SEZIONE 1. IDENTIFICAZIONE DELLA SOSTANZA O DELLA MISCELA E DELLA SOCIETÀ/IMPRESA

1.1 Identificatore del prodotto

Nome sostanza:	Jet A-1
Sinonimi	Aviation Jet Fuel (tutti i tipi)
Numero CAS	n.a (Miscela)
Numero CE	n.a (Miscela)
Numero indice	n.a (Miscela)
Numero di Registrazione	n.a (Miscela)
UFI	J110-00PP-P006-MAGX

1.2 Usi pertinenti identificati della sostanza o della miscela e usi sconsigliati

USI COMUNI: carburante per motori a turbina.
USI IDENTIFICATI NELLA RELAZIONE DELLA SICUREZZA CHIMICA: elenco generico delle applicazioni:

- Uso industriale: distribuzione della sostanza (GEST1A_I) formulazione e (re)imballaggio delle sostanze e delle miscele (GEST2_I), utilizzo come carburante (GEST12_I)
- Uso professionale: utilizzo come carburante (GEST12_I)
- Consumatore (G28): utilizzo come carburante (GEST12_I)

USI SCONSIGLIATI: gli usi pertinenti sono sopra elencati. Non sono raccomandati altri usi a meno che non sia stata condotta una valutazione , prima dell'inizio di detto uso, che dimostri che i rischi connessi a tale uso sono controllati.

Consultare l'allegato per la lista completa degli impieghi per i quali è previsto uno scenario di esposizione.

1.3 Informazioni sul fornitore della scheda di dati di sicurezza:

Ragione sociale	italiana petroli S.p.A
Indirizzo	Viale Salaria, 1322
Città / Nazione	00138 - Roma - ITALIA
Telefono	+39.06.84931
E-mail Tecnico competente	*sicurezza@gruppoapi.com*

1.4 Numero telefonico di emergenza:

Centro Antiveleni Ospedale Niguarda (Milano): +39 02 66101029 (24 ore)
Centro Antiveleni del Policlinico A. Gemelli (Roma): +39 06 3054343 (24 ore)
Napoli Ospedali Riuniti Cardarelli Via Antonio Cardarelli 9: +39 081 5453333
Roma Policlinico Umberto I Viale del Policlinico: +39 06 490663
Roma "Osp. Pediatrico Bambino Gesù" Dip. Emergenza e Accettazione DEA: + 39 06 8593726
Foggia Az. Osp. Univ. Foggia: +39 800183459
Az. Osp. "Careggi" U.O. Tossicologia Medica, Firenze: +39 0557 947819
Centro Nazionale di Informazione Tossicologica, Pavia: +39 0382 24444
Azienda Ospedaliera Papa Giovanni XXII, Bergamo: +39 800883300

SEZIONE 2. IDENTIFICAZIONE DEI PERICOLI

Pericoli fisico-chimici: Miscela infiammabile.

Pericoli per la salute: La miscela ha effetti irritanti per la cute. può causare danni ai polmoni in caso di ingestione. L'inalazione dei vapori può provocare sonnolenza e vertigini. Può provocare il cancro.

Pericoli per l'ambiente: La miscela ha effetti tossici per gli organismi acquatici con effetti a lungo termine per l'ambiente acquatico.

2.1 Classificazione della sostanza o della miscela

Classificazione Regolamento (CE) 1272/2008 (CLP)

Flam. Liq. 3	H226
Skin Irrit. 2	H315
Asp. Tox. 1	H304
STOT SE Exp.3	H336
Aquatic Chronic 2	H411
Carc. 1B	H350

L'elenco delle indicazioni H estese è riportato in sezione 16.

2.2 Elementi dell'etichetta

Avvertenza: **PERICOLO**

Indicazioni di pericolo:

H226: Liquido e vapore infiammabile
H304: Può essere letale in caso di ingestione e di penetrazione nelle vie respiratorie
H315: Provoca irritazione cutanea
H336: Può provocare sonnolenza o vertigini
H411: Tossico per gli organismi acquatici con effetti di lunga durata
H350: Può provocare il cancro

Consigli di prudenza

Carattere generale

P102: Tenere fuori dalla portata dei bambini

Prevenzione

P210: Tenere lontano da fonti di calore, superfici riscaldate, scintille, fiamme e altre fonti di innesco.

Vietato fumare.
P280: Indossare guanti/indumenti protettivi/Proteggere gli occhi/il viso
Reazione
P301+310: IN CASO DI INGESTIONE: contattare immediatamente un CENTRO ANTIVELENI o un medico
P331 Non provocare il vomito
Smaltimento
P501: Smaltire il prodotto/recipiente in conformità al D.Lgs. 152/06 e s.m.i.

Per le misure di gestione dei rischi si faccia riferimento agli scenari di esposizione allegati.

Altre informazioni: nota H sezione 16.

2.3 Altri pericoli

In alcune circostanze, il prodotto può accumulare cariche elettrostatiche in quantità notevole, con rischio di scariche che possono innescare incendi o esplosioni. Il prodotto non soddisfa i criteri di classificazione PBT o vPvB di cui all'allegato XIII del Regolamento REACH. I vapori sono più pesanti dell'aria e possono accumularsi in spazi confinati.

La miscela non contiene nessuna sostanza che è valutata essere PBT o vPvB in concentrazione >= 0,1% Questo prodotto non contiene alcuna sostanza inclusa, a causa delle sue proprietà interferenti endocrine, nella lista redatta in accordo con l'articolo 59, par. 1, del Regolamento REACh, in concentrazione uguale o superiore a 0,1% in peso, nè alcuna sostanza riconosciuta interferente endocrina secondo i criteri indicati nel Regolamento Delegato della Commissione (EU) 2017/2100 o nel regolamento della Commissione 2018/605.

SEZIONE 3. COMPOSIZIONE / INFORMAZIONI SUGLI INGREDIENTI

3.1 Sostanze

n.a.

3.2 Miscele

Complesso UVCB (PrC3) Cherosene idrodesolforato, CAS 64742-81-0 EINECS 265-184-9 N. INDICE 649-423-00-8, n° Registrazione 01-2119462828-25-XXXX ("Combinazione complessa di idrocarburi prodotta da petrolio grezzo per trattamento con idrogeno per convertire lo zolfo organico a solfuro di idrogeno che è poi rimosso. È costituita da idrocarburi con numero di atomi di carbonio prevalentemente nell'intervallo C9-C16 e punto di ebollizione nell'intervallo 150°C - 290°C"): 0-100% in peso.

e/o

Complesso UVCB (PrC3) Cherosene (petrolio): CAS 8008-20-6 EINECS 232-366-4, N. INDICE 649-404-00-4, n° Registrazione 01-2119485517-27-XXXX ("Combinazione complessa di idrocarburi ottenuta per distillazione del grezzo. E' costituita da idrocarburi con un numero di atomi di carbonio prevalentemente nell'intervallo C9-C16 e punto di ebollizione nell'intervallo 150°C – 290°C ca): 0-100 % in peso.

Entrambe le sostanze sono classificate:

Classificazione Regolamento (CE) 1272/2008 (CLP)

Flam. Liq. 3 H226
Skin Irrit. 2 H315

Asp. Tox. 1	H304
STOT SE Exp.3	H336
Aquatic Chronic 2	H411
Carc. 1B	H350

Componente(i) pericoloso(i) contenuto(i) in UVCB e/o sostanza(i) multicostituente(i) conforme(i) ai criteri di classificazione e/o con un limite di esposizione (VLE):
Cumene CE: 202-704-5 Numero CAS: 98-82-8 (Flam. Liq. 3, H226 Carc. 1B, H350 STOT SE 3, H335 Asp. Tox. 1, H304 Aquatic Chronic 2, H411) **< 0,25 % p/p**

Non sono presenti ingredienti addizionali che, nelle conoscenze attuali del fornitore e nelle concentrazoni applicabili, siano classificati come pericolosi per la salute o per l'ambiente, rispondano ai criteri PBT o vPvB oppure siano considerati come sostanze con grado di problematicità equivalente o sostanze alle quali sia stato assegnato un limite di esposizione professionale e che debbano quindi essere riportati in questa sezione.

L'elenco delle indicazioni H estese è riportato in sezione 16.

SEZIONE 4. MISURE DI PRIMO SOCCORSO

4.1 Descrizione delle misure di primo soccorso

Contatto occhi: Risciacquare delicatamente con acqua per alcuni minuti; se presenti, rimuovere le lenti a contatto se la situazione consente di effettuare l'operazione con facilità. Continuare a risciacquare. Consultare immediatamente un medico nel caso in cui irritazioni, vista offuscata o gonfiore si sviluppano e persistono.

Contatto cutaneo: Rimuovere le calzature e gli indumenti contaminati e smaltirli in sicurezza. Lavare la parte interessata con acqua e sapone. In caso di irritazioni, gonfiore o rossore, consultare un medico specialista.

Per ustioni termiche minori, raffreddare la parte lesa. Tenere la parte ustionata sotto acqua corrente fredda per almeno 5 minuti, o fino a quando il dolore scompare. Evitare un'ipotermia generale. Durante l'utilizzo di apparecchiature ad alta pressione, può verificarsi una iniezione di prodotto. In caso di lesioni provocate dall'alta pressione, consultare immediatamente un medico. Non attendere la comparsa dei sintomi.

Ingestione/aspirazione: Non provocare il vomito per evitare il rischio di aspirazione. Non somministrare nulla per bocca a una persona in stato di incoscienza. In caso di ingestione, presumere sempre che sia avvenuta aspirazione. Trasportare immediatamente la vittima in ospedale. Non attendere la comparsa dei sintomi. In caso di vomito spontaneo, mantenere la testa in basso per evitare il rischio aspirazione del vomito nei polmoni.

Inalazione: L'inalazione dei vapori a temperatura ambiente è improbabile a causa della bassa pressione di vapore del prodotto. L'esposizione ai vapori può, tuttavia, avvenire quando la sostanza è manipolata a elevate temperature in condizioni di scarsa ventilazione. In caso di respirazione difficoltosa, portare l'infortunato all'aria aperta e mantenerla in una posizione comoda per la respirazione.
Se l'infortunato è incosciente e non respira, verificare l'assenza di ostacoli alla respirazione e praticare la respirazione artificiale da parte di personale specializzato. Se necessario, effettuare un massaggio cardiaco esterno e consultare un medico.

Se l'infortunato respira, mantenerlo in posizione laterale di sicurezza. Somministrare ossigeno se necessario.

4.2 Principali sintomi ed effetti sia acuti che ritardati

Sintomi:

- **Contatto con gli occhi:** arrossamenti, irritazioni, leggera irritazione agli occhi.
- **Per inalazione:** l'inalazione dei vapori può provocare mal di testa, nausea, vomito e uno stato di coscienza alterato.
- **Per ingestione:** pochi o nessun sintomo previsto. Eventualmente, possono presentarsi nausea e diarrea.
- **Contatto con la pelle:** I sintomi negativi possono comprendere i seguenti: irritazione rossore.

4.3 Indicazione della eventuale necessità di consultare immediatamente un medico e di trattamenti speciali

In caso di inalazione consultare un medico nel caso in cui la vittima si trovi in uno stato di coscienza alterato, o se i sintomi non scompaiono.

SEZIONE 5. MISURE DI LOTTA ANTINCENDIO

5.1 Mezzi di estinzione

Incendi di piccole dimensioni: terra o sabbia, anidride carbonica, schiuma, polvere chimica secca.
Incendi di grandi dimensioni: schiuma, acqua nebulizzata, altri gas inerti (come permessi dalla normativa).
Nota: l'uso di acqua a getto frazionato (acqua nebulizzata) è riservato al personale appositamente addestrato.
Mezzi di estinzione non adatti: non utilizzare getti d'acqua diretti sul prodotto che brucia, possono causare schizzi e diffondere l'incendio. Evitare l'utilizzo simultaneo di schiuma e acqua sulla stessa superficie poiché l'acqua distrugge la schiuma.

5.2 Pericoli speciali derivanti dalla sostanza o dalla miscela

La combustione incompleta potrebbe generare una complessa miscela di particelle solide e liquide aerodisperse e di gas, incluso CO (monossido di carbonio), SO_x (ossidi di zolfo) o H_2SO_4 (acido solforico), composti organici e inorganici non identificati.

5.3 Raccomandazioni per gli addetti all'estinzione degli incendi

In caso di incendio o in spazi confinati o scarsamente ventilati, indossare un indumento completo di protezione ignifugo e un respiratore autonomo dotato di maschera completa funzionante in pressione positiva. Non dovrà essere intrapresa alcuna azione che implichi qualsiasi rischio personale o senza l'addestramento appropriato. Spostare i contenitori lontano dall'area dell'incendio se non c'è alcun rischio. Usare l'acqua per raffreddare il serbatoito e le parti esposte al flusso termico non interessate però dalle fiamme

Speciali mezzi protettivi per il personale antincendio: I pompieri devono indossare equipaggiamento protettivo ed un autorespiratore (SCBA) con maschera a pieno facciale sul viso operante a pressione positiva. Gli indumenti per addetti all'estinzione degli incendi (compreso caschi, stivali protettivi e guanti) conformi alla norma europea EN 469 assicureranno una protezione di livello base per gli incidenti chimici.

Informazioni supplementari: Non considerato esplosivo in base al bilancio di ossigeno e alla struttura chimica
Nota: i guanti realizzati in PVA (olivinilalcool) non sono resistenti all'acqua e non sono adatti per uso di emergenza.

SEZIONE 6. MISURE IN CASO DI RILASCIO ACCIDENTALE

6.1 Precauzioni personali, dispositivi di protezione e procedure in caso di emergenza

Se le condizioni di sicurezza lo consentono, arrestare o contenere la perdita alla fonte. Evitare il contatto diretto con il materiale rilasciato. Rimanere sopravvento. In caso di sversamenti di grande entità, avvertire i residenti delle zone sottovento. Allontanare il personale non coinvolto dall'area dello sversamento. Avvertire le squadre di emergenza. Salvo in caso di versamenti di piccola entità, la fattibilità degli interventi deve sempre essere valutata e approvata, se possibile, da personale qualificato e competente incaricato di gestire l'emergenza. Eliminare tutte le fonti di accensione se le condizioni di sicurezza lo consentono (es.: elettricità, scintille, fuochi, fiaccole). Se richiesto, comunicare l'evento alle autorità preposte conformemente alla legislazione applicabile.
Sversamenti di piccola entità: i tradizionali indumenti di lavoro antistatici sono generalmente appropriati.
Sversamenti di grande entità: indumento di protezione totale resistente agli agenti chimici e realizzato in materiale antistatico. Guanti da lavoro che forniscano un'adeguata resistenza agli agenti chimici, in particolare agli idrocarburi aromatici. I guanti realizzati in PVA (polivinilalcool) non sono resistenti all'acqua e non sono adatti per uso di emergenza. Elmetto di protezione. Scarpe o stivali di sicurezza antistatici e antisdrucciolo. Occhiali di protezione o dispositivi di protezione per il viso se schizzi o contatto con gli occhi sono possibili o prevedibili. Protezione respiratoria: una semimaschera o una maschera intera dotata di filtro(i) per vapori organici o un respiratore autonomo possono essere utilizzati secondo l'entità dello sversamento e del livello prevedibile di esposizione. Nel caso in cui la situazione non possa essere completamente valutata o se c'è il rischio di carenza di ossigeno, utilizzare esclusivamente un respiratore autonomo.

6.2 Precauzioni ambientali

Evitare che il prodotto finisca nelle fognature, nei fiumi o in altri corpi d'acqua.

6.3 Metodi e materiali per il contenimento e per la bonifica

Spandimenti sul suolo: se necessario, arginare il prodotto con terra asciutta, sabbia o altro materiale non infiammabile. Gli sversamenti di grande entità possono essere ricoperti, con cautela, di schiuma, se disponibile, al fine di prevenire i rischi di incendio. Non usare getti diretti. All'interno di edifici o spazi confinati, garantire una ventilazione appropriata. Assorbire il prodotto versato con materiali non infiammabili. Raccogliere il prodotto versato con mezzi adeguati. Trasferire il prodotto e gli altri materiali contaminati raccolti in adeguati serbatoi o contenitori per il riciclo o lo smaltimento in sicurezza. In caso di contaminazione del terreno, rimuovere il suolo contaminato e trattare conformemente alla legislazione locale.
Spandimenti in acqua: in caso di piccoli sversamenti in acque chiuse (es.: nei porti) contenere il prodotto utilizzando barriere galleggianti o altri dispositivi. Raccogliere il prodotto versato con specifici materiali assorbenti galleggianti. Se possibile, contenere gli sversamenti maggiori in acqua utilizzando barriere galleggianti o altri mezzi meccanici. Se ciò non fosse possibile, controllare il livello di diffusione del prodotto versato e raccogliere il materiale utilizzando uno skimmer o altro mezzo meccanico. L'utilizzo di agenti disperdenti deve essere proposto da un esperto e, se richiesto, autorizzato dalle autorità locali competenti. Raccogliere il prodotto recuperato e gli altri materiali in adeguati serbatoi o contenitori, per il riciclo o lo smaltimento in sicurezza.
Le misure raccomandate si basano sugli scenari più probabili di sversamento per questo prodotto. Le condizioni locali (vento, temperatura dell'aria, direzione e velocità delle onde e delle correnti) possono, tuttavia, influire significativamente sulla scelta dell'azione da compiere. Consultare, pertanto, esperti locali se necessario. La legislazione locale può stabilire o limitare le azioni da compiere.

6.4 Riferimento ad altre sezioni

Per maggiori informazioni in merito ai dispositivi di protezione individuale, fare riferimento alla sezione "Controllo delle esposizioni e protezione individuale" ovvero alla Sez.8 ed alla Sez.13

SEZIONE 7. MANIPOLAZIONE E IMMAGAZZINAMENTO

7.1 Precauzione per la manipolazione sicura

7.1.1 Misure protettive

Rischio di miscela esplosiva di vapori e aria. Assicurarsi che tutte le disposizioni in materia di atmosfere esplosive e strutture di gestione e stoccaggio dei prodotti infiammabili siano correttamente rispettate. Tenere lontano da fonti di calore/scintille/fiamme libere/superfici calde. Non fumare.
Utilizzare e conservare esclusivamente all'esterno o in un luogo ben ventilato Utilizzare appropriati dispositivi di protezione individuale, se necessario. Non utilizzare aria compressa durante le operazioni di riempimento, scarico o manipolazione. Il vapore è più pesante dell'aria: prestare particolare attenzione all'accumulo nei pozzi e negli spazi confinati. Evitare il contatto con pelle e occhi. Non ingerire. Evitare di respirare vapori. Per maggiori informazioni in merito ai dispositivi di protezione individuale e alle condizioni operative, fare riferimento agli scenari di esposizione allegati. Prevenire il rischio di scivolamento. Non rilasciare nell'ambiente.

7.1.2 Indicazioni in materia di igiene del lavoro

Assicurarsi che siano adottate adeguate misure di pulizia (housekeeping). Il materiale contaminato non deve accumularsi nei luoghi di lavoro e non deve mai essere conservato in tasca. Tenere lontano da cibi e bevande. Non mangiare, bere o fumare durante l'utilizzo del prodotto. Lavare accuratamente le mani dopo la manipolazione. Non riutilizzare gli indumenti contaminati.

7.2 Condizioni per l' immagazzinamento sicuro, comprese eventuali incompatibilità

La struttura dell'area di stoccaggio, le caratteristiche dei serbatoi, le apparecchiature e le procedure operative devono essere conformi alla legislazione pertinente in ambito europeo, nazionale o locale. Gli impianti di stoccaggio devono essere dotati di appositi sistemi per prevenire la contaminazione del suolo e delle acque in caso di perdite o sversamenti. Dovranno essere presenti muri di contenimento delle cisterne. Le attività di pulizia, ispezione e manutenzione della struttura interna dei serbatoi di stoccaggio devono essere effettuate da personale qualificato e correttamente attrezzato, così come stabilito dalla legislazione nazionale, locale, o regolamenti aziendali.
Prima di accedere ai serbatoi di stoccaggio e avviare qualsiasi tipo di intervento in uno spazio confinato, controllare l'atmosfera e verificare il contenuto di ossigeno e il grado di infiammabilità. Conservare separato dagli agenti ossidanti.
Materiali raccomandati: acciaio dolce o acciaio inossidabile per contenitori e rivestimenti. Alcuni materiali sintetici possono non essere adatti ai contenitori o ai rivestimenti sulla base delle caratteristiche del materiale e degli usi previsti. Verificare la compatibilità dei materiali presso il produttore in relazione alle condizioni di utilizzo.
Se il prodotto è fornito in contenitori, conservare esclusivamente nei contenitori originali o in contenitori adatti al tipo di prodotto. Conservare i contenitori accuratamente chiusi e correttamente etichettati. I contenitori vuoti possono contenere residui infiammabili di prodotto, ciò può causare pericolo di incendi o esplosioni. Aprire lentamente per tenere sotto controllo eventuali rilasci di pressione. I contenitori vuoti possono contenere residui combustibili di prodotto. Non saldare, brasare, perforare, tagliare o incenerire i contenitori vuoti a meno che essi non siano stati adeguatamente bonificati.

Direttiva Seveso - Soglie di segnalazione
CHEROSENE –

- Categoria 34
- Nome Notifica e soglia MAPP 2500 tons
- Soglia notifica di sicurezza Sostanze specificate25000 tons

7.3 Usi finali particolari

Vedi scenari di esposizione allegati.

SEZIONE 8. CONTROLLO DELL'ESPOSIZIONE/PROTEZIONE INDIVIDUALE

8.1 Parametri di controllo

Valori limite di esposizione:

Kerosene:

ACGIH

TLV®-TWA: 200 mg/m^3

Procedure di monitoraggio: fare riferimento al D.Lgs. 81/2008 e s.m.i. o alle buone pratiche di igiene industriale.

DNEL (Livello Derivato di Non Effetto)

	DNEL Lavoratori				DNEL popolazione generale			
Vie di esposizione	**Cronico, effetti locali**	**Cronico, effetti sistemici**	**Acuto, effetti locali**	**Acuto, effetti sistemici**	**Cronico, effetti locali**	**Cronico, effetti sistemici**	**Acuto, effetti locali**	**Acuto, effetti sistemici**
orale	n.a.	n.a.	n.a.	n.a.	n.a.	5 mg/kg bw/day	n.a.	n.a.
dermica	Nota b	7.7 mg/kg bw/day	Nota b	Nota a	Nota b	1.64 mg/kg bw/day	Nota b	Nota a
Inalatoria	Nota a	50 mg/m^3	250 mg/m^3	Nota a	Nota a	10.66 mg/m^3	Nota a	Nota a
Occhi	Nota a	Nota a	Nota a	Nota a	Nota a	Nota a	Nota a	Nota a

Nota a: non è stato identificato alcun pericolo per tale via di esposizione
Nota b: i dati disponibili non sono sufficienti per derivare il DNEL

DMEL (Livello Derivato di Effetto Minimo)
Non derivati in quanto il kerosene non è una sostanza con effetti "non soglia-dipendenti".

PNEC(S) (Concentrazione Prevista di Non Effetto)
Consultare gli scenari di esposizione allegati.

Componente(i) pericoloso(i) contenuto(i) in UVCB e/o sostanza(i) multicostituente(i) conforme(i) ai criteri di classificazione e/o con un limite di esposizione (VLE):

Cumene. Valori limite di esposizione:

Decreto Legislativo n. 819/2008. Titolo IX. Protezione da agenti chimici, cancerogeni e mutageni (Italia, 6/2020). Assorbito attraverso la cute.

- 8 ore: 20 ppm 8 ore.
- 8 ore: 100 mg/m^3 8 ore.
- Breve Termine: 50 ppm 15 minuti.
- Breve Termine: 250 mg/m^3 15 minuti

Valori limite biologici (VLB): Non sono noti indici di esposizione.

Procedure di monitoraggio consigliate: Fare riferimento alle norme di monitoraggio, come ad esempio alle seguenti: Norma europea EN 689 (Atmosfera nell'ambiente di lavoro - Guida alla valutazione dell'esposizione

per inalazione a composti chimici ai fini del confronto con i valori limite e strategia di misurazione) Norma europea EN 14042 (Atmosfere nell'ambiente di lavoro - Guida all'applicazione e all'utilizzo di procedimenti per la valutazione dell'esposizione ad agenti chimici e biologici) Norma europea EN 482 (Atmosfere nell'ambiente di lavoro - Requisiti generali per la prestazione di procedure per la misurazione di agenti chimici) Si dovrà inoltre fare riferimento ai documenti nazionali di orientamento sui metodi per la determinazione delle sostanze pericolose.

Altri valori limite di esposizione professionale: Hydrocarbon vapours C6-C12: OEL = 1500 mg/m3 TWA = 1000 mg/m3 Benzene hydrocarbon vapours, C9-C12: TWA = 150 mg/m3 Solfuro di idrogeno (UE): OEL = 7 mg/m3, 5ppm (8 ore), 14 mg/m3, 10ppm (brevetermine). (US) ACGIH: TLV-TWA = 1ppm, 1.4 mg/m3/ TLV-STEL = 5ppm, 7mg/m3. NIOSH: REL = 10ppm, 10 minute ceiling. IDHL = 100ppm

8.2 Controlli dell'esposizione

8.2.1 Controlli tecnici idonei

Minimizzare l'esposizione a nebbie/vapori/aerosol. Prima di accedere ai serbatoi di stoccaggio e avviare qualsiasi tipo di intervento in uno spazio confinato, controllare l'atmosfera e verificare il contenuto di ossigeno e il grado di infiammabilità. Usare solo con ventilazione adeguata. Eseguire il processo in condizioni di contenimento, usare sistemi di aspirazione localizzata o altri dispositivi di controllo per mantenere l'esposizione degli operatori a inquinanti nell'aria al di sotto di qualsiasi limite consigliato o prescritto dalla legge. I dispositivi di controllo devono anche mantenere le concentrazioni di gas, vapore o polvere al di sotto di qualsiasi limite inferiore di esplosività. Utilizzare un sistema di ventilazione antideflagrante. Se si sospetta la presenza di composti di zolfo nel prodotto, monitorare l'atmosfera per individuare il tenore di H2S

8.2.2 Misure di protezione individuale

(a) Protezione per occhi/ volto:

In assenza di sistemi di contenimento e in caso di rischio di contatto con occhi/volto, indossare una protezione per la testa e per il viso (visiera e/o occhiali di protezione (EN 166)).

(b) Protezione della pelle:

i) Protezione delle mani

In assenza di sistemi di contenimento e in caso di possibilità di contatto con la pelle, usare guanti con polsini alti resistenti agli idrocarburi, felpati internamente, se necessario isolati termicamente. Guanti di PVC (polivinilcloruro) con indice di protezione da agenti chimici almeno pari a 5 (tempo di permeazione > di 240 minuti) possono essere utilizzati per brevi periodi. Il neoprene o la gomma naturale (lattice) non hanno caratteristiche adeguate di resistenza. Usare i guanti nel rispetto delle condizioni e dei limiti fissati dal produttore. Nel caso, fare riferimento alla norma UNI EN 374. I guanti devono essere sottoposti a periodica ispezione e sostituiti in caso di usura, perforazione o contaminazione.

ii) Altro

In caso di manipolazione del prodotto, usare abiti da lavoro con maniche lunghe. Nel caso, fare riferimento alle norme UNI EN 465-466-467.

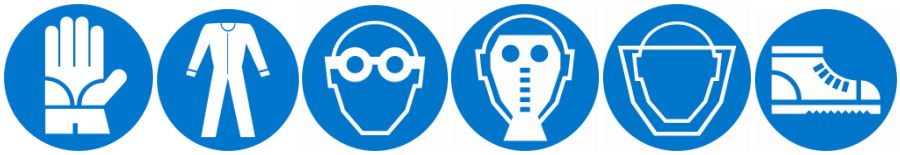
In caso di contanimazione degli indumenti sostituirli e pulirli immediatamente

(c) Protezione respiratoria:

In ambienti ventilati o all'aperto: nessuna.

Se non è possibile determinare o stimare con buona certezza i livelli di esposizione o se è possibile che si verifichi una carenza d'ossigeno, utilizzare esclusivamente un respiratore autonomo.

(d) Pericoli termici: vedi precedente lettera b)



8.2.3 Controlli dell'esposizione ambientale

Non rilasciare nell'ambiente. Gli impianti di stoccaggio devono essere dotati di appositi sistemi per prevenire la contaminazione del suolo e delle acque in caso di perdite o sversamenti.
Per maggiori dettagli consultare gli scenari di esposizione allegati.

8.3 Altro

Per informazioni aggiuntive in merito ai dispositivi di protezione individuale e alle condizioni operative , fare riferimento agli scenari di esposizione allegati.

SEZIONE 9. PROPRIETA' FISICHE E CHIMICHE

9.1 Informazioni sulle proprietà fisiche e chimiche fondamentali

a	Stato fisico:	**liquido**
b	Colore	**limpido**
c	Odore	**di petrolio**
d	Punto di fusione/punto di congelamento:	**-49 °C a 101.325 KPa**
e	punto di ebollizione o punto iniziale di ebollizione e intervallo di ebollizione	**146° - 299° C a 101.325 KPa**
f	infiammabilità:	**Infiammabile**
g	limite inferiore e superiore di esplosività	**LEL 0,7 % UEL 5,0 %**
h	punto di infiammabilità:	**>29 °C a 101.325 Kpa**
i	temperatura di autoaccensione:	**217°-250°C a 101.325 KPa**
j	temperatura di decomposizione:	**n.a. (*non si autodecompone*)**
k	pH:	**n.a. (*idrocarburo*)**
l	viscosità cinematica:	**< 5 mm2/s a 37,8 °C**
m	solubilità:	***solubilità in acqua non applicabile poiché miscela idrocarburica. In solvente organico completamente miscibile***
n	coefficiente di ripartizione n-ottanolo/acqua (valore logaritmico):	**n.a. (perché miscela idrocarburica)**
o	tensione di vapore:	**1-3,7 KPa a 37,8 °C**
p	densità e/o densità relativa:	**0,775 -0,840 g/cm3 a 15° C /rel.**
q	densità di vapore relativa:	**Data waiver°C**
r	caratteristiche delle particelle:	**n.a. *(alle condizioni standard la miscela è un liquido)***

9.2 Altre informazioni

Proprietà esplosive: nessun gruppo chimico associabile alla molecola con proprietà esplosive (Rif. colonna 2 del REACH dell'allegato VII)

Proprietà ossidanti: non ossidante (sulla base della struttura chimica, la sostanza non è in grado di reagire

esotermicamente con materiali combustibili. Rif. colonna 2 del REACH dell'allegato VII)

I metodi di analisi delle caratteristiche sono quelli riconosciuti a livello nazionale ed internazionale, riportati per lo più nelle specifiche tecniche del prodotto.

SEZIONE 10. STABILITA' E REATTIVITA'

10.1 Reattività
Il prodotto non presenta ulteriori pericoli legati alla reattività rispetto a quelli riportati nei sottotitoli successivi.

10.2 Stabilità chimica
Questo prodotto è stabile in relazione alle sue proprietà intrinseche.

10.3 Possibilità di reazioni pericolose
Il contatto con forti ossidanti (quali perossidi e cromati) può causare un pericolo di incendio. Una miscela con nitrati o altri ossidanti forti (quali clorati, perclorati e ossigeno liquido) può generare una massa esplosiva. La sensibilità al calore, alla frizione e allo shock non possono essere valutate in anticipo.

10.4 Condizioni da evitare
Conservare separato dagli agenti ossidanti. Tenere lontano da fonti di calore/scintille/fiamme libere/superfici calde. Non fumare. Evitare la formazione di cariche elettrostatiche.

10.5 Materiali incompatibili
Forti ossidanti. Forti acidi. Basi forti. Alogeni.

10.6 Prodotti di decomposizione pericolosi
Il prodotto non decompone quando utilizzato per gli usi previsti.

SEZIONE 11. INFORMAZIONI TOSSICOLOGICHE

11.1 Informazione sulle classi di pericolo definite nel regolamento (CE) n°1272/2008
Sono disponibili solamente pochi studi sulla tossicocinetica del cherosene. Sono disponibili alcuni studi per alcuni costituenti del cherosene.
Le applicazioni dermiche di cherosene hanno rivelato che i costituenti aromatici e alifatici sono ben assorbiti attraverso la cute e che gli aromatici penetrano a una velocità maggiore degli alcani. Dopo l'assorbimento i costituenti del cherosene sono distribuiti attraverso la circolazione sanguigna ai tessuti grassi e ai vari organi.
Gli studi sulla via di esposizione inalatoria hanno rivelato che i costituenti volatili del cherosene sono ben assorbiti (31-54%) e sono distribuiti principalmente nei tessuti grassi. I componenti aromatici sono metabolizzati più velocemente dei nafteni, n-alcani, isoalcani e 1-alcheni.
Gli studi sulla via di esposizione orale hanno indicato che l'assorbimento gastrointestinale del cherosene è lento e incompleto.

a) Tossicità acuta:
Il cherosene ha una bassa tossicità acuta con una DL_{50} orale ratto maggiore di 5000 mg/kg, una DL_{50} dermica coniglio superiore a 2000 mg/kg e una CL_{50} inalatoria ratto superiore a 5,28 mg/l. Negli animali gli effetti più significativi, provocati da esposizioni a dosi molto elevate di cherosene, sono irritazione leggera dello stomaco e del tratto gastrointestinale. Gli unici effetti avversi osservati in studi di inalazione acuta sono diminuizione dell'attività e della frequenza respiratoria. L'esposizione dermica a cherosene non comporta effetti di tossicità sistemica, gli unici effetti osservati sono correlati all'irritazione dermica. **Il cherosene non è pertanto classificato per la tossicità acuta ai sensi delle normative europee sulle sostanze pericolose.**

Via orale

Di seguito è riportata una sintesi degli studi maggiormente rappresentativi del Dossier di registrazione.

Metodo	Risultato	Commenti	Fonte
RATTO oral: gavage EPA OTS 798.1175 Equivalente a OECD Guideline 420	DL_{50}>5000 mg/kg (M/F) Assenza di mortalità e effetti sistemici	Studio chiave CAS 68333-23-3 Affidabile senza restrizioni	ARCO (Atlantic Richfield Company) 1992a

Via Inalatoria

Di seguito è riportata una sintesi degli studi maggiormente rappresentativi del Dossier di registrazione.

Metodo	Risultato	Commenti	Fonte
RATTO inalazione: vapori OECD Guideline 403 (Acute Inhalation Toxicity)	CL_{50} > 5,28 mg/l/4h (M/F) Assenza di mortalità e effetti sistemici	Studio chiave CAS 8008-20-6 Affidabile senza restrizioni	Studio di American Petroleum Institute (API) 1987a

Via Cutanea

Di seguito è riportata una sintesi degli studi maggiormente rappresentativi del Dossier di registrazione.

Metodo	Risultato	Commenti	Fonte
CONIGLIO Bendaggio occlusivo EPA OTS 798.1100 Equivalente a OECD Guideline 402	DL_{50}>2000 mg/kg (M/F)	Studio chiave CAS 68333-23-3 Affidabile senza restrizioni	ARCO (Atlantic Richfield Company) 1982g

b) Corrosione/irritazione cutanea

Il potenziale di irritazione cutanea di campioni appartenenti alla categoria del cherosene è stato testato in un gran numero di studi condotti in genere sul coniglio. Le conclusioni di questi studi indicano che il cherosene è irritante per la cute**. Tali risultati portano alla classificazione Skin Irrit. 2; H315 (Provoca irritazione cutanea).**
Di seguito è riportata una sintesi degli studi maggiormente rappresentativi del Dossier di registrazione.

Metodo	Risultato	Commenti	Fonte
CONIGLIO Bendaggio semiocclusivo su pelle rasata OECD Guideline 404	Non irritante Punteggio medio Eritema: 0,17 di max 4 (completamente reversibile entro 48h) Indice Edema: 0 di max 4	Studio chiave Cherosene Affidabile senza restrizioni	Shell (1991a)
CONIGLIO Bendaggio occlusivo su pelle intatta EPA Guidelines in FR Vol. 44, No. 145, pgs. 44054-44093	Irritante Punteggio medio: 3,46 di max 4 (non completamente reversibile entro 10 giorni) Punteggio medio: 2,33 di max 4 Edema punteggio: (non completamente reversibile entro 10 giorni)	Studio chiave Cherosene Affidabile con restrizioni	ARCO (Atlantic Richfield Company) 1986 d

c) Lesioni oculari gravi/irritazioni oculari gravi

Il potenziale di irritazione degli occhi di campioni appartenenti alla categoria del cherosene è stato testato in un gran numero di studi condotti in genere sul coniglio. Tutti gli studi hanno evidenziato assenza o solo transitoria e reversibile irritazione degli occhi, **non è pertanto necessaria nessuna classificazione della sostanza**. Di seguito è riportata una sintesi degli studi maggiormente rappresentativi del Dossier di registrazione.

Metodo	Risultato	Commenti	Fonte
CONIGLIO EPA OTS 798.4500 (Acute Eye Irritation)	Non irritante Punteggio medio cornea: 0 di max 80 Punteggio medio iride: 0 di max 10 Punteggio medio congiuntiva: 0 di max 20	Studio chiave CAS 68333-23-3 Affidabile senza restrizioni	ARCO (Atlantic Richfield Company) 1992n

d) Sensibilizzazione respiratoria o cutanea

Sensibilizzazione respiratoria

Questo endpoint non è un requisito REACH e non sono disponibili dati per questo endpoint. I prodotti appartenenti alla categoria del cherosene non provocano sensibilizzazione delle vie respiratorie, **non è pertanto necessaria nessuna classificazione del prodotto.**

Sensibilizzazione cutanea

Sono disponibili diversi studi condotti per saggiare il potenziale di sensibilizzazione di prodotti appartenenti alla categoria del cherosene.

I risultati ottenuti da questi studi indicano l'assenza di potenziale di sensibilizzazione cutanea, non è pertanto necessaria nessuna classificazione del prodotto.

Di seguito è riportata una sintesi degli studi maggiormente rappresentativi del Dossier di registrazione.

Metodo	Risultato	Commenti	Fonte
PORCELLINO D'INDIA EPA OTS 798.4100 (Skin Sensitisation) equivalente a OECD Guideline 406	Non sensibilizzante	Studio chiave CAS 68333-23-3 Affidabile senza restrizioni	ARCO (Atlantic Richfield Company) 1992q

e) Mutagenicità delle cellule germinali

Il potenziale mutageno del cherosene è stato ampiamente studiato in una serie test in vivo e in vitro. La maggior parte degli studi non hanno mostrato prove coerenti di attività mutagena, pertanto non è prevista nessuna classificazione ai sensi della normativa sulle sostanze pericolose. Di seguito è riportata una sintesi degli studi maggiormente rappresentativi del Dossier di registrazione.

