



DuPont™ DYMEL® 152a Aerosol propellant

Version 3.0

Überarbeitet am 01.10.2010

Ref.130000000071

Dieses SDB entspricht den Richtlinien und gesetzlichen Anforderungen Deutschlands und entspricht nicht unbedingt den Anforderungen anderer Länder.

1. BEZEICHNUNG DES STOFFS BZW. DES GEMISCHS UND DES UNTERNEHMENS

Produktinformation

Produktname : DuPont™ DYMEL® 152a Aerosol propellant

Registrierungsnummer : 01-2119474440-43-0000

Verwendung des Stoffs/des Gemisches : Treibmittel
ES 1 – Formulation, blending, re-packaging – Industrial use
ES 2 – Propellant – Industrial Use
ES 4 – Propellant (incl. one component foam) – Professional use
ES 5 – Propellant/one component foam – Consumer use

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2. MÖGLICHE GEFAHREN

Hochentzündlich.
Schnelles Verdampfen der Flüssigkeit kann Erfrierungen bewirken.
Dämpfe sind schwerer als Luft und können durch Verdrängung des Luftsauerstoffs zu Erstickungen führen.
Kann Herzrhythmusstörungen verursachen.

3. ZUSAMMENSETZUNG/ANGABEN ZU BESTANDTEILEN

| Chemische Bezeichnung | CAS-Nr. | EG-Nr. | Registrierungsnummer | Einstufung | Konzentration [%] |
|-----------------------|---------|-----------|-----------------------|------------|-------------------|
| 1,1-Difluorethan | 75-37-6 | 200-866-1 | 01-2119474440-43-0000 | F+; R12 | 100 |

Den vollen Wortlaut der hier genannten R-Sätze finden Sie in Abschnitt 16.

4. ERSTE-HILFE-MASSNAHMEN

Allgemeine Hinweise : Nie einer ohnmächtigen Person etwas durch den Mund einflößen. Wenn die Symptome anhalten oder falls irgendein Zweifel besteht, ärztlichen Rat einholen.

Einatmen : Betroffenen aus dem Gefahrenbereich bringen und hinlegen. An die frische Luft



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| | |
|------------------------------|--|
| | bringen. Betroffenen warm und ruhig lagern. Künstliche Beatmung und/oder Sauerstoff kann notwendig sein. Arzt konsultieren. |
| Hautkontakt | : Beschmutzte, getränkte Kleidung sofort ausziehen. Stelle mit lauwarmem Wasser abspülen. Kein heißes Wasser verwenden. Bei Erfrierungen einen Arzt rufen. |
| Augenkontakt | : Nach Augenkontakt Augenlider geöffnet halten und Augen während mindestens 15 Minuten mit viel Wasser ausspülen. Ärztliche Betreuung aufsuchen. |
| Verschlucken | : Wird nicht als möglicher Aufnahmeweg angesehen. |
| Hinweise für den Arzt | |
| Behandlung | : Kein Adrenalin oder -derivate verabreichen. |

5. MASSNAHMEN ZUR BRANDBEKÄMPFUNG

| | |
|--|---|
| Geeignete Löschmittel | : Sprühwasser, Wassernebel, Trockenlöschmittel, Alkoholbeständiger Schaum, Kohlendioxid (CO ₂), |
| Besondere Gefahren bei der Brandbekämpfung | : Dämpfe können mit Luft explosionsfähige Gemische bilden. Dämpfe sind schwerer als Luft und breiten sich über dem Boden aus. Dämpfe oder Gase können sich über große Strecken bis zur Zündquelle ausbreiten und rückzünden. Entstehen eines Überdrucks Gefährliche Verbrennungsprodukte : Fluorwasserstoff Fluorierte Bestandteile. |
| Besondere Schutzausrüstung für die Brandbekämpfung | : Im Brandfall umgebungsluftunabhängiges Atemschutzgerät tragen. Persönliche Schutzausrüstung verwenden. Während der Aufräumarbeiten nach einem Brand Handschuhe aus Neopren tragen. Das Einatmen von Zersetzungsprodukten kann Gesundheitsschäden verursachen. |
| Weitere Information | : Löschmaßnahmen auf die Umgebung abstimmen. Personen in Sicherheit bringen. Container/Tanks mit Wassersprühstrahl kühlen. |

