SAFETY DATA SHEET (1907/2006)

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FORMALDEHYDE 37% UNSTABILIZED

1 General aspects

1.1 Qualitative worker exposure assessment

1.1.1 Worker exposure

1.1.1.1 General hazards

Formaldehyde as a pure substance is classified/labeled for severe skin burns and eye damage (H314/R34) and skin sensitization effects (H317/R43 – Skin Sens. Cat 1). Besides that, formaldehyde may also cause cancer (H350/R45 Carc. Cat 1B). In accordance with the REACH guidance part E, Table E 3-1 a qualitative assessment is performed to identify suitable risk management measures for the sensitizing potency of the substance on the skin, the damaging potency of the substance on the eyes and corrosive properties on the skin. According to the specific concentration limits for formaldehyde, classification/labeling for severe skin burns and eye damage (H314/R34) applies if the formaldehyde concentration in preparation is ≥ 25%. In case of using preparations with a formaldehyde content ≥ 5% - < 25%, skin and eye irritation effects may occur (H315/R38, H319/R36). Classification/Labeling for skin sensitization effects (H317/R43) applies in case of using preparations with a Formaldehyde concentration ≥ 0.2%.

1.1.1.2 Eyes

Preparations with a formaldehyde content of 1.5% used ES 4 are not classified for eye effects.
The concentration of formaldehyde is assumed to be above the concentration limit for serious damage to the eyes (≥ 25%) in uses described in ES 1 and 3. Preparations with 5% formaldehyde used in ES 2 and 5 may cause serious irritation effects on the eyes. The risk of both eye effects is evaluated qualitatively.
Exposure to the eyes can occur in two ways: direct from the air (splashes, aerosols, dust) or indirect via hand-eye contact. The likelihood/frequency of hand-eye contact is considered to be low due to the fact that the likelihood of actual hand exposure is at most low and workers have been trained to prevent exposure. For PROCs where aerosols are formed, the intensity of exposure due to contact of the eyes with air is estimated to be high due to the formation of aerosols.
Because of the severe nature of the effect, all risks should be avoided. Therefore, suitable eye protection like goggles, face shields or full face masks should be worn at the workplace to prevent eye exposure in all processes with mixtures containing ≥ 5% Formaldehyde. With the above described measures taken into account, the actual eye exposure is low and the risk of severe eye damage is considered to be controlled.

1.1.1.3 Skin

The likelihood/frequency of exposure is assessed for each PROC combined with a specification of measures depending on the specific PROC.
The concentration of formaldehyde is assumed to be above the concentration limit for skin sensitization (≥ 0.2%) in all processes. Hence, the risk of skin sensitization is evaluated qualitatively for all processes.
Formaldehyde preparations described in ES 1 and 3 exceed the limit for classification/labelling for severe skin burns. Formaldehyde preparations described in ES 2 and 5 may cause skin irritation. The risk of all three skin effects is evaluated qualitatively. Preparations with 1.5% formaldehyde used in ES 4 are not classified for corrosive and/or irritating effects on the skin.

1.1.2 Environment

In the chemical safety assessment performed according to Article 14(3) in connection Annex I section 3 (Environmental Hazard Assessment) and section 4 (PBT/ vPvB Assessment) no hazard was identified. Therefore according to REACH Annex I (5.0) an exposure-estimation is not necessary. Consequently all identified uses of the substance are assessed as safe for the environment.

1.1.3 Consumer exposure

In REACH regulation, Article 14, it is defined when a chemical safety assessment is necessary for substances. Article 14-2(a) refers to concentration limits in the classification and labeling directive. No Exposure Scenario needs to be made for products (preparation) with a concentration below the limits that Article 14-2 refers to. As formaldehyde is classified as toxic, the Exposure Scenarios need to be made for a chemical safety assessment when formaldehyde is present in a preparation in concentrations above 0.1%.
Formaldehyde is present in small concentrations in preparations like detergents, coatings and adhesives. Regarding consumer uses, the concentration of formaldehyde in this type of preparations does not exceed 0.1%. According to Article 14-2, the use of this type of preparations by consumers does not need to be evaluated in the chemical safety assessment.
The use of formaldehyde in resins, which are used in the production of articles like paper, panel boards and textiles, will result in a service life stage. For this stage, percentages of formaldehyde in the final article are below 0.1%. This percentage is maintained by the use of certification marks which are in place for panel boards, wall papers and floorings. It could be argued based on the article mentioned above that no Exposure Scenario is necessary for formaldehyde in articles in such low concentrations. Although Article 14-2 does not refer directly to articles with a concentration below certain limits, but only to preparations, it is considered reasonable to extrapolate this Article to articles. Scientifically it is to be expected that in general substances are emitted more extensively from preparations than from articles, because of the lower mobility of substances in matrices of which articles are made.
Although exposure scenarios are therefore not necessary for service life of articles made with formaldehyde based resins, it is well-known that authorities worry about the potential risks of exposure of the general public to formaldehyde in houses and other buildings and about the potential emissions from materials, such as textiles or wood based panels. Several studies of formaldehyde concentrations in houses have been made to see whether there is indeed a risk. Therefore, the potential risks of consumer exposure to formaldehyde due to indoor exposure caused by the use of formaldehyde based resins in the production of several materials was studied by evaluating both indoor air concentrations of formaldehyde, emission criteria and emissions of materials and reasonable worst case exposure scenarios of indoor air concentrations caused by emissions of materials, calculated via modelling. The results of that evaluation are in the report “Analysis of consumer exposure associated with the use of products and articles containing formaldehyde –based resins” (Marquart et al., 2013), which is added in section 13 of IUCLID.

1.2 Overview of exposure scenarios

Table 1 Overview on exposure scenarios and coverage of substance life cycle

ES number	Short description of exposure scenario	Resulting life cycle stage						Sector of use (SU)	Process Category (PROC)	Product Category (PC)	Article Category (AC)	Environmental Release Category (ERC)	Volume (tonnes)
		Manufacture	Formulation	End use			Service life (for articles)						
				Industrial	Professional	Consumer							
1	Manufacturing of formaldehyde and aq. formaldehyde solutions, formulation, use as intermediate or monomer, use of preparations or mixtures containing formaldehyde up to 60% (ES 1)	x	x	x					1, 2, 3, 4, 5, 6, 8A, 8B, 9, 10, 13, 14, 15			1, 2, 3, 4, 5, 6A, 6B, 6C, 6D, 7	
2	Industrial use of preparations containing formaldehyde up to 5% (ES 2)		x	x					1, 2, 3, 4, 5, 6, 7, 8A, 8B, 9, 10, 13, 14, 15, 16, 21, 22C, 23C, 24C, 25C			2, 3, 5, 6C, 6D	

ES number	Short description of exposure scenario	Resulting life cycle stage						Sector of use (SU)	Process Category (PROC)	Product Category (PC)	Article Category (AC)	Environmental Release Category (ERC)	Volume (tonnes)
		Manufacture	Formulation	End use			Service life (for articles)						
				Industrial	Professional	Consumer							
3	Industrial use of preparations containing formaldehyde up to 25% (ES 3)		x	x					5, 8A, 8B, 9, 13, 15			2, 3, 4, 5, 6C, 6D	
4	Professional use of preparations containing formaldehyde up to 1.5% (ES 4)				x				5, 8A, 8B, 10, 11, 13, 15, 16, 21, 23C, 24C, 25C			8A, 8B, 8C, 8D, 8F	
5	Professional use of preparations containing formaldehyde up to 5% (ES 5)				x				8A, 11, 13, 15			8A	

2 Exposure Scenario 1: Manufacturing of formaldehyde and aq. formaldehyde solutions, formulation, use as intermediate or monomer, use of preparations or mixtures containing formaldehyde up to 60% (ES 1)

This scenario is described by the following combinations of use descriptors. The corresponding contributing scenarios are described in the respective subchapters.
An overall exposure scenario may be described by a number of contributing scenarios which may be subdivided into environmental exposure, worker exposure and consumer exposure.
The following scenarios contribute to the scenario *Manufacturing of formaldehyde and aq. formaldehyde solutions, formulation, use as intermediate or monomer, use of preparations or mixtures containing formaldehyde up to 60%.*

Table 2 Description of ES 1

Free short title	Manufacturing of formaldehyde and aq. formaldehyde solutions, formulation, use as intermediate or monomer, use of preparations or mixtures containing formaldehyde up to 60% (ES 1)
Systematic title based on use descriptor	ERC 1, 2, 3, 4, 5, 6A, 6B, 6C, 6D, 7; PROC 1, 2, 3, 4, 5, 6, 8A, 8B, 9, 10, 13, 14, 15
Name of contributing environmental scenario and corresponding ERC	ERC 1 Production of chemicals ERC 2 Formulation of preparations ERC 3 Formulation in articles ERC 4 Industrial use of processing aids ERC 5 Industrial use resulting in inclusion into or onto a matrix ERC 6a Industrial use of intermediates ERC 6b Industrial use of reactive processing aids ERC 6c Production of plastics ERC 6d Production of resins/rubbers ERC 7 Industrial use of substances in closed systems
Name(s) of contributing worker scenarios and corresponding PROCs	PROC 1 - Use in closed process, no likelihood of exposure PROC 2 - Use in closed, continuous process with occasional controlled exposure PROC 3 - Use in closed batch process (synthesis or formulation) PROC 4 - Use in batch and other process (synthesis) where opportunity for exposure arises PROC 5 - Mixing or blending in batch processes (multistage and/or significant contact) PROC 6 - Calendering operations PROC 8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities PROC 8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities PROC 9 - Transfer of chemicals into small containers (dedicated filling line) PROC 10 - Roller application or brushing PROC 13 - Treatment of articles by dipping and pouring

	PROC 14 - Production of preparations or articles by tabletting, compression, extrusion, pelletisation PROC 15 - Use of laboratory reagents in small scale laboratories

2.1 Contributing Scenarios controlling environmental exposure

As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.

2.2 Contributing Scenario (1) controlling industrial worker exposure for PROC 1

Name of contributing scenario	1 - Use in closed process, no likelihood of exposure
Scenario subtitle	CS 1 Use in closed process, no likelihood of exposure - long term local
Exposure type	Inhalation: Long-term local Dermal: Long-term systemic
Qualitative Risk Assessment	
General	Handle substance within closed system. Provide a good standard of general ventilation (not less than 3 - 5 air changes per hour) Ensure good work practices are implemented Avoid skin contact. Wear chemically resistant gloves in combination with intensive management supervision control.
Eyes	In case of potential exposure: Use suitable eye protection.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 60%. It is however set at 100% since the concentration limit of 60% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.)*
Process temperature	150 °C
Fugacity / Dustiness	high
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	240 cm^2

Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	98 %, burst-time: >4 hours (default) *(justification: Wear chemically resistant gloves in combination with intensive management supervision control.)*
Respiratory protection	no
High level containment	inhalation: 99.9 % *(justification: High level of containment (99.9% reduction), consisting of:* *- Sealed and enclosed system* *- The enclosure is not opened during the activity* *- The system is designed to minimize the surface area which can contact the material or pairs of valves with wash space between them.)*
Use of external/measured value inhalation	The ART model has been used to estimate inhalative exposure. Exposure value used: the upper limit of the interquartile confidence interval of the 75th percentile estimate. PROC 1: high integrity closed systems Far field source of exposure Substance product type: Liquid Liquid weight fraction: 100% Process temperature: Hot process (50-150 degrees) Vapour pressure: 100 000 Pa (Pure Formaldehyde, limit of ART) Activity class: Handling of contaminated objects Treated/contaminated surface: surface <0.1 m2 Level of contamination: <10% of surface Containment: High level containment (99.9% reduction) Process fully enclosed? Yes Work area: Indoors Room size: 300 m³ Ventilation rate: 3 air changes per hour (ACH) Duration (mins): 480 min

2.3 Contributing Scenario (2) controlling industrial worker exposure for PROC 1

Name of contributing scenario	1 - Use in closed process, no likelihood of exposure
Scenario subtitle	CS 1 Use in closed process, no likelihood of exposure - short term local

Exposure type	Inhalation: Short-term local Dermal: Qualitative Risk Assessment
Qualitative Risk Assessment	
General	Handle substance within closed system. Provide a good standard of general ventilation (not less than 3 - 5 air changes per hour) Ensure good work practices are implemented
Eyes	In case of potential exposure: Use suitable eye protection.
Dermal	Avoid skin contact. Wear chemically resistant gloves in combination with intensive management supervision control.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 60%. It is however set at 100% since the concentration limit of 60% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.)*
Process temperature	150 °C
Fugacity / Dustiness	high
Frequency and duration of use	
Duration of activity	less than 15 mins
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	240 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection	no

High level containment	inhalation: 99.9 % *(justification: High level of containment (99.9% reduction), consisting of:* *- Sealed and enclosed system* *- The enclosure is not opened during the activity* *- The system is designed to minimize the surface area which can contact the material or pairs of valves with wash space between them.)*
Use of external/measured value inhalation	A peak factor of 2 is used for estimation of short term exposure. Short term exposure estimation based on long term ART scenario described for ES1, CS1 (PROC 1). Exposure value used: upper interquartile confidence limit of the 75th percentile estimate for full shift exposure * peak factor 2.

2.4 Contributing Scenario (3) controlling industrial worker exposure for PROC 2

Name of contributing scenario	2 - Use in closed, continuous process with occasional controlled exposure
Scenario subtitle	CS 2 Use in closed, continuous process with occasional controlled exposure - long term local
Exposure type	Inhalation: Long-term local Dermal: Long-term systemic
Qualitative Risk Assessment	
General	Provide a good standard of general ventilation (not less than 3 - 5 air changes per hour) Handle substance within closed system. Relevant for transfer activities Transfer via enclosed lines Ensure submerged loading Vapour recovery system Ensure good work practices are implemented Avoid skin contact. Wear chemically resistant gloves in combination with intensive management supervision control.
Eyes	In case of potential exposure: Use suitable eye protection.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 60%. It is however set at 100% since the concentration limit of 60% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.)*

Process temperature	150 °C
Fugacity / Dustiness	high
Frequency and duration of use	
Duration of activity	480 min/day, duration of activity has been considered linearly *(justification: Closed process: Daily, up to 360 minutes.* *Dedicated transfer: Daily, up to 120 minutes.)*
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	98 %, burst-time: >4 hours (default) *(justification: Dedicated transfer and closed process: wear chemically resistant gloves in combination with intensive management supervision control.)*
Respiratory protection	90 % *(justification: Dedicated transfer: Use of respiratory protective equipment (90% reduction).)*
Medium level of containment	inhalation: 99 % *(justification: Dedicated transfer and closed process:* *Medium level of containment (99% reduction), consisting of:* *- Physical containment or enclosure of the source of emission.* *- The material transfer is enclosed with the receiving vessel being docked or sealed to the source vessel.* *Examples include sealing heads, transfer containers and multiple o-rings. Inflatable packing head with continuous liner ensures a seal is maintained during the transfer and the continuous plastic liner prevents direct contact with the product. The correct type of tie off must be used.)*

Use of external/measured value inhalation	The ART model has been used to estimate inhalative exposure. Exposure value used: the upper limit of the interquartile confidence interval of the 75th percentile estimate. For ART estimations, worker exposure related to PROC 2 is considered the result of two sources: Fugative emissions from a closed process and a very limited duration of dedicated transfer of the substance. Exposure value used: time weighted average exposure level using the upper interquartile confidence limits of the 75th percentile estimates of both sources. General: Substance product type: Liquid Weight fraction: 100% Work area: Indoors Room size: 300 m³ Ventilation rate: 3 air changes per hour (ACH) Specific for closed process: Far field exposure Hot processes (50-150 degrees) Vapour pressure: 100 000 Pa (Pure Formaldehyde, limit of ART) Activity class: Handling of contaminated objects Treated/contaminated surface: surface <0.1 m2 Level of contamination: <10% of surface Containment: Medium level containment (99% reduction) Process fully enclosed? Yes Duration (mins): 360 min Specific for dedicated transfer: Near field exposure Room temperature (15-25 degrees) Vapour pressure: 1520 Pa (Formaldehyde solution 49%, 55 degrees) Activity class: Transfer of liquid products Activities with falling liquids and >1000 L/min Open process with submerged loading Primary localised control: Medium level of containment (99% reduction) Secondary localized control: Vapour recovery system (80% reduction) Duration (mins): 120 min Use of respiratory protection with effectiveness 90%

2.5 Contributing Scenario (4) controlling industrial worker exposure for PROC 2

Name of contributing scenario	2 - Use in closed, continuous process with occasional controlled exposure
Scenario subtitle	CS 2 Use in closed, continuous process with occasional controlled exposure - short term local
Exposure type	Inhalation: Short-term local Dermal: Qualitative Risk Assessment
Qualitative Risk Assessment	
General	Provide a good standard of general ventilation (not less than 3 - 5 air changes per hour) Handle substance within closed system. Relevant for transfer activities Transfer via enclosed lines Ensure submerged loading Vapour recovery system Ensure good work practices are implemented
Eyes	In case of potential exposure: Use suitable eye protection.
Dermal	Avoid skin contact. Wear chemically resistant gloves in combination with intensive management supervision control.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 60%. It is however set at 100% since the concentration limit of 60% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.)*
Process temperature	150 °C
Fugacity / Dustiness	high
Frequency and duration of use	
Duration of activity	less than 15 mins
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	

Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection	90 % *(justification: Dedicated transfer: Use of respiratory protective equipment (90% reduction).)*
Medium level of containment	inhalation: 99 % *(justification: Dedicated transfer and closed process:* *Medium level of containment (99% reduction), consisting of:* *- Physical containment or enclosure of the source of emission.* *- The material transfer is enclosed with the receiving vessel being docked or sealed to the source vessel.* *Examples include sealing heads, transfer containers and multiple o-rings. Inflatable packing head with continuous liner ensures a seal is maintained during the transfer and the continuous plastic liner prevents direct contact with the product. The correct type of tie off must be used.)*
Use of external/measured value inhalation	A peak factor of 2 is used for estimation of short term exposure. Short term exposure estimation based on long term ART scenario described for ES1, CS2(PROC 2). Worker exposure related to PROC 2 is considered the result of two sources: Fugative emissions from a closed process and a very limited duration of dedicated transfer of the substance. Exposure value used: time weighted average exposure level using the upper interquartile confidence limits of the 75th percentile estimates of both sources * peak factor 2.

2.6 Contributing Scenario (5) controlling industrial worker exposure for PROC 3

Name of contributing scenario	3 - Use in closed batch process (synthesis or formulation)
Scenario subtitle	CS 3 Use in closed batch process (synthesis/formulation) - long term local
Exposure type	Inhalation: Long-term local Dermal: Long-term systemic
Qualitative Risk Assessment	

General	Provide a good standard of general ventilation (not less than 3 - 5 air changes per hour) Handle substance within closed system. Relevant for transfer activities Transfer via enclosed lines Ensure submerged loading Vapour recovery system Ensure good work practices are implemented Avoid skin contact. Wear chemically resistant gloves in combination with intensive management supervision control.
Eyes	In case of potential exposure: Use suitable eye protection.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 60%. It is however set at 100% since the concentration limit of 60% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.)*
Process temperature	150 °C
Fugacity / Dustiness	high
Frequency and duration of use	
Duration of activity	480 min/day, duration of activity has been considered linearly *(justification: Closed process: Daily, up to 360 minutes.* *Dedicated transfer: Daily, up to 120 minutes.)*
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	240 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	98 %, burst-time: >4 hours (default) *(justification: Dedicated transfer and closed process: wear chemically resistant gloves in combination with intensive management supervision control.)*

Respiratory protection	90 % *(justification: Dedicated transfer: Use of respiratory protective equipment (90% reduction).)*
Medium level of containment	inhalation: 99 % *(justification: Dedicated transfer and closed process:* *Medium level of containment (99% reduction), consisting of:* *- Physical containment or enclosure of the source of emission.* *- The material transfer is enclosed with the receiving vessel being docked or sealed to the source vessel.* *Examples include sealing heads, transfer containers and multiple o-rings. Inflatable packing head with continuous liner ensures a seal is maintained during the transfer and the continuous plastic liner prevents direct contact with the product. The correct type of tie off must be used.)*
Use of external/measured value inhalation	The ART model has been used to estimate inhalative exposure. Exposure value used: the upper limit of the interquartile confidence interval of the 75th percentile estimate. For ART estimations, worker exposure related to PROC 3 is considered the result of two sources: Fugative emissions from a closed process and a very limited duration of dedicated transfer of the substance. Exposure value used: time weighted average exposure level using the upper interquartile confidence limits of the 75th percentile estimates of both sources. General: Substance product type: Liquid Weight fraction: 100% Work area: Indoors Room size: 300 m³ Ventilation rate: 3 air changes per hour (ACH) Specific for closed process: Far field exposure Hot processes (50-150 degrees) Vapour pressure: 100 000 Pa (Pure Formaldehyde, limit of ART) Activity class: Handling of contaminated objects Treated/contaminated surface: surface <0.1 m2 Level of contamination: <10% of surface Containment: Medium level containment (99% reduction) Process fully enclosed? Yes Duration (mins): 360 min Specific for dedicated transfer:

	Near field exposure Room temperature (15-25 degrees) Vapour pressure: 1520 Pa (Formaldehyde solution 49%, 55 degrees) Activity class: Transfer of liquid products Activities with falling liquids and >1000 L/min Open process with submerged loading Primary localised control: Medium level of containment (99% reduction) Secondary localized control: Vapour recovery system (80% reduction) Duration (mins): 120 min Use of respiratory protection with effectiveness 90%

2.7 Contributing Scenario (6) controlling industrial worker exposure for PROC 3

Name of contributing scenario	3 - Use in closed batch process (synthesis or formulation)
Scenario subtitle	CS 3 Use in closed batch process (synthesis/formulation) - short term local
Exposure type	Inhalation: Short-term local Dermal: Qualitative Risk Assessment
Qualitative Risk Assessment	
General	Provide a good standard of general ventilation (not less than 3 - 5 air changes per hour) Handle substance within closed system. Relevant for transfer activities Transfer via enclosed lines Ensure submerged loading Vapour recovery system Ensure good work practices are implemented
Eyes	Use suitable eye protection. In case of potential exposure:
Dermal	Avoid skin contact. Wear chemically resistant gloves in combination with intensive management supervision control.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 60%. It is however set at 100% since the concentration limit of 60% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.)*
Process temperature	150 °C
Fugacity / Dustiness	high

Frequency and duration of use	
Duration of activity	less than 15 mins
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	240 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection	90 % *(justification: Dedicated transfer: Use of respiratory protective equipment (90% reduction).)*
Medium level of containment	inhalation: 99 % *(justification: Dedicated transfer and closed process:* *Medium level of containment (99% reduction), consisting of:* *- Physical containment or enclosure of the source of emission.* *- The material transfer is enclosed with the receiving vessel being docked or sealed to the source vessel.* *Examples include sealing heads, transfer containers and multiple o-rings. Inflatable packing head with continuous liner ensures a seal is maintained during the transfer and the continuous plastic liner prevents direct contact with the product. The correct type of tie off must be used.)*
Use of external/measured value inhalation	A peak factor of 2 is used for estimation of short term exposure. Short term exposure estimation based on long term ART scenario described for ES1, CS3(PROC 3). Worker exposure related to PROC 3 is considered the result of two sources: Fugative emissions from a closed process and a very limited duration of dedicated transfer of the substance. Exposure value used: time weighted average exposure level using the upper interquartile confidence limits of the 75th percentile estimates of both sources * peak factor 2.

