ConnectingChemistry

BRENNTAG

Sicherheitsdatenblatt
FORMALDEHYD 40 VOL.%

Material Safety Data Sheet
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Fiche de Données de Sécurité / Fiche Signalétique
FORMALDEHYDE 40% VOL.

Hersteller/Lieferant
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Emergency telephone number, Swiss Toxicological Information Centre
Numéro d'appel d'urgence, Centre Suisse d'Information Toxicologique

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Nationale Notrufnummer
National Emergency Telephone Number
Numéro National d'Appel en cas d'Urgence

Tel. 145

8. Begrenzung und Überwachung der Exposition/Persönliche Schutzausrüstungen
Exposure controls/personal protection
Contrôles de l'exposition/ protection individuelle

Inhaltsstoff:	Formaldehyd	CAS-Nr.:	50-00-0

Arbeitsplatzgrenzwerte

SUVA, Kurzzeitiger Expositionsgrenzwert (STEL):
0,6 ppm, 0,74 mg/m3

SUVA, Zeitgewichteter Durchschnitt
0,3 ppm, 0,37 mg/m3

SUVA
Ein Risiko der Fruchtschädigung braucht bei Einhaltung des Arbeitsplatzgrenzwertes und des biologischen Grenzwertes (BGW) nicht befürchtet zu werden.

Component:	formaldehyde	CAS-No.:	50-00-0

Occupational Exposure Limits

SUVA, Short Term Exposure Limit (STEL):
0,6 ppm, 0,74 mg/m3

SUVA, Time Weighted Average (TWA):
0,3 ppm, 0,37 mg/m3

SUVA
If in compliance with the OEL and BEL values, then there should be no risk of reproductive damage.

Composant:	formaldéhyde	No.-CAS:	50-00-0

Limites d'exposition professionnelle

SUVA, Seuil limite d'exposition à court terme (STEL)
0,6 ppm, 0,74 mg/m3

SUVA, Limite d'exposition pondérée dans le temps (VME):
0,3 ppm, 0,37 mg/m3

SUVA
Aucun risque pour l'embryon si les valeurs de AGW et de BGW sont respectées.

Inhaltsstoff:	Methanol	CAS-Nr.:	67-56-1

Arbeitsplatzgrenzwerte

EU ELV, Zeitlich gewichteter Mittelwert (TWA):
200 ppm, 260 mg/m3
Indikativ

SUVA, Zeitgewichteter Durchschnitt
200 ppm, 260 mg/m3

SUVA
Ein Risiko der Fruchtschädigung braucht bei Einhaltung des Arbeitsplatzgrenzwertes und des biologischen Grenzwertes (BGW) nicht befürchtet zu werden.

SUVA, Angabe zur Haut:
Kann durch die Haut absorbiert werden.

SUVA, Kurzzeitiger Expositionsgrenzwert (STEL):
800 ppm, 1.040 mg/m3

Biologische Grenzwerte

CH BAT, Methanol, Urin
30 mg/l, Probenahmezeit: c) Langzeitexposition nach mehreren (4-5) Arbeitsschichten. b) Ende der Exposition/Schichtende.

Component:	methanol	CAS-No.:	67-56-1

Occupational Exposure Limits

EU ELV, Time Weighted Average (TWA):
200 ppm, 260 mg/m3
Indicative

SUVA, Time Weighted Average (TWA):
200 ppm, 260 mg/m3

SUVA
If in compliance with the OEL and BEL values, then there should be no risk of reproductive damage.

SUVA, Skin designation:
Can be absorbed through the skin.

SUVA, Short Term Exposure Limit (STEL):
800 ppm, 1.040 mg/m3

Biological Exposure Indices

CH BAT, methanol, Urine
30 mg/l, Sampling time: c) Long term exposure after several (4-5) work shifts. b) End of exposure / end of shift.

Composant:	méthanol	No.-CAS:	67-56-1

Limites d'exposition professionnelle

EU ELV, Limite d'exposition pondérée dans le temps (TWA):
200 ppm, 260 mg/m3
Indicatif

SUVA, Limite d'exposition pondérée dans le temps (VME):
200 ppm, 260 mg/m3

SUVA
Aucun risque pour l'embryon si les valeurs de AGW et de BGW sont respectées.

SUVA, Désignation de la peau:
Peut être absorbé à travers la peau.

SUVA, Seuil limite d'exposition à court terme (STEL)
800 ppm, 1.040 mg/m3

Indices d'exposition biologique

CH BAT, methanol, Urine
30 mg/l, Durée de prélèvement: c) L'exposition à long terme après plusieurs (4-5) quarts de travail. b) Fin de l'exposition / fin d'un quart de travail.

15. Rechtsvorschriften
Regulatory information
Informations relatives à la réglementation

CPID	:	276876-81
Mengenschwelle nach StFV	:	200 kg
Threshold quantity MAO		
Seulis quantitafis OPAM		

ChemRRV
ORRChem

ORRChim

Anhang Annex Annexe	:	Anhang 1.10: Krebserzeugende, erbgutverändernde und fortpflanzungsgefährdende Stoffe Anhang 1.11: Gefährliche flüssige Stoffe Annex 1.10: Carcinogenic, mutagenic and reproductive toxic substances Annex 1.11: Hazardous liquids Annexe 1.10: Substances cancérogènes, mutagènes et toxiques pour la reproduction Annexe 1.11: Substances liquides dangereuses

Formaldehyd 37% mit 11% Methanol

Version	Überarbeitet am:	SDB-Nummer:	Datum der letzten Ausgabe: 26.10.2018
4.3	17.12.2018	427779-00009	Datum der ersten Ausgabe: 21.12.2015

ABSCHNITT 1: Bezeichnung des Stoffs beziehungsweise des Gemischs und des Unternehmens

1.1 Produktidentifikator

Handelsname : Formaldehyd 37% mit 11% Methanol

Produktnummer : 22.6120.3711.

1.2 Relevante identifizierte Verwendungen des Stoffs oder Gemischs und Verwendungen, von denen abgeraten wird

Verwendung des Stoffs/des Gemisches : Chemikalie

1.3 Einzelheiten zum Lieferanten, der das Sicherheitsdatenblatt bereitstellt

Firma : INEOS Paraform GmbH & Co. KG
Hauptstraße 30
55120 Mainz, Germany

Telefon : +49 6131 621 114

E-Mailadresse der für SDB verantwortlichen Person : sdb-paraform@ineos.com

1.4 Notrufnummer

Emergency telephone number (24 h / 365 d):
Europe: +49 6132 84463 (GBK ID 92706)
Rest of World: +1 352 323 3500 (GBK/Infotrac ID 92706)

ABSCHNITT 2: Mögliche Gefahren

2.1 Einstufung des Stoffs oder Gemischs

Einstufung (VERORDNUNG (EG) Nr. 1272/2008)

Akute Toxizität, Kategorie 3	H301: Giftig bei Verschlucken.
Akute Toxizität, Kategorie 2	H330: Lebensgefahr bei Einatmen.
Akute Toxizität, Kategorie 3	H311: Giftig bei Hautkontakt.
Ätzwirkung auf die Haut, Unterkategorie 1B	H314: Verursacht schwere Verätzungen der Haut und schwere Augenschäden.
Schwere Augenschädigung, Kategorie 1	H318: Verursacht schwere Augenschäden.
Sensibilisierung durch Hautkontakt, Kategorie 1	H317: Kann allergische Hautreaktionen verursachen.
Keimzell-Mutagenität, Kategorie 2	H341: Kann vermutlich genetische Defekte verursachen.

Karzinogenität, Kategorie 1B	H350: Kann Krebs erzeugen.
Spezifische Zielorgan-Toxizität - einmalige Exposition, Kategorie 1	H370: Schädigt die Organe.
Spezifische Zielorgan-Toxizität - einmalige Exposition, Kategorie 3	H335: Kann die Atemwege reizen.

2.2 Kennzeichnungselemente

Kennzeichnung (VERORDNUNG (EG) Nr. 1272/2008)

Gefahrenpiktogramme :

Signalwort : Gefahr

Gefahrenhinweise :
H301 + H311 Giftig bei Verschlucken oder Hautkontakt.
H314 Verursacht schwere Verätzungen der Haut und schwere Augenschäden.
H317 Kann allergische Hautreaktionen verursachen.
H330 Lebensgefahr bei Einatmen.
H335 Kann die Atemwege reizen.
H341 Kann vermutlich genetische Defekte verursachen.
H350 Kann Krebs erzeugen.
H370 Schädigt die Organe.

Sicherheitshinweise :

Prävention:

P201 Vor Gebrauch besondere Anweisungen einholen.
P280 Schutzhandschuhe/ Schutzkleidung/ Augenschutz/ Gesichtsschutz tragen.

Reaktion:

P304 + P340 + P310 BEI EINATMEN: Die Person an die frische Luft bringen und für ungehinderte Atmung sorgen. Sofort GIFTINFORMATIONSZENTRUM/Arzt anrufen.
P305 + P351 + P338 + P310 BEI KONTAKT MIT DEN AUGEN: Einige Minuten lang behutsam mit Wasser spülen. Eventuell vorhandene Kontaktlinsen nach Möglichkeit entfernen. Weiter spülen. Sofort GIFTINFORMATIONSZENTRUM/Arzt anrufen.
P308 + P311 BEI Exposition oder falls betroffen: GIFTINFORMATIONSZENTRUM/Arzt anrufen.

Lagerung:

P403 + P233 An einem gut belüfteten Ort aufbewahren. Behälter dicht verschlossen halten.

Gefahrenbestimmende Komponente(n) zur Etikettierung:
Formaldehyd

Methanol

2.3 Sonstige Gefahren

Dämpfe können mit Luft ein explosionsfähiges Gemisch bilden.

ABSCHNITT 3: Zusammensetzung/Angaben zu Bestandteilen

3.2 Gemische

Inhaltsstoffe

Chemische Bezeichnung	CAS-Nr. EG-Nr. INDEX-Nr. Registrierungsnummer	Einstufung	Konzentration (% w/w)
Formaldehyd	50-00-0 200-001-8 605-001-00-5 01-2119488953-20-0008	Acute Tox.3; H301 Acute Tox.2; H330 Acute Tox.3; H311 Skin Corr.1B; H314 Eye Dam.1; H318 Skin Sens.1A; H317 Muta.2; H341 Carc.1B; H350 STOT SE3; H335	>= 30 - < 50
Methanol	67-56-1 200-659-6 603-001-00-X 01-2119433307-44	Flam. Liq.2; H225 Acute Tox.3; H301 Acute Tox.3; H331 Acute Tox.3; H311 STOT SE1; H370	>= 10 - < 20

Die Erklärung der Abkürzungen finden Sie unter Abschnitt 16.

ABSCHNITT 4: Erste-Hilfe-Maßnahmen

4.1 Beschreibung der Erste-Hilfe-Maßnahmen

Allgemeine Hinweise : Bei Unfall oder Unwohlsein sofort Arzt zuziehen.
Wenn die Symptome anhalten oder falls irgendein Zweifel besteht, ärztlichen Rat einholen.

Schutz der Ersthelfer : Erstversorger sollten auf Selbstschutz achten und die empfohlene persönliche Schutzkleidung verwenden, wenn ein Expositionsrisiko besteht.

Nach Einatmen : Bei Inhalation, an die frische Luft bringen.
Bei Atemstillstand, künstlich beatmen.
Bei Atemschwierigkeiten, Sauerstoff verabreichen.
Sofort Arzt hinzuziehen.

Nach Hautkontakt : Bei Kontakt, Haut sofort mit viel Wasser während mindestens 15 Minuten abspülen und dabei verunreinigte Kleidung und Schuhe ausziehen.
Sofort Arzt hinzuziehen.
Beschmutzte Kleidung vor Wiedergebrauch waschen.

Schuhe vor der Wiederverwendung gründlich reinigen.

Nach Augenkontakt : Bei Kontakt, Augen sofort mit viel Wasser während mindestens 15 Minuten ausspülen.
Vorhandene Kontaktlinsen, wenn möglich, entfernen.
Sofort Arzt hinzuziehen.

Nach Verschlucken : Bei Verschlucken, KEIN Erbrechen hervorrufen.
Wenn es zum Erbrechen kommt, betroffene Person nach vorne beugen lassen.
Sofort einen Arzt oder ein Behandlungszentrum für Vergiftungsfälle verständigen.
Mund gründlich mit Wasser ausspülen.
Nie einer ohnmächtigen Person etwas durch den Mund einflößen.

4.2 Wichtigste akute und verzögert auftretende Symptome und Wirkungen

Risiken : Giftig bei Verschlucken oder Hautkontakt.
Kann allergische Hautreaktionen verursachen.
Verursacht schwere Augenschäden.
Lebensgefahr bei Einatmen.
Kann die Atemwege reizen.
Kann vermutlich genetische Defekte verursachen.
Kann Krebs erzeugen.
Schädigt die Organe.
Verursacht schwere Verätzungen.

Verursacht Verätzungen des Verdauungstrakts.

4.3 Hinweise auf ärztliche Soforthilfe oder Spezialbehandlung

Behandlung : Symptomatisch und unterstützend behandeln.

ABSCHNITT 5: Maßnahmen zur Brandbekämpfung

5.1 Löschmittel

Geeignete Löschmittel : Wassernebel
Alkoholbeständiger Schaum
Kohlendioxid (CO_2)
Trockenlöschmittel

Ungeeignete Löschmittel : Wasservollstrahl

5.2 Besondere vom Stoff oder Gemisch ausgehende Gefahren

Besondere Gefahren bei der Brandbekämpfung : Keinen Wasservollstrahl verwenden, um eine Zerstreuung und Ausbreitung des Feuers zu unterdrücken.
Rückzündung auf große Entfernung möglich.
Dämpfe können mit Luft explosionsfähige Gemische bilden.
Kontakt mit Verbrennungsprodukten kann gesundheitsgefährdend sein.

Gefährliche Verbrennungsprodukte	:	Kohlenstoffoxide

5.3 Hinweise für die Brandbekämpfung

Besondere Schutzausrüstung für die Brandbekämpfung	:	Im Brandfall umgebungsluftunabhängiges Atemschutzgerät tragen. Persönliche Schutzausrüstung verwenden.
Spezifische Löschmethoden	:	Löschmaßnahmen auf die Umgebung abstimmen. Zur Kühlung geschlossener Behälter Wassersprühstrahl einsetzen. Entfernen Sie unbeschädigte Behälter aus dem Brandbereich, wenn dies sicher ist. Umgebung räumen.

ABSCHNITT 6: Maßnahmen bei unbeabsichtigter Freisetzung

6.1 Personenbezogene Vorsichtsmaßnahmen, Schutzausrüstungen und in Notfällen anzuwendende Verfahren

Personenbezogene Vorsichtsmaßnahmen	:	Personen in Sicherheit bringen. Nur geschultes Personal sollte den Bereich wieder betreten. Alle Zündquellen entfernen. Empfehlungen zur sicheren Handhabung und zur persönlichen Schutzausrüstung befolgen.

6.2 Umweltschutzmaßnahmen

Umweltschutzmaßnahmen	:	Ein Eintrag in die Umwelt ist zu vermeiden. Weiteres Auslaufen oder Verschütten verhindern, wenn dies ohne Gefahr möglich ist. Ausbreitung über große Flächen verhindern (z.B. durch Eindämmen oder Ölsperren). Verunreinigtes Waschwasser zurückhalten und entsorgen. Wenn größere Mengen verschütteten Materials nicht eingedämmt werden können, sollen die lokalen Behörden benachrichtigt werden.

6.3 Methoden und Material für Rückhaltung und Reinigung

Reinigungsverfahren	:	Funkensichere Werkzeuge verwenden. Mit inertem Aufsaugmittel aufnehmen. Gase/Dämpfe/Nebel mit Wassersprühstrahl niederschlagen. Bei großflächiger Verschmutzung, mit Gräben oder anderen Eindämmungsmaßnahmen weitere Verbreitung des Stoffes verhindern. Wenn Material aus den Gräben abgepumpt werden kann, dieses Material in geeigneten Behältern lagern. Restliches Material aus der verschmutzten Zone mit geeignetem Bindemittel beseitigen. Lokale oder nationale Richtlinien können für Freisetzung und Entsorgung des Stoffes gelten, ebenso für die bei der Beseitigung von freigesetztem Material verwendeten Stoffe und Gegenstände. Man muss ermitteln, welche dieser Richtlinien

anzuwenden sind.
Abschnitt 13 und 15 dieses SDBs liefern Informationen bezüglich bestimmter lokaler oder nationaler Vorschriften.

6.4 Verweis auf andere Abschnitte

Siehe Abschnitte: 7, 8, 11, 12 und 13.

ABSCHNITT 7: Handhabung und Lagerung

7.1 Schutzmaßnahmen zur sicheren Handhabung

Technische Maßnahmen	:	Siehe technische Maßnahmen im Abschnitt "Begrenzung und Überwachung der Exposition/Persönliche Schutzausrüstungen".
Lokale Belüftung / Volllüftung	:	Unter lokaler Absaugung der Abluft einsetzen.
Hinweise zum sicheren Umgang	:	Nicht auf die Haut oder die Kleidung gelangen lassen. Dämpfe und Sprühnebel nicht einatmen. Nicht verschlucken. Berührung mit den Augen vermeiden. Basierend auf den Ergebnissen der Bewertung der Exposition am Arbeitsplatz gemäß den üblichen industriellen Hygiene- und Sicherheitspraktiken handhaben Behälter dicht verschlossen halten. Bereits sensibilisierte Personen sollten ihren Arzt hinsichtlich des Arbeitens mit atemwegsreizenden oder sensibilisierenden Stoffen konsultieren. Von Hitze- und Zündquellen fernhalten. Maßnahmen gegen elektrostatische Aufladungen treffen. Massnahmen zu Vermeidung von Abfällen/unkontrolliertem Eintrag in die Umwelt sollten getroffen werden.
Hygienemaßnahmen	:	Sicherstellen, dass sich Augenspülanlagen und Sicherheitsduschen nahe beim Arbeitsplatz befinden. Bei der Arbeit nicht essen, trinken, rauchen. Beschmutzte Kleidung vor Wiedergebrauch waschen.