6. MASSNAHMEN BEI UNBEABSICHTIGTER FREISETZUNG

| | |
|-------------------------------------|--|
| Personenbezogene Vorsichtsmaßnahmen | : Personen in Sicherheit bringen. Den Bereich belüften. Siehe Schutzmaßnahmen unter Punkt 7 und 8 (Sicherheitsdatenblatt). |
| Umweltschutzmaßnahmen | : Nicht in die Umwelt gelangen lassen. |
| Reinigungsverfahren | : Verdampft. |
| Zusätzliche Hinweise | : Aussenluftunabhängiges Atemschutzgerät (SCBA) tragen. |

7. HANDHABUNG UND LAGERUNG

Handhabung



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Hinweise zum sicheren Umgang : Einatmen von Dämpfen oder Nebel vermeiden. Kontakt mit Haut, Augen und Kleidung vermeiden. Für ausreichenden Luftaustausch und/oder Absaugung in den Arbeitsräumen sorgen. Persönliche Schutzausrüstung siehe unter Abschnitt 8 (Sicherheitsdatenblatt).
Siehe Anhang - Abschnitt 2.2.

Hinweise zum Brand- und Explosionsschutz : Dämpfe sind schwerer als Luft und breiten sich über dem Boden aus. Dämpfe können mit Luft explosionsfähige Gemische bilden. Das Material nur an Orten verwenden, bei denen offenes Licht, Feuer und andere Zündquellen ferngehalten werden. Elektrische Einrichtungen müssen den Normen entsprechend explosionsgeschützt sein. Funkensicheres Werkzeug verwenden. Maßnahmen gegen elektrostatisches Aufladen treffen. Von Hitze- und Zündquellen fernhalten. Von offenen Flammen, heißen Oberflächen und Zündquellen fernhalten. Bei der Arbeit nicht rauchen.

Lagerung

Anforderungen an Lagerräume und Behälter : Behälter dicht verschlossen an einem trockenen, gut belüfteten Ort aufbewahren. Im Originalbehälter lagern.

Zusammenlagerungshinweise : Keine besonders zu erwähnenden Stoffe.

Lagertemperatur : < 52 °C

8. BEGRENZUNG UND ÜBERWACHUNG DER EXPOSITION/PERSÖNLICHE SCHUTZAUSRÜSTUNG

Components with DNELs/PNECs

| Components | CAS-No. | | |
|----------------|----------|--|------------------------|
| Dimethyl ether | 115-10-6 | DNEL/DMEL (worker) Repeated dose toxicity – systemic effects – Inhalation | 2713 mg/m ³ |
| | | DNEL/DMEL (consumer) Repeated dose toxicity – systemic effects – Inhalation | 675 mg/m ³ |
| | | PNEC aquatic – freshwater | 0.048 mg/L |
| | | PNEC aquatic – marine water | 0.0048 mg/L |
| | | PNEC aquatic – intermittent releases | 0.48 mg/L |
| | | PNEC Sediment – freshwater | 0.19 mg/kg d.w. |
| | | PNEC Sediment – marine | 0.019 mg/kg d.w. |
| | | PNEC Soil | 0.141 mg/kg d.w. |

Technische Schutzmaßnahmen

Für ausreichende Belüftung sorgen, besonders in geschlossenen Räumen.

Persönliche Schutzausrüstung

Atemschutz : Bei Rettungs- und Instandhaltungsarbeiten in Lagerbehältern umgebungsluftunabhängiges Atemschutzgerät verwenden. Dämpfe sind schwerer als Luft und können durch Verdrängung des Luftsauerstoffs zu Erstickungen führen.

