
Dermal, systemic, long-term (neurodevelopmental damage)	0.026 mg/kg bw/day (External Tool: <i>Extended TRA Workers v3</i>)	0.005
Combined routes, systemic, long-term (neurodevelopmental damage)		0.006

4.3.11. Worker exposure (CS11): Automated pigment paint spray application in an industrial booth (PROC 7)

Route of exposure and type of effects	Exposure estimate	Exposure / DMEL
Inhalation, systemic, long-term (carcinogenicity, lung)	3.33E-5 mg/m ³ (External Tool: <i>Extended ART v1.5</i>)	0.500
Oral, systemic, long-term (carcinogenicity, intestinal)	3.49E-05 µg/kg bw/day (calculated from exposure value for: Inhalation, systemic, long-term)	2.62E-05
Inhalation, systemic, long-term (neurodevelopmental damage)	2.78E-04 mg/m ³ (External Tool: <i>Extended ART v1.5</i>)	0.048
Dermal, systemic, long-term (neurodevelopmental damage)	0.965 mg/kg bw/day (External Tool: <i>Extended TRA Workers v3</i>)	0.193
Combined routes, systemic, long-term (neurodevelopmental damage)		0.241

4.3.12. Worker exposure (CS12): Manual pigment paint spray application in an industrial booth (PROC 7)

Route of exposure and type of effects	Exposure estimate	Exposure / DMEL
Inhalation, systemic, long-term (carcinogenicity, lung)	6.38E-5 mg/m ³ (External Tool: <i>Extended ART v1.5</i>)	0.956
Oral, systemic, long-term (carcinogenicity, intestinal)	6.68E-05 µg/kg bw/day (calculated from exposure value for: Inhalation, systemic, long-term)	5.01E-05
Inhalation, systemic, long-term (neurodevelopmental damage)	5.31E-04 mg/m ³ (External Tool: <i>Extended ART v1.5</i>)	0.092
Dermal, systemic, long-term (neurodevelopmental damage)	0.804 mg/kg bw/day (External Tool: <i>Extended TRA Workers v3</i>)	0.161
Combined routes, systemic, long-term (neurodevelopmental damage)		0.252

4.3.13. Worker exposure (CS13): Handling and manipulation of dried painted articles (PROC 21)

Route of exposure and type of effects	Exposure estimate	Exposure / DMEL
Inhalation, systemic, long-term (carcinogenicity, lung)	4.04E-6 mg/m ³ (External Tool: <i>Extended ART v1.5</i>)	0.061

Route of exposure and type of effects	Exposure estimate	Exposure / DMEL
Oral, systemic, long-term (carcinogenicity, intestinal)	2.57E-05 µg/kg bw/day (calculated from exposure value for: Inhalation, systemic, long-term)	1.93E-05
Inhalation, systemic, long-term (neurodevelopmental damage)	1.84E-04 mg/m³ (External Tool: <i>Extended ART v1.5</i>)	0.032
Dermal, systemic, long-term (neurodevelopmental damage)	0.074 mg/kg bw/day (External Tool: <i>Extended TRA Workers v3</i>)	0.015
Combined routes, systemic, long-term (neurodevelopmental damage)		0.047

4.3.14. Worker exposure (CS14): Pigment paint testing by brushing/rolling (PROC 10)

Route of exposure and type of effects	Exposure estimate	Exposure / DMEL
Inhalation, systemic, long-term (carcinogenicity, lung)	3.19E-5 mg/m³ (External Tool: <i>Extended ART v1.5</i>)	0.479
Oral, systemic, long-term (carcinogenicity, intestinal)	2.03E-04 µg/kg bw/day (calculated from exposure value for: Inhalation, systemic, long-term)	1.52E-04
Inhalation, systemic, long-term (neurodevelopmental damage)	1.45E-03 mg/m³ (External Tool: <i>Extended ART v1.5</i>)	0.250
Dermal, systemic, long-term (neurodevelopmental damage)	0.412 mg/kg bw/day (External Tool: <i>Extended TRA Workers v3</i>)	0.082
Combined routes, systemic, long-term (neurodevelopmental damage)		0.332

4.3.15. Worker exposure (CS15): Pigment paint application and heat curing (PROC 6)

Route of exposure and type of effects	Exposure estimate	Exposure / DMEL
Inhalation, systemic, long-term (carcinogenicity, lung)	5.45E-5 mg/m³ (External Tool: <i>Extended ART v1.5</i>)	0.817
Oral, systemic, long-term (carcinogenicity, intestinal)	3.46E-04 µg/kg bw/day (calculated from exposure value for: Inhalation, systemic, long-term)	2.59E-04
Inhalation, systemic, long-term (neurodevelopmental damage)	2.48E-03 mg/m³ (External Tool: <i>Extended ART v1.5</i>)	0.427
Dermal, systemic, long-term (neurodevelopmental damage)	0.617 mg/kg bw/day (External Tool: <i>Extended TRA Workers v3</i>)	0.123
Combined routes, systemic, long-term (neurodevelopmental damage)		0.550