2.8 Contributing Scenario (7) controlling industrial worker exposure for PROC 4

Name of contributing scenario	4 - Use in batch and other process (synthesis) where opportunity for exposure arises

Scenario subtitle	CS 4 Use in batch or other process (synthesis) where opportunity for exposure arises - long term local
Exposure type	Inhalation: Long-term local Dermal: Long-term systemic
Qualitative Risk Assessment	
General	Provide a good standard of general ventilation (not less than 3 - 5 air changes per hour) Provide extract ventilation to points where emissions occur (LEV). Relevant for transfer activities Transfer via enclosed lines Ensure submerged loading Vapour recovery system Ensure good work practices are implemented Avoid skin contact. Wear chemically resistant gloves in combination with intensive management supervision control. Wear suitable coveralls to prevent exposure to the skin.
Eyes	Use suitable eye protection.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 60%. It is however set at 100% since the concentration limit of 60% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.)*
Process temperature	150 °C
Fugacity / Dustiness	high
Frequency and duration of use	
Duration of activity	480 min/day, duration of activity has been considered linearly *(justification: Dedicated transfer and open parts of the process: Daily, up to 60 min. Closed process: Daily, up to 360 min.)*
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	

Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	98 %, burst-time: >4 hours (default) *(justification: Dedicated transfer, closed process and open parts of the process: Wear chemically resistant gloves in combination with intensive management supervision control.)*
Respiratory protection	95 % *(justification: Open parts of the processs: Use of respiratory protective equipment (95% reduction). Dedicated transfer: Use of respiratory protective equipment (90% reduction).)*
Medium level containment	inhalation: 99 % *(justification: Dedicated transfer and closed process:* *Medium level of containment (99% reduction), consisting of:* *- Physical containment or enclosure of the source of emission.* *- The material transfer is enclosed with the receiving vessel being docked or sealed to the source vessel.* *Examples include sealing heads, transfer containers and multiple o-rings. Inflatable packing head with continuous liner ensures a seal is maintained during the transfer and the continuous plastic liner prevents direct contact with the product. The correct type of tie off must be used.)*
Use of external/measured value inhalation	The ART model has been used to estimate inhalative exposure. Exposure value used: the upper limit of the interquartile confidence interval of the 75th percentile estimate. For ART estimations, worker exposure related to PROC 4 is considered the result of three sources: Fugative emissions from a closed process, dedicated transfer of the substance and exposure from open parts of the process. Exposure value used: time weighted average exposure level using the upper interquartile confidence limits of the 75th percentile estimates of all three sources. General: Substance product type: Liquid Weight fraction: 1 Work area: Indoors Room size: 300 m³ Ventilation rate: 3 air changes per hour (ACH) Specific for closed process: Far field exposure Vapour pressure: 100 000 Pa (Pure Formaldehyde, limit of

	ART) Activity class: Handling of contaminated objects Treated/contaminated surface: surface <0.1 m2 Level of contamination: <10% of surface Containment: Medium level containment (99% reduction) Process fully enclosed? Yes Duration (mins): 360 min Specific for dedicated transfer: Near field exposure Vapour pressure: 1520 Pa (Formaldehyde solution 49%, 55 degrees) Activity class: Transfer of liquid products Activities with falling liquids and >1000 L/min Open process with submerged loading Primary localised control: Medium level of containment (99% reduction) Secondary localized control: Vapour recovery system (80% reduction) Duration (mins): 60 min Use of respiratory protection with effectiveness 90% Specific for open parts of the process: Near field exposure Vapour pressure: 1520 Pa (Formaldehyde solution 49%, 55 degrees) Activity class: Activities with open liquid surfaces or open reservoirs Activities with agitated surfaces, open surface < 0.1 m2 Primary localised control: Local Exhaust Ventilation – Fixed capturing hood (90% reduction) Duration (mins): 60 min Use of respiratory protection with effectiveness 95%

2.9 Contributing Scenario (8) controlling industrial worker exposure for PROC 4

Name of contributing scenario	4 - Use in batch and other process (synthesis) where opportunity for exposure arises
Scenario subtitle	CS 4 Use in batch or other process (synthesis) where opportunity for exposure arises - short term local
Exposure type	Inhalation: Short-term local Dermal: Qualitative Risk Assessment
Qualitative Risk Assessment	

General	Provide a good standard of general ventilation (not less than 3 - 5 air changes per hour) Provide extract ventilation to points where emissions occur (LEV). Relevant for transfer activities Transfer via enclosed lines Ensure submerged loading Vapour recovery system Ensure good work practices are implemented
Eyes	Use suitable eye protection.
Dermal	Avoid skin contact. Wear chemically resistant gloves in combination with intensive management supervision control. Wear suitable coveralls to prevent exposure to the skin.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 60%. It is however set at 100% since the concentration limit of 60% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.)*
Process temperature	150 °C
Fugacity / Dustiness	high
Frequency and duration of use	
Duration of activity	less than 15 mins
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection	95 % *(justification: Open parts of the processs: Use of respiratory protective equipment (95% reduction). Dedicated transfer: Use of respiratory protective equipment (90% reduction).)*

Medium level containment	inhalation: 99 % *(justification: Dedicated transfer and closed process:* *Medium level of containment (99% reduction), consisting of:* *- Physical containment or enclosure of the source of emission.* *- The material transfer is enclosed with the receiving vessel being docked or sealed to the source vessel.* *Examples include sealing heads, transfer containers and multiple o-rings. Inflatable packing head with continuous liner ensures a seal is maintained during the transfer and the continuous plastic liner prevents direct contact with the product. The correct type of tie off must be used.)*
Use of external/measured value inhalation	A peak factor of 2 is used for estimation of short term exposure. Short term exposure estimation based on long term ART scenario described for ES1, CS4(PROC 4). For ART estimations, worker exposure related to PROC 4 is considered the result of three sources: Fugative emissions from a closed process, dedicated transfer of the substance and exposure from open parts of the process. Exposure value used: time weighted average exposure level using the upper interquartile confidence limits of the 75th percentile estimates of all three sources * peak factor 2.

2.10 Contributing Scenario (9) controlling industrial worker exposure for PROC 5

Name of contributing scenario	5 - Mixing or blending in batch processes (multistage and/or significant contact)
Scenario subtitle	CS 5 Mixing or blending in batch processes (multistage and/or significant contact) - long term local
Exposure type	Inhalation: Long-term local Dermal: Long-term systemic
Qualitative Risk Assessment	
General	Provide a good standard of general ventilation (not less than 3 - 5 air changes per hour) Provide extract ventilation to points where emissions occur (LEV). Relevant for transfer activities Transfer via enclosed lines Ensure submerged loading Vapour recovery system Ensure good work practices are implemented Avoid skin contact. Wear chemically resistant gloves in combination with

	intensive management supervision control. Wear suitable coveralls to prevent exposure to the skin.
Eyes	Use suitable eye protection.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 60%. It is however set at 100% since the concentration limit of 60% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.)*
Process temperature	150 °C
Fugacity / Dustiness	high
Frequency and duration of use	
Duration of activity	480 min/day, duration of activity has been considered linearly *(justification: Dedicated transfer and open parts of the process: Daily, up to 60 min. Closed process: Daily, up to 360 min.)*
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	98 %, burst-time: >4 hours (default) *(justification: Dedicated transfer, closed process and open parts of the process: Wear chemically resistant gloves in combination with intensive management supervision control.)*
Respiratory protection	95 % *(justification: Open parts of the processs: Use of respiratory protective equipment (95% reduction). Dedicated transfer: Use of respiratory protective equipment (90% reduction).)*
Medium level containment	inhalation: 99 % *(justification: Dedicated transfer and closed process: Medium level of containment (99% reduction), consisting of: - Physical containment or enclosure of the source of*

	emission. *- The material transfer is enclosed with the receiving vessel being docked or sealed to the source vessel.* *Examples include sealing heads, transfer containers and multiple o-rings. Inflatable packing head with continuous liner ensures a seal is maintained during the transfer and the continuous plastic liner prevents direct contact with the product. The correct type of tie off must be used.)*
Use of external/measured value inhalation	The ART model has been used to estimate inhalative exposure. Exposure value used: the upper limit of the interquartile confidence interval of the 75th percentile estimate. For ART estimations, worker exposure related to PROC 5 is considered the result of three sources: Fugative emissions from a closed process, dedicated transfer of the substance and exposure from open parts of the process. Exposure value used: time weighted average exposure level using the upper interquartile confidence limits of the 75th percentile estimates of all three sources. General: Substance product type: Liquid Weight fraction: 1 Work area: Indoors Room size: 300 m^3 Ventilation rate: 3 air changes per hour (ACH) Specific for closed process: Far field exposure Vapour pressure: 100 000 Pa (Pure Formaldehyde, limit of ART) Activity class: Handling of contaminated objects Treated/contaminated surface: surface <0.1 m2 Level of contamination: <10% of surface Containment: Medium level containment (99% reduction) Process fully enclosed? Yes Duration (mins): 360 min Specific for dedicated transfer: Near field exposure Vapour pressure: 1520 Pa (Formaldehyde solution 49%, 55 degrees) Activity class: Transfer of liquid products Activities with falling liquids and >1000 L/min Open process with submerged loading Primary localised control: Medium level of containment

	(99% reduction) Secondary localized control: Vapour recovery system (80% reduction) Duration (mins): 60 min Use of respiratory protection with effectiveness 90% Specific for open parts of the process: Near field exposure Vapour pressure: 1520 Pa (Formaldehyde solution 49%, 55 degrees) Activity class: Activities with open liquid surfaces or open reservoirs Activities with agitated surfaces, open surface < 0.1 m2. Primary localised control: Local Exhaust Ventilation – Fixed capturing hood (90% reduction) Duration (mins): 60 min Use of respiratory protection with effectiveness 95%

2.11 Contributing Scenario (10) controlling industrial worker exposure for PROC 5

Name of contributing scenario	5 - Mixing or blending in batch processes (multistage and/or significant contact)
Scenario subtitle	CS 5 Mixing or blending in batch processes (multistage and/or significant contact)- short term local
Exposure type	Inhalation: Short-term local Dermal: Qualitative Risk Assessment
Qualitative Risk Assessment	
General	Provide a good standard of general ventilation (not less than 3 - 5 air changes per hour) Provide extract ventilation to points where emissions occur (LEV). Relevant for transfer activities Transfer via enclosed lines Ensure submerged loading Vapour recovery system Ensure good work practices are implemented
Eyes	Use suitable eye protection.
Dermal	Avoid skin contact. Wear chemically resistant gloves in combination with intensive management supervision control. Wear suitable coveralls to prevent exposure to the skin.
Product characteristics	
Physical state	liquid

Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 60%. It is however set at 100% since the concentration limit of 60% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.)*
Process temperature	150 °C
Fugacity / Dustiness	high
Frequency and duration of use	
Duration of activity	less than 15 mins
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection	95 % *(justification: Open parts of the processs: Use of respiratory protective equipment (95% reduction). Dedicated transfer: Use of respiratory protective equipment (90% reduction).)*
Medium level containment	inhalation: 99 % *(justification: Dedicated transfer and closed process: Medium level of containment (99% reduction), consisting of: - Physical containment or enclosure of the source of emission. - The material transfer is enclosed with the receiving vessel being docked or sealed to the source vessel. Examples include sealing heads, transfer containers and multiple o-rings. Inflatable packing head with continuous liner ensures a seal is maintained during the transfer and the continuous plastic liner prevents direct contact with the product. The correct type of tie off must be used.)*

Use of external/measured value inhalation	A peak factor of 2 is used for estimation of short term exposure. Short term exposure estimation based on long term ART scenario described for ES1, CS5(PROC 5). For ART estimations, worker exposure related to PROC 5 is considered the result of three sources: Fugative emissions from a closed process, dedicated transfer of the substance and exposure from open parts of the process. Exposure value used: time weighted average exposure level using the upper interquartile confidence limits of the 75th percentile estimates of all three sources * peak factor 2.

2.12 Contributing Scenario (11) controlling industrial worker exposure for PROC 6

Name of contributing scenario	6 - Calendering operations
Scenario subtitle	CS 6 Calendering operations - long term local
Exposure type	Inhalation: Long-term local Dermal: Long-term systemic
Qualitative Risk Assessment	
General	Reduce concentration to less than 60% Ensure good work practices are implemented Supervision in place to check that the RMMs in place are being used correctly and OCs followed. Avoid skin contact. Wear chemically resistant gloves in combination with intensive management supervision control. Wear suitable coveralls to prevent exposure to the skin.
Eyes	Use suitable eye protection.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 60%. It is however set at 100% since the concentration limit of 60% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.)*
Process temperature	60 °C
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	1 - 4 hours
Frequency of use	5 days / week
Human factors not influenced by risk management	

Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 90 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	98 %, burst-time: >4 hours (default) *(justification: Wear chemically resistant gloves in combination with intensive management supervision control.)*
Respiratory protection	95 %

2.13 Contributing Scenario (12) controlling industrial worker exposure for PROC 6

Name of contributing scenario	6 - Calendering operations
Scenario subtitle	CS 6 Calendering operations - short term local
Exposure type	Inhalation: Short-term local Dermal: Qualitative Risk Assessment
Qualitative Risk Assessment	
General	Reduce concentration to less than 60% Ensure good work practices are implemented Supervision in place to check that the RMMs in place are being used correctly and OCs followed.
Eyes	Use suitable eye protection.
Dermal	Avoid skin contact. Wear chemically resistant gloves in combination with intensive management supervision control. Wear suitable coveralls to prevent exposure to the skin.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 60%. It is however set at 100% since the concentration limit of 60% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.)*
Process temperature	60 °C
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	less than 15 mins

Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 90 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection	95 %

2.14 Contributing Scenario (13) controlling industrial worker exposure for PROC 8A

Name of contributing scenario	8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities
Scenario subtitle	CS 7a Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities (30-60% formaldehyde) - long term local
Exposure type	Inhalation: Long-term local Dermal: Long-term systemic
Qualitative Risk Assessment	
General	Reduce concentration to less than 60% Provide a good standard of general ventilation (not less than 3 - 5 air changes per hour) Ensure submerged loading In case of outdoor use: Vapour recovery system Ensure good work practices are implemented Avoid skin contact. Wear chemically resistant gloves in combination with intensive management supervision control. Wear suitable coveralls to prevent exposure to the skin.
Eyes	Use suitable eye protection.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 60%. It is however set at 100% since the concentration limit of 60% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.)*

Process temperature	55 °C
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	1 - 4 hours
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	98 %, burst-time: >4 hours (default) *(justification: Wear chemically resistant gloves in combination with intensive management supervision control.)*
Respiratory protection	90 %
Medium level containment	inhalation: 99 % *(justification: Medium level of containment (99% reduction), consisting of:* *- Physical containment or enclosure of the source of emission.* *- The material transfer is enclosed with the receiving vessel being docked or sealed to the source vessel.* *Examples include sealing heads, transfer containers and multiple o-rings. Inflatable packing head with continuous liner ensures a seal is maintained during the transfer and the continuous plastic liner prevents direct contact with the product. The correct type of tie off must be used.)*
Use of external/measured value inhalation	The ART model has been used to estimate inhalative exposure. Exposure value used: the upper limit of the interquartile confidence interval of the 75th percentile estimate. Near field exposure Substance product type: Liquid Weight fraction: 100% Vapour pressure: 1520 Pa (Formaldehyde solution 49%, 55 degrees) Activity class: Transfer of liquid products Activities with falling liquids use rate 100-1000 L/min Open process with submerged loading Primary localised control: Medium level of containment

	(99% reduction) Work area: Indoors Room size: 300 m³ Ventilation rate: 3 air changes per hour (ACH) Duration (mins): 240 min Use of respiratory protection with effectiveness 90%

2.15 Contributing Scenario (14) controlling industrial worker exposure for PROC 8A

Name of contributing scenario	8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities
Scenario subtitle	CS 7a Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities (30-60% formaldehyde) - short term local
Exposure type	Inhalation: Short-term local Dermal: Qualitative Risk Assessment
Qualitative Risk Assessment	
General	Reduce concentration to less than 60% Provide a good standard of general ventilation (not less than 3 - 5 air changes per hour) Ensure submerged loading In case of outdoor use: Vapour recovery system Ensure good work practices are implemented
Eyes	Use suitable eye protection.
Dermal	Avoid skin contact. Wear chemically resistant gloves in combination with intensive management supervision control. Wear suitable coveralls to prevent exposure to the skin.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 60%. It is however set at 100% since the concentration limit of 60% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.)*
Process temperature	55 °C
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	less than 15 mins
Frequency of use	5 days / week

Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection	90 %
Medium level containment	inhalation: 99 % *(justification: Medium level of containment (99% reduction), consisting of:* *- Physical containment or enclosure of the source of emission.* *- The material transfer is enclosed with the receiving vessel being docked or sealed to the source vessel.* *Examples include sealing heads, transfer containers and multiple o-rings. Inflatable packing head with continuous liner ensures a seal is maintained during the transfer and the continuous plastic liner prevents direct contact with the product. The correct type of tie off must be used.)*
Use of external/measured value inhalation	A peak factor of 2 is used for estimation of short term exposure. Short term exposure estimation based on long term ART scenario described for ES1, CS7a (PROC 8a). Exposure value used: upper interquartile confidence limit of the 75th percentile estimate for full shift exposure * peak factor 2.

2.16 Contributing Scenario (15) controlling industrial worker exposure for PROC 8A

Name of contributing scenario	8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities
Scenario subtitle	CS 7b Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities (5% formaldehyde) - long term local
Exposure type	Inhalation: Long-term local Dermal: Long-term systemic
Qualitative Risk Assessment	

General	Reduce concentration to less than 5% Provide a good standard of general ventilation (not less than 3 - 5 air changes per hour) Ensure submerged loading In case of outdoor use: Vapour recovery system Ensure good work practices are implemented Avoid skin contact. Wear chemically resistant gloves in combination with specific activity training Wear suitable coveralls to prevent exposure to the skin.
Eyes	Use suitable eye protection.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 5%. It is however set at 100% since the concentration limit of 5% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.)*
Process temperature	25 °C
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	95 %, burst-time: >4 hours (default) *(justification: Wear chemically resistant gloves in combination with specific activity training.)*
Respiratory protection	no

Medium level containment	inhalation: 99 % *(justification: Medium level of containment (99% reduction), consisting of:* *- Physical containment or enclosure of the source of emission.* *- The material transfer is enclosed with the receiving vessel being docked or sealed to the source vessel.* *Examples include sealing heads, transfer containers and multiple o-rings. Inflatable packing head with continuous liner ensures a seal is maintained during the transfer and the continuous plastic liner prevents direct contact with the product. The correct type of tie off must be used.)*
Use of external/measured value inhalation	The ART model has been used to estimate inhalative exposure. Exposure value used: the upper limit of the interquartile confidence interval of the 75th percentile estimate. Near field exposure Substance product type: Liquid Liquid weight fraction: 8.1% (8.1% of 62% = 5%) Vapour pressure: 1400 Pa (Formaldehyde solution 30-60%, room temperature) Activity class: Transfer of liquid products Activities with falling liquids use rate 100-1000 L/min Open process with submerged loading Primary localised control: Medium level of containment (99% reduction) Work area: Indoors Room size: 300 m³ Ventilation rate: 3 air changes per hour (ACH) Duration (mins): 480 min

2.17 Contributing Scenario (16) controlling industrial worker exposure for PROC 8A

Name of contributing scenario	8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities
Scenario subtitle	CS 7b Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities (5% formaldehyde) - short term local
Exposure type	Inhalation: Short-term local Dermal: Qualitative Risk Assessment
Qualitative Risk Assessment	

General	Reduce concentration to less than 5% Provide a good standard of general ventilation (not less than 3 - 5 air changes per hour) Ensure submerged loading In case of outdoor use: Vapour recovery system Ensure good work practices are implemented
Eyes	Use suitable eye protection.
Dermal	Avoid skin contact. Wear chemically resistant gloves in combination with specific activity training Wear suitable coveralls to prevent exposure to the skin.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 5%. It is however set at 100% since the concentration limit of 5% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.)*
Process temperature	25 °C
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	less than 15 mins
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection	no

Medium level containment	inhalation: 99 % *(justification: Medium level of containment (99% reduction), consisting of:* *- Physical containment or enclosure of the source of emission.* *- The material transfer is enclosed with the receiving vessel being docked or sealed to the source vessel.* *Examples include sealing heads, transfer containers and multiple o-rings. Inflatable packing head with continuous liner ensures a seal is maintained during the transfer and the continuous plastic liner prevents direct contact with the product. The correct type of tie off must be used.)*
Use of external/measured value inhalation	A peak factor of 2 is used for estimation of short term exposure. Short term exposure estimation based on long term ART scenario described for ES1, CS7b (PROC 8a). Exposure value used: upper interquartile confidence limit of the 75th percentile estimate for full shift exposure * peak factor 2.