Studi in vitro:

Metodo	Risultato	Commenti	Fonte
Test di Ames in vitro S. typhimurium TA98 Dosi: 50 µl/ml (ASTM E1687, modificato).	Negativo	Studio chiave CAS 64742-81-0 Affidabile senza restrizioni	Mobil (1991)
Test di Ames in vitro S. typhimurium TA98 Dosi: 50 µl/ml (ASTM E1687, modificato).	Negativo	Studio chiave CAS 8008-20-6 Affidabile senza restrizioni	Mobil (1991)

Metodo	Risultato	Commenti	Fonte
Saggio su cellule di mammifero: scambio dei cromatidi fratelli Cellule ovariche di criceto Dosi: 0,007, 0,013, 0,025, e 0,05 µl/ml (senza attivazione metabolica) 0,05, 0,1, 0,2 e 0,4 µl/ml (con attivazione metabolica)	Negativo	Studio chiave CAS 64742-81-0 Affidabile senza restrizioni	American Petroleum Institute (API) 1988a

OECD Guideline 479			

Studi in vivo:

Metodo	Risultato	Commenti	Fonte
Test di aberrazione cromosomica RATTO (M/F) Via di somministrazione: Intraperitoneale Dosi: 0, 0,3, 1,0 e 3,0 g/kg (concentrazione analitica) OECD Guideline 475	Negativo	Studio chiave CAS 8008-20-6 Affidabile senza restrizioni	American Petroleum Institute (API) 1985c
Test di aberrazione cromosomica RATTO (M/F) Via di somministrazione: Intraperitoneale Dosi: 0,3, 1,0 e 3,0 g/kg OECD Guideline 475	Negativo	Studio chiave CAS 64742-81-0 Affidabile senza restrizioni	American Petroleum Institute (API) 1984b

f) Cancerogenicità

Il cherosene non è cancerogeno per gli animali a seguito di esposizioni per via orale e inalatoria. Contatti cronici con cherosene comportano la formazione di tumori come conseguenza di cicli ripetuti di irritazione, danni e riparazioni.

Comunque il cherosene non è risultato mutageno né genotossico e gli studi su animali confermano che la formazione di tumori cutanei non è di natura genotossica. Anche se l'irritazione dermica da sola non sembra essere sufficiente a causare i tumori dermici, gli studi dimostrano chiaramente che l'irritazione e l'infiammazione dermica sono prerequisiti per la carcicongenicità dermica.

In conclusione **il cherosene è classificato come prodotto che può provocare il cancro** ai sensi delle normative europeee sulle sostanze pericolose perché per esposizioni ripetute, specie per via dermica, può provocare il cancro. Va considerata anche la nuova classificazione del Cumene, secondo l'EC 2022/692 (che lo determina come sostanza H350) che è contenuto in % > 0,1% w/w nelle sostanze kerosones UVCB. Di seguito è riportata una sintesi degli studi maggiormente rappresentativi del Dossier di registrazione.

Metodo	Risultato	Commenti	Fonte
TOPO (C3H/HeNCriBr) (M) 35,5 (quantitativo applicato) Esposizione 2 anni (2 volta a settimana) Equivalente o simile a Guideline 451	50 µl Effetti neoplastici	Studio chiave Test Material JET fuel A Affidabile senza restrizioni	Freeman J.J., Federici T.M., McKee R.H. (1993)
TOPO (M/F) Esposizione: metà della durata di vita (2 volte a settimana) Dosi: 50 µl Nessuna linea guida disponibile. Guideline 451	50 µl Effetti neoplastici	Studio chiave CAS 64742-81-0 Affidabile con restrizioni	Studio di American Petroleum Institute (API) 1989b

g) Tossicità per la riproduzione

<u>Tossicità per la riproduzione</u>

Di seguito è riportata una sintesi degli studi maggiormente rappresentativi del Dossier di registrazione. La maggior parte degli studi non hanno mostrato prove coerenti di tossicità per la fertilità. **Nessuna classificazione prevista dalla normativa sulle sostanze pericolose.**

Metodo	Risultato	Commenti	Fonte
RATTO (M/F) Fertility Somministrazione: orale (gavage) Maschi: 750, 1500, o 3000 mg/kg/giorno (dose ingerita effettiva) Femmine: 325, 750, o 1500 mg/kg/giorno (dose ingerita effettiva) Esposizione: Maschi: 70-90 giorni. Femmine: 21 settimane (trattamento giornaliero)	NOAEL (P) 750 mg/kg/giorno Femmine, effetti sul peso corporeo NOAEL (riproduzione): >= 3000 mg/kg/giorno (durata della gravidanza, caratterizzazione sperma) NOAEL (riproduzione) (P): >= 1500 mg/kg/giorno Femmine (durata della gravidanza, indice di vita del nascituro, dimensioni e peso della nidiata) NOAEL (F1) 750 mg/kg (M/F) (peso del neonato)	Studio chiave JP-8 jet fuel Affidabile senza restrizioni	Mattie, D.R., Marit, G.B., Cooper, J.R., Sterner, T.R., Flemming, C.D. (2000)

Tossicità sullo sviluppo/teratogenesi

Gli studi sullo sviluppo hanno rilevato effetti positivi solamente ad alte dosi che hanno provocato anche tossicità materna. **Non è pertanto necessaria nessuna classificazione** del prodotto nell'ambito della normativa sulle sostanze pericolose. Di seguito è riportata una sintesi degli studi maggiormente rappresentativi del Dossier di registrazione.

Metodo	Risultato	Commenti	Fonte
RATTO Somministrazione: orale (gavage) Dosi: 500, 1000, 1500, o 2000 mg/kg/giorno (dose ingerita effettiva) Esposizione: 10 giorni (giornaliera) OECD Guideline 414 (Prenatal Developmental Toxicity Study)	NOAEL (tossicità dell'embrione): 1000 mg/kg/giorno Effetti: riduzione del peso del feto LOAEL ((tossicità dell'embrione): 1500 mg/kg/giorno Effetti: riduzione del peso del feto NOAEL (tossicità materna): 500 mg/kg/giorno Effetti: riduzione del peso LOAEL (tossicità materna): 1000 mg/kg/giorno Effetti: riduzione del peso	Studio chiave JP-8 jet fuel Affidabile senza restrizioni	Cooper, J.R., Mattie, D.R. (1996)
RATTO Dosi: 106 o 364 ppm (concentrazioni analitiche) Somministrazione: inalazione Esposizione: 6 h/giorno ogni giorno OECD Guideline 414 (Prenatal Developmental Toxicity Study	NOAEC (tossicità materna): >= 364 ppm NOAEC (teratogenicià): >= 364 ppm	Studio chiave CAS 8008-20-6 Affidabile senza restrizioni	American Petroleum Institute (API) 1979b

h) Tossicità specifica per organi bersaglio (STOT) - esposizione singola:

Il cherosene è classificato STOT SE Exp 3; H336 (Può provocare sonnolenza o vertigini).

i) Tossicità specifica per organi bersaglio (STOT) - esposizione ripetuta:

Sono disponibili numerosi studi di tossicità subacuta e subcronica sui cherosene. In tutti gli studi è stata rilevata assenza di effetti sistemici avversi anche alle dosi maggiori somministrate, pertanto **il cherosene non è classificato pericoloso per tale end-point** ai sensi delle normative sulle sostanze pericolose. Di seguito è riportata una sintesi degli studi maggiormente rappresentativi del Dossier di registrazione.

Metodo	Risultato	Commenti	Fonte
Orale			
RATTO (M/F) Gavage Sub cronico: maschi per 70-90 giorni Femmine per 21 settimane Dosi: Maschi: 750, 1500, o 3000 mg/kg/giorno (effettivamente ingerito) Femmine: 325, 750, o 1500 mg/kg/giorno (effettivamente ingerito)	NOAEL: 750 mg/kg/giorno (femmina) (effetti sul peso corporeo)	Studio chiave JP-8 jet fuel Affidabile senza restrizioni	Mattie, D.R., Marit, G.B., Cooper, J.R., Sterner, T.R., Flemming, C.D. (2000)
Inalazione			
RATTO (M/F) vapori Inalazione (vapore) Subacuto: 4 settimane (6 ore/giorno, 5 giorni a settimana) Dose: 24 mg/m³ OECD Guideline 412	NOAEC: >= 24 mg/m³ (M/F) (non sono stati osservati effetti correlati al trattamento.)	Studio chiave CAS 64742-81-0 Affidabile senza restrizioni	American Petroleum Institute (API) 1986
Metodo	**Risultato**	**Commenti**	**Fonte**
Inalazione			
RATTO (M/F) vapori Inalazione (vapore) Subcronico: 90 giorni (continuo: 24 ore al giorno) Dosi: 0, 500 o 1000 mg/m³ Veicolo: aria OECD Guideline 413	NOAEL: >= 1000 mg/m³ Femmine: effetti totali LOAEL: 500 mg/m³ Maschi: effetti sul peso corporeo, peso degli organi e istopatologia (gli effetti sono dovuti a nefropatia mediata da alpha-2u globulin)	Studio chiave JP-8 jet fuel Affidabile senza restrizioni	Mattie, D.R., Alden, C.L., Newell, T.K., Gaworski, C.L., Flemming, C.D. (1991)
Cutanea			
RATTO (M/F) Subacuto 4 settimane (6 ore al giorno per 5 giorni a settimana) Dosi: 0,01, 0,05 o 0,50 ml/kg/giorno OECD Guideline 410	NOAEL: >= 0,5 ml/kg (M/F) LOAEL cute: 0,01 ml/kg (M/F)	Studio chiave CAS 68333-23-3 Affidabile senza restrizioni	ARCO (Atlantic Richfield Company) 1992v

j) Pericolo di aspirazione:

Poiché il cherosene ha una viscosità < 20,5 mm^2/s a 40 °C è possibile che si verifichi l'aspirazione del prodotto nei polmoni. **Pertanto è classificato Asp. Tox. 1; H304** (Può essere letale in caso di ingestione e di penetrazione nelle vie respiratorie).

11.2 Informazioni su altri pericoli

11.2.1: Proprietà di interferenza con il sistema endocrino: Nessun effetto di interferenza con il sistema endocrino (a seguito dei test previsti nei regolamenti CE: n°1907/2006, 2017/2100, 218/605)

Non sono disponibili ulteriori informazioni

SEZIONE 12. INFORMAZIONI ECOLOGICHE

Sulla base delle informazioni ecologiche sotto riportate ed in base ai criteri indicati dalle normative sulle sostanze pericolose, il cherosene è classificato pericoloso per l'ambiente Aquatic Chronic 2; H411.

12.1 Tossicità

Di seguito è riportata una sintesi degli studi maggiormente rappresentativi del Dossier di registrazione.

Endpoint	Risultato	Commenti
Tossicità acquatica		
Invertebrati Daphnia magna Breve termine	EL_{50} (48 h): 1,4 mg/l (mobilità) EL_{50} (24 h): 4,6 mg/l (mobilità) NOEL (48 h): 0,3 mg/l (mobilità)	Studio chiave CAS 64742-81-0 Affidabile senza restrizioni OECD Guideline 202 Exxon (1995d)
Invertebrati Daphnia magna Lungo termine	EL_{50} (21 giorni): 0,89 mg/l (riproduzione) EL_{50} (21 giorni): 0,81 mg/l (immobilizzazione) NOEL (21 giorni): 0,48 mg/l (riproduzione) LOEL (21 giorni): 1,2 mg/l (riproduzione) NOEL (21 giorni): 1,2 mg/l (lunghezza dell'adulto) LOEL (21 giorni): 0,48 mg/l (lunghezza dell'adulto)	Studio chiave CAS 64742-81-0 Affidabile senza restrizioni OECD Guideline 211 ExxonMobil (2010)
Alghe Pseudokirchnerella subcapitata Inibizione della crescita	EL_{50} (24 h): 1-3 mg/l (Numero delle cellule) EL_{50} (48 h): 1-3 mg/l (Numero delle cellule) EL_{50} (72 h): 1-3 mg/l (Numero delle cellule) NOEL (24 h): 1 mg/l (Numero delle cellule) NOEL (48 h): 1 mg/l (Numero delle cellule) LOEL (72 h): 1 mg/l (Numero delle cellule)	Studio chiave CAS 64742-94-5 Affidabile senza restrizioni OECD Guideline 201 Shell (1994)
Alghe Pseudokirchnerella subcapitata Inibizione della crescita	EL_{50} (72 h): 10- 30 mg/l (velocità di crescita) EL_{50} (48 h): > 30 mg/l (velocità di crescita) EL_{50} (24 h): > 30 mg/l (velocità di crescita) NOEL (72 h): 10 mg/l (velocità di crescita) NOEL (48 h): 10 mg/l (velocità di crescita) NOEL (24 h): 10 mg/l (velocità di crescita)	Studio di supporto CAS 64742-81-0 Affidabile senza restrizioni OECD Guideline 201 Shell (1995)
Pesci Oncorhynchus mykiss Breve termine	LL_{50} (96 h): 2-5 mg/l LL_{50} (72 h): 2-5 mg/l LL_{50} (48 h): 2-5 mg/l LL_{50} (24 h): 5-17 NOEL (96 h): 2 mg/l test	Studio chiave CAS 64742-94-5 Affidabile senza restrizioni OECD Guideline 203 Shell (1994)

12.2 Persistenza e degradabilità

Degradabilità abiotica

Idrolisi: il cherosene è resistente all'idrolisi. Pertanto, questo processo non contribuirà a una perdita misurabile dii degradazione della sostanza nell'ambiente.

Degradabilità biotica

Sulla base degli studi isponibili e delle proprietà degli idrocarburi C9-C16, i cheroseni sono considerati inerentemente biodegradabili.

12.3 Potenziale di bioaccumulo

I test standard per questo endpoint non sono applicabili alle sostanze UVCB.

12.4 Mobilità nel suolo

Assorbimento Koc: i test standard per questo endpoint non sono applicabili alla sostanze UVCB.

12.5 Risultati della valutazione PBT e vPvB

Comparazione con i criteri dell'allegato XIII del Regolamento REACH

Valutazione della persistenza: alcune strutture di idrocarburi contenuti in questa categoria presentano caratteristiche di P (Persistent) o Vp (very Persistent).
Valutazione del potenziale di bioaccumulo: la struttura della maggior parte degli idrocarburi contenuti in questa categoria non presentano caratteristiche di vB (very Bioaccumulative), tuttavia alcuni componenti presentano caratteristiche di B (Bioaccumulative).
Valutazione della tossicità: per le strutture che hanno mostrato caratteristiche di P e B è stata valutata la tossicità ma nessun componente rilevante soddisfa i criteri di tossicità ad eccezione dell'antracene il quale è stato confermato un PBT. **Poiché l'antracene è presente in concentrazioni < 0,1% il prodotto non è PBT/vPvB.**

12.6 Proprietà di interferenza con il sistema endocrino:
La miscela non ha effetti d'interferenza con il sistema endocrino

12.7 Altri effetti avversi: Non presenti.

SEZIONE 13. CONSIDERAZIONI SULLO SMALTIMENTO

13.1 Metodi di trattamento dei rifiuti

Non scaricare sul terreno né in fognature, cunicoli o corsi d'acqua.
Per lo smaltimento dei rifiuti derivanti dal prodotto, inclusi i contenitori vuoti non bonificati, attenersi al D.Lgs. 152/06 e s.m.i.
Codice Catalogo Europeo dei Rifiuti: 13 07 03 (Ref: 2001/118/CE e Dir. Min. Ambiente 9/04/2002) Il codice riportato è solo un'indicazione generale, basata sulla composizione originale del prodotto e sugli usi previsti. Il produttore del rifiuto ha la responsabilità di scegliere il codice più adeguato sulla base dell'uso effettivo del prodotto, eventuali alterazioni e contaminazioni. Il prodotto come tale non contiene composti alogenati.

Smaltimento dei contenitori: Non disperdere i contenitori nell'ambiente. Smaltire secondo le norme vigenti locali. Non forare, tagliare, smerigliare, saldare, brasare, bruciare o incenerire i contenitori o i fusti vuoti non bonificati.

SEZIONE 14. INFORMAZIONI SUL TRASPORTO

14.1 Numero ONU o Numero ID:
1863
14.2 Designazione Ufficiale ONU di trasporto:
Italiano: Carburante per motori a turbina aeronautici
Inglese: Fuel, aviation, turbine engine
14.3 Classi di pericolo connesso al trasporto:

Trasporto stradale/ferroviario (ADR/RID):	Classe 3
Codice di classificazione:	F1
Numero di identificazione del pericolo:	30
Trasporto marittimo (IMDG):	Classe 3
Trasporto aereo (IATA):	Classe 3

14.4 Gruppi di imballaggio:
III; Etichetta 3 + Marchio Pericolo ambientale.
14.5 Pericoli per l'ambiente:

Secondo i regolamenti tipo dell'ONU:	Pericoloso per l'ambiente
Secondo il codice IMDG:	Marine Pollutant
Secondo l'ADN, solo in cisterna:	Pericoloso per l'ambiente

14.6 Precauzioni speciali per gli utilizzatori (operazioni di trasporto):
Il trasporto, compreso il carico e lo scarico, deve essere eseguito da personale che abbia ricevuto la necessaria formazione prevista dai pertinenti regolamenti modali concernenti il trasporto di merci pericolose.

Durante il carico e lo scarico applicare le misure di protezione individuale prescritte dalla sezione 8.2.2 della presente scheda. Evitare il contatto diretto del prodotto con la pelle. Identificare potenziali aree di contatto indiretto con la pelle. Indossare guanti di protezione (testati secondo lo standard EN374) se esiste la probabilità che la sostanza entri in contatto con le mani. Eliminare le contaminazioni/fuoriuscite non appena esse si verifichino. Rimuovere immediatamente qualsiasi contaminazione con la pelle. Fornire una formazione di base al personale mirata alla prevenzione/limitazione delle esposizioni (E3).

Misure di emergenza a bordo nave (IMDG): EmS F-E, S-E (norme speciali 223)
Misure di emergenza in caso di incidente aereo (ICAO): ERG Code 3L
Merce ad alto rischio (security): NO

14.7 Trasporto marittimo alla rinfusa conformemente agli atti dell'IMO:

Se si intendesse effettuare il trasporto alla rinfusa attenersi alla normativa (IMO) ed al capitolo VI e VII della convezione SOLAS, allegato II o allegato V, Marpol 73/78 ed al codice IBC ove applicabile

Altro:

Codice di restrizione Tunnel (ADR): D/E

SEZIONE 15. INFORMAZIONI SULLA REGOLAMENTAZIONE

15.1 Norme e legislazione su salute, sicurezza ed ambiente specifiche per la sostanza o la miscela

Autorizzazione ai sensi del Regolamento REACH (Regolamento CE n. 1907/2006 ed s.m.i.): prodotto non presente nell'elenco delle sostanze estremamente preoccupanti (SVHC) candidate all'autorizzazione.
Restrizioni all'uso ai sensi del Regolamento REACH (Regolamento CE n. 1907/2006 ed s.m.i.): Uso ristretto agli utuilizzatori professionali secondo l'Allegato XVII ed ai del Titolo VIII.

Altre normative EU e recepimenti nazionali:
Categoria Seveso (Dir. 96/82/CE e Dir 105/2003/CE e D.Lgs 334/99 e s.m.i.): allegato I parte 1.
Agente chimico pericoloso ai sensi del Titolo IX (recepimento Dir. 98/24/CE) del D.Lgs 81/08 e s.m.i.
Per lo smaltimento dei rifiuti fare riferimento al D. Lgs 152/06 e s.m.i
Convenzione Marpol risoluzione MSC.286 (86)
Classificazione ed Etichettatura della sostanza secondo il Regolamento CE 1272/2008

15.2 Valutazione della sicurezza chimica

E' stata effettuata una valutazione sulla sicurezza chimica.

SEZIONE 16. ALTRE INFORMAZIONI

Elenco delle indicazioni di pericolo pertinenti

Queste indicazioni sono esposte per informazione e non sono necessariamente corrispondenti alla classificazione del prodotto

Indicazioni di pericolo H

H226: Liquido e vapore infiammabile
H304: Può essere letale in caso di ingestione e di penetrazione nelle vie respiratorie
H315: Provoca irritazione cutanea
H336: Può provocare sonnolenza o vertigini
H411: Tossico per gli organismi acquatici con effetti di lunga durata
H350: Può provocare il cancro

Indicazioni sulla formazione:

Formare in maniera adeguata i lavoratori potenzialmente esposti a tale prodotto sulla base dei contenuti della presente scheda di sicurezza.

Principali riferimenti bibliografici e fonti di dati:

Dossier di Registrazione.

Legenda delle abbreviazioni e acronimi:

ACGIH	=	American Conference of Governmental Industrial Hygienists
CSR	=	Relazione sulla Sicurezza Chimica
DNEL	=	Livello Derivato di Non Effetto
DMEL	=	Livello Derivato di Effetto Minimo
EC_{50}	=	Concentrazione effettiva mediana
IC_{50}	=	Concentrazione di inibizione, 50%
LC_{50}	=	Concentrazione letale, 50%
LD_{50}	=	Dose letale media
PNEC	=	Concentrazione Prevista di Non Effetto
n.a.	=	non applicabile
n.d.	=	non disponibile
PBT	=	Sostanza Persistente, Bioaccumulabile e Tossica
SNC	=	Sistema nervoso centrale
STOT	=	Tossicità specifica per organi bersaglio
(STOT) RE	=	Esposizione ripetuta
(STOT) SE	=	Esposizione singola
TLV®TWA	=	Valore limite di soglia – media ponderata nel tempo
TLV®STEL	=	Valore limite di soglia – limite per breve tempo di esposizione
UVCB	=	sostanza dalla composizione non conosciuta e variabile (substances of Unknown or Variable composition)
vPvB	=	molto Persistente e molto Bioaccumulabile
nota H	=	La classificazione e l'etichettatura indicate per questa sostanza concernono la proprietà o le proprietà pericolose specificate dall'indicazione o dalle indicazioni di pericolo in combinazione con la classe o le classi di pericolo e la categoria o le categorie indicate. Le disposizioni dell'articolo 4 relative a fabbricanti, importatori o utilizzatori a valle di questa sostanza si applicano a tutte le altre classi e categorie di pericolo. Per le classi di pericolo per le quali la via di esposizione o la natura degli effetti determina una differenziazione della classificazione della classe di pericolo, il fabbricante, l'importatore o l'utilizzatore a valle sono tenuti a prendere in considerazione le vie di esposizione o la natura degli effetti non ancora considerate.

Classificazione a norma del Regolamento (CE) 1272/2008 (CLP).
Procedura di classificazione: Metodo di calcolo e giudizio di esperti.

Data compilazione 5/07/2018
Revisione n. 1.3 del 5/07/2018
Data rev. 1.4: 06/03/2019
Data rev. 5: 06/11/2022 (NB: Nuova numerazione, si lascia la nomenclatura a due cifre per passare a quella a singolo numero in analogia alle altre SDS del gruppo IP)
Data rev. 6: 30/12/2023

Motivo revisione: Applicazione del Regolamento UE 2022/692 del 16/02/2022 che modifica l'Annesso VI dell'EC 1272/2008. Sezione 2, Sezione 3, Sezione 11, Sezione 15, Sezione 16.

ALLEGATO

SCENARI DI ESPOSIZIONE

Use code	IUCLID Use name	Chesar Use name	Life Cycle Stage	C&L status
M-1	01 - Manufacture of substance(classified)	Manufacture of substance	Manufacture	Classified non-CMR
F-4	02 - Formulation & (re)packing of substances andmixtures (classified)	Formulation & (re)packing of substances and mixtures	Formulation	Classified non-CMR
IW-22	12a - Use in fuel: Industrial (classified)	Use in fuel; Industrial	Industrial	Classified non-CMR
PW-23	12b - Use in fuel: Professional (classified)	Use in fuel; Professional	Professional	Classified non-CMR
C-24	12c - Use in fuel: Consumer (classified)	Use in fuel; Consumer	Consumer	Classified non-CMR

9.0 Exposure scenario 1: Manufacture - Manufacture of substance; closed systems; Level I

Worker contributing scenario(s):		
CS 1	General exposures; Closed systems	PROC 1
CS 2	General exposures; Closed systems	**PROC 2**, PROC 1
CS 3	Storage	**PROC 2**, PROC 1
CS 4	General exposures; Batch process; Closed systems	PROC 3
CS 5	General exposures; Closed systems	PROC 4
CS 6	Equipment cleaning and maintenance	**PROC 8a**, PROC 28
CS 7	Bulk transfers; Closed systems; Loading and unloading	PROC 8b
CS 8	Process sampling	PROC 9
CS 9	Laboratory activities	PROC 15

Further description of the use:

Manufacture of the substance or use as a process chemical or extraction agent within closed or contained systems. Includes incidental exposures during recycling/ recovery, material transfers, storage, sampling, associated laboratory activities, maintenance and loading (including marine vessel/barge, road/rail car and bulkcontainer).

9.0.1. Worker CS 1: General exposures; Closed systems (PROC 1)

Assessment entity group used for the assessment of this contributing scenario: Substance classified as H350(containing 0.1 to 1% cumene)

9.0.1.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Liquid, including paste/slurry/suspension	TRA Workers 3.0
• Liquid, vapour pressure < 0.5kPa at STP, with potential for aerosol generation	
• Covers percentage substance in the product up to 100% (unless stated differently) *It is required to map this condition of use against each contributing scenario for the exposure scenario for communication. The specific contributing scenario may cover concentrations less than 100%.*	
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 8 h/day	TRA Workers 3.0
• Covers daily exposures up to 8 hours (unless stated differently) *It is required to map this condition of use against each contributing scenario for the exposure scenario for communication. The specific contributing scenario may be shorter than 8 hours.*	
Technical and organisational conditions and measures	
• Local exhaust ventilation: No	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Room ventilation: Basic (up to 3 ACH)	TRA Workers 3.0
• Closed batch process with occasional controlled exposure	
• Handle substance within a closed system	

• Sample via a closed loop or other system to avoid exposure (E8).	
Conditions and measures related to personal protection, hygiene and health evaluation	

	Method
• Dermal protection: No	TRA Workers 3.0
• Respiratory protection: No	TRA Workers 3.0
• Face/eye protection: No	
• Assumes a good basic standard of occupational hygiene is implemented *Good occupational hygiene practice is considered by Concawe to constitute measures that are routinely encountered and applied to meet the requirements of relevant workplace legislation such as regulations supporting the EU Framework Directive, in addition to specific RMM identified in the ES. These may include, but are not limited to:* *- Risk assessment of local workplace activities* *- Procedures supporting safe handling and maintenance of controls* *- Education and training of workers in understanding the hazards and control measures relevant to their activities* *- Provision of general ventilation* *- Good housekeeping and prompt clearance of spillages* *- Appropriate selection, testing and maintenance of equipment used to control exposure,* *e.g. Personal Protective Equipment (PPE), Local Exhaust Ventilation (LEV)* *- Draining of equipment prior to maintenance; retention of drained material in sealed storage pending disposal or recycling* *- Regular supply and laundering of work clothing; provision of washing and changing facilities; eating and smoking only in designated areas separate from the workplace*	
• General measures (aspiration) *General measures (aspiration): Do not ingest. If swallowed then seek immediate medical assistance.*	
• General Measures (skin irritants) *General Measures (skin irritants): Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contactwith substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.*	
• General measures (flammability) *General measures (flammability): Use in contained systems. Avoid ignition sources – No Smoking. Handle in well ventilated area to prevent formation of explosive atmosphere. Use equipment and protective systems approved for flammable substances.Restrict line velocity during pumping to avoid generation of electrostatic discharge.* *Ground/bond container and receiving equipment. Use non-sparking tools. Comply with relevant EU/national regulations. Review SDS for additional advice.*	

• General Measures (carcinogenicity) *Consider technical advances and process upgrades (including automation) for the elimination of releases. Minimise exposure using measures such as closed systems, dedicated facilities and suitable general / local exhaust ventilation. Drain down systemsand clear transfer lines prior to breaking containment. Clean / flush equipment, where possible, prior to maintenance. Where there is potential for exposure: Restrict access toauthorised persons; provide specific activity training to operators to minimise exposures; wear suitable gloves and coveralls to prevent skin contamination; wear respiratory protection when its use is identified for certain contributing scenarios; clear up spills immediately and dispose of wastes safely. Ensure safe systems of work or equivalent arrangements are in place to manage risks. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance.*	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 40 °C	TRA Workers 3.0
• Covers use at ambient temperatures (unless stated differently) *It is required to map this condition of use against each contributing scenario for the exposure scenario for communication. The specific contributing scenario may be carried out above ambient temperature.*	

9.0.1.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.5. Exposure concentrations and risks for workers

Route of exposure and type of effects	Assessment entity	Exposure concentration	Risk quantification
Inhalation, systemic, long term	Cumene	5.01E-3 mg/m³ (TRA Workers) RCR = 1E-4	Final RCR < 0.01
Inhalation, systemic, acute	Cumene	0.02 mg/m³ (TRA Workers)	Qualitative risk
Inhalation, local, long term	Cumene	5.01E-3 mg/m³ (TRA Workers)	Qualitative risk
Inhalation, local, acute	Cumene	0.02 mg/m³ (TRA Workers) RCR = 8.01E-5	Final RCR < 0.01
Dermal, systemic, long term	Cumene	3.4E-3 mg/kg bw/day (TRA Workers) RCR = 4.42E-4	Final RCR < 0.01
Dermal, local, long term	Registered substanceas such (100%)	9.92E-3 mg/cm² (TRA Workers)	Qualitative risk
	Cumene	9.92E-4 mg/cm² (TRA Workers)	
Dermal, local, acute	Registered substanceas such (100%)	9.92E-3 mg/cm² (TRA Workers)	Qualitative risk
	Cumene	9.92E-4 mg/cm² (TRA Workers)	
Combined routes, systemic, long-term			Final RCR < 0.01

Remarks on exposure dataset obtained with ECETOC TRA

Percentage (w/w) of Registered substance as such (100%) in mixture/article: 100 %Percentage (w/w) of Cumene in mixture/article: 1 %
The vapour pressure at operating temperature (40°C) used for the calculation is 4.24E3 Pa for Registeredsubstance as such (100%).
The vapour pressure at operating temperature (40°C) used for the calculation is 1.58E3 Pa for Cumene.

Table 9.6.

Assessment Entity	Inhalation effectiveness used by TRA
Registered substanceas such (100%)	0 %
Cumene	0 %

Risk characterisation

Qualitative risk characterisation (Inhalation, systemic, acute, Inhalation, local, long term, Dermal, systemic, acute, Dermal, local, long term, Dermal, local, acute, Eye, local):
Qualitative risks management measures are laid out above (General measures). More details are available insection 9.0.4.

9.0.2. Worker CS 2: General exposures; Closed systems (PROC 2, PROC 1)

Assessment entity group used for the assessment of this contributing scenario: Substance classified as H350(containing 0.1 to 1% cumene) PROC 2 and PROC 1 (similar activities within the exposure scenario) have been assessed within one contributing scenario. The (highest) exposure predictions of PROC 2 have been used in the exposure and riskassessment and PROC 1 has been mapped as an additional PROC relevant for the contributing activity.

9.0.2.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Liquid, including paste/slurry/suspension	TRA Workers 3.0
• Liquid, vapour pressure < 0.5kPa at STP, with potential for aerosol generation	
• Covers percentage substance in the product up to 100% (unless stated differently) *It is required to map this condition of use against each contributing scenario for the exposure scenario for communication. The specific contributing scenario may cover concentrations less than 100%.*	
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 8 h/day	TRA Workers 3.0
• Covers daily exposures up to 8 hours (unless stated differently) *It is required to map this condition of use against each contributing scenario for the exposure scenario for communication. The specific contributing scenario may be shorter than 8 hours.*	
Technical and organisational conditions and measures	
• Local exhaust ventilation: No	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Room ventilation: Basic (up to 3 ACH)	TRA Workers 3.0
• Closed batch process with occasional controlled exposure	
• Handle substance within a closed system	
• Sample via a closed loop or other system to avoid exposure (E8).	

Conditions and measures related to personal protection, hygiene and health evaluation	
• Dermal protection: Chemical resistant dermal protection with basic employee training.(effectiveness >= 90%)	TRA Workers 3.0
• Respiratory protection: No	TRA Workers 3.0
• Face/eye protection: No	
• Assumes a good basic standard of occupational hygiene is implemented *Good occupational hygiene practice is considered by Concawe to constitute measures that are routinely encountered and applied to meet the requirements of relevant workplace legislation such as regulations supporting the EU Framework Directive, in addition to specific RMM identified in the ES. These may include, but are not limited to:* *- Risk assessment of local workplace activities* *- Procedures supporting safe handling and maintenance of controls* *- Education and training of workers in understanding the hazards and control measures relevant to their activities* *- Provision of general ventilation* *- Good housekeeping and prompt clearance of spillages* *- Appropriate selection, testing and maintenance of equipment used to control exposure,* *e.g. Personal Protective Equipment (PPE), Local Exhaust Ventilation (LEV)* *- Draining of equipment prior to maintenance; retention of drained material in sealed storage pending disposal or recycling* *- Regular supply and laundering of work clothing; provision of washing and changing facilities; eating and smoking only in designated areas separate from the workplace*	
• General measures (aspiration) *General measures (aspiration): Do not ingest. If swallowed then seek immediate medical assistance.*	
• General Measures (skin irritants) *General Measures (skin irritants): Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.*	
• General measures (flammability) *General measures (flammability): Use in contained systems. Avoid ignition sources – No Smoking. Handle in well ventilated area to prevent formation of explosive atmosphere. Use equipment and protective systems approved for flammable substances.Restrict line velocity during pumping to avoid generation of electrostatic discharge.* *Ground/bond container and receiving equipment. Use non-sparking tools. Comply with relevant EU/national regulations. Review SDS for additional advice.*	

• General Measures (carcinogenicity) *Consider technical advances and process upgrades (including automation) for the elimination of releases. Minimise exposure using measures such as closed systems, dedicated facilities and suitable general / local exhaust ventilation. Drain down systemsand clear transfer lines prior to breaking containment. Clean / flush equipment, where possible, prior to maintenance. Where there is potential for exposure: Restrict access toauthorised persons; provide specific activity training to operators to minimise exposures; wear suitable gloves and coveralls to prevent skin contamination; wear respiratory protection when its use is identified for certain contributing scenarios; clear up spills immediately and dispose of wastes safely. Ensure safe systems of work or equivalent arrangements are in place to manage risks. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance.*	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 40 °C	TRA Workers 3.0
• Covers use at ambient temperatures (unless stated differently) *It is required to map this condition of use against each contributing scenario for the exposure scenario for communication. The specific contributing scenario may be carried out above ambient temperature.*	

9.0.2.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.7. Exposure concentrations and risks for workers

Route of exposure and type of effects	Assessment entity	Exposure concentration	Risk quantification
Inhalation, systemic, long term	Cumene	2.504 mg/m³ (TRA Workers) RCR = 0.05	Final RCR = 0.05
Inhalation, systemic, acute	Cumene	10.01 mg/m³ (TRA Workers)	Qualitative risk
Inhalation, local, long term	Cumene	2.504 mg/m³ (TRA Workers)	Qualitative risk
Inhalation, local, acute	Cumene	10.01 mg/m³ (TRA Workers) RCR = 0.04	Final RCR = 0.04
Dermal, systemic, long term	Cumene	0.014 mg/kg bw/day (TRA Workers) RCR = 1.78E-3	Final RCR < 0.01
Dermal, local, long term	Registered substanceas such (100%)	0.02 mg/cm² (TRA Workers)	Qualitative risk
	Cumene	2E-3 mg/cm² (TRA Workers)	

Route of exposure and type of effects	Assessment entity	Exposure concentration	Risk quantification
Dermal, local, acute	Registered substanceas such (100%)	0.02 mg/cm² (TRA Workers)	Qualitative risk
	Cumene	2E-3 mg/cm² (TRA Workers)	

Combined routes, systemic, long-term			Final RCR = 0.052

Remarks on exposure dataset obtained with ECETOC TRA

Percentage (w/w) of Registered substance as such (100%) in mixture/article: 100 %Percentage (w/w) of Cumene in mixture/article: 1 %
The vapour pressure at operating temperature (40°C) used for the calculation is 4.24E3 Pa for Registeredsubstance as such (100%).
The vapour pressure at operating temperature (40°C) used for the calculation is 1.58E3 Pa for Cumene.

Table 9.8.

Assessment Entity	Inhalation effectiveness used by TRA
Registered substanceas such (100%)	0 %
Cumene	0 %

Risk characterisation

Qualitative risk characterisation (Inhalation, systemic, acute, Inhalation, local, long term, Dermal, systemic, acute, Dermal, local, long term, Dermal, local, acute, Eye, local):
Qualitative risks management measures are laid out above (General measures). More details are available insection 9.0.4.

9.0.3. Worker CS 3: Storage (PROC 2, PROC 1)

Assessment entity group used for the assessment of this contributing scenario: Substance classified as H350(containing 0.1 to 1% cumene)
PROC 2 and PROC 1 (similar activities within the exposure scenario) have been assessed within one contributing scenario. The (highest) exposure predictions of PROC 2 have been used in the exposure and riskassessment and PROC 1 has been mapped as an additional PROC relevant for the contributing activity.

9.0.3.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Liquid, including paste/slurry/suspension	TRA Workers 3.0
• Liquid, vapour pressure < 0.5kPa at STP, with potential for aerosol generation	
• Covers percentage substance in the product up to 100% (unless stated differently) *It is required to map this condition of use against each contributing scenario for the exposure scenario for communication. The specific contributing scenario may cover concentrations less than 100%.*	
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 8 h/day	TRA Workers 3.0
• Covers daily exposures up to 8 hours (unless stated differently) *It is required to map this condition of use against each contributing scenario for the exposure scenario for communication. The specific contributing scenario may be shorter than 8 hours.*	
Technical and organisational conditions and measures	
• Local exhaust ventilation: No	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0

• Room ventilation: Basic (up to 3 ACH)	TRA Workers 3.0
• Store substance within a closed system	
• Closed continuous process with occasional controlled exposure *Store substance within a closed system.*	
Conditions and measures related to personal protection, hygiene and health evaluation	
• Dermal protection: No	TRA Workers 3.0
• Respiratory protection: No	TRA Workers 3.0
• Face/eye protection: No	
• Assumes a good basic standard of occupational hygiene is implemented *Good occupational hygiene practice is considered by Concawe to constitute measures that are routinely encountered and applied to meet the requirements of relevant workplace legislation such as regulations supporting the EU Framework Directive, in addition to specific RMM identified in the ES. These may include, but are not limited to:* *- Risk assessment of local workplace activities* *- Procedures supporting safe handling and maintenance of controls* *- Education and training of workers in understanding the hazards and control measuresrelevant to their activities* *- Provision of general ventilation* *- Good housekeeping and prompt clearance of spillages* *- Appropriate selection, testing and maintenance of equipment used to control exposure,* *e.g. Personal Protective Equipment (PPE), Local Exhaust Ventilation (LEV)* *- Draining of equipment prior to maintenance; retention of drained material in sealed storage pending disposal or recycling* *- Regular supply and laundering of work clothing; provision of washing and changing facilities; eating and smoking only in designated areas separate from the workplace*	
• General measures (aspiration) *General measures (aspiration): Do not ingest. If swallowed then seek immediate medical assistance.*	
• General Measures (skin irritants) *General Measures (skin irritants): Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.*	
• General measures (flammability) *General measures (flammability): Use in contained systems. Avoid ignition sources – No Smoking. Handle in well ventilated area to prevent formation of explosive atmosphere. Use equipment and protective systems approved for flammable substances.Restrict line velocity during pumping to avoid generation of electrostatic discharge.* *Ground/bond container and receiving equipment. Use non-sparking tools. Comply with relevant EU/national regulations. Review SDS for additional advice.*	

• General Measures (carcinogenicity) *Consider technical advances and process upgrades (including automation) for the elimination of releases. Minimise exposure using measures such as closed systems, dedicated facilities and suitable general / local exhaust ventilation. Drain down systemsand clear transfer lines prior to breaking containment. Clean / flush equipment, where possible, prior to maintenance. Where there is potential for exposure: Restrict access toauthorised persons; provide specific activity training to operators to minimise exposures; wear suitable gloves and coveralls to prevent skin contamination; wear respiratory protection when its use is identified for certain contributing scenarios; clear up spills immediately and dispose of wastes safely. Ensure safe systems of work or equivalent arrangements are in place to manage risks. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance.*	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 25 °C *Ambient temperature*	TRA Workers 3.0
• Covers use at ambient temperatures (unless stated differently) *It is required to map this condition of use against each contributing scenario for the exposure scenario for communication. The specific contributing scenario may be carried out above ambient temperature.*	

9.0.3.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.9. Exposure concentrations and risks for workers

Route of exposure and type of effects	Assessment entity	Exposure concentration	Risk quantification
Inhalation, systemic, long term	Cumene	2.504 mg/m³ (TRA Workers) RCR = 0.05	Final RCR = 0.05
Inhalation, systemic, acute	Cumene	10.01 mg/m³ (TRA Workers)	Qualitative risk
Inhalation, local, long term	Cumene	2.504 mg/m³ (TRA Workers)	Qualitative risk
Inhalation, local, acute	Cumene	10.01 mg/m³ (TRA Workers) RCR = 0.04	Final RCR = 0.04
Dermal, systemic, long term	Cumene	0.137 mg/kg bw/day (TRA Workers) RCR = 0.018	Final RCR = 0.018
Dermal, local, long term	Registered substanceas such (100%)	0.2 mg/cm² (TRA Workers)	Qualitative risk
	Cumene	0.02 mg/cm² (TRA Workers)	
Dermal, local, acute	Registered substanceas such (100%)	0.2 mg/cm² (TRA Workers)	Qualitative risk
	Cumene	0.02 mg/cm² (TRA Workers)	
Combined routes, systemic, long-term			Final RCR = 0.068

Remarks on exposure dataset obtained with ECETOC TRA

Percentage (w/w) of Registered substance as such (100%) in mixture/article: 100 %Percentage (w/w) of Cumene in mixture/article: 1 %
The vapour pressure at operating temperature (25°C) used for the calculation is 4.24E3 Pa for Registeredsubstance as such (100%).
The vapour pressure at operating temperature (25°C) used for the calculation is 1.58E3 Pa for Cumene.