4.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

Assessing compliance with the exposure scenario

The downstream user must assess the operational conditions and risk management measures for each worker activity with the contributing scenarios in section 4.2. The following should be considered:

- The actual volumes used (kg/day) and transfer speed (kg/minute, L/minute or m²/hour) must not exceed the values listed.
- The average duration (hours/week) for which a task is performed in practice must not exceed the values listed.
- Technical risk management measures are used within the boundaries set by the manufacturer (DCC) and are adequately maintained including:
 - General ventilation and LEV: a direct measurement of the airspeed in the ventilation channels and the concentration of the pigments is below 10% of the DMEL

- Assigned protection factor (APF) of the RPE is adequate for the specific worker function (Table 1).
- Fit testing prior to first use and repeated annually or as often as the workers face changes shape (weight loss or gain of more than 4 kg).
- Supervision of proper use for RPE needs to be in place and documented.

Explanation on risk characterisation

Most of the worker contributing scenarios have been assessed at less than 40 hours/week. In this chapter, the tasks as described by the contributing scenarios are combined into worker functions. The combinations were based on information gathered in the extensive site visits, information from interviews and literature. The combined tasks aim to provide an adequate description of actual exposures. If a downstream user has a different combination of activities, it is important to assess each function.

The carcinogenicity (lung and intestinal cancer) and developmental effects of PY.34 or PR.104 are linked to long term average exposure. The cumulative risk is referred to as the Exposure/DMEL ratio (EDR). In order for the cancer risk to be regarded as “acceptably low”, the Exposure / DMEL ratio (EDR) for the activity must not be higher than the EDR listed under Section 4.3.

This also means that the EDR for lung cancer combined with the EDR for intestinal cancer must be below 1 at all times in order for the yearly worker risk to be below 10^{-6} per year and the related life time worker risk to be below $4 \cdot 10^{-5}$ (which is accepted by Competent Authorities in the EU). The combined EDR for neurodevelopmental effects (inhalation and dermal route) must be below 1 for all female workers of childbearing age, because at this level the effect is toxicologically insignificant.

Risk calculation for functions

The summary tables provided in Section 1 of this document show which tasks (or contributing scenarios) are combined into functions. For each task among others the use of respiratory protection (including Assigned Protection Factor; APF) and the frequency of use (hours/week) is provided.

The cumulative risks for chromium (exposure / DMEL ratio) for these different functions are provided in Table 5:

- 1. The ratio of the 8-hour time weight average (TWA) respirable exposure value to pigment in $\mu\text{g}/\text{m}^3$ taking into account the assigned protection factor of respiratory protection and the inhalation DMEL for the pigment.**

This value shows the level of control for this route. As the value is below 1 for all functions, the excess lung cancer risk is less than $4 \cdot 10^{-5}$ for a 40 hour per week, 40 year exposure. This means that the additional cancer risk can be assessed as being “acceptably low”.

- 2. The ratio of the 8-hour oral dose in $\mu\text{g}/\text{kg bw}$ into account the assigned protection factor of respiratory protection used and the oral DMEL for the pigment.**

This value shows the level of control for this route. As the value is below 1 for all functions, the excess intestinal cancer risk is less than $4 \cdot 10^{-5}$ for a 40 hour per week, 40 year exposure. This means that the additional cancer risk can be assessed as being “acceptably low”.

- 3. The combined ratios mentioned under 1 and 2.**

This value shows the level of control for both the inhalation of the respirable fraction and the oral intake of the non-respirable inhalable fraction inhaled.

As the value is below 1 for all functions, the excess cancer risk is less than $4 \cdot 10^{-5}$ for a 40 hour per week, 40 year exposure. This means that the additional cancer risk can be assessed as being “acceptably low”.

The cumulative risks for chromium (exposure / DMEL ratio) for these different functions is provided in the table below:

Table 5. Overview of function based exposure / DMEL ratios for Use 2 (ES2)

	Function	Spray painter manual	Spray painter automated booth	Lab worker / Quality control	Heat curing paint applicator	Mixer	Filler
	Hours per week	40	40	30	40	40	40
1	Function inhalation respirable dust / DMEL ratio Chrome, <i>taking</i> RPE into account	9.86E-01	5.06E-01	4.86E-01	8.23E-01	1.57E-01	1.93E-01
2	Function oral exposure / DMEL ratio Chrome, <i>taking</i> RPE into account	5.94E-05	2.83E-05	1.54E-04	2.61E-04	4.99E-05	6.12E-05

3	Function combined inhalation and oral exposure / DMEL ratio Chrome, taking RPE into account	9.86E-01	5.06E-01	4.86E-01	8.24E-01	1.57E-01	1.93E-01
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In case the conditions as specified in this Annex are not in line with the actual conditions in your facility, contact and inform your supplier.

For any inquiries please contact the DCC Maastricht BV OR via the following e-mail address: hschulpen@dominioncolour.nl.