2.18 Contributing Scenario (17) controlling industrial worker exposure for PROC 8A

Name of contributing scenario	8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities
Scenario subtitle	CS 8 Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities (solid) - long term local
Exposure type	Inhalation: Long-term local Dermal: Long-term systemic
Qualitative Risk Assessment	
General	Reduce concentration to less than 60% Ensure good work practices are implemented Avoid skin contact. Wear chemically resistant gloves in combination with intensive management supervision control. Wear suitable coveralls to prevent exposure to the skin.
Eyes	Use suitable eye protection.
Product characteristics	
Physical state	solid

Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 60%. It is however set at 100% since the concentration limit of 60% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.* *Justification use of solid: The substance in this contributing scenario is used in solid fertilizer granules with urea formaldehyde resin.)*
Process temperature	20 °C
Fugacity / Dustiness	low
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 90 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	98 %, burst-time: >4 hours (default) *(justification: Wear chemically resistant gloves in combination with intensive management supervision control.)*
Respiratory protection	no

2.19 Contributing Scenario (18) controlling industrial worker exposure for PROC 8A

Name of contributing scenario	8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities
Scenario subtitle	CS 8 Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities (solid) - short term local
Exposure type	Inhalation: Short-term local Dermal: Qualitative Risk Assessment
Qualitative Risk Assessment	
General	Reduce concentration to less than 60% Ensure good work practices are implemented
Eyes	Use suitable eye protection.

Dermal	Avoid skin contact. Wear chemically resistant gloves in combination with intensive management supervision control. Wear suitable coveralls to prevent exposure to the skin.
Product characteristics	
Physical state	solid
Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 60%. It is however set at 100% since the concentration limit of 60% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.* *Justification use of solid: The substance in this contributing scenario is used in solid fertilizer granules with urea formaldehyde resin.)*
Process temperature	20 °C
Fugacity / Dustiness	low
Frequency and duration of use	
Duration of activity	less than 15 mins
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 90 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection	no

2.20 Contributing Scenario (19) controlling industrial worker exposure for PROC 8B

Name of contributing scenario	8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities
Scenario subtitle	CS 9a Transfer of chemicals (charging/discharging) from/to vessels/large containers at dedicated facilities (30-60% formaldehyde) - long term local
Exposure type	Inhalation: Long-term local Dermal: Long-term systemic
Qualitative Risk Assessment	

General	Reduce concentration to less than 60% Provide a good standard of general ventilation (not less than 3 - 5 air changes per hour) Transfer via enclosed lines Ensure submerged loading Vapour recovery system Ensure good work practices are implemented Avoid skin contact. Wear chemically resistant gloves in combination with intensive management supervision control.
Eyes	In case of potential exposure: Use suitable eye protection.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 60%. It is however set at 100% since the concentration limit of 60% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.)*
Process temperature	55 °C
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	1 - 4 hours
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	98 %, burst-time: >4 hours (default) *(justification: Wear chemically resistant gloves in combination with intensive management supervision control.)*
Respiratory protection	90 %

Use of external/measured value inhalation	The ART model has been used to estimate inhalative exposure. Exposure value used: the upper limit of the interquartile confidence interval of the 75th percentile estimate. Near field exposure Substance product type: Liquid Liquid weight fraction: 100% Vapour pressure: 1520 Pa (Formaldehyde solution 49%, 55 degrees) Activity class: Transfer of liquid products Activities with falling liquids use rate >1000 L/min Open process with submerged loading Primary localised control: Medium level of containment (99% reduction) Secondary localised control: Vapour recovery system (80% reduction) Work area: Indoors Room size: 300 m³ Ventilation rate: 3 air changes per hour (ACH) Duration (mins): 240 min Use of respiratory protection with effectiveness 90%

2.21 Contributing Scenario (20) controlling industrial worker exposure for PROC 8B

Name of contributing scenario	8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities
Scenario subtitle	CS 9a Transfer of chemicals (charging/discharging) from/to vessels/large containers at dedicated facilities (30-60% formaldehyde) - short term local
Exposure type	Inhalation: Short-term local Dermal: Qualitative Risk Assessment
Qualitative Risk Assessment	
General	Reduce concentration to less than 60% Provide a good standard of general ventilation (not less than 3 - 5 air changes per hour) Transfer via enclosed lines Ensure submerged loading Vapour recovery system Ensure good work practices are implemented
Eyes	In case of potential exposure: Use suitable eye protection.
Dermal	Avoid skin contact. Wear chemically resistant gloves in combination with intensive management supervision control.
Product characteristics	

Physical state	liquid
Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 60%. It is however set at 100% since the concentration limit of 60% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.)*
Process temperature	55 °C
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	less than 15 mins
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection	90 %
Use of external/measured value inhalation	A peak factor of 2 is used for estimation of short term exposure. Short term exposure estimation based on long term ART scenario described for ES1, CS9a (PROC 8b). Exposure value used: upper interquartile confidence limit of the 75th percentile estimate for full shift exposure * peak factor 2.

2.22 Contributing Scenario (21) controlling industrial worker exposure for PROC 8B

Name of contributing scenario	8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities
Scenario subtitle	CS 9b Transfer of chemicals (charging/discharging) from/to vessels/large containers at dedicated facilities (5% formaldehyde) - long term local
Exposure type	Inhalation: Long-term local Dermal: Long-term systemic
Qualitative Risk Assessment	

General	Reduce concentration to less than 5% Provide a good standard of general ventilation (not less than 3 - 5 air changes per hour) Transfer via enclosed lines Ensure submerged loading Vapour recovery system Ensure good work practices are implemented Avoid skin contact. Wear chemically resistant gloves in combination with specific activity training
Eyes	In case of potential exposure: Use suitable eye protection.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 5%. It is however set at 100% since the concentration limit of 5% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.)*
Process temperature	25 °C
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	95 %, burst-time: >4 hours (default) *(justification: Wear chemically resistant gloves in combination with specific activity training.)*
Respiratory protection	no

Medium level containment	inhalation: 99 % *(justification: Medium level of containment (99% reduction), consisting of:* *- Physical containment or enclosure of the source of emission.* *- The material transfer is enclosed with the receiving vessel being docked or sealed to the source vessel.* *Examples include sealing heads, transfer containers and multiple o-rings. Inflatable packing head with continuous liner ensures a seal is maintained during the transfer and the continuous plastic liner prevents direct contact with the product. The correct type of tie off must be used.)*
Use of external/measured value inhalation	The ART model has been used to estimate inhalative exposure. Exposure value used: the upper limit of the interquartile confidence interval of the 75th percentile estimate. Near field exposure Substance product type: Liquid Liquid weight fraction: 8.1% (8.1% of 62% = 5%) Vapour pressure: 1400 Pa (Formaldehyde solution 30-60%, room temperature) Activity class: Transfer of liquid products Activities with falling liquids use rate >1000 L/min Open process with submerged loading Primary localised control: Medium level of containment (99% reduction) Secondary localised control: Vapour recovery system (80% reduction) Work area: Indoors Room size: 300 m^3 Ventilation rate: 3 air changes per hour (ACH) Duration (mins): 480 min

2.23 Contributing Scenario (22) controlling industrial worker exposure for PROC 8B

Name of contributing scenario	8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities
Scenario subtitle	CS 9b Transfer of chemicals (charging/discharging) from/to vessels/large containers at dedicated facilities (5% formaldehyde) - short term local
Exposure type	Inhalation: Short-term local Dermal: Qualitative Risk Assessment
Qualitative Risk Assessment	

General	Reduce concentration to less than 5% Provide a good standard of general ventilation (not less than 3 - 5 air changes per hour) Transfer via enclosed lines Ensure submerged loading Vapour recovery system Ensure good work practices are implemented
Eyes	In case of potential exposure: Use suitable eye protection.
Dermal	Avoid skin contact. Wear chemically resistant gloves in combination with specific activity training
Product characteristics	
Physical state	liquid
Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 5%. It is however set at 100% since the concentration limit of 5% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.)*
Process temperature	25 °C
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	less than 15 mins
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection	no

Medium level containment	inhalation: 99 % *(justification: Medium level of containment (99% reduction), consisting of:* *- Physical containment or enclosure of the source of emission.* *- The material transfer is enclosed with the receiving vessel being docked or sealed to the source vessel.* *Examples include sealing heads, transfer containers and multiple o-rings. Inflatable packing head with continuous liner ensures a seal is maintained during the transfer and the continuous plastic liner prevents direct contact with the product. The correct type of tie off must be used.)*
Use of external/measured value inhalation	A peak factor of 2 is used for estimation of short term exposure. Short term exposure estimation based on long term ART scenario described for ES1, CS9b (PROC 8b). Exposure value used: upper interquartile confidence limit of the 75th percentile estimate for full shift exposure * peak factor 2.

2.24 Contributing Scenario (23) controlling industrial worker exposure for PROC 9

Name of contributing scenario	9 - Transfer of chemicals into small containers (dedicated filling line)
Scenario subtitle	CS 10a Transfer of substance or preparations into small containers (dedicated filling line including weighing) (30-60% formaldehyde) - long term local
Exposure type	Inhalation: Long-term local Dermal: Long-term systemic
Qualitative Risk Assessment	
General	Reduce concentration to less than 60% Provide a good standard of general ventilation (not less than 3 - 5 air changes per hour) Ensure submerged loading Provide extract ventilation to points where emissions occur (LEV). Ensure good work practices are implemented Avoid skin contact. Wear chemically resistant gloves in combination with intensive management supervision control.
Eyes	In case of potential exposure: Use suitable eye protection.
Product characteristics	
Physical state	liquid

Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 60%. It is however set at 100% since the concentration limit of 60% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.)*
Process temperature	55 °C
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	1 - 4 hours
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 90 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	98 %, burst-time: >4 hours (default) *(justification: Wear chemically resistant gloves in combination with intensive management supervision control.)*
Respiratory protection	90 %
Low level containment	inhalation: 90 % *(justification: Low level of containment (90% reduction), consisting of:* *- 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 contained with a loose lid or cover, which is not air tight. This includes tapping molten metal through covered launders and placing a loose lid on a ladle. 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.)*

Use of external/measured value inhalation	The ART model has been used to estimate inhalative exposure. Exposure value used: the upper limit of the interquartile confidence interval of the 75th percentile estimate. Near field exposure Substance product type: Liquid Liquid weight fraction: 100% Vapour pressure: 1520 Pa (Formaldehyde solution 49%, 55 degrees) Activity class: Transfer of liquid products Activities with falling liquids use rate 10-100 L/min Open process with submerged loading Primary localised control: Low level of containment (90% reduction) Secondary localised control: LEV - fixed capturing hood (90% reduction) Work area: Indoors Room size: 300 m³ Ventilation rate: 3 air changes per hour (ACH) Duration (mins): 240 min Use of respiratory protection with effectiveness 90%

2.25 Contributing Scenario (24) controlling industrial worker exposure for PROC 9

Name of contributing scenario	9 - Transfer of chemicals into small containers (dedicated filling line)
Scenario subtitle	CS 10a Transfer of substance or preparations into small containers (dedicated filling line including weighing) (30-60% formaldehyde) - short term local
Exposure type	Inhalation: Short-term local Dermal: Qualitative Risk Assessment
Qualitative Risk Assessment	
General	Reduce concentration to less than 60% Provide a good standard of general ventilation (not less than 3 - 5 air changes per hour) Ensure submerged loading Provide extract ventilation to points where emissions occur (LEV). Ensure good work practices are implemented
Eyes	Use suitable eye protection. In case of potential exposure:
Dermal	Avoid skin contact. Wear chemically resistant gloves in combination with intensive management supervision control.
Product characteristics	

Physical state	liquid
Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 60%. It is however set at 100% since the concentration limit of 60% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.)*
Process temperature	55 °C
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	less than 15 mins
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 90 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection	90 %
Low level containment	inhalation: 90 % *(justification: Low level of containment (90% reduction), consisting of:* *- 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 contained with a loose lid or cover, which is not air tight. This includes tapping molten metal through covered launders and placing a loose lid on a ladle. 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.)*

Use of external/measured value inhalation	A peak factor of 2 is used for estimation of short term exposure. Short term exposure estimation based on long term ART scenario described for ES1, CS10a (PROC 9). Exposure value used: upper interquartile confidence limit of the 75th percentile estimate for full shift exposure * peak factor 2.

2.26 Contributing Scenario (25) controlling industrial worker exposure for PROC 9

Name of contributing scenario	9 - Transfer of chemicals into small containers (dedicated filling line)
Scenario subtitle	CS 10b Transfer of substance or preparations into small containers (dedicated filling line including weighing) (5% formaldehyde) - long term local
Exposure type	Inhalation: Long-term local Dermal: Long-term systemic
Qualitative Risk Assessment	
General	Reduce concentration to less than 5% Provide a good standard of general ventilation (not less than 3 - 5 air changes per hour) Ensure submerged loading Provide extract ventilation to points where emissions occur (LEV). Ensure good work practices are implemented Avoid skin contact. Wear chemically resistant gloves in combination with specific activity training
Eyes	In case of potential exposure: Use suitable eye protection.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 5%. It is however set at 100% since the concentration limit of 5% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.)*
Process temperature	25 °C
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week

Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 90 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	95 %, burst-time: >4 hours (default) *(justification: Wear chemically resistant gloves in combination with specific activity training.)*
Respiratory protection	no
Low level containment	inhalation: 90 % *(justification: Low level of containment (90% reduction), consisting of:* *- 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 contained with a loose lid or cover, which is not air tight. This includes tapping molten metal through covered launders and placing a loose lid on a ladle. 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.)*

Use of external/measured value inhalation	The ART model has been used to estimate inhalative exposure. Exposure value used: the upper limit of the interquartile confidence interval of the 75th percentile estimate. Near field exposure Substance product type: Liquid Liquid weight fraction: 8.1% (8.1% of 62% = 5%) Vapour pressure: 1400 Pa (Formaldehyde solution 30-60%, room temperature) Activity class: Transfer of liquid products Activities with falling liquids use rate 10-100 L/min Open process with submerged loading Primary localised control: Low level of containment (90% reduction) Secondary localised control: LEV - fixed capturing hood (90% reduction) Work area: Indoors Room size: 300 m³ Ventilation rate: 3 air changes per hour (ACH) Duration (mins): 480 min

2.27 Contributing Scenario (26) controlling industrial worker exposure for PROC 9

Name of contributing scenario	9 - Transfer of chemicals into small containers (dedicated filling line)
Scenario subtitle	CS 10b Transfer of substance or preparations into small containers (dedicated filling line including weighing) (5% formaldehyde) - short term local
Exposure type	Inhalation: Short-term local Dermal: Qualitative Risk Assessment
Qualitative Risk Assessment	
General	Reduce concentration to less than 5% Provide a good standard of general ventilation (not less than 3 - 5 air changes per hour) Ensure submerged loading Provide extract ventilation to points where emissions occur (LEV). Ensure good work practices are implemented
Eyes	In case of potential exposure: Use suitable eye protection.
Dermal	Avoid skin contact. Wear chemically resistant gloves in combination with specific activity training
Product characteristics	
Physical state	liquid

Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 5%. It is however set at 100% since the concentration limit of 5% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.)*
Process temperature	25 °C
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	less than 15 mins
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 90 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection	no
Low level containment	inhalation: 90 % *(justification: Low level of containment (90% reduction), consisting of:* *- 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 contained with a loose lid or cover, which is not air tight. This includes tapping molten metal through covered launders and placing a loose lid on a ladle. 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.)*
Use of external/measured value inhalation	A peak factor of 2 is used for estimation of short term exposure. Short term exposure estimation based on long term ART scenario described for ES1, CS10b (PROC 9). Exposure value used: upper interquartile confidence limit of the 75th percentile estimate for full shift exposure * peak factor 2.

2.28 Contributing Scenario (27) controlling industrial worker exposure for PROC 10

Name of contributing scenario	10 - Roller application or brushing
Scenario subtitle	CS 11 Roller application or brushing - long term local
Exposure type	Inhalation: Long-term local Dermal: Long-term systemic
Qualitative Risk Assessment	
General	Reduce concentration to less than 60% Ensure good work practices are implemented Supervision in place to check that the RMMs in place are being used correctly and OCs followed. Avoid skin contact. Wear chemically resistant gloves in combination with intensive management supervision control. Wear suitable coveralls to prevent exposure to the skin.
Eyes	Use suitable eye protection.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 60%. It is however set at 100% since the concentration limit of 60% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.)*
Process temperature	20 °C
Fugacity / Dustiness	low
Frequency and duration of use	
Duration of activity	1 - 4 hours
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 90 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	98 %, burst-time: >4 hours (default) *(justification: Wear chemically resistant gloves in combination with intensive management supervision control.)*

Respiratory protection	90 %

2.29 Contributing Scenario (28) controlling industrial worker exposure for PROC 10

Name of contributing scenario	10 - Roller application or brushing
Scenario subtitle	CS 11 Roller application or brushing - short term local
Exposure type	Inhalation: Short-term local Dermal: Qualitative Risk Assessment
Qualitative Risk Assessment	
General	Reduce concentration to less than 60% Ensure good work practices are implemented Supervision in place to check that the RMMs in place are being used correctly and OCs followed.
Eyes	Use suitable eye protection.
Dermal	Avoid skin contact. Wear chemically resistant gloves in combination with intensive management supervision control. Wear suitable coveralls to prevent exposure to the skin.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 60%. It is however set at 100% since the concentration limit of 60% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.)*
Process temperature	20 °C
Fugacity / Dustiness	low
Frequency and duration of use	
Duration of activity	less than 15 mins
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 90 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection	90 %

2.30 Contributing Scenario (29) controlling industrial worker exposure for PROC 13

Name of contributing scenario	13 - Treatment of articles by dipping and pouring
Scenario subtitle	CS 12 Treatment of articles by dipping and pouring - long term local
Exposure type	Inhalation: Long-term local Dermal: Long-term systemic
Qualitative Risk Assessment	
General	Reduce concentration to less than 60% Ensure good work practices are implemented Supervision in place to check that the RMMs in place are being used correctly and OCs followed. Avoid skin contact. Wear chemically resistant gloves in combination with intensive management supervision control. Wear suitable coveralls to prevent exposure to the skin.
Eyes	Use suitable eye protection.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 60%. It is however set at 100% since the concentration limit of 60% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.)*
Process temperature	60 °C
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	1 - 4 hours
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Ventilation	enhanced (70%)
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 90 %)
Conditions and measures related to personal protection, hygiene and health evaluation	

Protective gloves	98 %, burst-time: >4 hours (default) *(justification: Wear chemically resistant gloves in combination with intensive management supervision control.)*
Respiratory protection	90 %

2.31 Contributing Scenario (30) controlling industrial worker exposure for PROC 13

Name of contributing scenario	13 - Treatment of articles by dipping and pouring
Scenario subtitle	CS 12 Treatment of articles by dipping and pouring - short term local
Exposure type	Inhalation: Short-term local Dermal: Qualitative Risk Assessment
Qualitative Risk Assessment	
General	Reduce concentration to less than 60% Ensure good work practices are implemented Supervision in place to check that the RMMs in place are being used correctly and OCs followed.
Eyes	Use suitable eye protection.
Dermal	Avoid skin contact. Wear chemically resistant gloves in combination with intensive management supervision control. Wear suitable coveralls to prevent exposure to the skin.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 60%. It is however set at 100% since the concentration limit of 60% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.)*
Process temperature	60 °C
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	less than 15 mins
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Ventilation	enhanced (70%)

Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 90 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection	90 %