7.2 Bedingungen zur sicheren Lagerung unter Berücksichtigung von Unverträglichkeiten

Anforderungen an Lagerräume und Behälter	:	In korrekt beschrifteten Behältern aufbewahren. Unter Verschluss aufbewahren. Dicht verschlossen halten. Kühl an einem gut belüfteten Ort aufbewahren. In Übereinstimmung mit den besonderen nationalen gesetzlichen Vorschriften lagern. Von Hitze- und Zündquellen fernhalten.
Zusammenlagerungshinweise	:	Nicht mit den folgenden Produktarten lagern: Starke Oxidationsmittel Organische Peroxide Entzündbare Flüssigkeiten Entzündbare Feststoffe Pyrophore Flüssigkeiten Pyrophore Feststoffe Selbsterhitzungsfähige Stoffe und Gemische

Stoffe und Gemische, die in Berührung mit Wasser entzündbare Gase entwickeln
Sprengstoffe
Gase

7.3 Spezifische Endanwendungen

Bestimmte Verwendung(en) : Keine Daten verfügbar

ABSCHNITT 8: Begrenzung und Überwachung der Exposition/Persönliche Schutzausrüstungen

8.1 Zu überwachende Parameter

Arbeitsplatzgrenzwerte

Inhaltsstoffe	CAS-Nr.	Werttyp (Art der Exposition)	Zu überwachende Parameter	Grundlage
Formaldehyd	50-00-0	KZGW	0,6 ppm 0,74 mg/m³	CH SUVA
Weitere Information	Kein erhöhtes Krebsrisiko bei Einhalten des MAK-Werts, Sensibilisatoren, die mit S gekennzeichneten Substanzen führen besonders häufig zu Überempfindlichkeitsreaktionen (allergischen Krankheiten)., Krebserzeugende Stoffe Kategorie 2, National Institute for Occupational Safety and Health, Occupational Safety and Health Administration, Deutsche Forschungsgemeinschaft, Health and Safety Executive (Occupational Medicine and Hygiene Laboratory), Eine Schädigung der Leibesfrucht braucht bei Einhaltung des MAK-Wertes nicht befürchtet zu werden.			
		MAK-Wert	0,3 ppm 0,37 mg/m³	CH SUVA
Weitere Information	Kein erhöhtes Krebsrisiko bei Einhalten des MAK-Werts, Sensibilisatoren, die mit S gekennzeichneten Substanzen führen besonders häufig zu Überempfindlichkeitsreaktionen (allergischen Krankheiten)., Krebserzeugende Stoffe Kategorie 2, National Institute for Occupational Safety and Health, Occupational Safety and Health Administration, Deutsche Forschungsgemeinschaft, Health and Safety Executive (Occupational Medicine and Hygiene Laboratory), Eine Schädigung der Leibesfrucht braucht bei Einhaltung des MAK-Wertes nicht befürchtet zu werden.			
Methanol	67-56-1	MAK-Wert	200 ppm 260 mg/m³	CH SUVA
Weitere Information	Vergiftung durch Hautresorption möglich; Bei Stoffen, welche die Haut leicht zu durchdringen vermögen, kann durch die zusätzliche Hautresorption die innere Belastung wesentlich höher werden als bei alleiniger Aufnahme durch die Atemwege., National Institute for Occupational Safety and Health, Institut National de Recherche et de Sécurité pour la prévention des accidents du travail et des maladies professionnelles, Eine Schädigung der Leibesfrucht braucht bei Einhaltung des MAK-Wertes nicht befürchtet zu werden.			
		KZGW	800 ppm 1.040 mg/m³	CH SUVA
Weitere Information	Vergiftung durch Hautresorption möglich; Bei Stoffen, welche die Haut leicht zu durchdringen vermögen, kann durch die zusätzliche Hautresorption die innere Belastung wesentlich höher werden als bei alleiniger Aufnahme durch die Atemwege., National Institute for Occupational Safety and Health, Institut			

	National de Recherche et de Sécurité pour la prévention des accidents du travail et des maladies professionnelles, Eine Schädigung der Leibesfrucht braucht bei Einhaltung des MAK-Wertes nicht befürchtet zu werden.			
		TWA	200 ppm 260 mg/m³	2006/15/EC
Weitere Information	Indikativ, Zeigt die Möglichkeit an, dass größere Mengen des Stoffs durch die Haut aufgenommen werden			

Biologischer Arbeitsplatzgrenzwert

Stoffname	CAS-Nr.	Zu überwachende Parameter	Probennahmezeitpunkt	Grundlage
Methanol	67-56-1	Methanol: 30 mg/l (Urin)	Expositionsende, bzw. Schichtende, bei Langzeitexposition: nach mehreren vorangegangenen Schichten	CH BAT
		Methanol: 936 µmol/l (Urin)	Expositionsende, bzw. Schichtende, bei Langzeitexposition: nach mehreren vorangegangenen Schichten	CH BAT

Abgeleitete Expositionshöhe ohne Beeinträchtigung (DNEL) gemäß Verordnung (EG) Nr. 1907/2006:

Stoffname	Anwendungsbereich	Expositionswege	Mögliche Gesundheitsschäden	Wert
Formaldehyd	Arbeitnehmer	Einatmung	Langzeit - systemische Effekte	9 mg/m³
	Arbeitnehmer	Einatmung	Langzeit - lokale Effekte	0,375 mg/m³
	Arbeitnehmer	Hautkontakt	Langzeit - systemische Effekte	240 mg/kg Körpergewicht/Tag
	Arbeitnehmer	Einatmung	Akut - lokale Effekte	0,75 mg/m³
	Verbraucher	Einatmung	Langzeit - systemische Effekte	3,2 mg/m³
	Verbraucher	Hautkontakt	Langzeit - systemische Effekte	102 mg/kg Körpergewicht/Tag
	Verbraucher	Verschlucken	Langzeit - systemische Effekte	4,1 mg/kg Körpergewicht/Tag
	Arbeitnehmer	Hautkontakt	Langzeit - lokale Effekte	0,037 mg/cm²
	Verbraucher	Einatmung	Langzeit - lokale Effekte	0,1 mg/m³
	Verbraucher	Hautkontakt	Langzeit - lokale Effekte	0,012 mg/cm²
Methanol	Arbeitnehmer	Einatmung	Langzeit - systemische Effekte	260 mg/m³
	Arbeitnehmer	Einatmung	Akut - systemische	260 mg/m³

			Effekte	
	Arbeitnehmer	Einatmung	Langzeit - lokale Effekte	260 mg/m³
	Arbeitnehmer	Einatmung	Akut - lokale Effekte	260 mg/m³
	Arbeitnehmer	Hautkontakt	Langzeit - systemische Effekte	40 mg/kg Körpergewicht/Tag
	Arbeitnehmer	Hautkontakt	Akut - systemische Effekte	40 mg/kg Körpergewicht/Tag
	Verbraucher	Einatmung	Langzeit - systemische Effekte	50 mg/m³
	Verbraucher	Einatmung	Akut - systemische Effekte	50 mg/m³
	Verbraucher	Einatmung	Langzeit - lokale Effekte	50 mg/m³
	Verbraucher	Einatmung	Akut - lokale Effekte	50 mg/m³
	Verbraucher	Hautkontakt	Langzeit - systemische Effekte	8 mg/kg Körpergewicht/Tag
	Verbraucher	Hautkontakt	Akut - systemische Effekte	8 mg/kg Körpergewicht/Tag
	Verbraucher	Verschlucken	Langzeit - systemische Effekte	8 mg/kg Körpergewicht/Tag
	Verbraucher	Verschlucken	Akut - systemische Effekte	8 mg/kg Körpergewicht/Tag

Abgeschätzte Nicht-Effekt-Konzentration (PNEC) gemäß Verordnung (EG) Nr. 1907/2006:

Stoffname	Umweltkompartiment	Wert
Formaldehyd	Süßwasser	0,44 mg/l
	Meerwasser	0,44 mg/l
	Zeitweise Verwendung/Freisetzung	4,44 mg/l
	Abwasserkläranlage	0,19 mg/l
	Süßwassersediment	2,3 mg/kg
	Meeressediment	2,3 mg/kg
	Boden	0,2 mg/kg
Methanol	Süßwasser	20,8 mg/l
	Meerwasser	2,08 mg/l
	Zeitweise Verwendung/Freisetzung	1540 mg/l
	Abwasserkläranlage	100 mg/l
	Süßwassersediment	77 mg/kg
	Meeressediment	7,7 mg/kg
	Boden	100 mg/kg

8.2 Begrenzung und Überwachung der Exposition

Technische Schutzmaßnahmen

Expositionskonzentrationen am Arbeitsplatz minimieren.
Unter lokaler Absaugung der Abluft einsetzen.

Persönliche Schutzausrüstung

Augenschutz	:	Folgende persönliche Schutzausrüstung tragen: Chemikalienbeständige Schutzbrillen müssen getragen werden. Falls Spritzer möglich sind, Folgendes tragen: Gesichtsschutzschild
Handschutz		
Material	:	Nitrilkautschuk
Durchbruchzeit	:	120 - < 240 min
Handschuhdicke	:	0,425 mm
Richtlinie	:	DIN EN 374
Schutzindex	:	Klasse 4
Material	:	Butylkautschuk
Durchbruchzeit	:	> 480 min
Handschuhdicke	:	0,3 mm
Richtlinie	:	DIN EN 374
Schutzindex	:	Klasse 6
Material	:	Fluorkautschuk
Durchbruchzeit	:	> 480 min
Handschuhdicke	:	0,7 mm
Richtlinie	:	DIN EN 374
Schutzindex	:	Klasse 6
Anmerkungen	:	Chemikalienschutzhandschuhe sind in ihrer Ausführung in Abhängigkeit von Gefahrstoffkonzentration und -menge arbeitsplatzspezifisch auszuwählen. Es wird empfohlen, die Chemikalienbeständigkeit der oben genannten Schutzhandschuhe für spezielle Anwendungen mit dem Handschuhhersteller abzuklären. Vor den Pausen und bei Arbeitsende Hände waschen.
Haut- und Körperschutz	:	Angemessene Schutzkleidung basierend auf den Angaben zur chemischen Beständigkeit und einer Bewertung der potenziellen Exposition vor Ort wählen. Folgende persönliche Schutzausrüstung tragen: Flammhemmende antistatische Schutzkleidung, es sei denn, dass eine Bewertung ergibt, dass das Risiko explosiver Atmosphären oder Brände gering ist Hautkontakt mittels undurchdringlicher Schutzkleidung vermeiden (Handschuhe, Schürzen, Stiefel etc.).
Atemschutz	:	Atemschutz verwenden, außer wenn geeignete lokale Abgasableitung vorhanden ist oder eine Expositionsbeurteilung zeigt, dass die Exposition im Rahmen der einschlägigen Richtlinien liegt. Empfohlener Filtertyp: ABEK-P3-Filter

ABSCHNITT 9: Physikalische und chemische Eigenschaften

9.1 Angaben zu den grundlegenden physikalischen und chemischen Eigenschaften

Aussehen	:	flüssig
Farbe	:	farblos
Geruch	:	beißend
Geruchsschwelle	:	Keine Daten verfügbar
pH-Wert	:	Keine Daten verfügbar
Schmelzpunkt/Gefrierpunkt	:	< -15 °C
Siedebeginn und Siedebereich	:	ca. 97 °C
Flammpunkt	:	66 - 73 °C
Verdampfungsgeschwindigkeit	:	Keine Daten verfügbar
Entzündbarkeit (fest, gasförmig)	:	Nicht anwendbar
Obere Explosionsgrenze / Obere Entzündbarkeitsgrenze	:	72 %(V)
Untere Explosionsgrenze / Untere Entzündbarkeitsgrenze	:	7 %(V)
Dampfdruck	:	1 hPa (20 °C)
Relative Dampfdichte	:	Keine Daten verfügbar
Dichte	:	1,08 - 1,10 g/cm³ (20 °C)
Löslichkeit(en)		
Wasserlöslichkeit	:	vollkommen löslich
Verteilungskoeffizient: n-Octanol/Wasser	:	log Pow: 0,35
Selbstentzündungstemperatur	:	380 °C (1.013 hPa) Methode: DIN 51794
Zersetzungstemperatur	:	Der Stoff oder das Gemisch ist nicht als selbstreagierend eingestuft.
Viskosität		
Viskosität, dynamisch	:	1,8 - 2,5 mPa.s (25 °C)

Methode: DIN 51562

Viskosität, kinematisch : Keine Daten verfügbar

Explosive Eigenschaften : Nicht explosiv

Oxidierende Eigenschaften : Der Stoff oder das Gemisch ist nicht eingestuft als oxidierend.

9.2 Sonstige Angaben

Entzündbarkeit (Flüssigkeiten) : Keine Daten verfügbar

Partikelgröße : Nicht anwendbar

ABSCHNITT 10: Stabilität und Reaktivität

10.1 Reaktivität

Nicht als reaktionsgefährlich eingestuft.

10.2 Chemische Stabilität

Stabil unter normalen Bedingungen.

10.3 Möglichkeit gefährlicher Reaktionen

Gefährliche Reaktionen : Brennbare Flüssigkeit.
Dämpfe können mit Luft ein explosionsfähiges Gemisch bilden.
Reaktionsfähig mit starken Oxidationsmitteln.

10.4 Zu vermeidende Bedingungen

Zu vermeidende Bedingungen : Hitze, Flammen und Funken.

10.5 Unverträgliche Materialien

Zu vermeidende Stoffe : Oxidationsmittel

10.6 Gefährliche Zersetzungsprodukte

Es sind keine gefährlichen Zersetzungsprodukte bekannt.

ABSCHNITT 11: Toxikologische Angaben

11.1 Angaben zu toxikologischen Wirkungen

Angaben zu wahrscheinlichen Expositionswegen : Einatmung
Hautkontakt
Verschlucken
Augenkontakt

Akute Toxizität

Giftig bei Verschlucken oder Hautkontakt.
Lebensgefahr bei Einatmen.

Produkt:

Akute orale Toxizität	:	Schätzwert Akuter Toxizität: 243,9 mg/kg Methode: Rechenmethode
Akute inhalative Toxizität	:	Schätzwert Akuter Toxizität: 261 ppm Expositionszeit: 4 h Testatmosphäre: Gas Methode: Rechenmethode
Akute dermale Toxizität	:	Schätzwert Akuter Toxizität: 564,85 mg/kg Methode: Rechenmethode

Inhaltsstoffe:

Formaldehyd:

Akute orale Toxizität	:	Schätzwert Akuter Toxizität: 100 mg/kg Methode: Fachmännische Beurteilung
Akute inhalative Toxizität	:	Schätzwert Akuter Toxizität: 100 ppm Expositionszeit: 4 h Testatmosphäre: Gas Methode: Fachmännische Beurteilung
Akute dermale Toxizität	:	LD50 (Kaninchen): 270 mg/kg

Methanol:

Akute orale Toxizität	:	Schätzwert Akuter Toxizität (Menschen): 300 mg/kg Methode: Fachmännische Beurteilung
Akute inhalative Toxizität	:	Schätzwert Akuter Toxizität: 3 mg/l Expositionszeit: 4 h Testatmosphäre: Dampf Methode: Fachmännische Beurteilung Anmerkungen: Basierend auf der harmonisierten Einstufung in der EU-Verordnung 1272/2008, Anhang VI
Akute dermale Toxizität	:	Schätzwert Akuter Toxizität (Menschen): 300 mg/kg Methode: Fachmännische Beurteilung

Ätz-/Reizwirkung auf die Haut

Verursacht schwere Verätzungen.

Inhaltsstoffe:

Formaldehyd:

Spezies	:	Kaninchen
Methode	:	OECD Prüfrichtlinie 404
Ergebnis	:	Ätzend nach 3 Minuten bis 1 Stunde Exposition

Methanol:

Spezies	:	Kaninchen
Ergebnis	:	Keine Hautreizung

Schwere Augenschädigung/-reizung

Verursacht schwere Augenschäden.

Inhaltsstoffe:

Formaldehyd:

Spezies	:	Kaninchen
Ergebnis	:	Irreversible Schädigung der Augen

Methanol:

Spezies	:	Kaninchen
Ergebnis	:	Keine Augenreizung

Sensibilisierung der Atemwege/Haut

Sensibilisierung durch Hautkontakt

Kann allergische Hautreaktionen verursachen.

Sensibilisierung durch Einatmen

Nicht klassifiziert nach den vorliegenden Informationen.

Inhaltsstoffe:

Formaldehyd:

Art des Testes	:	Lokaler Lymphknotentest (LLNA)
Expositionswege	:	Hautkontakt
Spezies	:	Maus
Methode	:	OECD Prüfrichtlinie 429
Ergebnis	:	positiv
Bewertung	:	Hohe Sensibilisierungsrate der Haut beim Menschen wahrscheinlich oder bewiesen

Methanol:

Art des Testes	:	Maximierungstest
Expositionswege	:	Hautkontakt
Spezies	:	Meerschweinchen
Ergebnis	:	negativ

Keimzell-Mutagenität

Kann vermutlich genetische Defekte verursachen.

Inhaltsstoffe:

Formaldehyd:

Gentoxizität in vitro	:	Art des Testes: Bakterieller Rückmutationstest (AMES) Ergebnis: positiv Art des Testes: Chromosomenaberrationstest in vitro Ergebnis: positiv
Gentoxizität in vivo	:	Art des Testes: Erythrozyten-Mikrokerntest bei Säugern (In-vitro-Zytogenetiktest)

Spezies: Ratte
Applikationsweg: Einatmung
Ergebnis: positiv

Keimzell-Mutagenität- Bewertung : Positive(s) Ergebnis(se) aus Mutagenitätstests an in-vivo somatischen Säugetierzellen.

Methanol:

Gentoxizität in vitro : Art des Testes: Bakterieller Rückmutationstest (AMES)
Methode: OECD Prüfrichtlinie 471
Ergebnis: negativ

Art des Testes: In-Vitro-Genmutationstest an Säugetierzellen
Ergebnis: negativ

Gentoxizität in vivo : Art des Testes: Erythrozyten-Mikrokerntest bei Säugern (In-vitro-Zytogenetiktest)
Spezies: Maus
Applikationsweg: Intraperitoneale Injektion
Ergebnis: negativ

Karzinogenität

Kann Krebs erzeugen.

Inhaltsstoffe:

Formaldehyd:

Spezies	:	Ratte
Applikationsweg	:	Inhalation (Gas)
Expositionszeit	:	28 Monate
Ergebnis	:	positiv

Karzinogenität - Bewertung : Ausreichende Beweise für Karzinogenität in Tierversuchen

Methanol:

Spezies	:	Maus
Applikationsweg	:	Inhalation (Dampf)
Expositionszeit	:	18 Monate
Ergebnis	:	negativ

Reproduktionstoxizität

Nicht klassifiziert nach den vorliegenden Informationen.

Inhaltsstoffe:

Formaldehyd:

Effekte auf die Fötusentwicklung : Art des Testes: Embryo-fötale Entwicklung
Spezies: Ratte
Applikationsweg: Inhalation (Gas)
Ergebnis: negativ

Methanol:

Wirkung auf die Fruchtbarkeit	:	Art des Testes: Fruchtbarkeit / frühe Embryonalentwicklung Spezies: Maus Applikationsweg: Verschlucken Ergebnis: negativ
Effekte auf die Fötusentwicklung	:	Art des Testes: Embryo-fötale Entwicklung Spezies: Maus Applikationsweg: Verschlucken Ergebnis: positiv Anmerkungen: Die Wirkungen wurden nur nach Dosen nachgewiesen, die für das Muttertier toxisch waren.

Spezifische Zielorgan-Toxizität bei einmaliger Exposition

Kann die Atemwege reizen.
Schädigt die Organe.

Inhaltsstoffe:

Formaldehyd:

Bewertung	:	Kann die Atemwege reizen.

Methanol:

Zielorgane	:	Augen, Zentralnervensystem
Bewertung	:	Schädigt die Organe.

Spezifische Zielorgan-Toxizität bei wiederholter Exposition

Nicht klassifiziert nach den vorliegenden Informationen.

Inhaltsstoffe:

Formaldehyd:

Bewertung	:	Keine signifikanten gesundheitlichen Effekte bei Tieren in Konzentrationen von 250 ppmV/6h/d oder weniger.

Toxizität bei wiederholter Verabreichung

Inhaltsstoffe:

Formaldehyd:

Spezies	:	Ratte
NOAEL	:	6 ppm
LOAEL	:	10 ppm
Applikationsweg	:	Inhalation (Gas)
Expositionszeit	:	28 Tage

Methanol:

Spezies	:	Ratte
NOAEL	:	1,06 mg/l
Applikationsweg	:	Inhalation (Dampf)

Expositionszeit : 90 Tage

Aspirationstoxizität

Nicht klassifiziert nach den vorliegenden Informationen.