5. ES 4: Service life (worker at industrial site); Service life of coated articles. Performance and longevity depend on the pigment quality for bright lasting colours improving visibility and safety, light and weather fastness (durability), chemical fastness, impact resistance and heat stability.; Coatings; PC 9a

This section is aimed at HSE specialists and details the exposure scenario and its contributing scenarios as is required within the REACH Regulation (1907/2006/EC). Detailed information is presented on the worker and environmental exposure estimation and risk characterisation which are in line with the Chemical Safety Report that was submitted in the registration dossiers of DCC PY.34 and PR.104.

Section 5.1 provides an overview of the activities (contributing scenarios, CS) relevant for Use 2 with the related use descriptors. The contributing scenarios describe all activities that have a potential exposure to human and the environment. Multiple activities can be performed by one worker per day.

The table includes the following information:

- Subsection number: the same as the contributing scenario number listed in Table 1 of this document.
- Use descriptors: defined by the European Chemicals Agency (ECHA) (please refer to ECHA Guidance R.12 for a further explanation).
- Environmental Release Categories (ERCs): describe the emission from an environmental point of view.
- Process Categories (PROCs): describe exposure from a worker point of view.

Section 5.2 describes all conditions under which the activities of DCC PY.34 or PR.104 are in line with the permitted uses. Here you will find detailed information on the activities, the operational conditions and risk management measures for the environment and the workers.

For the environmental assessment the following information is outlined:

- Maximum amount of pigment to be used per site (both daily and per year).
- Maximum number of emission days per year (operating / use days).
- Minimum flow of a river to which the waste water is shed.
- Information regarding the treatment of sewage.

For the worker exposure the following information for each activity is described:

- The form of the mixture in which the pigments are used (i.e. powder, paste, slurry).
- Dustiness of the pigment and the respirable fraction.
- Concentration (%) of the pigments in any mixtures used.
- Average duration of use per week and maximum duration of use per shift (recalculated to maximum hours/week).
- Amounts of the pigment / paste / paint / pellets handled by users.
- Technical and organizational risk management measures (i.e. ventilation rate, local exhaust ventilation, good housekeeping).
- Required personal protective equipment (including gloves and respirator).
- Type of activity that is being performed (in line with the input of the exposure models used).

Corresponding information that is to be used by the worker itself is summarized in the Workplace Instruction Cards (see Section 2 of this document).

Section 5.3 provides information on the exposure and risk including the methods (e.g. models) used to estimate the exposure, the estimated exposure value and the ratio of this value with regard to the defined exposure limits (Exposure / DMEL ratio) for each contributing scenario.

Section 5.4 provides guidance to the downstream user regarding the boundaries of the exposure scenario, its contributing scenarios and the defined functions. It provides information on the effectiveness of risk management measures.

Please note that any other activity than the ones described in this Annex are not permitted. In case any doubt exists regarding the allowed uses, please contact DCC or HMG Paints Limited without undue delay.

5.1. Title section

Coatings and Paints, Thinners, paint removers (PC 9a)	
Vehicles (AC 1)	
Machinery, mechanical appliances, electrical/electronic articles (AC 2)	
Metal articles (AC 7)	
Environment	
CS 1: Sanding of painted/coated articles	ERC 12b, ERC 12a
Worker	
CS 2: Cutting painted metal sheet (dry)	PROC 21
CS 3: Sanding of dried paint on machines, vehicles, other metal articles etc.	PROC 24
CS 4: Welding, torch cutting of painted metal (dry)	PROC 25
Exposure scenario of the uses leading to the inclusion of the substance into the article	
ES 2: Use at industrial site; Industrial application of paints on metal surfaces (machines, vehicles, structures, signs, road furniture, coil coating). Pigment choice is governed by end product specifications on visibility, colour, durability, other technical requirements and Regulations.; Coatings; PC 9a	
ES 3: Use by professional worker; Professional, non-consumer application of paints on metal surfaces (machines, vehicles, structures, signs, road furniture) or as road marking. Pigment choice is governed by requirements on visibility, colour, durability, technical performance and Regulations.; Coatings; PC 9a	

5.2. Conditions of use affecting exposure

5.2.1. Control of environmental exposure (CS1): Sanding of painted/coated articles (ERC 12b)

Product (article) characteristics
Correction for Pb content of pigment (60%): Correction applicable (The pigment contains 60% lead) [Effectiveness Water: 40%; Air: 40%]
Correction for water solubility of Pb in paint (0.5%): Correction applicable (Transformation/dissolution tests were carried out with paints containing the pigment. These tests show 0.2% dissolution. Based on the results of these tests, 0.5% dissolution is applied as a worst-case.) [Effectiveness Water: 99.5%]
Amount used, frequency and duration of use (or from service life)
Daily amount per site <= 0.006 tonnes/day
Annual amount per site <= 1.2 tonnes/year
Percentage of EU tonnage used at regional scale: = 100 %
Emission days per year: = 200 days/year
Conditions and measures related to treatment of waste (including article waste)
Dispose of waste or used sacks/containers according to local regulations.
Other conditions affecting environmental exposure
Receiving surface water flow >= 18000 m3/d