Handschutz : Wärmeisolierende Handschuhe, und, Undurchlässige Handschuhe



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| | | |
|------------------------|---|---|
| Augenschutz | : | Vollschließende Korbbrille für Chemikalien tragen. Zusätzlich Gesichtsschutzschild tragen, wenn ein Gesichtskontakt mit diesem Werkstoff durch Spritzen, Sprühen oder Material in der Luft möglich ist. |
| Haut- und Körperschutz | : | undurchlässige Schutzkleidung |
| Hygienemaßnahmen | : | Die beim Umgang mit Chemikalien üblichen Vorsichtsmaßnahmen sind zu beachten. |
| Schutzmaßnahmen | : | Bei der Arbeit nicht rauchen. |

9. PHYSIKALISCHE UND CHEMISCHE EIGENSCHAFTEN

| | | |
|--|---|--|
| Form | : | Verflüssigtes Gas, |
| Farbe | : | farblos, |
| Geruch | : | leicht, nach Ether, |
| Gefrierpunkt | : | -117 °C bei 1 013 hPa |
| Siedepunkt | : | -24,7 °C bei 1 013 hPa |
| Zündtemperatur | : | 440 °C |
| Untere Explosionsgrenze / untere Entzündbarkeitsgrenze | : | 4,32 vol% |
| Obere Explosionsgrenze / obere Entzündbarkeitsgrenze | : | 17,35 vol% |
| Dampfdruck | : | 5 146,24 hPa bei 25 °C |
| Dichte | : | 0,0027 g/cm ³ bei 25 °C (1 013 hPa) |
| Wasserlöslichkeit | : | 3,2 g/l bei 21 °C bei 1 013 hPa |
| Verteilungskoeffizient: n- Octanol/Wasser | : | POW: 1,13 bei: 25 °C |
| Relative Dampfdichte | : | 2,4 bei 25 °C, (Luft = 1.0) |

10. STABILITÄT UND REAKTIVITÄT

| | | |
|------------------------------------|---|---|
| Zu vermeidende Bedingungen | : | Temperatur : > 52 °C Hitze, Flammen und Funken. |
| Zu vermeidende Stoffe | : | Alkalimetalle, Erdalkalimetalle, Pulverförmige Metalle, Pulverförmige Metallsalze |
| Gefährliche Zersetzungsprodukte | : | Zu den gefährlichen thermischen Zersetzungsprodukten können gehören: Kohlenstoffoxide, Fluorwasserstoff, Carbonylfluorid, Fluorkohlenwasserstoffe |



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Gefährliche Reaktionen : Dämpfe können mit Luft ein explosionsfähiges Gemisch bilden.

11. TOXIKOLOGISCHE ANGABEN

- Akute inhalative Toxizität : Dosis bei der keine gesundheitsschädigende Wirkungen beobachtet wurden/
Ratte :
24 994 ppm
- Akute inhalative Toxizität
• 1,1-Difluorethan : LC50/ 2 h/ Ratte : > 539,5 mg/l

LC50/ 2 h/ Maus : 960 mg/l

LC50/ 4 h/ Ratte :
> 437 500 ppm

/ Hund :
Herzsensibilisierung
- Karzinogenizitätsbewertung : Zeigte in Tierversuchen keine krebserzeugende Wirkung.
- Bewertung der
Reproduktionstoxizität : Tierversuche zeigten keine erbgutverändernden oder fruchtschädigenden
Effekte.
- Erfahrung am Menschen : Übermäßige Einwirkung kann beim Menschen folgende Gesundheitsschäden
bewirken:

Einatmen
Starke Kurzatmigkeit, Narkose, Herzrhythmusstörungen
- Weitere Information : Kann Herzrhythmusstörungen verursachen.Schnelles Verdampfen der
Flüssigkeit kann Erfrierungen bewirken.