Table 9.10.

Assessment Entity	Inhalation effectiveness used by TRA
Registered substanceas such (100%)	0 %
Cumene	0 %

Risk characterisation

Qualitative risk characterisation (Inhalation, systemic, acute, Inhalation, local, long term, Dermal, systemic, acute, Dermal, local, long term, Dermal, local, acute, Eye, local):
Qualitative risks management measures are laid out above (General measures). More details are available in section 9.0.4.

9.0.4. Worker CS 4: General exposures; Batch process; Closed systems (PROC 3)

Assessment entity group used for the assessment of this contributing scenario: Substance classified as H350(containing 0.1 to 1% cumene)

9.0.4.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Liquid, including paste/slurry/suspension	TRA Workers 3.0
• Liquid, vapour pressure < 0.5kPa at STP, with potential for aerosol generation	
• Covers percentage substance in the product up to 100% (unless stated differently) *It is required to map this condition of use against each contributing scenario for the exposure scenario for communication. The specific contributing scenario may cover concentrations less than 100%.*	
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 8 h/day	TRA Workers 3.0
• Covers daily exposures up to 8 hours (unless stated differently) *It is required to map this condition of use against each contributing scenario for the exposure scenario for communication. The specific contributing scenario may be shorter than 8 hours.*	
Technical and organisational conditions and measures	
• Local exhaust ventilation: No	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Room ventilation: Basic (up to 3 ACH)	TRA Workers 3.0
• Closed batch process with occasional controlled exposure	
• Handle substance within a closed system	
• Sample via a closed loop or other system to avoid exposure (E8).	
Conditions and measures related to personal protection, hygiene and health evaluation	

• Dermal protection: Chemical resistant dermal protection with basic employee training.(effectiveness >= 90%)	TRA Workers 3.0
• Respiratory protection: No	TRA Workers 3.0
• Face/eye protection: No	
• Assumes a good basic standard of occupational hygiene is implemented *Good occupational hygiene practice is considered by Concawe to constitute measures that are routinely encountered and applied to meet the requirements of relevant workplace legislation such as regulations supporting the EU Framework Directive, in addition to specific RMM identified in the ES. These may include, but are not limited to:* *- Risk assessment of local workplace activities* *- Procedures supporting safe handling and maintenance of controls* *- Education and training of workers in understanding the hazards and control measures relevant to their activities* *- Provision of general ventilation* *- Good housekeeping and prompt clearance of spillages* *- Appropriate selection, testing and maintenance of equipment used to control exposure,* *e.g. Personal Protective Equipment (PPE), Local Exhaust Ventilation (LEV)* *- Draining of equipment prior to maintenance; retention of drained material in sealed storage pending disposal or recycling*	
- Regular supply and laundering of work clothing; provision of washing and changing facilities; eating and smoking only in designated areas separate from the workplace	
• General measures (aspiration) *General measures (aspiration): Do not ingest. If swallowed then seek immediate medical assistance.*	
• General Measures (skin irritants) *General Measures (skin irritants): Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.*	
• General measures (flammability) *General measures (flammability): Use in contained systems. Avoid ignition sources – No Smoking. Handle in well ventilated area to prevent formation of explosive atmosphere. Use equipment and protective systems approved for flammable substances.Restrict line velocity during pumping to avoid generation of electrostatic discharge.* *Ground/bond container and receiving equipment. Use non-sparking tools. Comply with relevant EU/national regulations. Review SDS for additional advice.*	
• General Measures (carcinogenicity) *Consider technical advances and process upgrades (including automation) for the elimination of releases. Minimise exposure using measures such as closed systems, dedicated facilities and suitable general / local exhaust ventilation. Drain down systemsand clear transfer lines prior to breaking containment. Clean / flush equipment, where possible, prior to maintenance. Where there is potential for exposure: Restrict access toauthorised persons; provide specific activity training to operators to minimise exposures; wear suitable gloves and coveralls to prevent skin contamination; wear respiratory protection when its use is identified for certain contributing scenarios; clear up spills immediately and dispose of wastes safely. Ensure safe systems of work or equivalent arrangements are in place to manage risks. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance.*	

Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 25 °C *Ambient temperature*	TRA Workers 3.0
• Covers use at ambient temperatures (unless stated differently) *It is required to map this condition of use against each contributing scenario for the exposure scenario for communication. The specific contributing scenario may be carried out above ambient temperature.*	

9.0.4.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.11. Exposure concentrations and risks for workers

Route of exposure and type of effects	Assessment entity	Exposure concentration	Risk quantification
Inhalation, systemic, long term	Cumene	5.008 mg/m³ (TRA Workers) RCR = 0.1	Final RCR = 0.1
Inhalation, systemic, acute	Cumene	20.03 mg/m³ (TRA Workers)	Qualitative risk
Inhalation, local, long term	Cumene	5.008 mg/m³ (TRA Workers)	Qualitative risk
Inhalation, local,	Cumene	20.03 mg/m³ (TRA Workers)	Final RCR = 0.08

Route of exposure and type of effects	Assessment entity	Exposure concentration	Risk quantification
acute		RCR = 0.08	
Dermal, systemic, long term	Cumene	6.9E-3 mg/kg bw/day (TRA Workers) RCR = 8.96E-4	Final RCR < 0.01
Dermal, local, long term	Registered substanceas such (100%)	0.02 mg/cm² (TRA Workers)	Qualitative risk
	Cumene	2.01E-3 mg/cm² (TRA Workers)	
Dermal, local, acute	Registered substanceas such (100%)	0.02 mg/cm² (TRA Workers)	Qualitative risk
	Cumene	2.01E-3 mg/cm² (TRA Workers)	
Combined routes, systemic, long-term			Final RCR = 0.101

Remarks on exposure dataset obtained with ECETOC TRA

Percentage (w/w) of Registered substance as such (100%) in mixture/article: 100 %Percentage (w/w) of Cumene in mixture/article: 1 %
The vapour pressure at operating temperature (25°C) used for the calculation is 4.24E3 Pa for Registeredsubstance as such (100%).
The vapour pressure at operating temperature (25°C) used for the calculation is 602.3 Pa for Cumene.

Table 9.12.

Assessment Entity	Inhalation effectiveness used by TRA

Registered substanceas such (100%)	0 %
Cumene	0 %

Risk characterisation

Qualitative risk characterisation (Inhalation, systemic, acute, Inhalation, local, long term, Dermal, systemic, acute, Dermal, local, long term, Dermal, local, acute, Eye, local):
Qualitative risks management measures are laid out above (General measures). More details are available insection 9.0.4.

9.0.5. Worker CS 5: General exposures; Closed systems (PROC 4)

Assessment entity group used for the assessment of this contributing scenario: Substance classified as H350(containing 0.1 to 1% cumene)

9.0.5.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Liquid, including paste/slurry/suspension	TRA Workers 3.0
• Liquid, vapour pressure < 0.5kPa at STP, with potential for aerosol generation	
• Covers percentage substance in the product up to 100% (unless stated differently) *It is required to map this condition of use against each contributing scenario for the exposure scenario for communication. The specific contributing scenario may cover concentrations less than 100%.*	
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 8 h/day	TRA Workers 3.0
• Covers daily exposures up to 8 hours (unless stated differently) *It is required to map this condition of use against each contributing scenario for the exposure scenario for communication. The specific contributing scenario may be shorter than 8 hours.*	
Technical and organisational conditions and measures	
• Local exhaust ventilation: No	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Room ventilation: Basic (up to 3 ACH)	TRA Workers 3.0
• Closed batch process with occasional controlled exposure	
• Handle substance within a closed system	
• Sample via a closed loop or other system to avoid exposure (E8).	
Conditions and measures related to personal protection, hygiene and health evaluation	
• Dermal protection: Chemical resistant dermal protection with basic employee training.(effectiveness >= 90%)	TRA Workers 3.0
• Respiratory protection: No	TRA Workers 3.0
• Face/eye protection: No	

• Assumes a good basic standard of occupational hygiene is implemented *Good occupational hygiene practice is considered by Concawe to constitute measures that are routinely encountered and applied to meet the requirements of relevant workplace legislation such as regulations supporting the EU Framework Directive, in addition to specific RMM identified in the ES. These may include, but are not limited to:* *- Risk assessment of local workplace activities* *- Procedures supporting safe handling and maintenance of controls* *- Education and training of workers in understanding the hazards and control measures relevant to their activities* *- Provision of general ventilation* *- Good housekeeping and prompt clearance of spillages* *- Appropriate selection, testing and maintenance of equipment used to control exposure,* *e.g. Personal Protective Equipment (PPE), Local Exhaust Ventilation (LEV)* *- Draining of equipment prior to maintenance; retention of drained material in sealed storage pending disposal or recycling* *- Regular supply and laundering of work clothing; provision of washing and changing facilities; eating and smoking only in designated areas separate from the workplace*	
• General measures (aspiration) *General measures (aspiration): Do not ingest. If swallowed then seek immediate medical assistance.*	
• General Measures (skin irritants) *General Measures (skin irritants): Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.*	
• General measures (flammability) *General measures (flammability): Use in contained systems. Avoid ignition sources – No Smoking. Handle in well ventilated area to prevent formation of explosive atmosphere. Use equipment and protective systems approved for flammable substances.Restrict line velocity during pumping to avoid generation of electrostatic discharge.* *Ground/bond container and receiving equipment. Use non-sparking tools. Comply with relevant EU/national regulations. Review SDS for additional advice.*	
• General Measures (carcinogenicity) *Consider technical advances and process upgrades (including automation) for the elimination of releases. Minimise exposure using measures such as closed systems, dedicated facilities and suitable general / local exhaust ventilation. Drain down systems and clear transfer lines prior to breaking containment. Clean / flush equipment, where possible, prior to maintenance. Where there is potential for exposure: Restrict access to authorised persons; provide specific activity training to operators to minimise exposures; wear suitable gloves and coveralls to prevent skin contamination; wear respiratory protection when its use is identified for certain contributing scenarios; clear up spills immediately and dispose of wastes safely. Ensure safe systems of work or equivalent arrangements are in place to manage risks. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance.*	

Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 25 °C *Ambient temperature*	TRA Workers 3.0

• Covers use at ambient temperatures (unless stated differently) *It is required to map this condition of use against each contributing scenario for the exposure scenario for communication. The specific contributing scenario may be carried out above ambient temperature.*	

9.0.5.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.13. Exposure concentrations and risks for workers

Route of exposure and type of effects	Assessment entity	Exposure concentration	Risk quantification
Inhalation, systemic, long term	Cumene	10.01 mg/m³ (TRA Workers) RCR = 0.2	Final RCR = 0.2
Inhalation, systemic, acute	Cumene	40.06 mg/m³ (TRA Workers)	Qualitative risk
Inhalation, local, long term	Cumene	10.01 mg/m³ (TRA Workers)	Qualitative risk
Inhalation, local, acute	Cumene	40.06 mg/m³ (TRA Workers) RCR = 0.16	Final RCR = 0.16
Dermal, systemic, long term	Cumene	0.069 mg/kg bw/day (TRA Workers) RCR = 8.91E-3	Final RCR < 0.01
Dermal, local, long term	Registered substanceas such (100%)	0.1 mg/cm² (TRA Workers)	Qualitative risk
	Cumene	0.01 mg/cm² (TRA Workers)	
Dermal, local, acute	Registered substanceas such (100%)	0.1 mg/cm² (TRA Workers)	Qualitative risk
	Cumene	0.01 mg/cm² (TRA Workers)	
Combined routes, systemic, long-term			Final RCR = 0.209

Remarks on exposure dataset obtained with ECETOC TRA

Percentage (w/w) of Registered substance as such (100%) in mixture/article: 100 %Percentage (w/w) of Cumene in mixture/article: 1 %
The vapour pressure at operating temperature (25°C) used for the calculation is 4.24E3 Pa for Registeredsubstance as such (100%).
The vapour pressure at operating temperature (25°C) used for the calculation is 1.58E3 Pa for Cumene.

Table 9.14.

Assessment Entity	Inhalation effectiveness used by TRA
Registered substanceas such (100%)	0 %

Assessment Entity	Inhalation effectiveness used by TRA
Cumene	0 %

Risk characterisation

Qualitative risk characterisation (Inhalation, systemic, acute, Inhalation, local, long term, Dermal, systemic, acute, Dermal, local, long term, Dermal, local, acute, Eye, local):
Qualitative risks management measures are laid out above (General measures). More details are available insection 9.0.4.

9.0.6. Worker CS 6: Equipment cleaning and maintenance (PROC 8a,PROC 28)

Assessment entity group used for the assessment of this contributing scenario: Substance classified as H350(containing 0.1 to 1% cumene)
Cleaning and maintenance activities have been assessed within one contributing scenario. Since the ECETOC TRA currently does not provide exposure predictions for the associated PROC28, PROC8a exposure predictionshave been used and PROC28 has been mapped as an additional PROC relevant for the contributing activity.

9.0.6.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Solid (material with medium dustiness) *As described in ECETOC TR114. exposure to aerosol can be estimated using the medium dustiness band of the ECETOC TRA. For a detailed explanation see section 9.0.4.*	TRA Workers 3.0
• Liquid, vapour pressure < 0.5kPa at STP, with potential for aerosol generation	
• Covers percentage substance in the product up to 100% (unless stated differently) *It is required to map this condition of use against each contributing scenario for the exposure scenario for communication. The specific contributing scenario may cover concentrations less than 100%.*	
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 8 h/day	TRA Workers 3.0
• Covers daily exposures up to 8 hours (unless stated differently) *It is required to map this condition of use against each contributing scenario for the exposure scenario for communication. The specific contributing scenario may be shorter than 8 hours.*	
Technical and organisational conditions and measures	
• Local exhaust ventilation: No	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Room ventilation: Basic (up to 3 ACH)	TRA Workers 3.0
• Standard Operating Procedures (SOP) maintenance (industrial) [Effectiveness Inhalation: 90%, Dermal: 0%] *Drain down and flush system prior to equipment break-in or maintenance.* Inhalation explanation: *Based on results from Fraunhofer experimental study report Verifying the Effectiveness of Solvent RMMs 15/6/2016.* Dermal explanation: *Expect dermal exposure is substantially reduced when lines and equipment are properly drained and flushed according to Standard Operating Procedures (SOP). Specific exposure reduction is per assessor professional judgment.*	
Conditions and measures related to personal protection, hygiene and health evaluation	
• Dermal protection: Chemical resistant dermal protection with basic employee training.(effectiveness >= 90%)	TRA Workers 3.0

	Method

• Respiratory protection: No	TRA Workers 3.0
• Face/eye protection: No	
• Assumes a good basic standard of occupational hygiene is implemented *Good occupational hygiene practice is considered by Concawe to constitute measures that are routinely encountered and applied to meet the requirements of relevant workplace legislation such as regulations supporting the EU Framework Directive, in addition to specific RMM identified in the ES. These may include, but are not limited to:* *- Risk assessment of local workplace activities* *- Procedures supporting safe handling and maintenance of controls* *- Education and training of workers in understanding the hazards and control measures relevant to their activities* *- Provision of general ventilation* *- Good housekeeping and prompt clearance of spillages* *- Appropriate selection, testing and maintenance of equipment used to control exposure,* *e.g. Personal Protective Equipment (PPE), Local Exhaust Ventilation (LEV)* *- Draining of equipment prior to maintenance; retention of drained material in sealed storage pending disposal or recycling* *- Regular supply and laundering of work clothing; provision of washing and changing facilities; eating and smoking only in designated areas separate from the workplace*	
• General measures (aspiration) *General measures (aspiration): Do not ingest. If swallowed then seek immediate medical assistance.*	
• General Measures (skin irritants) *General Measures (skin irritants): Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.*	
• General measures (flammability) *General measures (flammability): Use in contained systems. Avoid ignition sources – No Smoking. Handle in well ventilated area to prevent formation of explosive atmosphere. Use equipment and protective systems approved for flammable substances.Restrict line velocity during pumping to avoid generation of electrostatic discharge.* *Ground/bond container and receiving equipment. Use non-sparking tools. Comply with relevant EU/national regulations. Review SDS for additional advice.*	
• General Measures (carcinogenicity) *Consider technical advances and process upgrades (including automation) for the elimination of releases. Minimise exposure using measures such as closed systems, dedicated facilities and suitable general / local exhaust ventilation. Drain down systemsand clear transfer lines prior to breaking containment. Clean / flush equipment, where possible, prior to maintenance. Where there is potential for exposure: Restrict access toauthorised persons; provide specific activity training to operators to minimise exposures; wear suitable gloves and coveralls to prevent skin contamination; wear respiratory protection when its use is identified for certain contributing scenarios; clear up spills immediately and dispose of wastes safely. Ensure safe systems of work or equivalent arrangements are in place to manage risks. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance.*	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0

• Operating temperature: <= 25 °C *Ambient temperature*	TRA Workers 3.0
• Covers use at ambient temperatures (unless stated differently) *It is required to map this condition of use against each contributing scenario for the exposure scenario for communication. The specific contributing scenario may be carried out above ambient temperature.*	

9.0.6.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.15. Exposure concentrations and risks for workers

Route of exposure and type of effects	Assessment entity	Exposure concentration	Risk quantification
Inhalation, systemic, long term	Cumene	25.04 mg/m³ (TRA Workers) RCR = 0.501	Final RCR = 0.501
Inhalation, systemic, acute	Cumene	100.1 mg/m³ (TRA Workers)	Qualitative risk
Inhalation, local, long term	Cumene	25.04 mg/m³ (TRA Workers)	Qualitative risk
Inhalation, local, acute	Cumene	100.1 mg/m³ (TRA Workers) RCR = 0.401	Final RCR = 0.401
Dermal, systemic, long term	Cumene	0.137 mg/kg bw/day (TRA Workers) RCR = 0.018	Final RCR = 0.018
Dermal, local, long term	Registered substanceas such (100%)	0.1 mg/cm² (TRA Workers)	Qualitative risk
	Cumene	1E-2 mg/cm² (TRA Workers)	
Dermal, local, acute	Registered substanceas such (100%)	0.1 mg/cm² (TRA Workers)	Qualitative risk
	Cumene	1E-2 mg/cm² (TRA Workers)	
Combined routes, systemic, long-term			Final RCR = 0.519

Remarks on exposure dataset obtained with ECETOC TRA

Percentage (w/w) of Registered substance as such (100%) in mixture/article: 100 %Percentage (w/w) of Cumene in mixture/article: 1 %
The vapour pressure at operating temperature (25°C) used for the calculation is 4.24E3 Pa for Registeredsubstance as such (100%).
The vapour pressure at operating temperature (25°C) used for the calculation is 1.58E3 Pa for Cumene.

Table 9.16.

Assessment Entity	Inhalation effectiveness used by TRA
Registered substanceas such (100%)	0 %
Cumene	0 %

Risk characterisation

Qualitative risk characterisation (Inhalation, systemic, acute, Inhalation, local, long term, Dermal, systemic, acute, Dermal, local, long term, Dermal, local, acute, Eye, local):
Qualitative risks management measures are laid out above (General measures). More details are available insection 9.0.4.

9.0.7. Worker CS 7: Bulk transfers; Closed systems; Loading andunloading (PROC 8b)

Assessment entity group used for the assessment of this contributing scenario: Substance classified as H350(containing 0.1 to 1% cumene)

9.0.7.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Liquid, including paste/slurry/suspension	TRA Workers 3.0
• Liquid, vapour pressure < 0.5kPa at STP, with potential for aerosol generation	
• Covers percentage substance in the product up to 100% (unless stated differently) *It is required to map this condition of use against each contributing scenario for the exposure scenario for communication. The specific contributing scenario may cover concentrations less than 100%.*	
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 8 h/day	TRA Workers 3.0
• Covers daily exposures up to 8 hours (unless stated differently) *It is required to map this condition of use against each contributing scenario for the exposure scenario for communication. The specific contributing scenario may be shorter than 8 hours.*	
Technical and organisational conditions and measures	
• Local exhaust ventilation: No	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Room ventilation: Basic (up to 3 ACH)	TRA Workers 3.0
• Transfer under containment [Effectiveness Inhalation: 90%, Dermal: 0%] *Ensure material transfers are under containment or extract ventilation.* Inhalation explanation: *Based on results from Fraunhofer experimental study report Verifying the Effectiveness of Solvent RMMs 15/6/2016. This supports ESIG standard phrase Ensure material transfers are under containment or extract ventilation. E66*	
Conditions and measures related to personal protection, hygiene and health evaluation	
• Dermal protection: Chemical resistant dermal protection with basic employee training.(effectiveness >= 90%)	TRA Workers 3.0
• Respiratory protection: No	TRA Workers 3.0
• Face/eye protection: No	

• Assumes a good basic standard of occupational hygiene is implemented *Good occupational hygiene practice is considered by Concawe to constitute measures that are routinely encountered and applied to meet the requirements of relevant workplace legislation such as regulations supporting the EU Framework Directive, in addition to specific RMM identified in the ES. These may include, but are not limited to:* *- Risk assessment of local workplace activities* *- Procedures supporting safe handling and maintenance of controls* *- Education and training of workers in understanding the hazards and control measures relevant to their activities* *- Provision of general ventilation* *- Good housekeeping and prompt clearance of spillages* *- Appropriate selection, testing and maintenance of equipment used to control exposure,* *e.g. Personal Protective Equipment (PPE), Local Exhaust Ventilation (LEV)* *- Draining of equipment prior to maintenance; retention of drained material in sealedstorage pending disposal or recycling* *- Regular supply and laundering of work clothing; provision of washing and changing facilities; eating and smoking only in designated areas separate from the workplace*	
• General measures (aspiration) *General measures (aspiration): Do not ingest. If swallowed then seek immediate medical assistance.*	
• General Measures (skin irritants)	

	Method
General Measures (skin irritants): Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contactwith substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.	
• General measures (flammability) *General measures (flammability): Use in contained systems. Avoid ignition sources – No Smoking. Handle in well ventilated area to prevent formation of explosive atmosphere. Use equipment and protective systems approved for flammable substances.Restrict line velocity during pumping to avoid generation of electrostatic discharge.* *Ground/bond container and receiving equipment. Use non-sparking tools. Comply with relevant EU/national regulations. Review SDS for additional advice.*	
• General Measures (carcinogenicity) *Consider technical advances and process upgrades (including automation) for the elimination of releases. Minimise exposure using measures such as closed systems, dedicated facilities and suitable general / local exhaust ventilation. Drain down systemsand clear transfer lines prior to breaking containment. Clean / flush equipment, where possible, prior to maintenance. Where there is potential for exposure: Restrict access toauthorised persons; provide specific activity training to operators to minimise exposures; wear suitable gloves and coveralls to prevent skin contamination; wear respiratory protection when its use is identified for certain contributing scenarios; clear up spills immediately and dispose of wastes safely. Ensure safe systems of work or equivalent arrangements are in place to manage risks. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance.*	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0

• Operating temperature: <= 25 °C *Ambient temperature*	TRA Workers 3.0
• Covers use at ambient temperatures (unless stated differently) *It is required to map this condition of use against each contributing scenario for the exposure scenario for communication. The specific contributing scenario may be carried out above ambient temperature.*	

9.0.7.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.17. Exposure concentrations and risks for workers

Route of exposure and type of effects	Assessment entity	Exposure concentration	Risk quantification
Inhalation, systemic, long term	Cumene	12.52 mg/m³ (TRA Workers) RCR = 0.25	Final RCR = 0.25
Inhalation, systemic, acute	Cumene	50.08 mg/m³ (TRA Workers)	Qualitative risk
Inhalation, local, long term	Cumene	12.52 mg/m³ (TRA Workers)	Qualitative risk
Inhalation, local, acute	Cumene	50.08 mg/m³ (TRA Workers) RCR = 0.2	Final RCR = 0.2
Dermal, systemic, long term	Cumene	0.137 mg/kg bw/day (TRA Workers) RCR = 0.018	Final RCR = 0.018
Dermal, local, long term	Registered substanceas such (100%)	0.1 mg/cm² (TRA Workers)	Qualitative risk
	Cumene	1E-2 mg/cm² (TRA Workers)	
Route of exposure and type of effects	**Assessment entity**	**Exposure concentration**	**Risk quantification**
Dermal, local, acute	Registered substanceas such (100%)	0.1 mg/cm² (TRA Workers)	Qualitative risk
	Cumene	1E-2 mg/cm² (TRA Workers)	
Combined routes, systemic, long-term			Final RCR = 0.268

Remarks on exposure dataset obtained with ECETOC TRA

Percentage (w/w) of Registered substance as such (100%) in mixture/article: 100 %Percentage (w/w) of Cumene in mixture/article: 1 %
The vapour pressure at operating temperature (25°C) used for the calculation is 4.24E3 Pa for Registeredsubstance as such (100%).
The vapour pressure at operating temperature (25°C) used for the calculation is 1.58E3 Pa for Cumene.

Table 9.18.

Assessment Entity	Inhalation effectiveness used by TRA
Registered substanceas such (100%)	0 %
Cumene	0 %

Risk characterisation

Qualitative risk characterisation (Inhalation, systemic, acute, Inhalation, local, long term, Dermal, systemic, acute, Dermal, local, long term, Dermal, local, acute, Eye, local):
Qualitative risks management measures are laid out above (General measures). More details are available insection 9.0.4.

9.0.8. Worker CS 8: Process sampling (PROC 9)

Assessment entity group used for the assessment of this contributing scenario: Substance classified as H350(containing 0.1 to 1% cumene)

9.0.8.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Solid (material with medium dustiness) *As described in ECETOC TR114. exposure to aerosol can be estimated using the medium dustiness band of the ECETOC TRA. For a detailed explanation see section 9.0.4.*	TRA Workers 3.0
• Liquid, vapour pressure < 0.5kPa at STP, with potential for aerosol generation	
• Covers percentage substance in the product up to 100% (unless stated differently) *It is required to map this condition of use against each contributing scenario for the exposure scenario for communication. The specific contributing scenario may cover concentrations less than 100%.*	
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 8 h/day	TRA Workers 3.0
• Covers daily exposures up to 8 hours (unless stated differently) *It is required to map this condition of use against each contributing scenario for the exposure scenario for communication. The specific contributing scenario may be shorter than 8 hours.*	
Technical and organisational conditions and measures	
• Local exhaust ventilation: No	TRA Workers 3.0

	Method
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Room ventilation: Basic (up to 3 ACH)	TRA Workers 3.0
Conditions and measures related to personal protection, hygiene and health evaluation	
• Dermal protection: Chemical resistant dermal protection with basic employee training.(effectiveness >= 90%)	TRA Workers 3.0
• Respiratory protection: No	TRA Workers 3.0
• Face/eye protection: No	
• Assumes a good basic standard of occupational hygiene is implemented *Good occupational hygiene practice is considered by Concawe to constitute measures that are routinely encountered and applied to meet the requirements of relevant workplace legislation such as regulations supporting the EU Framework Directive, in addition to specific RMM identified in the ES. These may include, but are not limited to:* *- Risk assessment of local workplace activities* *- Procedures supporting safe handling and maintenance of controls* *- Education and training of workers in understanding the hazards and control*	

measuresrelevant to their activities *- Provision of general ventilation* *- Good housekeeping and prompt clearance of spillages* *- Appropriate selection, testing and maintenance of equipment used to control exposure,* *e.g. Personal Protective Equipment (PPE), Local Exhaust Ventilation (LEV)* *- Draining of equipment prior to maintenance; retention of drained material in sealed storage pending disposal or recycling* *- Regular supply and laundering of work clothing; provision of washing and changing facilities; eating and smoking only in designated areas separate from the workplace*	
• General measures (aspiration) *General measures (aspiration): Do not ingest. If swallowed then seek immediate medical assistance.*	
• General Measures (skin irritants) *General Measures (skin irritants): Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contactwith substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.*	
• General measures (flammability) *General measures (flammability): Use in contained systems. Avoid ignition sources – No Smoking. Handle in well ventilated area to prevent formation of explosive atmosphere. Use equipment and protective systems approved for flammable substances.Restrict line velocity during pumping to avoid generation of electrostatic discharge.* *Ground/bond container and receiving equipment. Use non-sparking tools. Comply with relevant EU/national regulations. Review SDS for additional advice.*	
• General Measures (carcinogenicity) *Consider technical advances and process upgrades (including automation) for the elimination of releases. Minimise exposure using measures such as closed systems, dedicated facilities and suitable general / local exhaust ventilation. Drain down systemsand clear transfer lines prior to breaking containment. Clean / flush equipment, where possible, prior to maintenance. Where there is potential for exposure: Restrict access toauthorised persons; provide specific activity training to operators to minimise exposures; wear suitable gloves and coveralls to prevent skin contamination; wear respiratory protection when its use is identified for certain contributing scenarios; clear up spills immediately and dispose of wastes safely. Ensure safe systems of work or equivalent arrangements are in place to manage risks. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance.*	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 25 °C *Ambient temperature*	TRA Workers 3.0
• Covers use at ambient temperatures (unless stated differently) *It is required to map this condition of use against each contributing scenario for the exposure scenario for communication. The specific contributing scenario may be carried out above ambient temperature.*	

9.0.8.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.19. Exposure concentrations and risks for workers

Route of exposure and type of effects	Assessment entity	Exposure concentration	Risk quantification
Inhalation, systemic, long term	Cumene	2.504 mg/m³ (TRA Workers) RCR = 0.05	Final RCR = 0.05
Inhalation, systemic, acute	Cumene	10.01 mg/m³ (TRA Workers)	Qualitative risk
Inhalation, local, long term	Cumene	2.504 mg/m³ (TRA Workers)	Qualitative risk
Inhalation, local, acute	Cumene	10.01 mg/m³ (TRA Workers) RCR = 0.04	Final RCR = 0.04
Dermal, systemic, long term	Cumene	0.069 mg/kg bw/day (TRA Workers) RCR = 8.91E-3	Final RCR < 0.01
Dermal, local, long term	Registered substanceas such (100%)	0.1 mg/cm² (TRA Workers)	Qualitative risk
	Cumene	0.01 mg/cm² (TRA Workers)	
Dermal, local, acute	Registered substanceas such (100%)	0.1 mg/cm² (TRA Workers)	Qualitative risk
	Cumene	0.01 mg/cm² (TRA Workers)	
Combined routes, systemic, long-term			Final RCR = 0.059

Remarks on exposure dataset obtained with ECETOC TRA

Percentage (w/w) of Registered substance as such (100%) in mixture/article: 100 %Percentage (w/w) of Cumene in mixture/article: 1 %
The vapour pressure at operating temperature (25°C) used for the calculation is 1.14E3 Pa for Registeredsubstance as such (100%).
The vapour pressure at operating temperature (25°C) used for the calculation is 427 Pa for Cumene.

Table 9.20.

Assessment Entity	Inhalation effectiveness used by TRA
Registered substanceas such (100%)	0 %
Cumene	0 %

Risk characterisation

Qualitative risk characterisation (Inhalation, systemic, acute, Inhalation, local, long term, Dermal, systemic, acute, Dermal, local, long term, Dermal, local, acute, Eye, local):
Qualitative risks management measures are laid out above (General measures). More details are available insection 9.0.4.

9.0.9. Worker CS 9: Laboratory activities (PROC 15)

Assessment entity group used for the assessment of this contributing scenario: Substance classified as H350(containing 0.1 to 1% cumene)

9.0.9.1. Conditions of use

	Method
Product (article) characteristics	

• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Solid (material with medium dustiness) *As described in ECETOC TR114. exposure to aerosol can be estimated using the medium dustiness band of the ECETOC TRA. For a detailed explanation see section 9.0.4.*	TRA Workers 3.0
• Liquid, vapour pressure < 0.5kPa at STP, with potential for aerosol generation	
• Covers percentage substance in the product up to 100% (unless stated differently) *It is required to map this condition of use against each contributing scenario for the exposure scenario for communication. The specific contributing scenario may cover concentrations less than 100%.*	
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 8 h/day	TRA Workers 3.0
• Covers daily exposures up to 8 hours (unless stated differently) *It is required to map this condition of use against each contributing scenario for the exposure scenario for communication. The specific contributing scenario may be shorter than 8 hours.*	
Technical and organisational conditions and measures	
• Local exhaust ventilation: No	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Room ventilation: Basic (up to 3 ACH)	TRA Workers 3.0
• Closed batch process with occasional controlled exposure	
• Handle substance within a closed system	
• Sample via a closed loop or other system to avoid exposure (E8).	
Conditions and measures related to personal protection, hygiene and health evaluation	
• Dermal protection: Chemical resistant dermal protection with basic employee training.(effectiveness >= 90%)	TRA Workers 3.0
• Respiratory protection: No	TRA Workers 3.0
• Face/eye protection: No	
• Assumes a good basic standard of occupational hygiene is implemented *Good occupational hygiene practice is considered by Concawe to constitute measures that are routinely encountered and applied to meet the requirements of relevant workplace legislation such as regulations supporting the EU Framework Directive, in addition to specific RMM identified in the ES. These may include, but are not limited to:* *- Risk assessment of local workplace activities* *- Procedures supporting safe handling and maintenance of controls* *- Education and training of workers in understanding the hazards and control measuresrelevant to their activities* *- Provision of general ventilation* *- Good housekeeping and prompt clearance of spillages* *- Appropriate selection, testing and maintenance of equipment used to control exposure,* *e.g. Personal Protective Equipment (PPE), Local Exhaust Ventilation (LEV)* *- Draining of equipment prior to maintenance; retention of drained material in sealed storage pending disposal or recycling* *- Regular supply and laundering of work clothing; provision of washing and changing facilities; eating and smoking only in designated areas separate from the workplace*	

• General measures (aspiration) *General measures (aspiration): Do not ingest. If swallowed then seek immediate medical assistance.*	
• General Measures (skin irritants) *General Measures (skin irritants): Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.*	
• General measures (flammability) *General measures (flammability): Use in contained systems. Avoid ignition sources – No Smoking. Handle in well ventilated area to prevent formation of explosive atmosphere. Use equipment and protective systems approved for flammable substances.Restrict line velocity during pumping to avoid generation of electrostatic discharge.* *Ground/bond container and receiving equipment. Use non-sparking tools. Comply with relevant EU/national regulations. Review SDS for additional advice.*	
• General Measures (carcinogenicity) *Consider technical advances and process upgrades (including automation) for the elimination of releases. Minimise exposure using measures such as closed systems, dedicated facilities and suitable general / local exhaust ventilation. Drain down systemsand clear transfer lines prior to breaking containment. Clean / flush equipment, where possible, prior to maintenance. Where there is potential for exposure: Restrict access toauthorised persons; provide specific activity training to operators to minimise exposures; wear suitable gloves and coveralls to prevent skin contamination; wear respiratory protection when its use is identified for certain contributing scenarios; clear up spills immediately and dispose of wastes safely. Ensure safe systems of work or equivalent arrangements are in place to manage risks. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance.*	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 25 °C *Ambient temperature*	TRA Workers 3.0
• Covers use at ambient temperatures (unless stated differently) *It is required to map this condition of use against each contributing scenario for the exposure scenario for communication. The specific contributing scenario may be carried out above ambient temperature.*	
• No other specific measures identified [E120] *No other specific measures identified [E120]*	

9.0.9.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.21. Exposure concentrations and risks for workers

Route of exposure and type of effects	Assessment entity	Exposure concentration	Risk quantification
Inhalation, systemic, long term	Cumene	2.504 mg/m³ (TRA Workers) RCR = 0.05	Final RCR = 0.05

Inhalation, systemic, acute	Cumene	10.01 mg/m³ (TRA Workers)	Qualitative risk
Inhalation, local, long term	Cumene	2.504 mg/m³ (TRA Workers)	Qualitative risk

Route of exposure and type of effects	Assessment entity	Exposure concentration	Risk quantification
Inhalation, local, acute	Cumene	10.01 mg/m³ (TRA Workers) RCR = 0.04	Final RCR = 0.04
Dermal, systemic, long term	Cumene	3.4E-3 mg/kg bw/day (TRA Workers) RCR = 4.42E-4	Final RCR < 0.01
Dermal, local, long term	Registered substanceas such (100%)	9.92E-3 mg/cm² (TRA Workers)	Qualitative risk
	Cumene	9.92E-4 mg/cm² (TRA Workers)	
Dermal, local, acute	Registered substanceas such (100%)	9.92E-3 mg/cm² (TRA Workers)	Qualitative risk
	Cumene	9.92E-4 mg/cm² (TRA Workers)	
Combined routes, systemic, long-term			Final RCR = 0.051

Remarks on exposure dataset obtained with ECETOC TRA

Percentage (w/w) of Registered substance as such (100%) in mixture/article: 100 %Percentage (w/w) of Cumene in mixture/article: 1 %
The vapour pressure at operating temperature (25°C) used for the calculation is 1.14E3 Pa for Registeredsubstance as such (100%).
The vapour pressure at operating temperature (25°C) used for the calculation is 427 Pa for Cumene.

Table 9.22.

Assessment Entity	Inhalation effectiveness used by TRA
Registered substanceas such (100%)	0 %
Cumene	0 %

Risk characterisation

Qualitative risk characterisation (Inhalation, systemic, acute, Inhalation, local, long term, Dermal, systemic, acute, Dermal, local, long term, Dermal, local, acute, Eye, local):
Qualitative risks management measures are laid out above (General measures). More details are available insection 9.0.4.

9.2. *Exposure scenario 2: Use at industrial sites - Use as anintermediate; Closed systems; Level I*

Market sector: Use as an intermediate
Sector of use: SU 8: Manufacture of bulk, large scale chemicals (including petroleum products); SU 9:Manufacture of fine chemicals

Worker contributing scenario(s):		
CS 1	General exposures; Closed systems	**PROC 2**, PROC 1
CS 2	Storage	**PROC 2**, PROC 1
CS 3	General exposures; Batch process; Closed systems	PROC 3
CS 4	General exposures	PROC 4
CS 5	Equipment cleaning and maintenance	**PROC 8a**, PROC 28
CS 6	Bulk transfers; Closed systems; Loading and unloading	PROC 8b
CS 7	Process sampling	PROC 9
CS 8	Laboratory activities	PROC 15

Further description of the use:

Use of substance as an intermediate within closed or contained systems (not related to Strictly Controlled Conditions). Includes incidental exposures during recycling/ recovery, material transfers, storage, sampling, associated laboratory activities, maintenance and loading (including marine vessel/barge, road/rail car and bulkcontainer).