5.2.2. Control of worker exposure (CS2): Cutting painted metal sheet (dry) (PROC 21)

Product (article) characteristics
Substance product type: Powders
<ul style="list-style-type: none"> • Limit the substance content in the product to 5 %. • Dustiness: Firm granules, flakes or pellets • Moisture Content of the product: Dry product

• Covers solid products only (relevant for dermal assessment only).
Amount used (or contained in articles), frequency and duration of use/exposure
Duration of use (hours/week): 40 hours/week
Amount used (or contained in articles), frequency and duration of use/exposure
<i>Covers daily exposures up to 8 hours.</i>
Ventilation rate of the general ventilation system in the work area: 3 ACH (ACH = air changes per hour.)
Technical and organisational conditions and measures
<i>Advanced (industrial) exposure controls assumed.</i>
Conditions and measures related to personal protection, hygiene and health evaluation
Wear chemically resistant gloves (tested to EN374) in combination with specific activity training; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Handling of objects
• Handling of apparently clean objects
• Handling that departs from regular work procedures and involves large amounts of energy
Room size of the work area: Any size workroom

5.2.3. Control of worker exposure (CS3): Sanding of dried paint on machines, vehicles, other metal articles etc. (PROC 24)

Product (article) characteristics
Physical form: Massive object
• Limit the substance content in the product to 5 %.
• Covers solid products only (relevant for dermal assessment only).
Amount used (or contained in articles), frequency and duration of use/exposure
Duration of use (hours/week): 6 hours/week
Technical and organisational conditions and measures
<i>Basic (professional) exposure controls assumed.</i>
Integrated LEV
Conditions and measures related to personal protection, hygiene and health evaluation
Wear a respirator providing a minimum efficiency of 96.66 % (APF 30)
Wear chemically resistant gloves (tested to EN374) in combination with specific activity training; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Covers use at ambient temperatures
• Pattern of use: Wide dispersive use
• Pattern of exposure control: Direct handling
• Contact level: Extensive

5.2.4. Control of worker exposure (CS4): Welding, torch cutting of painted metal (dry) (PROC 25)

Product (article) characteristics
Physical form: Massive object
• Limit the substance content in the product to 5 %.
• Covers solid products only (relevant for dermal assessment only).
Amount used (or contained in articles), frequency and duration of use/exposure
Duration of use (hours/week): 6 hours/week
Technical and organisational conditions and measures
<i>Basic (professional) exposure controls assumed.</i>

Integrated LEV
Conditions and measures related to personal protection, hygiene and health evaluation
Wear a respirator providing a minimum efficiency of 99 % (APF 100)
Wear chemically resistant gloves (tested to EN374) in combination with specific activity training; For further specification, refer to section 8 of the SDS.
Other conditions affecting workers exposure
Covers use at ambient temperatures <ul style="list-style-type: none"> • Pattern of use: Wide dispersive use • Pattern of exposure control: Direct handling • Contact level: Extensive

5.3. Exposure estimation and reference to its source

5.3.1. Environmental release and exposure (CS1): Sanding of painted/coated articles (ERC 12b)

Release route	Release rate	Release estimation method
Water	5.76E-4 kg/day	ERC based
Air	0.115 kg/day	ERC based
Soil	1.2 kg/day	ERC based

Protection target	Exposure estimate (based on: EUSES 2.1.2)	RCR
Freshwater	7.168E-7 mg/L	< 0.01
Sediment (freshwater)	0.212 mg/kg dw	< 0.01
Marine water	7.168E-8 mg/L	< 0.01
Sediment (marine water)	0.021 mg/kg dw	< 0.01
Sewage treatment plant	3.89E-5 mg/L	< 0.01
Agricultural soil	0.012 mg/kg dw	< 0.01

5.3.2. Worker exposure (CS2): Cutting painted metal sheet (dry) (PROC 21)

Route of exposure and type of effects	Exposure estimate	Exposure / DMEL
Inhalation, systemic, long-term (carcinogenicity, lung)	1.67E-6 mg/m³ (External Tool: <i>Extended ART v1.5</i>)	0.025
Oral, systemic, long-term (carcinogenicity, intestinal)	1.06E-05 µg/kg bw/day (calculated from exposure value for: Inhalation, systemic, long-term)	7.96E-06
Inhalation, systemic, long-term (neurodevelopmental damage)	7.60E-05 mg/m³ (External Tool: <i>Extended ART v1.5</i>)	0.013
Dermal, systemic, long-term (neurodevelopmental damage)	0.028 mg/kg bw/day (TRA Workers 3.0)	0.006
Combined routes, systemic, long-term (neurodevelopmental damage)		0.019