ABSCHNITT 12: Umweltbezogene Angaben

12.1 Toxizität

Inhaltsstoffe:

Formaldehyd:

Toxizität gegenüber Fischen	:	LC50 : 6,7 mg/l Expositionszeit: 96 h Anmerkungen: Basierend auf Testdaten von ähnlichen Materialien
Toxizität gegenüber Daphnien und anderen wirbellosen Wassertieren	:	EC50 (Daphnia pulex (Wasserfloh)): 5,8 mg/l Expositionszeit: 48 h Methode: OECD- Prüfrichtlinie 202
Toxizität gegenüber Algen	:	EC50 (Desmodesmus subspicatus (Grünalge)): 4,89 mg/l Expositionszeit: 72 h Methode: OECD- Prüfrichtlinie 201
Toxizität bei Mikroorganismen	:	EC50 : 34,1 mg/l Expositionszeit: 120 h
Toxizität gegenüber Fischen (Chronische Toxizität)	:	NOEC: >= 48 mg/l Expositionszeit: 28 d Spezies: Oryzias latipes (Roter Killifisch)
Toxizität gegenüber Daphnien und anderen wirbellosen Wassertieren (Chronische Toxizität)	:	NOEC: >= 6,4 mg/l Expositionszeit: 21 d Spezies: Daphnia magna (Großer Wasserfloh) Methode: OECD- Prüfrichtlinie 211

Methanol:

Toxizität gegenüber Fischen	:	LC50 (Lepomis macrochirus (Blauer Sonnenbarsch)): 15.400 mg/l Expositionszeit: 96 h
Toxizität gegenüber Daphnien und anderen wirbellosen Wassertieren	:	EC50 (Daphnia magna (Großer Wasserfloh)): > 10.000 mg/l Expositionszeit: 48 h
Toxizität gegenüber Algen	:	EC50 (Pseudokirchneriella subcapitata (Grünalge)): 22.000 mg/l Expositionszeit: 96 h Methode: OECD- Prüfrichtlinie 201
Toxizität bei Mikroorganis-	:	IC50 : > 1.000 mg/l

men — Expositionszeit: 3 h

Toxizität gegenüber Fischen (Chronische Toxizität) : NOEC: 15.800 mg/l
Expositionszeit: 200 h
Spezies: Oryzias latipes (Roter Killifisch)

12.2 Persistenz und Abbaubarkeit

Inhaltsstoffe:

Formaldehyd:

Biologische Abbaubarkeit : Ergebnis: Leicht biologisch abbaubar.
Biologischer Abbau: 91 %
Expositionszeit: 14 d
Methode: OECD Prüfrichtlinie 301C
Anmerkungen: Basierend auf Testdaten von ähnlichen Materialien

Methanol:

Biologische Abbaubarkeit : Ergebnis: Leicht biologisch abbaubar.
Biologischer Abbau: 95 %
Expositionszeit: 20 d

12.3 Bioakkumulationspotenzial

Inhaltsstoffe:

Formaldehyd:

Verteilungskoeffizient: n-Octanol/Wasser : log Pow: 0,35

Methanol:

Bioakkumulation : Spezies: Leuciscus idus (Goldorfe)
Biokonzentrationsfaktor (BCF): < 10

Verteilungskoeffizient: n-Octanol/Wasser : log Pow: -0,77

12.4 Mobilität im Boden

Keine Daten verfügbar

12.5 Ergebnisse der PBT- und vPvB-Beurteilung

Nicht relevant

12.6 Andere schädliche Wirkungen

Keine Daten verfügbar

ABSCHNITT 13: Hinweise zur Entsorgung

13.1 Verfahren der Abfallbehandlung

Produkt : Unter Beachtung der örtlichen behördlichen Bestimmungen

beseitigen.
Gemäß europäischem Abfallkatalog (EAK) sind Abfallschlüsselnummern nicht produkt- sondern anwendungsbezogen. Abfallschlüsselnummern sollen vom Verbraucher, möglichst in Absprache mit den Abfallentsorgungsbehörden, ausgestellt werden.

Verunreinigte Verpackungen : Leere Behälter einer anerkannten Abfallentsorgungsanlage zuführen zwecks Wiedergewinnung oder Entsorgung.
Leere Behälter enthalten Produktrückstände und können gefährlich sein.
Diese Behälter nicht unter Druck setzen, schneiden, schweißen, hartlöten, weichlöten, bohren, schweißen oder Hitze, Flammen, Funken oder anderen Entzündungsquellen aussetzen. Sie können explodieren und zu Verletzungen und/oder Tod führen.
Falls nicht anders angegeben: Entsorgung als unbenutztes Produkt.

ABSCHNITT 14: Angaben zum Transport

14.1 UN-Nummer

ADN : UN 2209
ADR : UN 2209
RID : UN 2209
IMDG : UN 2209
IATA : UN 2209

14.2 Ordnungsgemäße UN-Versandbezeichnung

ADN : FORMALDEHYDLÖSUNG
ADR : FORMALDEHYDLÖSUNG
RID : FORMALDEHYDLÖSUNG
IMDG : FORMALDEHYDE SOLUTION
IATA : Formaldehyde solution

14.3 Transportgefahrenklassen

ADN : 8
ADR : 8
RID : 8
IMDG : 8
IATA : 8

14.4 Verpackungsgruppe

ADN
Verpackungsgruppe : III

Klassifizierungscode	:	C9
Nummer zur Kennzeichnung der Gefahr	:	80
Gefahrzettel	:	8

ADR

Verpackungsgruppe	:	III
Klassifizierungscode	:	C9
Nummer zur Kennzeichnung der Gefahr	:	80
Gefahrzettel	:	8
Tunnelbeschränkungscode	:	(E)

RID

Verpackungsgruppe	:	III
Klassifizierungscode	:	C9
Nummer zur Kennzeichnung der Gefahr	:	80
Gefahrzettel	:	8

IMDG

Verpackungsgruppe	:	III
Gefahrzettel	:	8
EmS Kode	:	F-A, S-B

IATA (Fracht)

Verpackungsanweisung (Frachtflugzeug)	:	856
Verpackungsanweisung (LQ)	:	Y841
Verpackungsgruppe	:	III
Gefahrzettel	:	Corrosive

IATA (Passagier)

Verpackungsanweisung (Passagierflugzeug)	:	852
Verpackungsanweisung (LQ)	:	Y841
Verpackungsgruppe	:	III
Gefahrzettel	:	Corrosive

14.5 Umweltgefahren

ADN

Umweltgefährdend	:	nein

ADR

Umweltgefährdend	:	nein

RID

Umweltgefährdend	:	nein

IMDG

Meeresschadstoff	:	nein

14.6 Besondere Vorsichtsmaßnahmen für den Verwender

Die hierin bereitgestellte(n) Transporteinstung(en) ist/sind nur zu informativen Zwecken gedacht und basieren lediglich auf den Eigenschaften des unverpackten Materials gemäß Beschreibung in diesem Sicherheitsdatenblatt. Transporteinstufungen können mit dem Transportmittel, der Verpackungsgröße und Abweichungen in regionalen oder Länderbestimmungen variieren.

14.7 Massengutbeförderung gemäß Anhang II des MARPOL-Übereinkommens und gemäß IBC-Code

Anmerkungen : Auf Produkt im Lieferzustand nicht zutreffend.

ABSCHNITT 15: Rechtsvorschriften

15.1 Vorschriften zu Sicherheit, Gesundheits- und Umweltschutz/spezifische Rechtsvorschriften für den Stoff oder das Gemisch

REACH - Liste der für eine Zulassung in Frage kommenden besonders besorgniserregenden Stoffe (Artikel 59).	:	Nicht anwendbar
REACH - Verzeichnis der zulassungspflichtigen Stoffe (Anhang XIV)	:	Nicht anwendbar
Verordnung (EG) Nr. 1005/2009 über Stoffe, die zum Abbau der Ozonschicht führen	:	Nicht anwendbar
Verordnung (EG) Nr. 850/2004 über persistente organische Schadstoffe	:	Nicht anwendbar
Verordnung (EG) Nr. 649/2012 des Europäischen Parlaments und des Rates über die Aus- und Einfuhr gefährlicher Chemikalien	:	Nicht anwendbar
REACH - Beschränkungen der Herstellung, des Inverkehrbringens und der Verwendung bestimmter gefährlicher Stoffe, Zubereitungen und Erzeugnisse (Anhang XVII)	:	Die Beschränkungsbedingungen für folgende Einträge sollten berücksichtigt werden: Nummer in der Liste 3 Methanol (Nummer in der Liste 69)
Verordnung über den Schutz vor Störfällen Mengenschwelle gemäß Störfallverordnung (StfV 814.012)	:	200 kg
Flüchtige organische Verbindungen	:	Verordnung über die Lenkungsabgabe auf flüchtige organische Verbindungen (VOCV) Gehalt flüchtiger organischer Verbindungen (VOC): 49 %

Sonstige Vorschriften:

Artikel 13 Mutterschutzverordnung (SR 822.111.52): Schwangere Frauen und stillende Mütter dürfen bei ihrer Arbeit nur dann mit diesem Produkt (diesem Stoff / dieser Zubereitung) in Kontakt kommen, wenn aufgrund einer Risikobeurteilung gemäss Art. 63 ArGV 1 (SR 822.111) feststeht, dass keine konkrete gesundheitliche Belastung für Mutter und Kind vorliegt oder diese durch geeignete Schutzmassnahmen ausgeschlossen werden kann.

Artikel 4 Absatz 4 der Jugendarbeitsschutzverordnung (SR 822.115) und Artikel 1 lit. f der Verordnung des WBF über gefährliche Arbeiten für Jugendliche (SR 822.115.2): Jugendliche in der beruflichen Grundbildung dürfen nur mit diesem Produkt (diesem Stoff / dieser Zubereitung) arbeiten, wenn dies in der jeweiligen Bildungsverordnung zur Erreichung ihres Ausbildungszieles vorgesehen ist, die Voraussetzungen des Bildungsplans erfüllt sind und die gel-

tenden Altersbeschränkungen eingehalten werden. Jugendliche, die keine berufliche Grundbildung absolvieren, dürfen nicht mit diesem Produkt (diesem Stoff / dieser Zubereitung) arbeiten. Als Jugendliche gelten Arbeitnehmer beider Geschlechter bis zum vollendeten 18. Altersjahr.

Das Produkt gehört zur Chemikaliengruppe 1 nach Schweizer Chemikalienverordnung (ChemV 813.11).

Die Komponenten dieses Produktes sind in folgenden Verzeichnissen aufgeführt:

TSCA	:	Alle chemischen Stoffe in diesem Produkt sind entweder im TSCA-Bestand aufgeführt oder entsprechen einer Ausnahme laut TSCA-Verzeichnis.
DSL	:	Alle in diesem Produkt enthaltenen chemischen Substanzen entsprechen CEPA 1999 und den NSNR und sind in der Canadian Domestic Substances List (DSL) aufgeführt oder davon befreit.
PICCS	:	Alle Inhaltsstoffe aufgeführt oder befreit.
IECSC	:	Alle Inhaltsstoffe aufgeführt oder befreit.
NZIoC	:	Alle Inhaltsstoffe aufgeführt oder befreit.
AICS	:	Alle Inhaltsstoffe aufgeführt oder befreit.
ENCS/ISHL	:	Alle Bestandteile sind im ENCS/ISHL aufgeführt oder von der Aufnahme im Bestandsverzeichnis freigestellt.
KECI	:	Alle Inhaltsstoffe aufgeführt, befreit oder gemeldet.

15.2 Stoffsicherheitsbeurteilung

Für diesen Stoff wurde eine chemische Stoffsicherheitsbeurteilung durchgeführt.

ABSCHNITT 16: Sonstige Angaben

Sonstige Angaben	:	Positionen, bei denen Veränderungen gegenüber der vorherigen Fassung vorgenommen wurden, sind im Textkörper durch zwei vertikale Linien hervorgehoben.

Volltext der H-Sätze

H225	:	Flüssigkeit und Dampf leicht entzündbar.
H301	:	Giftig bei Verschlucken.
H311	:	Giftig bei Hautkontakt.
H314	:	Verursacht schwere Verätzungen der Haut und schwere Augenschäden.
H317	:	Kann allergische Hautreaktionen verursachen.
H318	:	Verursacht schwere Augenschäden.
H330	:	Lebensgefahr bei Einatmen.
H331	:	Giftig bei Einatmen.
H335	:	Kann die Atemwege reizen.
H341	:	Kann vermutlich genetische Defekte verursachen.

H350	:	Kann Krebs erzeugen.
H370	:	Schädigt die Organe.

Volltext anderer Abkürzungen

Acute Tox.	:	Akute Toxizität
Carc.	:	Karzinogenität
Eye Dam.	:	Schwere Augenschädigung
Flam. Liq.	:	Entzündbare Flüssigkeiten
Muta.	:	Keimzell-Mutagenität
Skin Corr.	:	Ätzwirkung auf die Haut
Skin Sens.	:	Sensibilisierung durch Hautkontakt
STOT SE	:	Spezifische Zielorgan-Toxizität - einmalige Exposition
2006/15/EC	:	Arbeitsplatz-Richtgrenzwerten
CH BAT	:	Schweiz. SUVA Liste der Biologischen Arbeitsstofftoleranzwerte (BAT-Werte).
CH SUVA	:	Grenzwerte am Arbeitsplatz
2006/15/EC / TWA	:	Grenzwerte - 8 Stunden
CH SUVA / MAK-Wert	:	Maximale Arbeitsplatzkonzentrationswert
CH SUVA / KZGW	:	Kurzzeitgrenzwerte

ADN - Europäisches Übereinkommens über die internationale Beförderung gefährlicher Güter auf Binnenwasserstrassen; ADR - Europäisches Übereinkommens über die internationale Beförderung gefährlicher Güter auf der Straße; AICS - Australisches Verzeichnis chemischer Substanzen; ASTM - Amerikanische Gesellschaft für Werkstoffprüfung; bw - Körpergewicht; CLP - Verordnung über die Einstufung, Kennzeichnung und Verpackung von Stoffen, Verordnung (EG) Nr 1272/2008; CMR - Karzinogener, mutagener oder reproduktiver Giftstoff; DIN - Norm des Deutschen Instituts für Normung; DSL - Liste heimischer Substanzen (Kanada); ECHA - Europäische Chemikalienbehörde; EC-Number - Nummer der Europäischen Gemeinschaft; ECx - Konzentration verbunden mit x % Reaktion; ELx - Beladungsrate verbunden mit x % Reaktion; EmS - Notfallplan; ENCS - Vorhandene und neue chemische Substanzen (Japan); ErCx - Konzentration verbunden mit x % Wachstumsgeschwindigkeit; GHS - Global harmonisiertes System; GLP - Gute Laborpraxis; IARC - Internationale Krebsforschungsagentur; IATA - Internationale Luftverkehrs-Vereinigung; IBC - Internationaler Code für den Bau und die Ausrüstung von Schiffen zur Beförderung gefährlicher Chemikalien als Massengut; IC50 - Halbmaximale Hemmstoffkonzentration; ICAO - Internationale Zivilluftfahrt-Organisation; IECSC - Verzeichnis der in China vorhandenen chemischen Substanzen; IMDG - Code – Internationaler Code für die Beförderung gefährlicher Güter mit Seeschiffen; IMO - Internationale Seeschifffahrtsorganisation; ISHL - Gesetz über Sicherheit und Gesundheitsschutz am Arbeitsplatz (Japan); ISO - Internationale Organisation für Normung; KECI - Verzeichnis der in Korea vorhandenen Chemikalien; LC50 - Lethale Konzentration für 50 % einer Versuchspopulation; LD50 - Lethale Dosis für 50 % einer Versuchspopulation (mittlere lethale Dosis); MARPOL - Internationales Übereinkommen zur Verhütung der Meeresverschmutzung durch Schiffe; n.o.s. - nicht anderweitig genannt; NO(A)EC - Konzentration, bei der keine (schädliche) Wirkung erkennbar ist; NO(A)EL - Dosis, bei der keine (schädliche) Wirkung erkennbar ist; NOELR - Keine erkennbare Effektladung; NZIoC - Neuseeländisches Chemikalienverzeichnis; OECD - Organisation für wirtschaftliche Zusammenarbeit und Entwicklung; OPPTS - Büro für chemische Sicherheit und Verschmutzungsverhütung (OSCPP); PBT - Persistente, bioakkumulierbare und toxische Substanzen; PICCS - Verzeichnis der auf den Philippinen vorhandenen Chemikalien und chemischen Substanzen; (Q)SAR - (Quantitative) Struktur-Wirkungsbeziehung; REACH - Verordnung (EG) Nr. 1907/2006 des Europäischen Parliaments und des Rats bezüglich der Registrierung, Bewertung, Genehmigung und Restriktion von Chemikalien; RID - Regelung zur internationalen Beförderung gefährlicher Güter im Schienenverkehr; SADT - Selbstbeschleunigende Zersetzungstemperatur; SDS - Sicherheitsdatenblatt; SVHC - besonders besorgniserregender Stoff; TCSI - Verzeichnis der in Taiwan vorhandenen chemischen Substanzen; TSCA - Gesetz zur Kontrolle giftiger Stoffe (Vereinigte Staaten); UN - Verein-

te Nationen; UNRTDG - Empfehlungen der Vereinten Nationen über den Transport gefährlicher Güter; vPvB - Sehr persistent und sehr bioakkumulierbar

Weitere Information

Quellen der wichtigsten Daten, die zur Erstellung des Datenblatts verwendet wurden	:	Interne technische Daten, Rohstoffdaten von den SDB, Suchergebnisse des OECD eChem Portals und der Europäischen Chemikalienagentur, http://echa.europa.eu/

Einstufung des Gemisches:		**Einstufungsverfahren:**
Acute Tox. 3	H301	Rechenmethode
Acute Tox. 2	H330	Rechenmethode
Acute Tox. 3	H311	Rechenmethode
Skin Corr. 1B	H314	Rechenmethode
Eye Dam. 1	H318	Rechenmethode
Skin Sens. 1	H317	Rechenmethode
Muta. 2	H341	Rechenmethode
Carc. 1B	H350	Rechenmethode
STOT SE 1	H370	Rechenmethode
STOT SE 3	H335	Rechenmethode

Die in diesem Sicherheitsdatenblatt enthaltenenen Informationen sind nach bestem Wissen und Gewissen erstellt worden und basieren auf dem Wissensstand zum Zeitpunkt der Veröffentlichung. Die Informationen dienen lediglich als Richtlinie für eine sichere Handhabung, Verwendung, Verarbeitung, Lagerung, Transport, Entsorgung und Freisetzung und stellen keine Gewährleistung oder Qualitätsspezifikation dar. Die vorliegenden Informationen beziehen sich nur auf den oben in diesem SDB bezeichneten Stoff und gelten nicht bei Verwendung des im SDB angegebenen Stoffes in Kombination mit anderen Stoffen oder in anderen Verfahren, sofern nicht anders im Text angegeben ist. Anwender des Stoffes sollten die Informationen und Empfehlungen im konkreten Einzelfall der vorgesehenen Handhabung, Verwendung, Verarbeitung und Lagerung, einschließlich gegebenenfalls einer Beurteilung der Angemessenheit des im SDB bezeichneten Stoffes im Endprodukt des Anwenders, überprüfen.

CH / DE

Annex to the extended safety data sheet (eSDS

1. Overview of exposure scenarios (ES)

1.1 General information

General remarks

Substance characteristics
The following parameters are taken into account:
- Formaldehyde is not stable; therefore it is stored as formalin (30-60%). Formaldehyde has another vapour pressure than formalin. For the application of different vapour pressures in different situations (temperature, percentage formaldehyde) is referred to the section justification of choices on general ART parameters and the percentage modification used in ECETOC TRA.
- The molecular weight of formaldehyde is 30.03 g/mol.

The Formaldehyde Chemical Safety Report (CSR) describes worker exposure assessment based on worker exposure values modelled with a Tier 1 or Tier 2 model. The report “Analysis of worker exposure in manufacture and use of formaldehyde in Europe, including downstream applications” (Van Manen-Vernooij et al., 2013), added in section 13 of IUCLID describes and uses available user and literature data for worker exposure assessment as far as possible, supplemented by model estimates for situations with insufficient useful user and literature data. Worker exposure assessments underpinned with user and/or literature data presented in Van Manen-Vernooij et al. (2013) support the model estimations in the CSR.
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.

Quantitative worker exposure assessment

The worker exposure assessments have at first instance been performed by ECETOC TRA, version 3.0 build in EasyTRA 4.0.0. EasyTRA uses algorithms on the basis of the latest versions of the ECHA REACH Guidance chapters R12 (as of March 2010), R14, R15, and R16 (as of October 2012). EasyTRA works in compliance with ECETOC® Targeted Risk Assessment 3 (as of July 2012) for the calculation of worker exposure.