2.32 Contributing Scenario (31) controlling industrial worker exposure for PROC 14

Name of contributing scenario	14 - Production of preparations or articles by tabletting, compression, extrusion, pelletisation
Scenario subtitle	CS 13 Production of preparations or articles by tabletting, compression, extrusion, pelletisation - long term local
Exposure type	Inhalation: Long-term local Dermal: Long-term systemic
Qualitative Risk Assessment	
General	Reduce concentration to less than 60% Ensure good work practices are implemented Avoid skin contact. Wear chemically resistant gloves in combination with intensive management supervision control. Wear suitable coveralls to prevent exposure to the skin.
Eyes	Use suitable eye protection.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 60%. It is however set at 100% since the concentration limit of 60% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.)*
Process temperature	60 °C
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	1 - 4 hours
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial

Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 90 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	98 %, burst-time: >4 hours (default) *(justification: Wear chemically resistant gloves in combination with intensive management supervision control.)*
Respiratory protection	95 %

2.33 Contributing Scenario (32) controlling industrial worker exposure for PROC 14

Name of contributing scenario	14 - Production of preparations or articles by tabletting, compression, extrusion, pelletisation
Scenario subtitle	CS 13 Production of preparations or articles by tabletting, compression, extrusion, pelletisation - short term local
Exposure type	Inhalation: Short-term local Dermal: Qualitative Risk Assessment
Qualitative Risk Assessment	
General	Reduce concentration to less than 60% Ensure good work practices are implemented
Eyes	Use suitable eye protection.
Dermal	Avoid skin contact. Wear chemically resistant gloves in combination with intensive management supervision control. Wear suitable coveralls to prevent exposure to the skin.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 60%. It is however set at 100% since the concentration limit of 60% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.)*
Process temperature	60 °C
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	less than 15 mins
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	

Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 90 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection	95 %

2.34 Contributing Scenario (33) controlling industrial worker exposure for PROC 15

Name of contributing scenario	15 - Use of laboratory reagents in small scale laboratories
Scenario subtitle	CS 14 Use as a laboratory reagent - long term local
Exposure type	Inhalation: Long-term local Dermal: Long-term systemic
Qualitative Risk Assessment	
General	Reduce concentration to less than 60% Provide a good standard of controlled ventilation (10 to 15 air changes per hour) Avoid skin contact. Ensure good work practices are implemented Wear chemically resistant gloves in combination with intensive management supervision control. Wear suitable coveralls to prevent exposure to the skin.
Eyes	Use suitable eye protection.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 60%. It is however set at 100% since the concentration limit of 60% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.)*
Process temperature	25 °C
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	240 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors

Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	98 %, burst-time: >4 hours (default) *(justification: Wear chemically resistant gloves in combination with intensive management supervision control.)*
Respiratory protection	no
Local exhaust ventilation	inhalation: 99 % *(justification: Local exhaust ventilation (enclosing hood, fume cupboard, 99% reduction).)*
Use of external/measured value inhalation	The ART model has been used to estimate inhalative exposure. Exposure value used: the upper limit of the interquartile confidence interval of the 75th percentile estimate. Near field exposure Substance product type: Liquid Liquid weight fraction: 100% Vapour pressure: 1400 Pa (Formaldehyde solution 30-60%, room temperature) Activity class: Transfer of liquid products Activities with falling liquids use rate <0.1 L/min Open process with splash loading Primary localised control: LEV-Enclosed hood-Fume cupboard Work area: Indoors Room size: 100 m³ Ventilation rate: 10 air changes per hour (ACH) Duration (mins): 480 min

2.35 Contributing Scenario (34) controlling industrial worker exposure for PROC 15

Name of contributing scenario	15 - Use of laboratory reagents in small scale laboratories
Scenario subtitle	CS 14 Use as a laboratory reagent - short term local
Exposure type	Inhalation: Short-term local Dermal: Qualitative Risk Assessment
Qualitative Risk Assessment	
General	Reduce concentration to less than 60% Provide a good standard of controlled ventilation (10 to 15 air changes per hour) Ensure good work practices are implemented
Eyes	Use suitable eye protection.

Dermal	Avoid skin contact. Wear chemically resistant gloves in combination with intensive management supervision control. Wear suitable coveralls to prevent exposure to the skin.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 60%. It is however set at 100% since the concentration limit of 60% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.)*
Process temperature	25 °C
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	less than 15 mins
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	240 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection	no
Local exhaust ventilation	inhalation: 99 % *(justification: Local exhaust ventilation (enclosing hood, fume cupboard, 99% reduction).)*
Use of external/measured value inhalation	A peak factor of 2 is used for estimation of short term exposure. Short term exposure estimation based on long term ART scenario described for ES1, CS14 (PROC 15). Exposure value used: upper interquartile confidence limit of the 75th percentile estimate for full shift exposure * peak factor 2.

3 Exposure Scenario 2: Industrial use of preparations containing formaldehyde up to 5% (ES 2)

This scenario is described by the following combinations of use descriptors. The corresponding contributing scenarios are described in the respective subchapters.
An overall exposure scenario may be described by a number of contributing scenarios which may be subdivided into environmental exposure, worker exposure and consumer exposure.
The following scenarios contribute to the scenario *Industrial use of preparations containing formaldehyde up to 5%*.

Table 3 Description of ES 2

Free short title	Industrial use of preparations containing formaldehyde up to 5% (ES 2)
Systematic title based on use descriptor	ERC 2, 3, 5, 6C, 6D; PROC 1, 2, 3, 4, 5, 6, 7, 8A, 8B, 9, 10, 13, 14, 15, 16, 21, 22C, 23C, 24C, 25C
Name of contributing environmental scenario and corresponding ERC	ERC 2 Formulation of preparations ERC 3 Formulation in articles ERC 5 Industrial use resulting in inclusion into or onto a matrix ERC 6c Production of plastics ERC 6d Production of resins/rubbers
Name(s) of contributing worker scenarios and corresponding PROCs	PROC 1 - Use in closed process, no likelihood of exposure PROC 2 - Use in closed, continuous process with occasional controlled exposure PROC 3 - Use in closed batch process (synthesis or formulation) PROC 4 - Use in batch and other process (synthesis) where opportunity for exposure arises PROC 5 - Mixing or blending in batch processes (multistage and/or significant contact) PROC 6 - Calendering operations PROC 7 - Industrial spraying PROC 8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities PROC 8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities PROC 9 - Transfer of chemicals into small containers (dedicated filling line) PROC 10 - Roller application or brushing PROC 13 - Treatment of articles by dipping and pouring PROC 14 - Production of preparations or articles by tabletting, compression, extrusion, pelletisation PROC 15 - Use of laboratory reagents in small scale laboratories PROC 16 - Using material as fuel sources, limited exposure to unburned product to be expected PROC 21 - Low energy manipulation of substances in materials and/or articles

	PROC 22c - Potentially closed operations with minerals at elevated temperature - pt > mp - High Fugacity PROC 23c - Open processing and transfer of minerals at elevated temperature - pt > mp - High Fugacity PROC 24c - High (mechanical) energy work-up of substances bound in materials and/or articles - pt > mp - High Fugacity PROC 25c - Hot work operations with metals - pt > mp - High Fugacity

3.1 Contributing Scenario (1) controlling environmental exposure

As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.

3.2 Contributing Scenario (2) controlling industrial worker exposure for PROC 1

Name of contributing scenario	1 - Use in closed process, no likelihood of exposure
Scenario subtitle	CS 1 Use in closed process, no likelihood of exposure - long term local
Exposure type	Inhalation: Long-term local Dermal: Long-term systemic
Qualitative Risk Assessment	
General	Reduce concentration to less than 5% Ensure good work practices are implemented Avoid skin contact. Wear chemically resistant gloves in combination with specific activity training
Eyes	In case of potential exposure: Use suitable eye protection.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 5%. It is however set at 100% since the concentration limit of 5% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.)*
Process temperature	100 °C
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	

Exposed skin surface	240 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	95 %, burst-time: >4 hours (default) *(justification: Wear chemically resistant gloves in combination with specific activity training.)*
Respiratory protection	no

3.3 Contributing Scenario (3) controlling industrial worker exposure for PROC 1

Name of contributing scenario	1 - Use in closed process, no likelihood of exposure
Scenario subtitle	CS 1 Use in closed process, no likelihood of exposure - short term local
Exposure type	Inhalation: Short-term local Dermal: Qualitative Risk Assessment
Qualitative Risk Assessment	
General	Reduce concentration to less than 5% Ensure good work practices are implemented
Eyes	In case of potential exposure: Use suitable eye protection.
Dermal	Avoid skin contact. Wear chemically resistant gloves in combination with specific activity training
Product characteristics	
Physical state	liquid
Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 5%. It is however set at 100% since the concentration limit of 5% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.)*
Process temperature	100 °C
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	less than 15 mins
Frequency of use	5 days / week

Human factors not influenced by risk management	
Exposed skin surface	240 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection	no

3.4 Contributing Scenario (4) controlling industrial worker exposure for PROC 2

Name of contributing scenario	2 - Use in closed, continuous process with occasional controlled exposure
Scenario subtitle	CS 2 Use in closed, continuous process with occasional controlled exposure - long term local
Exposure type	Inhalation: Long-term local Dermal: Long-term systemic
Qualitative Risk Assessment	
General	Reduce concentration to less than 5% Ensure good work practices are implemented Avoid skin contact. Wear chemically resistant gloves in combination with specific activity training
Eyes	In case of potential exposure: Use suitable eye protection.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 5%. It is however set at 100% since the concentration limit of 5% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.)*
Process temperature	100 °C
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	

Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Ventilation	enhanced (70%)
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 90 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	95 %, burst-time: >4 hours (default) *(justification: Wear chemically resistant gloves in combination with specific activity training.)*
Respiratory protection	no

3.5 Contributing Scenario (5) controlling industrial worker exposure for PROC 2

Name of contributing scenario	2 - Use in closed, continuous process with occasional controlled exposure
Scenario subtitle	CS 2 Use in closed, continuous process with occasional controlled exposure - short term local
Exposure type	Inhalation: Short-term local Dermal: Qualitative Risk Assessment
Qualitative Risk Assessment	
General	Reduce concentration to less than 5% Ensure good work practices are implemented
Eyes	In case of potential exposure: Use suitable eye protection.
Dermal	Avoid skin contact. Wear chemically resistant gloves in combination with specific activity training
Product characteristics	
Physical state	liquid
Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 5%. It is however set at 100% since the concentration limit of 5% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.)*
Process temperature	100 °C
Fugacity / Dustiness	medium
Frequency and duration of use	

Duration of activity	less than 15 mins
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Ventilation	enhanced (70%)
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 90 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection	no

3.6 Contributing Scenario (6) controlling industrial worker exposure for PROC 3

Name of contributing scenario	3 - Use in closed batch process (synthesis or formulation)
Scenario subtitle	CS 3 Use in closed batch process (synthesis or formulation) - long term local
Exposure type	Inhalation: Long-term local Dermal: Long-term systemic
Qualitative Risk Assessment	
General	Reduce concentration to less than 5% Ensure good work practices are implemented Avoid skin contact. Wear chemically resistant gloves in combination with specific activity training
Eyes	In case of potential exposure: Use suitable eye protection.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 5%. It is however set at 100% since the concentration limit of 5% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.)*
Process temperature	100 °C
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	1 - 4 hours

Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	240 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 90 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	95 %, burst-time: >4 hours (default) *(justification: Wear chemically resistant gloves in combination with specific activity training.)*
Respiratory protection	90 %

3.7 Contributing Scenario (7) controlling industrial worker exposure for PROC 3

Name of contributing scenario	3 - Use in closed batch process (synthesis or formulation)
Scenario subtitle	CS 3 Use in closed batch process (synthesis or formulation) - short term local
Exposure type	Inhalation: Short-term local Dermal: Qualitative Risk Assessment
Qualitative Risk Assessment	
General	Reduce concentration to less than 5% Ensure good work practices are implemented
Eyes	In case of potential exposure: Use suitable eye protection.
Dermal	Avoid skin contact. Wear chemically resistant gloves in combination with specific activity training
Product characteristics	
Physical state	liquid
Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 5%. It is however set at 100% since the concentration limit of 5% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.)*
Process temperature	100 °C
Fugacity / Dustiness	medium
Frequency and duration of use	

Duration of activity	less than 15 mins
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	240 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 90 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection	90 %

3.8 Contributing Scenario (8) controlling industrial worker exposure for PROC 4

Name of contributing scenario	4 - Use in batch and other process (synthesis) where opportunity for exposure arises
Scenario subtitle	CS 4 Use in batch and other process (synthesis) where opportunity for exposure arises - long term local
Exposure type	Inhalation: Long-term local Dermal: Long-term systemic
Qualitative Risk Assessment	
General	Reduce concentration to less than 5% Ensure good work practices are implemented Avoid skin contact. Wear chemically resistant gloves in combination with specific activity training Wear suitable coveralls to prevent exposure to the skin.
Eyes	Use suitable eye protection.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 5%. It is however set at 100% since the concentration limit of 5% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.)*
Process temperature	100 °C
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	1 - 4 hours

Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 90 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	95 %, burst-time: >4 hours (default) *(justification: Wear chemically resistant gloves in combination with specific activity training.)*
Respiratory protection	90 %

3.9 Contributing Scenario (9) controlling industrial worker exposure for PROC 4

Name of contributing scenario	4 - Use in batch and other process (synthesis) where opportunity for exposure arises
Scenario subtitle	CS 4 Use in batch and other process (synthesis) where opportunity for exposure arises - short term local
Exposure type	Inhalation: Short-term local Dermal: Qualitative Risk Assessment
Qualitative Risk Assessment	
General	Reduce concentration to less than 5% Ensure good work practices are implemented
Eyes	Use suitable eye protection.
Dermal	Avoid skin contact. Wear chemically resistant gloves in combination with specific activity training Wear suitable coveralls to prevent exposure to the skin.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 5%. It is however set at 100% since the concentration limit of 5% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.)*
Process temperature	100 °C
Fugacity / Dustiness	medium

Frequency and duration of use	
Duration of activity	less than 15 mins
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 90 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection	90 %

3.10 Contributing Scenario (10) controlling industrial worker exposure for PROC 5

Name of contributing scenario	5 - Mixing or blending in batch processes (multistage and/or significant contact)
Scenario subtitle	CS 5 Mixing or blending in batch processes (multistage and/or significant contact) - long term local
Exposure type	Inhalation: Long-term local Dermal: Long-term systemic
Qualitative Risk Assessment	
General	Reduce concentration to less than 5% Ensure good work practices are implemented Avoid skin contact. Wear chemically resistant gloves in combination with specific activity training Wear suitable coveralls to prevent exposure to the skin.
Eyes	Use suitable eye protection.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 5%. It is however set at 100% since the concentration limit of 5% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.)*
Process temperature	60 °C
Fugacity / Dustiness	low
Frequency and duration of use	

Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Ventilation	enhanced (70%)
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 90 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	95 %, burst-time: >4 hours (default) *(justification: Wear chemically resistant gloves in combination with specific activity training.)*
Respiratory protection	no

3.11 Contributing Scenario (11) controlling industrial worker exposure for PROC 5

Name of contributing scenario	5 - Mixing or blending in batch processes (multistage and/or significant contact)
Scenario subtitle	CS 5 Mixing or blending in batch processes (multistage and/or significant contact) - short term local
Exposure type	Inhalation: Short-term local Dermal: Qualitative Risk Assessment
Qualitative Risk Assessment	
General	Reduce concentration to less than 5% Ensure good work practices are implemented
Eyes	Use suitable eye protection.
Dermal	Avoid skin contact. Wear chemically resistant gloves in combination with specific activity training Wear suitable coveralls to prevent exposure to the skin.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 5%. It is however set at 100% since the concentration limit of 5% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.)*

Process temperature	60 °C
Fugacity / Dustiness	low
Frequency and duration of use	
Duration of activity	less than 15 mins
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Ventilation	enhanced (70%)
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 90 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection	no

3.12 Contributing Scenario (12) controlling industrial worker exposure for PROC 6

Name of contributing scenario	6 - Calendering operations
Scenario subtitle	CS 6 Calendering operations - long term local
Exposure type	Inhalation: Long-term local Dermal: Long-term systemic
Qualitative Risk Assessment	
General	Reduce concentration to less than 5% Ensure good work practices are implemented Supervision in place to check that the RMMs in place are being used correctly and OCs followed. Avoid skin contact. Wear chemically resistant gloves in combination with specific activity training Wear suitable coveralls to prevent exposure to the skin.
Eyes	Use suitable eye protection.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 5%. It is however set at 100% since the concentration limit of 5% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.)*

Process temperature	60 °C
Fugacity / Dustiness	low
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Ventilation	enhanced (70%)
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 90 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	95 %, burst-time: >4 hours (default) *(justification: Wear chemically resistant gloves in combination with specific activity training.)*
Respiratory protection	no

3.13 Contributing Scenario (13) controlling industrial worker exposure for PROC 6

Name of contributing scenario	6 - Calendering operations
Scenario subtitle	CS 6 Calendering operations - short term local
Exposure type	Inhalation: Short-term local Dermal: Qualitative Risk Assessment
Qualitative Risk Assessment	
General	Reduce concentration to less than 5% Ensure good work practices are implemented Supervision in place to check that the RMMs in place are being used correctly and OCs followed.
Eyes	Use suitable eye protection.
Dermal	Avoid skin contact. Wear chemically resistant gloves in combination with specific activity training Wear suitable coveralls to prevent exposure to the skin.
Product characteristics	
Physical state	liquid

Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 5%. It is however set at 100% since the concentration limit of 5% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.)*
Process temperature	60 °C
Fugacity / Dustiness	low
Frequency and duration of use	
Duration of activity	less than 15 mins
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Ventilation	enhanced (70%)
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 90 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection	no

3.14 Contributing Scenario (14) controlling industrial worker exposure for PROC 7

Name of contributing scenario	7 - Industrial spraying
Scenario subtitle	CS 7a Industrial spraying - long term local option 1
Exposure type	Inhalation: Long-term local Dermal: Long-term systemic
Qualitative Risk Assessment	

General	Provide a good standard of general ventilation (not less than 3 - 5 air changes per hour) Ensure that the worker is in a seperated (control) room with independent air supply Provide extract ventilation to points where emissions occur (LEV). Reduce concentration to less than 5% Ensure good work practices are implemented Supervision in place to check that the RMMs in place are being used correctly and OCs followed. Avoid skin contact. Wear chemically resistant gloves in combination with specific activity training Wear suitable coveralls to prevent exposure to the skin.
Eyes	Wear suitable face shield
Product characteristics	
Physical state	liquid
Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 5%. It is however set at 100% since the concentration limit of 5% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.)*
Process temperature	20 °C
Fugacity / Dustiness	low
Frequency and duration of use	
Duration of activity	1 - 4 hours
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	1,500 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 95 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	95 %, burst-time: >4 hours (default) *(justification: Wear chemically resistant gloves in combination with specific activity training.)*
Respiratory protection	95 %

Complete segregation with ventilation and filtrations of recirculated air	inhalation: 90 % *(justification: Complete segregation with ventilation and filtrations of recirculated air with an effectiveness of 90%)*
Use of external/measured value inhalation	The ART model has been used to estimate inhalative exposure. Exposure value used: the upper limit of the interquartile confidence interval of the 75th percentile estimate. Emission sources: Far field Process temperature: Room temperature Vapour pressure: 31.14 Pa Liquid weight fraction: 1 Activity coefficient: 1 Substance product type: Liquids Situation: Surface spraying of liquids, high application rate >3L/min Spray direction: Only horizontal or downward Spray technique: Spraying with high compressed air use Primary localized controls: Fixed capturing hood (90% reduction) Secondary localized controls: No (0 % reduction) Segregation: Complete segregation with ventilation and filtrations of recirculated air (90% reduction) Personal enclosure: No (0% reduction) Effective housekeeping practices in place: Yes General housekeeping practices in place: No Process fully enclosed: No Room size: 300 m³ Work area: Indoors Duration (mins): 240 Ventilation rate: 3 air changes per hour (ACH) Use of respiratory protection effectiveness 95%

3.15 Contributing Scenario (15) controlling industrial worker exposure for PROC 7

Name of contributing scenario	7 - Industrial spraying
Scenario subtitle	CS 7a Industrial spraying - short term local option 1
Exposure type	Inhalation: Short-term local Dermal: Qualitative Risk Assessment
Qualitative Risk Assessment	

General	Provide a good standard of general ventilation (not less than 3 - 5 air changes per hour) Ensure that the worker is in a seperated (control) room with independent air supply Provide extract ventilation to points where emissions occur (LEV). Reduce concentration to less than 5% Ensure good work practices are implemented Supervision in place to check that the RMMs in place are being used correctly and OCs followed.
Eyes	Wear suitable face shield
Dermal	Avoid skin contact. Wear chemically resistant gloves in combination with specific activity training Wear suitable coveralls to prevent exposure to the skin.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 5%. It is however set at 100% since the concentration limit of 5% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.)*
Process temperature	20 °C
Fugacity / Dustiness	low
Frequency and duration of use	
Duration of activity	less than 15 mins
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	1,500 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 95 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection	95 %
Complete segregation with ventilation and filtrations of recirculated air	inhalation: 90 % *(justification: Complete segregation with ventilation and filtrations of recirculated air with an effectiveness of 90%)*

Use of external/measured value inhalation	A peak factor of 2 is used for estimation of short term exposure. Short term exposure estimation based on long term ART scenario described for ES2, CS7a (PROC 7). Exposure value used: upper interquartile confidence limit of the 75th percentile estimate for full shift exposure * peak factor 2.