5.3.3. Worker exposure (CS3): Sanding of dried paint on machines, vehicles, other metal articles etc. (PROC 24)

Route of exposure and type of effects	Exposure estimate	Exposure / DMEL
Inhalation, systemic, long-term (carcinogenicity, lung)	3.84E-5 mg/m³ (External Tool: <i>Extended MEASE 1.02.01</i>)	0.576
Oral, systemic, long-term (carcinogenicity, intestinal)	4.02E-05 µg/kg bw/day (calculated from exposure value for: Inhalation, systemic, long-term)	3.02E-05
Inhalation, systemic, long-term (neurodevelopmental damage)	3.20E-04 mg/m³ (External Tool: <i>Extended ART v1.5</i>)	0.055
Dermal, systemic, long-term (neurodevelopmental damage)	0.004 mg/kg bw/day (External Tool: <i>Extended TRA Workers v3</i>)	8.4E-4
Combined routes, systemic, long-term (neurodevelopmental damage)		0.056

5.3.4. Worker exposure (CS4): Welding, torch cutting of painted metal (dry) (PROC 25)

Route of exposure and type of effects	Exposure estimate	Exposure / DMEL
Inhalation, systemic, long-term (carcinogenicity, lung)	1.8E-5 mg/m³ (External Tool: <i>Extended MEASE 1.02.01</i>)	0.27
Oral, systemic, long-term (carcinogenicity, intestinal)	1.89E-05 µg/kg bw/day (calculated from exposure value for: Inhalation, systemic, long-term)	1.41E-05
Inhalation, systemic, long-term (neurodevelopmental damage)	1.5E-04 mg/m³ (External Tool: <i>Extended ART v1.5</i>)	0.026
Dermal, systemic, long-term (neurodevelopmental damage)	4.5E-4 mg/kg bw/day (External Tool: <i>Extended TRA Workers v3</i>)	9E-5
Combined routes, systemic, long-term (neurodevelopmental damage)		0.026

5.4. Guidance to DU to evaluate whether he works inside the boundaries set by the ES

Assessing compliance with the exposure scenario

The downstream user must assess the operational conditions and risk management measures for each worker activity with the contributing scenarios in Section 5.2. The prescribed risk management measures are shown for guidance where the overall objective is to achieve the required DMELs. The following should be considered:

- The actual volumes used (kg/day) and transfer speed (kg/minute, L/minute or m²/hour) must not exceed the values listed.
- The average duration (hours/week) for which a task is performed in practice must not exceed the values listed.
- Technical risk management measures are used within the boundaries set by the manufacturer (DCC) and are adequately maintained including:
 - General ventilation and LEV: a direct measurement of the airspeed in the ventilation channels and the concentration of the pigments is below 10% of the DMEL
 - Assigned protection factor (APF) of the RPE is adequate for the specific worker function (Table 1).
 - Fit testing prior to first use and repeated annually or as often as the workers face changes shape (weight loss or gain of more than 4 kg).
 - Supervision of proper use for RPE needs to be in place and documented.

Explanation on risk characterisation

Most of the worker contributing scenarios have been assessed at less than 40 hours/week. In this chapter, the tasks as described by the contributing scenarios are combined into worker functions. The combinations were based on information gathered in the extensive site visits, information from interviews and literature. The combined tasks

aim to provide an adequate description of actual exposures. If a downstream user has a different combination of activities, it is important to assess each function.

The carcinogenicity (lung and intestinal cancer) and developmental effects of PY.34 or PR.104 are linked to long term average exposure. The cumulative risk is referred to as the Exposure/DMEL ratio (EDR). In order for the cancer risk to be regarded as “acceptably low”, the Exposure / DMEL ratio (EDR) for the activity must not be higher than the EDR listed under Section 5.3.

This also means that the EDR for lung cancer combined with the EDR for intestinal cancer must be below 1 at all times in order for the yearly worker risk to be below 10^{-6} per year and the related life time worker risk to be below $4 \cdot 10^{-5}$ (which is accepted by Competent Authorities in the EU). The combined EDR for neurodevelopmental effects (inhalation and dermal route) must be below 1 for all female workers of childbearing age, because at this level the effect is toxicologically insignificant.

Risk calculation for functions

The summary tables provided in Section 1 of this document show which tasks (or contributing scenarios) are combined into functions. For each task among others the use of respiratory protection (including Assigned Protection Factor; APF) and the frequency of use (hours/week) is provided.

The cumulative risks for chromium (exposure / DMEL ratio) for these different functions are provided in Table 6:

4. The ratio of the 8-hour time weight average (TWA) respirable exposure value to pigment in $\mu\text{g}/\text{m}^3$ taking into account the assigned protection factor of respiratory protection and the inhalation DMEL for the pigment.

This value shows the level of control for this route. As the value is below 1 for all functions, the excess lung cancer risk is less than $4 \cdot 10^{-5}$ for a 40 hour per week, 40 year exposure. This means that the additional cancer risk can be assessed as being “acceptably low”.

5. The ratio of the 8-hour oral dose in $\mu\text{g}/\text{kg}$ bw into account the assigned protection factor of respiratory protection used and the oral DMEL for the pigment.