9.2.1. Worker CS 1: General exposures; Closed systems (PROC 2, PROC 1)

Assessment entity group used for the assessment of this contributing scenario: Substance classified as H350(containing 0.1 to 1% cumene)
PROC 2 and PROC 1 (similar activities within the exposure scenario) have been assessed within one contributing scenario. The (highest) exposure predictions of PROC 2 have been used in the exposure and riskassessment and PROC 1 has been mapped as an additional PROC relevant for the contributing activity.

9.2.1.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Liquid, including paste/slurry/suspension	TRA Workers 3.0
• Liquid, vapour pressure < 0.5kPa at STP, with potential for aerosol generation	
• Covers percentage substance in the product up to 100% (unless stated differently) *It is required to map this condition of use against each contributing scenario for the exposure scenario for communication. The specific contributing scenario may cover concentrations less than 100%.*	
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 8 h/day	TRA Workers 3.0
• Covers daily exposures up to 8 hours (unless stated differently) *It is required to map this condition of use against each contributing scenario for the exposure scenario for communication. The specific contributing scenario may be shorter than 8 hours.*	
Technical and organisational conditions and measures	
• Local exhaust ventilation: No	TRA Workers 3.0

• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0

	Method
• Room ventilation: Basic (up to 3 ACH)	TRA Workers 3.0
• Handle substance within a closed system	
• Sample via a closed loop or other system to avoid exposure (E8).	
Conditions and measures related to personal protection, hygiene and health evaluation	
• Dermal protection: Chemical resistant dermal protection with basic employee training.(effectiveness >= 90%)	TRA Workers 3.0
• Respiratory protection: No	TRA Workers 3.0
• Face/eye protection: No	
• Assumes a good basic standard of occupational hygiene is implemented *Good occupational hygiene practice is considered by Concawe to constitute measures that are routinely encountered and applied to meet the requirements of relevant workplace legislation such as regulations supporting the EU Framework Directive, in addition to specific RMM identified in the ES. These may include, but are not limited to:* *- Risk assessment of local workplace activities* *- Procedures supporting safe handling and maintenance of controls* *- Education and training of workers in understanding the hazards and control measures relevant to their activities* *- Provision of general ventilation* *- Good housekeeping and prompt clearance of spillages* *- Appropriate selection, testing and maintenance of equipment used to control exposure,* *e.g. Personal Protective Equipment (PPE), Local Exhaust Ventilation (LEV)* *- Draining of equipment prior to maintenance; retention of drained material in sealedstorage pending disposal or recycling* *- Regular supply and laundering of work clothing; provision of washing and changing facilities; eating and smoking only in designated areas separate from the workplace*	
• General measures (aspiration) *General measures (aspiration): Do not ingest. If swallowed then seek immediate medical assistance.*	
• General Measures (skin irritants) *General Measures (skin irritants): Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.*	
• General measures (flammability) *General measures (flammability): Use in contained systems. Avoid ignition sources – No Smoking. Handle in well ventilated area to prevent formation of explosive atmosphere. Use equipment and protective systems approved for flammable substances.Restrict line velocity during pumping to avoid generation of electrostatic discharge.* *Ground/bond container and receiving equipment. Use non-sparking tools. Comply with relevant EU/national regulations. Review SDS for additional advice.*	

• General Measures (carcinogenicity) *Consider technical advances and process upgrades (including automation) for the elimination of releases. Minimise exposure using measures such as closed systems, dedicated facilities and suitable general / local exhaust ventilation. Drain down systemsand clear transfer lines prior to breaking containment. Clean / flush equipment, where possible, prior to maintenance. Where there is potential for exposure: Restrict access toauthorised persons; provide specific activity training to operators to minimise exposures; wear suitable gloves and coveralls to prevent skin contamination; wear respiratory protection when its use is identified for certain contributing scenarios; clear up spills immediately and dispose of wastes safely. Ensure safe systems of work or equivalent arrangements are in place to manage risks. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance.*	
Other conditions affecting workers exposure	

	Method
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 25 °C *Ambient temperature*	TRA Workers 3.0
• Covers use at ambient temperatures (unless stated differently) *It is required to map this condition of use against each contributing scenario for the exposure scenario for communication. The specific contributing scenario may be carried out above ambient temperature.*	

9.2.1.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.23. Exposure concentrations and risks for workers

Route of exposure and type of effects	Assessment entity	Exposure concentration	Risk quantification
Inhalation, systemic, long term	Cumene	2.504 mg/m³ (TRA Workers) RCR = 0.05	Final RCR = 0.05
Inhalation, systemic, acute	Cumene	10.01 mg/m³ (TRA Workers)	Qualitative risk
Inhalation, local, long term	Cumene	2.504 mg/m³ (TRA Workers)	Qualitative risk
Inhalation, local, acute	Cumene	10.01 mg/m³ (TRA Workers) RCR = 0.04	Final RCR = 0.04
Dermal, systemic, long term	Cumene	0.014 mg/kg bw/day (TRA Workers) RCR = 1.78E-3	Final RCR < 0.01
Dermal, local, long term	Registered substanceas such (100%)	0.02 mg/cm² (TRA Workers)	Qualitative risk
	Cumene	2E-3 mg/cm² (TRA Workers)	
Dermal, local, acute	Registered substanceas such (100%)	0.02 mg/cm² (TRA Workers)	Qualitative risk
	Cumene	2E-3 mg/cm² (TRA Workers)	
Combined routes, systemic, long-term			Final RCR = 0.052

Remarks on exposure dataset obtained with ECETOC TRA

Percentage (w/w) of Registered substance as such (100%) in mixture/article: 100
%Percentage (w/w) of Cumene in mixture/article: 1 %
The vapour pressure at operating temperature (25°C) used for the calculation is 4.24E3 Pa for Registeredsubstance as such (100%).
The vapour pressure at operating temperature (25°C) used for the calculation is 1.58E3 Pa for Cumene.

Table 9.24.

Assessment Entity	Inhalation effectiveness used by TRA
Registered substanceas such (100%)	0 %
Cumene	0 %

Risk characterisation

Qualitative risk characterisation (Inhalation, systemic, acute, Inhalation, local, long term, Dermal, systemic, acute, Dermal, local, long term, Dermal, local, acute, Eye, local):
Qualitative risks management measures are laid out above (General measures). More details are available insection 9.0.4.

9.2.2. Worker CS 2: Storage (PROC 2, PROC 1)

Assessment entity group used for the assessment of this contributing scenario: Substance classified as H350(containing 0.1 to 1% cumene)
PROC 2 and PROC 1 (similar activities within the exposure scenario) have been assessed within one contributing scenario. The (highest) exposure predictions of PROC 2 have been used in the exposure and riskassessment and PROC 1 has been mapped as an additional PROC relevant for the contributing activity.

9.2.2.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Liquid, including paste/slurry/suspension	TRA Workers 3.0
• Liquid, vapour pressure < 0.5kPa at STP, with potential for aerosol generation	
• Covers percentage substance in the product up to 100% (unless stated differently) *It is required to map this condition of use against each contributing scenario for the exposure scenario for communication. The specific contributing scenario may cover concentrations less than 100%.*	
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 8 h/day	TRA Workers 3.0
• Covers daily exposures up to 8 hours (unless stated differently) *It is required to map this condition of use against each contributing scenario for the exposure scenario for communication. The specific contributing scenario may be shorter than 8 hours.*	
Technical and organisational conditions and measures	
• Local exhaust ventilation: No	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Room ventilation: Basic (up to 3 ACH)	TRA Workers 3.0
• Store substance within a closed system	

Conditions and measures related to personal protection, hygiene and health evaluation	
• Dermal protection: Chemical resistant dermal protection with basic employee training.(effectiveness >= 90%)	TRA Workers 3.0
• Respiratory protection: No	TRA Workers 3.0
• Face/eye protection: No	
• Assumes a good basic standard of occupational hygiene is implemented *Good occupational hygiene practice is considered by Concawe to constitute measures that are routinely encountered and applied to meet the requirements of relevant workplace legislation such as regulations supporting the EU Framework Directive, in addition to specific RMM identified in the ES. These may include, but are not limited to:* *- Risk assessment of local workplace activities* *- Procedures supporting safe handling and maintenance of controls* *- Education and training of workers in understanding the hazards and control measuresrelevant to their activities* *- Provision of general ventilation* *- Good housekeeping and prompt clearance of spillages* *- Appropriate selection, testing and maintenance of equipment used to control exposure,* *e.g. Personal Protective Equipment (PPE), Local Exhaust Ventilation (LEV)* *- Draining of equipment prior to maintenance; retention of drained material in sealed storage pending disposal or recycling* *- Regular supply and laundering of work clothing; provision of washing and changing facilities; eating and smoking only in designated areas separate from the workplace*	

• General measures (aspiration) *General measures (aspiration): Do not ingest. If swallowed then seek immediate medical assistance.*	
• General Measures (skin irritants) *General Measures (skin irritants): Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.*	
• General measures (flammability) *General measures (flammability): Use in contained systems. Avoid ignition sources – No Smoking. Handle in well ventilated area to prevent formation of explosive atmosphere. Use equipment and protective systems approved for flammable substances.Restrict line velocity during pumping to avoid generation of electrostatic discharge.* *Ground/bond container and receiving equipment. Use non-sparking tools. Comply with relevant EU/national regulations. Review SDS for additional advice.*	

• General Measures (carcinogenicity) *Consider technical advances and process upgrades (including automation) for the elimination of releases. Minimise exposure using measures such as closed systems, dedicated facilities and suitable general / local exhaust ventilation. Drain down systemsand clear transfer lines prior to breaking containment. Clean / flush equipment, where possible, prior to maintenance. Where there is potential for exposure: Restrict access toauthorised persons; provide specific activity training to operators to minimise exposures; wear suitable gloves and coveralls to prevent skin contamination; wear respiratory protection when its use is identified for certain contributing scenarios; clear up spills immediately and dispose of wastes safely. Ensure safe systems of work or equivalent arrangements are in place to manage risks. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance.*	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 25 °C *Ambient temperature*	TRA Workers 3.0
• Covers use at ambient temperatures (unless stated differently) *It is required to map this condition of use against each contributing scenario for the exposure scenario for communication. The specific contributing scenario may be carried out above ambient temperature.*	

9.2.2.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.25. Exposure concentrations and risks for workers

Route of exposure and type of effects	Assessment entity	Exposure concentration	Risk quantification
Inhalation, systemic, long term	Cumene	2.504 mg/m³ (TRA Workers) RCR = 0.05	Final RCR = 0.05
Inhalation, systemic, acute	Cumene	10.01 mg/m³ (TRA Workers)	Qualitative risk
Inhalation, local, long term	Cumene	2.504 mg/m³ (TRA Workers)	Qualitative risk
Inhalation, local, acute	Cumene	10.01 mg/m³ (TRA Workers) RCR = 0.04	Final RCR = 0.04
Dermal, systemic,	Cumene	0.014 mg/kg bw/day (TRA Workers)	Final RCR < 0.01

Route of exposure and type of effects	Assessment entity	Exposure concentration	Risk quantification
long term		RCR = 1.78E-3	
Dermal, local, long term	Registered substanceas such (100%)	0.02 mg/cm² (TRA Workers)	Qualitative risk
	Cumene	2E-3 mg/cm² (TRA Workers)	
Dermal, local, acute	Registered substanceas such (100%)	0.02 mg/cm² (TRA Workers)	Qualitative risk
	Cumene	2E-3 mg/cm² (TRA Workers)	

Combined routes, systemic, long-term			Final RCR = 0.052

Remarks on exposure dataset obtained with ECETOC TRA

Percentage (w/w) of Registered substance as such (100%) in mixture/article: 100 %Percentage (w/w) of Cumene in mixture/article: 1 %
The vapour pressure at operating temperature (25°C) used for the calculation is 4.24E3 Pa for Registeredsubstance as such (100%).
The vapour pressure at operating temperature (25°C) used for the calculation is 1.58E3 Pa for Cumene.

Table 9.26.

Assessment Entity	Inhalation effectiveness used by TRA
Registered substanceas such (100%)	0 %
Cumene	0 %

Risk characterisation

Qualitative risk characterisation (Inhalation, systemic, acute, Inhalation, local, long term, Dermal, systemic, acute, Dermal, local, long term, Dermal, local, acute, Eye, local):
Qualitative risks management measures are laid out above (General measures). More details are available insection 9.0.4.

9.2.3. Worker CS 3: General exposures; Batch process; Closed systems (PROC 3)

Assessment entity group used for the assessment of this contributing scenario: Substance classified as H350(containing 0.1 to 1% cumene)

9.2.3.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Liquid, including paste/slurry/suspension	TRA Workers 3.0
• Liquid, vapour pressure < 0.5kPa at STP, with potential for aerosol generation	
• Covers percentage substance in the product up to 100% (unless stated differently) *It is required to map this condition of use against each contributing scenario for the exposure scenario for communication. The specific contributing scenario may cover concentrations less than 100%.*	
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 8 h/day	TRA Workers 3.0
• Covers daily exposures up to 8 hours (unless stated differently) *It is required to map this condition of use against each contributing scenario for the exposure scenario for communication. The specific contributing scenario may be shorter than 8 hours.*	

Technical and organisational conditions and measures	
• Local exhaust ventilation: No	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Room ventilation: Basic (up to 3 ACH)	TRA Workers 3.0
• Handle substance within a closed system	

• Sample via a closed loop or other system to avoid exposure (E8).	
Conditions and measures related to personal protection, hygiene and health evaluation	
• Dermal protection: Chemical resistant dermal protection with basic employee training.(effectiveness >= 90%)	TRA Workers 3.0
• Respiratory protection: No	TRA Workers 3.0
• Face/eye protection: No	
• Assumes a good basic standard of occupational hygiene is implemented *Good occupational hygiene practice is considered by Concawe to constitute measures that are routinely encountered and applied to meet the requirements of relevant workplace legislation such as regulations supporting the EU Framework Directive, in addition to specific RMM identified in the ES. These may include, but are not limited to:* *- Risk assessment of local workplace activities* *- Procedures supporting safe handling and maintenance of controls* *- Education and training of workers in understanding the hazards and control measuresrelevant to their activities* *- Provision of general ventilation* *- Good housekeeping and prompt clearance of spillages* *- Appropriate selection, testing and maintenance of equipment used to control exposure,* *e.g. Personal Protective Equipment (PPE), Local Exhaust Ventilation (LEV)* *- Draining of equipment prior to maintenance; retention of drained material in sealed storage pending disposal or recycling* *- Regular supply and laundering of work clothing; provision of washing and changing facilities; eating and smoking only in designated areas separate from the workplace*	
• General measures (aspiration) *General measures (aspiration): Do not ingest. If swallowed then seek immediate medical assistance.*	
• General Measures (skin irritants) *General Measures (skin irritants): Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.*	
• General measures (flammability) *General measures (flammability): Use in contained systems. Avoid ignition sources – No Smoking. Handle in well ventilated area to prevent formation of explosive atmosphere. Use equipment and protective systems approved for flammable substances.Restrict line velocity during pumping to avoid generation of electrostatic discharge.* *Ground/bond container and receiving equipment. Use non-sparking tools. Comply with relevant EU/national regulations. Review SDS for additional advice.*	
• General Measures (carcinogenicity) *Consider technical advances and process upgrades (including automation) for the elimination of releases. Minimise exposure using measures such as closed systems, dedicated facilities and suitable general / local exhaust ventilation. Drain down systemsand clear transfer lines prior to breaking containment. Clean / flush equipment, where possible, prior to maintenance. Where there is potential for exposure: Restrict access toauthorised persons; provide specific activity training to operators to minimise exposures; wear suitable gloves and coveralls to prevent skin contamination; wear respiratory protection when its use is identified for certain contributing scenarios; clear*	

up spills immediately and dispose of wastes safely. Ensure safe systems of work or equivalent arrangements are in place to manage risks. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance.	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 25 °C *Ambient temperature*	TRA Workers 3.0
• Covers use at ambient temperatures (unless stated differently) *It is required to map this condition of use against each contributing scenario for the exposure scenario for communication. The specific contributing scenario may be carried out above ambient temperature.*	

9.2.3.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.27. Exposure concentrations and risks for workers

Route of exposure and type of effects	Assessment entity	Exposure concentration	Risk quantification
Inhalation, systemic, long term	Cumene	5.008 mg/m³ (TRA Workers) RCR = 0.1	Final RCR = 0.1
Inhalation, systemic, acute	Cumene	20.03 mg/m³ (TRA Workers)	Qualitative risk
Inhalation, local, long term	Cumene	5.008 mg/m³ (TRA Workers)	Qualitative risk
Inhalation, local, acute	Cumene	20.03 mg/m³ (TRA Workers) RCR = 0.08	Final RCR = 0.08
Dermal, systemic, long term	Cumene	6.9E-3 mg/kg bw/day (TRA Workers) RCR = 8.96E-4	Final RCR < 0.01
Dermal, local, long term	Registered substanceas such (100%)	0.02 mg/cm² (TRA Workers)	Qualitative risk
	Cumene	2.01E-3 mg/cm² (TRA Workers)	
Dermal, local, acute	Registered substanceas such (100%)	0.02 mg/cm² (TRA Workers)	Qualitative risk
	Cumene	2.01E-3 mg/cm² (TRA Workers)	
Combined routes, systemic, long-term			Final RCR = 0.101

Remarks on exposure dataset obtained with ECETOC TRA

Percentage (w/w) of Registered substance as such (100%) in mixture/article: 100 %Percentage (w/w) of Cumene in mixture/article: 1 %
The vapour pressure at operating temperature (25°C) used for the calculation is 4.24E3 Pa for Registeredsubstance as such (100%).
The vapour pressure at operating temperature (25°C) used for the calculation is 1.58E3 Pa for Cumene.

Table 9.28.

Assessment Entity	Inhalation effectiveness used by TRA

Registered substanceas such (100%)	0 %
Cumene	0 %

Risk characterisation

Qualitative risk characterisation (Inhalation, systemic, acute, Inhalation, local, long term, Dermal, systemic, acute, Dermal, local, long term, Dermal, local, acute, Eye, local):
Qualitative risks management measures are laid out above (General measures). More details are available insection 9.0.4.

9.2.4. Worker CS 4: General exposures (PROC 4)

Assessment entity group used for the assessment of this contributing scenario: Substance classified as H350(containing 0.1 to 1% cumene)

9.2.4.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Solid (material with medium dustiness) *As described in ECETOC TR114. exposure to aerosol can be estimated using the medium dustiness band of the ECETOC TRA. For a detailed explanation see section 9.0.4.*	TRA Workers 3.0
• Liquid, vapour pressure < 0.5kPa at STP, with potential for aerosol generation	
• Covers percentage substance in the product up to 100% (unless stated differently) *It is required to map this condition of use against each contributing scenario for the exposure scenario for communication. The specific contributing scenario may cover concentrations less than 100%.*	
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 8 h/day	TRA Workers 3.0
• Covers daily exposures up to 8 hours (unless stated differently) *It is required to map this condition of use against each contributing scenario for the exposure scenario for communication. The specific contributing scenario may be shorter than 8 hours.*	
Technical and organisational conditions and measures	
• Local exhaust ventilation: No	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Room ventilation: Basic (up to 3 ACH)	TRA Workers 3.0
• Closed batch process with occasional controlled exposure	
• Handle substance within a closed system	
• Sample via a closed loop or other system to avoid exposure (E8).	
Conditions and measures related to personal protection, hygiene and health evaluation	
• Dermal protection: Chemical resistant dermal protection with basic employee training.(effectiveness >= 90%)	TRA Workers 3.0
• Respiratory protection: No	TRA Workers 3.0
• Face/eye protection: No	

• Assumes a good basic standard of occupational hygiene is implemented *Good occupational hygiene practice is considered by Concawe to constitute measures that are routinely encountered and applied to meet the requirements of relevant workplace legislation such as regulations supporting the EU Framework Directive, in addition to specific RMM identified in the ES. These may include, but are not limited to:* *- Risk assessment of local workplace activities* *- Procedures supporting safe handling and maintenance of controls* *- Education and training of workers in understanding the hazards and control measures relevant to their activities* *- Provision of general ventilation* *- Good housekeeping and prompt clearance of spillages*	
- Appropriate selection, testing and maintenance of equipment used to control exposure, *e.g. Personal Protective Equipment (PPE), Local Exhaust Ventilation (LEV)* *- Draining of equipment prior to maintenance; retention of drained material in sealed storage pending disposal or recycling* *- Regular supply and laundering of work clothing; provision of washing and changing facilities; eating and smoking only in designated areas separate from the workplace*	
• General measures (aspiration) *General measures (aspiration): Do not ingest. If swallowed then seek immediate medical assistance.*	
• General Measures (skin irritants) *General Measures (skin irritants): Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.*	
• General measures (flammability) *General measures (flammability): Use in contained systems. Avoid ignition sources – No Smoking. Handle in well ventilated area to prevent formation of explosive atmosphere. Use equipment and protective systems approved for flammable substances.Restrict line velocity during pumping to avoid generation of electrostatic discharge.* *Ground/bond container and receiving equipment. Use non-sparking tools. Comply with relevant EU/national regulations. Review SDS for additional advice.*	
• General Measures (carcinogenicity) *Consider technical advances and process upgrades (including automation) for the elimination of releases. Minimise exposure using measures such as closed systems, dedicated facilities and suitable general / local exhaust ventilation. Drain down systemsand clear transfer lines prior to breaking containment. Clean / flush equipment, where possible, prior to maintenance. Where there is potential for exposure: Restrict access toauthorised persons; provide specific activity training to operators to minimise exposures; wear suitable gloves and coveralls to prevent skin contamination; wear respiratory protection when its use is identified for certain contributing scenarios; clear up spills immediately and dispose of wastes safely. Ensure safe systems of work or equivalent arrangements are in place to manage risks. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance.*	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 25 °C *Ambient temperature*	TRA Workers 3.0

• Covers use at ambient temperatures (unless stated differently) *It is required to map this condition of use against each contributing scenario for the exposure scenario for communication. The specific contributing scenario may be carried out above ambient temperature.*	

9.2.4.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.29. Exposure concentrations and risks for workers

Route of exposure and type of effects	Assessment entity	Exposure concentration	Risk quantification
Inhalation, systemic, long term	Cumene	10.01 mg/m³ (TRA Workers) RCR = 0.2	Final RCR = 0.2
Inhalation, systemic, acute	Cumene	40.06 mg/m³ (TRA Workers)	Qualitative risk

Route of exposure and type of effects	Assessment entity	Exposure concentration	Risk quantification
Inhalation, local, long term	Cumene	10.01 mg/m³ (TRA Workers)	Qualitative risk
Inhalation, local, acute	Cumene	40.06 mg/m³ (TRA Workers) RCR = 0.16	Final RCR = 0.16
Dermal, systemic, long term	Cumene	0.069 mg/kg bw/day (TRA Workers) RCR = 8.91E-3	Final RCR < 0.01
Dermal, local, long term	Registered substanceas such (100%)	0.1 mg/cm² (TRA Workers)	Qualitative risk
	Cumene	0.01 mg/cm² (TRA Workers)	
Dermal, local, acute	Registered substanceas such (100%)	0.1 mg/cm² (TRA Workers)	Qualitative risk
	Cumene	0.01 mg/cm² (TRA Workers)	
Combined routes, systemic, long-term			Final RCR = 0.209

Remarks on exposure dataset obtained with ECETOC TRA

Percentage (w/w) of Registered substance as such (100%) in mixture/article: 100 %Percentage (w/w) of Cumene in mixture/article: 1 %
The vapour pressure at operating temperature (25°C) used for the calculation is 4.24E3 Pa for Registeredsubstance as such (100%).
The vapour pressure at operating temperature (25°C) used for the calculation is 1.58E3 Pa for Cumene.

Table 9.30.

Assessment Entity	Inhalation effectiveness used by TRA
Registered substanceas such (100%)	0 %
Cumene	0 %

Risk characterisation

Qualitative risk characterisation (Inhalation, systemic, acute, Inhalation, local, long term, Dermal, systemic, acute, Dermal, local, long term, Dermal, local, acute, Eye, local):
Qualitative risks management measures are laid out above (General measures). More details are available insection 9.0.4.

9.2.5. Worker CS 5: Equipment cleaning and maintenance (PROC 8a,PROC 28)

Assessment entity group used for the assessment of this contributing scenario: Substance classified as H350(containing 0.1 to 1% cumene)
Cleaning and maintenance activities have been assessed within one contributing scenario. Since the ECETOC TRA currently does not provide exposure predictions for the associated PROC28, PROC8a exposure predictionshave been used and PROC28 has been mapped as an additional PROC relevant for the contributing activity.

9.2.5.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Liquid, including paste/slurry/suspension	TRA Workers 3.0
• Liquid, vapour pressure < 0.5kPa at STP, with potential for aerosol generation	
• Covers percentage substance in the product up to 100% (unless stated differently) *It is required to map this condition of use against each contributing scenario for the*	

	Method
exposure scenario for communication. The specific contributing scenario may cover concentrations less than 100%.	
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 8 h/day	TRA Workers 3.0
• Covers daily exposures up to 8 hours (unless stated differently) *It is required to map this condition of use against each contributing scenario for the exposure scenario for communication. The specific contributing scenario may be shorter than 8 hours.*	
Technical and organisational conditions and measures	
• Local exhaust ventilation: No	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Room ventilation: Basic (up to 3 ACH)	TRA Workers 3.0
• Standard Operating Procedures (SOP) maintenance (industrial) [Effectiveness Inhalation: 90%, Dermal: 0%] *Drain down and flush system prior to equipment break-in or maintenance.* Inhalation explanation: *Based on results from Fraunhofer experimental study report Verifying the Effectiveness of Solvent RMMs 15/6/2016.* Dermal explanation: *Expect dermal exposure is substantially reduced when lines and equipment are properly drained and flushed according to Standard Operating Procedures (SOP). Specific exposure reduction is per assessor professional judgment.*	
Conditions and measures related to personal protection, hygiene and health evaluation	
• Dermal protection: Chemical resistant dermal protection with basic employee training.(effectiveness >= 90%)	TRA Workers 3.0
• Respiratory protection: No	TRA Workers 3.0
• Face/eye protection: No	

• Assumes a good basic standard of occupational hygiene is implemented *Good occupational hygiene practice is considered by Concawe to constitute measures that are routinely encountered and applied to meet the requirements of relevant workplace legislation such as regulations supporting the EU Framework Directive, in addition to specific RMM identified in the ES. These may include, but are not limited to:* *- Risk assessment of local workplace activities* *- Procedures supporting safe handling and maintenance of controls* *- Education and training of workers in understanding the hazards and control measuresrelevant to their activities* *- Provision of general ventilation* *- Good housekeeping and prompt clearance of spillages* *- Appropriate selection, testing and maintenance of equipment used to control exposure,* *e.g. Personal Protective Equipment (PPE), Local Exhaust Ventilation (LEV)* *- Draining of equipment prior to maintenance; retention of drained material in sealed storage pending disposal or recycling* *- Regular supply and laundering of work clothing; provision of washing and changing facilities; eating and smoking only in designated areas separate from the workplace*	
• General measures (aspiration) *General measures (aspiration): Do not ingest. If swallowed then seek immediate medical assistance.*	
• General Measures (skin irritants) *General Measures (skin irritants): Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.*	
• General measures (flammability)	
General measures (flammability): Use in contained systems. Avoid ignition sources – No Smoking. Handle in well ventilated area to prevent formation of explosive atmosphere. Use equipment and protective systems approved for flammable substances.Restrict line velocity during pumping to avoid generation of electrostatic discharge. *Ground/bond container and receiving equipment. Use non-sparking tools. Comply with relevant EU/national regulations. Review SDS for additional advice.*	
• General Measures (carcinogenicity) *Consider technical advances and process upgrades (including automation) for the elimination of releases. Minimise exposure using measures such as closed systems, dedicated facilities and suitable general / local exhaust ventilation. Drain down systemsand clear transfer lines prior to breaking containment. Clean / flush equipment, where possible, prior to maintenance. Where there is potential for exposure: Restrict access toauthorised persons; provide specific activity training to operators to minimise exposures; wear suitable gloves and coveralls to prevent skin contamination; wear respiratory protection when its use is identified for certain contributing scenarios; clear up spills immediately and dispose of wastes safely. Ensure safe systems of work or equivalent arrangements are in place to manage risks. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance.*	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 25 °C *Ambient temperature*	TRA Workers 3.0

• Covers use at ambient temperatures (unless stated differently) *It is required to map this condition of use against each contributing scenario for the exposure scenario for communication. The specific contributing scenario may be carried out above ambient temperature.*	

9.2.5.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.31. Exposure concentrations and risks for workers

Route of exposure and type of effects	Assessment entity	Exposure concentration	Risk quantification
Inhalation, systemic, long term	Cumene	25.04 mg/m³ (TRA Workers) RCR = 0.501	Final RCR = 0.501
Inhalation, systemic, acute	Cumene	100.1 mg/m³ (TRA Workers)	Qualitative risk
Inhalation, local, long term	Cumene	25.04 mg/m³ (TRA Workers)	Qualitative risk
Inhalation, local, acute	Cumene	100.1 mg/m³ (TRA Workers) RCR = 0.401	Final RCR = 0.401
Dermal, systemic, long term	Cumene	0.137 mg/kg bw/day (TRA Workers) RCR = 0.018	Final RCR = 0.018
Dermal, local, long term	Registered substanceas such (100%)	0.1 mg/cm² (TRA Workers)	Qualitative risk
	Cumene	1E-2 mg/cm² (TRA Workers)	
Dermal, local, acute	Registered substanceas such (100%)	0.1 mg/cm² (TRA Workers)	Qualitative risk
	Cumene	1E-2 mg/cm² (TRA Workers)	
Combined routes, systemic, long-term			Final RCR = 0.519

Remarks on exposure dataset obtained with ECETOC TRA

Percentage (w/w) of Registered substance as such (100%) in mixture/article: 100 %Percentage (w/w) of Cumene in mixture/article: 1 %
The vapour pressure at operating temperature (25°C) used for the calculation is 4.24E3 Pa for Registeredsubstance as such (100%).
The vapour pressure at operating temperature (25°C) used for the calculation is 1.58E3 Pa for Cumene.

Table 9.32.

Assessment Entity	Inhalation effectiveness used by TRA
Registered substanceas such (100%)	0 %
Cumene	0 %

Risk characterisation

Qualitative risk characterisation (Inhalation, systemic, acute, Inhalation, local, long term, Dermal, systemic, acute, Dermal, local, long term, Dermal, local, acute, Eye, local):

Qualitative risks management measures are laid out above (General measures). More details are available insection 9.0.4.

9.2.6. Worker CS 6: Bulk transfers; Closed systems; Loading andunloading (PROC 8b)

Assessment entity group used for the assessment of this contributing scenario: Substance classified as H350(containing 0.1 to 1% cumene)

9.2.6.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Liquid, including paste/slurry/suspension	TRA Workers 3.0
• Liquid, vapour pressure < 0.5kPa at STP, with potential for aerosol generation	
• Covers percentage substance in the product up to 100% (unless stated differently) *It is required to map this condition of use against each contributing scenario for the exposure scenario for communication. The specific contributing scenario may cover concentrations less than 100%.*	
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 8 h/day	TRA Workers 3.0
• Covers daily exposures up to 8 hours (unless stated differently) *It is required to map this condition of use against each contributing scenario for the exposure scenario for communication. The specific contributing scenario may be shorter than 8 hours.*	
Technical and organisational conditions and measures	
• Local exhaust ventilation: No	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Room ventilation: Basic (up to 3 ACH)	TRA Workers 3.0
• Transfer under containment [Effectiveness Inhalation: 90%, Dermal: 0%] *Ensure material transfers are under containment or extract ventilation.* Inhalation explanation: *Based on results from Fraunhofer experimental study report Verifying the Effectiveness of Solvent RMMs 15/6/2016. This supports ESIG standard phrase Ensure material transfers are under containment or extract ventilation. E66*	
Conditions and measures related to personal protection, hygiene and health evaluation	
• Dermal protection: No	TRA Workers 3.0

	Method
• Respiratory protection: No	TRA Workers 3.0
• Face/eye protection: No	

• Assumes a good basic standard of occupational hygiene is implemented *Good occupational hygiene practice is considered by Concawe to constitute measures that are routinely encountered and applied to meet the requirements of relevant workplace legislation such as regulations supporting the EU Framework Directive, in addition to specific RMM identified in the ES. These may include, but are not limited to:* *- Risk assessment of local workplace activities* *- Procedures supporting safe handling and maintenance of controls* *- Education and training of workers in understanding the hazards and control measures relevant to their activities* *- Provision of general ventilation* *- Good housekeeping and prompt clearance of spillages* *- Appropriate selection, testing and maintenance of equipment used to control exposure,* *e.g. Personal Protective Equipment (PPE), Local Exhaust Ventilation (LEV)* *- Draining of equipment prior to maintenance; retention of drained material in sealed storage pending disposal or recycling* *- Regular supply and laundering of work clothing; provision of washing and changing facilities; eating and smoking only in designated areas separate from the workplace*	
• General measures (aspiration) *General measures (aspiration): Do not ingest. If swallowed then seek immediate medical assistance.*	
• General Measures (skin irritants) *General Measures (skin irritants): Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.*	
• General measures (flammability) *General measures (flammability): Use in contained systems. Avoid ignition sources – No Smoking. Handle in well ventilated area to prevent formation of explosive atmosphere. Use equipment and protective systems approved for flammable substances.Restrict line velocity during pumping to avoid generation of electrostatic discharge.* *Ground/bond container and receiving equipment. Use non-sparking tools. Comply with relevant EU/national regulations. Review SDS for additional advice.*	
• General Measures (carcinogenicity) *Consider technical advances and process upgrades (including automation) for the elimination of releases. Minimise exposure using measures such as closed systems, dedicated facilities and suitable general / local exhaust ventilation. Drain down systemsand clear transfer lines prior to breaking containment. Clean / flush equipment, where possible, prior to maintenance. Where there is potential for exposure: Restrict access toauthorised persons; provide specific activity training to operators to minimise exposures; wear suitable gloves and coveralls to prevent skin contamination; wear respiratory protection when its use is identified for certain contributing scenarios; clear up spills immediately and dispose of wastes safely. Ensure safe systems of work or equivalent arrangements are in place to manage risks. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance.*	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 25 °C *Ambient temperature*	TRA Workers 3.0

• Covers use at ambient temperatures (unless stated differently) *It is required to map this condition of use against each contributing scenario for the exposure scenario for communication. The specific contributing scenario may be carried out above ambient temperature.*	

9.2.6.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.33. Exposure concentrations and risks for workers

Route of exposure and type of effects	Assessment entity	Exposure concentration	Risk quantification
Inhalation, systemic, long term	Cumene	12.52 mg/m³ (TRA Workers) RCR = 0.25	Final RCR = 0.25
Inhalation, systemic, acute	Cumene	50.08 mg/m³ (TRA Workers)	Qualitative risk
Inhalation, local, long term	Cumene	12.52 mg/m³ (TRA Workers)	Qualitative risk
Inhalation, local, acute	Cumene	50.08 mg/m³ (TRA Workers) RCR = 0.2	Final RCR = 0.2
Dermal, systemic, long term	Cumene	1.371 mg/kg bw/day (TRA Workers) RCR = 0.178	Final RCR = 0.178
Dermal, local, long term	Registered substanceas such (100%)	1 mg/cm² (TRA Workers)	Qualitative risk
	Cumene	0.1 mg/cm² (TRA Workers)	
Dermal, local, acute	Registered substanceas such (100%)	1 mg/cm² (TRA Workers)	Qualitative risk
	Cumene	0.1 mg/cm² (TRA Workers)	
Combined routes, systemic, long-term			Final RCR = 0.428

Remarks on exposure dataset obtained with ECETOC TRA

Percentage (w/w) of Registered substance as such (100%) in mixture/article: 100 %Percentage (w/w) of Cumene in mixture/article: 1 %
The vapour pressure at operating temperature (25°C) used for the calculation is 4.24E3 Pa for Registeredsubstance as such (100%).
The vapour pressure at operating temperature (25°C) used for the calculation is 1.58E3 Pa for Cumene.

Table 9.34.

Assessment Entity	Inhalation effectiveness used by TRA
Registered substanceas such (100%)	0 %
Cumene	0 %

Risk characterisation

Qualitative risk characterisation (Inhalation, systemic, acute, Inhalation, local, long term, Dermal, systemic, acute, Dermal, local, long term, Dermal, local, acute, Eye, local):

Qualitative risks management measures are laid out above (General measures). More details are available insection 9.0.4.