ECETOC TRA version 3.0 has been used with the following modifications:
- Percentage substance: The percentage of formaldehyde in a mixture was not used as such in the calculations of inhalation exposure in ECETOC TRA v3.0. Instead, the partial vapour pressure of formaldehyde of the relevant concentration was calculated at the relevant temperature with the Lacy equation described in the monograph on formaldehyde by Walker (1964). This partial vapour pressure was entered into ECETOC TRA v3.0 and the estimation was done without further correction for percentage of substance. It therefore seems that 100% formaldehyde is used in each contributing scenario, but this is not the case. To explain this an example will be given, but first a few assumptions about temperatures and concentrations are summarised. Three temperatures, 20, 60 and 100°C were used for the estimations with ECETOC TRA. For closed processes 100°C is used (PROC 1-4). For PROC 5, 6, 8b, 13, 14, 15, 16, 22, 23, 25 a temperature of 60°C is assumed. For PROC 8a a temperature of 60°C is assumed for professional use and room temperature (20°C) is assumed for industrial use. For all other PROCs room temperature was assumed. In cases where pure formaldehyde (as a formalin solution 30-60%) was used (during manufacturing, formulation and in the industrial use up to 60% exposure scenarios) vapour pressure calculations were performed with a 49% concentration as this is in the middle of the concentration range. For the example we will take a look at PROC 6 of ES 1. The vapour pressure is calculated with the following formula: VP = 9.942 – 0.953 * (0.488^(w/10)) – 2905 / T . In which VP is de vapour pressure in log mmHg, W is the concentration in %, and T is the temperature in Kelvin. The resulting vapour pressure of PROC 6 of ES 1, where 60°C is assumed and pure formaldehyde is used, is 2089.60 Pa. This vapour pressure and the altered process temperature are in the tier 2 worker settings in EasyTRA along with the following explanation: “Process temperature of 60 degrees Celsius assumed for industrial use of preparations with 30-60% formaldehyde in this type of process. Vapour pressure 2089.68 Pa based on Walker, No 159 of American Chemical Society Monograph series P. 115”.
- For dermal exposure estimates, no correction for percentage of substance in the products was made in the estimates with ECETOC TRA v3.0. The method used for correcting the partial vapour pressure for inhalation exposure makes it very difficult to also include another form of correction for percentage of substance for dermal exposure. Since all RCRs for dermal exposure were very low it was decided to use dermal exposure values uncorrected for percentage of substance.
- LEV: No effect of LEV on dermal exposure was assumed.
- Gloves: The following effectiveness values are assumed: Use of suitable gloves in combination with specific activity training: 95%; Use of suitable gloves in combination with intensive management supervision controls: 98%. The last option is not available in ECETOC TRA v3.0. It was therefore used by calculating the value without gloves and then adding the reduction effect of gloves afterwards.

The standard occupational hygiene strategy was used for the iterations, which includes the prescription of technical conditions first (e.g. LEV), followed by organisational measures (e.g. time restrictions) and use personal protection (e.g. RPE) at last. However, for certain contributing scenarios this strategy might not fit e.g. maintenance activities, transfer activities may not first rely on LEV, because of a lack of technical feasibility. The choice of the risk management measure used therefore also relies on the feasibility and achievability in the specific situation. For large open services enclosure and LEV are for instance not feasible options. In these cases prescribing personal protective equipment is a better alternative. Only RMMs that are considered to be technically feasible are used in a contributing scenario.
If respiratory protection equipment was prescribed in a contributing scenario, time restriction of <4 hours was added (even though this would not be necessary to ensure safe use). This is ensure that long-term activities (> 4 hours) do not take place in combination with respiratory protection equipment.
Personal protective equipment recommendations
Where the use of respiratory protection is advised, the following materials should be used:
- Suitable respiratory protection for lower concentration or short-term effect: Gas filter for gases/vapours of inorganic compounds (e.g. EN 14387 Type B).
- Suitable respiratory protection for higher concentrations or long-term effect: Self-contained breathing apparatus.

Where the use of gloves is advised, the following chemically resistant glove materials (tested to EN374) also with prolonged, direct contact (Recommended: Protective index 6, corresponding > 480 minutes of permeation time according to EN374) should be used:
- butyl rubber (butyl) – 0.7 mm coating thickness
- nitrile rubber (NBR) – 0.4 mm coating thickness

Where eye protection is advised tightly fitting safety goggles (splash goggles (e.g. EN 166) should be used. A chemical-protective face shield (e.g. EN 166) should be used where suitable face shields are advised.

A chemical-protection suit (f.e. according to EN 14605) should be used where suitable coveralls are advised.

Combined quantitative exposure
As the inhalation exposure is set against the long-term local DNEL and dermal exposure is set against the long-term systemic DNEL, a combined systemic RCR is not calculated. The DNEL for long-term systemic inhalation is equal to the long-term local DNEL. The exposure value of the long-term systemic route would therefore be equal or lower to the long-term local route, as the systemic route takes time into consideration but the local route does not. If the RCRs of the long-term local inhalation route is combined with the long-term systemic dermal route is still below 1. It can therefore be stated that the combined long-term systemic exposure (inhalation and dermal) is controlled.

Second tier quantitative worker exposure assessment
For higher tier inhalation exposure assessments the Advanced REACH Tool version 1.5 (ART) was used. ART is a second tier model, which was developed for higher tier exposure assessment generating scientifically justified and realistic exposure estimates. For a detailed description of the model is referred to R14 of the ECHA Guidance on information requirements and chemical safety assessment and on the ART website www.advancedreachtool.com. Within ART, a number of generic choices have been made for all assessments which are described below.

ECETOC TRA assumes that the conditions of use do not lead to formation of aerosol or mist. Hence, the ART model is used for inhalation exposure assessment of aerosol forming processes including PROC 7 and 11. For the use of formalin (30-60% formaldehyde) it became clear that the first tier assessments did not lead to conclusions of control of risks for the inhalation route. Therefore, higher tier exposure assessments with ART have been performed for these exposure scenarios.

Choices on the use of Advanced REACH Tool (ART)

Only the mechanistic model of ART is used. ART calculates several percentiles and confidence intervals. The basic estimator is the median value for the given inputs. Percentiles are used to represent the variability within the Exposure Scenario. They are calculated by ART based on known and published studies on variability within and between companies within the same type of use. Confidence intervals represent uncertainty and are calculated from the unexplained variation in the model calibration (which links ART-scores to actual exposure levels) from which the within and between company variation have been subtracted, because this has already been taken into account in the variability. For the estimations with ART the reasonable worst case exposure level has been defined in this case as the upper limit of the interquartile confidence interval of the 75th percentile. This estimator takes account of a reasonable variation and a reasonable uncertainty. It is considered that the final estimate made in this way corresponds reasonably well to the estimate that would have been reached if a calculation would be done of the 90th percentile based on the total unexplained variation in the calibration of ART. Thereby it would probably be the most similar result to a 90th percentile of models such as Stoffenmanager and RISKOFDERM that do not differentiate between variability and uncertainty.

Some PROCs are described by different activities within ART. If safe use was not demonstrated without RPE, RPE was prescribed for only part of the activities to limit the period of uncomfortable use of RPE where possible. This was done by modifying the task estimate responsible for the high exposure level with the protective effect of RPE. This correction of a task with RPE was followed by the calculation of time weighted average exposure levels with the following equation:

Full shift TWA = ((Exp_t1 * Fact_RPE * T_t1) + (Exp_t2 * T_t2))/T_fullshift

Where:
Exp_t1 = exposure estimate for the high exposure task (task 1)
Fact_RPE = reduction factor for RPE used with the high exposure task
T_t1 = duration of exposure due to task 1 = duration task 1
Exp_t2 = exposure estimate for the lower (longer duration) task 2
T_t2 = duration of exposure due to task 2 = duration task 2
T_fullhift = duration of full shift (8 hours or 480 minutes)

ART estimates exposure over the duration of one or more activities or over a full shift. It cannot estimate short term (acute) exposure levels, higher than the exposure level over an activity that may occur for periods within one activity. For these situations, short term exposure levels are considered to be 2 times the calculated full shift (480 min) exposure level for exposures related to activities with a duration of 1 hour or more and equal to the activity exposure level for activities with a duration of less than 1 hour.

Justification of choices on general parameters

The mechanistic model of ART is relatively complex and requires a large number of choices. Choices relate to e.g. activity emission potential, operational conditions (OC) and risk management measures (RMM). A number of choices made are the same for all contributing scenarios in the Exposure Scenario. These choices are described below, while the scenario specific choices are justified in the relevant ES.

- The physical state of the substance is a liquid
- Transfer activities are estimated for solutions of 30-60%, 5% and 1.5% of formaldehyde in water.
- Vapour pressure of pure formaldehyde, which may exist only in the process of manufacturing/formulation (at high temperatures (50-150˚C), is above the limit of ART. The limit of ART (100,000 Pa) is used for these type of estimations.
- Formaldehyde in pure form is not stable. Therefore, it is always handled after production as solution in water (30-60%), called formalin. For formaldehyde stored, handled or used as formalin the vapour pressure is 1400 Pa (partial vapour pressure for formalin solution at room temperature).
- For the transfer activities with 1.5 and 5% formaldehyde solution estimations were performed with 1400 Pa (partial vapour pressure for formalin solution at room temperature). Room temperature was assumed because these processes take place after extra dilution of the warmer original solution with water. A corrected concentration was used in the ART assessment, as the vapour pressure of the formalin solution (30-60%) was used. For the 5% solution estimation a corrected concentration of 8.1% was used, because 5% of 100% is equal to 8.1% of 60%.
- For the production-transfer activities with 30-60% formaldehyde high temperatures (up to 60˚C) were taken into account. This was done by using the vapour pressure of 1520 Pa (49% formaldehyde at 55˚C). This information is from the same literature source that indicated the vapour pressure for 37% formaldehyde at room temperature. 49% is used as this is in the middle of the concentration range. 55˚C is chosen as this reasonable worst case if the process is up to 60˚C.

Because a direct value for vapour pressure of the relevant percentage at the relevant temperature range was used, no further correction was needed for fraction or temperature. Therefore:

o Mole fraction of the substance in the mixture was set to 1

o Process temperature was set to room temperature (15-25˚C).

- Mole fraction of the substance = 1. In reality the mole fraction of formaldehyde in the solution is much lower than 1 (generally around 0.37). However, the (partial) vapour pressure for formaldehyde in solution is used and not the pure vapour pressure. This already corrects for the fact that formaldehyde is in a solution. Therefore, the mole fraction was not reduced to prevent taking account of the dilution twice.
- The room size of industrial settings was set on 300 m³ reflecting a reasonable worst-case size for large rooms and process halls.
- A ventilation rate of 3 air changes per hour is assumed for industrial settings reflecting proper general ventilation in this type of industry.
- The room size and ventilation rate of professional settings was set on 30 m³ and 1 air change per hour (ACH) respectively, reflecting a reasonable worst case situation for professional settings.

These choices are considered to be fitting reasonable worst cases for the handling of formaldehyde in this Exposure Scenario. For other parameters the inputs vary per Contributing Scenario.

Efficacy values in CSR

For a number of risk management measures, the efficacy is relevant information to incorporate in the Exposure Scenarios that will be communicated with the SDS. However, within ART the efficacy of a specific measure is not always given or easy to calculate. Where relevant, the information relating the efficacy of these RMM is given, even in an ‘efficacy value’ or other measure:

- the efficacy of RMM like LEV, vapour recovery system, RPE and level of containment are given as a percentage of reduction that should be achieved
- the required ventilation is given in air changes per hour (ACH)
- the room size in which activities may be performed and the maximum duration of activities are given as exact values
- The reduction factors used for RPE are based on the reduction factors for RPE used by ECETOC TRA Version 3.0.
- the percentage of formaldehyde and the process temperature are given as a range.

Peak exposure values

For assessment of risks of short term exposure the following method was used to derive peak exposure levels for inhalation exposure.
It was assumed that estimations made with ART, taking the upper quartile confidence limit of the 75th percentile estimate, correspond (roughly) with the 90th percentile of the full exposure distribution for the situation. Therefore, to derive the 95th percentile of short term exposure levels, the full shift value as estimated with ART was multiplied by 2. This is in accordance to the method described in Guidance document R.14.

Estimations with ECETOC TRA v3.0 are considered to correspond to the 75th percentile of the full exposure distribution for the situation. For the short term local route ECETOC TRA v3.0 derives a peak exposure value without correction factors.

Measured worker exposure levels

The exposure estimates in this CSR are based on exposure modelling. However, to support the values estimated here an analysis of measured worker exposure levels, based on data gathered from manufacturers and users of formaldehyde as well as available literature, was made. The results of that analysis are presented in the appended report “Analysis of worker exposure in manufacture and use of formaldehyde in Europe, including downstream applications” (Van Manen-Vernooij et al., 2013).

Qualitative worker exposure assessment

General
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 described in chapter 3 of the CSR, 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%.

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.

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.

PROC: 1, 2, 3, 8b, 9
Likelihood/frequency of exposure is considered to be practically negligible for PROC 1 due to the high integrity closed systems and very low for the other PROCs mentioned due to the generally closed processes with only occasional potential contact. Good practices and training need to be ensured and suitable gloved need to be applied. With the protective measures described in the exposure scenario taken into account, the actual exposure is low and the risk of skin effects is considered to be controlled.

PROC: 4, 5, 8a, 14, 15, 16, 21, 22, 23, 24, 25
The likelihood/frequency of dermal exposure is considered to be at most low for the PROCs mentioned due to generally closed processes and the careful handling of the (hot) substance in sampling situations and laboratories. The intensity of exposure may in some cases potentially be medium to high, however, actual exposure will be largely prevented by protective measures including good practices and training combined with the use of chemically resistant gloves and suitable coveralls. With the protective measures described in the exposure scenario taken into account, the actual dermal exposure is very low and the risk of skin effects is considered to be controlled.

PROC: 6, 10, 13
Likelihood and frequency of exposure may be high due to the open nature of the processes. The intensity of exposure may in some cases potentially be high as well, however, actual exposure will be largely prevented by protective measures including good practices and training combined with use of suitable coveralls and chemically resistant gloves. Management/supervision should be in place to check that the RMMs are being used correctly and OCs followed. With the protective measures described in the exposure scenario taken into account, the actual dermal exposure is low and the risk of skin effects is considered to be controlled.

PROC: 7, 11
The process of industrial and professional spraying described by PROC 7 and 11 respectively is considered an open process with aerosol formation. Both the likelihood/frequency and the intensity of dermal exposure are considered high. However, actual exposure will be largely prevented by the combination of the following measures; good practices and training need to be ensured. Besides that, suitable eye protection, face shields, coveralls and chemically resistant gloves need to be applied. Management/supervision should be in place to check that the RMMs are being used correctly and OCs followed. With the protective measures described in the exposure scenario taken into account, the actual dermal exposure is low and the risk of skin effects is considered to be controlled.

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.

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.

2.1 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%

This scenario is described by the following combinations of use descriptors. The corresponding contributing scenarios are described in the respective subchapters.

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%
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 constributing 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 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

2.2 Conditions of use affecting exposure

2.2.1 Contributing Scenario (1) controlling environmental exposure for ERC 1
2.2.2 Contributing Scenario (2) controlling environmental exposure for ERC 2
2.2.3 Contributing Scenario (3) controlling environmental exposure for ERC 3
2.2.4 Contributing Scenario (4) controlling environmental exposure for ERC 4
2.2.5 Contributing Scenario (5) controlling environmental exposure for ERC 5
2.2.6 Contributing Scenario (6) controlling environmental exposure for ERC 6A
2.2.7 Contributing Scenario (7) controlling environmental exposure for ERC 6B
2.2.8 Contributing Scenario (8) controlling environmental exposure for ERC 6C
2.2.9 Contributing Scenario (9) controlling environmental exposure for ERC 6D
2.2.10 Contributing Scenario (10) controlling environmental exposure for ERC 7

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

2.2.11 Contributing Scenario (11) controlling industrial worker exposure for PROC 1

Name of contributing scenario	PROC 1 Use in closed process, no likelihood of exposure
Scenario subtitle	CS 1 Use in closed process, no likelihood of exposure - long term local
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 1.1 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 m^3 Ventilation rate: 3 air changes per hour (ACH) Duration (mins): 480 min

2.2.12 Contributing Scenario (12) controlling industrial worker exposure for PROC 1

Name of contributing scenario	PROC 1 Use in closed process, no likelihood of exposure
Scenario subtitle	CS 1 Use in closed process, no likelihood of exposure - short term local
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.
Title.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 1.1 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.

2.2.13 Contributing Scenario (13) controlling industrial worker exposure for PROC 2

Name of contributing scenario	PROC 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
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 1.1 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%

2.2.14 Contributing Scenario (14) controlling industrial worker exposure for PROC 2

Name of contributing scenario	PROC 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
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.
Title.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 1.1 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.

2.2.15 Contributing Scenario (15) controlling industrial worker exposure for PROC 3

Name of contributing scenario	PROC 3 Use in closed batch process (synthesis or formulation)
Scenario subtitle	CS 3 Use in closed batch process (synthesis/formulation) - long term local
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 1.1 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%

2.2.16 Contributing Scenario (16) controlling industrial worker exposure for PROC 3

Name of contributing scenario	PROC 3 Use in closed batch process (synthesis or formulation)
Scenario subtitle	CS 3 Use in closed batch process (synthesis/formulation) - short term local
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:
Title.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 1.1 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.

2.2.17 Contributing Scenario (17) controlling industrial worker exposure for PROC 4

Name of contributing scenario	PROC 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
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 1.1 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%

2.2.18 Contributing Scenario (18) controlling industrial worker exposure for PROC 4

Name of contributing scenario	PROC 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
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.
Title.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 1.1 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.

2.2.19 Contributing Scenario (19) controlling industrial worker exposure for PROC 5

Name of contributing scenario	PROC 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
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 1.1 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 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%

2.2.20 Contributing Scenario (20) controlling industrial worker exposure for PROC 5

Name of contributing scenario	PROC 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
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.
Title.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 1.1 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.

2.2.21 Contributing Scenario (21) controlling industrial worker exposure for PROC 6

Name of contributing scenario	PROC 6 Calendering operations
Scenario subtitle	CS 6 Calendering operations - long term local
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 1.1 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 %

2.2.22 Contributing Scenario (22) controlling industrial worker exposure for PROC 6

Name of contributing scenario	PROC 6 Calendering operations
Scenario subtitle	CS 6 Calendering operations - short term local
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.
Title.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 1.1 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 %

2.2.23 Contributing Scenario (23) controlling industrial worker exposure for PROC 8A

Name of contributing scenario	PROC 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
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 1.1 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%

2.2.24 Contributing Scenario (24) controlling industrial worker exposure for PROC 8A

Name of contributing scenario	PROC 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
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.
Title.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 1.1 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.

2.2.25 Contributing Scenario (25) controlling industrial worker exposure for PROC 8A

Name of contributing scenario	PROC 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
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 1.1 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

2.2.26 Contributing Scenario (26) controlling industrial worker exposure for PROC 8A

Name of contributing scenario	PROC 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
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.
Title.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 1.1 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.

2.2.27 Contributing Scenario (27) controlling industrial worker exposure for PROC 8A

Name of contributing scenario	PROC 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
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 1.1 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

2.2.28 Contributing Scenario (28) controlling industrial worker exposure for PROC 8A

Name of contributing scenario	PROC 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
Qualitative Risk Assessment	
General	Reduce concentration to less than 60% Ensure good work practices are implemented
Eyes	Use suitable eye protection.
Title.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 1.1 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

2.2.29 Contributing Scenario (29) controlling industrial worker exposure for PROC 8B

Name of contributing scenario	PROC 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
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 1.1 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 m^3 Ventilation rate: 3 air changes per hour (ACH) Duration (mins): 240 min Use of respiratory protection with effectiveness 90%

2.2.30 Contributing Scenario (30) controlling industrial worker exposure for PROC 8B

Name of contributing scenario	PROC 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
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.

Title.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 1.1 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.

2.2.31 Contributing Scenario (31) controlling industrial worker exposure for PROC 8B

Name of contributing scenario	PROC 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
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 1.1 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

2.2.32 Contributing Scenario (32) controlling industrial worker exposure for PROC 8B

Name of contributing scenario	PROC 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
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.
Title.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 1.1 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.

2.2.33 Contributing Scenario (33) controlling industrial worker exposure for PROC 9

Name of contributing scenario	PROC 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
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 1.1 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 m^3 Ventilation rate: 3 air changes per hour (ACH) Duration (mins): 240 min Use of respiratory protection with effectiveness 90%

2.2.34 Contributing Scenario (34) controlling industrial worker exposure for PROC 9

Name of contributing scenario	PROC 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
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:
Title.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 1.1 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.

2.2.35 Contributing Scenario (35) controlling industrial worker exposure for PROC 9

Name of contributing scenario	PROC 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
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 1.1 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 m^3 Ventilation rate: 3 air changes per hour (ACH) Duration (mins): 480 min

2.2.36 Contributing Scenario (36) controlling industrial worker exposure for PROC 9

Name of contributing scenario	PROC 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
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.
Title.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 1.1 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.