3.16 Contributing Scenario (16) controlling industrial worker exposure for PROC 7

Name of contributing scenario	7 - Industrial spraying
Scenario subtitle	CS 7b Industrial spraying - long term local option 2
Exposure type	Inhalation: Long-term local Dermal: Long-term systemic
Qualitative Risk Assessment	
General	Provide a good standard of controlled ventilation (10 to 15 air changes per hour) Ensure that the worker is in a seperated (control) room with independent air supply Provide extract ventilation to points where emissions occur (LEV). Reduce concentration to less than 5% Ensure good work practices are implemented Supervision in place to check that the RMMs in place are being used correctly and OCs followed. Avoid skin contact. Wear chemically resistant gloves in combination with specific activity training Wear suitable coveralls to prevent exposure to the skin.
Eyes	Wear suitable face shield
Product characteristics	
Physical state	liquid
Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 5%. It is however set at 100% since the concentration limit of 5% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.)*
Process temperature	20 °C
Fugacity / Dustiness	low
Frequency and duration of use	
Duration of activity	15 mins to 1 hour
Frequency of use	5 days / week

Human factors not influenced by risk management	
Exposed skin surface	1,500 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Ventilation	enhanced (70%)
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 95 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	95 %, burst-time: >4 hours (default) *(justification: Wear chemically resistant gloves in combination with specific activity training.)*
Respiratory protection	no
Complete segregation with ventilation and filtrations of recirculated air	inhalation: 90 % *(justification: Complete segregation with ventilation and filtrations of recirculated air with an effectiveness of 90%)*
Use of external/measured value inhalation	The ART model has been used to estimate inhalative exposure. Exposure value used: the upper limit of the interquartile confidence interval of the 75th percentile estimate. Emission sources: Far field Process temperature: Room temperature Vapour pressure: 31.14 Pa Liquid weight fraction: 1 Activity coefficient: 1 Substance product type: Liquids Situation: Surface spraying of liquids, high application rate >3L/min Spray direction: Only horizontal or downward Spray technique: Spraying with high compressed air use Primary localized controls: Fixed capturing hood (90% reduction) Secondary localized controls: No (0 % reduction) Segregation: Complete segregation with ventilation and filtrations of recirculated air (90% reduction) Personal enclosure: No (0% reduction) Effective housekeeping practices in place: Yes General housekeeping practices in place: No Process fully enclosed: No Room size: 300 m^3 Work area: Indoors

	Duration (mins): 60 Ventilation rate: 10 air changes per hour (ACH)

3.17 Contributing Scenario (17) controlling industrial worker exposure for PROC 7

Name of contributing scenario	7 - Industrial spraying
Scenario subtitle	CS 7b Industrial spraying - short term local option 2
Exposure type	Inhalation: Short-term local Dermal: Qualitative Risk Assessment
Qualitative Risk Assessment	
General	Provide a good standard of controlled ventilation (10 to 15 air changes per hour) Ensure that the worker is in a seperated (control) room with independent air supply Provide extract ventilation to points where emissions occur (LEV). Reduce concentration to less than 5% Ensure good work practices are implemented Supervision in place to check that the RMMs in place are being used correctly and OCs followed.
Eyes	Wear suitable face shield
Dermal	Avoid skin contact. Wear chemically resistant gloves in combination with specific activity training Wear suitable coveralls to prevent exposure to the skin.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 5%. It is however set at 100% since the concentration limit of 5% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.)*
Process temperature	20 °C
Fugacity / Dustiness	low
Frequency and duration of use	
Duration of activity	less than 15 mins
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	1,500 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors

Ventilation	enhanced (70%)
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 95 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection	no
Complete segregation with ventilation and filtrations of recirculated air	inhalation: 90 % *(justification: Complete segregation with ventilation and filtrations of recirculated air with an effectiveness of 90%)*
Use of external/measured value inhalation	A peak factor of 2 is used for estimation of short term exposure. Short term exposure estimation based on long term ART scenario described for ES2, CS7b (PROC 7). Exposure value used: upper interquartile confidence limit of the 75th percentile estimate for full shift exposure * peak factor 2.

3.18 Contributing Scenario (18) controlling industrial worker exposure for PROC 8A

Name of contributing scenario	8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities
Scenario subtitle	CS 8 Transfer of chemicals from/to vessels/ large containers at non-dedicated facilities - long term local
Exposure type	Inhalation: Long-term local Dermal: Long-term systemic
Qualitative Risk Assessment	
General	Reduce concentration to less than 5% Ensure good work practices are implemented Avoid skin contact. Wear chemically resistant gloves in combination with specific activity training Wear suitable coveralls to prevent exposure to the skin.
Eyes	Use suitable eye protection.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 5%. It is however set at 100% since the concentration limit of 5% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.)*
Process temperature	20 °C

Fugacity / Dustiness	low
Frequency and duration of use	
Duration of activity	1 - 4 hours
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 90 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	95 %, burst-time: >4 hours (default) *(justification: Wear chemically resistant gloves in combination with specific activity training.)*
Respiratory protection	90 %

3.19 Contributing Scenario (19) controlling industrial worker exposure for PROC 8A

Name of contributing scenario	8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities
Scenario subtitle	CS 8 Transfer of chemicals from/to vessels/ large containers at non-dedicated facilities - short term local
Exposure type	Inhalation: Short-term local Dermal: Qualitative Risk Assessment
Qualitative Risk Assessment	
General	Reduce concentration to less than 5% Ensure good work practices are implemented
Eyes	Use suitable eye protection.
Dermal	Avoid skin contact. Wear chemically resistant gloves in combination with specific activity training Wear suitable coveralls to prevent exposure to the skin.
Product characteristics	
Physical state	liquid

Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 5%. It is however set at 100% since the concentration limit of 5% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.)*
Process temperature	20 °C
Fugacity / Dustiness	low
Frequency and duration of use	
Duration of activity	less than 15 mins
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 90 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection	90 %

3.20 Contributing Scenario (20) controlling industrial worker exposure for PROC 8B

Name of contributing scenario	8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities
Scenario subtitle	CS 9 Transfer of chemicals from/to vessels/ large containers at dedicated facilities - long term local
Exposure type	Inhalation: Long-term local Dermal: Long-term systemic
Qualitative Risk Assessment	
General	Reduce concentration to less than 5% Ensure good work practices are implemented Avoid skin contact. Wear chemically resistant gloves in combination with specific activity training
Eyes	In case of potential exposure: Use suitable eye protection.
Product characteristics	
Physical state	liquid

Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 5%. It is however set at 100% since the concentration limit of 5% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.)*
Process temperature	60 °C
Fugacity / Dustiness	low
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Ventilation	good (30%)
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 95 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	95 %, burst-time: >4 hours (default) *(justification: Wear chemically resistant gloves in combination with specific activity training.)*
Respiratory protection	no

3.21 Contributing Scenario (21) controlling industrial worker exposure for PROC 8B

Name of contributing scenario	8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities
Scenario subtitle	CS 9 Transfer of chemicals from/to vessels/ large containers at dedicated facilities - short term local
Exposure type	Inhalation: Short-term local Dermal: Qualitative Risk Assessment
Qualitative Risk Assessment	
General	Reduce concentration to less than 5% Ensure good work practices are implemented
Eyes	In case of potential exposure: Use suitable eye protection.

Dermal	Avoid skin contact. Wear chemically resistant gloves in combination with specific activity training
Product characteristics	
Physical state	liquid
Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 5%. It is however set at 100% since the concentration limit of 5% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.)*
Process temperature	60 °C
Fugacity / Dustiness	low
Frequency and duration of use	
Duration of activity	less than 15 mins
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Ventilation	good (30%)
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 95 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection	no

3.22 Contributing Scenario (22) controlling industrial worker exposure for PROC 9

Name of contributing scenario	9 - Transfer of chemicals into small containers (dedicated filling line)
Scenario subtitle	CS 10 Transfer of chemicals into small containers (dedicated filling line) - long term local
Exposure type	Inhalation: Long-term local Dermal: Long-term systemic
Qualitative Risk Assessment	

General	Reduce concentration to less than 5% Ensure good work practices are implemented Avoid skin contact. Wear chemically resistant gloves in combination with specific activity training
Eyes	In case of potential exposure: Use suitable eye protection.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 5%. It is however set at 100% since the concentration limit of 5% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.)*
Process temperature	20 °C
Fugacity / Dustiness	low
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Ventilation	enhanced (70%)
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 90 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	95 %, burst-time: >4 hours (default) *(justification: Wear chemically resistant gloves in combination with specific activity training.)*
Respiratory protection	no

3.23 Contributing Scenario (23) controlling industrial worker exposure for PROC 9

Name of contributing scenario	9 - Transfer of chemicals into small containers (dedicated filling line)
Scenario subtitle	CS 10 Transfer of chemicals into small containers (dedicated filling line) - short term local

Exposure type	Inhalation: Short-term local Dermal: Qualitative Risk Assessment
Qualitative Risk Assessment	
General	Reduce concentration to less than 5% Ensure good work practices are implemented
Eyes	In case of potential exposure: Use suitable eye protection.
Dermal	Avoid skin contact. Wear chemically resistant gloves in combination with specific activity training
Product characteristics	
Physical state	liquid
Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 5%. It is however set at 100% since the concentration limit of 5% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.)*
Process temperature	20 °C
Fugacity / Dustiness	low
Frequency and duration of use	
Duration of activity	less than 15 mins
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Ventilation	enhanced (70%)
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 90 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection	no

3.24 Contributing Scenario (24) controlling industrial worker exposure for PROC 10

Name of contributing scenario	10 - Roller application or brushing
Scenario subtitle	CS 11 Roller application or brushing - long term local

Exposure type	Inhalation: Long-term local Dermal: Long-term systemic
Qualitative Risk Assessment	
General	Reduce concentration to less than 5% Ensure good work practices are implemented Supervision in place to check that the RMMs in place are being used correctly and OCs followed. Avoid skin contact. Wear chemically resistant gloves in combination with specific activity training Wear suitable coveralls to prevent exposure to the skin.
Eyes	Use suitable eye protection.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 5%. It is however set at 100% since the concentration limit of 5% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.)*
Process temperature	20 °C
Fugacity / Dustiness	low
Frequency and duration of use	
Duration of activity	1 - 4 hours
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 90 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	95 %, burst-time: >4 hours (default) *(justification: Wear chemically resistant gloves in combination with specific activity training.)*
Respiratory protection	90 %

3.25 Contributing Scenario (25) controlling industrial worker exposure for PROC 10

Name of contributing scenario	10 - Roller application or brushing
Scenario subtitle	CS 11 Roller application or brushing - short term local
Exposure type	Inhalation: Short-term local Dermal: Qualitative Risk Assessment
Qualitative Risk Assessment	
General	Reduce concentration to less than 5% Ensure good work practices are implemented Supervision in place to check that the RMMs in place are being used correctly and OCs followed.
Eyes	Use suitable eye protection.
Dermal	Avoid skin contact. Wear chemically resistant gloves in combination with specific activity training Wear suitable coveralls to prevent exposure to the skin.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 5%. It is however set at 100% since the concentration limit of 5% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.)*
Process temperature	20 °C
Fugacity / Dustiness	low
Frequency and duration of use	
Duration of activity	less than 15 mins
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 90 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection	90 %

3.26 Contributing Scenario (26) controlling industrial worker exposure for PROC 13

Name of contributing scenario	13 - Treatment of articles by dipping and pouring
Scenario subtitle	CS 12 Treatment of articles by dipping and pouring - long term local
Exposure type	Inhalation: Long-term local Dermal: Long-term systemic
Qualitative Risk Assessment	
General	Reduce concentration to less than 5% Ensure good work practices are implemented Supervision in place to check that the RMMs in place are being used correctly and OCs followed. Avoid skin contact. Wear chemically resistant gloves in combination with specific activity training Wear suitable coveralls to prevent exposure to the skin.
Eyes	Use suitable eye protection.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 5%. It is however set at 100% since the concentration limit of 5% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.)*
Process temperature	60 °C
Fugacity / Dustiness	low
Frequency and duration of use	
Duration of activity	1 - 4 hours
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 90 %)
Conditions and measures related to personal protection, hygiene and health evaluation	

Protective gloves	95 %, burst-time: >4 hours (default) *(justification: Wear chemically resistant gloves in combination with specific activity training.)*
Respiratory protection	90 %

3.27 Contributing Scenario (27) controlling industrial worker exposure for PROC 13

Name of contributing scenario	13 - Treatment of articles by dipping and pouring
Scenario subtitle	CS 12 Treatment of articles by dipping and pouring - short term local
Exposure type	Inhalation: Short-term local Dermal: Qualitative Risk Assessment
Qualitative Risk Assessment	
General	Reduce concentration to less than 5% Ensure good work practices are implemented Supervision in place to check that the RMMs in place are being used correctly and OCs followed.
Eyes	Use suitable eye protection.
Dermal	Avoid skin contact. Wear chemically resistant gloves in combination with specific activity training Wear suitable coveralls to prevent exposure to the skin.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 5%. It is however set at 100% since the concentration limit of 5% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.)*
Process temperature	60 °C
Fugacity / Dustiness	low
Frequency and duration of use	
Duration of activity	less than 15 mins
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial

Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 90 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection	90 %

3.28 Contributing Scenario (28) controlling industrial worker exposure for PROC 14

Name of contributing scenario	14 - Production of preparations or articles by tabletting, compression, extrusion, pelletisation
Scenario subtitle	CS 13 Production of preparations or articles by tabletting, compression, extrusion, pelletisation - long term local
Exposure type	Inhalation: Long-term local Dermal: Long-term systemic
Qualitative Risk Assessment	
General	Reduce concentration to less than 5% Ensure good work practices are implemented Avoid skin contact. Wear chemically resistant gloves in combination with specific activity training Wear suitable coveralls to prevent exposure to the skin.
Eyes	Use suitable eye protection.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 5%. It is however set at 100% since the concentration limit of 5% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.)*
Process temperature	60 °C
Fugacity / Dustiness	low
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Ventilation	enhanced (70%)
Domain	industrial

Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 90 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	95 %, burst-time: >4 hours (default) *(justification: Wear chemically resistant gloves in combination with specific activity training.)*
Respiratory protection	no

3.29 Contributing Scenario (29) controlling industrial worker exposure for PROC 14

Name of contributing scenario	14 - Production of preparations or articles by tabletting, compression, extrusion, pelletisation
Scenario subtitle	CS 13 Production of preparations or articles by tabletting, compression, extrusion, pelletisation - short term local
Exposure type	Inhalation: Short-term local Dermal: Qualitative Risk Assessment
Qualitative Risk Assessment	
General	Reduce concentration to less than 5% Ensure good work practices are implemented
Eyes	Use suitable eye protection.
Dermal	Avoid skin contact. Wear chemically resistant gloves in combination with specific activity training Wear suitable coveralls to prevent exposure to the skin.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 5%. It is however set at 100% since the concentration limit of 5% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.)*
Process temperature	60 °C
Fugacity / Dustiness	low
Frequency and duration of use	
Duration of activity	less than 15 mins
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	

Location	indoors
Ventilation	enhanced (70%)
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 90 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection	no

3.30 Contributing Scenario (30) controlling industrial worker exposure for PROC 15

Name of contributing scenario	15 - Use of laboratory reagents in small scale laboratories
Scenario subtitle	CS 14 Use of laboratory reagents in small scale laboratories - long term local
Exposure type	Inhalation: Long-term local Dermal: Long-term systemic
Qualitative Risk Assessment	
General	Reduce concentration to less than 5% Ensure good work practices are implemented Avoid skin contact. Wear chemically resistant gloves in combination with specific activity training Wear suitable coveralls to prevent exposure to the skin.
Eyes	Use suitable eye protection.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 5%. It is however set at 100% since the concentration limit of 5% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.)*
Process temperature	60 °C
Fugacity / Dustiness	low
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	240 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors

Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	95 %, burst-time: >4 hours (default) *(justification: Wear chemically resistant gloves in combination with specific activity training.)*
Respiratory protection	no
Local exhaust ventilation	inhalation: 99 % *(justification: Local exhaust ventilation (enclosing hood, fume cupboard, 99% reduction).)*

3.31 Contributing Scenario (31) controlling industrial worker exposure for PROC 15

Name of contributing scenario	15 - Use of laboratory reagents in small scale laboratories
Scenario subtitle	CS 14 Use of laboratory reagents in small scale laboratories - short term local
Exposure type	Inhalation: Short-term local Dermal: Qualitative Risk Assessment
Qualitative Risk Assessment	
General	Reduce concentration to less than 5% Ensure good work practices are implemented
Eyes	Use suitable eye protection.
Dermal	Avoid skin contact. Wear chemically resistant gloves in combination with specific activity training Wear suitable coveralls to prevent exposure to the skin.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 5%. It is however set at 100% since the concentration limit of 5% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.)*
Process temperature	60 °C
Fugacity / Dustiness	low
Frequency and duration of use	
Duration of activity	less than 15 mins
Frequency of use	5 days / week
Human factors not influenced by risk management	

Exposed skin surface	240 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection	no
Local exhaust ventilation	inhalation: 99 % *(justification: Local exhaust ventilation (enclosing hood, fume cupboard, 99% reduction).)*

3.32 Contributing Scenario (32) controlling industrial worker exposure for PROC 16

Name of contributing scenario	16 - Using material as fuel sources, limited exposure to unburned product to be expected
Scenario subtitle	CS 15 Using material as fuel sources, limited exposure to unburned product to be expected - long term local
Exposure type	Inhalation: Long-term local Dermal: Long-term systemic
Qualitative Risk Assessment	
General	Reduce concentration to less than 5% Ensure good work practices are implemented Avoid skin contact. Wear chemically resistant gloves in combination with specific activity training Wear suitable coveralls to prevent exposure to the skin.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 2.5%. It is however set at 100% since the concentration limit of 2.5% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.)*
Process temperature	60 °C
Fugacity / Dustiness	low
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	

Exposed skin surface	240 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 90 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	95 %, burst-time: >4 hours (default) *(justification: Wear chemically resistant gloves in combination with specific activity training.)*
Respiratory protection	no

3.33 Contributing Scenario (33) controlling industrial worker exposure for PROC 16

Name of contributing scenario	16 - Using material as fuel sources, limited exposure to unburned product to be expected
Scenario subtitle	CS 15 Using material as fuel sources, limited exposure to unburned product to be expected - short term local
Exposure type	Inhalation: Short-term local Dermal: Qualitative Risk Assessment
Qualitative Risk Assessment	
General	Ensure good work practices are implemented Reduce concentration to less than 5%
Dermal	Avoid skin contact. Wear chemically resistant gloves in combination with specific activity training Wear suitable coveralls to prevent exposure to the skin.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 2.5%. It is however set at 100% since the concentration limit of 2.5% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.)*
Process temperature	60 °C
Fugacity / Dustiness	low
Frequency and duration of use	
Duration of activity	less than 15 mins
Frequency of use	5 days / week

Human factors not influenced by risk management	
Exposed skin surface	240 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 90 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection	no

3.34 Contributing Scenario (34) controlling industrial worker exposure for PROC 21

Name of contributing scenario	21 - Low energy manipulation of substances in materials and/or articles
Scenario subtitle	CS 16 Low energy manipulation of substances bound in materials and/or articles - long term local
Exposure type	Inhalation: Long-term local Dermal: Long-term systemic
Qualitative Risk Assessment	
General	Reduce concentration to less than 5% Ensure good work practices are implemented Avoid skin contact. Wear chemically resistant gloves in combination with specific activity training Wear suitable coveralls to prevent exposure to the skin.
Eyes	Use suitable eye protection.
Product characteristics	
Physical state	solid
Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 5%. It is however set at 100% since the concentration limit of 5% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.)*
Process temperature	20 °C
Fugacity / Dustiness	high
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	

Exposed skin surface	1,980 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Ventilation	enhanced (70%)
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 90 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	95 %, burst-time: >4 hours (default) *(justification: Wear chemically resistant gloves in combination with specific activity training.)*
Respiratory protection	no

3.35 Contributing Scenario (35) controlling industrial worker exposure for PROC 21

Name of contributing scenario	21 - Low energy manipulation of substances in materials and/or articles
Scenario subtitle	CS 16 Low energy manipulation of substances bound in materials and/or articles - short term local
Exposure type	Inhalation: Short-term local Dermal: Qualitative Risk Assessment
Qualitative Risk Assessment	
General	Reduce concentration to less than 5% Ensure good work practices are implemented
Eyes	Use suitable eye protection.
Dermal	Avoid skin contact. Wear chemically resistant gloves in combination with specific activity training Wear suitable coveralls to prevent exposure to the skin.
Product characteristics	
Physical state	solid
Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 5%. It is however set at 100% since the concentration limit of 5% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.)*
Process temperature	20 °C
Fugacity / Dustiness	high
Frequency and duration of use	

Duration of activity	less than 15 mins
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	1,980 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Ventilation	enhanced (70%)
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 90 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection	no