9.2.7. Worker CS 7: Process sampling (PROC 9)

Assessment entity group used for the assessment of this contributing scenario: Substance classified as H350(containing 0.1 to 1% cumene)

9.2.7.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Solid (material with medium dustiness) *As described in ECETOC TR114. exposure to aerosol can be estimated using the medium dustiness band of the ECETOC TRA. For a detailed explanation see section 9.0.4.*	TRA Workers 3.0
• Liquid, vapour pressure < 0.5kPa at STP, with potential for aerosol generation	
• Covers percentage substance in the product up to 100% (unless stated differently) *It is required to map this condition of use against each contributing scenario for the exposure scenario for communication. The specific contributing scenario may cover concentrations less than 100%.*	
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 8 h/day	TRA Workers 3.0
• Covers daily exposures up to 8 hours (unless stated differently) *It is required to map this condition of use against each contributing scenario for the exposure scenario for communication. The specific contributing scenario may be shorter than 8 hours.*	
Technical and organisational conditions and measures	
• Local exhaust ventilation: No	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Room ventilation: Basic (up to 3 ACH)	TRA Workers 3.0
• Closed batch process with occasional controlled exposure	
• Handle substance within a closed system	
• Sample via a closed loop or other system to avoid exposure (E8).	
Conditions and measures related to personal protection, hygiene and health evaluation	
• Dermal protection: Chemical resistant dermal protection with basic employee training.(effectiveness >= 90%)	TRA Workers 3.0
• Respiratory protection: No	TRA Workers 3.0
• Face/eye protection: No	

• Assumes a good basic standard of occupational hygiene is implemented *Good occupational hygiene practice is considered by Concawe to constitute measures that are routinely encountered and applied to meet the requirements of relevant workplace legislation such as regulations supporting the EU Framework Directive, in addition to specific RMM identified in the ES. These may include, but are not limited to:* *- Risk assessment of local workplace activities* *- Procedures supporting safe handling and maintenance of controls* *- Education and training of workers in understanding the hazards and control measuresrelevant to their activities* *- Provision of general ventilation* *- Good housekeeping and prompt clearance of spillages* *- Appropriate selection, testing and maintenance of equipment used to control exposure,* *e.g. Personal Protective Equipment (PPE), Local Exhaust Ventilation (LEV)* *- Draining of equipment prior to maintenance; retention of drained material in sealed storage pending disposal or recycling* *- Regular supply and laundering of work clothing; provision of washing and changing facilities; eating and smoking only in designated areas separate from the workplace*	
• General measures (aspiration) *General measures (aspiration): Do not ingest. If swallowed then seek immediate medical assistance.*	
• General Measures (skin irritants)	
General Measures (skin irritants): Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.	
• General measures (flammability) *General measures (flammability): Use in contained systems. Avoid ignition sources – No Smoking. Handle in well ventilated area to prevent formation of explosive atmosphere. Use equipment and protective systems approved for flammable substances.Restrict line velocity during pumping to avoid generation of electrostatic discharge.* *Ground/bond container and receiving equipment. Use non-sparking tools. Comply with relevant EU/national regulations. Review SDS for additional advice.*	
• General Measures (carcinogenicity) *Consider technical advances and process upgrades (including automation) for the elimination of releases. Minimise exposure using measures such as closed systems, dedicated facilities and suitable general / local exhaust ventilation. Drain down systemsand clear transfer lines prior to breaking containment. Clean / flush equipment, where possible, prior to maintenance. Where there is potential for exposure: Restrict access toauthorised persons; provide specific activity training to operators to minimise exposures; wear suitable gloves and coveralls to prevent skin contamination; wear respiratory protection when its use is identified for certain contributing scenarios; clear up spills immediately and dispose of wastes safely. Ensure safe systems of work or equivalent arrangements are in place to manage risks. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance.*	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0

• Operating temperature: <= 25 °C *Ambient temperature*	TRA Workers 3.0
• Covers use at ambient temperatures (unless stated differently) *It is required to map this condition of use against each contributing scenario for the exposure scenario for communication. The specific contributing scenario may be carried out above ambient temperature.*	

9.2.7.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.35. Exposure concentrations and risks for workers

Route of exposure and type of effects	Assessment entity	Exposure concentration	Risk quantification
Inhalation, systemic, long term	Cumene	25.04 mg/m³ (TRA Workers) RCR = 0.501	Final RCR = 0.501
Inhalation, systemic, acute	Cumene	100.1 mg/m³ (TRA Workers)	Qualitative risk
Inhalation, local, long term	Cumene	25.04 mg/m³ (TRA Workers)	Qualitative risk
Inhalation, local, acute	Cumene	100.1 mg/m³ (TRA Workers) RCR = 0.401	Final RCR = 0.401
Dermal, systemic, long term	Cumene	0.069 mg/kg bw/day (TRA Workers) RCR = 8.91E-3	Final RCR < 0.01
Dermal, local, long term	Registered substanceas such (100%)	0.1 mg/cm² (TRA Workers)	Qualitative risk
	Cumene	0.01 mg/cm² (TRA Workers)	

Route of exposure and type of effects	Assessment entity	Exposure concentration	Risk quantification
Dermal, local, acute	Registered substanceas such (100%)	0.1 mg/cm² (TRA Workers)	Qualitative risk
	Cumene	0.01 mg/cm² (TRA Workers)	
Combined routes, systemic, long-term			Final RCR = 0.51

Remarks on exposure dataset obtained with ECETOC TRA

Percentage (w/w) of Registered substance as such (100%) in mixture/article: 100 %Percentage (w/w) of Cumene in mixture/article: 1 %
The vapour pressure at operating temperature (25°C) used for the calculation is 4.24E3 Pa for Registeredsubstance as such (100%).
The vapour pressure at operating temperature (25°C) used for the calculation is 1.58E3 Pa for Cumene.

Table 9.36.

Assessment Entity	Inhalation effectiveness used by TRA
Registered substanceas such (100%)	0 %
Cumene	0 %

Risk characterisation

Qualitative risk characterisation (Inhalation, systemic, acute, Inhalation, local, long term, Dermal, systemic, acute, Dermal, local, long term, Dermal, local, acute, Eye, local):
Qualitative risks management measures are laid out above (General measures). More details are available insection 9.0.4.

9.2.8. Worker CS 8: Laboratory activities (PROC 15)

Assessment entity group used for the assessment of this contributing scenario: Substance classified as H350(containing 0.1 to 1% cumene)

9.2.8.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Solid (material with medium dustiness) *As described in ECETOC TR114. exposure to aerosol can be estimated using the medium dustiness band of the ECETOC TRA. For a detailed explanation see section 9.0.4.*	TRA Workers 3.0
• Liquid, vapour pressure < 0.5kPa at STP, with potential for aerosol generation	
• Covers percentage substance in the product up to 100% (unless stated differently) *It is required to map this condition of use against each contributing scenario for the exposure scenario for communication. The specific contributing scenario may cover concentrations less than 100%.*	
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 8 h/day	TRA Workers 3.0
• Covers daily exposures up to 8 hours (unless stated differently) *It is required to map this condition of use against each contributing scenario for the exposure scenario for communication. The specific contributing scenario may be shorter than 8 hours.*	
Technical and organisational conditions and measures	
• Local exhaust ventilation: No	TRA Workers 3.0
	Method
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Room ventilation: Basic (up to 3 ACH)	TRA Workers 3.0
• Handle within a fume cupboard or implement suitable equivalent methods to minimiseexposure *according to Fransman et al (2011) a fume cupboard reduces exposure by at least 99%.* *Fransman et al. Ann. Occup. Hyg., Vol. 55, No. 9, pp. 957–979, 2011* *TRA: LEV with TRA efficiency provides an exposure reduction of 90% and can be considered a conservative assessment* *ART: LEV - Fume cupboard provides an exposure reduction of 99%*	
Conditions and measures related to personal protection, hygiene and health evaluation	
• Dermal protection: Chemical resistant dermal protection with basic employee training.(effectiveness >= 90%)	TRA Workers 3.0
• Respiratory protection: No	TRA Workers 3.0
• Face/eye protection: No	

• Assumes a good basic standard of occupational hygiene is implemented *Good occupational hygiene practice is considered by Concawe to constitute measures that are routinely encountered and applied to meet the requirements of relevant workplace legislation such as regulations supporting the EU Framework Directive, in addition to specific RMM identified in the ES. These may include, but are not limited to:* *- Risk assessment of local workplace activities* *- Procedures supporting safe handling and maintenance of controls* *- Education and training of workers in understanding the hazards and control measuresrelevant to their activities* *- Provision of general ventilation* *- Good housekeeping and prompt clearance of spillages* *- Appropriate selection, testing and maintenance of equipment used to control exposure,* *e.g. Personal Protective Equipment (PPE), Local Exhaust Ventilation (LEV)* *- Draining of equipment prior to maintenance; retention of drained material in sealed storage pending disposal or recycling* *- Regular supply and laundering of work clothing; provision of washing and changing facilities; eating and smoking only in designated areas separate from the workplace*	
• General measures (aspiration) *General measures (aspiration): Do not ingest. If swallowed then seek immediate medical assistance.*	
• General Measures (skin irritants) *General Measures (skin irritants): Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.*	
• General measures (flammability) *General measures (flammability): Use in contained systems. Avoid ignition sources – No Smoking. Handle in well ventilated area to prevent formation of explosive atmosphere. Use equipment and protective systems approved for flammable substances.Restrict line velocity during pumping to avoid generation of electrostatic discharge.* *Ground/bond container and receiving equipment. Use non-sparking tools. Comply with relevant EU/national regulations. Review SDS for additional advice.*	
• General Measures (carcinogenicity) *Consider technical advances and process upgrades (including automation) for the elimination of releases. Minimise exposure using measures such as closed systems, dedicated facilities and suitable general / local exhaust ventilation. Drain down systems and clear transfer lines prior to breaking containment. Clean / flush equipment, where possible, prior to maintenance. Where there is potential for exposure: Restrict access to authorised persons; provide specific activity training to operators to minimise exposures; wear suitable gloves and coveralls to prevent skin contamination; wear respiratory protection when its use is identified for certain contributing scenarios; clear up spills immediately and dispose of wastes safely. Ensure safe systems of work or equivalent arrangements are in place to manage risks. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance.*	

Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 25 °C *Ambient temperature*	TRA Workers 3.0

• Covers use at ambient temperatures (unless stated differently) *It is required to map this condition of use against each contributing scenario for the exposure scenario for communication. The specific contributing scenario may be carried out above ambient temperature.*	
• No other specific measures identified [E120] *No other specific measures identified [E120]*	

9.2.8.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.37. Exposure concentrations and risks for workers

Route of exposure and type of effects	Assessment entity	Exposure concentration	Risk quantification
Inhalation, systemic, long term	Cumene	5.008 mg/m³ (TRA Workers) RCR = 0.1	Final RCR = 0.1
Inhalation, systemic, acute	Cumene	20.03 mg/m³ (TRA Workers)	Qualitative risk
Inhalation, local, long term	Cumene	5.008 mg/m³ (TRA Workers)	Qualitative risk
Inhalation, local, acute	Cumene	20.03 mg/m³ (TRA Workers) RCR = 0.08	Final RCR = 0.08
Dermal, systemic, long term	Cumene	3.4E-3 mg/kg bw/day (TRA Workers) RCR = 4.42E-4	Final RCR < 0.01
Dermal, local, long term	Registered substanceas such (100%)	9.92E-3 mg/cm² (TRA Workers)	Qualitative risk
	Cumene	9.92E-4 mg/cm² (TRA Workers)	
Dermal, local, acute	Registered substanceas such (100%)	9.92E-3 mg/cm² (TRA Workers)	Qualitative risk
	Cumene	9.92E-4 mg/cm² (TRA Workers)	
Combined routes, systemic, long-term			Final RCR = 0.101

Remarks on exposure dataset obtained with ECETOC TRA

Percentage (w/w) of Registered substance as such (100%) in mixture/article: 100 %Percentage (w/w) of Cumene in mixture/article: 1 %
The vapour pressure at operating temperature (25°C) used for the calculation is 4.24E3 Pa for Registeredsubstance as such (100%).
The vapour pressure at operating temperature (25°C) used for the calculation is 1.58E3 Pa for Cumene.

Table 9.38.

Assessment Entity	Inhalation effectiveness used by TRA

Assessment Entity	Inhalation effectiveness used by TRA
Registered substanceas such (100%)	0 %
Cumene	0 %

Risk characterisation

Qualitative risk characterisation (Inhalation, systemic, acute, Inhalation, local, long term, Dermal, systemic, acute, Dermal, local, long term, Dermal, local, acute, Eye, local):
Qualitative risks management measures are laid out above (General measures). More details are available insection 9.0.4.

9.3. Exposure scenario 3: Formulation or re-packing - Formulation & (re)packing of substances and mixtures; Level I

Worker contributing scenario(s):		
CS 1	General exposures; Closed systems	**PROC 2**, PROC 1
CS 2	Storage	**PROC 2**, PROC 1
CS 3	General exposures; Batch process; Closed systems	PROC 3
CS 4	Equipment cleaning and maintenance	**PROC 8a**, PROC 28
CS 5	Bulk transfers; Drum/batch transfers; Closed systems	PROC 8b
CS 6	Drum and small package filling	PROC 9
CS 7	Process sampling	PROC 9
CS 8	Laboratory activities	PROC 15

Further description of the use:

Formulation of the substance and its mixtures in batch or continuous operations within closed or contained systems, including incidental exposures during storage, materials transfers, mixing, maintenance, sampling andassociated laboratory activities.

9.3.1. Worker CS 1: General exposures; Closed systems (PROC 2, PROC 1)

Assessment entity group used for the assessment of this contributing scenario: Substance classified as H350(containing 0.1 to 1% cumene)
PROC 2 and PROC 1 (similar activities within the exposure scenario) have been assessed within one contributing scenario. The (highest) exposure predictions of PROC 2 have been used in the exposure and riskassessment and PROC 1 has been mapped as an additional PROC relevant for the contributing activity.

9.3.1.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Liquid, including paste/slurry/suspension	TRA Workers 3.0
• Liquid, vapour pressure < 0.5kPa at STP, with potential for aerosol generation	
• Covers percentage substance in the product up to 100% (unless stated differently) *It is required to map this condition of use against each contributing scenario for the exposure scenario for communication. The specific contributing scenario may cover concentrations less than 100%.*	
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 8 h/day	TRA Workers 3.0
• Covers daily exposures up to 8 hours (unless stated differently) *It is required to map this condition of use against each contributing scenario for the exposure scenario for communication. The specific contributing scenario may be shorter than 8 hours.*	
Technical and organisational conditions and measures	

• Local exhaust ventilation: No	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Room ventilation: Basic (up to 3 ACH)	TRA Workers 3.0
• Handle substance within a closed system	
• Sample via a closed loop or other system to avoid exposure (E8).	
Conditions and measures related to personal protection, hygiene and health evaluation	

• Dermal protection: Chemical resistant dermal protection with basic employee training.(effectiveness >= 90%)	TRA Workers 3.0
• Respiratory protection: No	TRA Workers 3.0
• Face/eye protection: No	
• Assumes a good basic standard of occupational hygiene is implemented *Good occupational hygiene practice is considered by Concawe to constitute measures that are routinely encountered and applied to meet the requirements of relevant workplace legislation such as regulations supporting the EU Framework Directive, in addition to specific RMM identified in the ES. These may include, but are not limited to:* *- Risk assessment of local workplace activities* *- Procedures supporting safe handling and maintenance of controls* *- Education and training of workers in understanding the hazards and control measures relevant to their activities* *- Provision of general ventilation* *- Good housekeeping and prompt clearance of spillages* *- Appropriate selection, testing and maintenance of equipment used to control exposure,* *e.g. Personal Protective Equipment (PPE), Local Exhaust Ventilation (LEV)* *- Draining of equipment prior to maintenance; retention of drained material in sealed storage pending disposal or recycling* *- Regular supply and laundering of work clothing; provision of washing and changing facilities; eating and smoking only in designated areas separate from the workplace*	
• General measures (aspiration) *General measures (aspiration): Do not ingest. If swallowed then seek immediate medical assistance.*	
• General Measures (skin irritants) *General Measures (skin irritants): Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.*	
• General measures (flammability) *General measures (flammability): Use in contained systems. Avoid ignition sources – No Smoking. Handle in well ventilated area to prevent formation of explosive atmosphere. Use equipment and protective systems approved for flammable substances.Restrict line velocity during pumping to avoid generation of electrostatic discharge.* *Ground/bond container and receiving equipment. Use non-sparking tools. Comply with relevant EU/national regulations. Review SDS for additional advice.*	

• General Measures (carcinogenicity) *Consider technical advances and process upgrades (including automation) for the elimination of releases. Minimise exposure using measures such as closed systems, dedicated facilities and suitable general / local exhaust ventilation. Drain down systemsand clear transfer lines prior to breaking containment. Clean / flush equipment, where possible, prior to maintenance. Where there is potential for exposure: Restrict access toauthorised persons; provide specific activity training to operators to minimise exposures; wear suitable gloves and coveralls to prevent skin contamination; wear respiratory protection when its use is identified for certain contributing scenarios; clear up spills immediately and dispose of wastes safely. Ensure safe systems of work or equivalent arrangements are in place to manage risks. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance.*	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 25 °C *Ambient temperature*	TRA Workers 3.0
• Covers use at ambient temperatures (unless stated differently)	

	Method
It is required to map this condition of use against each contributing scenario for the exposure scenario for communication. The specific contributing scenario may be carried out above ambient temperature.	

9.3.1.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.39. Exposure concentrations and risks for workers

Route of exposure and type of effects	Assessment entity	Exposure concentration	Risk quantification
Inhalation, systemic, long term	Cumene	2.504 mg/m³ (TRA Workers) RCR = 0.05	Final RCR = 0.05
Inhalation, systemic, acute	Cumene	10.01 mg/m³ (TRA Workers)	Qualitative risk
Inhalation, local, long term	Cumene	2.504 mg/m³ (TRA Workers)	Qualitative risk
Inhalation, local, acute	Cumene	10.01 mg/m³ (TRA Workers) RCR = 0.04	Final RCR = 0.04
Dermal, systemic, long term	Cumene	0.014 mg/kg bw/day (TRA Workers) RCR = 1.78E-3	Final RCR < 0.01
Dermal, local, long term	Registered substanceas such (100%)	0.02 mg/cm² (TRA Workers)	Qualitative risk
	Cumene	2E-3 mg/cm² (TRA Workers)	
Dermal, local, acute	Registered substanceas such (100%)	0.02 mg/cm² (TRA Workers)	Qualitative risk
	Cumene	2E-3 mg/cm² (TRA Workers)	

Combined routes, systemic, long-term			Final RCR = 0.052

Remarks on exposure dataset obtained with ECETOC TRA

Percentage (w/w) of Registered substance as such (100%) in mixture/article: 100 %Percentage (w/w) of Cumene in mixture/article: 1 %
The vapour pressure at operating temperature (25°C) used for the calculation is 4.24E3 Pa for Registeredsubstance as such (100%).
The vapour pressure at operating temperature (25°C) used for the calculation is 1.58E3 Pa for Cumene.

Table 9.40.

Assessment Entity	Inhalation effectiveness used by TRA
Registered substanceas such (100%)	0 %
Cumene	0 %

Risk characterisation

Qualitative risk characterisation (Inhalation, systemic, acute, Inhalation, local, long term, Dermal, systemic, acute, Dermal, local, long term, Dermal, local, acute, Eye, local):
Qualitative risks management measures are laid out above (General measures). More details are available insection 9.0.4.

9.3.2. Worker CS 2: Storage (PROC 2, PROC 1)

Assessment entity group used for the assessment of this contributing scenario: Substance classified as H350(containing 0.1 to 1% cumene) PROC 2 and PROC 1 (similar activities within the exposure scenario) have been assessed within one contributing scenario. The (highest) exposure predictions of PROC 2 have been used in the exposure and riskassessment and PROC 1 has been mapped as an additional PROC relevant for the contributing activity.

9.3.2.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Liquid, including paste/slurry/suspension	TRA Workers 3.0
• Liquid, vapour pressure < 0.5kPa at STP, with potential for aerosol generation	
• Covers percentage substance in the product up to 100% (unless stated differently) *It is required to map this condition of use against each contributing scenario for the exposure scenario for communication. The specific contributing scenario may cover concentrations less than 100%.*	
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 8 h/day	TRA Workers 3.0
• Covers daily exposures up to 8 hours (unless stated differently) *It is required to map this condition of use against each contributing scenario for the exposure scenario for communication. The specific contributing scenario may be shorter than 8 hours.*	
Technical and organisational conditions and measures	
• Local exhaust ventilation: No	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Room ventilation: Basic (up to 3 ACH)	TRA Workers 3.0

• Closed batch process with occasional controlled exposure	
• Handle substance within a closed system	
• Sample via a closed loop or other system to avoid exposure (E8).	
• Store substance within a closed system	
Conditions and measures related to personal protection, hygiene and health evaluation	
• Dermal protection: No	TRA Workers 3.0
• Respiratory protection: No	TRA Workers 3.0
• Face/eye protection: No	
• Assumes a good basic standard of occupational hygiene is implemented *Good occupational hygiene practice is considered by Concawe to constitute measures that are routinely encountered and applied to meet the requirements of relevant workplace legislation such as regulations supporting the EU Framework Directive, in addition to specific RMM identified in the ES. These may include, but are not limited to:* *- Risk assessment of local workplace activities* *- Procedures supporting safe handling and maintenance of controls* *- Education and training of workers in understanding the hazards and control measuresrelevant to their activities* *- Provision of general ventilation* *- Good housekeeping and prompt clearance of spillages* *- Appropriate selection, testing and maintenance of equipment used to control exposure,* *e.g. Personal Protective Equipment (PPE), Local Exhaust Ventilation (LEV)* *- Draining of equipment prior to maintenance; retention of drained material in sealed storage pending disposal or recycling* *- Regular supply and laundering of work clothing; provision of washing and changing facilities; eating and smoking only in designated areas separate from the workplace*	
• General measures (aspiration) *General measures (aspiration): Do not ingest. If swallowed then seek immediate medical assistance.*	

• General Measures (skin irritants) *General Measures (skin irritants): Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.*	
• General measures (flammability) *General measures (flammability): Use in contained systems. Avoid ignition sources – No Smoking. Handle in well ventilated area to prevent formation of explosive atmosphere. Use equipment and protective systems approved for flammable substances.Restrict line velocity during pumping to avoid generation of electrostatic discharge.* *Ground/bond container and receiving equipment. Use non-sparking tools. Comply with relevant EU/national regulations. Review SDS for additional advice.*	

• General Measures (carcinogenicity) *Consider technical advances and process upgrades (including automation) for the elimination of releases. Minimise exposure using measures such as closed systems, dedicated facilities and suitable general / local exhaust ventilation. Drain down systemsand clear transfer lines prior to breaking containment. Clean / flush equipment, where possible, prior to maintenance. Where there is potential for exposure: Restrict access toauthorised persons; provide specific activity training to operators to minimise exposures; wear suitable gloves and coveralls to prevent skin contamination; wear respiratory protection when its use is identified for certain contributing scenarios; clear up spills immediately and dispose of wastes safely. Ensure safe systems of work or equivalent arrangements are in place to manage risks. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance.*	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 25 °C *Ambient temperature*	TRA Workers 3.0
• Covers use at ambient temperatures (unless stated differently) *It is required to map this condition of use against each contributing scenario for the exposure scenario for communication. The specific contributing scenario may be carried out above ambient temperature.*	

9.3.2.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.41. Exposure concentrations and risks for workers

Route of exposure and type of effects	Assessment entity	Exposure concentration	Risk quantification
Inhalation, systemic, long term	Cumene	2.504 mg/m³ (TRA Workers) RCR = 0.05	Final RCR = 0.05
Inhalation, systemic, acute	Cumene	10.01 mg/m³ (TRA Workers)	Qualitative risk
Inhalation, local, long term	Cumene	2.504 mg/m³ (TRA Workers)	Qualitative risk
Inhalation, local, acute	Cumene	10.01 mg/m³ (TRA Workers) RCR = 0.04	Final RCR = 0.04
Dermal, systemic, long term	Cumene	0.137 mg/kg bw/day (TRA Workers) RCR = 0.018	Final RCR = 0.018
Dermal, local, long	Registered substance	0.2 mg/cm² (TRA Workers)	Qualitative risk

Route of exposure and type of effects	Assessment entity	Exposure concentration	Risk quantification
term	as such (100%)		
	Cumene	0.02 mg/cm² (TRA Workers)	
Dermal, local, acute	Registered substanceas such (100%)	0.2 mg/cm² (TRA Workers)	Qualitative risk
	Cumene	0.02 mg/cm² (TRA Workers)	

Combined routes, systemic, long-term			Final RCR = 0.068

Remarks on exposure dataset obtained with ECETOC TRA

Percentage (w/w) of Registered substance as such (100%) in mixture/article: 100 %Percentage (w/w) of Cumene in mixture/article: 1 %
The vapour pressure at operating temperature (25°C) used for the calculation is 4.24E3 Pa for Registeredsubstance as such (100%).
The vapour pressure at operating temperature (25°C) used for the calculation is 1.58E3 Pa for Cumene.

Table 9.42.

Assessment Entity	Inhalation effectiveness used by TRA
Registered substanceas such (100%)	0 %
Cumene	0 %

Risk characterisation

Qualitative risk characterisation (Inhalation, systemic, acute, Inhalation, local, long term, Dermal, systemic, acute, Dermal, local, long term, Dermal, local, acute, Eye, local):
Qualitative risks management measures are laid out above (General measures). More details are available insection 9.0.4.

9.3.3. Worker CS 3: General exposures; Batch process; Closed systems (PROC 3)

Assessment entity group used for the assessment of this contributing scenario: Substance classified as H350(containing 0.1 to 1% cumene)

9.3.3.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Liquid, including paste/slurry/suspension	TRA Workers 3.0
• Liquid, vapour pressure < 0.5kPa at STP, with potential for aerosol generation	
• Covers percentage substance in the product up to 100% (unless stated differently) *It is required to map this condition of use against each contributing scenario for the exposure scenario for communication. The specific contributing scenario may cover concentrations less than 100%.*	
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 8 h/day	TRA Workers 3.0
• Covers daily exposures up to 8 hours (unless stated differently) *It is required to map this condition of use against each contributing scenario for the exposure scenario for communication. The specific contributing scenario may be shorter than 8 hours.*	
Technical and organisational conditions and measures	
• Local exhaust ventilation: No	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Room ventilation: Basic (up to 3 ACH)	TRA Workers 3.0
• Handle substance within a closed system	

• Sample via a closed loop or other system to avoid exposure (E8).	
Conditions and measures related to personal protection, hygiene and health evaluation	
• Dermal protection: Chemical resistant dermal protection with basic employee training.(effectiveness >= 90%)	TRA Workers 3.0
• Respiratory protection: No	TRA Workers 3.0
• Face/eye protection: No	
• Assumes a good basic standard of occupational hygiene is implemented *Good occupational hygiene practice is considered by Concawe to constitute measures that are routinely encountered and applied to meet the requirements of relevant workplace legislation such as regulations supporting the EU Framework Directive, in addition to specific RMM identified in the ES. These may include, but are not limited to:* *- Risk assessment of local workplace activities* *- Procedures supporting safe handling and maintenance of controls* *- Education and training of workers in understanding the hazards and control measures relevant to their activities* *- Provision of general ventilation* *- Good housekeeping and prompt clearance of spillages* *- Appropriate selection, testing and maintenance of equipment used to control exposure,* *e.g. Personal Protective Equipment (PPE), Local Exhaust Ventilation (LEV)* *- Draining of equipment prior to maintenance; retention of drained material in sealed storage pending disposal or recycling* *- Regular supply and laundering of work clothing; provision of washing and changing facilities; eating and smoking only in designated areas separate from the workplace*	
• General measures (aspiration) *General measures (aspiration): Do not ingest. If swallowed then seek immediate medical assistance.*	
• General Measures (skin irritants) *General Measures (skin irritants): Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.*	
• General measures (flammability) *General measures (flammability): Use in contained systems. Avoid ignition sources – No Smoking. Handle in well ventilated area to prevent formation of explosive atmosphere. Use equipment and protective systems approved for flammable substances.Restrict line velocity during pumping to avoid generation of electrostatic discharge.* *Ground/bond container and receiving equipment. Use non-sparking tools. Comply with relevant EU/national regulations. Review SDS for additional advice.*	
• General Measures (carcinogenicity) *Consider technical advances and process upgrades (including automation) for the elimination of releases. Minimise exposure using measures such as closed systems, dedicated facilities and suitable general / local exhaust ventilation. Drain down systemsand clear transfer lines prior to breaking containment. Clean / flush equipment, where possible, prior to maintenance. Where there is potential for exposure: Restrict access toauthorised persons; provide specific activity training to operators to minimise exposures; wear suitable gloves and coveralls to prevent skin contamination; wear respiratory protection when its use is identified for certain contributing scenarios; clear up spills immediately and dispose of wastes safely. Ensure safe systems of work or*	

	Method
equivalent arrangements are in place to manage risks. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance.	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 25 °C *Ambient temperature*	TRA Workers 3.0
• Covers use at ambient temperatures (unless stated differently) *It is required to map this condition of use against each contributing scenario for the exposure scenario for communication. The specific contributing scenario may be carried out above ambient temperature.*	

9.3.3.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.43. Exposure concentrations and risks for workers

Route of exposure and type of effects	Assessment entity	Exposure concentration	Risk quantification
Inhalation, systemic, long term	Cumene	5.008 mg/m³ (TRA Workers) RCR = 0.1	Final RCR = 0.1
Inhalation, systemic, acute	Cumene	20.03 mg/m³ (TRA Workers)	Qualitative risk
Inhalation, local, long term	Cumene	5.008 mg/m³ (TRA Workers)	Qualitative risk
Inhalation, local, acute	Cumene	20.03 mg/m³ (TRA Workers) RCR = 0.08	Final RCR = 0.08
Dermal, systemic, long term	Cumene	6.9E-3 mg/kg bw/day (TRA Workers) RCR = 8.96E-4	Final RCR < 0.01
Dermal, local, long term	Registered substanceas such (100%)	0.02 mg/cm² (TRA Workers)	Qualitative risk
	Cumene	2.01E-3 mg/cm² (TRA Workers)	
Dermal, local, acute	Registered substanceas such (100%)	0.02 mg/cm² (TRA Workers)	Qualitative risk
	Cumene	2.01E-3 mg/cm² (TRA Workers)	
Combined routes, systemic, long-term			Final RCR = 0.101

Remarks on exposure dataset obtained with ECETOC TRA

Percentage (w/w) of Registered substance as such (100%) in mixture/article: 100 %Percentage (w/w) of Cumene in mixture/article: 1 %
The vapour pressure at operating temperature (25°C) used for the calculation is 4.24E3 Pa for Registeredsubstance as such (100%).
The vapour pressure at operating temperature (25°C) used for the calculation is 1.58E3 Pa for Cumene.

Table 9.44.

Assessment Entity	Inhalation effectiveness used by TRA

Registered substanceas such (100%)	0 %
Cumene	0 %

Risk characterisation

Qualitative risk characterisation (Inhalation, systemic, acute, Inhalation, local, long term, Dermal, systemic, acute, Dermal, local, long term, Dermal, local, acute, Eye, local):
Qualitative risks management measures are laid out above (General measures). More details are available insection 9.0.4.

9.3.4. Worker CS 4: Equipment cleaning and maintenance (PROC 8a,PROC 28)

Assessment entity group used for the assessment of this contributing scenario: Substance classified as H350(containing 0.1 to 1% cumene)
Cleaning and maintenance activities have been assessed within one contributing scenario. Since the ECETOC TRA currently does not provide exposure predictions for the associated PROC28, PROC8a exposure predictionshave been used and PROC28 has been mapped as an additional PROC relevant for the contributing activity.

9.3.4.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Solid (material with medium dustiness) *As described in ECETOC TR114. exposure to aerosol can be estimated using the medium dustiness band of the ECETOC TRA. For a detailed explanation see section 9.0.4.*	TRA Workers 3.0
• Liquid, vapour pressure < 0.5kPa at STP, with potential for aerosol generation	
• Covers percentage substance in the product up to 100% (unless stated differently) *It is required to map this condition of use against each contributing scenario for the exposure scenario for communication. The specific contributing scenario may cover concentrations less than 100%.*	
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 8 h/day	TRA Workers 3.0
• Covers daily exposures up to 8 hours (unless stated differently) *It is required to map this condition of use against each contributing scenario for the exposure scenario for communication. The specific contributing scenario may be shorter than 8 hours.*	
Technical and organisational conditions and measures	
• Local exhaust ventilation: No	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Room ventilation: Basic (up to 3 ACH)	TRA Workers 3.0

• Standard Operating Procedures (SOP) maintenance (industrial) [Effectiveness Inhalation: 90%, Dermal: 0%] *Drain down and flush system prior to equipment break-in or maintenance.* Inhalation explanation: *Based on results from Fraunhofer experimental study report Verifying the Effectiveness of Solvent RMMs 15/6/2016.* Dermal explanation: *Expect dermal exposure is substantially reduced when lines and equipment are properly drained and flushed according to Standard Operating Procedures (SOP). Specific exposure reduction is per assessor professional judgment.*	
Conditions and measures related to personal protection, hygiene and health evaluation	
• Dermal protection: Chemical resistant dermal protection with basic employee training.(effectiveness >= 90%)	TRA Workers 3.0
• Respiratory protection: No	TRA Workers 3.0
• Face/eye protection: No	
• Assumes a good basic standard of occupational hygiene is implemented *Good occupational hygiene practice is considered by Concawe to constitute measures that are routinely encountered and applied to meet the requirements of relevant*	

	Method
workplace legislation such as regulations supporting the EU Framework Directive, in addition to specific RMM identified in the ES. These may include, but are not limited to: *- Risk assessment of local workplace activities* *- Procedures supporting safe handling and maintenance of controls* *- Education and training of workers in understanding the hazards and control measures relevant to their activities* *- Provision of general ventilation* *- Good housekeeping and prompt clearance of spillages* *- Appropriate selection, testing and maintenance of equipment used to control exposure,* *e.g. Personal Protective Equipment (PPE), Local Exhaust Ventilation (LEV)* *- Draining of equipment prior to maintenance; retention of drained material in sealed storage pending disposal or recycling* *- Regular supply and laundering of work clothing; provision of washing and changing facilities; eating and smoking only in designated areas separate from the workplace*	
• General measures (aspiration) *General measures (aspiration): Do not ingest. If swallowed then seek immediate medical assistance.*	
• General Measures (skin irritants) *General Measures (skin irritants): Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.*	
• General measures (flammability) *General measures (flammability): Use in contained systems. Avoid ignition sources – No Smoking. Handle in well ventilated area to prevent formation of explosive atmosphere. Use equipment and protective systems approved for flammable substances.Restrict line velocity during pumping to avoid generation of electrostatic discharge.* *Ground/bond container and receiving equipment. Use non-sparking tools. Comply with relevant EU/national regulations. Review SDS for additional advice.*	

• General Measures (carcinogenicity) *Consider technical advances and process upgrades (including automation) for the elimination of releases. Minimise exposure using measures such as closed systems, dedicated facilities and suitable general / local exhaust ventilation. Drain down systemsand clear transfer lines prior to breaking containment. Clean / flush equipment, where possible, prior to maintenance. Where there is potential for exposure: Restrict access toauthorised persons; provide specific activity training to operators to minimise exposures; wear suitable gloves and coveralls to prevent skin contamination; wear respiratory protection when its use is identified for certain contributing scenarios; clear up spills immediately and dispose of wastes safely. Ensure safe systems of work or equivalent arrangements are in place to manage risks. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance.*	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 25 °C *Ambient temperature*	TRA Workers 3.0
• Covers use at ambient temperatures (unless stated differently) *It is required to map this condition of use against each contributing scenario for the exposure scenario for communication. The specific contributing scenario may be carried out above ambient temperature.*	

9.3.4.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.45. Exposure concentrations and risks for workers

Route of exposure and type of effects	Assessment entity	Exposure concentration	Risk quantification
Inhalation, systemic, long term	Cumene	25.04 mg/m³ (TRA Workers) RCR = 0.501	Final RCR = 0.501
Inhalation, systemic, acute	Cumene	100.1 mg/m³ (TRA Workers)	Qualitative risk
Inhalation, local, long term	Cumene	25.04 mg/m³ (TRA Workers)	Qualitative risk
Inhalation, local, acute	Cumene	100.1 mg/m³ (TRA Workers) RCR = 0.401	Final RCR = 0.401
Dermal, systemic, long term	Cumene	0.137 mg/kg bw/day (TRA Workers) RCR = 0.018	Final RCR = 0.018
Dermal, local, long term	Registered substanceas such (100%)	0.1 mg/cm² (TRA Workers)	Qualitative risk
	Cumene	1E-2 mg/cm² (TRA Workers)	
Dermal, local, acute	Registered substanceas such (100%)	0.1 mg/cm² (TRA Workers)	Qualitative risk
	Cumene	1E-2 mg/cm² (TRA Workers)	
Combined routes, systemic, long-term			Final RCR = 0.519

Remarks on exposure dataset obtained with ECETOC TRA

Percentage (w/w) of Registered substance as such (100%) in mixture/article: 100 %Percentage (w/w) of Cumene in mixture/article: 1 %
The vapour pressure at operating temperature (25°C) used for the calculation is 4.24E3 Pa for Registeredsubstance as such (100%).
The vapour pressure at operating temperature (25°C) used for the calculation is 1.58E3 Pa for Cumene.

Table 9.46.

Assessment Entity	Inhalation effectiveness used by TRA
Registered substanceas such (100%)	0 %
Cumene	0 %

Risk characterisation

Qualitative risk characterisation (Inhalation, systemic, acute, Inhalation, local, long term, Dermal, systemic, acute, Dermal, local, long term, Dermal, local, acute, Eye, local):
Qualitative risks management measures are laid out above (General measures). More details are available insection 9.0.4.

9.3.5. Worker CS 5: Bulk transfers; Drum/batch transfers; Closed systems(PROC 8b)

Assessment entity group used for the assessment of this contributing scenario: Substance classified as H350(containing 0.1 to 1% cumene)

9.3.5.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Solid (material with medium dustiness) *As described in ECETOC TR114. exposure to aerosol can be estimated using the medium dustiness band of the ECETOC TRA. For a detailed explanation see section 9.0.4.*	TRA Workers 3.0
• Liquid, vapour pressure < 0.5kPa at STP, with potential for aerosol generation	
• Covers percentage substance in the product up to 100% (unless stated differently) *It is required to map this condition of use against each contributing scenario for the exposure scenario for communication. The specific contributing scenario may cover concentrations less than 100%.*	
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 8 h/day	TRA Workers 3.0
• Covers daily exposures up to 8 hours (unless stated differently) *It is required to map this condition of use against each contributing scenario for the exposure scenario for communication. The specific contributing scenario may be shorter than 8 hours.*	
Technical and organisational conditions and measures	
• Local exhaust ventilation: No	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Room ventilation: Basic (up to 3 ACH)	TRA Workers 3.0

• Use drum pumps [E53] [Effectiveness Inhalation: 90%, Dermal: 0%] *Use drum pumps [E53]* Inhalation explanation: *Based on results from Fraunhofer experimental study report Verifying the Effectiveness of Solvent RMMs 15/6/2016. This supports ESIG standard phrase E53.* Dermal explanation: *Expect dermal exposure is substantially reduced when drum pumps are used. Specific exposure reduction is per assessor professional judgment.*	
• Transfer under containment [Effectiveness Inhalation: 90%, Dermal: 0%] *Ensure material transfers are under containment or extract ventilation.* Inhalation explanation: *Based on results from Fraunhofer experimental study report Verifying the Effectiveness of Solvent RMMs 15/6/2016. This supports ESIG standard phrase Ensure material transfers are under containment or extract ventilation. E66*	
Conditions and measures related to personal protection, hygiene and health evaluation	
• Dermal protection: Chemical resistant dermal protection with basic employee training.(effectiveness >= 90%)	TRA Workers 3.0
• Respiratory protection: No	TRA Workers 3.0
• Face/eye protection: No	
• Assumes a good basic standard of occupational hygiene is implemented *Good occupational hygiene practice is considered by Concawe to constitute measures that are routinely encountered and applied to meet the requirements of relevant workplace legislation such as regulations supporting the EU Framework Directive, in addition to specific RMM identified in the ES. These may include, but are not limited to:* *- Risk assessment of local workplace activities* *- Procedures supporting safe handling and maintenance of controls* *- Education and training of workers in understanding the hazards and control measures relevant to their activities* *- Provision of general ventilation* *- Good housekeeping and prompt clearance of spillages* *- Appropriate selection, testing and maintenance of equipment used to control exposure,* *e.g. Personal Protective Equipment (PPE), Local Exhaust Ventilation (LEV)* *- Draining of equipment prior to maintenance; retention of drained material in sealed storage pending disposal or recycling* *- Regular supply and laundering of work clothing; provision of washing and changing facilities; eating and smoking only in designated areas separate from the workplace*	
• General measures (aspiration) *General measures (aspiration): Do not ingest. If swallowed then seek immediate medical assistance.*	

• General Measures (skin irritants) *General Measures (skin irritants): Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contactwith substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.*	
• General measures (flammability) *General measures (flammability): Use in contained systems. Avoid ignition sources – No Smoking. Handle in well ventilated area to prevent formation of explosive atmosphere. Use equipment and protective systems approved for flammable substances.Restrict line velocity during pumping to avoid generation of electrostatic discharge.*	

Ground/bond container and receiving equipment. Use non-sparking tools. Comply with relevant EU/national regulations. Review SDS for additional advice.	
• General Measures (carcinogenicity) *Consider technical advances and process upgrades (including automation) for the elimination of releases. Minimise exposure using measures such as closed systems, dedicated facilities and suitable general / local exhaust ventilation. Drain down systemsand clear transfer lines prior to breaking containment. Clean / flush equipment, where possible, prior to maintenance. Where there is potential for exposure: Restrict access toauthorised persons; provide specific activity training to operators to minimise exposures; wear suitable gloves and coveralls to prevent skin contamination; wear respiratory protection when its use is identified for certain contributing scenarios; clear up spills immediately and dispose of wastes safely. Ensure safe systems of work or equivalent arrangements are in place to manage risks. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance.*	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 25 °C *Ambient temperature*	TRA Workers 3.0
• Covers use at ambient temperatures (unless stated differently) *It is required to map this condition of use against each contributing scenario for the exposure scenario for communication. The specific contributing scenario may be carried out above ambient temperature.*	

9.3.5.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.47. Exposure concentrations and risks for workers

Route of exposure and type of effects	Assessment entity	Exposure concentration	Risk quantification
Inhalation, systemic, long term	Cumene	12.52 mg/m³ (TRA Workers) RCR = 0.25	Final RCR = 0.25
Inhalation, systemic, acute	Cumene	50.08 mg/m³ (TRA Workers)	Qualitative risk
Inhalation, local, long term	Cumene	12.52 mg/m³ (TRA Workers)	Qualitative risk
Inhalation, local, acute	Cumene	50.08 mg/m³ (TRA Workers) RCR = 0.2	Final RCR = 0.2
Dermal, systemic, long term	Cumene	0.137 mg/kg bw/day (TRA Workers) RCR = 0.018	Final RCR = 0.018
Dermal, local, long	Registered substance	0.1 mg/cm² (TRA Workers)	Qualitative risk

Route of exposure and type of effects	Assessment entity	Exposure concentration	Risk quantification
term	as such (100%)		

	Cumene	1E-2 mg/cm² (TRA Workers)	
Dermal, local, acute	Registered substanceas such (100%)	0.1 mg/cm² (TRA Workers)	Qualitative risk
	Cumene	1E-2 mg/cm² (TRA Workers)	
Combined routes, systemic, long-term			Final RCR = 0.268

Remarks on exposure dataset obtained with ECETOC TRA

Percentage (w/w) of Registered substance as such (100%) in mixture/article: 100 %Percentage (w/w) of Cumene in mixture/article: 1 %
The vapour pressure at operating temperature (25°C) used for the calculation is 4.24E3 Pa for Registeredsubstance as such (100%).
The vapour pressure at operating temperature (25°C) used for the calculation is 1.58E3 Pa for Cumene.