2.2.37 Contributing Scenario (37) controlling industrial worker exposure for PROC 10

Name of contributing scenario	PROC 10 Roller application or brushing
Scenario subtitle	CS 11 Roller application or brushing - long term local
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 1.1 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 %

2.2.38 Contributing Scenario (38) controlling industrial worker exposure for PROC 10

Name of contributing scenario	PROC 10 Roller application or brushing
Scenario subtitle	CS 11 Roller application or brushing - short term local
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.
Title.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 1.1 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 %

2.2.39 Contributing Scenario (39) controlling industrial worker exposure for PROC 13

Name of contributing scenario	PROC 13 Treatment of articles by dipping and pouring
Scenario subtitle	CS 12 Treatment of articles by dipping and pouring - long term local
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 1.1 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 %

2.2.40 Contributing Scenario (40) controlling industrial worker exposure for PROC 13

Name of contributing scenario	PROC 13 Treatment of articles by dipping and pouring
Scenario subtitle	CS 12 Treatment of articles by dipping and pouring - short term local
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.
Title.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 1.1 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 %

2.2.41 Contributing Scenario (41) controlling industrial worker exposure for PROC 14

Name of contributing scenario	PROC 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
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 1.1 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 %

2.2.42 Contributing Scenario (42) controlling industrial worker exposure for PROC 14

Name of contributing scenario	PROC 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
Qualitative Risk Assessment	

General	Reduce concentration to less than 60% Ensure good work practices are implemented
Eyes	Use suitable eye protection.
Title.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 1.1 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 %

2.2.43 Contributing Scenario (43) controlling industrial worker exposure for PROC 15

Name of contributing scenario	PROC 15 Use of laboratory reagents in small scale laboratories
Scenario subtitle	CS 14 Use as a laboratory reagent - long term local
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 1.1 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 m^3 Ventilation rate: 10 air changes per hour (ACH) Duration (mins): 480 min

2.2.44 Contributing Scenario (44) controlling industrial worker exposure for PROC 15

Name of contributing scenario	PROC 15 Use of laboratory reagents in small scale laboratories
Scenario subtitle	CS 14 Use as a laboratory reagent - short term local
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.
Title.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 1.1 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.

2.3 Exposure estimation

2.3.1 Contributing Scenario (1) controlling environmental exposure for ERC1
Manufacturing of formaldehyde and aq. formaldehyde solutions, formulation, use as intermediate or monomer, use of preparations or mixtures containing formaldehyde up to 60%

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

2.3.2 Contributing Scenario (2) controlling environmental exposure for ERC2
Manufacturing of formaldehyde and aq. formaldehyde solutions, formulation, use as intermediate or monomer, use of preparations or mixtures containing formaldehyde up to 60%

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

2.3.3 Contributing Scenario (3) controlling environmental exposure for ERC3
Manufacturing of formaldehyde and aq. formaldehyde solutions, formulation, use as intermediate or monomer, use of preparations or mixtures containing formaldehyde up to 60%

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

2.3.4 Contributing Scenario (4) controlling environmental exposure for ERC4
Manufacturing of formaldehyde and aq. formaldehyde solutions, formulation, use as intermediate or monomer, use of preparations or mixtures containing formaldehyde up to 60%

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

2.3.5 Contributing Scenario (5) controlling environmental exposure for ERC5
Manufacturing of formaldehyde and aq. formaldehyde solutions, formulation, use as intermediate or monomer, use of preparations or mixtures containing formaldehyde up to 60%

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

2.3.6 Contributing Scenario (6) controlling environmental exposure for ERC6A
Manufacturing of formaldehyde and aq. formaldehyde solutions, formulation, use as intermediate or monomer, use of preparations or mixtures containing formaldehyde up to 60%

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

2.3.7 Contributing Scenario (7) controlling environmental exposure for ERC6B
Manufacturing of formaldehyde and aq. formaldehyde solutions, formulation, use as intermediate or monomer, use of preparations or mixtures containing formaldehyde up to 60%

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

2.3.8 Contributing Scenario (8) controlling environmental exposure for ERC6C
Manufacturing of formaldehyde and aq. formaldehyde solutions, formulation, use as intermediate or monomer, use of preparations or mixtures containing formaldehyde up to 60%

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

2.3.9 Contributing Scenario (9) controlling environmental exposure for ERC6D
Manufacturing of formaldehyde and aq. formaldehyde solutions, formulation, use as intermediate or monomer, use of preparations or mixtures containing formaldehyde up to 60%

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

2.3.10 Contributing Scenario (10) controlling environmental exposure for ERC7
Manufacturing of formaldehyde and aq. formaldehyde solutions, formulation, use as intermediate or monomer, use of preparations or mixtures containing formaldehyde up to 60%

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

2.3.11 Contributing Scenario (11) controlling industrial worker exposure for PROC 1
Manufacturing of formaldehyde and aq. formaldehyde solutions, formulation, use as intermediate or monomer, use of preparations or mixtures containing formaldehyde up to 60% CS 1 Use in closed process, no likelihood of exposure - long term local

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
dermal, longterm systemic	0.000686 mg/kg bw/day	240 mg/kg bw/day	2.86E-6
inhalation, longterm local (measured / external: 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)	0.025 mg/m^3	0.375 mg/m^3	0.066667

2.3.12 Contributing Scenario (12) controlling industrial worker exposure for PROC 1
Manufacturing of formaldehyde and aq. formaldehyde solutions, formulation, use as intermediate or monomer, use of preparations or mixtures containing formaldehyde up to 60% CS 1 Use in closed process, no likelihood of exposure - short term local

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
inhalation, shortterm local (measured / external: 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.)	0.051 mg/m^3	0.750 mg/m^3	0.068

2.3.13 Contributing Scenario (13) controlling industrial worker exposure for PROC 2
Manufacturing of formaldehyde and aq. formaldehyde solutions, formulation, use as intermediate or monomer, use of preparations or mixtures containing formaldehyde up to 60% CS 2 Use in closed, continuous process with occasional controlled exposure - long term local

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
dermal, longterm systemic	0.027429 mg/kg bw/day	240 mg/kg bw/day	0.000114
inhalation, longterm local (measured / external: 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	0.253 mg/m^3	0.375 mg/m^3	0.674667

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
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%)			

2.3.14 Contributing Scenario (14) controlling industrial worker exposure for PROC 2
Manufacturing of formaldehyde and aq. formaldehyde solutions, formulation, use as intermediate or monomer, use of preparations or mixtures containing formaldehyde up to 60% CS 2 Use in closed, continuous process with occasional controlled exposure - short term local

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
inhalation, shortterm local (measured / external: 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.)	0.510 mg/m^3	0.750 mg/m^3	0.680

2.3.15 Contributing Scenario (15) controlling industrial worker exposure for PROC 3
Manufacturing of formaldehyde and aq. formaldehyde solutions, formulation, use as intermediate or monomer, use of preparations or mixtures containing formaldehyde up to 60% CS 3 Use in closed batch process (synthesis/formulation) - long term local

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
dermal, longterm systemic	0.013714 mg/kg bw/day	240 mg/kg bw/day	0.000057
inhalation, longterm local (measured / external: 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	0.253 mg/m^3	0.375 mg/m^3	0.674667

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
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%)			

2.3.16 Contributing Scenario (16) controlling industrial worker exposure for PROC 3
Manufacturing of formaldehyde and aq. formaldehyde solutions, formulation, use as intermediate or monomer, use of preparations or mixtures containing formaldehyde up to 60% CS 3 Use in closed batch process (synthesis/formulation) - short term local

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
inhalation, shortterm local (measured / external: 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.)	0.510 mg/m^3	0.750 mg/m^3	0.680

2.3.17 Contributing Scenario (17) controlling industrial worker exposure for PROC 4
Manufacturing of formaldehyde and aq. formaldehyde solutions, formulation, use as intermediate or monomer, use of preparations or mixtures containing formaldehyde up to 60% CS 4 Use in batch or other process (synthesis) where opportunity for exposure arises - long term local

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
dermal, longterm systemic	0.137143 mg/kg bw/day	240 mg/kg bw/day	0.000571
inhalation, longterm local (measured / external: 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)	0.285 mg/m^3	0.375 mg/m^3	0.760

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
Duration (mins): 60 min Use of respiratory protection with effectiveness 95%)			

2.3.18 Contributing Scenario (18) controlling industrial worker exposure for PROC 4
Manufacturing of formaldehyde and aq. formaldehyde solutions, formulation, use as intermediate or monomer, use of preparations or mixtures containing formaldehyde up to 60% CS 4 Use in batch or other process (synthesis) where opportunity for exposure arises - short term local

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
inhalation, shortterm local (measured / external: 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.)	0.570 mg/m^3	0.750 mg/m^3	0.760

2.3.19 Contributing Scenario (19) controlling industrial worker exposure for PROC 5
Manufacturing of formaldehyde and aq. formaldehyde solutions, formulation, use as intermediate or monomer, use of preparations or mixtures containing formaldehyde up to 60% CS 5 Mixing or blending in batch processes (multistage and/or significant contact) - long term local

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
dermal, longterm systemic	0.274286 mg/kg bw/day	240 mg/kg bw/day	0.001143
inhalation, longterm local (measured / external: 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 m³	0.285 mg/m^3	0.375 mg/m^3	0.760

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
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%)			

2.3.20 Contributing Scenario (20) controlling industrial worker exposure for PROC 5
Manufacturing of formaldehyde and aq. formaldehyde solutions, formulation, use as intermediate or monomer, use of preparations or mixtures containing formaldehyde up to 60% CS 5 Mixing or blending in batch processes (multistage and/or significant contact)- short term local

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
inhalation, shortterm local (measured / external: 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	0.570 mg/m^3	0.750 mg/m^3	0.760

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
confidence limits of the 75th percentile estimates of all three sources * peak factor 2.)			

2.3.21 Contributing Scenario (21) controlling industrial worker exposure for PROC 6
Manufacturing of formaldehyde and aq. formaldehyde solutions, formulation, use as intermediate or monomer, use of preparations or mixtures containing formaldehyde up to 60% CS 6 Calendering operations - long term local

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
dermal, longterm systemic	0.329143 mg/kg bw/day	240 mg/kg bw/day	0.001371
inhalation, longterm local	0.312774 mg/m^3	0.375 mg/m^3	0.834064

2.3.22 Contributing Scenario (22) controlling industrial worker exposure for PROC 6
Manufacturing of formaldehyde and aq. formaldehyde solutions, formulation, use as intermediate or monomer, use of preparations or mixtures containing formaldehyde up to 60% CS 6 Calendering operations - short term local

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
inhalation, shortterm local	0.312774 mg/m^3	0.750 mg/m^3	0.417032

2.3.23 Contributing Scenario (23) controlling industrial worker exposure for PROC 8A
Manufacturing of formaldehyde and aq. formaldehyde solutions, formulation, use as intermediate or monomer, use of preparations or mixtures containing formaldehyde up to 60% CS 7a Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities (30-60% formaldehyde) - long term local

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
dermal, longterm systemic	0.164571 mg/kg bw/day	240 mg/kg bw/day	0.000686
inhalation, longterm local (measured / external: 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	0.170 mg/m^3	0.375 mg/m^3	0.453333

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
Ventilation rate: 3 air changes per hour (ACH) Duration (mins): 240 min Use of respiratory protection with effectiveness 90%)			

2.3.24 Contributing Scenario (24) controlling industrial worker exposure for PROC 8A
Manufacturing of formaldehyde and aq. formaldehyde solutions, formulation, use as intermediate or monomer, use of preparations or mixtures containing formaldehyde up to 60% CS 7a Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities (30-60% formaldehyde) - short term local

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
inhalation, shortterm local (measured / external: 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.)	0.340 mg/m^3	0.750 mg/m^3	0.453333

2.3.25 Contributing Scenario (25) controlling industrial worker exposure for PROC 8A
Manufacturing of formaldehyde and aq. formaldehyde solutions, formulation, use as intermediate or monomer, use of preparations or mixtures containing formaldehyde up to 60% CS 7b Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities (5% formaldehyde) - long term local

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
dermal, longterm systemic	0.685714 mg/kg bw/day	240 mg/kg bw/day	0.002857
inhalation, longterm local (measured / external: 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)	0.260 mg/m^3	0.375 mg/m^3	0.693333

2.3.26 Contributing Scenario (26) controlling industrial worker exposure for PROC 8A
Manufacturing of formaldehyde and aq. formaldehyde solutions, formulation, use as intermediate or monomer, use of preparations or mixtures containing formaldehyde up to 60% CS 7b Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities (5% formaldehyde) - short term local

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
inhalation, shortterm local (measured / external: 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.)	0.520 mg/m^3	0.750 mg/m^3	0.693333

2.3.27 Contributing Scenario (27) controlling industrial worker exposure for PROC 8A
Manufacturing of formaldehyde and aq. formaldehyde solutions, formulation, use as intermediate or monomer, use of preparations or mixtures containing formaldehyde up to 60% CS 8 Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities (solid) - long term local

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
dermal, longterm systemic	0.274286 mg/kg bw/day	240 mg/kg bw/day	0.001143
inhalation, longterm local	0.050 mg/m^3	0.375 mg/m^3	0.133333

2.3.28 Contributing Scenario (28) controlling industrial worker exposure for PROC 8A
Manufacturing of formaldehyde and aq. formaldehyde solutions, formulation, use as intermediate or monomer, use of preparations or mixtures containing formaldehyde up to 60% CS 8 Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated facilities (solid) - short term local

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
inhalation, shortterm local	0.050 mg/m^3	0.750 mg/m^3	0.066667

2.3.29 Contributing Scenario (29) controlling industrial worker exposure for PROC 8B
Manufacturing of formaldehyde and aq. formaldehyde solutions, formulation, use as intermediate or monomer, use of preparations or mixtures containing formaldehyde up to 60% CS 9a Transfer of chemicals (charging/discharging) from/to vessels/large containers at dedicated facilities (30-60% formaldehyde) - long term local

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
dermal, longterm systemic	0.164571 mg/kg bw/day	240 mg/kg bw/day	0.000686
inhalation, longterm local (measured / external:	0.110 mg/m^3	0.375 mg/m^3	0.293333

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
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%)			

2.3.30 Contributing Scenario (30) controlling industrial worker exposure for PROC 8B
Manufacturing of formaldehyde and aq. formaldehyde solutions, formulation, use as intermediate or monomer, use of preparations or mixtures containing formaldehyde up to 60% CS 9a Transfer of chemicals (charging/discharging) from/to vessels/large containers at dedicated facilities (30-60% formaldehyde) - short term local

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
inhalation, shortterm local (measured / external: 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.)	0.220 mg/m^3	0.750 mg/m^3	0.293333

2.3.31 Contributing Scenario (31) controlling industrial worker exposure for PROC 8B
Manufacturing of formaldehyde and aq. formaldehyde solutions, formulation, use as intermediate or monomer, use of preparations or mixtures containing formaldehyde up to 60% CS 9b Transfer of chemicals (charging/discharging) from/to vessels/large containers at dedicated facilities (5% formaldehyde) - long term local

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
dermal, longterm systemic	0.685714 mg/kg bw/day	240 mg/kg bw/day	0.002857
inhalation, longterm local (measured / external: The ART model has been used to estimate inhalative exposure. Exposure value used: the upper limit of the interquartile confidence interval of the 75th	0.170 mg/m^3	0.375 mg/m^3	0.453333

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
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 m³ Ventilation rate: 3 air changes per hour (ACH) Duration (mins): 480 min)			

2.3.32 Contributing Scenario (32) controlling industrial worker exposure for PROC 8B
Manufacturing of formaldehyde and aq. formaldehyde solutions, formulation, use as intermediate or monomer, use of preparations or mixtures containing formaldehyde up to 60% CS 9b Transfer of chemicals (charging/discharging) from/to vessels/large containers at dedicated facilities (5% formaldehyde) - short term local

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
inhalation, shortterm local (measured / external: 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.)	0.340 mg/m^3	0.750 mg/m^3	0.453333

2.3.33 Contributing Scenario (33) controlling industrial worker exposure for PROC 9
Manufacturing of formaldehyde and aq. formaldehyde solutions, formulation, use as intermediate or monomer, use of preparations or mixtures containing formaldehyde up to 60% CS 10a Transfer of substance or preparations into small containers (dedicated filling line including weighing) (30-60% formaldehyde) - long term local

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
dermal, longterm systemic	0.082286 mg/kg bw/day	240 mg/kg bw/day	0.000343
inhalation, longterm local (measured / external: 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	0.060 mg/m^3	0.375 mg/m^3	0.160

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
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%)			

2.3.34 Contributing Scenario (34) controlling industrial worker exposure for PROC 9
Manufacturing of formaldehyde and aq. formaldehyde solutions, formulation, use as intermediate or monomer, use of preparations or mixtures containing formaldehyde up to 60% CS 10a Transfer of substance or preparations into small containers (dedicated filling line including weighing) (30-60% formaldehyde) - short term local

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
inhalation, shortterm local (measured / external: 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.)	0.110 mg/m^3	0.750 mg/m^3	0.146667

2.3.35 Contributing Scenario (35) controlling industrial worker exposure for PROC 9
Manufacturing of formaldehyde and aq. formaldehyde solutions, formulation, use as intermediate or monomer, use of preparations or mixtures containing formaldehyde up to 60% CS 10b Transfer of substance or preparations into small containers (dedicated filling line including weighing) (5% formaldehyde) - long term local

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
dermal, longterm systemic	0.342857 mg/kg bw/day	240 mg/kg bw/day	0.001429
inhalation, longterm local (measured / external: 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	0.085 mg/m^3	0.375 mg/m^3	0.226667

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
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)			

2.3.36 Contributing Scenario (36) controlling industrial worker exposure for PROC 9
Manufacturing of formaldehyde and aq. formaldehyde solutions, formulation, use as intermediate or monomer, use of preparations or mixtures containing formaldehyde up to 60% CS 10b Transfer of substance or preparations into small containers (dedicated filling line including weighing) (5% formaldehyde) - short term local

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
inhalation, shortterm local (measured / external: 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.)	0.170 mg/m^3	0.750 mg/m^3	0.226667

2.3.37 Contributing Scenario (37) controlling industrial worker exposure for PROC 10
Manufacturing of formaldehyde and aq. formaldehyde solutions, formulation, use as intermediate or monomer, use of preparations or mixtures containing formaldehyde up to 60% CS 11 Roller application or brushing - long term local

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
dermal, longterm systemic	0.548571 mg/kg bw/day	240 mg/kg bw/day	0.002286
inhalation, longterm local	0.12511 mg/m^3	0.375 mg/m^3	0.333626

2.3.38 Contributing Scenario (38) controlling industrial worker exposure for PROC 10
Manufacturing of formaldehyde and aq. formaldehyde solutions, formulation, use as intermediate or monomer, use of preparations or mixtures containing formaldehyde up to 60% CS 11 Roller application or brushing - short term local

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
inhalation, shortterm local	0.12511 mg/m^3	0.750 mg/m^3	0.166813

2.3.39 Contributing Scenario (39) controlling industrial worker exposure for PROC 13
Manufacturing of formaldehyde and aq. formaldehyde solutions, formulation, use as intermediate or monomer, use of preparations or mixtures containing formaldehyde up to 60% CS 12 Treatment of articles by dipping and pouring - long term local

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
dermal, longterm systemic	0.164571 mg/kg bw/day	240 mg/kg bw/day	0.000686
inhalation, longterm local	0.187664 mg/m^3	0.375 mg/m^3	0.500438

2.3.40 Contributing Scenario (40) controlling industrial worker exposure for PROC 13
Manufacturing of formaldehyde and aq. formaldehyde solutions, formulation, use as intermediate or monomer, use of preparations or mixtures containing formaldehyde up to 60% CS 12 Treatment of articles by dipping and pouring - short term local

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
inhalation, shortterm local	0.187664 mg/m^3	0.750 mg/m^3	0.250219

2.3.41 Contributing Scenario (41) controlling industrial worker exposure for PROC 14
Manufacturing of formaldehyde and aq. formaldehyde solutions, formulation, use as intermediate or monomer, use of preparations or mixtures containing formaldehyde up to 60% CS 13 Production of preparations or articles by tabletting, compression, extrusion, pelletisation - long term local

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
dermal, longterm systemic	0.041143 mg/kg bw/day	240 mg/kg bw/day	0.000171
inhalation, longterm local	0.312774 mg/m^3	0.375 mg/m^3	0.834064

2.3.42 Contributing Scenario (42) controlling industrial worker exposure for PROC 14
Manufacturing of formaldehyde and aq. formaldehyde solutions, formulation, use as intermediate or monomer, use of preparations or mixtures containing formaldehyde up to 60% CS 13 Production of preparations or articles by tabletting, compression, extrusion, pelletisation - short term local

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
inhalation, shortterm local	0.312774 mg/m^3	0.750 mg/m^3	0.417032

2.3.43 Contributing Scenario (43) controlling industrial worker exposure for PROC 15
Manufacturing of formaldehyde and aq. formaldehyde solutions, formulation, use as intermediate or monomer, use of preparations or mixtures containing formaldehyde up to 60% CS 14 Use as a laboratory reagent - long term local

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
dermal, longterm systemic	0.006857 mg/kg bw/day	240 mg/kg bw/day	0.000029
inhalation, longterm local (measured / external: The ART model has been used to estimate inhalative exposure.	0.300 mg/m^3	0.375 mg/m^3	0.800

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
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)			

2.3.44 Contributing Scenario (44) controlling industrial worker exposure for PROC 15
Manufacturing of formaldehyde and aq. formaldehyde solutions, formulation, use as intermediate or monomer, use of preparations or mixtures containing formaldehyde up to 60% CS 14 Use as a laboratory reagent - short term local

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
inhalation, shortterm local (measured / external: 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.)	0.600 mg/m^3	0.750 mg/m^3	0.800

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

Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

3.1 Scenario 2: Industrial use of preparations containing formaldehyde up to 5%

This scenario is described by the following combinations of use descriptors. The corresponding contributing scenarios are described in the respective subchapters.