3.36 Contributing Scenario (36) controlling industrial worker exposure for PROC 22C

Name of contributing scenario	22c - Potentially closed operations with minerals at elevated temperature - pt > mp - High Fugacity
Scenario subtitle	CS 17 Potentially closed processing operations with minerals/metals at elevated temperature - long term local
Exposure type	Inhalation: Long-term local Dermal: Long-term systemic
Qualitative Risk Assessment	
General	Reduce concentration to less than 5% Ensure good work practices are implemented Avoid skin contact. Wear chemically resistant gloves in combination with specific activity training Wear suitable coveralls to prevent exposure to the skin.
Eyes	Use suitable eye protection.
Product characteristics	
Physical state	solid
Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 5%. It is however set at 100% since the concentration limit of 5% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.)*
Process temperature	60 °C
Fugacity / Dustiness	high
Frequency and duration of use	

Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	1,980 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Ventilation	enhanced (70%)
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 90 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	95 %, burst-time: >4 hours (default) *(justification: Wear chemically resistant gloves in combination with specific activity training.)*
Respiratory protection	no

3.37 Contributing Scenario (37) controlling industrial worker exposure for PROC 22C

Name of contributing scenario	22c - Potentially closed operations with minerals at elevated temperature - pt > mp - High Fugacity
Scenario subtitle	CS 17 Potentially closed processing operations with minerals/metals at elevated temperature - short term local
Exposure type	Inhalation: Short-term local Dermal: Qualitative Risk Assessment
Qualitative Risk Assessment	
General	Reduce concentration to less than 5% Ensure good work practices are implemented
Eyes	Use suitable eye protection.
Dermal	Avoid skin contact. Wear chemically resistant gloves in combination with specific activity training Wear suitable coveralls to prevent exposure to the skin.
Product characteristics	
Physical state	solid
Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 5%. It is however set at 100% since the concentration limit of 5% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.)*

Process temperature	60 °C
Fugacity / Dustiness	high
Frequency and duration of use	
Duration of activity	less than 15 mins
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	1,980 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Ventilation	enhanced (70%)
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 90 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection	no

3.38 Contributing Scenario (38) controlling industrial worker exposure for PROC 23C

Name of contributing scenario	23c - Open processing and transfer of minerals at elevated temperature - pt > mp - High Fugacity
Scenario subtitle	CS 18 Open processing and transfer operations with minerals/metals at elevated temperature - long term local
Exposure type	Inhalation: Long-term local Dermal: Long-term systemic
Qualitative Risk Assessment	
General	Reduce concentration to less than 5% Ensure good work practices are implemented Wear a suitable respiratory protection with adequate effectiveness (90%). In case of potential exposure: Avoid skin contact. Wear chemically resistant gloves in combination with specific activity training Wear suitable coveralls to prevent exposure to the skin.
Eyes	Use suitable eye protection.
Product characteristics	
Physical state	solid

Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 5%. It is however set at 100% since the concentration limit of 5% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.)*
Process temperature	60 °C
Fugacity / Dustiness	high
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	1,980 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Ventilation	enhanced (70%)
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 90 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	95 %, burst-time: >4 hours (default) *(justification: Wear chemically resistant gloves in combination with specific activity training.)*
Respiratory protection	no

3.39 Contributing Scenario (39) controlling industrial worker exposure for PROC 23C

Name of contributing scenario	23c - Open processing and transfer of minerals at elevated temperature - pt > mp - High Fugacity
Scenario subtitle	CS 18 Open processing and transfer operations with minerals/metals at elevated temperature - short term local
Exposure type	Inhalation: Short-term local Dermal: Qualitative Risk Assessment
Qualitative Risk Assessment	
General	Reduce concentration to less than 5% Ensure good work practices are implemented
Eyes	Use suitable eye protection.

Dermal	Avoid skin contact. Wear chemically resistant gloves in combination with specific activity training Wear suitable coveralls to prevent exposure to the skin.
Product characteristics	
Physical state	solid
Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 5%. It is however set at 100% since the concentration limit of 5% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.)*
Process temperature	60 °C
Fugacity / Dustiness	high
Frequency and duration of use	
Duration of activity	less than 15 mins
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	1,980 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Ventilation	enhanced (70%)
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 90 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection	no

3.40 Contributing Scenario (41) controlling industrial worker exposure for PROC 24C

Name of contributing scenario	24c - High (mechanical) energy work-up of substances bound in materials and/or articles - pt > mp - High Fugacity
Scenario subtitle	CS 19 High (mechanical) energy work-up of substances bound in materials and/or articles - long term local
Exposure type	Inhalation: Long-term local Dermal: Long-term systemic
Qualitative Risk Assessment	

General	Reduce concentration to less than 5% Ensure good work practices are implemented Avoid skin contact. Wear chemically resistant gloves in combination with specific activity training Wear suitable coveralls to prevent exposure to the skin.
Eyes	Use suitable eye protection.
Product characteristics	
Physical state	solid
Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 5%. It is however set at 100% since the concentration limit of 5% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.)*
Process temperature	20 °C
Fugacity / Dustiness	high
Frequency and duration of use	
Duration of activity	1 - 4 hours
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	1,980 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 80 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	95 %, burst-time: >4 hours (default) *(justification: Wear chemically resistant gloves in combination with specific activity training.)*
Respiratory protection	90 %

3.41 Contributing Scenario (42) controlling industrial worker exposure for PROC 24C

Name of contributing scenario	24c - High (mechanical) energy work-up of substances bound in materials and/or articles - pt > mp - High Fugacity
Scenario subtitle	CS 19 High (mechanical) energy work-up of substances bound in materials and/or articles - short term local
Exposure type	Inhalation: Short-term local Dermal: Qualitative Risk Assessment

Qualitative Risk Assessment	
General	Reduce concentration to less than 5% Ensure good work practices are implemented
Eyes	Use suitable eye protection.
Dermal	Avoid skin contact. Wear chemically resistant gloves in combination with specific activity training Wear suitable coveralls to prevent exposure to the skin.
Product characteristics	
Physical state	solid
Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 5%. It is however set at 100% since the concentration limit of 5% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.)*
Process temperature	20 °C
Fugacity / Dustiness	high
Frequency and duration of use	
Duration of activity	less than 15 mins
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	1,980 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 80 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection	90 %

3.42 Contributing Scenario (43) controlling industrial worker exposure for PROC 25C

Name of contributing scenario	25c - Hot work operations with metals - pt > mp - High Fugacity
Scenario subtitle	CS 20 Other hot work operations with metals - long term local
Exposure type	Inhalation: Long-term local Dermal: Long-term systemic
Qualitative Risk Assessment	

General	Reduce concentration to less than 5% Ensure good work practices are implemented Avoid skin contact. Wear chemically resistant gloves in combination with specific activity training Wear suitable coveralls to prevent exposure to the skin.
Eyes	Use suitable eye protection.
Product characteristics	
Physical state	solid
Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 5%. It is however set at 100% since the concentration limit of 5% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.)*
Process temperature	60 °C
Fugacity / Dustiness	high
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	1,980 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Ventilation	enhanced (70%)
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 90 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	95 %, burst-time: >4 hours (default) *(justification: Wear chemically resistant gloves in combination with specific activity training.)*
Respiratory protection	no

3.43 Contributing Scenario (44) controlling industrial worker exposure for PROC 25C

Name of contributing scenario	25c - Hot work operations with metals - pt > mp - High Fugacity
Scenario subtitle	CS 20 Other hot work operations with metals - short term local

Exposure type	Inhalation: Short-term local Dermal: Qualitative Risk Assessment
Qualitative Risk Assessment	
General	Reduce concentration to less than 5% Ensure good work practices are implemented
Eyes	Use suitable eye protection.
Dermal	Avoid skin contact. Wear chemically resistant gloves in combination with specific activity training Wear suitable coveralls to prevent exposure to the skin.
Product characteristics	
Physical state	solid
Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 5%. It is however set at 100% since the concentration limit of 5% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.)*
Process temperature	60 °C
Fugacity / Dustiness	high
Frequency and duration of use	
Duration of activity	less than 15 mins
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	1,980 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Ventilation	enhanced (70%)
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 90 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection	no

4 Exposure Scenario 3: Industrial use of preparations containing formaldehyde up to 25% (ES 3)

This scenario is described by the following combinations of use descriptors. The corresponding contributing scenarios are described in the respective subchapters.
An overall exposure scenario may be described by a number of contributing scenarios which may be subdivided into environmental exposure, worker exposure and consumer exposure.
The following scenarios contribute to the scenario *Industrial use of preparations containing formaldehyde up to 25%*.

Table 4 Description of ES 3

Free short title	Industrial use of preparations containing formaldehyde up to 25% (ES 3)
Systematic title based on use descriptor	ERC 2, 3, 4, 5, 6C, 6D; PROC 5, 8A, 8B, 9, 13, 15
Name of contributing environmental scenario and corresponding ERC	ERC 2 Formulation of preparations ERC 3 Formulation in articles ERC 4 Industrial use of processing aids ERC 5 Industrial use resulting in inclusion into or onto a matrix ERC 6c Production of plastics ERC 6d Production of resins/rubbers
Name(s) of contributing worker scenarios and corresponding PROCs	PROC 5 - Mixing or blending in batch processes (multistage and/or significant contact) PROC 8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities PROC 8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities PROC 9 - Transfer of chemicals into small containers (dedicated filling line) PROC 13 - Treatment of articles by dipping and pouring PROC 15 - Use of laboratory reagents in small scale laboratories

4.1 Contributing Scenario (1) controlling environmental exposure

As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.

4.2 Contributing Scenario (2) controlling industrial worker exposure for PROC 5

Name of contributing scenario	5 - Mixing or blending in batch processes (multistage and/or significant contact)
Scenario subtitle	CS 1 Mixing or blending in batch process (multistage and/or significant contact) - long term local
Exposure type	Inhalation: Long-term local Dermal: Long-term systemic
Qualitative Risk Assessment	

General	Reduce concentration to less than 25% Ensure good work practices are implemented Avoid skin contact. Wear chemically resistant gloves in combination with intensive management supervision control. Wear suitable coveralls to prevent exposure to the skin.
Eyes	Use suitable eye protection.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 25%. It is however set at 100% since the concentration limit of 25% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.)*
Process temperature	60 °C
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	1 - 4 hours
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Ventilation	enhanced (70%)
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 90 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	98 %, burst-time: >4 hours (default) *(justification: Wear chemically resistant gloves in combination with intensive management supervision control.)*
Respiratory protection	90 %

4.3 Contributing Scenario (3) controlling industrial worker exposure for PROC 5

Name of contributing scenario	5 - Mixing or blending in batch processes (multistage and/or significant contact)
Scenario subtitle	CS 1 Mixing or blending in batch process (multistage and/or significant contact) - short term local

Exposure type	Inhalation: Short-term local Dermal: Qualitative Risk Assessment
Qualitative Risk Assessment	
General	Reduce concentration to less than 25% Ensure good work practices are implemented
Eyes	Use suitable eye protection.
Dermal	Avoid skin contact. Wear chemically resistant gloves in combination with intensive management supervision control. Wear suitable coveralls to prevent exposure to the skin.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 25%. It is however set at 100% since the concentration limit of 25% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.)*
Process temperature	60 °C
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	less than 15 mins
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Ventilation	enhanced (70%)
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 90 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection	90 %

4.4 Contributing Scenario (4) controlling industrial worker exposure for PROC 8A

Name of contributing scenario	8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities
Scenario subtitle	CS 2 Transfer of chemicals from/to vessels/large containers at non-dedicated facilities - long term local

Exposure type	Inhalation: Long-term local Dermal: Long-term systemic
Qualitative Risk Assessment	
General	Reduce concentration to less than 25% Ensure good work practices are implemented Avoid skin contact. Wear chemically resistant gloves in combination with intensive management supervision control. Wear suitable coveralls to prevent exposure to the skin.
Eyes	Use suitable eye protection.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 25%. It is however set at 100% since the concentration limit of 25% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.)*
Process temperature	20 °C
Fugacity / Dustiness	low
Frequency and duration of use	
Duration of activity	1 - 4 hours
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 90 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	98 %, burst-time: >4 hours (default) *(justification: Wear chemically resistant gloves in combination with intensive management supervision control.)*
Respiratory protection	90 %

4.5 Contributing Scenario (5) controlling industrial worker exposure for PROC 8A

Name of contributing scenario	8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities

Scenario subtitle	CS 2 Transfer of chemicals from/to vessels/large containers at non-dedicated facilities - short term local
Exposure type	Inhalation: Short-term local Dermal: Qualitative Risk Assessment
Qualitative Risk Assessment	
General	Reduce concentration to less than 25% Ensure good work practices are implemented
Eyes	Use suitable eye protection.
Dermal	Avoid skin contact. Wear chemically resistant gloves in combination with intensive management supervision control. Wear suitable coveralls to prevent exposure to the skin.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 25%. It is however set at 100% since the concentration limit of 25% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.)*
Process temperature	20 °C
Fugacity / Dustiness	low
Frequency and duration of use	
Duration of activity	less than 15 mins
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 90 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection	90 %

4.6 Contributing Scenario (6) controlling industrial worker exposure for PROC 8B

Name of contributing scenario	8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities

Scenario subtitle	CS 3 Transfer of chemicals from/to vessels/large containers at dedicated facilities - long term local
Exposure type	Inhalation: Long-term local Dermal: Long-term systemic
Qualitative Risk Assessment	
General	Reduce concentration to less than 25% Ensure good work practices are implemented Avoid skin contact. Wear chemically resistant gloves in combination with intensive management supervision control.
Eyes	Use suitable eye protection.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 25%. It is however set at 100% since the concentration limit of 25% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.)*
Process temperature	60 °C
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	1 - 4 hours
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Ventilation	enhanced (70%)
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 95 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	98 %, burst-time: >4 hours (default) *(justification: Wear chemically resistant gloves in combination with intensive management supervision control.)*
Respiratory protection	90 %

4.7 Contributing Scenario (7) controlling industrial worker exposure for PROC 8B

Name of contributing scenario	8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities
Scenario subtitle	CS 3 Transfer of chemicals from/to vessels/large containers at dedicated facilities - short term local
Exposure type	Inhalation: Short-term local Dermal: Qualitative Risk Assessment
Qualitative Risk Assessment	
General	Reduce concentration to less than 25% In case of potential exposure: Wear a suitable respiratory protection with adequate effectiveness (90%). Ensure good work practices are implemented
Eyes	Use suitable eye protection.
Dermal	Avoid skin contact. Wear chemically resistant gloves in combination with intensive management supervision control.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 25%. It is however set at 100% since the concentration limit of 25% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.)*
Process temperature	60 °C
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	less than 15 mins
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Ventilation	enhanced (70%)
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 95 %)

Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection	no

4.8 Contributing Scenario (8) controlling industrial worker exposure for PROC 9

Name of contributing scenario	9 - Transfer of chemicals into small containers (dedicated filling line)
Scenario subtitle	CS 4 Transfer of chemicals into small containers (dedicated filling line) - long term local
Exposure type	Inhalation: Long-term local Dermal: Long-term systemic
Qualitative Risk Assessment	
General	Reduce concentration to less than 25% Ensure good work practices are implemented Avoid skin contact. Wear chemically resistant gloves in combination with intensive management supervision control.
Eyes	Use suitable eye protection.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 25%. It is however set at 100% since the concentration limit of 25% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.)*
Process temperature	20 °C
Fugacity / Dustiness	low
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Ventilation	enhanced (70%)
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 90 %)
Conditions and measures related to personal protection, hygiene and health evaluation	

Protective gloves	98 %, burst-time: >4 hours (default) *(justification: Wear chemically resistant gloves in combination with intensive management supervision control.)*
Respiratory protection	no

4.9 Contributing Scenario (9) controlling industrial worker exposure for PROC 9

Name of contributing scenario	9 - Transfer of chemicals into small containers (dedicated filling line)
Scenario subtitle	CS 4 Transfer of chemicals into small containers (dedicated filling line) - short term local
Exposure type	Inhalation: Short-term local Dermal: Qualitative Risk Assessment
Qualitative Risk Assessment	
General	Reduce concentration to less than 25% Ensure good work practices are implemented
Eyes	Use suitable eye protection.
Dermal	Avoid skin contact. Wear chemically resistant gloves in combination with intensive management supervision control.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 25%. It is however set at 100% since the concentration limit of 25% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.)*
Process temperature	20 °C
Fugacity / Dustiness	low
Frequency and duration of use	
Duration of activity	less than 15 mins
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Ventilation	enhanced (70%)
Domain	industrial
Technical conditions and measures to control dispersion and exposure	

Local exhaust ventilation	yes (inhalation 90 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection	no

4.10 Contributing Scenario (10) controlling industrial worker exposure for PROC 13

Name of contributing scenario	13 - Treatment of articles by dipping and pouring
Scenario subtitle	CS 5 Treatment of articles by dipping and pouring - long term local
Exposure type	Inhalation: Long-term local Dermal: Long-term systemic
Qualitative Risk Assessment	
General	Reduce concentration to less than 25% Ensure good work practices are implemented Supervision in place to check that the RMMs in place are being used correctly and OCs followed. Avoid skin contact. Wear chemically resistant gloves in combination with intensive management supervision control. Wear suitable coveralls to prevent exposure to the skin.
Eyes	Use suitable eye protection.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 25%. It is however set at 100% since the concentration limit of 25% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.)*
Process temperature	60 °C
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	1 - 4 hours
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Ventilation	enhanced (70%)
Domain	industrial

Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 90 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	98 %, burst-time: >4 hours (default) *(justification: Wear chemically resistant gloves in combination with intensive management supervision control.)*
Respiratory protection	90 %

4.11 Contributing Scenario (11) controlling industrial worker exposure for PROC 13

Name of contributing scenario	13 - Treatment of articles by dipping and pouring
Scenario subtitle	CS 5 Treatment of articles by dipping and pouring - short term local
Exposure type	Inhalation: Short-term local Dermal: Qualitative Risk Assessment
Qualitative Risk Assessment	
General	Reduce concentration to less than 25% Ensure good work practices are implemented Supervision in place to check that the RMMs in place are being used correctly and OCs followed.
Eyes	Use suitable eye protection.
Dermal	Avoid skin contact. Wear chemically resistant gloves in combination with intensive management supervision control. Wear suitable coveralls to prevent exposure to the skin.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 25%. It is however set at 100% since the concentration limit of 25% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.)*
Process temperature	60 °C
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	less than 15 mins
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2

Other given operational conditions affecting workers exposure	
Location	indoors
Ventilation	enhanced (70%)
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 90 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection	90 %

4.12 Contributing Scenario (12) controlling industrial worker exposure for PROC 15

Name of contributing scenario	15 - Use of laboratory reagents in small scale laboratories
Scenario subtitle	CS 6 Use as a laboratory reagent - long term local
Exposure type	Inhalation: Long-term local Dermal: Long-term systemic
Qualitative Risk Assessment	
General	Reduce concentration to less than 25% Ensure good work practices are implemented Avoid skin contact. Wear chemically resistant gloves in combination with intensive management supervision control. Wear suitable coveralls to prevent exposure to the skin.
Eyes	Use suitable eye protection.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 25%. It is however set at 100% since the concentration limit of 25% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.)*
Process temperature	60 °C
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	240 cm^2
Other given operational conditions affecting workers exposure	

Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	98 %, burst-time: >4 hours (default) *(justification: Wear chemically resistant gloves in combination with intensive management supervision control.)*
Respiratory protection	no
Local exhaust ventilation	inhalation: 99 % *(justification: Local exhaust ventilation (enclosing hood, fume cupboard, 99% reduction).)*

4.13 Contributing Scenario (13) controlling industrial worker exposure for PROC 15

Name of contributing scenario	15 - Use of laboratory reagents in small scale laboratories
Scenario subtitle	CS 6 Use as a laboratory reagent - short term local
Exposure type	Inhalation: Short-term local Dermal: Qualitative Risk Assessment
Qualitative Risk Assessment	
General	Reduce concentration to less than 25% Ensure good work practices are implemented
Eyes	Use suitable eye protection.
Dermal	Avoid skin contact. Wear chemically resistant gloves in combination with intensive management supervision control. Wear suitable coveralls to prevent exposure to the skin.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 25%. It is however set at 100% since the concentration limit of 25% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.)*
Process temperature	60 °C
Fugacity / Dustiness	medium
Frequency and duration of use	
Duration of activity	less than 15 mins
Frequency of use	5 days / week
Human factors not influenced by risk management	

Exposed skin surface	240 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	industrial
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection	no
Local exhaust ventilation	inhalation: 99 % *(justification: Local exhaust ventilation (enclosing hood, fume cupboard, 99% reduction).)*

5 Exposure Scenario 4: Professional use of preparations containing formaldehyde up to 1.5% (ES 4)

This scenario is described by the following combinations of use descriptors. The corresponding contributing scenarios are described in the respective subchapters.
An overall exposure scenario may be described by a number of contributing scenarios which may be subdivided into environmental exposure, worker exposure and consumer exposure.
The following scenarios contribute to the scenario *Professional use of preparations containing formaldehyde up to 1.5%*.