Table 9.48.

Assessment Entity	Inhalation effectiveness used by TRA
Registered substanceas such (100%)	0 %
Cumene	0 %

Risk characterisation

Qualitative risk characterisation (Inhalation, systemic, acute, Inhalation, local, long term, Dermal, systemic, acute, Dermal, local, long term, Dermal, local, acute, Eye, local):
Qualitative risks management measures are laid out above (General measures). More details are available insection 9.0.4.

9.3.6. Worker CS 6: Drum and small package filling (PROC 9)

Assessment entity group used for the assessment of this contributing scenario: Substance classified as H350(containing 0.1 to 1% cumene)

9.3.6.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Solid (material with medium dustiness) *As described in ECETOC TR114. exposure to aerosol can be estimated using the medium dustiness band of the ECETOC TRA. For a detailed explanation see section 9.0.4.*	TRA Workers 3.0
• Liquid, vapour pressure < 0.5kPa at STP, with potential for aerosol generation	
• Covers percentage substance in the product up to 100% (unless stated differently) *It is required to map this condition of use against each contributing scenario for the exposure scenario for communication. The specific contributing scenario may cover concentrations less than 100%.*	
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 8 h/day	TRA Workers 3.0

• Covers daily exposures up to 8 hours (unless stated differently) *It is required to map this condition of use against each contributing scenario for the exposure scenario for communication. The specific contributing scenario may be shorter than 8 hours.*	

	Method
Technical and organisational conditions and measures	
• Local exhaust ventilation: No	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Room ventilation: Basic (up to 3 ACH)	TRA Workers 3.0
• Closed batch process with occasional controlled exposure	
• Handle substance within a closed system	
• Use drum pumps [E53] [Effectiveness Inhalation: 90%, Dermal: 0%] *Use drum pumps [E53]* Inhalation explanation: *Based on results from Fraunhofer experimental study report Verifying the Effectiveness of Solvent RMMs 15/6/2016. This supports ESIG standard phrase E53.* Dermal explanation: *Expect dermal exposure is substantially reduced when drum pumps are used. Specific exposure reduction is per assessor professional judgment.*	
Conditions and measures related to personal protection, hygiene and health evaluation	
• Dermal protection: Chemical resistant dermal protection with basic employee training.(effectiveness >= 90%)	TRA Workers 3.0
• Respiratory protection: No	TRA Workers 3.0
• Face/eye protection: No	
• Assumes a good basic standard of occupational hygiene is implemented *Good occupational hygiene practice is considered by Concawe to constitute measures that are routinely encountered and applied to meet the requirements of relevant workplace legislation such as regulations supporting the EU Framework Directive, in addition to specific RMM identified in the ES. These may include, but are not limited to:* *- Risk assessment of local workplace activities* *- Procedures supporting safe handling and maintenance of controls* *- Education and training of workers in understanding the hazards and control measures relevant to their activities* *- Provision of general ventilation* *- Good housekeeping and prompt clearance of spillages* *- Appropriate selection, testing and maintenance of equipment used to control exposure,* *e.g. Personal Protective Equipment (PPE), Local Exhaust Ventilation (LEV)* *- Draining of equipment prior to maintenance; retention of drained material in sealed storage pending disposal or recycling* *- Regular supply and laundering of work clothing; provision of washing and changing facilities; eating and smoking only in designated areas separate from the workplace*	
• General measures (aspiration) *General measures (aspiration): Do not ingest. If swallowed then seek immediate medical assistance.*	

• General Measures (skin irritants) *General Measures (skin irritants): Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.*	
• General measures (flammability) *General measures (flammability): Use in contained systems. Avoid ignition sources – No Smoking. Handle in well ventilated area to prevent formation of explosive atmosphere. Use equipment and protective systems approved for flammable substances.Restrict line velocity during pumping to avoid generation of electrostatic discharge.* *Ground/bond container and receiving equipment. Use non-sparking tools. Comply with relevant EU/national regulations. Review SDS for additional advice.*	
• General Measures (carcinogenicity)	

Consider technical advances and process upgrades (including automation) for the elimination of releases. Minimise exposure using measures such as closed systems, dedicated facilities and suitable general / local exhaust ventilation. Drain down systemsand clear transfer lines prior to breaking containment. Clean / flush equipment, where possible, prior to maintenance. Where there is potential for exposure: Restrict access toauthorised persons; provide specific activity training to operators to minimise exposures; wear suitable gloves and coveralls to prevent skin contamination; wear respiratory protection when its use is identified for certain contributing scenarios; clear up spills immediately and dispose of wastes safely. Ensure safe systems of work or equivalent arrangements are in place to manage risks. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance.	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 25 °C *Ambient temperature*	TRA Workers 3.0
• Covers use at ambient temperatures (unless stated differently) *It is required to map this condition of use against each contributing scenario for the exposure scenario for communication. The specific contributing scenario may be carried out above ambient temperature.*	

9.3.6.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.49. Exposure concentrations and risks for workers

Route of exposure and type of effects	Assessment entity	Exposure concentration	Risk quantification
Inhalation, systemic, long term	Cumene	25.04 mg/m³ (TRA Workers) RCR = 0.501	Final RCR = 0.501
Inhalation, systemic, acute	Cumene	100.1 mg/m³ (TRA Workers)	Qualitative risk
Inhalation, local, long term	Cumene	25.04 mg/m³ (TRA Workers)	Qualitative risk
Inhalation, local, acute	Cumene	100.1 mg/m³ (TRA Workers) RCR = 0.401	Final RCR = 0.401

Dermal, systemic, long term	Cumene	0.069 mg/kg bw/day (TRA Workers) RCR = 8.91E-3	Final RCR < 0.01
Dermal, local, long term	Registered substanceas such (100%)	0.1 mg/cm² (TRA Workers)	Qualitative risk
	Cumene	0.01 mg/cm² (TRA Workers)	
Dermal, local, acute	Registered substanceas such (100%)	0.1 mg/cm² (TRA Workers)	Qualitative risk
	Cumene	0.01 mg/cm² (TRA Workers)	
Combined routes, systemic, long-term			Final RCR = 0.51

Remarks on exposure dataset obtained with ECETOC TRA

Percentage (w/w) of Registered substance as such (100%) in mixture/article: 100 %Percentage (w/w) of Cumene in mixture/article: 1 %
The vapour pressure at operating temperature (25°C) used for the calculation is 4.24E3 Pa for Registeredsubstance as such (100%).
The vapour pressure at operating temperature (25°C) used for the calculation is 1.58E3 Pa for Cumene.

Table 9.50.

Assessment Entity	Inhalation effectiveness used by TRA
Registered substanceas such (100%)	0 %
Cumene	0 %

Risk characterisation

Qualitative risk characterisation (Inhalation, systemic, acute, Inhalation, local, long term, Dermal, systemic, acute, Dermal, local, long term, Dermal, local, acute, Eye, local):
Qualitative risks management measures are laid out above (General measures). More details are available insection 9.0.4.

9.3.7. Worker CS 7: Process sampling (PROC 9)

Assessment entity group used for the assessment of this contributing scenario: Substance classified as H350(containing 0.1 to 1% cumene)

9.3.7.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Solid (material with medium dustiness) *As described in ECETOC TR114. exposure to aerosol can be estimated using the medium dustiness band of the ECETOC TRA. For a detailed explanation see section 9.0.4.*	TRA Workers 3.0
• Liquid, vapour pressure < 0.5kPa at STP, with potential for aerosol generation	
• Covers percentage substance in the product up to 100% (unless stated differently) *It is required to map this condition of use against each contributing scenario for the exposure scenario for communication. The specific contributing scenario may cover concentrations less than 100%.*	

Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 8 h/day	TRA Workers 3.0
• Covers daily exposures up to 8 hours (unless stated differently) *It is required to map this condition of use against each contributing scenario for the exposure scenario for communication. The specific contributing scenario may be shorter than 8 hours.*	
Technical and organisational conditions and measures	
• Local exhaust ventilation: No	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Room ventilation: Basic (up to 3 ACH)	TRA Workers 3.0
• Sample via a closed loop or other system to avoid exposure (E8).	
Conditions and measures related to personal protection, hygiene and health evaluation	
• Dermal protection: Chemical resistant dermal protection with basic employee training.(effectiveness >= 90%)	TRA Workers 3.0
• Respiratory protection: No	TRA Workers 3.0
• Face/eye protection: No	
• Assumes a good basic standard of occupational hygiene is implemented *Good occupational hygiene practice is considered by Concawe to constitute measures that are routinely encountered and applied to meet the requirements of relevant workplace legislation such as regulations supporting the EU Framework Directive, in addition to specific RMM identified in the ES. These may include, but are not limited to:*	

- Risk assessment of local workplace activities *- Procedures supporting safe handling and maintenance of controls* *- Education and training of workers in understanding the hazards and control measuresrelevant to their activities* *- Provision of general ventilation* *- Good housekeeping and prompt clearance of spillages* *- Appropriate selection, testing and maintenance of equipment used to control exposure,* *e.g. Personal Protective Equipment (PPE), Local Exhaust Ventilation (LEV)* *- Draining of equipment prior to maintenance; retention of drained material in sealed storage pending disposal or recycling* *- Regular supply and laundering of work clothing; provision of washing and changing facilities; eating and smoking only in designated areas separate from the workplace*	
• General measures (aspiration) *General measures (aspiration): Do not ingest. If swallowed then seek immediate medical assistance.*	
• General Measures (skin irritants) *General Measures (skin irritants): Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.*	

• General measures (flammability) *General measures (flammability): Use in contained systems. Avoid ignition sources – No Smoking. Handle in well ventilated area to prevent formation of explosive atmosphere. Use equipment and protective systems approved for flammable substances.Restrict line velocity during pumping to avoid generation of electrostatic discharge.* *Ground/bond container and receiving equipment. Use non-sparking tools. Comply with relevant EU/national regulations. Review SDS for additional advice.*	
• General Measures (carcinogenicity) *Consider technical advances and process upgrades (including automation) for the elimination of releases. Minimise exposure using measures such as closed systems, dedicated facilities and suitable general / local exhaust ventilation. Drain down systemsand clear transfer lines prior to breaking containment. Clean / flush equipment, where possible, prior to maintenance. Where there is potential for exposure: Restrict access toauthorised persons; provide specific activity training to operators to minimise exposures; wear suitable gloves and coveralls to prevent skin contamination; wear respiratory protection when its use is identified for certain contributing scenarios; clear up spills immediately and dispose of wastes safely. Ensure safe systems of work or equivalent arrangements are in place to manage risks. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance.*	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 25 °C *Ambient temperature*	TRA Workers 3.0
• Covers use at ambient temperatures (unless stated differently) *It is required to map this condition of use against each contributing scenario for the exposure scenario for communication. The specific contributing scenario may be carried out above ambient temperature.*	

9.3.7.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.51. Exposure concentrations and risks for workers

Route of exposure and type of effects	Assessment entity	Exposure concentration	Risk quantification
Inhalation, systemic, long term	Cumene	25.04 mg/m³ (TRA Workers) RCR = 0.501	Final RCR = 0.501
Inhalation, systemic, acute	Cumene	100.1 mg/m³ (TRA Workers)	Qualitative risk
Inhalation, local, long term	Cumene	25.04 mg/m³ (TRA Workers)	Qualitative risk
Inhalation, local, acute	Cumene	100.1 mg/m³ (TRA Workers) RCR = 0.401	Final RCR = 0.401
Dermal, systemic, long term	Cumene	0.069 mg/kg bw/day (TRA Workers) RCR = 8.91E-3	Final RCR < 0.01
Dermal, local, long term	Registered substanceas such (100%)	0.1 mg/cm² (TRA Workers)	Qualitative risk
	Cumene	0.01 mg/cm² (TRA Workers)	

Dermal, local, acute	Registered substanceas such (100%)	0.1 mg/cm² (TRA Workers)	Qualitative risk
	Cumene	0.01 mg/cm² (TRA Workers)	
Combined routes, systemic, long-term			Final RCR = 0.51

Remarks on exposure dataset obtained with ECETOC TRA

Percentage (w/w) of Registered substance as such (100%) in mixture/article: 100 %Percentage (w/w) of Cumene in mixture/article: 1 %
The vapour pressure at operating temperature (25°C) used for the calculation is 4.24E3 Pa for Registeredsubstance as such (100%).
The vapour pressure at operating temperature (25°C) used for the calculation is 1.58E3 Pa for Cumene.

Table 9.52.

Assessment Entity	Inhalation effectiveness used by TRA
Registered substanceas such (100%)	0 %
Cumene	0 %

Risk characterisation

Qualitative risk characterisation (Inhalation, systemic, acute, Inhalation, local, long term, Dermal, systemic, acute, Dermal, local, long term, Dermal, local, acute, Eye, local):
Qualitative risks management measures are laid out above (General measures). More details are available insection 9.0.4.

9.3.8. Worker CS 8: Laboratory activities (PROC 15)

Assessment entity group used for the assessment of this contributing scenario: Substance classified as H350(containing 0.1 to 1% cumene)

9.3.8.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Solid (material with medium dustiness) *As described in ECETOC TR114. exposure to aerosol can be estimated using the medium dustiness band of the ECETOC TRA. For a detailed explanation see section 9.0.4.*	TRA Workers 3.0
• Liquid, vapour pressure < 0.5kPa at STP, with potential for aerosol generation	
• Covers percentage substance in the product up to 100% (unless stated differently) *It is required to map this condition of use against each contributing scenario for the exposure scenario for communication. The specific contributing scenario may cover concentrations less than 100%.*	
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 8 h/day	TRA Workers 3.0
• Covers daily exposures up to 8 hours (unless stated differently) *It is required to map this condition of use against each contributing scenario for the exposure scenario for communication. The specific contributing scenario may be shorter than 8 hours.*	

Technical and organisational conditions and measures	
• Local exhaust ventilation: No	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Room ventilation: Basic (up to 3 ACH)	TRA Workers 3.0
• Handle within a fume cupboard or implement suitable equivalent methods to minimiseexposure *according to Fransman et al (2011) a fume cupboard reduces exposure by at least 99%.* *Fransman et al. Ann. Occup. Hyg., Vol. 55, No. 9, pp. 957–979, 2011* *TRA: LEV with TRA efficiency provides an exposure reduction of 90% and can be considered a conservative assessment* *ART: LEV - Fume cupboard provides an exposure reduction of 99%*	
Conditions and measures related to personal protection, hygiene and health evaluation	
• Dermal protection: Chemical resistant dermal protection with basic employee training.(effectiveness >= 90%)	TRA Workers 3.0
• Respiratory protection: No	TRA Workers 3.0
• Face/eye protection: No	
• Assumes a good basic standard of occupational hygiene is implemented *Good occupational hygiene practice is considered by Concawe to constitute measures that are routinely encountered and applied to meet the requirements of relevant workplace legislation such as regulations supporting the EU Framework Directive, in addition to specific RMM identified in the ES. These may include, but are not limited to:* *- Risk assessment of local workplace activities* *- Procedures supporting safe handling and maintenance of controls* *- Education and training of workers in understanding the hazards and control measuresrelevant to their activities* *- Provision of general ventilation* *- Good housekeeping and prompt clearance of spillages* *- Appropriate selection, testing and maintenance of equipment used to control exposure,* *e.g. Personal Protective Equipment (PPE), Local Exhaust Ventilation (LEV)* *- Draining of equipment prior to maintenance; retention of drained material in sealed storage pending disposal or recycling* *- Regular supply and laundering of work clothing; provision of washing and changing facilities; eating and smoking only in designated areas separate from the workplace*	
• General measures (aspiration) *General measures (aspiration): Do not ingest. If swallowed then seek immediate medical assistance.*	
• General Measures (skin irritants) *General Measures (skin irritants): Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.*	

• General measures (flammability) *General measures (flammability): Use in contained systems. Avoid ignition sources – No Smoking. Handle in well ventilated area to prevent formation of explosive atmosphere. Use equipment and protective systems approved for flammable substances.Restrict line velocity during pumping to avoid generation of electrostatic discharge.* *Ground/bond container and receiving equipment. Use non-sparking tools. Comply with relevant EU/national regulations. Review SDS for additional advice.*	
• General Measures (carcinogenicity) *Consider technical advances and process upgrades (including automation) for the elimination of releases. Minimise exposure using measures such as closed systems, dedicated facilities and suitable general / local exhaust ventilation. Drain down systemsand clear transfer lines prior to breaking containment. Clean / flush equipment, where possible, prior to maintenance. Where there is potential for exposure: Restrict access toauthorised persons; provide specific activity training to operators to minimise exposures; wear suitable gloves and coveralls to prevent skin contamination; wear respiratory protection when its use is identified for certain contributing scenarios; clear up spills immediately and dispose of wastes safely. Ensure safe systems of work or equivalent arrangements are in place to manage risks. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance.*	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 25 °C *Ambient temperature*	TRA Workers 3.0
• Covers use at ambient temperatures (unless stated differently) *It is required to map this condition of use against each contributing scenario for the exposure scenario for communication. The specific contributing scenario may be carried out above ambient temperature.*	
• No other specific measures identified [E120] *No other specific measures identified [E120]*	

9.3.8.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.53. Exposure concentrations and risks for workers

Route of exposure and type of effects	Assessment entity	Exposure concentration	Risk quantification
Inhalation, systemic, long term	Cumene	5.008 mg/m³ (TRA Workers) RCR = 0.1	Final RCR = 0.1
Inhalation, systemic, acute	Cumene	20.03 mg/m³ (TRA Workers)	Qualitative risk
Inhalation, local, long term	Cumene	5.008 mg/m³ (TRA Workers)	Qualitative risk
Inhalation, local, acute	Cumene	20.03 mg/m³ (TRA Workers) RCR = 0.08	Final RCR = 0.08
Dermal, systemic, long term	Cumene	3.4E-3 mg/kg bw/day (TRA Workers) RCR = 4.42E-4	Final RCR < 0.01
Dermal, local, long term	Registered substanceas such	9.92E-3 mg/cm² (TRA Workers)	Qualitative risk

	(100%)		
	Cumene	9.92E-4 mg/cm² (TRA Workers)	

Route of exposure and type of effects	Assessment entity	Exposure concentration	Risk quantification
Dermal, local, acute	Registered substanceas such (100%)	9.92E-3 mg/cm² (TRA Workers)	Qualitative risk
	Cumene	9.92E-4 mg/cm² (TRA Workers)	
Combined routes, systemic, long-term			Final RCR = 0.101

Remarks on exposure dataset obtained with ECETOC TRA

Percentage (w/w) of Registered substance as such (100%) in mixture/article: 100 %Percentage (w/w) of Cumene in mixture/article: 1 %
The vapour pressure at operating temperature (25°C) used for the calculation is 4.24E3 Pa for Registeredsubstance as such (100%).
The vapour pressure at operating temperature (25°C) used for the calculation is 1.58E3 Pa for Cumene.

Table 9.54.

Assessment Entity	Inhalation effectiveness used by TRA
Registered substanceas such (100%)	0 %
Cumene	0 %

Risk characterisation

Qualitative risk characterisation (Inhalation, systemic, acute, Inhalation, local, long term, Dermal, systemic, acute, Dermal, local, long term, Dermal, local, acute, Eye, local):
Qualitative risks management measures are laid out above (General measures). More details are available insection 9.0.4.

9.5. *Exposure scenario 5: Use at industrial sites - Use in fuel;Industrial; Level I*

Use Map: Use in fuel

Worker contributing scenario(s):		
CS 1	General exposures; Closed systems	**PROC 2**, PROC 1
CS 2	Storage	**PROC 2**, PROC 1
CS 3	Equipment cleaning and maintenance	**PROC 8a**, PROC 28
CS 4	Bulk transfers; Dedicated facility	PROC 8b
CS 5	Drum/batch transfers; Dedicated facility	PROC 8b
CS 6	Use of fuels; Closed systems	PROC 16

Further description of the use:

Covers the use as a fuel (or fuel additives and additive components) within closed or contained systems, including incidental exposures during activities associated with its transfer, use, equipment maintenance andhandling of waste.

9.5.1. Worker CS 1: General exposures; Closed systems (PROC 2, PROC 1)

Assessment entity group used for the assessment of this contributing scenario: Substance classified as H350(containing 0.1 to 1% cumene)
PROC 2 and PROC 1 (similar activities within the exposure scenario) have been assessed within one contributing scenario. The (highest) exposure predictions of PROC 2 have been used in the exposure and riskassessment and PROC 1 has been mapped as an additional PROC relevant for the contributing activity.

9.5.1.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Liquid, including paste/slurry/suspension	TRA Workers 3.0
• Liquid, vapour pressure < 0.5kPa at STP, with potential for aerosol generation	
• Covers percentage substance in the product up to 100% (unless stated differently) *It is required to map this condition of use against each contributing scenario for the exposure scenario for communication. The specific contributing scenario may cover concentrations less than 100%.*	
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 8 h/day	TRA Workers 3.0
• Covers daily exposures up to 8 hours (unless stated differently) *It is required to map this condition of use against each contributing scenario for the exposure scenario for communication. The specific contributing scenario may be shorter than 8 hours.*	
Technical and organisational conditions and measures	
• Local exhaust ventilation: No	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Room ventilation: Basic (up to 3 ACH)	TRA Workers 3.0
• Handle substance within a closed system	
• Sample via a closed loop or other system to avoid exposure (E8).	

Conditions and measures related to personal protection, hygiene and health evaluation

	Method
• Dermal protection: Chemical resistant dermal protection with basic employee training.(effectiveness >= 90%)	TRA Workers 3.0
• Respiratory protection: No	TRA Workers 3.0
• Face/eye protection: No	
• Assumes a good basic standard of occupational hygiene is implemented *Good occupational hygiene practice is considered by Concawe to constitute measures that are routinely encountered and applied to meet the requirements of relevant workplace legislation such as regulations supporting the EU Framework Directive, in addition to specific RMM identified in the ES. These may include, but are not limited to:* *- Risk assessment of local workplace activities* *- Procedures supporting safe handling and maintenance of controls* *- Education and training of workers in understanding the hazards and control measuresrelevant to their activities* *- Provision of general ventilation* *- Good housekeeping and prompt clearance of spillages* *- Appropriate selection, testing and maintenance of equipment used to control exposure,* *e.g. Personal Protective Equipment (PPE), Local Exhaust Ventilation (LEV)* *- Draining of equipment prior to maintenance; retention of drained material in sealed storage pending disposal or recycling* *- Regular supply and laundering of work clothing; provision of washing and changing facilities; eating and smoking only in designated areas separate from the workplace*	
• General measures (aspiration) *General measures (aspiration): Do not ingest. If swallowed then seek immediate medical assistance.*	
• General Measures (skin irritants) *General Measures (skin irritants): Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contactwith substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.*	
• General measures (flammability) *General measures (flammability): Use in contained systems. Avoid ignition sources – No Smoking. Handle in well ventilated area to prevent formation of explosive atmosphere. Use equipment and protective systems approved for flammable substances.Restrict line velocity during pumping to avoid generation of electrostatic discharge.* *Ground/bond container and receiving equipment. Use non-sparking tools. Comply with relevant EU/national regulations. Review SDS for additional advice.*	

• General Measures (carcinogenicity) *Consider technical advances and process upgrades (including automation) for the elimination of releases. Minimise exposure using measures such as closed systems, dedicated facilities and suitable general / local exhaust ventilation. Drain down systemsand clear transfer lines prior to breaking containment. Clean / flush equipment, where possible, prior to maintenance. Where there is potential for exposure: Restrict access toauthorised persons; provide specific activity training to operators to minimise exposures; wear suitable gloves and coveralls to prevent skin contamination; wear respiratory protection when its use is identified for certain contributing scenarios; clear up spills immediately and dispose of wastes safely. Ensure safe systems of work or equivalent arrangements are in place to manage risks. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance.*	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 25 °C *Ambient temperature*	TRA Workers 3.0
• Covers use at ambient temperatures (unless stated differently)	

It is required to map this condition of use against each contributing scenario for the exposure scenario for communication. The specific contributing scenario may be carried out above ambient temperature.	

9.5.1.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.69. Exposure concentrations and risks for workers

Route of exposure and type of effects	Assessment entity	Exposure concentration	Risk quantification
Inhalation, systemic, long term	Cumene	2.504 mg/m³ (TRA Workers) RCR = 0.05	Final RCR = 0.05
Inhalation, systemic, acute	Cumene	10.01 mg/m³ (TRA Workers)	Qualitative risk
Inhalation, local, long term	Cumene	2.504 mg/m³ (TRA Workers)	Qualitative risk
Inhalation, local, acute	Cumene	10.01 mg/m³ (TRA Workers) RCR = 0.04	Final RCR = 0.04
Dermal, systemic, long term	Cumene	0.014 mg/kg bw/day (TRA Workers) RCR = 1.78E-3	Final RCR < 0.01
Dermal, local, long term	Registered substanceas such (100%)	0.02 mg/cm² (TRA Workers)	Qualitative risk
	Cumene	2E-3 mg/cm² (TRA Workers)	
Dermal, local, acute	Registered substanceas such (100%)	0.02 mg/cm² (TRA Workers)	Qualitative risk
	Cumene	2E-3 mg/cm² (TRA Workers)	
Combined routes, systemic, long-term			Final RCR = 0.052

Remarks on exposure dataset obtained with ECETOC TRA

Percentage (w/w) of Registered substance as such (100%) in mixture/article: 100 %Percentage (w/w) of Cumene in mixture/article: 1 %
The vapour pressure at operating temperature (25°C) used for the calculation is 4.24E3 Pa for Registeredsubstance as such (100%).
The vapour pressure at operating temperature (25°C) used for the calculation is 1.58E3 Pa for Cumene.

Table 9.70.

Assessment Entity	Inhalation effectiveness used by TRA
Registered substanceas such (100%)	0 %
Cumene	0 %

Risk characterisation

Qualitative risk characterisation (Inhalation, systemic, acute, Inhalation, local, long term, Dermal, systemic, acute, Dermal, local, long term, Dermal, local, acute, Eye, local):
Qualitative risks management measures are laid out above (General measures). More details are available insection 9.0.4.

9.5.2. Worker CS 2: Storage (PROC 2, PROC 1)

Assessment entity group used for the assessment of this contributing scenario: Substance classified as H350(containing 0.1 to 1% cumene) PROC 2 and PROC 1 (similar activities within the exposure scenario) have been assessed within one contributing scenario. The (highest) exposure predictions of PROC 2 have been used in the exposure and riskassessment and PROC 1 has been mapped as an additional PROC relevant for the contributing activity.

9.5.2.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Liquid, including paste/slurry/suspension	TRA Workers 3.0
• Liquid, vapour pressure < 0.5kPa at STP, with potential for aerosol generation	
• Covers percentage substance in the product up to 100% (unless stated differently) *It is required to map this condition of use against each contributing scenario for the exposure scenario for communication. The specific contributing scenario may cover concentrations less than 100%.*	
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 8 h/day	TRA Workers 3.0
• Covers daily exposures up to 8 hours (unless stated differently) *It is required to map this condition of use against each contributing scenario for the exposure scenario for communication. The specific contributing scenario may be shorter than 8 hours.*	
Technical and organisational conditions and measures	
• Local exhaust ventilation: No	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Room ventilation: Basic (up to 3 ACH)	TRA Workers 3.0
• Closed batch process with occasional controlled exposure	
• Store substance within a closed system	

Conditions and measures related to personal protection, hygiene and health evaluation	
• Dermal protection: Chemical resistant dermal protection with basic employee training.(effectiveness >= 90%)	TRA Workers 3.0
• Respiratory protection: No	TRA Workers 3.0
• Face/eye protection: No	
• Assumes a good basic standard of occupational hygiene is implemented *Good occupational hygiene practice is considered by Concawe to constitute measures that are routinely encountered and applied to meet the requirements of relevant workplace legislation such as regulations supporting the EU Framework Directive, in addition to specific RMM identified in the ES. These may include, but are not limited to:* *- Risk assessment of local workplace activities* *- Procedures supporting safe handling and maintenance of controls* *- Education and training of workers in understanding the hazards and control measuresrelevant to their activities* *- Provision of general ventilation* *- Good housekeeping and prompt clearance of spillages* *- Appropriate selection, testing and maintenance of equipment used to control exposure,* *e.g. Personal Protective Equipment (PPE), Local Exhaust Ventilation (LEV)* *- Draining of equipment prior to maintenance; retention of drained material in sealed storage pending disposal or recycling* *- Regular supply and laundering of work clothing; provision of washing and changing facilities; eating and smoking only in designated areas separate from the workplace*	
• General measures (aspiration) *General measures (aspiration): Do not ingest. If swallowed then seek immediate medical assistance.*	
• General Measures (skin irritants)	
General Measures (skin irritants): Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.	
• General measures (flammability) *General measures (flammability): Use in contained systems. Avoid ignition sources – No Smoking. Handle in well ventilated area to prevent formation of explosive atmosphere. Use equipment and protective systems approved for flammable substances.Restrict line velocity during pumping to avoid generation of electrostatic discharge.* *Ground/bond container and receiving equipment. Use non-sparking tools. Comply with relevant EU/national regulations. Review SDS for additional advice.*	

• General Measures (carcinogenicity) *Consider technical advances and process upgrades (including automation) for the elimination of releases. Minimise exposure using measures such as closed systems, dedicated facilities and suitable general / local exhaust ventilation. Drain down systemsand clear transfer lines prior to breaking containment. Clean / flush equipment, where possible, prior to maintenance. Where there is potential for exposure: Restrict access toauthorised persons; provide specific activity training to operators to minimise exposures; wear suitable gloves and coveralls to prevent skin contamination; wear respiratory protection when its use is identified for certain contributing scenarios; clear up spills immediately and dispose of wastes safely. Ensure safe systems of work or equivalent arrangements are in place to manage risks. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance.*	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 25 °C *Ambient temperature*	TRA Workers 3.0
• Covers use at ambient temperatures (unless stated differently) *It is required to map this condition of use against each contributing scenario for the exposure scenario for communication. The specific contributing scenario may be carried out above ambient temperature.*	

9.5.2.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.71. Exposure concentrations and risks for workers

Route of exposure and type of effects	Assessment entity	Exposure concentration	Risk quantification
Inhalation, systemic, long term	Cumene	2.504 mg/m³ (TRA Workers) RCR = 0.05	Final RCR = 0.05
Inhalation, systemic, acute	Cumene	10.01 mg/m³ (TRA Workers)	Qualitative risk
Inhalation, local, long term	Cumene	2.504 mg/m³ (TRA Workers)	Qualitative risk
Inhalation, local, acute	Cumene	10.01 mg/m³ (TRA Workers) RCR = 0.04	Final RCR = 0.04
Dermal, systemic, long term	Cumene	0.014 mg/kg bw/day (TRA Workers) RCR = 1.78E-3	Final RCR < 0.01
Dermal, local, long term	Registered substanceas such (100%)	0.02 mg/cm² (TRA Workers)	Qualitative risk
	Cumene	2E-3 mg/cm² (TRA Workers)	

Route of exposure and type of effects	Assessment entity	Exposure concentration	Risk quantification
Dermal, local, acute	Registered substanceas such (100%)	0.02 mg/cm² (TRA Workers)	Qualitative risk
	Cumene	2E-3 mg/cm² (TRA Workers)	

Combined routes, systemic, long-term			Final RCR = 0.052

Remarks on exposure dataset obtained with ECETOC TRA

Percentage (w/w) of Registered substance as such (100%) in mixture/article: 100 %Percentage (w/w) of Cumene in mixture/article: 1 %
The vapour pressure at operating temperature (25°C) used for the calculation is 4.24E3 Pa for Registeredsubstance as such (100%).
The vapour pressure at operating temperature (25°C) used for the calculation is 1.58E3 Pa for Cumene.

Table 9.72.

Assessment Entity	Inhalation effectiveness used by TRA
Registered substanceas such (100%)	0 %
Cumene	0 %

Risk characterisation

Qualitative risk characterisation (Inhalation, systemic, acute, Inhalation, local, long term, Dermal, systemic, acute, Dermal, local, long term, Dermal, local, acute, Eye, local):
Qualitative risks management measures are laid out above (General measures). More details are available insection 9.0.4.

9.5.3. Worker CS 3: Equipment cleaning and maintenance (PROC 8a,PROC 28)

Assessment entity group used for the assessment of this contributing scenario: Substance classified as H350(containing 0.1 to 1% cumene)
Cleaning and maintenance activities have been assessed within one contributing scenario. Since the ECETOC TRA currently does not provide exposure predictions for the associated PROC28, PROC8a exposure predictionshave been used and PROC28 has been mapped as an additional PROC relevant for the contributing activity.

9.5.3.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Solid (material with medium dustiness) *As described in ECETOC TR114. exposure to aerosol can be estimated using the medium dustiness band of the ECETOC TRA. For a detailed explanation see section 9.0.4.*	TRA Workers 3.0
• Liquid, vapour pressure < 0.5kPa at STP, with potential for aerosol generation	
• Covers percentage substance in the product up to 100% (unless stated differently) *It is required to map this condition of use against each contributing scenario for the exposure scenario for communication. The specific contributing scenario may cover concentrations less than 100%.*	
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 8 h/day	TRA Workers 3.0
• Covers daily exposures up to 8 hours (unless stated differently) *It is required to map this condition of use against each contributing scenario for the exposure scenario for communication. The specific contributing scenario may be*	

	Method

shorter than 8 hours.	
Technical and organisational conditions and measures	
• Local exhaust ventilation: No	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Room ventilation: Basic (up to 3 ACH)	TRA Workers 3.0
• Standard Operating Procedures (SOP) maintenance (industrial) [Effectiveness Inhalation: 90%, Dermal: 0%] *Drain down and flush system prior to equipment break-in or maintenance.* Inhalation explanation: *Based on results from Fraunhofer experimental study report Verifying the Effectiveness of Solvent RMMs 15/6/2016.* Dermal explanation: *Expect dermal exposure is substantially reduced when lines and equipment are properly drained and flushed according to Standard Operating Procedures (SOP). Specific exposure reduction is per assessor professional judgment.*	
Conditions and measures related to personal protection, hygiene and health evaluation	
• Dermal protection: Chemical resistant dermal protection with basic employee training.(effectiveness >= 90%)	TRA Workers 3.0
• Respiratory protection: No	TRA Workers 3.0
• Face/eye protection: No	
• Assumes a good basic standard of occupational hygiene is implemented *Good occupational hygiene practice is considered by Concawe to constitute measures that are routinely encountered and applied to meet the requirements of relevant workplace legislation such as regulations supporting the EU Framework Directive, in addition to specific RMM identified in the ES. These may include, but are not limited to:* *- Risk assessment of local workplace activities* *- Procedures supporting safe handling and maintenance of controls* *- Education and training of workers in understanding the hazards and control measuresrelevant to their activities* *- Provision of general ventilation* *- Good housekeeping and prompt clearance of spillages* *- Appropriate selection, testing and maintenance of equipment used to control exposure,* *e.g. Personal Protective Equipment (PPE), Local Exhaust Ventilation (LEV)* *- Draining of equipment prior to maintenance; retention of drained material in sealed storage pending disposal or recycling* *- Regular supply and laundering of work clothing; provision of washing and changing facilities; eating and smoking only in designated areas separate from the workplace*	
• General measures (aspiration) *General measures (aspiration): Do not ingest. If swallowed then seek immediate medical assistance.*	
• General Measures (skin irritants) *General Measures (skin irritants): Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.*	

• General measures (flammability) *General measures (flammability): Use in contained systems. Avoid ignition sources – No Smoking. Handle in well ventilated area to prevent formation of explosive atmosphere. Use equipment and protective systems approved for flammable substances.Restrict line velocity during pumping to avoid generation of electrostatic discharge.* *Ground/bond container and receiving equipment. Use non-sparking tools. Comply with relevant EU/national regulations. Review SDS for additional advice.*	
• General Measures (carcinogenicity) *Consider technical advances and process upgrades (including automation) for the elimination of releases. Minimise exposure using measures such as closed systems, dedicated facilities and suitable general / local exhaust ventilation. Drain down systemsand clear transfer lines prior to breaking containment. Clean / flush equipment, where possible, prior to maintenance. Where there is potential for exposure: Restrict access toauthorised persons; provide specific activity training to operators to minimise exposures; wear suitable gloves and coveralls to prevent skin contamination; wear respiratory protection when its use is identified for certain contributing scenarios; clearup spills immediately and dispose of wastes safely. Ensure safe systems of work or equivalent arrangements are in place to manage risks. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance.*	

Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 25 °C *Ambient temperature*	TRA Workers 3.0
• Covers use at ambient temperatures (unless stated differently) *It is required to map this condition of use against each contributing scenario for the exposure scenario for communication. The specific contributing scenario may be carried out above ambient temperature.*	

9.5.3.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.73. Exposure concentrations and risks for workers

Route of exposure and type of effects	Assessment entity	Exposure concentration	Risk quantification
Inhalation, systemic, long term	Cumene	25.04 mg/m³ (TRA Workers) RCR = 0.501	Final RCR = 0.501
Inhalation, systemic, acute	Cumene	100.1 mg/m³ (TRA Workers)	Qualitative risk
Inhalation, local, long term	Cumene	25.04 mg/m³ (TRA Workers)	Qualitative risk
Inhalation, local, acute	Cumene	100.1 mg/m³ (TRA Workers) RCR = 0.401	Final RCR = 0.401
Dermal, systemic, long term	Cumene	0.137 mg/kg bw/day (TRA Workers) RCR = 0.018	Final RCR = 0.018
Dermal, local, long term	Registered substanceas such (100%)	0.1 mg/cm² (TRA Workers)	Qualitative risk

	Cumene	1E-2 mg/cm² (TRA Workers)	
Dermal, local, acute	Registered substanceas such (100%)	0.1 mg/cm² (TRA Workers)	Qualitative risk
	Cumene	1E-2 mg/cm² (TRA Workers)	
Combined routes, systemic, long-term			Final RCR = 0.519

Remarks on exposure dataset obtained with ECETOC TRA

Percentage (w/w) of Registered substance as such (100%) in mixture/article: 100 %Percentage (w/w) of Cumene in mixture/article: 1 %
The vapour pressure at operating temperature (25°C) used for the calculation is 4.24E3 Pa for Registeredsubstance as such (100%).
The vapour pressure at operating temperature (25°C) used for the calculation is 1.58E3 Pa for Cumene.