This value shows the level of control for this route. As the value is below 1 for all functions, the excess intestinal cancer risk is less than $4 \cdot 10^{-5}$ for a 40 hour per week, 40 year exposure. This means that the additional cancer risk can be assessed as being “acceptably low”.

6. The combined ratios mentioned under 1 and 2.

This value shows the level of control for both the inhalation of the respirable fraction and the oral intake of the non-respirable inhalable fraction inhaled.

As the value is below 1 for all functions, the excess cancer risk is less than $4 \cdot 10^{-5}$ for a 40 hour per week, 40 year exposure. This means that the additional cancer risk can be assessed as being “acceptably low”.

The cumulative risks for chromium (exposure / DMEL ratio) for these different functions is provided in the table below:

Table 6. Overview of function based exposure / DMEL ratios for Use 2 (ES4)

	Function	Maintenance worker in industrial setting
	Hours per week	40
1	Function inhalation respirable dust / DMEL ratio Chrome, taking RPE into account	8.71E-01
2	Function oral exposure / DMEL ratio Chrome, taking RPE into account	5.23E-05
3	Function combined inhalation and oral exposure / DMEL ratio Chrome, taking RPE into account	9.75E-01

In case the conditions as specified in this Annex are not in line with the actual conditions in your facility, contact and inform your supplier.

For any inquiries please contact the DCC Maastricht BV OR via the following e-mail address: hschulpen@dominioncolour.nl.

USE 2: Verification of DCC PY.34 & PR.104 RMM and OC Summary of Blood lead, Air Monitoring and RPE

DATE: 28.11..2016

Dear Customer and Down Stream User,

We are pleased to inform you that our pigment supplier, DCC has successfully applied for the continued use of Pigment Yellow 34 and Pigment Red 104. In order to ensure safe handling of these pigments, the European Commission has included the assessment of biomonitoring data, air monitoring data and RPE effectiveness by the Authorisationholder.

As per Article 3(e) of the final EC decision, C(2016) 5644 of 07.09.2016, all customers and downstream users are obligated to provide blood lead information and air monitoring results for chromium to ECHA. DCC Maastricht B.V. OR will receive data from ECHA as per Article 3(f) for the purpose of preparing a review reports.

In order to complete your notification to ECHA, please refer to Table 1 which can be found in each eSDS to identify the worker functions and the activities that are covered per use under DCC's Authorisation. Table 1 indicates the specific activities that a worker is permitted to perform under the specified technical and organisational conditions. The table below summarises the uses and the assigned Authorisation numbers for DCC PY.34 and PR.104.

DCC eSDS (Use)	Description of USE for Paint Sector	DCC PY.34 Authorisation Numbers:	DCC PR.104 Authorisation Numbers:
Use 1	Use: distribution and mixing of pigment powder in an industrial environment into solvent-based paints for non-consumer use	REACH/16/3/0	REACH/16/3/6
Use 2	Use: industrial application of paints on metal surfaces (such as machines vehicles, structures, signs, road furniture, coil coating, etc.)	REACH/16/3/1	REACH/16/3/7
Use 3	Use: professional, non-consumer application of paints on metal surfaces (such as machines, vehicles, structures, signs, road furniture, etc.) or as road marking	REACH/16/3/2	REACH/16/3/8

DCC eSDS (Use)	Description of USE for Plastic Sector	DCC PY.34 Authorisation Numbers:	DCC PR.104 Authorisation Numbers:
Use 4	Use: distribution and mixing pigment powder in an industrial environment into liquid or solid premix to colour plastic/plasticised articles for non-consumer use	REACH/16/3/3	REACH/16/3/9
Use 5	Use: industrial use of solid or liquid colour premixes and pre-compounds containing pigment to colour plastic or plasticised articles for non-consumer use	REACH/16/3/4	REACH/16/3/10
Use 6	Use: professional use of solid or liquid colour premixes and pre-compounds containing pigment in the application of hot melt road marking	REACH/16/3/5	REACH/16/3/11

HMG Paints Limited & DCC recommends using the attached form **for each employee** involved with DCC PY.34 and/or PR.104 to verify and monitor worker exposures. This form can be submitted to ECHA and to DCC (hschulpen@dominioncolour.nl) by March, 31st of each year, summarising the results of the previous year.

If you have any questions regarding the use of DCC PY.34 and/or PR.104, please feel free to contact your HMG Paints Limited representative.

Thank you for your continued support.