Table 5 Description of ES 4

Free short title	Professional use of preparations containing formaldehyde up to 1.5% (ES 4)
Systematic title based on use descriptor	ERC 8A, 8B, 8C, 8D, 8F; PROC 5, 8A, 8B, 10, 11, 13, 15, 16, 21, 23C, 24C, 25C
Name of contributing environmental scenario and corresponding ERC	ERC 8a Wide dispersive indoor use of processing aids in open systems ERC 8b Wide dispersive indoor use of reactive substances in open systems ERC 8c Wide dispersive indoor use resulting in inclusion into or onto a matrix ERC 8d Wide dispersive outdoor use of processing aids in open systems ERC 8f Wide dispersive outdoor use resulting in inclusion into or onto a matrix
Name(s) of contributing worker scenarios and corresponding PROCs	PROC 5 - Mixing or blending in batch processes (multistage and/or significant contact) PROC 8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities PROC 8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities PROC 10 - Roller application or brushing PROC 11 - Non industrial spraying PROC 13 - Treatment of articles by dipping and pouring PROC 15 - Use of laboratory reagents in small scale laboratories PROC 16 - Using material as fuel sources, limited exposure to unburned product to be expected PROC 21 - Low energy manipulation of substances in materials and/or articles PROC 23c - Open processing and transfer of minerals at elevated temperature - pt > mp - High Fugacity PROC 24c - High (mechanical) energy work-up of substances bound in materials and/or articles - pt > mp - High Fugacity PROC 25c - Hot work operations with metals - pt > mp - High Fugacity

5.1 Contributing Scenario (1) controlling environmental exposure

As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.

5.2 Contributing Scenario (2) controlling professional worker exposure for PROC 5

Name of contributing scenario	5 - Mixing or blending in batch processes (multistage and/or significant contact)
Scenario subtitle	CS 1 Mixing or blending in batch processes (multistage and/or significant contact) - long term local
Exposure type	Inhalation: Long-term local Dermal: Long-term systemic
Qualitative Risk Assessment	
General	Reduce concentration to less than 1.5% Ensure good work practices are implemented Avoid skin contact. Wear chemically resistant gloves in combination with specific activity training Wear suitable coveralls to prevent exposure to the skin.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 1.5%. It is however set at 100% since the concentration limit of 1.5% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.)*
Process temperature	60 °C
Fugacity / Dustiness	low
Frequency and duration of use	
Duration of activity	1 - 4 hours
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Ventilation	good (30%)
Domain	professional
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 80 %)

Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	95 %, burst-time: >4 hours (default) *(justification: Wear chemically resistant gloves in combination with specific activity training.)*
Respiratory protection	90 %

5.3 Contributing Scenario (3) controlling professional worker exposure for PROC 5

Name of contributing scenario	5 - Mixing or blending in batch processes (multistage and/or significant contact)
Scenario subtitle	CS 1 Mixing or blending in batch processes (multistage and/or significant contact) - short term local
Exposure type	Inhalation: Short-term local Dermal: Qualitative Risk Assessment
Qualitative Risk Assessment	
General	Reduce concentration to less than 1.5% Ensure good work practices are implemented
Dermal	Avoid skin contact. Wear chemically resistant gloves in combination with specific activity training Wear suitable coveralls to prevent exposure to the skin.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 1.5%. It is however set at 100% since the concentration limit of 1.5% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.)*
Process temperature	60 °C
Fugacity / Dustiness	low
Frequency and duration of use	
Duration of activity	less than 15 mins
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Ventilation	good (30%)
Domain	professional

Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 80 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection	90 %

5.4 Contributing Scenario (4) controlling professional worker exposure for PROC 8A

Name of contributing scenario	8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities
Scenario subtitle	CS 2 Transfer of chemicals from/to vessels/ large containers at non-dedicated facilities - long term local
Exposure type	Inhalation: Long-term local Dermal: Long-term systemic
Qualitative Risk Assessment	
General	Reduce concentration to less than 1.5% Ensure good work practices are implemented Avoid skin contact. Wear chemically resistant gloves in combination with specific activity training Wear suitable coveralls to prevent exposure to the skin.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 1.5%. It is however set at 100% since the concentration limit of 1.5% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.)*
Process temperature	60 °C
Fugacity / Dustiness	low
Frequency and duration of use	
Duration of activity	1 - 4 hours
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Ventilation	good (30%)
Domain	professional

Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 80 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	95 %, burst-time: >4 hours (default) *(justification: Wear chemically resistant gloves in combination with specific activity training.)*
Respiratory protection	95 %

5.5 Contributing Scenario (5) controlling professional worker exposure for PROC 8A

Name of contributing scenario	8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities
Scenario subtitle	CS 2 Transfer of chemicals from/to vessels/ large containers at non-dedicated facilities - short term local
Exposure type	Inhalation: Short-term local Dermal: Qualitative Risk Assessment
Qualitative Risk Assessment	
General	Reduce concentration to less than 1.5% Ensure good work practices are implemented
Dermal	Avoid skin contact. Wear chemically resistant gloves in combination with specific activity training Wear suitable coveralls to prevent exposure to the skin.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 1.5%. It is however set at 100% since the concentration limit of 1.5% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.)*
Process temperature	60 °C
Fugacity / Dustiness	low
Frequency and duration of use	
Duration of activity	less than 15 mins
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2

Other given operational conditions affecting workers exposure	
Location	indoors
Ventilation	good (30%)
Domain	professional
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 80 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection	95 %

5.6 Contributing Scenario (6) controlling professional worker exposure for PROC 8B

Name of contributing scenario	8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities
Scenario subtitle	CS 3 Transfer of chemicals from/to vessels/ large containers at dedicated facilities - long term local
Exposure type	Inhalation: Long-term local Dermal: Long-term systemic
Qualitative Risk Assessment	
General	Reduce concentration to less than 1.5% Ensure good work practices are implemented Avoid skin contact. Wear chemically resistant gloves in combination with specific activity training
Product characteristics	
Physical state	liquid
Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 1.5%. It is however set at 100% since the concentration limit of 1.5% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.)*
Process temperature	60 °C
Fugacity / Dustiness	low
Frequency and duration of use	
Duration of activity	1 - 4 hours
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	

Location	indoors
Ventilation	good (30%)
Domain	professional
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 90 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	95 %, burst-time: >4 hours (default) *(justification: Wear chemically resistant gloves in combination with specific activity training.)*
Respiratory protection	90 %

5.7 Contributing Scenario (7) controlling professional worker exposure for PROC 8B

Name of contributing scenario	8b - Transfer of chemicals from/to vessels/ large containers at dedicated facilities
Scenario subtitle	CS 3 Transfer of chemicals from/to vessels/ large containers at dedicated facilities - short term local
Exposure type	Inhalation: Short-term local Dermal: Qualitative Risk Assessment
Qualitative Risk Assessment	
General	Reduce concentration to less than 1.5% Ensure good work practices are implemented
Dermal	Avoid skin contact. Wear chemically resistant gloves in combination with specific activity training
Product characteristics	
Physical state	liquid
Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 1.5%. It is however set at 100% since the concentration limit of 1.5% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.)*
Process temperature	60 °C
Fugacity / Dustiness	low
Frequency and duration of use	
Duration of activity	less than 15 mins
Frequency of use	5 days / week
Human factors not influenced by risk management	

Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Ventilation	good (30%)
Domain	professional
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 90 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection	90 %

5.8 Contributing Scenario (8) controlling professional worker exposure for PROC 10

Name of contributing scenario	10 - Roller application or brushing
Scenario subtitle	CS 4a Roller application or brushing- long term local outdoors
Exposure type	Inhalation: Long-term local Dermal: Long-term systemic
Qualitative Risk Assessment	
General	Reduce concentration to less than 1.5% Ensure good work practices are implemented Supervision in place to check that the RMMs in place are being used correctly and OCs followed. Avoid skin contact. Wear chemically resistant gloves in combination with specific activity training Wear suitable coveralls to prevent exposure to the skin.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 1.5%. It is however set at 100% since the concentration limit of 1.5% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.)*
Process temperature	20 °C
Fugacity / Dustiness	low
Frequency and duration of use	
Duration of activity	1 - 4 hours
Frequency of use	5 days / week

Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	outdoors (30%)
Domain	professional
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	95 %, burst-time: >4 hours (default) *(justification: Wear chemically resistant gloves in combination with specific activity training.)*
Respiratory protection	99 % *(justification: Use of respiratory protection effectiveness 99%)*

5.9 Contributing Scenario (9) controlling professional worker exposure for PROC 10

Name of contributing scenario	10 - Roller application or brushing
Scenario subtitle	CS 4a Roller application or brushing - short term local outdoors
Exposure type	Inhalation: Short-term local Dermal: Qualitative Risk Assessment
Qualitative Risk Assessment	
General	Reduce concentration to less than 1.5% Ensure good work practices are implemented Supervision in place to check that the RMMs in place are being used correctly and OCs followed.
Dermal	Avoid skin contact. Wear chemically resistant gloves in combination with specific activity training Wear suitable coveralls to prevent exposure to the skin.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 1.5%. It is however set at 100% since the concentration limit of 1.5% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.)*
Process temperature	20 °C
Fugacity / Dustiness	low

Frequency and duration of use	
Duration of activity	less than 15 mins
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	outdoors (30%)
Domain	professional
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection	99 % *(justification: Use of respiratory protection effectiveness 99%)*

5.10 Contributing Scenario (10) controlling professional worker exposure for PROC 10

Name of contributing scenario	10 - Roller application or brushing
Scenario subtitle	CS 4b Roller application or brushing- long term local indoors
Exposure type	Inhalation: Long-term local Dermal: Long-term systemic
Qualitative Risk Assessment	
General	Reduce concentration to less than 1.5% Ensure good work practices are implemented Supervision in place to check that the RMMs in place are being used correctly and OCs followed. Avoid skin contact. Wear chemically resistant gloves in combination with specific activity training Wear suitable coveralls to prevent exposure to the skin.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 1.5%. It is however set at 100% since the concentration limit of 1.5% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.)*
Process temperature	20 °C
Fugacity / Dustiness	low

Frequency and duration of use	
Duration of activity	1 - 4 hours
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Ventilation	good (30%)
Domain	professional
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 80 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	95 %, burst-time: >4 hours (default) *(justification: Wear chemically resistant gloves in combination with specific activity training.)*
Respiratory protection	95 %

5.11 Contributing Scenario (11) controlling professional worker exposure for PROC 10

Name of contributing scenario	10 - Roller application or brushing
Scenario subtitle	CS 4b Roller application or brushing - short term local indoors
Exposure type	Inhalation: Short-term local Dermal: Qualitative Risk Assessment
Qualitative Risk Assessment	
General	Reduce concentration to less than 1.5% Ensure good work practices are implemented Supervision in place to check that the RMMs in place are being used correctly and OCs followed.
Dermal	Avoid skin contact. Wear chemically resistant gloves in combination with specific activity training Wear suitable coveralls to prevent exposure to the skin.
Product characteristics	
Physical state	liquid

Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 1.5%. It is however set at 100% since the concentration limit of 1.5% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.)*
Process temperature	20 °C
Fugacity / Dustiness	low
Frequency and duration of use	
Duration of activity	less than 15 mins
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Ventilation	good (30%)
Domain	professional
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 80 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection	95 %

5.12 Contributing Scenario (12) controlling professional worker exposure for PROC 11

Name of contributing scenario	11 - Non industrial spraying
Scenario subtitle	CS 5a Professional spraying - long term local outdoors
Exposure type	Inhalation: Long-term local Dermal: Long-term systemic
Qualitative Risk Assessment	
General	Ensure that the task is not carried out overhead. Reduce concentration to less than 1.5% Ensure good work practices are implemented Supervision in place to check that the RMMs in place are being used correctly and OCs followed. Avoid skin contact. Wear chemically resistant gloves in combination with specific activity training Wear suitable coveralls to prevent exposure to the skin.
Product characteristics	

Physical state	liquid
Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 1.5%. It is however set at 100% since the concentration limit of 1.5% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.)*
Process temperature	20 °C
Fugacity / Dustiness	low
Frequency and duration of use	
Duration of activity	less than 15 mins
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	1,500 cm^2
Other given operational conditions affecting workers exposure	
Location	outdoors (30%)
Domain	professional
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	95 %, burst-time: >4 hours (default) *(justification: Wear chemically resistant gloves in combination with specific activity training.)*
Respiratory protection	98 % *(justification: Use of respiratory protection effectiveness 98%)*

Use of external/measured value inhalation	The ART model has been used to estimate inhalative exposure. Exposure value used: the upper limit of the interquartile confidence interval of the 75th percentile estimate. Emission sources: Near field Process temperature: Room temperature Vapour pressure: 20.1 Pa Liquid weight fraction: 1 Activity coefficient: 1 Substance product type: Liquids Situation: Surface spraying of liquids, moderate application rate (0.3 – 3 L/min) Spray direction: Only horizontal or downward Spray technique: Spraying with high compressed air use Primary localized controls: No (0% reduction) Secondary localized controls: No (0 % reduction) Segregation: No (0% reduction) Personal enclosure: No (0% reduction) Effective housekeeping practices in place: No General housekeeping practices in place: No Process fully enclosed: No Work area: Outdoors Source located close to buildings: Yes Duration (mins): 15 Use of respiratory protection effectiveness 98%

5.13 Contributing Scenario (13) controlling professional worker exposure for PROC 11

Name of contributing scenario	11 - Non industrial spraying
Scenario subtitle	CS 5a Professional spraying - short term local outdoors
Exposure type	Inhalation: Short-term local Dermal: Qualitative Risk Assessment
Qualitative Risk Assessment	
General	Ensure that the task is not carried out overhead. Reduce concentration to less than 1.5% Ensure good work practices are implemented Supervision in place to check that the RMMs in place are being used correctly and OCs followed.
Dermal	Avoid skin contact. Wear chemically resistant gloves in combination with specific activity training Wear suitable coveralls to prevent exposure to the skin.
Product characteristics	
Physical state	liquid

Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 1.5%. It is however set at 100% since the concentration limit of 1.5% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.)*
Process temperature	20 °C
Fugacity / Dustiness	low
Frequency and duration of use	
Duration of activity	less than 15 mins
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	1,500 cm^2
Other given operational conditions affecting workers exposure	
Location	outdoors (30%)
Domain	professional
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection	98 % *(justification: Use of respiratory protection with effectiveness 98% necessary for demonstrating safe use during peak exposure events.* *Types of RPE with APF40 include powered-assisted full face masks, hoods and/or helmets.)*
Use of external/measured value inhalation	A peak factor of 2 is used for estimation of short term exposure. Short term exposure estimation based on long term ART scenario described for ES4, CS5a (PROC 11). Exposure value used: upper interquartile confidence limit of the 75th percentile estimate for full shift exposure * peak factor 2.

5.14 Contributing Scenario (14) controlling professional worker exposure for PROC 11

Name of contributing scenario	11 - Non industrial spraying
Scenario subtitle	CS 5b Professional spraying - long term local indoors
Exposure type	Inhalation: Long-term local Dermal: Long-term systemic
Qualitative Risk Assessment	

General	Provide a good standard of controlled ventilation (10 to 15 air changes per hour) Provide extract ventilation to points where emissions occur (LEV). Reduce concentration to less than 1.5% Ensure good work practices are implemented Supervision in place to check that the RMMs in place are being used correctly and OCs followed. Avoid skin contact. Wear chemically resistant gloves in combination with specific activity training Wear suitable coveralls to prevent exposure to the skin.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 1.5%. It is however set at 100% since the concentration limit of 1.5% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.)*
Process temperature	20 °C
Fugacity / Dustiness	low
Frequency and duration of use	
Duration of activity	15 mins to 1 hour
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	1,500 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Ventilation	good (30%)
Domain	professional
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 80 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	95 %, burst-time: >4 hours (default) *(justification: Wear chemically resistant gloves in combination with specific activity training.)*
Respiratory protection	95 %

Use of external/measured value inhalation	The ART model has been used to estimate inhalative exposure. Exposure value used: the upper limit of the interquartile confidence interval of the 75th percentile estimate. Emission sources: Near field Process temperature: Room temperature Vapour pressure: 20.1 Pa Liquid weight fraction: 1 Activity coefficient: 1 Substance product type: Liquids Situation: Surface spraying of liquids, moderate application rate (0.3 – 3 L/min) Spray direction: Only horizontal or downward Spray technique: Spraying with high compressed air use Primary localized controls: Fixed capturing hood (90% reduction) Secondary localized controls: No (0 % reduction) Segregation: No (0% reduction) Personal enclosure: No (0% reduction) Effective housekeeping practices in place: No General housekeeping practices in place: No Process fully enclosed: No Room size: 30 m³ Work area: Indoors Duration (mins): 30 Ventilation rate: Specialised room ventilation with more than 10 ACH Use of respiratory protection effectiveness 95%

5.15 Contributing Scenario (15) controlling professional worker exposure for PROC 11

Name of contributing scenario	11 - Non industrial spraying
Scenario subtitle	CS 5b Professional spraying - short term local indoors
Exposure type	Inhalation: Short-term local Dermal: Qualitative Risk Assessment
Qualitative Risk Assessment	
General	Reduce concentration to less than 1.5% Ensure good work practices are implemented Supervision in place to check that the RMMs in place are being used correctly and OCs followed.
Dermal	Avoid skin contact. Wear chemically resistant gloves in combination with specific activity training Wear suitable coveralls to prevent exposure to the skin.
Product characteristics	
Physical state	liquid

Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 1.5%. It is however set at 100% since the concentration limit of 1.5% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.)*
Process temperature	20 °C
Fugacity / Dustiness	low
Frequency and duration of use	
Duration of activity	less than 15 mins
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	1,500 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Ventilation	good (30%)
Domain	professional
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 80 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection	95 %
Use of external/measured value inhalation	A peak factor of 2 is used for estimation of short term exposure. Short term exposure estimation based on long term ART scenario described for ES4, CS5b (PROC 11). Exposure value used: upper interquartile confidence limit of the 75th percentile estimate for full shift exposure * peak factor 2.

5.16 Contributing Scenario (16) controlling professional worker exposure for PROC 13

Name of contributing scenario	13 - Treatment of articles by dipping and pouring
Scenario subtitle	CS 6 Treatment of articles by dipping and pouring - long term local
Exposure type	Inhalation: Long-term local Dermal: Long-term systemic
Qualitative Risk Assessment	

General	Reduce concentration to less than 1.5% Ensure good work practices are implemented Supervision in place to check that the RMMs in place are being used correctly and OCs followed. Avoid skin contact. Wear chemically resistant gloves in combination with specific activity training Wear suitable coveralls to prevent exposure to the skin.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 1.5%. It is however set at 100% since the concentration limit of 1.5% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.)*
Process temperature	60 °C
Fugacity / Dustiness	low
Frequency and duration of use	
Duration of activity	1 - 4 hours
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Ventilation	good (30%)
Domain	professional
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 80 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	95 %, burst-time: >4 hours (default) *(justification: Wear chemically resistant gloves in combination with specific activity training.)*
Respiratory protection	90 %

5.17 Contributing Scenario (17) controlling professional worker exposure for PROC 13

Name of contributing scenario	13 - Treatment of articles by dipping and pouring
Scenario subtitle	CS 6 Treatment of articles by dipping and pouring - short term local

Exposure type	Inhalation: Short-term local Dermal: Qualitative Risk Assessment
Qualitative Risk Assessment	
General	Reduce concentration to less than 1.5% Ensure good work practices are implemented Supervision in place to check that the RMMs in place are being used correctly and OCs followed.
Dermal	Avoid skin contact. Wear chemically resistant gloves in combination with specific activity training Wear suitable coveralls to prevent exposure to the skin.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 1.5%. It is however set at 100% since the concentration limit of 1.5% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.)*
Process temperature	60 °C
Fugacity / Dustiness	low
Frequency and duration of use	
Duration of activity	less than 15 mins
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Ventilation	good (30%)
Domain	professional
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 80 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection	90 %

5.18 Contributing Scenario (18) controlling professional worker exposure for PROC 15

Name of contributing scenario	15 - Use of laboratory reagents in small scale laboratories

Scenario subtitle	CS 7 Use of laboratory reagents in small scale laboratories - long term local
Exposure type	Inhalation: Long-term local Dermal: Long-term systemic
Qualitative Risk Assessment	
General	Reduce concentration to less than 1.5% Ensure good work practices are implemented Avoid skin contact. Wear chemically resistant gloves in combination with specific activity training Wear suitable coveralls to prevent exposure to the skin.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 1.5%. It is however set at 100% since the concentration limit of 1.5% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.)*
Process temperature	60 °C
Fugacity / Dustiness	low
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	240 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	professional
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	95 %, burst-time: >4 hours (default) *(justification: Wear chemically resistant gloves in combination with specific activity training.)*
Respiratory protection	no
Local exhaust ventilation	inhalation: 99 % *(justification: Local exhaust ventilation (enclosing hood, fume cupboard, 99% reduction).)*

5.19 Contributing Scenario (19) controlling professional worker exposure for PROC 15

Name of contributing scenario	15 - Use of laboratory reagents in small scale laboratories
Scenario subtitle	CS 7 Use of laboratory reagents in small scale laboratories - short term local
Exposure type	Inhalation: Short-term local Dermal: Qualitative Risk Assessment
Qualitative Risk Assessment	
General	Reduce concentration to less than 1.5% Ensure good work practices are implemented
Dermal	Avoid skin contact. Wear chemically resistant gloves in combination with specific activity training Wear suitable coveralls to prevent exposure to the skin.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 1.5%. It is however set at 100% since the concentration limit of 1.5% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.)*
Process temperature	60 °C
Fugacity / Dustiness	low
Frequency and duration of use	
Duration of activity	less than 15 mins
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	240 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	professional
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection	no
Local exhaust ventilation	inhalation: 99 % *(justification: Local exhaust ventilation (enclosing hood, fume cupboard, 99% reduction).)*