Table 9.74.

Assessment Entity	Inhalation effectiveness used by TRA
Registered substanceas such (100%)	0 %
Cumene	0 %

Risk characterisation

Qualitative risk characterisation (Inhalation, systemic, acute, Inhalation, local, long term, Dermal, systemic, acute, Dermal, local, long term, Dermal, local, acute, Eye, local):
Qualitative risks management measures are laid out above (General measures). More details are available insection 9.0.4.

9.5.4. Worker CS 4: Bulk transfers; Dedicated facility (PROC 8b)

Assessment entity group used for the assessment of this contributing scenario: Substance classified as H350(containing 0.1 to 1% cumene)

9.5.4.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Liquid, including paste/slurry/suspension	TRA Workers 3.0
• Liquid, vapour pressure < 0.5kPa at STP, with potential for aerosol generation	
• Covers percentage substance in the product up to 100% (unless stated differently) *It is required to map this condition of use against each contributing scenario for the exposure scenario for communication. The specific contributing scenario may cover concentrations less than 100%.*	
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 8 h/day	TRA Workers 3.0
• Covers daily exposures up to 8 hours (unless stated differently) *It is required to map this condition of use against each contributing scenario for the exposure scenario for communication. The specific contributing scenario may be shorter than 8 hours.*	
Technical and organisational conditions and measures	

• Local exhaust ventilation: No	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Room ventilation: Basic (up to 3 ACH)	TRA Workers 3.0
• Transfer under containment [Effectiveness Inhalation: 90%, Dermal: 0%] *Ensure material transfers are under containment or extract ventilation.* Inhalation explanation: *Based on results from Fraunhofer experimental study report Verifying the Effectiveness of Solvent RMMs 15/6/2016. This supports ESIG standard phrase Ensure material transfers are under containment or extract ventilation. E66*	
Conditions and measures related to personal protection, hygiene and health evaluation	
• Dermal protection: Chemical resistant dermal protection with specific employeetraining. (effectiveness >= 95%)	TRA Workers 3.0
• Respiratory protection: No	TRA Workers 3.0
• Face/eye protection: No	
• Assumes a good basic standard of occupational hygiene is implemented *Good occupational hygiene practice is considered by Concawe to constitute measures that are routinely encountered and applied to meet the requirements of relevant workplace legislation such as regulations supporting the EU Framework Directive, in addition to specific RMM identified in the ES. These may include, but are not limited to:* *- Risk assessment of local workplace activities*	

	Method
- Procedures supporting safe handling and maintenance of controls *- Education and training of workers in understanding the hazards and control measures relevant to their activities* *- Provision of general ventilation* *- Good housekeeping and prompt clearance of spillages* *- Appropriate selection, testing and maintenance of equipment used to control exposure,* *e.g. Personal Protective Equipment (PPE), Local Exhaust Ventilation (LEV)* *- Draining of equipment prior to maintenance; retention of drained material in sealedstorage pending disposal or recycling* *- Regular supply and laundering of work clothing; provision of washing and changing facilities; eating and smoking only in designated areas separate from the workplace*	
• General measures (aspiration) *General measures (aspiration): Do not ingest. If swallowed then seek immediate medical assistance.*	
• General Measures (skin irritants) *General Measures (skin irritants): Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contactwith substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.*	
• General measures (flammability) *General measures (flammability): Use in contained systems. Avoid ignition sources – No Smoking. Handle in well ventilated area to prevent formation of explosive atmosphere. Use equipment and protective systems approved for flammable substances.Restrict line velocity during pumping to avoid generation of electrostatic discharge.* *Ground/bond container and receiving equipment. Use non-sparking tools. Comply with relevant EU/national regulations. Review SDS for additional advice.*	

• General Measures (carcinogenicity) *Consider technical advances and process upgrades (including automation) for the elimination of releases. Minimise exposure using measures such as closed systems, dedicated facilities and suitable general / local exhaust ventilation. Drain down systemsand clear transfer lines prior to breaking containment. Clean / flush equipment, where possible, prior to maintenance. Where there is potential for exposure: Restrict access toauthorised persons; provide specific activity training to operators to minimise exposures; wear suitable gloves and coveralls to prevent skin contamination; wear respiratory protection when its use is identified for certain contributing scenarios; clear up spills immediately and dispose of wastes safely. Ensure safe systems of work or equivalent arrangements are in place to manage risks. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance.*	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 25 °C *Ambient temperature*	TRA Workers 3.0
• Covers use at ambient temperatures (unless stated differently) *It is required to map this condition of use against each contributing scenario for the exposure scenario for communication. The specific contributing scenario may be carried out above ambient temperature.*	

9.5.4.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.75. Exposure concentrations and risks for workers

Route of exposure and type of effects	Assessment entity	Exposure concentration	Risk quantification
Inhalation, systemic, long term	Cumene	12.52 mg/m³ (TRA Workers) RCR = 0.25	Final RCR = 0.25
Inhalation, systemic, acute	Cumene	50.08 mg/m³ (TRA Workers)	Qualitative risk
Inhalation, local, long term	Cumene	12.52 mg/m³ (TRA Workers)	Qualitative risk
Inhalation, local, acute	Cumene	50.08 mg/m³ (TRA Workers) RCR = 0.2	Final RCR = 0.2
Dermal, systemic, long term	Cumene	0.069 mg/kg bw/day (TRA Workers) RCR = 8.9E-3	Final RCR < 0.01
Dermal, local, long term	Registered substanceas such (100%)	0.05 mg/cm² (TRA Workers)	Qualitative risk
	Cumene	5E-3 mg/cm² (TRA Workers)	
Dermal, local, acute	Registered substanceas such (100%)	0.05 mg/cm² (TRA Workers)	Qualitative risk
	Cumene	5E-3 mg/cm² (TRA Workers)	
Combined routes, systemic, long-term			Final RCR = 0.259

Remarks on exposure dataset obtained with ECETOC TRA

Percentage (w/w) of Registered substance as such (100%) in mixture/article: 100 %Percentage (w/w) of Cumene in mixture/article: 1 %
The vapour pressure at operating temperature (25°C) used for the calculation is 4.24E3 Pa for Registeredsubstance as such (100%).
The vapour pressure at operating temperature (25°C) used for the calculation is 1.58E3 Pa for Cumene.

Table 9.76.

Assessment Entity	Inhalation effectiveness used by TRA
Registered substanceas such (100%)	0 %
Cumene	0 %

Risk characterisation

Qualitative risk characterisation (Inhalation, systemic, acute, Inhalation, local, long term, Dermal, systemic, acute, Dermal, local, long term, Dermal, local, acute, Eye, local):
Qualitative risks management measures are laid out above (General measures). More details are available insection 9.0.4.

9.5.5. Worker CS 5: Drum/batch transfers; Dedicated facility (PROC 8b)

Assessment entity group used for the assessment of this contributing scenario: Substance classified as H350(containing 0.1 to 1% cumene)

9.5.5.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Solid (material with medium dustiness) *As described in ECETOC TR114. exposure to aerosol can be estimated using the medium dustiness band of the ECETOC TRA. For a detailed explanation see section 9.0.4.*	TRA Workers 3.0

	Method
• Liquid, vapour pressure < 0.5kPa at STP, with potential for aerosol generation	
• Covers percentage substance in the product up to 100% (unless stated differently) *It is required to map this condition of use against each contributing scenario for the exposure scenario for communication. The specific contributing scenario may cover concentrations less than 100%.*	
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 8 h/day	TRA Workers 3.0
• Covers daily exposures up to 8 hours (unless stated differently) *It is required to map this condition of use against each contributing scenario for the exposure scenario for communication. The specific contributing scenario may be shorter than 8 hours.*	
Technical and organisational conditions and measures	
• Local exhaust ventilation: No	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Room ventilation: Basic (up to 3 ACH)	TRA Workers 3.0

• Use drum pumps [E53] [Effectiveness Inhalation: 90%, Dermal: 0%] *Use drum pumps [E53]* Inhalation explanation: *Based on results from Fraunhofer experimental study report Verifying the Effectiveness of Solvent RMMs 15/6/2016. This supports ESIG standard phrase E53.* Dermal explanation: *Expect dermal exposure is substantially reduced when drum pumps are used. Specific exposure reduction is per assessor professional judgment.*	
Conditions and measures related to personal protection, hygiene and health evaluation	
• Dermal protection: Chemical resistant dermal protection with specific employeetraining. (effectiveness >= 95%)	TRA Workers 3.0
• Respiratory protection: No	TRA Workers 3.0
• Face/eye protection: No	
• Assumes a good basic standard of occupational hygiene is implemented *Good occupational hygiene practice is considered by Concawe to constitute measures that are routinely encountered and applied to meet the requirements of relevant workplace legislation such as regulations supporting the EU Framework Directive, in addition to specific RMM identified in the ES. These may include, but are not limited to:* *- Risk assessment of local workplace activities* *- Procedures supporting safe handling and maintenance of controls* *- Education and training of workers in understanding the hazards and control measures relevant to their activities* *- Provision of general ventilation* *- Good housekeeping and prompt clearance of spillages* *- Appropriate selection, testing and maintenance of equipment used to control exposure,* *e.g. Personal Protective Equipment (PPE), Local Exhaust Ventilation (LEV)* *- Draining of equipment prior to maintenance; retention of drained material in sealed storage pending disposal or recycling* *- Regular supply and laundering of work clothing; provision of washing and changing facilities; eating and smoking only in designated areas separate from the workplace*	
• General measures (aspiration) *General measures (aspiration): Do not ingest. If swallowed then seek immediate medical assistance.*	
• General Measures (skin irritants) *General Measures (skin irritants): Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent /*	

	Method
minimise exposures and to report any skin problems that may develop.	
• General measures (flammability) *General measures (flammability): Use in contained systems. Avoid ignition sources – No Smoking. Handle in well ventilated area to prevent formation of explosive atmosphere. Use equipment and protective systems approved for flammable substances.Restrict line velocity during pumping to avoid generation of electrostatic discharge.* *Ground/bond container and receiving equipment. Use non-sparking tools. Comply with relevant EU/national regulations. Review SDS for additional advice.*	

• General Measures (carcinogenicity) *Consider technical advances and process upgrades (including automation) for the elimination of releases. Minimise exposure using measures such as closed systems, dedicated facilities and suitable general / local exhaust ventilation. Drain down systemsand clear transfer lines prior to breaking containment. Clean / flush equipment, where possible, prior to maintenance. Where there is potential for exposure: Restrict access toauthorised persons; provide specific activity training to operators to minimise exposures; wear suitable gloves and coveralls to prevent skin contamination; wear respiratory protection when its use is identified for certain contributing scenarios; clear up spills immediately and dispose of wastes safely. Ensure safe systems of work or equivalent arrangements are in place to manage risks. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance.*	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 25 °C *Ambient temperature*	TRA Workers 3.0
• Covers use at ambient temperatures (unless stated differently) *It is required to map this condition of use against each contributing scenario for the exposure scenario for communication. The specific contributing scenario may be carried out above ambient temperature.*	

9.5.5.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.77. Exposure concentrations and risks for workers

Route of exposure and type of effects	Assessment entity	Exposure concentration	Risk quantification
Inhalation, systemic, long term	Cumene	12.52 mg/m³ (TRA Workers) RCR = 0.25	Final RCR = 0.25
Inhalation, systemic, acute	Cumene	50.08 mg/m³ (TRA Workers)	Qualitative risk
Inhalation, local, long term	Cumene	12.52 mg/m³ (TRA Workers)	Qualitative risk
Inhalation, local, acute	Cumene	50.08 mg/m³ (TRA Workers) RCR = 0.2	Final RCR = 0.2
Dermal, systemic, long term	Cumene	0.069 mg/kg bw/day (TRA Workers) RCR = 8.9E-3	Final RCR < 0.01
Dermal, local, long term	Registered substanceas such (100%)	0.05 mg/cm² (TRA Workers)	Qualitative risk
	Cumene	5E-3 mg/cm² (TRA Workers)	
Dermal, local, acute	Registered substanceas such (100%)	0.05 mg/cm² (TRA Workers)	Qualitative risk
	Cumene	5E-3 mg/cm² (TRA Workers)	

Route of exposure and type of effects	Assessment entity	Exposure concentration	Risk quantification
Combined routes, systemic, long-term			Final RCR = 0.259

Remarks on exposure dataset obtained with ECETOC TRA

Percentage (w/w) of Registered substance as such (100%) in mixture/article: 100 %Percentage (w/w) of Cumene in mixture/article: 1 %
The vapour pressure at operating temperature (25°C) used for the calculation is 4.24E3 Pa for Registeredsubstance as such (100%).
The vapour pressure at operating temperature (25°C) used for the calculation is 1.58E3 Pa for Cumene.

Table 9.78.

Assessment Entity	Inhalation effectiveness used by TRA
Registered substanceas such (100%)	0 %
Cumene	0 %

Risk characterisation

Qualitative risk characterisation (Inhalation, systemic, acute, Inhalation, local, long term, Dermal, systemic, acute, Dermal, local, long term, Dermal, local, acute, Eye, local):
Qualitative risks management measures are laid out above (General measures). More details are available insection 9.0.4.

9.5.6. Worker CS 6: Use of fuels; Closed systems (PROC 16)

Assessment entity group used for the assessment of this contributing scenario: Substance classified as H350(containing 0.1 to 1% cumene)

9.5.6.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Liquid, including paste/slurry/suspension	TRA Workers 3.0
• Liquid, vapour pressure < 0.5kPa at STP, with potential for aerosol generation	
• Covers percentage substance in the product up to 100% (unless stated differently) *It is required to map this condition of use against each contributing scenario for the exposure scenario for communication. The specific contributing scenario may cover concentrations less than 100%.*	
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 8 h/day	TRA Workers 3.0
• Covers daily exposures up to 8 hours (unless stated differently) *It is required to map this condition of use against each contributing scenario for the exposure scenario for communication. The specific contributing scenario may be shorter than 8 hours.*	
Technical and organisational conditions and measures	
• Local exhaust ventilation: No	TRA Workers 3.0
• Occupational Health and Safety Management System: Advanced	TRA Workers 3.0
• Room ventilation: Basic (up to 3 ACH)	TRA Workers 3.0

• Handle substance within a closed system	
Conditions and measures related to personal protection, hygiene and health evaluation	
• Dermal protection: Chemical resistant dermal protection with basic employee training.	TRA Workers 3.0

	Method
(effectiveness >= 90%)	
• Respiratory protection: No	TRA Workers 3.0
• Face/eye protection: No	
• Assumes a good basic standard of occupational hygiene is implemented *Good occupational hygiene practice is considered by Concawe to constitute measures that are routinely encountered and applied to meet the requirements of relevant workplace legislation such as regulations supporting the EU Framework Directive, in addition to specific RMM identified in the ES. These may include, but are not limited to:* *- Risk assessment of local workplace activities* *- Procedures supporting safe handling and maintenance of controls* *- Education and training of workers in understanding the hazards and control measures relevant to their activities* *- Provision of general ventilation* *- Good housekeeping and prompt clearance of spillages* *- Appropriate selection, testing and maintenance of equipment used to control exposure,* *e.g. Personal Protective Equipment (PPE), Local Exhaust Ventilation (LEV)* *- Draining of equipment prior to maintenance; retention of drained material in sealed storage pending disposal or recycling* *- Regular supply and laundering of work clothing; provision of washing and changing facilities; eating and smoking only in designated areas separate from the workplace*	
• General measures (aspiration) *General measures (aspiration): Do not ingest. If swallowed then seek immediate medical assistance.*	
• General Measures (skin irritants) *General Measures (skin irritants): Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.*	
• General measures (flammability) *General measures (flammability): Use in contained systems. Avoid ignition sources – No Smoking. Handle in well ventilated area to prevent formation of explosive atmosphere. Use equipment and protective systems approved for flammable substances.Restrict line velocity during pumping to avoid generation of electrostatic discharge.* *Ground/bond container and receiving equipment. Use non-sparking tools. Comply with relevant EU/national regulations. Review SDS for additional advice.*	

• General Measures (carcinogenicity) *Consider technical advances and process upgrades (including automation) for the elimination of releases. Minimise exposure using measures such as closed systems, dedicated facilities and suitable general / local exhaust ventilation. Drain down systems and clear transfer lines prior to breaking containment. Clean / flush equipment, where possible, prior to maintenance. Where there is potential for exposure: Restrict access to authorised persons; provide specific activity training to operators to minimise exposures; wear suitable gloves and coveralls to prevent skin contamination; wear respiratory protection when its use is identified for certain contributing scenarios; clear up spills immediately and dispose of wastes safely. Ensure safe systems of work or equivalent arrangements are in place to manage risks. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance.*	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 25 °C *Ambient temperature*	TRA Workers 3.0
• Covers use at ambient temperatures (unless stated differently) *It is required to map this condition of use against each contributing scenario for the*	

	Method
exposure scenario for communication. The specific contributing scenario may be carried out above ambient temperature.	

9.5.6.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.79. Exposure concentrations and risks for workers

Route of exposure and type of effects	Assessment entity	Exposure concentration	Risk quantification
Inhalation, systemic, long term	Cumene	2.504 mg/m³ (TRA Workers) RCR = 0.05	Final RCR = 0.05
Inhalation, systemic, acute	Cumene	10.01 mg/m³ (TRA Workers)	Qualitative risk
Inhalation, local, long term	Cumene	2.504 mg/m³ (TRA Workers)	Qualitative risk
Inhalation, local, acute	Cumene	10.01 mg/m³ (TRA Workers) RCR = 0.04	Final RCR = 0.04
Dermal, systemic, long term	Cumene	3.4E-3 mg/kg bw/day (TRA Workers) RCR = 4.42E-4	Final RCR < 0.01
Dermal, local, long term	Registered substanceas such (100%)	9.92E-3 mg/cm² (TRA Workers)	Qualitative risk
	Cumene	9.92E-4 mg/cm² (TRA Workers)	
Dermal, local, acute	Registered substanceas such (100%)	9.92E-3 mg/cm² (TRA Workers)	Qualitative risk
	Cumene	9.92E-4 mg/cm² (TRA Workers)	

Combined routes, systemic, long-term			Final RCR = 0.051

Remarks on exposure dataset obtained with ECETOC TRA

Percentage (w/w) of Registered substance as such (100%) in mixture/article: 100 %Percentage (w/w) of Cumene in mixture/article: 1 %
The vapour pressure at operating temperature (25°C) used for the calculation is 4.24E3 Pa for Registeredsubstance as such (100%).
The vapour pressure at operating temperature (25°C) used for the calculation is 1.58E3 Pa for Cumene.

Table 9.80.

Assessment Entity	Inhalation effectiveness used by TRA
Registered substanceas such (100%)	0 %
Cumene	0 %

Risk characterisation

Qualitative risk characterisation (Inhalation, systemic, acute, Inhalation, local, long term, Dermal, systemic, acute, Dermal, local, long term, Dermal, local, acute, Eye, local):
Qualitative risks management measures are laid out above (General measures). More details are available insection 9.0.4.

9.6. *Exposure scenario 6: Widespread use by professionalworkers - Use in fuel; Professional; Level I*

Use Map: Use in fuel

Worker contributing scenario(s):		
CS 1	General exposures; Closed systems	**PROC 2**, PROC 1
CS 2	Storage	**PROC 2**, PROC 1
CS 3	Equipment cleaning and maintenance	**PROC 8a**, PROC 28
CS 4	Bulk transfers; Dedicated facility	PROC 8b
CS 5	Drum/batch transfers; Dedicated facility	PROC 8b
CS 6	Refuelling	PROC 8b
CS 7	Use of fuels; Closed systems	PROC 16

Further description of the use:

Covers the use as a fuel (or fuel additive) and includes activities associated with its transfer, use, equipment maintenance and handling of waste.

9.6.1. Worker CS 1: General exposures; Closed systems (PROC 2, PROC 1)

Assessment entity group used for the assessment of this contributing scenario: Substance classified as H350(containing 0.1 to 1% cumene)
PROC 2 and PROC 1 (similar activities within the exposure scenario) have been assessed within one contributing scenario. The (highest) exposure predictions of PROC 2 have been used in the exposure and riskassessment and PROC 1 has been mapped as an additional PROC relevant for the contributing activity.

9.6.1.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Liquid, including paste/slurry/suspension	TRA Workers 3.0
• Liquid, vapour pressure < 0.5kPa at STP, with potential for aerosol generation	
• Covers percentage substance in the product up to 100% (unless stated differently) *It is required to map this condition of use against each contributing scenario for the exposure scenario for communication. The specific contributing scenario may cover concentrations less than 100%.*	
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 8 h/day	TRA Workers 3.0
• Covers daily exposures up to 8 hours (unless stated differently) *It is required to map this condition of use against each contributing scenario for the exposure scenario for communication. The specific contributing scenario may be shorter than 8 hours.*	
Technical and organisational conditions and measures	
• Local exhaust ventilation: No	TRA Workers 3.0
• Occupational Health and Safety Management System: Basic	TRA Workers 3.0
• Room ventilation: Basic (up to 3 ACH)	TRA Workers 3.0
• Handle substance within a closed system	

• Sample via a closed loop or other system to avoid exposure (E8).	
Conditions and measures related to personal protection, hygiene and health evaluation	

	Method
• Dermal protection: Chemical resistant dermal protection with basic employee training.(effectiveness >= 90%)	TRA Workers 3.0
• Respiratory protection: No	TRA Workers 3.0
• Face/eye protection: No	
• Assumes a good basic standard of occupational hygiene is implemented *Good occupational hygiene practice is considered by Concawe to constitute measures that are routinely encountered and applied to meet the requirements of relevant workplace legislation such as regulations supporting the EU Framework Directive, in addition to specific RMM identified in the ES. These may include, but are not limited to:* *- Risk assessment of local workplace activities* *- Procedures supporting safe handling and maintenance of controls* *- Education and training of workers in understanding the hazards and control measures relevant to their activities* *- Provision of general ventilation* *- Good housekeeping and prompt clearance of spillages* *- Appropriate selection, testing and maintenance of equipment used to control exposure,* *e.g. Personal Protective Equipment (PPE), Local Exhaust Ventilation (LEV)* *- Draining of equipment prior to maintenance; retention of drained material in sealed storage pending disposal or recycling* *- Regular supply and laundering of work clothing; provision of washing and changing facilities; eating and smoking only in designated areas separate from the workplace*	
• General measures (aspiration) *General measures (aspiration): Do not ingest. If swallowed then seek immediate medical assistance.*	
• General Measures (skin irritants) *General Measures (skin irritants): Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.*	
• General measures (flammability) *General measures (flammability): Use in contained systems. Avoid ignition sources – No Smoking. Handle in well ventilated area to prevent formation of explosive atmosphere. Use equipment and protective systems approved for flammable substances.Restrict line velocity during pumping to avoid generation of electrostatic discharge.* *Ground/bond container and receiving equipment. Use non-sparking tools. Comply with relevant EU/national regulations. Review SDS for additional advice.*	

• General Measures (carcinogenicity) *Consider technical advances and process upgrades (including automation) for the elimination of releases. Minimise exposure using measures such as closed systems, dedicated facilities and suitable general / local exhaust ventilation. Drain down systemsand clear transfer lines prior to breaking containment. Clean / flush equipment, where possible, prior to maintenance. Where there is potential for exposure: Restrict access toauthorised persons; provide specific activity training to operators to minimise exposures; wear suitable gloves and coveralls to prevent skin contamination; wear respiratory protection when its use is identified for certain contributing scenarios; clear up spills immediately and dispose of wastes safely. Ensure safe systems of work or equivalent arrangements are in place to manage risks. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance.*	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 25 °C *Ambient temperature*	TRA Workers 3.0
• Covers use at ambient temperatures (unless stated differently)	

It is required to map this condition of use against each contributing scenario for the exposure scenario for communication. The specific contributing scenario may be carried out above ambient temperature.	

9.6.1.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.81. Exposure concentrations and risks for workers

Route of exposure and type of effects	Assessment entity	Exposure concentration	Risk quantification
Inhalation, systemic, long term	Cumene	10.01 mg/m³ (TRA Workers) RCR = 0.2	Final RCR = 0.2
Inhalation, systemic, acute	Cumene	40.06 mg/m³ (TRA Workers)	Qualitative risk
Inhalation, local, long term	Cumene	10.01 mg/m³ (TRA Workers)	Qualitative risk
Inhalation, local, acute	Cumene	40.06 mg/m³ (TRA Workers) RCR = 0.16	Final RCR = 0.16
Dermal, systemic, long term	Cumene	0.014 mg/kg bw/day (TRA Workers) RCR = 1.78E-3	Final RCR < 0.01
Dermal, local, long term	Registered substanceas such (100%)	0.02 mg/cm² (TRA Workers)	Qualitative risk
	Cumene	2E-3 mg/cm² (TRA Workers)	
Dermal, local, acute	Registered substanceas such (100%)	0.02 mg/cm² (TRA Workers)	Qualitative risk
	Cumene	2E-3 mg/cm² (TRA Workers)	
Combined routes, systemic, long-term			Final RCR = 0.202

Remarks on exposure dataset obtained with ECETOC TRA

Percentage (w/w) of Registered substance as such (100%) in mixture/article: 100 %Percentage (w/w) of Cumene in mixture/article: 1 %
The vapour pressure at operating temperature (25°C) used for the calculation is 4.24E3 Pa for Registeredsubstance as such (100%).
The vapour pressure at operating temperature (25°C) used for the calculation is 1.58E3 Pa for Cumene.

Table 9.82.

Assessment Entity	Inhalation effectiveness used by TRA
Registered substanceas such (100%)	0 %
Cumene	0 %

Risk characterisation

Qualitative risk characterisation (Inhalation, systemic, acute, Inhalation, local, long term, Dermal, systemic, acute, Dermal, local, long term, Dermal, local, acute, Eye, local):
Qualitative risks management measures are laid out above (General measures). More details are available insection 9.0.4.

9.6.2. Worker CS 2: Storage (PROC 2, PROC 1)

Assessment entity group used for the assessment of this contributing scenario: Substance classified as H350(containing 0.1 to 1% cumene)

PROC 2 and PROC 1 (similar activities within the exposure scenario) have been assessed within one contributing scenario. The (highest) exposure predictions of PROC 2 have been used in the exposure and riskassessment and PROC 1 has been mapped as an additional PROC relevant for the contributing activity.

9.6.2.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Liquid, including paste/slurry/suspension	TRA Workers 3.0
• Liquid, vapour pressure < 0.5kPa at STP, with potential for aerosol generation	
• Covers percentage substance in the product up to 100% (unless stated differently) *It is required to map this condition of use against each contributing scenario for the exposure scenario for communication. The specific contributing scenario may cover concentrations less than 100%.*	
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 8 h/day	TRA Workers 3.0
• Covers daily exposures up to 8 hours (unless stated differently) *It is required to map this condition of use against each contributing scenario for the exposure scenario for communication. The specific contributing scenario may be shorter than 8 hours.*	
Technical and organisational conditions and measures	
• Local exhaust ventilation: No	TRA Workers 3.0
• Occupational Health and Safety Management System: Basic	TRA Workers 3.0
• Room ventilation: Basic (up to 3 ACH)	TRA Workers 3.0
• Store substance within a closed system	

Conditions and measures related to personal protection, hygiene and health evaluation	
• Dermal protection: Chemical resistant dermal protection with basic employee training.(effectiveness >= 90%)	TRA Workers 3.0
• Respiratory protection: No	TRA Workers 3.0
• Face/eye protection: No	
• Assumes a good basic standard of occupational hygiene is implemented *Good occupational hygiene practice is considered by Concawe to constitute measures that are routinely encountered and applied to meet the requirements of relevant workplace legislation such as regulations supporting the EU Framework Directive, in addition to specific RMM identified in the ES. These may include, but are not limited to:* *- Risk assessment of local workplace activities* *- Procedures supporting safe handling and maintenance of controls* *- Education and training of workers in understanding the hazards and control measuresrelevant to their activities* *- Provision of general ventilation* *- Good housekeeping and prompt clearance of spillages* *- Appropriate selection, testing and maintenance of equipment used to control exposure,* *e.g. Personal Protective Equipment (PPE), Local Exhaust Ventilation (LEV)* *- Draining of equipment prior to maintenance; retention of drained material in sealed storage pending disposal or recycling* *- Regular supply and laundering of work clothing; provision of washing and changing facilities; eating and smoking only in designated areas separate from the workplace*	
• General measures (aspiration) *General measures (aspiration): Do not ingest. If swallowed then seek immediate medical assistance.*	
• General Measures (skin irritants) *General Measures (skin irritants): Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.*	
• General measures (flammability) *General measures (flammability): Use in contained systems. Avoid ignition sources – No Smoking. Handle in well ventilated area to prevent formation of explosive atmosphere. Use equipment and protective systems approved for flammable substances.Restrict line velocity during pumping to avoid generation of electrostatic discharge.* *Ground/bond container and receiving equipment. Use non-sparking tools. Comply with relevant EU/national regulations. Review SDS for additional advice.*	

• General Measures (carcinogenicity) *Consider technical advances and process upgrades (including automation) for the elimination of releases. Minimise exposure using measures such as closed systems, dedicated facilities and suitable general / local exhaust ventilation. Drain down systemsand clear transfer lines prior to breaking containment. Clean / flush equipment, where possible, prior to maintenance. Where there is potential for exposure: Restrict access toauthorised persons; provide specific activity training to operators to minimise exposures; wear suitable gloves and coveralls to prevent skin contamination; wear respiratory protection when its use is identified for certain contributing scenarios; clear up spills immediately and dispose of wastes safely. Ensure safe systems of work or equivalent arrangements are in place to manage risks. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance.*	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 25 °C *Ambient temperature*	TRA Workers 3.0
• Covers use at ambient temperatures (unless stated differently) *It is required to map this condition of use against each contributing scenario for the exposure scenario for communication. The specific contributing scenario may be carried out above ambient temperature.*	

9.6.2.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.83. Exposure concentrations and risks for workers

Route of exposure and type of effects	Assessment entity	Exposure concentration	Risk quantification
Inhalation, systemic, long term	Cumene	10.01 mg/m³ (TRA Workers) RCR = 0.2	Final RCR = 0.2
Inhalation, systemic, acute	Cumene	40.06 mg/m³ (TRA Workers)	Qualitative risk
Inhalation, local, long term	Cumene	10.01 mg/m³ (TRA Workers)	Qualitative risk
Inhalation, local, acute	Cumene	40.06 mg/m³ (TRA Workers) RCR = 0.16	Final RCR = 0.16
Dermal, systemic, long term	Cumene	0.014 mg/kg bw/day (TRA Workers) RCR = 1.78E-3	Final RCR < 0.01
Dermal, local, long term	Registered substanceas such (100%)	0.02 mg/cm² (TRA Workers)	Qualitative risk
	Cumene	2E-3 mg/cm² (TRA Workers)	

Route of exposure and type of effects	Assessment entity	Exposure concentration	Risk quantification
Dermal, local, acute	Registered substanceas such (100%)	0.02 mg/cm² (TRA Workers)	Qualitative risk
	Cumene	2E-3 mg/cm² (TRA Workers)	

Combined routes, systemic, long-term			Final RCR = 0.202

Remarks on exposure dataset obtained with ECETOC TRA

Percentage (w/w) of Registered substance as such (100%) in mixture/article: 100 %Percentage (w/w) of Cumene in mixture/article: 1 %
The vapour pressure at operating temperature (25°C) used for the calculation is 4.24E3 Pa for Registeredsubstance as such (100%).
The vapour pressure at operating temperature (25°C) used for the calculation is 1.58E3 Pa for Cumene.

Table 9.84.

Assessment Entity	Inhalation effectiveness used by TRA
Registered substanceas such (100%)	0 %
Cumene	0 %

Risk characterisation

Qualitative risk characterisation (Inhalation, systemic, acute, Inhalation, local, long term, Dermal, systemic, acute, Dermal, local, long term, Dermal, local, acute, Eye, local):
Qualitative risks management measures are laid out above (General measures). More details are available insection 9.0.4.

9.6.3. Worker CS 3: Equipment cleaning and maintenance (PROC 8a,PROC 28)

Assessment entity group used for the assessment of this contributing scenario: Substance classified as H350(containing 0.1 to 1% cumene)
Cleaning and maintenance activities have been assessed within one contributing scenario. Since the ECETOC TRA currently does not provide exposure predictions for the associated PROC28, PROC8a exposure predictionshave been used and PROC28 has been mapped as an additional PROC relevant for the contributing activity.

9.6.3.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Solid (material with medium dustiness) *As described in ECETOC TR114. exposure to aerosol can be estimated using the medium dustiness band of the ECETOC TRA. For a detailed explanation see section 9.0.4.*	TRA Workers 3.0
• Liquid, vapour pressure < 0.5kPa at STP, with potential for aerosol generation	
• Covers percentage substance in the product up to 100% (unless stated differently) *It is required to map this condition of use against each contributing scenario for the exposure scenario for communication. The specific contributing scenario may cover concentrations less than 100%.*	
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 8 h/day	TRA Workers 3.0
• Covers daily exposures up to 8 hours (unless stated differently) *It is required to map this condition of use against each contributing scenario for the exposure scenario for communication. The specific contributing scenario may be shorter than 8 hours.*	

Technical and organisational conditions and measures	
• Local exhaust ventilation: No	TRA Workers 3.0
• Occupational Health and Safety Management System: Basic	TRA Workers 3.0
• Room ventilation: Good (3 to 5 ACH)	TRA Workers 3.0
• Standard Operating Procedures (SOP) maintenance (industrial) [Effectiveness Inhalation: 80%, Dermal: 0%] *Drain down and flush system prior to equipment break-in or maintenance.* Inhalation explanation: *Based on results from Fraunhofer experimental study report Verifying the Effectiveness of Solvent RMMs 15/6/2016.* Dermal explanation: *Expect dermal exposure is substantially reduced when lines and equipment are properly drained and flushed according to Standard Operating Procedures (SOP). Specific exposure reduction is per assessor professional judgment.*	
Conditions and measures related to personal protection, hygiene and health evaluation	
• Dermal protection: Chemical resistant dermal protection with basic employee training.(effectiveness >= 90%)	TRA Workers 3.0
• Respiratory protection: No	TRA Workers 3.0
• Face/eye protection: No	
• Assumes a good basic standard of occupational hygiene is implemented *Good occupational hygiene practice is considered by Concawe to constitute measures that are routinely encountered and applied to meet the requirements of relevant workplace legislation such as regulations supporting the EU Framework Directive, in addition to specific RMM identified in the ES. These may include, but are not limited to:* *- Risk assessment of local workplace activities* *- Procedures supporting safe handling and maintenance of controls* *- Education and training of workers in understanding the hazards and control measures relevant to their activities* *- Provision of general ventilation* *- Good housekeeping and prompt clearance of spillages* *- Appropriate selection, testing and maintenance of equipment used to control exposure,* *e.g. Personal Protective Equipment (PPE), Local Exhaust Ventilation (LEV)* *- Draining of equipment prior to maintenance; retention of drained material in sealed storage pending disposal or recycling* *- Regular supply and laundering of work clothing; provision of washing and changing facilities; eating and smoking only in designated areas separate from the workplace*	
• General measures (aspiration) *General measures (aspiration): Do not ingest. If swallowed then seek immediate medical assistance.*	
• General Measures (skin irritants) *General Measures (skin irritants): Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.*	

• General measures (flammability) *General measures (flammability): Use in contained systems. Avoid ignition sources – No Smoking. Handle in well ventilated area to prevent formation of explosive atmosphere. Use equipment and protective systems approved for flammable substances.Restrict line velocity during pumping to avoid generation of electrostatic discharge.* *Ground/bond container and receiving equipment. Use non-sparking tools. Comply with relevant EU/national regulations. Review SDS for additional advice.*	
• General Measures (carcinogenicity) *Consider technical advances and process upgrades (including automation) for the elimination of releases. Minimise exposure using measures such as closed systems, dedicated facilities and suitable general / local exhaust ventilation. Drain down systemsand clear transfer lines prior to breaking containment. Clean / flush equipment, where possible, prior to maintenance. Where there is potential for exposure: Restrict access toauthorised persons; provide specific activity training to operators to minimise exposures; wear suitable gloves and coveralls to prevent skin contamination; wear respiratory protection when its use is identified for certain contributing scenarios; clearup spills immediately and dispose of wastes safely. Ensure safe systems of work or equivalent arrangements are in place to manage risks. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance.*	

Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 25 °C *Ambient temperature*	TRA Workers 3.0
• Covers use at ambient temperatures (unless stated differently) *It is required to map this condition of use against each contributing scenario for the exposure scenario for communication. The specific contributing scenario may be carried out above ambient temperature.*	

9.6.3.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.85. Exposure concentrations and risks for workers

Route of exposure and type of effects	Assessment entity	Exposure concentration	Risk quantification
Inhalation, systemic, long term	Cumene	35.05 mg/m³ (TRA Workers) RCR = 0.701	Final RCR = 0.701
Inhalation, systemic, acute	Cumene	140.2 mg/m³ (TRA Workers)	Qualitative risk
Inhalation, local, long term	Cumene	35.05 mg/m³ (TRA Workers)	Qualitative risk
Inhalation, local, acute	Cumene	140.2 mg/m³ (TRA Workers) RCR = 0.561	Final RCR = 0.561
Dermal, systemic, long term	Cumene	0.137 mg/kg bw/day (TRA Workers) RCR = 0.018	Final RCR = 0.018
Dermal, local, long term	Registered substanceas such (100%)	0.1 mg/cm² (TRA Workers)	Qualitative risk

	Cumene	1E-2 mg/cm² (TRA Workers)	
Dermal, local, acute	Registered substanceas such (100%)	0.1 mg/cm² (TRA Workers)	Qualitative risk
	Cumene	1E-2 mg/cm² (TRA Workers)	
Combined routes, systemic, long-term			Final RCR = 0.719

Remarks on exposure dataset obtained with ECETOC TRA

Percentage (w/w) of Registered substance as such (100%) in mixture/article: 100 %Percentage (w/w) of Cumene in mixture/article: 1 %
The vapour pressure at operating temperature (25°C) used for the calculation is 4.24E3 Pa for Registeredsubstance as such (100%).
The vapour pressure at operating temperature (25°C) used for the calculation is 1.58E3 Pa for Cumene.

Table 9.86.

Assessment Entity	Inhalation effectiveness used by TRA
Registered substanceas such (100%)	0 %
Cumene	0 %

Risk characterisation

Qualitative risk characterisation (Inhalation, systemic, acute, Inhalation, local, long term, Dermal, systemic, acute, Dermal, local, long term, Dermal, local, acute, Eye, local):
Qualitative risks management measures are laid out above (General measures). More details are available insection 9.0.4.