Description of ES 2

Free short title	Industrial use of preparations containing formaldehyde up to 5%
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 constributing 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 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

3.2 Conditions of use affecting exposure

3.2.1 Contributing Scenario (1) controlling environmental exposure for ERC 2
3.2.2 Contributing Scenario (2) controlling environmental exposure for ERC 3
3.2.3 Contributing Scenario (3) controlling environmental exposure for ERC 5
3.2.4 Contributing Scenario (4) controlling environmental exposure for ERC 6C
3.2.5 Contributing Scenario (5) controlling environmental exposure for ERC 6D

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

3.2.6 Contributing Scenario (6) controlling industrial worker exposure for PROC 1

Name of contributing scenario	PROC 1 Use in closed process, no likelihood of exposure
Scenario subtitle	CS 1 Use in closed process, no likelihood of exposure - long term local
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 1.1 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

3.2.7 Contributing Scenario (7) controlling industrial worker exposure for PROC 1

Name of contributing scenario	PROC 1 Use in closed process, no likelihood of exposure
Scenario subtitle	CS 1 Use in closed process, no likelihood of exposure - short term local
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.
Title.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 1.1 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

3.2.8 Contributing Scenario (8) controlling industrial worker exposure for PROC 2

Name of contributing scenario	PROC 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
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 1.1 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

3.2.9 Contributing Scenario (9) controlling industrial worker exposure for PROC 2

Name of contributing scenario	PROC 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
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.
Title.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 1.1 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

3.2.10 Contributing Scenario (10) controlling industrial worker exposure for PROC 3

Name of contributing scenario	PROC 3 Use in closed batch process (synthesis or formulation)
Scenario subtitle	CS 3 Use in closed batch process (synthesis or formulation) - long term local
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 1.1 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 %

3.2.11 Contributing Scenario (11) controlling industrial worker exposure for PROC 3

Name of contributing scenario	PROC 3 Use in closed batch process (synthesis or formulation)
Scenario subtitle	CS 3 Use in closed batch process (synthesis or formulation) - short term local
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.
Title.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 1.1 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 %

3.2.12 Contributing Scenario (12) controlling industrial worker exposure for PROC 4

Name of contributing scenario	PROC 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
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 1.1 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 %

3.2.13 Contributing Scenario (13) controlling industrial worker exposure for PROC 4

Name of contributing scenario	PROC 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
Qualitative Risk Assessment	
General	Reduce concentration to less than 5% Ensure good work practices are implemented
Eyes	Use suitable eye protection.
Title.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 1.1 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 %

3.2.14 Contributing Scenario (14) controlling industrial worker exposure for PROC 5

Name of contributing scenario	PROC 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
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 1.1 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

3.2.15 Contributing Scenario (15) controlling industrial worker exposure for PROC 5

Name of contributing scenario	PROC 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
Qualitative Risk Assessment	
General	Reduce concentration to less than 5% Ensure good work practices are implemented
Eyes	Use suitable eye protection.
Title.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 1.1 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

3.2.16 Contributing Scenario (16) controlling industrial worker exposure for PROC 6

Name of contributing scenario	PROC 6 Calendering operations
Scenario subtitle	CS 6 Calendering operations - long term local
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 1.1 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

3.2.17 Contributing Scenario (17) controlling industrial worker exposure for PROC 6

Name of contributing scenario	PROC 6 Calendering operations
Scenario subtitle	CS 6 Calendering operations - short term local
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.
Title.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 1.1 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

3.2.18 Contributing Scenario (18) controlling industrial worker exposure for PROC 7

Name of contributing scenario	PROC 7 Industrial spraying
Scenario subtitle	CS 7a Industrial spraying - long term local option 1
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 1.1 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 m^3 Work area: Indoors Duration (mins): 240 Ventilation rate: 3 air changes per hour (ACH) Use of respiratory protection effectiveness 95%

3.2.19 Contributing Scenario (19) controlling industrial worker exposure for PROC 7

Name of contributing scenario	PROC 7 Industrial spraying
Scenario subtitle	CS 7a Industrial spraying - short term local option 1
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
Title.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 1.1 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.

3.2.20 Contributing Scenario (20) controlling industrial worker exposure for PROC 7

Name of contributing scenario	PROC 7 Industrial spraying
Scenario subtitle	CS 7b Industrial spraying - long term local option 2
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 1.1 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 m³ Work area: Indoors Duration (mins): 60 Ventilation rate: 10 air changes per hour (ACH)

3.2.21 Contributing Scenario (21) controlling industrial worker exposure for PROC 7

Name of contributing scenario	PROC 7 Industrial spraying
Scenario subtitle	CS 7b Industrial spraying - short term local option 2
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
Title.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 1.1 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.

3.2.22 Contributing Scenario (22) controlling industrial worker exposure for PROC 8A

Name of contributing scenario	PROC 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
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 1.1 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 %

3.2.23 Contributing Scenario (23) controlling industrial worker exposure for PROC 8A

Name of contributing scenario	PROC 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

Qualitative Risk Assessment	
General	Reduce concentration to less than 5% Ensure good work practices are implemented
Eyes	Use suitable eye protection.
Title.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 1.1 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 %

3.2.24 Contributing Scenario (24) controlling industrial worker exposure for PROC 8B

Name of contributing scenario	PROC 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
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 1.1 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

3.2.25 Contributing Scenario (25) controlling industrial worker exposure for PROC 8B

Name of contributing scenario	PROC 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
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.
Title.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 1.1 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

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

Name of contributing scenario	PROC 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
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 1.1 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

3.2.27 Contributing Scenario (27) controlling industrial worker exposure for PROC 9

Name of contributing scenario	PROC 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
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.
Title.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 1.1 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

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

Name of contributing scenario	PROC 10 Roller application or brushing
Scenario subtitle	CS 11 Roller application or brushing - long term local
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 1.1 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 %

3.2.29 Contributing Scenario (29) controlling industrial worker exposure for PROC 10

Name of contributing scenario	PROC 10 Roller application or brushing
Scenario subtitle	CS 11 Roller application or brushing - short term local
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.
Title.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 1.1 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 %

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

Name of contributing scenario	PROC 13 Treatment of articles by dipping and pouring
Scenario subtitle	CS 12 Treatment of articles by dipping and pouring - long term local
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 1.1 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 %

3.2.31 Contributing Scenario (31) controlling industrial worker exposure for PROC 13

Name of contributing scenario	PROC 13 Treatment of articles by dipping and pouring
Scenario subtitle	CS 12 Treatment of articles by dipping and pouring - short term local
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.
Title.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 1.1 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 %

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

Name of contributing scenario	PROC 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
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 1.1 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

3.2.33 Contributing Scenario (33) controlling industrial worker exposure for PROC 14

Name of contributing scenario	PROC 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
Qualitative Risk Assessment	
General	Reduce concentration to less than 5% Ensure good work practices are implemented
Eyes	Use suitable eye protection.

Title.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 1.1 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

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

Name of contributing scenario	PROC 15 Use of laboratory reagents in small scale laboratories
Scenario subtitle	CS 14 Use of laboratory reagents in small scale laboratories - long term local
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 1.1 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).)*

3.2.35 Contributing Scenario (35) controlling industrial worker exposure for PROC 15

Name of contributing scenario	PROC 15 Use of laboratory reagents in small scale laboratories
Scenario subtitle	CS 14 Use of laboratory reagents in small scale laboratories - short term local
Qualitative Risk Assessment	
General	Reduce concentration to less than 5% Ensure good work practices are implemented
Eyes	Use suitable eye protection.
Title.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 1.1 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).)*

3.2.36 Contributing Scenario (36) controlling industrial worker exposure for PROC 16

Name of contributing scenario	PROC 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
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 1.1 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

3.2.37 Contributing Scenario (37) controlling industrial worker exposure for PROC 16

Name of contributing scenario	PROC 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
Qualitative Risk Assessment	
General	Ensure good work practices are implemented Reduce concentration to less than 5%
Title.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 1.1 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

3.2.38 Contributing Scenario (38) controlling industrial worker exposure for PROC 21

Name of contributing scenario	PROC 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
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 1.1 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

3.2.39 Contributing Scenario (39) controlling industrial worker exposure for PROC 21

Name of contributing scenario	PROC 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
Qualitative Risk Assessment	

General	Reduce concentration to less than 5% Ensure good work practices are implemented
Eyes	Use suitable eye protection.
Title.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 1.1 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

3.2.40 Contributing Scenario (40) controlling industrial worker exposure for PROC 22C

Name of contributing scenario	PROC 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
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 1.1 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

3.2.41 Contributing Scenario (41) controlling industrial worker exposure for PROC 22C

Name of contributing scenario	PROC 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
Qualitative Risk Assessment	
General	Reduce concentration to less than 5% Ensure good work practices are implemented
Eyes	Use suitable eye protection.
Title.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 1.1 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

3.2.42 Contributing Scenario (42) controlling industrial worker exposure for PROC 23C

Name of contributing scenario	PROC 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
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 1.1 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

3.2.43 Contributing Scenario (43) controlling industrial worker exposure for PROC 23C

Name of contributing scenario	PROC 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
Qualitative Risk Assessment	
General	Reduce concentration to less than 5% Ensure good work practices are implemented
Eyes	Use suitable eye protection.
Title.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 1.1 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

3.2.44 Contributing Scenario (44) controlling industrial worker exposure for PROC 24C

Name of contributing scenario	PROC 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
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 1.1 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 %

3.2.45 Contributing Scenario (45) controlling industrial worker exposure for PROC 24C

Name of contributing scenario	PROC 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
Qualitative Risk Assessment	
General	Reduce concentration to less than 5% Ensure good work practices are implemented
Eyes	Use suitable eye protection.
Title.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 1.1 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 %

3.2.46 Contributing Scenario (46) controlling industrial worker exposure for PROC 25C

Name of contributing scenario	PROC 25c Other hot work operations with metals - pt > mp - High Fugacity
Scenario subtitle	CS 20 Other hot work operations with metals - long term local
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 1.1 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

3.2.47 Contributing Scenario (47) controlling industrial worker exposure for PROC 25C

Name of contributing scenario	PROC 25c Other hot work operations with metals - pt > mp - High Fugacity
Scenario subtitle	CS 20 Other hot work operations with metals - short term local
Qualitative Risk Assessment	
General	Reduce concentration to less than 5% Ensure good work practices are implemented
Eyes	Use suitable eye protection.
Title.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 1.1 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

3.3 Exposure estimation

3.3.1 Contributing Scenario (1) controlling environmental exposure for ERC2
Industrial use of preparations containing formaldehyde up to 5%

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

3.3.2 Contributing Scenario (2) controlling environmental exposure for ERC3
Industrial use of preparations containing formaldehyde up to 5%

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

3.3.3 Contributing Scenario (3) controlling environmental exposure for ERC5
Industrial use of preparations containing formaldehyde up to 5%

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

3.3.4 Contributing Scenario (4) controlling environmental exposure for ERC6C
Industrial use of preparations containing formaldehyde up to 5%

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

3.3.5 Contributing Scenario (5) controlling environmental exposure for ERC6D
Industrial use of preparations containing formaldehyde up to 5%

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

3.3.6 Contributing Scenario (6) controlling industrial worker exposure for PROC 1
Industrial use of preparations containing formaldehyde up to 5% CS 1 Use in closed process, no likelihood of exposure - long term local

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
dermal, longterm systemic	0.001714 mg/kg bw/day	240 mg/kg bw/day	7.14E-6
inhalation, longterm local	0.012511 mg/m^3	0.375 mg/m^3	0.033363

3.3.7 Contributing Scenario (7) controlling industrial worker exposure for PROC 1
Industrial use of preparations containing formaldehyde up to 5% CS 1 Use in closed process, no likelihood of exposure - short term local

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
inhalation, shortterm local	0.012511 mg/m^3	0.750 mg/m^3	0.016681

3.3.8 Contributing Scenario (8) controlling industrial worker exposure for PROC 2
Industrial use of preparations containing formaldehyde up to 5% CS 2 Use in closed, continuous process with occasional controlled exposure - long term local

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
dermal, longterm systemic	0.068571 mg/kg bw/day	240 mg/kg bw/day	0.000286
inhalation, longterm local	0.187664 mg/m^3	0.375 mg/m^3	0.500438

3.3.9 Contributing Scenario (9) controlling industrial worker exposure for PROC 2
Industrial use of preparations containing formaldehyde up to 5% CS 2 Use in closed, continuous process with occasional controlled exposure - short term local

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
inhalation, shortterm local	0.187664 mg/m^3	0.750 mg/m^3	0.250219

3.3.10 Contributing Scenario (10) controlling industrial worker exposure for PROC 3
Industrial use of preparations containing formaldehyde up to 5% CS 3 Use in closed batch process (synthesis or formulation) - long term local

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
dermal, longterm systemic	0.020571 mg/kg bw/day	240 mg/kg bw/day	0.000086
inhalation, longterm local	0.12511 mg/m^3	0.375 mg/m^3	0.333626

3.3.11 Contributing Scenario (11) controlling industrial worker exposure for PROC 3

Industrial use of preparations containing formaldehyde up to 5% CS 3 Use in closed batch process (synthesis or formulation) - short term local

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
inhalation, shortterm local	0.12511 mg/m^3	0.750 mg/m^3	0.166813

3.3.12 Contributing Scenario (12) controlling industrial worker exposure for PROC 4
Industrial use of preparations containing formaldehyde up to 5% CS 4 Use in batch and other process (synthesis) where opportunity for exposure arises - long term local

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
dermal, longterm systemic	0.205714 mg/kg bw/day	240 mg/kg bw/day	0.000857
inhalation, longterm local	0.250219 mg/m^3	0.375 mg/m^3	0.667251

3.3.13 Contributing Scenario (13) controlling industrial worker exposure for PROC 4
Industrial use of preparations containing formaldehyde up to 5% CS 4 Use in batch and other process (synthesis) where opportunity for exposure arises - short term local

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
inhalation, shortterm local	0.250219 mg/m^3	0.750 mg/m^3	0.333626

3.3.14 Contributing Scenario (14) controlling industrial worker exposure for PROC 5
Industrial use of preparations containing formaldehyde up to 5% CS 5 Mixing or blending in batch processes (multistage and/or significant contact) - long term local

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
dermal, longterm systemic	0.685714 mg/kg bw/day	240 mg/kg bw/day	0.002857
inhalation, longterm local	0.187664 mg/m^3	0.375 mg/m^3	0.500438

3.3.15 Contributing Scenario (15) controlling industrial worker exposure for PROC 5
Industrial use of preparations containing formaldehyde up to 5% CS 5 Mixing or blending in batch processes (multistage and/or significant contact) - short term local

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
inhalation, shortterm local	0.187664 mg/m^3	0.750 mg/m^3	0.250219

3.3.16 Contributing Scenario (16) controlling industrial worker exposure for PROC 6
Industrial use of preparations containing formaldehyde up to 5% CS 6 Calendering operations - long term local

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
dermal, longterm systemic	1.371 mg/kg bw/day	240 mg/kg bw/day	0.005714
inhalation, longterm local	0.187664 mg/m^3	0.375 mg/m^3	0.500438

3.3.17 Contributing Scenario (17) controlling industrial worker exposure for PROC 6
Industrial use of preparations containing formaldehyde up to 5% CS 6 Calendering operations - short term local

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
inhalation, shortterm local	0.187664 mg/m^3	0.750 mg/m^3	0.250219

3.3.18 Contributing Scenario (18) controlling industrial worker exposure for PROC 7
Industrial use of preparations containing formaldehyde up to 5% CS 7a Industrial spraying - long term local option 1

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
dermal, longterm systemic	2.143 mg/kg bw/day	240 mg/kg bw/day	0.008929
inhalation, longterm local (measured / external: 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)	0.200 mg/m^3	0.375 mg/m^3	0.533333

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
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%)			

3.3.19 Contributing Scenario (19) controlling industrial worker exposure for PROC 7
Industrial use of preparations containing formaldehyde up to 5% CS 7a Industrial spraying - short term local option 1

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
inhalation, shortterm local (measured / external: 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.)	0.400 mg/m^3	0.750 mg/m^3	0.533333

3.3.20 Contributing Scenario (20) controlling industrial worker exposure for PROC 7
Industrial use of preparations containing formaldehyde up to 5% CS 7b Industrial spraying - long term local option 2

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
dermal, longterm systemic	2.143 mg/kg bw/day	240 mg/kg bw/day	0.008929
inhalation, longterm local (measured / external: 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)	0.330 mg/m^3	0.375 mg/m^3	0.880

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
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): 60 Ventilation rate: 10 air changes per hour (ACH))			

3.3.21 Contributing Scenario (21) controlling industrial worker exposure for PROC 7
Industrial use of preparations containing formaldehyde up to 5% CS 7b Industrial spraying - short term local option 2

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
inhalation, shortterm local (measured / external: 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.)	0.660 mg/m^3	0.750 mg/m^3	0.880

3.3.22 Contributing Scenario (22) controlling industrial worker exposure for PROC 8A
Industrial use of preparations containing formaldehyde up to 5% CS 8 Transfer of chemicals from/to vessels/ large containers at non-dedicated facilities - long term local

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
dermal, longterm systemic	0.685714 mg/kg bw/day	240 mg/kg bw/day	0.002857
inhalation, longterm local	0.12511 mg/m^3	0.375 mg/m^3	0.333626

3.3.23 Contributing Scenario (23) controlling industrial worker exposure for PROC 8A
Industrial use of preparations containing formaldehyde up to 5% CS 8 Transfer of chemicals from/to vessels/ large containers at non-dedicated facilities - short term local

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
inhalation, shortterm local	0.12511 mg/m^3	0.750 mg/m^3	0.166813

3.3.24 Contributing Scenario (24) controlling industrial worker exposure for PROC 8B
Industrial use of preparations containing formaldehyde up to 5% CS 9 Transfer of chemicals from/to vessels/ large containers at dedicated facilities - long term local

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
dermal, longterm systemic	0.685714 mg/kg bw/day	240 mg/kg bw/day	0.002857
inhalation, longterm local	0.218942 mg/m^3	0.375 mg/m^3	0.583845

3.3.25 Contributing Scenario (25) controlling industrial worker exposure for PROC 8B
Industrial use of preparations containing formaldehyde up to 5% CS 9 Transfer of chemicals from/to vessels/ large containers at dedicated facilities - short term local

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
inhalation, shortterm local	0.218942 mg/m^3	0.750 mg/m^3	0.291922

3.3.26 Contributing Scenario (26) controlling industrial worker exposure for PROC 9
Industrial use of preparations containing formaldehyde up to 5% CS 10 Transfer of chemicals into small containers (dedicated filling line) - long term local