12. UMWELTBEZOGENE ANGABEN

- Toxizität gegenüber Fischen
• 1,1-Difluorethan : LC50 / 96 h/ Fisch (Spezies nicht spezifiziert) : 295,783 mg/l
- Toxizität gegenüber Algen
• 1,1-Difluorethan : / EC50/ 96 h/ Alge: 47,755 mg/l
Methode: (errechnet)
- Aquatische Toxizität
• 1,1-Difluorethan : / EC50/ 48 h/ Daphnia: 146,695 mg/l
- Ozonabbaupotential : 0



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Erwärmungspotential
(GWP) : 124

13. HINWEISE ZUR ENTSORGUNG

Produkt : Wiederverwendung nach Aufarbeitung. In Übereinstimmung mit den örtlichen und nationalen gesetzlichen Bestimmungen.
Siehe Anhang - Abschnitt 2.1.

Verunreinigte
Verpackungen : Leere Druckgefäße an den Lieferanten zurückgeben.

14. ANGABEN ZUM TRANSPORT

ADR

Klasse: 2
Klassifizierungscode: 2F
NI Nr.: 23
UN-Nummer: 1030
Kennzeichnungs-Nr.: 2.1
Ordnungsgemäße UN-
Versandbezeichnung: 1,1-Difluorethan

IATA_C

Klasse: 2.1
UN-Nummer: 1030
Kennzeichnungs-Nr.: 2.1
Ordnungsgemäße UN-
Versandbezeichnung: 1,1-Difluoroethane

IMDG

Klasse: 2.1
UN-Nummer: 1030
Kennzeichnungs-Nr.: 2.1
Ordnungsgemäße UN-
Versandbezeichnung: 1,1-Difluoroethane

Weitere Information : ICAO / IATA nur Transportflugzeug

15. RECHTSVORSCHRIFTEN

Kennzeichnung gemäß EG-Richtlinien

Symbol(e) : F+ Hochentzündlich

R-Sätze : R12 Hochentzündlich.

S-Sätze : S 3 Kühl aufbewahren.
S 9 Behälter an einem gut gelüfteten Ort aufbewahren.
S16 Von Zündquellen fernhalten - Nicht rauchen.



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S33 Maßnahmen gegen elektrostatische Aufladungen treffen.

Besondere Kennzeichnung : Enthält vom Kyoto-Protokoll erfasste fluorierte Treibhausgase. 1,1-Difluorethan bestimmter Gemische

Nationale Vorschriften

Wassergefährdungsklasse : WGK 1 schwach wassergefährdend

16. SONSTIGE ANGABEN

Volltext der unter Abschnitt 3 aufgeführten R-Sätze

R12 Hochentzündlich.

Weitere Information

Vor Gebrauch DuPonts Sicherheitsinformationen beachten., Für weitere Angaben richten Sie sich bitte an die lokale DuPont Geschäftsstelle oder an einen DuPont Vertreter., (R) Eingetragenes Warenzeichen von DuPont

Wichtige Abänderungen gegenüber der früheren Ausgabe werden mit einer Doppellinie hervorgehoben.

Die Angaben in diesem Sicherheitsdatenblatt entsprechen nach bestem Wissen unseren Erkenntnissen zum Zeitpunkt der Überarbeitung. Die Informationen sollen Ihnen Anhaltspunkte für den sicheren Umgang mit dem in diesem Sicherheitsdatenblatt genannten Produkt bei Lagerung, Verarbeitung, Transport und Entsorgung geben. Die Angaben sind nicht übertragbar auf andere Produkte. Die obgenannten Angaben beziehen sich nur auf das bestimmte genannte Produkt(die bestimmten genannten Produkte) und ist nicht übertragbar auf dieses(diese) Produkt(e), wenn dieses(diese) mit anderen Materialien vermengt, vermischt oder verarbeitet wird(werden), oder wenn das Material verändert oder einer Bearbeitung unterzogen wird, ausser dies sei ausdrücklich im Text vermerkt.