9.6.4. Worker CS 4: Bulk transfers; Dedicated facility (PROC 8b)

Assessment entity group used for the assessment of this contributing scenario: Substance classified as H350(containing 0.1 to 1% cumene)

9.6.4.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Solid (material with medium dustiness) *As described in ECETOC TR114. exposure to aerosol can be estimated using the medium dustiness band of the ECETOC TRA. For a detailed explanation see section 9.0.4.*	TRA Workers 3.0
• Liquid, vapour pressure < 0.5kPa at STP, with potential for aerosol generation	
• Covers percentage substance in the product up to 100% (unless stated differently) *It is required to map this condition of use against each contributing scenario for the exposure scenario for communication. The specific contributing scenario may cover concentrations less than 100%.*	
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 8 h/day	TRA Workers 3.0

• Covers daily exposures up to 8 hours (unless stated differently) *It is required to map this condition of use against each contributing scenario for the exposure scenario for communication. The specific contributing scenario may be shorter than 8 hours.*	
Technical and organisational conditions and measures	
• Local exhaust ventilation: No	TRA Workers 3.0
• Occupational Health and Safety Management System: Basic	TRA Workers 3.0
• Room ventilation: Basic (up to 3 ACH)	TRA Workers 3.0
• Transfer under containment [Effectiveness Inhalation: 90%, Dermal: 0%] *Ensure material transfers are under containment or extract ventilation.* Inhalation explanation: *Based on results from Fraunhofer experimental study report Verifying the Effectiveness of Solvent RMMs 15/6/2016. This supports ESIG standard phrase Ensure material transfers are under containment or extract ventilation. E66*	
Conditions and measures related to personal protection, hygiene and health evaluation	
• Dermal protection: Chemical resistant dermal protection with basic employee training.(effectiveness >= 90%)	TRA Workers 3.0
• Respiratory protection: No	TRA Workers 3.0
• Face/eye protection: No	
• Assumes a good basic standard of occupational hygiene is implemented *Good occupational hygiene practice is considered by Concawe to constitute measures that are routinely encountered and applied to meet the requirements of relevant*	

	Method
workplace legislation such as regulations supporting the EU Framework Directive, in addition to specific RMM identified in the ES. These may include, but are not limited to: *- Risk assessment of local workplace activities* *- Procedures supporting safe handling and maintenance of controls* *- Education and training of workers in understanding the hazards and control measures relevant to their activities* *- Provision of general ventilation* *- Good housekeeping and prompt clearance of spillages* *- Appropriate selection, testing and maintenance of equipment used to control exposure,* *e.g. Personal Protective Equipment (PPE), Local Exhaust Ventilation (LEV)* *- Draining of equipment prior to maintenance; retention of drained material in sealed storage pending disposal or recycling* *- Regular supply and laundering of work clothing; provision of washing and changing facilities; eating and smoking only in designated areas separate from the workplace*	
• General measures (aspiration) *General measures (aspiration): Do not ingest. If swallowed then seek immediate medical assistance.*	
• General Measures (skin irritants) *General Measures (skin irritants): Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.*	

• General measures (flammability) *General measures (flammability): Use in contained systems. Avoid ignition sources – No Smoking. Handle in well ventilated area to prevent formation of explosive atmosphere. Use equipment and protective systems approved for flammable substances.Restrict line velocity during pumping to avoid generation of electrostatic discharge.* *Ground/bond container and receiving equipment. Use non-sparking tools. Comply with relevant EU/national regulations. Review SDS for additional advice.*	
• General Measures (carcinogenicity) *Consider technical advances and process upgrades (including automation) for the elimination of releases. Minimise exposure using measures such as closed systems, dedicated facilities and suitable general / local exhaust ventilation. Drain down systemsand clear transfer lines prior to breaking containment. Clean / flush equipment, where possible, prior to maintenance. Where there is potential for exposure: Restrict access toauthorised persons; provide specific activity training to operators to minimise exposures; wear suitable gloves and coveralls to prevent skin contamination; wear respiratory protection when its use is identified for certain contributing scenarios; clear up spills immediately and dispose of wastes safely. Ensure safe systems of work or equivalent arrangements are in place to manage risks. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance.*	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 25 °C *Ambient temperature*	TRA Workers 3.0
• Covers use at ambient temperatures (unless stated differently) *It is required to map this condition of use against each contributing scenario for the exposure scenario for communication. The specific contributing scenario may be carried out above ambient temperature.*	

9.6.4.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.87. Exposure concentrations and risks for workers

Route of exposure and type of effects	Assessment entity	Exposure concentration	Risk quantification
Inhalation, systemic, long term	Cumene	25.04 mg/m³ (TRA Workers) RCR = 0.501	Final RCR = 0.501
Inhalation, systemic, acute	Cumene	100.1 mg/m³ (TRA Workers)	Qualitative risk
Inhalation, local, long term	Cumene	25.04 mg/m³ (TRA Workers)	Qualitative risk
Inhalation, local, acute	Cumene	100.1 mg/m³ (TRA Workers) RCR = 0.401	Final RCR = 0.401
Dermal, systemic, long term	Cumene	0.137 mg/kg bw/day (TRA Workers) RCR = 0.018	Final RCR = 0.018
Dermal, local, long term	Registered substanceas such (100%)	0.1 mg/cm² (TRA Workers)	Qualitative risk
	Cumene	1E-2 mg/cm² (TRA Workers)	

Dermal, local, acute	Registered substanceas such (100%)	0.1 mg/cm² (TRA Workers)	Qualitative risk
	Cumene	1E-2 mg/cm² (TRA Workers)	
Combined routes, systemic, long-term			Final RCR = 0.519

Remarks on exposure dataset obtained with ECETOC TRA

Percentage (w/w) of Registered substance as such (100%) in mixture/article: 100 %Percentage (w/w) of Cumene in mixture/article: 1 %
The vapour pressure at operating temperature (25°C) used for the calculation is 4.24E3 Pa for Registeredsubstance as such (100%).
The vapour pressure at operating temperature (25°C) used for the calculation is 1.58E3 Pa for Cumene.

Table 9.88.

Assessment Entity	Inhalation effectiveness used by TRA
Registered substanceas such (100%)	0 %
Cumene	0 %

Risk characterisation

Qualitative risk characterisation (Inhalation, systemic, acute, Inhalation, local, long term, Dermal, systemic, acute, Dermal, local, long term, Dermal, local, acute, Eye, local):
Qualitative risks management measures are laid out above (General measures). More details are available insection 9.0.4.

9.6.5. Worker CS 5: Drum/batch transfers; Dedicated facility (PROC 8b)

Assessment entity group used for the assessment of this contributing scenario: Substance classified as H350(containing 0.1 to 1% cumene)

9.6.5.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Solid (material with medium dustiness) *As described in ECETOC TR114. exposure to aerosol can be estimated using the medium dustiness band of the ECETOC TRA. For a detailed explanation see section 9.0.4.*	TRA Workers 3.0

	Method
• Liquid, vapour pressure < 0.5kPa at STP, with potential for aerosol generation	
• Covers percentage substance in the product up to 100% (unless stated differently) *It is required to map this condition of use against each contributing scenario for the exposure scenario for communication. The specific contributing scenario may cover concentrations less than 100%.*	
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 8 h/day	TRA Workers 3.0

• Covers daily exposures up to 8 hours (unless stated differently) *It is required to map this condition of use against each contributing scenario for the exposure scenario for communication. The specific contributing scenario may be shorter than 8 hours.*	
Technical and organisational conditions and measures	
• Local exhaust ventilation: No	TRA Workers 3.0
• Occupational Health and Safety Management System: Basic	TRA Workers 3.0
• Room ventilation: Basic (up to 3 ACH)	TRA Workers 3.0
• Use drum pumps [E53] [Effectiveness Inhalation: 90%, Dermal: 0%] *Use drum pumps [E53]* Inhalation explanation: *Based on results from Fraunhofer experimental study report Verifying the Effectiveness of Solvent RMMs 15/6/2016. This supports ESIG standard phrase E53.* Dermal explanation: *Expect dermal exposure is substantially reduced when drum pumps are used. Specific exposure reduction is per assessor professional judgment.*	
Conditions and measures related to personal protection, hygiene and health evaluation	
• Dermal protection: Chemical resistant dermal protection with basic employee training.(effectiveness >= 90%)	TRA Workers 3.0
• Respiratory protection: No	TRA Workers 3.0
• Face/eye protection: No	
• Assumes a good basic standard of occupational hygiene is implemented *Good occupational hygiene practice is considered by Concawe to constitute measures that are routinely encountered and applied to meet the requirements of relevant workplace legislation such as regulations supporting the EU Framework Directive, in addition to specific RMM identified in the ES. These may include, but are not limited to:* *- Risk assessment of local workplace activities* *- Procedures supporting safe handling and maintenance of controls* *- Education and training of workers in understanding the hazards and control measuresrelevant to their activities* *- Provision of general ventilation* *- Good housekeeping and prompt clearance of spillages* *- Appropriate selection, testing and maintenance of equipment used to control exposure,* *e.g. Personal Protective Equipment (PPE), Local Exhaust Ventilation (LEV)* *- Draining of equipment prior to maintenance; retention of drained material in sealed storage pending disposal or recycling* *- Regular supply and laundering of work clothing; provision of washing and changing facilities; eating and smoking only in designated areas separate from the workplace*	
• General measures (aspiration) *General measures (aspiration): Do not ingest. If swallowed then seek immediate medical assistance.*	
• General Measures (skin irritants) *General Measures (skin irritants): Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.*	

• General measures (flammability) *General measures (flammability): Use in contained systems. Avoid ignition sources – No Smoking. Handle in well ventilated area to prevent formation of explosive atmosphere. Use equipment and protective systems approved for flammable substances.Restrict line velocity during pumping to avoid generation of electrostatic discharge.* *Ground/bond container and receiving equipment. Use non-sparking tools. Comply with relevant EU/national regulations. Review SDS for additional advice.*	
• General Measures (carcinogenicity) *Consider technical advances and process upgrades (including automation) for the elimination of releases. Minimise exposure using measures such as closed systems, dedicated facilities and suitable general / local exhaust ventilation. Drain down systemsand clear transfer lines prior to breaking containment. Clean / flush equipment, where possible, prior to maintenance. Where there is potential for exposure: Restrict access toauthorised persons; provide specific activity training to operators to minimise exposures; wear suitable gloves and coveralls to prevent skin contamination; wear respiratory protection when its use is identified for certain contributing scenarios; clear up spills immediately and dispose of wastes safely. Ensure safe systems of work or equivalent arrangements are in place to manage risks. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance.*	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 25 °C *Ambient temperature*	TRA Workers 3.0
• Covers use at ambient temperatures (unless stated differently) *It is required to map this condition of use against each contributing scenario for the exposure scenario for communication. The specific contributing scenario may be carried out above ambient temperature.*	

9.6.5.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.89. Exposure concentrations and risks for workers

Route of exposure and type of effects	Assessment entity	Exposure concentration	Risk quantification
Inhalation, systemic, long term	Cumene	25.04 mg/m³ (TRA Workers) RCR = 0.501	Final RCR = 0.501
Inhalation, systemic, acute	Cumene	100.1 mg/m³ (TRA Workers)	Qualitative risk
Inhalation, local, long term	Cumene	25.04 mg/m³ (TRA Workers)	Qualitative risk
Inhalation, local, acute	Cumene	100.1 mg/m³ (TRA Workers) RCR = 0.401	Final RCR = 0.401
Dermal, systemic, long term	Cumene	0.137 mg/kg bw/day (TRA Workers) RCR = 0.018	Final RCR = 0.018
Dermal, local, long term	Registered substanceas such (100%)	0.1 mg/cm² (TRA Workers)	Qualitative risk
	Cumene	1E-2 mg/cm² (TRA Workers)	

Dermal, local, acute	Registered substanceas such (100%)	0.1 mg/cm² (TRA Workers)	Qualitative risk
	Cumene	1E-2 mg/cm² (TRA Workers)	

Route of exposure and type of effects	Assessment entity	Exposure concentration	Risk quantification
Combined routes, systemic, long-term			Final RCR = 0.519

Remarks on exposure dataset obtained with ECETOC TRA

Percentage (w/w) of Registered substance as such (100%) in mixture/article: 100 %Percentage (w/w) of Cumene in mixture/article: 1 %
The vapour pressure at operating temperature (25°C) used for the calculation is 4.24E3 Pa for Registeredsubstance as such (100%).
The vapour pressure at operating temperature (25°C) used for the calculation is 1.58E3 Pa for Cumene.

Table 9.90.

Assessment Entity	Inhalation effectiveness used by TRA
Registered substanceas such (100%)	0 %
Cumene	0 %

Risk characterisation

Qualitative risk characterisation (Inhalation, systemic, acute, Inhalation, local, long term, Dermal, systemic, acute, Dermal, local, long term, Dermal, local, acute, Eye, local):
Qualitative risks management measures are laid out above (General measures). More details are available insection 9.0.4.

9.6.6. Worker CS 6: Refuelling (PROC 8b)

Assessment entity group used for the assessment of this contributing scenario: Substance classified as H350(containing 0.1 to 1% cumene)

9.6.6.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Solid (material with medium dustiness) *As described in ECETOC TR114. exposure to aerosol can be estimated using the medium dustiness band of the ECETOC TRA. For a detailed explanation see section 9.0.4.*	TRA Workers 3.0
• Liquid, vapour pressure < 0.5kPa at STP, with potential for aerosol generation	
• Covers percentage substance in the product up to 100% (unless stated differently) *It is required to map this condition of use against each contributing scenario for the exposure scenario for communication. The specific contributing scenario may cover concentrations less than 100%.*	
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 8 h/day	TRA Workers 3.0

• Covers daily exposures up to 8 hours (unless stated differently) *It is required to map this condition of use against each contributing scenario for the exposure scenario for communication. The specific contributing scenario may be shorter than 8 hours.*	
Technical and organisational conditions and measures	
• Local exhaust ventilation: No	TRA Workers 3.0
• Occupational Health and Safety Management System: Basic	TRA Workers 3.0
• Room ventilation: Basic (up to 3 ACH)	TRA Workers 3.0
• Use drum pumps [E53] [Effectiveness Inhalation: 90%, Dermal: 0%]	

	Method
Use drum pumps [E53] Inhalation explanation: *Based on results from Fraunhofer experimental study report Verifying the Effectiveness of Solvent RMMs 15/6/2016. This supports ESIG standard phrase E53.* Dermal explanation: *Expect dermal exposure is substantially reduced when drum pumps are used. Specific exposure reduction is per assessor professional judgment.*	
Conditions and measures related to personal protection, hygiene and health evaluation	
• Dermal protection: Chemical resistant dermal protection with basic employee training.(effectiveness >= 90%)	TRA Workers 3.0
• Respiratory protection: No	TRA Workers 3.0
• Face/eye protection: No	
• Assumes a good basic standard of occupational hygiene is implemented *Good occupational hygiene practice is considered by Concawe to constitute measures that are routinely encountered and applied to meet the requirements of relevant workplace legislation such as regulations supporting the EU Framework Directive, in addition to specific RMM identified in the ES. These may include, but are not limited to:* *- Risk assessment of local workplace activities* *- Procedures supporting safe handling and maintenance of controls* *- Education and training of workers in understanding the hazards and control measuresrelevant to their activities* *- Provision of general ventilation* *- Good housekeeping and prompt clearance of spillages* *- Appropriate selection, testing and maintenance of equipment used to control exposure,* *e.g. Personal Protective Equipment (PPE), Local Exhaust Ventilation (LEV)* *- Draining of equipment prior to maintenance; retention of drained material in sealed storage pending disposal or recycling* *- Regular supply and laundering of work clothing; provision of washing and changing facilities; eating and smoking only in designated areas separate from the workplace*	
• General measures (aspiration) *General measures (aspiration): Do not ingest. If swallowed then seek immediate medical assistance.*	
• General Measures (skin irritants) *General Measures (skin irritants): Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.*	

• General measures (flammability) *General measures (flammability): Use in contained systems. Avoid ignition sources – No Smoking. Handle in well ventilated area to prevent formation of explosive atmosphere. Use equipment and protective systems approved for flammable substances.Restrict line velocity during pumping to avoid generation of electrostatic discharge.* *Ground/bond container and receiving equipment. Use non-sparking tools. Comply with relevant EU/national regulations. Review SDS for additional advice.*	
• General Measures (carcinogenicity) *Consider technical advances and process upgrades (including automation) for the elimination of releases. Minimise exposure using measures such as closed systems, dedicated facilities and suitable general / local exhaust ventilation. Drain down systemsand clear transfer lines prior to breaking containment. Clean / flush equipment, where possible, prior to maintenance. Where there is potential for exposure: Restrict access toauthorised persons; provide specific activity training to operators to minimise exposures; wear suitable gloves and coveralls to prevent skin contamination; wear respiratory protection when its use is identified for certain contributing scenarios; clear up spills immediately and dispose of wastes safely. Ensure safe systems of work or equivalent arrangements are in place to manage risks. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance.*	

Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 25 °C *Ambient temperature*	TRA Workers 3.0
• Covers use at ambient temperatures (unless stated differently) *It is required to map this condition of use against each contributing scenario for the exposure scenario for communication. The specific contributing scenario may be carried out above ambient temperature.*	

9.6.6.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.91. Exposure concentrations and risks for workers

Route of exposure and type of effects	Assessment entity	Exposure concentration	Risk quantification
Inhalation, systemic, long term	Cumene	25.04 mg/m³ (TRA Workers) RCR = 0.501	Final RCR = 0.501
Inhalation, systemic, acute	Cumene	100.1 mg/m³ (TRA Workers)	Qualitative risk
Inhalation, local, long term	Cumene	25.04 mg/m³ (TRA Workers)	Qualitative risk
Inhalation, local, acute	Cumene	100.1 mg/m³ (TRA Workers) RCR = 0.401	Final RCR = 0.401
Dermal, systemic, long term	Cumene	0.137 mg/kg bw/day (TRA Workers) RCR = 0.018	Final RCR = 0.018
Dermal, local, long term	Registered substanceas such (100%)	0.1 mg/cm² (TRA Workers)	Qualitative risk
	Cumene	1E-2 mg/cm² (TRA Workers)	

Dermal, local, acute	Registered substanceas such (100%)	0.1 mg/cm² (TRA Workers)	Qualitative risk
	Cumene	1E-2 mg/cm² (TRA Workers)	
Combined routes, systemic, long-term			Final RCR = 0.519

Remarks on exposure dataset obtained with ECETOC TRA

Percentage (w/w) of Registered substance as such (100%) in mixture/article: 100 %Percentage (w/w) of Cumene in mixture/article: 1 %
The vapour pressure at operating temperature (25°C) used for the calculation is 4.24E3 Pa for Registeredsubstance as such (100%).
The vapour pressure at operating temperature (25°C) used for the calculation is 1.58E3 Pa for Cumene.

Table 9.92.

Assessment Entity	Inhalation effectiveness used by TRA
Registered substanceas such (100%)	0 %
Cumene	0 %

Risk characterisation

Qualitative risk characterisation (Inhalation, systemic, acute, Inhalation, local, long term, Dermal, systemic,acute, Dermal, local, long term, Dermal, local, acute, Eye, local):

Qualitative risks management measures are laid out above (General measures). More details are available insection 9.0.4.

9.6.7. Worker CS 7: Use of fuels; Closed systems (PROC 16)

Assessment entity group used for the assessment of this contributing scenario: Substance classified as H350(containing 0.1 to 1% cumene)

9.6.7.1. Conditions of use

	Method
Product (article) characteristics	
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Workers 3.0
• Physical form of the used product: Liquid, including paste/slurry/suspension	TRA Workers 3.0
• Liquid, vapour pressure < 0.5kPa at STP, with potential for aerosol generation	
• Covers percentage substance in the product up to 100% (unless stated differently) *It is required to map this condition of use against each contributing scenario for the exposure scenario for communication. The specific contributing scenario may cover concentrations less than 100%.*	
Amount used (or contained in articles), frequency and duration of use/exposure	
• Duration of activity: <= 8 h/day	TRA Workers 3.0
• Covers daily exposures up to 8 hours (unless stated differently) *It is required to map this condition of use against each contributing scenario for the exposure scenario for communication. The specific contributing scenario may be shorter than 8 hours.*	
Technical and organisational conditions and measures	
• Local exhaust ventilation: No	TRA Workers 3.0

• Occupational Health and Safety Management System: Basic	TRA Workers 3.0
• Room ventilation: Basic (up to 3 ACH)	TRA Workers 3.0
• Handle substance within a closed system	
Conditions and measures related to personal protection, hygiene and health evaluation	
• Dermal protection: Chemical resistant dermal protection with basic employee training.(effectiveness >= 90%)	TRA Workers 3.0
• Respiratory protection: No	TRA Workers 3.0
• Face/eye protection: No	
• Assumes a good basic standard of occupational hygiene is implemented *Good occupational hygiene practice is considered by Concawe to constitute measures that are routinely encountered and applied to meet the requirements of relevant workplace legislation such as regulations supporting the EU Framework Directive, in addition to specific RMM identified in the ES. These may include, but are not limited to:* *- Risk assessment of local workplace activities* *- Procedures supporting safe handling and maintenance of controls* *- Education and training of workers in understanding the hazards and control measures relevant to their activities* *- Provision of general ventilation* *- Good housekeeping and prompt clearance of spillages* *- Appropriate selection, testing and maintenance of equipment used to control exposure,* *e.g. Personal Protective Equipment (PPE), Local Exhaust Ventilation (LEV)* *- Draining of equipment prior to maintenance; retention of drained material in sealed storage pending disposal or recycling* *- Regular supply and laundering of work clothing; provision of washing and changing facilities; eating and smoking only in designated areas separate from the workplace*	
• General measures (aspiration)	
General measures (aspiration): Do not ingest. If swallowed then seek immediate medical assistance.	
• General Measures (skin irritants) *General Measures (skin irritants): Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.*	
• General measures (flammability) *General measures (flammability): Use in contained systems. Avoid ignition sources – No Smoking. Handle in well ventilated area to prevent formation of explosive atmosphere. Use equipment and protective systems approved for flammable substances.Restrict line velocity during pumping to avoid generation of electrostatic discharge.* *Ground/bond container and receiving equipment. Use non-sparking tools. Comply with relevant EU/national regulations. Review SDS for additional advice.*	

• General Measures (carcinogenicity) *Consider technical advances and process upgrades (including automation) for the elimination of releases. Minimise exposure using measures such as closed systems, dedicated facilities and suitable general / local exhaust ventilation. Drain down systemsand clear transfer lines prior to breaking containment. Clean / flush equipment, where possible, prior to maintenance. Where there is potential for exposure: Restrict access toauthorised persons; provide specific activity training to operators to minimise exposures; wear suitable gloves and coveralls to prevent skin contamination; wear respiratory protection when its use is identified for certain contributing scenarios; clear up spills immediately and dispose of wastes safely. Ensure safe systems of work or equivalent arrangements are in place to manage risks. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance.*	
Other conditions affecting workers exposure	
• Place of use: Indoor	TRA Workers 3.0
• Operating temperature: <= 25 °C *Ambient temperature*	TRA Workers 3.0
• Covers use at ambient temperatures (unless stated differently) *It is required to map this condition of use against each contributing scenario for the exposure scenario for communication. The specific contributing scenario may be carried out above ambient temperature.*	

9.6.7.2. Exposure and risks for workers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.93. Exposure concentrations and risks for workers

Route of exposure and type of effects	Assessment entity	Exposure concentration	Risk quantification
Inhalation, systemic, long term	Cumene	5.008 mg/m³ (TRA Workers) RCR = 0.1	Final RCR = 0.1
Inhalation, systemic, acute	Cumene	20.03 mg/m³ (TRA Workers)	Qualitative risk
Inhalation, local, long term	Cumene	5.008 mg/m³ (TRA Workers)	Qualitative risk
Inhalation, local, acute	Cumene	20.03 mg/m³ (TRA Workers) RCR = 0.08	Final RCR = 0.08
Dermal, systemic, long term	Cumene	3.4E-3 mg/kg bw/day (TRA Workers) RCR = 4.42E-4	Final RCR < 0.01

Route of exposure and type of effects	Assessment entity	Exposure concentration	Risk quantification
Dermal, local, long term	Registered substanceas such (100%)	9.92E-3 mg/cm² (TRA Workers)	Qualitative risk
	Cumene	9.92E-4 mg/cm² (TRA Workers)	
Dermal, local, acute	Registered substanceas such (100%)	9.92E-3 mg/cm² (TRA Workers)	Qualitative risk
	Cumene	9.92E-4 mg/cm² (TRA Workers)	

Combined routes, systemic, long-term			Final RCR = 0.101

Remarks on exposure dataset obtained with ECETOC TRA

Percentage (w/w) of Registered substance as such (100%) in mixture/article: 100 %Percentage (w/w) of Cumene in mixture/article: 1 %
The vapour pressure at operating temperature (25°C) used for the calculation is 4.24E3 Pa for Registeredsubstance as such (100%).
The vapour pressure at operating temperature (25°C) used for the calculation is 1.58E3 Pa for Cumene.

Table 9.94.

Assessment Entity	Inhalation effectiveness used by TRA
Registered substanceas such (100%)	0 %
Cumene	0 %

Risk characterisation

Qualitative risk characterisation (Inhalation, systemic, acute, Inhalation, local, long term, Dermal, systemic, acute, Dermal, local, long term, Dermal, local, acute, Eye, local):
Qualitative risks management measures are laid out above (General measures). More details are available insection 9.0.4.

9.7. *Exposure scenario 7: Consumer use - Use in fuel; Consumer*

Use Map: Use in fuel

Consumer contributing scenario(s):			**SCED**
CS 1	Fuels; Liquid; Automotive refuelling; Level I	PC 13	Concawe_SCED_13_1_a
CS 2	Fuels; Liquid: home space heater fuel; Level I	PC 13	Concawe_SCED_13_5_a
CS 3	Fuels; Liquid; Garden equipment; Level I	PC 13	Concawe_SCED_13_4_a

Further description of the use:

Covers consumer uses in liquid fuels.

Explanation on the approach taken for the ES:

Uses listed in IUCLID are determined by manufacturers based on specific permutations of their substance and followed down the supply chain from manufacture; to cover all potential manufacturing cases there are multipleuses listed for Consumer Fuel Use in IUCLID. However, regardless of its starting permutation, consumers are potentially exposed only to fuel meeting the standards of Directive 98/70/EC of the European Parliament and ofthe Council of 13 October 1998 relating to the quality of petrol and diesel fuels. Therefore only one Exposure Scenario is required for Consumer Fuel Use and this covers all IUCLID use permutations and tonnages.

9.7.1. Cons CS 1: Fuels; Liquid; Automotive refuelling; Level I (PC 13)

Assessment entity group used for the assessment of this contributing scenario: Substance classified as H350(containing 0.1 to 1% cumene)

9.7.1.1. Conditions of use

The contributing scenario is based on SCED: Concawe_SCED_13_1_a Fuels, Liquid, Automotive refuelling(gasoline)
Version date: December 2017

Products/activities covered by the SCED: Filling motor vehicle outdoors with a full tank of fuel every week
Applicability of the SCED: Determinant values refer to gasoline as the fuel
Source of SCED: http://www.concawe.org

	Method
Product (article) characteristics	
• Exposure via dermal route: Yes	TRA Consumers 3.1 (R15)
• Exposure via inhalation route: Yes	TRA Consumers 3.1 (R15)
• Spray: No	TRA Consumers 3.1 (R15)

• Exposure via oral route: Oral exposure is considered to be not relevant *The SCED already addresses inhalation and dermal exposure routes assuming 100% systemic absorption. Oral exposure (e.g. from hand-to-mouth behaviour) is only likely to arise from incidental consumer actions. The potential contribution of oral exposure to systemic dose is therefore expected to be minimal when seen in the context of the other exposure routes.*	TRA Consumers 3.1 (R15)
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Consumers 3.1 (R15)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Amount of product used per application: <= 3.75E4 g/event *Based on 50 L fuel dispensed and density of 750 g/L. Value is consistent with reported*	TRA Consumers 3.1 (R15)

	Method
refuelling amounts: 90th percentile of 53 L and average of 30 L	
• Exposure time per event: = 0.05 h/event *Consistent with reported refuelling time ranging from 0.3-3.5 min, with an average of 1 min*	TRA Consumers 3.1 (R15)
• Frequency of use over a year: Frequent *52 times/year - once/week; consistent with the 90th percentile of 5 times per month (0.17) and average of 3.1 times per month (0.1);* *corresponds to "frequent" Use Freq band in ECETOC TRA v3.1*	TRA Consumers 3.1 (R15)
• Frequency of use over a day: = 1 events per day *Unchanged from ECETOC TRA default value*	TRA Consumers 3.1 (R15)
Information and behavioral advice for consumers	
• Place of use: Outdoor	TRA Consumers 3.1 (R15)
• Adult/child assumed: Adult	TRA Consumers 3.1 (R15)
Other conditions affecting consumers exposure	
• Dermal transfer factor: = 2E-3 *Estimated conservative value for gasoline. This value is greater (more conservative) than the 75th percentile of 0.00005 for hand contamination during pouring from a pesticide container (further justification in Concawe Handbook "SCEDs and Supporting Explanation" at www.concawe.org). Rationale for skin contact area: only one hand holds the fuel nozzle when refueling.*	TRA Consumers 3.1 (R15)
• Body parts potentially exposed: Palm of one hand	TRA Consumers 3.1 (R15)
• Inhalation transfer factor: = 2E-3 *Measured evaporative losses of 4 – 10.4 g VOC emitted per gallon of gasoline during vehicle refuelling converts to an inhalation transfer factor of 0.001 – 0.004 for automobiles without vapour capture systems. EU laws mandate vapour capture and applying the recovery system default value of 98% efficiency to this data gives an estimated emission of 0.0001-0.0003 weight fraction (further justification in Concawe Handbook "SCEDs and Supporting Explanation" at www.concawe.org).*	TRA Consumers 3.1 (R15)

9.7.1.2. Exposure and risks for consumers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.95. Exposure concentrations and risks for consumers

Route of exposure and type of effects	Assessment entity	Exposure concentration	Risk quantification
Inhalation, systemic, long term	Cumene	1.481 mg/m³ (TRA Consumers) RCR = 0.139	Final RCR = 0.139
Inhalation, local, long term	Cumene	1.481 mg/m³ (TRA Consumers)	Qualitative risk
Dermal, systemic, long term	Cumene	7E-4 mg/kg bw/day (TRA Consumers) RCR = 4.27E-4	Final RCR < 0.01
Oral, systemic, long term	Cumene	0 mg/kg bw/day (TRA Consumers) RCR = 0	Final RCR < 0.01
Combined routes, systemic, long-term			Final RCR = 0.139

Remarks on exposure dataset obtained with ECETOC TRA

Risk characterisation

Qualitative risk characterisation (Inhalation, systemic, acute, Inhalation, local, long term , Inhalation, local, acute, Dermal, systemic, acute, Dermal, local, long term , Dermal, local, acute, Eye, local):
Qualitative risks management measures are laid out above (General measures). More details are available insection 9.0.5.

9.7.2. Cons CS 2: Fuels; Liquid: home space heater fuel; Level I (PC 13)

Assessment entity group used for the assessment of this contributing scenario: Substance classified as H350(containing 0.1 to 1% cumene)

9.7.2.1. Conditions of use

The contributing scenario is based on SCED: Concawe_SCED_13_5_a Fuels, Liquid, Home space heaterVersion date: December 2017

Products/activities covered by the SCED: Filling space heater indoors with fuel every day during heating seasonApplicability of the SCED: Determinant values refer to kerosene as the fuel
Source of SCED: http://www.concawe.org

	Method
Product (article) characteristics	
• Exposure via dermal route: Yes	TRA Consumers 3.1 (R15)
• Exposure via inhalation route: Yes	TRA Consumers 3.1 (R15)
• Spray: No	TRA Consumers 3.1 (R15)

• Exposure via oral route: Oral exposure is considered to be not relevant *The SCED already addresses inhalation and dermal exposure routes assuming 100% systemic absorption. Oral exposure (e.g. from hand-to-mouth behaviour) is only likely to arise from incidental consumer actions. The potential contribution of oral exposure to systemic dose is therefore expected to be minimal when seen in the context of the other exposure routes.*	TRA Consumers 3.1 (R15)
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Consumers 3.1 (R15)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Amount of product used per application: <= 3.32E3 g/event *Based on 4L and a density of 830 g/L (tank size of a home space heater is about 5L and the heater with a full tank of the fuel can last for 12-15hr.*	TRA Consumers 3.1 (R15)
• Exposure time per event: = 0.033 h/event *Estimated 2 min as it should take significantly less time to refuel a smaller size tank than auto-refuelling (3 min).*	TRA Consumers 3.1 (R15)
• Frequency of use over a year: Frequent *180 times/year - Daily use during heating season (6 months); corresponds to "frequent" Use Freq band in ECETOC TRA v3.1*	TRA Consumers 3.1 (R15)
• Frequency of use over a day: = 1 events per day *Unchanged from ECETOC TRA default value*	TRA Consumers 3.1 (R15)
Information and behavioral advice for consumers	
• Place of use: Indoor	TRA Consumers 3.1 (R15)
• Adult/child assumed: Adult	TRA Consumers 3.1 (R15)
Other conditions affecting consumers exposure	
• Dermal transfer factor: = 1E-3 *Estimated value. This value is greater (more conservative) than the <0.001% of*	TRA Consumers 3.1 (R15)

	Method
material handled that has been measured as being transferred onto the skin when refuelling cars (further justification in Concawe Handbook "SCEDs and Supporting Explanation" at www.concawe.org). Rationale for skin contact area: palm of only one hand expected to hold the fuel container when refueling.	
• Body parts potentially exposed: Palm of one hand	TRA Consumers 3.1 (R15)
• Inhalation transfer factor: = 0.02 *It is reasonable to anticipate that only a low amount (c. 5 mL) is likely to be routinely spilled during pouring in a residence and this equates to a comparative evaporative loss of <0.02 based on equivalent gasoline values for scooters (for scooter refuelling, the emission loss is calculated to be ~0.001 for refuelling spillage and 0.002 for vapour displacement emission based on the scooter tank volume of 5 L) (further justification in Concawe Handbook "SCEDs and Supporting Explanation" at www.concawe.org).*	TRA Consumers 3.1 (R15)

9.7.2.2. Exposure and risks for consumers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.96. Exposure concentrations and risks for consumers

Route of exposure and type of effects	Assessment entity	Exposure concentration	Risk quantification
Inhalation, systemic, long term	Cumene	7.235 mg/m³ (TRA Consumers) RCR = 0.679	Final RCR = 0.679
Inhalation, local, long term	Cumene	7.235 mg/m³ (TRA Consumers)	Qualitative risk
Dermal, systemic, long term	Cumene	3.5E-4 mg/kg bw/day (TRA Consumers) RCR = 2.13E-4	Final RCR < 0.01
Oral, systemic, long term	Cumene	0 mg/kg bw/day (TRA Consumers) RCR = 0	Final RCR < 0.01
Combined routes, systemic, long-term			Final RCR = 0.679

Remarks on exposure dataset obtained with ECETOC TRA

Risk characterisation

Qualitative risk characterisation (Inhalation, systemic, acute, Inhalation, local, long term , Inhalation, local, acute, Dermal, systemic, acute, Dermal, local, long term , Dermal, local, acute, Eye, local):
Qualitative risks management measures are laid out above (General measures). More details are available insection 9.0.5.

9.7.3. Cons CS 3: Fuels; Liquid; Garden equipment; Level I (PC 13)

Assessment entity group used for the assessment of this contributing scenario: Substance classified as H350(containing 0.1 to 1% cumene)

9.7.3.1. Conditions of use

The contributing scenario is based on SCED: Concawe_SCED_13_4_a Fuels, Liquids, Garden equipmentrefuelling
Version date: December 2017

Products/activities covered by the SCED: Filling lawn mower outdoors with a full tank of fuel once per week during spring and summer (6 months)
Applicability of the SCED: SCED data refers to gasoline
Source of SCED: http://www.concawe.org

	Method
Product (article) characteristics	
• Exposure via dermal route: Yes	TRA Consumers 3.1 (R15)
• Exposure via inhalation route: Yes	TRA Consumers 3.1 (R15)
• Spray: No	TRA Consumers 3.1 (R15)

• Exposure via oral route: Oral exposure is considered to be not relevant *The SCED already addresses inhalation and dermal exposure routes assuming 100% systemic absorption. Oral exposure (e.g. from hand-to-mouth behaviour) is only likely to arise from incidental consumer actions. The potential contribution of oral exposure to systemic dose is therefore expected to be minimal when seen in the context of the other exposure routes.*	TRA Consumers 3.1 (R15)
• Percentage (w/w) of substance in mixture/article: <= 100 %	TRA Consumers 3.1 (R15)
Amount used (or contained in articles), frequency and duration of use/exposure	
• Amount of product used per application: <= 750 g/event *Based on tank size of 1 L and substance density of 750 g/L*	TRA Consumers 3.1 (R15)
• Exposure time per event: = 0.033 h/event *Estimated 2 min: time taken to refuel a smaller size tank should be significantly less than for the auto-refuelling exposure time of 3 min.*	TRA Consumers 3.1 (R15)
• Frequency of use over a year: Frequent *26 times/year - Once/two weeks: refuelling of garden machinery activity occurs mostly during spring and summer; reported frequency for (vehicle) refuelling activity throughout the year was once/week, that corresponds to once/two weeks per year for garden equipment; corresponds to "occasional" Use Freq band in ECETOC TRA v3.1*	TRA Consumers 3.1 (R15)
• Frequency of use over a day: = 1 events per day *Unchanged from ECETOC TRA default value*	TRA Consumers 3.1 (R15)
Information and behavioral advice for consumers	
• Place of use: Indoor	TRA Consumers 3.1 (R15)
• Adult/child assumed: Adult	TRA Consumers 3.1 (R15)
Other conditions affecting consumers exposure	
• Dermal transfer factor: = 1E-3 *Estimated value for gasoline. This value is greater (more conservative) than the <0.001% of material handled that has been measured as being transferred onto the skin when refuelling cars (further justification in Concawe Handbook "SCEDs and Supporting Explanation" at www.concawe.org). Rationale for skin contact area: only one hand holds the fuel nozzle when re-fuelling. Total area exposed less than for one hand.*	TRA Consumers 3.1 (R15)
• Body parts potentially exposed: Inside hands / one hand / palm of hands	TRA Consumers 3.1 (R15)
• Inhalation transfer factor: = 0.03 *Estimated loss of <0.03 product used via spillage or evaporation (further justification in Concawe Handbook "SCEDs and Supporting Explanation" at www.concawe.org).*	TRA Consumers 3.1 (R15)

9.7.3.2. Exposure and risks for consumers

The exposure concentrations and risk characterisation ratios (RCR) are reported in the following table.

Table 9.97. Exposure concentrations and risks for consumers

Route of exposure and type of effects	Assessment entity	Exposure concentration	Risk quantification

Inhalation, systemic, long term	Cumene	2.451 mg/m³ (TRA Consumers) RCR = 0.23	Final RCR = 0.23
Inhalation, local, long term	Cumene	2.451 mg/m³ (TRA Consumers)	Qualitative risk
Dermal, systemic, long term	Cumene	7.15E-4 mg/kg bw/day (TRA Consumers) RCR = 4.36E-4	Final RCR < 0.01
Oral, systemic, long term	Cumene	0 mg/kg bw/day (TRA Consumers) RCR = 0	Final RCR < 0.01
Combined routes, systemic, long-term			Final RCR = 0.23

Remarks on exposure dataset obtained with ECETOC TRA

Risk characterisation

Qualitative risk characterisation (Inhalation, systemic, acute, Inhalation, local, long term , Inhalation, local, acute, Dermal, systemic, acute, Dermal, local, long term , Dermal, local, acute, Eye, local):
Qualitative risks management measures are laid out above (General measures). More details are available insection 9.0.5.