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
dermal, longterm systemic	0.342857 mg/kg bw/day	240 mg/kg bw/day	0.001429
inhalation, longterm local	0.187664 mg/m^3	0.375 mg/m^3	0.500438

3.3.27 Contributing Scenario (27) controlling industrial worker exposure for PROC 9
Industrial use of preparations containing formaldehyde up to 5% CS 10 Transfer of chemicals into small containers (dedicated filling line) - short term local

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
inhalation, shortterm local	0.187664 mg/m^3	0.750 mg/m^3	0.250219

3.3.28 Contributing Scenario (28) controlling industrial worker exposure for PROC 10
Industrial use of preparations containing formaldehyde up to 5% CS 11 Roller application or brushing - long term local

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
dermal, longterm systemic	1.371 mg/kg bw/day	240 mg/kg bw/day	0.005714
inhalation, longterm local	0.12511 mg/m^3	0.375 mg/m^3	0.333626

3.3.29 Contributing Scenario (29) controlling industrial worker exposure for PROC 10
Industrial use of preparations containing formaldehyde up to 5% CS 11 Roller application or brushing - short term local

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
inhalation, shortterm local	0.12511 mg/m^3	0.750 mg/m^3	0.166813

3.3.30 Contributing Scenario (30) controlling industrial worker exposure for PROC 13
Industrial use of preparations containing formaldehyde up to 5% CS 12 Treatment of articles by dipping and pouring - long term local

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
dermal, longterm systemic	0.685714 mg/kg bw/day	240 mg/kg bw/day	0.002857
inhalation, longterm local	0.12511 mg/m^3	0.375 mg/m^3	0.333626

3.3.31 Contributing Scenario (31) controlling industrial worker exposure for PROC 13
Industrial use of preparations containing formaldehyde up to 5% CS 12 Treatment of articles by dipping and pouring - short term local

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
inhalation, shortterm local	0.12511 mg/m^3	0.750 mg/m^3	0.166813

3.3.32 Contributing Scenario (32) controlling industrial worker exposure for PROC 14
Industrial use of preparations containing formaldehyde up to 5% CS 13 Production of preparations or articles by tabletting, compression, extrusion, pelletisation - long term local

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
dermal, longterm systemic	0.171429 mg/kg bw/day	240 mg/kg bw/day	0.000714
inhalation, longterm local	0.187664 mg/m^3	0.375 mg/m^3	0.500438

3.3.33 Contributing Scenario (33) controlling industrial worker exposure for PROC 14
Industrial use of preparations containing formaldehyde up to 5% CS 13 Production of preparations or articles by tabletting, compression, extrusion, pelletisation - short term local

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
inhalation, shortterm local	0.187664 mg/m^3	0.750 mg/m^3	0.250219

3.3.34 Contributing Scenario (34) controlling industrial worker exposure for PROC 15
Industrial use of preparations containing formaldehyde up to 5% CS 14 Use of laboratory reagents in small scale laboratories - long term local

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
dermal, longterm systemic	0.017143 mg/kg bw/day	240 mg/kg bw/day	0.000071
inhalation, longterm local	0.062555 mg/m^3	0.375 mg/m^3	0.166813

3.3.35 Contributing Scenario (35) controlling industrial worker exposure for PROC 15
Industrial use of preparations containing formaldehyde up to 5% CS 14 Use of laboratory reagents in small scale laboratories - short term local

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
inhalation, shortterm local	0.062555 mg/m^3	0.750 mg/m^3	0.083406

3.3.36 Contributing Scenario (36) controlling industrial worker exposure for PROC 16
Industrial use of preparations containing formaldehyde up to 5% CS 15 Using material as fuel sources, limited exposure to unburned product to be expected - long term local

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
dermal, longterm systemic	0.017143 mg/kg bw/day	240 mg/kg bw/day	0.000071
inhalation, longterm local	0.12511 mg/m^3	0.375 mg/m^3	0.333626

3.3.37 Contributing Scenario (37) controlling industrial worker exposure for PROC 16
Industrial use of preparations containing formaldehyde up to 5% CS 15 Using material as fuel sources, limited exposure to unburned product to be expected - short term local

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
inhalation, shortterm local	0.12511 mg/m^3	0.750 mg/m^3	0.166813

3.3.38 Contributing Scenario (38) controlling industrial worker exposure for PROC 21
Industrial use of preparations containing formaldehyde up to 5% CS 16 Low energy manipulation of substances bound in materials and/or articles - long term local

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
dermal, longterm systemic	0.141429 mg/kg bw/day	240 mg/kg bw/day	0.000589
inhalation, longterm local	0.300 mg/m^3	0.375 mg/m^3	0.800

3.3.39 Contributing Scenario (39) controlling industrial worker exposure for PROC 21
Industrial use of preparations containing formaldehyde up to 5% CS 16 Low energy manipulation of substances bound in materials and/or articles - short term local

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
inhalation, shortterm local	0.300 mg/m^3	0.750 mg/m^3	0.400

3.3.40 Contributing Scenario (40) controlling industrial worker exposure for PROC 22C
Industrial use of preparations containing formaldehyde up to 5% CS 17 Potentially closed processing operations with minerals/metals at elevated temperature - long term local

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
dermal, longterm systemic	0.141429 mg/kg bw/day	240 mg/kg bw/day	0.000589
inhalation, longterm local	0.300 mg/m^3	0.375 mg/m^3	0.800

3.3.41 Contributing Scenario (41) controlling industrial worker exposure for PROC 22C
Industrial use of preparations containing formaldehyde up to 5% CS 17 Potentially closed processing operations with minerals/metals at elevated temperature - short term local

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
inhalation, shortterm local	0.300 mg/m^3	0.750 mg/m^3	0.400

3.3.42 Contributing Scenario (42) controlling industrial worker exposure for PROC 23C
Industrial use of preparations containing formaldehyde up to 5% CS 18 Open processing and transfer operations with minerals/metals at elevated temperature - long term local

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
dermal, longterm systemic	0.070714 mg/kg bw/day	240 mg/kg bw/day	0.000295
inhalation, longterm local	0.300 mg/m^3	0.375 mg/m^3	0.800

3.3.43 Contributing Scenario (43) controlling industrial worker exposure for PROC 23C
Industrial use of preparations containing formaldehyde up to 5% CS 18 Open processing and transfer operations with minerals/metals at elevated temperature - short term local

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
inhalation, shortterm local	0.300 mg/m^3	0.750 mg/m^3	0.400

3.3.44 Contributing Scenario (44) controlling industrial worker exposure for PROC 24C
Industrial use of preparations containing formaldehyde up to 5% CS 19 High (mechanical) energy work-up of substances bound in materials and/or articles - long term local

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
dermal, longterm systemic	0.141429 mg/kg bw/day	240 mg/kg bw/day	0.000589
inhalation, longterm local	0.200 mg/m^3	0.375 mg/m^3	0.533333

3.3.45 Contributing Scenario (45) controlling industrial worker exposure for PROC 24C
Industrial use of preparations containing formaldehyde up to 5% CS 19 High (mechanical) energy work-up of substances bound in materials and/or articles - short term local

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
inhalation, shortterm local	0.200 mg/m^3	0.750 mg/m^3	0.266667

3.3.46 Contributing Scenario (46) controlling industrial worker exposure for PROC 25C
Industrial use of preparations containing formaldehyde up to 5% CS 20 Other hot work operations with metals - long term local

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
dermal, longterm systemic	0.014143 mg/kg bw/day	240 mg/kg bw/day	0.000059
inhalation, longterm local	0.150 mg/m^3	0.375 mg/m^3	0.400

3.3.47 Contributing Scenario (47) controlling industrial worker exposure for PROC 25C
Industrial use of preparations containing formaldehyde up to 5% CS 20 Other hot work operations with metals - short term local

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
inhalation, shortterm local	0.150 mg/m^3	0.750 mg/m^3	0.200

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

Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

4.1 Scenario 3: Industrial use of preparations containing formaldehyde up to 25%

This scenario is described by the following combinations of use descriptors. The corresponding contributing scenarios are described in the respective subchapters.

Description of ES 3

Free short title	Industrial use of preparations containing formaldehyde up to 25%
Systematic title based on use descriptor	ERC 2, 3, 4, 5, 6C, 6D; PROC 5, 8A, 8B, 9, 13, 15
Name of constributing 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

4.2 Conditions of use affecting exposure

4.2.1 Contributing Scenario (1) controlling environmental exposure for ERC 2
4.2.2 Contributing Scenario (2) controlling environmental exposure for ERC 3
4.2.3 Contributing Scenario (3) controlling environmental exposure for ERC 4
4.2.4 Contributing Scenario (4) controlling environmental exposure for ERC 5
4.2.5 Contributing Scenario (5) controlling environmental exposure for ERC 6C
4.2.6 Contributing Scenario (6) controlling environmental exposure for ERC 6D

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

4.2.7 Contributing Scenario (7) controlling industrial worker exposure for PROC 5

Name of contributing scenario	PROC 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
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 1.1 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 %

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

Name of contributing scenario	PROC 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
Qualitative Risk Assessment	
General	Reduce concentration to less than 25% Ensure good work practices are implemented
Eyes	Use suitable eye protection.
Title.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 1.1 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 %

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

Name of contributing scenario	PROC 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
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 1.1 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 %

4.2.10 Contributing Scenario (10) controlling industrial worker exposure for PROC 8A

Name of contributing scenario	PROC 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
Qualitative Risk Assessment	
General	Reduce concentration to less than 25% Ensure good work practices are implemented
Eyes	Use suitable eye protection.
Title.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 1.1 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 %

4.2.11 Contributing Scenario (11) controlling industrial worker exposure for PROC 8B

Name of contributing scenario	PROC 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
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 1.1 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 %

4.2.12 Contributing Scenario (12) controlling industrial worker exposure for PROC 8B

Name of contributing scenario	PROC 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
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.
Title.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 1.1 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

4.2.13 Contributing Scenario (13) controlling industrial worker exposure for PROC 9

Name of contributing scenario	PROC 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
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 1.1 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

4.2.14 Contributing Scenario (14) controlling industrial worker exposure for PROC 9

Name of contributing scenario	PROC 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

Qualitative Risk Assessment	
General	Reduce concentration to less than 25% Ensure good work practices are implemented
Eyes	Use suitable eye protection.
Title.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 1.1 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

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

Name of contributing scenario	PROC 13 Treatment of articles by dipping and pouring
Scenario subtitle	CS 5 Treatment of articles by dipping and pouring - long term local
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 1.1 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 %

4.2.16 Contributing Scenario (16) controlling industrial worker exposure for PROC 13

Name of contributing scenario	PROC 13 Treatment of articles by dipping and pouring
Scenario subtitle	CS 5 Treatment of articles by dipping and pouring - short term local
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.
Title.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 1.1 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 %

4.2.17 Contributing Scenario (17) controlling industrial worker exposure for PROC 15

Name of contributing scenario	PROC 15 Use of laboratory reagents in small scale laboratories
Scenario subtitle	CS 6 Use as a laboratory reagent - long term local
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 1.1 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).)*

4.2.18 Contributing Scenario (18) controlling industrial worker exposure for PROC 15

Name of contributing scenario	PROC 15 Use of laboratory reagents in small scale laboratories
Scenario subtitle	CS 6 Use as a laboratory reagent - short term local
Qualitative Risk Assessment	
General	Reduce concentration to less than 25% Ensure good work practices are implemented
Eyes	Use suitable eye protection.
Title.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 1.1 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).)*

4.3 Exposure estimation

4.3.1 Contributing Scenario (1) controlling environmental exposure for ERC2
Industrial use of preparations containing formaldehyde up to 25%

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

4.3.2 Contributing Scenario (2) controlling environmental exposure for ERC3
Industrial use of preparations containing formaldehyde up to 25%

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

4.3.3 Contributing Scenario (3) controlling environmental exposure for ERC4
Industrial use of preparations containing formaldehyde up to 25%

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

4.3.4 Contributing Scenario (4) controlling environmental exposure for ERC5
Industrial use of preparations containing formaldehyde up to 25%

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

4.3.5 Contributing Scenario (5) controlling environmental exposure for ERC6C
Industrial use of preparations containing formaldehyde up to 25%

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

4.3.6 Contributing Scenario (6) controlling environmental exposure for ERC6D
Industrial use of preparations containing formaldehyde up to 25%

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

4.3.7 Contributing Scenario (7) controlling industrial worker exposure for PROC 5
Industrial use of preparations containing formaldehyde up to 25% CS 1 Mixing or blending in batch process (multistage and/or significant contact) - long term local

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
dermal, longterm systemic	0.164571 mg/kg bw/day	240 mg/kg bw/day	0.000686
inhalation, longterm local	0.187664 mg/m^3	0.375 mg/m^3	0.500438

4.3.8 Contributing Scenario (8) controlling industrial worker exposure for PROC 5
Industrial use of preparations containing formaldehyde up to 25% CS 1 Mixing or blending in batch process (multistage and/or significant contact) - short term local

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
inhalation, shortterm local	0.187664 mg/m^3	0.750 mg/m^3	0.250219

4.3.9 Contributing Scenario (9) controlling industrial worker exposure for PROC 8A
Industrial use of preparations containing formaldehyde up to 25% CS 2 Transfer of chemicals from/to vessels/large containers at non-dedicated facilities - long term local

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
dermal, longterm systemic	0.274286 mg/kg bw/day	240 mg/kg bw/day	0.001143
inhalation, longterm local	0.12511 mg/m^3	0.375 mg/m^3	0.333626

4.3.10 Contributing Scenario (10) controlling industrial worker exposure for PROC 8A
Industrial use of preparations containing formaldehyde up to 25% CS 2 Transfer of chemicals from/to vessels/large containers at non-dedicated facilities - short term local

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
inhalation, shortterm local	0.12511 mg/m^3	0.750 mg/m^3	0.166813

4.3.11 Contributing Scenario (11) controlling industrial worker exposure for PROC 8B
Industrial use of preparations containing formaldehyde up to 25% CS 3 Transfer of chemicals from/to vessels/large containers at dedicated facilities - long term local

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
dermal, longterm systemic	0.164571 mg/kg bw/day	240 mg/kg bw/day	0.000686
inhalation, longterm local	0.046916 mg/m^3	0.375 mg/m^3	0.12511

4.3.12 Contributing Scenario (12) controlling industrial worker exposure for PROC 8B
Industrial use of preparations containing formaldehyde up to 25% CS 3 Transfer of chemicals from/to vessels/large containers at dedicated facilities - short term local

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
inhalation, shortterm local	0.469161 mg/m^3	0.750 mg/m^3	0.625548

4.3.13 Contributing Scenario (13) controlling industrial worker exposure for PROC 9
Industrial use of preparations containing formaldehyde up to 25% CS 4 Transfer of chemicals into small containers (dedicated filling line) - long term local

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
dermal, longterm systemic	0.137143 mg/kg bw/day	240 mg/kg bw/day	0.000571
inhalation, longterm local	0.187664 mg/m^3	0.375 mg/m^3	0.500438

4.3.14 Contributing Scenario (14) controlling industrial worker exposure for PROC 9
Industrial use of preparations containing formaldehyde up to 25% CS 4 Transfer of chemicals into small containers (dedicated filling line) - short term local

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
inhalation, shortterm local	0.187664 mg/m^3	0.750 mg/m^3	0.250219

4.3.15 Contributing Scenario (15) controlling industrial worker exposure for PROC 13
Industrial use of preparations containing formaldehyde up to 25% CS 5 Treatment of articles by dipping and pouring - long term local

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
dermal, longterm systemic	0.164571 mg/kg bw/day	240 mg/kg bw/day	0.000686
inhalation, longterm local	0.187664 mg/m^3	0.375 mg/m^3	0.500438

4.3.16 Contributing Scenario (16) controlling industrial worker exposure for PROC 13
Industrial use of preparations containing formaldehyde up to 25% CS 5 Treatment of articles by dipping and pouring - short term local

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
inhalation, shortterm local	0.187664 mg/m^3	0.750 mg/m^3	0.250219

4.3.17 Contributing Scenario (17) controlling industrial worker exposure for PROC 15
Industrial use of preparations containing formaldehyde up to 25% CS 6 Use as a laboratory reagent - long term local

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
dermal, longterm systemic	0.006857 mg/kg bw/day	240 mg/kg bw/day	0.000029
inhalation, longterm local	0.12511 mg/m^3	0.375 mg/m^3	0.333626

4.3.18 Contributing Scenario (18) controlling industrial worker exposure for PROC 15
Industrial use of preparations containing formaldehyde up to 25% CS 6 Use as a laboratory reagent - short term local

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
inhalation, shortterm local	0.12511 mg/m^3	0.750 mg/m^3	0.166813

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

Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

5.1 Scenario 4: Professional use of preparations containing formaldehyde up to 1.5%

This scenario is described by the following combinations of use descriptors. The corresponding contributing scenarios are described in the respective subchapters.

Description of ES 4

Free short title	Professional use of preparations containing formaldehyde up to 1.5%
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 constributing 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

5.2 Conditions of use affecting exposure

5.2.1 Contributing Scenario (1) controlling environmental exposure for ERC 8A
5.2.2 Contributing Scenario (2) controlling environmental exposure for ERC 8B
5.2.3 Contributing Scenario (3) controlling environmental exposure for ERC 8C
5.2.4 Contributing Scenario (4) controlling environmental exposure for ERC 8D
5.2.5 Contributing Scenario (5) controlling environmental exposure for ERC 8F

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

5.2.6 Contributing Scenario (6) controlling professional worker exposure for PROC 5

Name of contributing scenario	PROC 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
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 1.1 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 %

5.2.7 Contributing Scenario (7) controlling professional worker exposure for PROC 5

Name of contributing scenario	PROC 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
Qualitative Risk Assessment	
General	Reduce concentration to less than 1.5% Ensure good work practices are implemented
Title.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 1.1 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 %

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

Name of contributing scenario	PROC 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
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 1.1 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 %

5.2.9 Contributing Scenario (9) controlling professional worker exposure for PROC 8A

Name of contributing scenario	PROC 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
Qualitative Risk Assessment	
General	Reduce concentration to less than 1.5% Ensure good work practices are implemented
Title.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 1.1 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 %

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

Name of contributing scenario	PROC 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
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 1.1 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 %

5.2.11 Contributing Scenario (11) controlling professional worker exposure for PROC 8B

Name of contributing scenario	PROC 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
Qualitative Risk Assessment	
General	Reduce concentration to less than 1.5% Ensure good work practices are implemented
Title.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 1.1 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 %

5.2.12 Contributing Scenario (12) controlling professional worker exposure for PROC 10

Name of contributing scenario	PROC 10 Roller application or brushing
Scenario subtitle	CS 4a Roller application or brushing- long term local outdoors
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 1.1 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%)*

5.2.13 Contributing Scenario (13) controlling professional worker exposure for PROC 10

Name of contributing scenario	PROC 10 Roller application or brushing
Scenario subtitle	CS 4a Roller application or brushing - short term local outdoors
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.
Title.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 1.1 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%)*

5.2.14 Contributing Scenario (14) controlling professional worker exposure for PROC 10

Name of contributing scenario	PROC 10 Roller application or brushing
Scenario subtitle	CS 4b Roller application or brushing- long term local indoors
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 1.1 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 %

5.2.15 Contributing Scenario (15) controlling professional worker exposure for PROC 10

Name of contributing scenario	PROC 10 Roller application or brushing
Scenario subtitle	CS 4b Roller application or brushing - short term local indoors
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.
Title.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 1.1 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 %

5.2.16 Contributing Scenario (16) controlling professional worker exposure for PROC 11

Name of contributing scenario	PROC 11 Non industrial spraying
Scenario subtitle	CS 5a Professional spraying - long term local outdoors
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 1.1 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%

5.2.17 Contributing Scenario (17) controlling professional worker exposure for PROC 11

Name of contributing scenario	PROC 11 Non industrial spraying
Scenario subtitle	CS 5a Professional spraying - short term local outdoors
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.
Title.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 1.1 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.