**USE 2: Verification of DCC PY.34 & PR.104 RMM and OC
Summary of Blood lead, Air Monitoring and RPE**

I. General Information:

Company Name:		Contact Name:	
Address:		Contact Phone #:	
Postal Code		Contact e-mail:	
City, Country:		Date:	
# Workers handling/exposed to PY.34 and/or PR.104			
Annual volume PY.34/PR.104 used:			
Comments:			

II. Company specific: Use and Legal Requirements

REACH Authorisation Number: Tick the boxes that apply to your company	% PY.34/PR.104 in product (ranges are acceptable, but within $\pm 10\%$ of the contents)	Member State Regulation related to Health Surveillance	Health Surveillance		Air Monitoring for Chromium
			Action Level ¹	Suspension Level ²	Comments:
PY.34 USE 1: REACH/16/3/0 USE 4: REACH/16/3/3 USE 2: REACH/16/3/1 USE 5: REACH/16/3/4 USE 3: REACH/16/3/2 USE 6: REACH/16/3/5		Directive 98/24/EC Directive 2004/37/EC Other.	40 μg lead/100 ml blood Other.	70 μg lead/100 ml blood Other.	Please provide Member State Regulation for Air Monitoring: Please provide Sampling Procedure for air monitoring: Please provide analytical method for air monitoring:
PR.104 USE 1: REACH/16/3/6 USE 4: REACH/16/3/9 USE 2: REACH/16/3/7 USE 5: REACH/16/3/10 USE 3: REACH/16/3/8 USE 6: REACH/16/3/11		If other apply, please specify:	If other apply, please specify:	If other apply, please specify:	
			Please provide Sampling test Method for Blood Lead:		

¹ Action level: triggers employer to carry out investigation, review control measures and take steps to reduce employee's blood lead concentration below the action level so far as reasonably practicable

² Suspension level: concentration at which employees are normally taken off work which exposes them to lead. Return to work/modification of work exposure is based on Doctor's recommendations

USE 2: Verification of DCC PY.34 & PR.104 RMM and OC Summary of Blood lead, Air Monitoring and RPE

III. Worker / Employee specific

Table 1. Overview of tasks per function for Use 2 (ES 2, 4)

Company:			Employee (internal) Id ³ :				Approximate volume handled by employee over last 6-12 months:								
Comments:			Smoker		Non- smoker		Approximate volume handled by employee/per day:								
Description of Worker Functions and Tasks			Summary of RMM for USE 2				Verification of RMM			Results of Monitoring Programs					
Function	Workplace instruction card (WIC)	Tasks (description of Contributing Scenario)	Technical RMM			Organisational RMM	RPE	Site RMM A, B or C	Max. hours/week hours	Type RPE used APF	Blood lead Testing		Personal Air Monitoring		
			A. Containment of source	B. Personal enclosure (PE) / segregation (SEG)	C. Local exhaust ventilation (LEV)	Maximum hours per week	Minimum Respiratory protective equipment (APF ⁴)				µg lead/100 ml blood	Date of test	pigment µg/m ³	Cr µg/m ³ ⁵	Date of Test
Spray painter manual	WIC07	Handling of packaged colour paste and/or paint, including distribution	Y			5	-								
		Mixing of paste and/or coating with extra solvents or additives before use	Y			5	20								
		Filling of spray equipment with pigment paints in dedicated settings				5	20								
		Manual pigment paint spray application in an industrial booth			Y (spray room)	25	400								
		Total				40									

³ Only list non-confidential details. Personal data to be maintained by the customer/downstream user.

⁴ Level of respiratory protection that can realistically be expected to be achieved in the workplace by 95% of adequately trained and supervised wearers using a properly functioning and correctly fitted respiratory protective device.

⁵ The exposure related to chromium can be calculated based on a general 15% Cr-content of PY.34/PR.104

USE 2: Verification of DCC PY.34 & PR.104 RMM and OC Summary of Blood lead, Air Monitoring and RPE

Table 2 continue: Overview of tasks per function for Use 2 (ES 2, 4)

Company:			Employee (internal) Id ⁶ :				Approximate volume handled by employee over last 6-12 months:								
Comments:			Smoker		Non- smoker		Approximate volume handled by employee/per day:								
Description of Worker Functions and Tasks			Summary of RMM for USE 2				Verification of RMM			Results of Monitoring Programs					
Function	Workplace instruction card (WIC)	Tasks (description of Contributing Scenario)	Technical RMM			Organisational RMM	RPE	Site RMM	Max. hours/week	Type RPE used	Blood lead results		Personal Air Monitoring		
			A. Containment of source	B. Personal enclosure (PE) / segregation (SEG)	C. Local exhaust ventilation (LEV)	Maximum hours per week	Minimum Respiratory protective equipment (APF) ⁷				A, B or C	hours	APF	µg lead/100 ml blood	Date of test
Spray painter automated spray booth	WIC08	Handling of packaged colour paste and/or paint, including distribution				5	-								
		Filling of spray equipment with pigment paints in dedicated settings or		-	-	5	20								
		Filling of equipment with pigment paint or		-	-	5	20								
		Transfer of pigment paint to/from drums/cans e.g. at a filling line before application		Y (SEG)	Y	5	20								
		Automated pigment paint spray application in an industrial booth		Y (PE / SEG)		30	10								
		Total				40									

⁶ Only list non-confidential details. Personal data to be maintained by the customer/downstream user.