5.20 Contributing Scenario (20) controlling professional worker exposure for PROC 16

Name of contributing scenario	16 - Using material as fuel sources, limited exposure to unburned product to be expected
Scenario subtitle	CS 8 Using material as fuel sources, limited exposure to unburned product to be expected - long term local
Exposure type	Inhalation: Long-term local Dermal: Long-term systemic
Qualitative Risk Assessment	
General	Reduce concentration to less than 1.5% Ensure good work practices are implemented Avoid skin contact. Wear chemically resistant gloves in combination with specific activity training Wear suitable coveralls to prevent exposure to the skin.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 1.5%. It is however set at 100% since the concentration limit of 1.5% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.)*
Process temperature	60 °C
Fugacity / Dustiness	low
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	240 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Ventilation	good (30%)
Domain	professional
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 80 %)
Conditions and measures related to personal protection, hygiene and health evaluation	

Protective gloves	95 %, burst-time: >4 hours (default) *(justification: Wear chemically resistant gloves in combination with specific activity training.)*
Respiratory protection	no

5.21 Contributing Scenario (21) controlling professional worker exposure for PROC 16

Name of contributing scenario	16 - Using material as fuel sources, limited exposure to unburned product to be expected
Scenario subtitle	CS 8 Using material as fuel sources, limited exposure to unburned product to be expected - short term local
Exposure type	Inhalation: Short-term local Dermal: Qualitative Risk Assessment
Qualitative Risk Assessment	
General	Reduce concentration to less than 1.5% Ensure good work practices are implemented
Dermal	Avoid skin contact. Wear chemically resistant gloves in combination with specific activity training Wear suitable coveralls to prevent exposure to the skin.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 1.5%. It is however set at 100% since the concentration limit of 1.5% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.)*
Process temperature	60 °C
Fugacity / Dustiness	low
Frequency and duration of use	
Duration of activity	less than 15 mins
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	240 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Ventilation	good (30%)
Domain	professional
Technical conditions and measures to control dispersion and exposure	

Local exhaust ventilation	yes (inhalation 80 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection	no

5.22 Contributing Scenario (22) controlling professional worker exposure for PROC 21

Name of contributing scenario	21 - Low energy manipulation of substances in materials and/or articles
Scenario subtitle	CS 9 Low energy manipulation of substances bound in materials and/or articles - long term local
Exposure type	Inhalation: Long-term local Dermal: Long-term systemic
Qualitative Risk Assessment	
General	Reduce concentration to less than 1.5% Ensure good work practices are implemented Avoid skin contact. Wear chemically resistant gloves in combination with specific activity training Wear suitable coveralls to prevent exposure to the skin.
Product characteristics	
Physical state	solid
Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 1.5%. It is however set at 100% since the concentration limit of 1.5% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.)*
Process temperature	20 °C
Fugacity / Dustiness	high
Frequency and duration of use	
Duration of activity	1 - 4 hours
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	1,980 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Ventilation	good (30%)
Domain	professional
Technical conditions and measures to control dispersion and exposure	

Local exhaust ventilation	yes (inhalation 80 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	95 %, burst-time: >4 hours (default) *(justification: Wear chemically resistant gloves in combination with specific activity training.)*
Respiratory protection	90 %

5.23 Contributing Scenario (23) controlling professional worker exposure for PROC 21

Name of contributing scenario	21 - Low energy manipulation of substances in materials and/or articles
Scenario subtitle	CS 9 Low energy manipulation of substances bound in materials and/or articles- short term local
Exposure type	Inhalation: Short-term local Dermal: Qualitative Risk Assessment
Qualitative Risk Assessment	
General	Reduce concentration to less than 1.5% Ensure good work practices are implemented
Dermal	Avoid skin contact. Wear chemically resistant gloves in combination with specific activity training Wear suitable coveralls to prevent exposure to the skin.
Product characteristics	
Physical state	solid
Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 1.5%. It is however set at 100% since the concentration limit of 1.5% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.)*
Process temperature	20 °C
Fugacity / Dustiness	high
Frequency and duration of use	
Duration of activity	less than 15 mins
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	1,980 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Ventilation	good (30%)

Domain	professional
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 80 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection	90 %

5.24 Contributing Scenario (24) controlling professional worker exposure for PROC 23C

Name of contributing scenario	23c - Open processing and transfer of minerals at elevated temperature - pt > mp - High Fugacity
Scenario subtitle	CS 10 Open processing and transfer operations with minerals/metals at elevated temperature - long term local
Exposure type	Inhalation: Long-term local Dermal: Long-term systemic
Qualitative Risk Assessment	
General	Reduce concentration to less than 1.5% Ensure good work practices are implemented Avoid skin contact. Wear chemically resistant gloves in combination with specific activity training Wear suitable coveralls to prevent exposure to the skin.
Product characteristics	
Physical state	solid
Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 1.5%. It is however set at 100% since the concentration limit of 1.5% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.)*
Process temperature	60 °C
Fugacity / Dustiness	high
Frequency and duration of use	
Duration of activity	1 - 4 hours
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	1,980 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Ventilation	good (30%)

Domain	professional
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 80 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	95 %, burst-time: >4 hours (default) *(justification: Wear chemically resistant gloves in combination with specific activity training.)*
Respiratory protection	90 %

5.25 Contributing Scenario (25) controlling professional worker exposure for PROC 23C

Name of contributing scenario	23c - Open processing and transfer of minerals at elevated temperature - pt > mp - High Fugacity
Scenario subtitle	CS 10 Open processing and transfer operations with minerals/metals at elevated temperature - short term local
Exposure type	Inhalation: Short-term local Dermal: Qualitative Risk Assessment
Qualitative Risk Assessment	
General	Reduce concentration to less than 1.5% Ensure good work practices are implemented
Dermal	Avoid skin contact. Wear chemically resistant gloves in combination with specific activity training Wear suitable coveralls to prevent exposure to the skin.
Product characteristics	
Physical state	solid
Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 1.5%. It is however set at 100% since the concentration limit of 1.5% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.)*
Process temperature	60 °C
Fugacity / Dustiness	high
Frequency and duration of use	
Duration of activity	less than 15 mins
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	1,980 cm^2
Other given operational conditions affecting workers exposure	

Location	indoors
Ventilation	good (30%)
Domain	professional
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 80 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection	90 %

5.26 Contributing Scenario (26) controlling professional worker exposure for PROC 24C

Name of contributing scenario	24c - High (mechanical) energy work-up of substances bound in materials and/or articles - pt > mp - High Fugacity
Scenario subtitle	CS 11 High (mechanical) energy work-up of substances bound in materials and/or articles - long term local
Exposure type	Inhalation: Long-term local Dermal: Long-term systemic
Qualitative Risk Assessment	
General	Reduce concentration to less than 1.5% Ensure good work practices are implemented Avoid skin contact. Wear chemically resistant gloves in combination with specific activity training Wear suitable coveralls to prevent exposure to the skin.
Product characteristics	
Physical state	solid
Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 1.5%. It is however set at 100% since the concentration limit of 1.5% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.)*
Process temperature	20 °C
Fugacity / Dustiness	high
Frequency and duration of use	
Duration of activity	1 - 4 hours
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	1,980 cm^2
Other given operational conditions affecting workers exposure	

Location	indoors
Ventilation	good (30%)
Domain	professional
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 75 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	95 %, burst-time: >4 hours (default) *(justification: Wear chemically resistant gloves in combination with specific activity training.)*
Respiratory protection	95 %

5.27 Contributing Scenario (27) controlling professional worker exposure for PROC 24C

Name of contributing scenario	24c - High (mechanical) energy work-up of substances bound in materials and/or articles - pt > mp - High Fugacity
Scenario subtitle	CS 11 High (mechanical) energy work-up of substances bound in materials and/or articles - short term local
Exposure type	Inhalation: Short-term local Dermal: Qualitative Risk Assessment
Qualitative Risk Assessment	
General	Reduce concentration to less than 1.5% Ensure good work practices are implemented
Dermal	Avoid skin contact. Wear chemically resistant gloves in combination with specific activity training Wear suitable coveralls to prevent exposure to the skin.
Product characteristics	
Physical state	solid
Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 1.5%. It is however set at 100% since the concentration limit of 1.5% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.)*
Process temperature	20 °C
Fugacity / Dustiness	high
Frequency and duration of use	
Duration of activity	less than 15 mins
Frequency of use	5 days / week
Human factors not influenced by risk management	

Exposed skin surface	1,980 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Ventilation	good (30%)
Domain	professional
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 75 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection	95 %

5.28 Contributing Scenario (28) controlling professional worker exposure for PROC 25C

Name of contributing scenario	25c - Hot work operations with metals - pt > mp - High Fugacity
Scenario subtitle	CS 12 Other hot work operations with metals - long term local
Exposure type	Inhalation: Long-term local Dermal: Long-term systemic
Qualitative Risk Assessment	
General	Reduce concentration to less than 1.5% Ensure good work practices are implemented Avoid skin contact. Wear chemically resistant gloves in combination with specific activity training Wear suitable coveralls to prevent exposure to the skin.
Product characteristics	
Physical state	solid
Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 1.5%. It is however set at 100% since the concentration limit of 1.5% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.)*
Process temperature	60 °C
Fugacity / Dustiness	high
Frequency and duration of use	
Duration of activity	1 - 4 hours
Frequency of use	5 days / week
Human factors not influenced by risk management	

Exposed skin surface	1,980 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	professional
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 80 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	95 %, burst-time: >4 hours (default) *(justification: Wear chemically resistant gloves in combination with specific activity training.)*
Respiratory protection	90 %

5.29 Contributing Scenario (29) controlling professional worker exposure for PROC 25C

Name of contributing scenario	25c - Hot work operations with metals - pt > mp - High Fugacity
Scenario subtitle	CS 12 Other hot work operations with metals - short term local
Exposure type	Inhalation: Short-term local Dermal: Qualitative Risk Assessment
Qualitative Risk Assessment	
General	Reduce concentration to less than 1.5% Ensure good work practices are implemented
Dermal	Avoid skin contact. Wear chemically resistant gloves in combination with specific activity training Wear suitable coveralls to prevent exposure to the skin.
Product characteristics	
Physical state	solid
Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 1.5%. It is however set at 100% since the concentration limit of 1.5% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.)*
Process temperature	60 °C
Fugacity / Dustiness	high
Frequency and duration of use	
Duration of activity	less than 15 mins
Frequency of use	5 days / week

Human factors not influenced by risk management	
Exposed skin surface	1,980 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	professional
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 80 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection	90 %

6 Exposure Scenario 5: Professional use of preparations containing formaldehyde up to 5% (ES 5)

This scenario is described by the following combinations of use descriptors. The corresponding contributing scenarios are described in the respective subchapters.
An overall exposure scenario may be described by a number of contributing scenarios which may be subdivided into environmental exposure, worker exposure and consumer exposure.
The following scenarios contribute to the scenario *Professional use of preparations containing formaldehyde up to 5%*.

Table 6 Description of ES 5

Free short title	Professional use of preparations containing formaldehyde up to 5% (ES 5)
Systematic title based on use descriptor	ERC 8A; PROC 8A, 11, 13, 15
Name of contributing environmental scenario and corresponding ERC	ERC 8a Wide dispersive indoor use of processing aids in open systems
Name(s) of contributing worker scenarios and corresponding PROCs	PROC 8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities PROC 11 - Non industrial spraying PROC 13 - Treatment of articles by dipping and pouring PROC 15 - Use of laboratory reagents in small scale laboratories

6.1 Contributing Scenario (1) controlling environmental exposure

As no environmental hazard was identified no environmental-related exposure assessment and risk characterization was performed.

6.2 Contributing Scenario (2) controlling professional worker exposure for PROC 8A

Name of contributing scenario	8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities
Scenario subtitle	CS 1 Transfer of chemicals from/to vessels/ large containers at non-dedicated facilities - long term local
Exposure type	Inhalation: Long-term local Dermal: Long-term systemic
Qualitative Risk Assessment	
General	Reduce concentration to less than 5% Ensure good work practices are implemented Avoid skin contact. Wear chemically resistant gloves in combination with specific activity training Wear suitable coveralls to prevent exposure to the skin.
Eyes	Use suitable eye protection.
Product characteristics	
Physical state	liquid

Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 5%. It is however set at 100% since the concentration limit of 5% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.)*
Process temperature	60 °C
Fugacity / Dustiness	low
Frequency and duration of use	
Duration of activity	1 - 4 hours
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	professional
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 80 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	95 %, burst-time: >4 hours (default) *(justification: Wear chemically resistant gloves in combination with specific activity training.)*
Respiratory protection	95 %

6.3 Contributing Scenario (3) controlling professional worker exposure for PROC 8A

Name of contributing scenario	8a - Transfer of chemicals from/to vessels/ large containers at non dedicated facilities
Scenario subtitle	CS 1 Transfer of chemicals from/to vessels/ large containers at non-dedicated facilities - short term local
Exposure type	Inhalation: Short-term local Dermal: Qualitative Risk Assessment
Qualitative Risk Assessment	
General	Reduce concentration to less than 5% Ensure good work practices are implemented
Eyes	Use suitable eye protection.
Dermal	Avoid skin contact. Wear chemically resistant gloves in combination with specific activity training Wear suitable coveralls to prevent exposure to the skin.

Product characteristics	
Physical state	liquid
Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 5%. It is however set at 100% since the concentration limit of 5% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.)*
Process temperature	60 °C
Fugacity / Dustiness	low
Frequency and duration of use	
Duration of activity	less than 15 mins
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	960 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	professional
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 80 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection	95 %

6.4 Contributing Scenario (4) controlling professional worker exposure for PROC 11

Name of contributing scenario	11 - Non industrial spraying
Scenario subtitle	CS 2 Professional spraying - long term local
Exposure type	Inhalation: Long-term local Dermal: Long-term systemic
Qualitative Risk Assessment	

General	Provide a good standard of controlled ventilation (10 to 15 air changes per hour) Provide extract ventilation to points where emissions occur (LEV). Reduce concentration to less than 5% Ensure good work practices are implemented Supervision in place to check that the RMMs in place are being used correctly and OCs followed. Avoid skin contact. Wear chemically resistant gloves in combination with specific activity training Wear suitable coveralls to prevent exposure to the skin.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 5%. It is however set at 100% since the concentration limit of 1.5% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.)*
Process temperature	20 °C
Fugacity / Dustiness	low
Frequency and duration of use	
Duration of activity	15 mins to 1 hour
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	1,500 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Ventilation	good (30%)
Domain	professional
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 80 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	95 %, burst-time: >4 hours (default) *(justification: Wear chemically resistant gloves in combination with specific activity training.)*
Respiratory protection	95 %
Use of external/measured value inhalation	The ART model has been used to estimate inhalative exposure.

	Exposure value used: the upper limit of the interquartile confidence interval of the 75th percentile estimate. Emission sources: Near field Process temperature: Room temperature Vapour pressure: 31.14 Pa Liquid weight fraction: 1 Activity coefficient: 1 Substance product type: Liquids Situation: Surface spraying of liquids, moderate application rate (0.3 – 3 L/min) Spray direction: Only horizontal or downward Spray technique: Spraying with high compressed air use Primary localized controls: Fixed capturing hood (90% reduction) Secondary localized controls: No (0 % reduction) Segregation: No (0% reduction) Personal enclosure: No (0% reduction) Effective housekeeping practices in place: No General housekeeping practices in place: No Process fully enclosed: No Room size: 30 m³ Work area: Indoors Duration (mins): 30 Ventilation rate: Specialised room ventilation with more than 10 ACH Use of respiratory protection effectiveness 95%

6.5 Contributing Scenario (5) controlling professional worker exposure for PROC 11

Name of contributing scenario	11 - Non industrial spraying
Scenario subtitle	CS 2 Professional spraying - short term local
Exposure type	Inhalation: Short-term local Dermal: Qualitative Risk Assessment
Qualitative Risk Assessment	
General	Reduce concentration to less than 5% Ensure good work practices are implemented Supervision in place to check that the RMMs in place are being used correctly and OCs followed.
Dermal	Avoid skin contact. Wear chemically resistant gloves in combination with specific activity training Wear suitable coveralls to prevent exposure to the skin.
Product characteristics	
Physical state	liquid

Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 1.5%. It is however set at 100% since the concentration limit of 1.5% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.)*
Process temperature	20 °C
Fugacity / Dustiness	low
Frequency and duration of use	
Duration of activity	less than 15 mins
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	1,500 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Ventilation	good (30%)
Domain	professional
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 80 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection	95 %
Use of external/measured value inhalation	A peak factor of 2 is used for estimation of short term exposure. Short term exposure estimation based on long term ART scenario described for ES5, CS2 (PROC 11). Exposure value used: upper interquartile confidence limit of the 75th percentile estimate for full shift exposure * peak factor 2.

6.6 Contributing Scenario (6) controlling professional worker exposure for PROC 13

Name of contributing scenario	13 - Treatment of articles by dipping and pouring
Scenario subtitle	CS 3 Treatment of articles by dipping and pouring - long term local
Exposure type	Inhalation: Long-term local Dermal: Long-term systemic
Qualitative Risk Assessment	

General	Reduce concentration to less than 5% Ensure good work practices are implemented Supervision in place to check that the RMMs in place are being used correctly and OCs followed. Avoid skin contact. Wear chemically resistant gloves in combination with specific activity training Wear suitable coveralls to prevent exposure to the skin.
Eyes	Use suitable eye protection.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 5%. It is however set at 100% since the concentration limit of 5% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.)*
Process temperature	60 °C
Fugacity / Dustiness	low
Frequency and duration of use	
Duration of activity	1 - 4 hours
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Ventilation	good (30%)
Domain	professional
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 80 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	95 %, burst-time: >4 hours (default) *(justification: Wear chemically resistant gloves in combination with specific activity training.)*
Respiratory protection	90 %

6.7 Contributing Scenario (7) controlling professional worker exposure for PROC 13

Name of contributing scenario	13 - Treatment of articles by dipping and pouring

Scenario subtitle	CS 3 Treatment of articles by dipping and pouring - short term local
Exposure type	Inhalation: Short-term local Dermal: Qualitative Risk Assessment
Qualitative Risk Assessment	
General	Supervision in place to check that the RMMs in place are being used correctly and OCs followed. Reduce concentration to less than 5% Ensure good work practices are implemented
Dermal	Avoid skin contact. Wear suitable coveralls to prevent exposure to the skin. Wear chemically resistant gloves in combination with specific activity training
Product characteristics	
Physical state	liquid
Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 5%. It is however set at 100% since the concentration limit of 5% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.)*
Process temperature	60 °C
Fugacity / Dustiness	low
Frequency and duration of use	
Duration of activity	less than 15 mins
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	480 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	professional
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	yes (inhalation 80 %)
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection	90 %

6.8 Contributing Scenario (8) controlling professional worker exposure for PROC 15

Name of contributing scenario	15 - Use of laboratory reagents in small scale laboratories

Scenario subtitle	CS 4 Use of laboratory reagents in small scale laboratories - long term local
Exposure type	Inhalation: Long-term local Dermal: Long-term systemic
Qualitative Risk Assessment	
General	Reduce concentration to less than 5% Ensure good work practices are implemented Avoid skin contact. Wear chemically resistant gloves in combination with specific activity training Wear suitable coveralls to prevent exposure to the skin.
Eyes	Use suitable eye protection.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 5%. It is however set at 100% since the concentration limit of 5% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.)*
Process temperature	60 °C
Fugacity / Dustiness	low
Frequency and duration of use	
Duration of activity	>4 hours (default)
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	240 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	professional
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Protective gloves	95 %, burst-time: >4 hours (default) *(justification: Wear chemically resistant gloves in combination with specific activity training.)*
Respiratory protection	no
Local exhaust ventilation	inhalation: 99 % *(justification: Local exhaust ventilation (enclosing hood, fume cupboard, 99% reduction).)*

6.9 Contributing Scenario (9) controlling professional worker exposure for PROC 15

Name of contributing scenario	15 - Use of laboratory reagents in small scale laboratories
Scenario subtitle	CS 4 Use of laboratory reagents in small scale laboratories - short term local
Exposure type	Inhalation: Short-term local Dermal: Qualitative Risk Assessment
Qualitative Risk Assessment	
General	Reduce concentration to less than 5% Ensure good work practices are implemented
Eyes	Use suitable eye protection.
Dermal	Avoid skin contact. Wear chemically resistant gloves in combination with specific activity training Wear suitable coveralls to prevent exposure to the skin.
Product characteristics	
Physical state	liquid
Concentration in substance	100 %, concentration has been considered linearly *(justification: The actual percentage formaldehyde used this contributing scenario is 5%. It is however set at 100% since the concentration limit of 5% has already been taken into account in the vapour pressure settings. See Ch 9.0 Introduction to the assessment for a detailed explanation.)*
Process temperature	60 °C
Fugacity / Dustiness	low
Frequency and duration of use	
Duration of activity	less than 15 mins
Frequency of use	5 days / week
Human factors not influenced by risk management	
Exposed skin surface	240 cm^2
Other given operational conditions affecting workers exposure	
Location	indoors
Domain	professional
Technical conditions and measures to control dispersion and exposure	
Local exhaust ventilation	no
Conditions and measures related to personal protection, hygiene and health evaluation	
Respiratory protection	no
Local exhaust ventilation	inhalation: 99 % *(justification: Local exhaust ventilation (enclosing hood, fume cupboard, 99% reduction).)*