5.2.18 Contributing Scenario (18) controlling professional worker exposure for PROC 11

Name of contributing scenario	PROC 11 Non industrial spraying
Scenario subtitle	CS 5b Professional spraying - long term local indoors
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 1.1 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%

5.2.19 Contributing Scenario (19) controlling professional worker exposure for PROC 11

Name of contributing scenario	PROC 11 Non industrial spraying
Scenario subtitle	CS 5b Professional spraying - short term local indoors
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.
Title.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 1.1 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.

5.2.20 Contributing Scenario (20) controlling professional worker exposure for PROC 13

Name of contributing scenario	PROC 13 Treatment of articles by dipping and pouring
Scenario subtitle	CS 6 Treatment of articles by dipping and pouring - long term local
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 1.1 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 %

5.2.21 Contributing Scenario (21) controlling professional worker exposure for PROC 13

Name of contributing scenario	PROC 13 Treatment of articles by dipping and pouring
Scenario subtitle	CS 6 Treatment of articles by dipping and pouring - short term local
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.
Title.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 1.1 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 %

5.2.22 Contributing Scenario (22) controlling professional worker exposure for PROC 15

Name of contributing scenario	PROC 15 Use of laboratory reagents in small scale laboratories
Scenario subtitle	CS 7 Use of laboratory reagents in small scale laboratories - long term local
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 1.1 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).)*

5.2.23 Contributing Scenario (23) controlling professional worker exposure for PROC 15

Name of contributing scenario	PROC 15 Use of laboratory reagents in small scale laboratories
Scenario subtitle	CS 7 Use of laboratory reagents in small scale laboratories - short term local
Qualitative Risk Assessment	
General	Reduce concentration to less than 1.5% Ensure good work practices are implemented
Title.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 1.1 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).)*

5.2.24 Contributing Scenario (24) controlling professional worker exposure for PROC 16

Name of contributing scenario	PROC 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
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 1.1 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

5.2.25 Contributing Scenario (25) controlling professional worker exposure for PROC 16

Name of contributing scenario	PROC 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
Qualitative Risk Assessment	
General	Reduce concentration to less than 1.5% Ensure good work practices are implemented
Title.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 1.1 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

5.2.26 Contributing Scenario (26) controlling professional worker exposure for PROC 21

Name of contributing scenario	PROC 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
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 1.1 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 %

5.2.27 Contributing Scenario (27) controlling professional worker exposure for PROC 21

Name of contributing scenario	PROC 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
Qualitative Risk Assessment	
General	Reduce concentration to less than 1.5% Ensure good work practices are implemented
Title.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 1.1 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 %

5.2.28 Contributing Scenario (28) controlling professional worker exposure for PROC 23C

Name of contributing scenario	PROC 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
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 1.1 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 %

5.2.29 Contributing Scenario (29) controlling professional worker exposure for PROC 23C

Name of contributing scenario	PROC 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
Qualitative Risk Assessment	
General	Reduce concentration to less than 1.5% Ensure good work practices are implemented
Title.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 1.1 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 %

5.2.30 Contributing Scenario (30) controlling professional worker exposure for PROC 24C

Name of contributing scenario	PROC 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
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 1.1 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 %

5.2.31 Contributing Scenario (31) controlling professional worker exposure for PROC 24C

Name of contributing scenario	PROC 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
Qualitative Risk Assessment	
General	Reduce concentration to less than 1.5% Ensure good work practices are implemented
Title.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 1.1 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 %

5.2.32 Contributing Scenario (32) controlling professional worker exposure for PROC 25C

Name of contributing scenario	PROC 25c Other hot work operations with metals - pt > mp - High Fugacity
Scenario subtitle	CS 12 Other hot work operations with metals - long term local
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 1.1 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 %

5.2.33 Contributing Scenario (33) controlling professional worker exposure for PROC 25C

Name of contributing scenario	PROC 25c Other hot work operations with metals - pt > mp - High Fugacity
Scenario subtitle	CS 12 Other hot work operations with metals - short term local
Qualitative Risk Assessment	
General	Reduce concentration to less than 1.5% Ensure good work practices are implemented
Title.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 1.1 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 %

5.3 Exposure estimation

5.3.1 Contributing Scenario (1) controlling environmental exposure for ERC8A
Professional use of preparations containing formaldehyde up to 1.5%

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

5.3.2 Contributing Scenario (2) controlling environmental exposure for ERC8B
Professional use of preparations containing formaldehyde up to 1.5%

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

5.3.3 Contributing Scenario (3) controlling environmental exposure for ERC8C
Professional use of preparations containing formaldehyde up to 1.5%

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

5.3.4 Contributing Scenario (4) controlling environmental exposure for ERC8D
Professional use of preparations containing formaldehyde up to 1.5%

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

5.3.5 Contributing Scenario (5) controlling environmental exposure for ERC8F
Professional use of preparations containing formaldehyde up to 1.5%

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

5.3.6 Contributing Scenario (6) controlling professional worker exposure for PROC 5
Professional use of preparations containing formaldehyde up to 1.5% CS 1 Mixing or blending in batch processes (multistage and/or significant contact) - long term local

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
dermal, longterm systemic	0.685714 mg/kg bw/day	240 mg/kg bw/day	0.002857
inhalation, longterm local	0.175153 mg/m^3	0.375 mg/m^3	0.467076

5.3.7 Contributing Scenario (7) controlling professional worker exposure for PROC 5
Professional use of preparations containing formaldehyde up to 1.5% CS 1 Mixing or blending in batch processes (multistage and/or significant contact) - short term local

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
inhalation, shortterm local	0.175153 mg/m^3	0.750 mg/m^3	0.233538

5.3.8 Contributing Scenario (8) controlling professional worker exposure for PROC 8A
Professional use of preparations containing formaldehyde up to 1.5% CS 2 Transfer of chemicals from/to vessels/ large containers at non-dedicated facilities - long term local

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
dermal, longterm systemic	0.685714 mg/kg bw/day	240 mg/kg bw/day	0.002857
inhalation, longterm local	0.218942 mg/m^3	0.375 mg/m^3	0.583845

5.3.9 Contributing Scenario (9) controlling professional worker exposure for PROC 8A
Professional use of preparations containing formaldehyde up to 1.5% CS 2 Transfer of chemicals from/to vessels/ large containers at non-dedicated facilities - short term local

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
inhalation, shortterm local	0.218942 mg/m^3	0.750 mg/m^3	0.291922

5.3.10 Contributing Scenario (10) controlling professional worker exposure for PROC 8B
Professional use of preparations containing formaldehyde up to 1.5% CS 3 Transfer of chemicals from/to vessels/ large containers at dedicated facilities - long term local

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
dermal, longterm systemic	0.685714 mg/kg bw/day	240 mg/kg bw/day	0.002857
inhalation, longterm local	0.087577 mg/m^3	0.375 mg/m^3	0.233538

5.3.11 Contributing Scenario (11) controlling professional worker exposure for PROC 8B
Professional use of preparations containing formaldehyde up to 1.5% CS 3 Transfer of chemicals from/to vessels/ large containers at dedicated facilities - short term local

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
inhalation, shortterm local	0.087577 mg/m^3	0.750 mg/m^3	0.116769

5.3.12 Contributing Scenario (12) controlling professional worker exposure for PROC 10
Professional use of preparations containing formaldehyde up to 1.5% CS 4a Roller application or brushing- long term local outdoors

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
dermal, longterm systemic	1.371 mg/kg bw/day	240 mg/kg bw/day	0.005714
inhalation, longterm local	0.218942 mg/m^3	0.375 mg/m^3	0.583845

5.3.13 Contributing Scenario (13) controlling professional worker exposure for PROC 10
Professional use of preparations containing formaldehyde up to 1.5% CS 4a Roller application or brushing - short term local outdoors

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
inhalation, shortterm local	0.218942 mg/m^3	0.750 mg/m^3	0.291922

5.3.14 Contributing Scenario (14) controlling professional worker exposure for PROC 10
Professional use of preparations containing formaldehyde up to 1.5% CS 4b Roller application or brushing- long term local indoors

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
dermal, longterm systemic	1.371 mg/kg bw/day	240 mg/kg bw/day	0.005714
inhalation, longterm local	0.218942 mg/m^3	0.375 mg/m^3	0.583845

5.3.15 Contributing Scenario (15) controlling professional worker exposure for PROC 10
Professional use of preparations containing formaldehyde up to 1.5% CS 4b Roller application or brushing - short term local indoors

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
inhalation, shortterm local	0.218942 mg/m^3	0.750 mg/m^3	0.291922

5.3.16 Contributing Scenario (16) controlling professional worker exposure for PROC 11
Professional use of preparations containing formaldehyde up to 1.5% CS 5a Professional spraying - long term local outdoors

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
dermal, longterm systemic	5.357 mg/kg bw/day	240 mg/kg bw/day	0.022321
inhalation, longterm local (measured / external: 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%)	0.280 mg/m^3	0.375 mg/m^3	0.746667

5.3.17 Contributing Scenario (17) controlling professional worker exposure for PROC 11
Professional use of preparations containing formaldehyde up to 1.5% CS 5a Professional spraying - short term local outdoors

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
inhalation, shortterm local (measured / external: 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.)	0.560 mg/m^3	0.750 mg/m^3	0.746667

5.3.18 Contributing Scenario (18) controlling professional worker exposure for PROC 11
Professional use of preparations containing formaldehyde up to 1.5% CS 5b Professional spraying - long term local indoors

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
dermal, longterm systemic	5.357 mg/kg bw/day	240 mg/kg bw/day	0.022321
inhalation, longterm local (measured / external: 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%)	0.210 mg/m^3	0.375 mg/m^3	0.560

5.3.19 Contributing Scenario (19) controlling professional worker exposure for PROC 11
Professional use of preparations containing formaldehyde up to 1.5% CS 5b Professional spraying - short term local indoors

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
inhalation, shortterm local (measured / external: 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.)	0.410 mg/m^3	0.750 mg/m^3	0.546667

5.3.20 Contributing Scenario (20) controlling professional worker exposure for PROC 13
Professional use of preparations containing formaldehyde up to 1.5% CS 6 Treatment of articles by dipping and pouring - long term local

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
dermal, longterm systemic	0.685714 mg/kg bw/day	240 mg/kg bw/day	0.002857
inhalation, longterm local	0.175153 mg/m^3	0.375 mg/m^3	0.467076

5.3.21 Contributing Scenario (21) controlling professional worker exposure for PROC 13
Professional use of preparations containing formaldehyde up to 1.5% CS 6 Treatment of articles by dipping and pouring - short term local

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
inhalation, shortterm local	0.175153 mg/m^3	0.750 mg/m^3	0.233538

5.3.22 Contributing Scenario (22) controlling professional worker exposure for PROC 15
Professional use of preparations containing formaldehyde up to 1.5% CS 7 Use of laboratory reagents in small scale laboratories - long term local

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
dermal, longterm systemic	0.017143 mg/kg bw/day	240 mg/kg bw/day	0.000071
inhalation, longterm local	0.062555 mg/m^3	0.375 mg/m^3	0.166813

5.3.23 Contributing Scenario (23) controlling professional worker exposure for PROC 15
Professional use of preparations containing formaldehyde up to 1.5% CS 7 Use of laboratory reagents in small scale laboratories - short term local

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
inhalation, shortterm local	0.062555 mg/m^3	0.750 mg/m^3	0.083406

5.3.24 Contributing Scenario (24) controlling professional worker exposure for PROC 16
Professional use of preparations containing formaldehyde up to 1.5% CS 8 Using material as fuel sources, limited exposure to unburned product to be expected - long term local

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
dermal, longterm systemic	0.017143 mg/kg bw/day	240 mg/kg bw/day	0.000071
inhalation, longterm local	0.175153 mg/m^3	0.375 mg/m^3	0.467076

5.3.25 Contributing Scenario (25) controlling professional worker exposure for PROC 16
Professional use of preparations containing formaldehyde up to 1.5% CS 8 Using material as fuel sources, limited exposure to unburned product to be expected - short term local

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
inhalation, shortterm local	0.175153 mg/m^3	0.750 mg/m^3	0.233538

5.3.26 Contributing Scenario (26) controlling professional worker exposure for PROC 21
Professional use of preparations containing formaldehyde up to 1.5% CS 9 Low energy manipulation of substances bound in materials and/or articles - long term local

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
dermal, longterm systemic	0.141429 mg/kg bw/day	240 mg/kg bw/day	0.000589
inhalation, longterm local	0.280 mg/m^3	0.375 mg/m^3	0.746667

5.3.27 Contributing Scenario (27) controlling professional worker exposure for PROC 21
Professional use of preparations containing formaldehyde up to 1.5% CS 9 Low energy manipulation of substances bound in materials and/or articles- short term local

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
inhalation, shortterm local	0.280 mg/m^3	0.750 mg/m^3	0.373333

5.3.28 Contributing Scenario (28) controlling professional worker exposure for PROC 23C
Professional use of preparations containing formaldehyde up to 1.5% CS 10 Open processing and transfer operations with minerals/metals at elevated temperature - long term local

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
dermal, longterm systemic	0.070714 mg/kg bw/day	240 mg/kg bw/day	0.000295
inhalation, longterm local	0.280 mg/m^3	0.375 mg/m^3	0.746667

5.3.29 Contributing Scenario (29) controlling professional worker exposure for PROC 23C
Professional use of preparations containing formaldehyde up to 1.5% CS 10 Open processing and transfer operations with minerals/metals at elevated temperature - short term local

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
inhalation, shortterm local	0.280 mg/m^3	0.750 mg/m^3	0.373333

5.3.30 Contributing Scenario (30) controlling professional worker exposure for PROC 24C
Professional use of preparations containing formaldehyde up to 1.5% CS 11 High (mechanical) energy work-up of substances bound in materials and/or articles - long term local

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
dermal, longterm systemic	0.141429 mg/kg bw/day	240 mg/kg bw/day	0.000589
inhalation, longterm local	0.175 mg/m^3	0.375 mg/m^3	0.466667

5.3.31 Contributing Scenario (31) controlling professional worker exposure for PROC 24C
Professional use of preparations containing formaldehyde up to 1.5% CS 11 High (mechanical) energy work-up of substances bound in materials and/or articles - short term local

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
inhalation, shortterm local	0.175 mg/m^3	0.750 mg/m^3	0.233333

5.3.32 Contributing Scenario (32) controlling professional worker exposure for PROC 25C
Professional use of preparations containing formaldehyde up to 1.5% CS 12 Other hot work operations with metals - long term local

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
dermal, longterm systemic	0.014143 mg/kg bw/day	240 mg/kg bw/day	0.000059
inhalation, longterm local	0.200 mg/m^3	0.375 mg/m^3	0.533333

5.3.33 Contributing Scenario (33) controlling professional worker exposure for PROC 25C
Professional use of preparations containing formaldehyde up to 1.5% CS 12 Other hot work operations with metals - short term local

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
inhalation, shortterm local	0.200 mg/m^3	0.750 mg/m^3	0.266667

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

Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

6.1 Scenario 5: Professional use of preparations containing formaldehyde up to 5%

This scenario is described by the following combinations of use descriptors. The corresponding contributing scenarios are described in the respective subchapters.

Description of ES 5

Free short title	Professional use of preparations containing formaldehyde up to 5%
Systematic title based on use descriptor	ERC 8A; PROC 8A, 11, 13, 15
Name of constributing 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

6.2 Conditions of use affecting exposure

6.2.1 Contributing Scenario (1) controlling environmental exposure for ERC 8A

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

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

Name of contributing scenario	PROC 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
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 1.1 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 %

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

Name of contributing scenario	PROC 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
Qualitative Risk Assessment	
General	Reduce concentration to less than 5% Ensure good work practices are implemented
Eyes	Use suitable eye protection.
Title.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 1.1 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 %

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

Name of contributing scenario	PROC 11 Non industrial spraying
Scenario subtitle	CS 2 Professional spraying - long term local
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 1.1 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 m^3 Work area: Indoors Duration (mins): 30 Ventilation rate: Specialised room ventilation with more than 10 ACH Use of respiratory protection effectiveness 95%

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

Name of contributing scenario	PROC 11 Non industrial spraying
Scenario subtitle	CS 2 Professional spraying - short term local
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.
Title.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 1.1 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.

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

Name of contributing scenario	PROC 13 Treatment of articles by dipping and pouring
Scenario subtitle	CS 3 Treatment of articles by dipping and pouring - long term local
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 1.1 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 %

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

Name of contributing scenario	PROC 13 Treatment of articles by dipping and pouring
Scenario subtitle	CS 3 Treatment of articles by dipping and pouring - short term local
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 1.1 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 %

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

Name of contributing scenario	PROC 15 Use of laboratory reagents in small scale laboratories
Scenario subtitle	CS 4 Use of laboratory reagents in small scale laboratories - long term local
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 1.1 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).)*

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

Name of contributing scenario	PROC 15 Use of laboratory reagents in small scale laboratories
Scenario subtitle	CS 4 Use of laboratory reagents in small scale laboratories - short term local
Qualitative Risk Assessment	
General	Reduce concentration to less than 5% Ensure good work practices are implemented
Eyes	Use suitable eye protection.
Title.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 1.1 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).)*

6.3 Exposure estimation

6.3.1 Contributing Scenario (1) controlling environmental exposure for ERC8A
Professional use of preparations containing formaldehyde up to 5%

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

6.3.2 Contributing Scenario (2) controlling professional worker exposure for PROC 8A
Professional use of preparations containing formaldehyde up to 5% CS 1 Transfer of chemicals from/to vessels/ large containers at non-dedicated facilities - long term local

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
dermal, longterm systemic	0.685714 mg/kg bw/day	240 mg/kg bw/day	0.002857
inhalation, longterm local	0.312774 mg/m^3	0.375 mg/m^3	0.834064

6.3.3 Contributing Scenario (3) controlling professional worker exposure for PROC 8A
Professional use of preparations containing formaldehyde up to 5% CS 1 Transfer of chemicals from/to vessels/ large containers at non-dedicated facilities - short term local

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
inhalation, shortterm local	0.312774 mg/m^3	0.750 mg/m^3	0.417032

6.3.4 Contributing Scenario (4) controlling professional worker exposure for PROC 11
Professional use of preparations containing formaldehyde up to 5% CS 2 Professional spraying - long term local

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
dermal, longterm systemic	5.357 mg/kg bw/day	240 mg/kg bw/day	0.022321
inhalation, longterm local (measured / external: 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	0.320 mg/m^3	0.375 mg/m^3	0.853333

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
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%)			

6.3.5 Contributing Scenario (5) controlling professional worker exposure for PROC 11
Professional use of preparations containing formaldehyde up to 5% CS 2 Professional spraying - short term local

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
inhalation, shortterm local (measured / external: 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.)	0.630 mg/m^3	0.750 mg/m^3	0.840

6.3.6 Contributing Scenario (6) controlling professional worker exposure for PROC 13
Professional use of preparations containing formaldehyde up to 5% CS 3 Treatment of articles by dipping and pouring - long term local

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
dermal, longterm systemic	0.685714 mg/kg bw/day	240 mg/kg bw/day	0.002857
inhalation, longterm local	0.175153 mg/m^3	0.375 mg/m^3	0.467076

6.3.7 Contributing Scenario (7) controlling professional worker exposure for PROC 13
Professional use of preparations containing formaldehyde up to 5% CS 3 Treatment of articles by dipping and pouring - short term local

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
inhalation, shortterm local	0.250219 mg/m^3	0.750 mg/m^3	0.333626

6.3.8 Contributing Scenario (8) controlling professional worker exposure for PROC 15
Professional use of preparations containing formaldehyde up to 5% CS 4 Use of laboratory reagents in small scale laboratories - long term local

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
dermal, longterm systemic	0.017143 mg/kg bw/day	240 mg/kg bw/day	0.000071
inhalation, longterm local	0.062555 mg/m^3	0.375 mg/m^3	0.166813

6.3.9 Contributing Scenario (9) controlling professional worker exposure for PROC 15
Professional use of preparations containing formaldehyde up to 5% CS 4 Use of laboratory reagents in small scale laboratories - short term local

The quantitative risk characterisation for this worker exposure has been calculated by EasyTRA.

The following table shows the exposure estimations via the dermal and inhalatory route together with the total exposure of workers over all routes.

Route	Exposure concentration (EC)	DNEL	Risk characterisation ratio = EC/DNEL
inhalation, shortterm local	0.062555 mg/m^3	0.750 mg/m^3	0.083406

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

Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.