⁷ Level of respiratory protection that can realistically be expected to be achieved in the workplace by 95% of adequately trained and supervised wearers using a properly functioning and correctly fitted respiratory protective device.

⁸ The exposure related to chromium can be calculated based on a general 15% Cr-content of PY.34/PR.104

**USE 2: Verification of DCC PY.34 & PR.104 RMM and OC
Summary of Blood lead, Air Monitoring and RPE**

Company:			Employee (internal) Id ⁹ :				Approximate volume handled by employee over last 6-12 months:								
Comments:			Smoker		Non-smoker		Approximate volume handled by employee/per day:								
Description of Worker Functions and Tasks			Summary of RMM for USE 2				Verification of RMM			Results of Monitoring Programs					
Function	Workplace instruction card (WIC)	Tasks (description of Contributing Scenario)	Technical RMM			Organisational RMM	RPE	Site RMM	Max. hours/week	Type RPE used	Blood lead results		Personal Air Monitoring		
			A. Containment of source	B. Personal enclosure (PE)/ segregation (SEG)	C. Local exhaust ventilation (LEV)						Maximum hours per week	Minimum Respiratory protective equipment (APR) ¹⁰	A, B or C	hours	APF
Lab worker /Quality control	WIC09	Laboratory handling of pigment paste and/or paints			Y	10									
		Pigment paint testing by brushing/rolling			Y	20									
		Total				30									
Heat Curing paint applicator	WIC10	Handling of packaged colour paste and/or paint, including distribution				5	-								
		Filling of spray equipment with pigment paints in dedicated settings or		-	-	5	20								
		Filling of equipment with pigment paint or		-	-	5	20								
		Transfer of pigment paint to/from drums/cans e.g. at a filling line before application		Y (SEG)	Y	5	20								
		Pigment paint application and heat curing					30	-							
		Total				40									

⁹ Only list non-confidential details. Personal data to be maintained by the customer/downstream user.

¹⁰ Level of respiratory protection that can realistically be expected to be achieved in the workplace by 95% of adequately trained and supervised wearers using a properly functioning and correctly fitted respiratory protective device.

¹¹ The exposure related to chromium can be calculated based on a general 15% Cr-content of PY.34/PR.104

**USE 2: Verification of DCC PY.34 & PR.104 RMM and OC
Summary of Blood lead, Air Monitoring and RPE**

Company:			Employee (internal) Id ¹² :				Approximate volume handled by employee over last 6-12 months:								
Comments:			Smoker		Non-smoker		Approximate volume handled by employee/per day:								
Description of Worker Functions and Tasks			Summary of RMM for USE 2				Verification of RMM		Results of Monitoring Programs						
Function	Workplace instruction card (WIC)	Tasks (description of Contributing Scenario)	Technical RMM			Organisational RMM	RPE	Site RMM	Max. hours/week	Type RPE used	Blood lead results		Personal Air Monitoring		
			A. Containment of source	B. Personal enclosure (PE) / segregation (SEG)	C. Local exhaust ventilation (LEV)						Maximum hours per week	Minimum Respiratory protective equipment (APF ¹³)	A, B or C	hours	APF
Mixer	WIC11	Mixing colour paste with paint in closed mixing machine with automated dosing of paste	Y (SEG)	Y		35	-								
		Equipment cleaning: scraping, brushing and wiping	Y			5	-								
		Total				40									
Filler	WIC12	Dried pigment paste and/or paint cleaning				5	20								
		Handling and manipulation of dried painted articles				35	-								
		Total				40									
Maintenance worker in industrial setting	WIC13	Cutting painted metal sheet (dry)				40	10								
		Sanding of dried paint on machines, vehicles, other metal articles etc.			Y	6	30								
		Welding, torchcutting of painted metal (dry)			Y	6	100								
		Total				40¹⁵									

¹² Only list non-confidential details. Personal data to be maintained by the customer/downstream user.

¹³ Level of respiratory protection that can realistically be expected to be achieved in the workplace by 95% of adequately trained and supervised wearers using a properly functioning and correctly fitted respiratory protective device.

¹⁴ The exposure related to chromium can be calculated based on a general 15% Cr-content of PY.34/PR.104

¹⁵ The limit value for the two pigments is based on an exposure duration of 40 hours per working week. Therefore the maximum duration for any function is 40 even though for this function the summed duration per task can be over 40 hours

**USE 2: Verification of DCC PY.34 & PR.104 RMM and OC
Summary of Blood lead, Air Monitoring and RPE**

IV. Company specific: Stationary Air Monitoring Data for Chromium

Company Name:		Please state Member State Regulation for Air Monitoring:	DMEL inhalation for Chromium: 0.067 µg pigment/m³		
Approximate Volume of PY.34/PR.104 handled during sampling period:			Sampling method/frequency:		
Location Description	Length of Sampling Period (hours)	Date of Sampling	Results (µg pigment/m³)	Results (µg Cr/m³)¹⁶	Comments

¹⁶ The exposure related to chromium can be calculated based on a general 15% Cr-content of PY.34/PR.104