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Anhang:

| | | |
|---|--|------------------|
| 1 Exposure Scenario (1) [1,1-Difluoroethane] | | |
| Formulation, blending, re-packaging – Industrial use | | |
| SU 3, 10 PROC 1, 2, 3, 4, 5, 8a, 8b, 9, 15 PC 1, 3, 4, 8, 9a, 14, 15, 24, 25, 26, 27, 28, 29, 31, 32, 34, 35, 38, 39, 40 ERC 2 | | |
| Formulation/blending in batch processes, transfers and packaging, sampling and laboratory use in industrial settings will describe the group of contributing scenarios listed below: | | |
| Contributing Scenario | Activity | Process Category |
| CS 1 | Closed continuous process | PROC 1 |
| CS 2 | Closed continuous process – controlled exposure | PROC 2 |
| CS 3 | Closed batch process | PROC 3 |
| CS 4 | Batch / other process – opportunity for exposure | PROC 4 |
| CS 5 | Mixing and blending | PROC 5 |
| CS 6 | Transfers – non-dedicated equipment | PROC 8a |
| CS 7 | Transfers - dedicated equipment | PROC 8b |
| CS 8 | Transfer and packaging | PROC 9 |
| CS 9 | Laboratory use | PROC 15 |
| 2.1 Contributing scenario (1) controlling environmental exposure for ... | | |
| Formulation/blending in batch processes, transfers and packaging, sampling and laboratory use in industrial settings | | |
| Product characteristics | | |
| Physical state: gas/liquefied gas Concentration: max. 100% | | |
| Amounts used | | |
| Largest site tonnage 2800 t/year or 3333 kg/day [assessed with OC and RMM as specified below] Fregion 1, Fmainsource 1.0 (from tonnages) ERC 2 default based Msafe: Maximum amount for safe handling (Msafe) without any further OC / RMM (no STP for wastewater): 46 kg/day corresponding to 0.46 tonnes per year (10 emission days). | | |
| Frequency and duration of use | | |
| Continuous, Release/emission: ≥ 300 days/year | | |
| Environment factors not influenced by risk management | | |
| Dilution factor river: 10 Dilution factor marine: 100 | | |
| Other given operational conditions affecting environmental exposure | | |
| None | | |



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| |
|---|
| Technical conditions and measures at process level (source) to prevent release |
| Containment in process |
| Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil |
| Process containment |
| Organizational measures to prevent/limit release from site |
| None |
| Conditions and measures related to municipal sewage treatment plant |
| Effluent rate of municipal STP: 2000 m3/days River flow rate: 18000 m3/days |
| Conditions and measures related to external treatment of waste for disposal |
| No waste generated as substance is a gas and will evaporate to air. |
| Conditions and measures related to external recovery of waste |
| None |
| 2.2 Contributing scenario (2) controlling worker exposure for ... |
| Formulation/blending in batch processes, transfers and packaging, sampling and laboratory use in industrial settings |
| Product characteristic |
| Physical state: gas/liquefied gas Concentration: max. 100% |
| Amounts used |
| Not applicable |
| Frequency and duration of use/exposure |
| Exposure frequency: daily for all PROCs Exposure duration: >4 hours (default) for all PROCs |
| Human factors not influenced by risk management |
| None |
| Other given operational conditions affecting workers exposure |
| Ventilation: Indoors without LEV for all PROCs |
| Technical conditions and measures at process level (source) to prevent release |
| Handling in industrial settings Containment according to definition of PROCs for liquefied gas See SDS section 7. |
| Technical conditions and measures to control dispersion from source towards the worker |
| None |
| Organisational measures to prevent / limit releases, dispersion and exposure |
| See SDS. |
| Conditions and measures related to personal protection, hygiene and health evaluation |
| See SDS section 8. |



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3. Exposure estimation and reference to its source

Quantitative risk characterisation for workers (ES 1)

| Toxicity Endpoint | CS # | Risk Characterisation Ratio |
|------------------------------|------|-----------------------------|
| | | Inhalation |
| Long-term - systemic effects | CS 1 | 0.0000101 |
| | CS 2 | 0.0507 |
| | CS 3 | 0.101 |
| | CS 4 | 0.101 |
| | CS 5 | 0.254 |
| | CS 6 | 0.254 |
| | CS 7 | 0.152 |
| | CS 8 | 0.203 |
| | CS 9 | 0.0507 |

Quantitative risk characterisation for humans exposed via the environment (ES 1)

| Route | Risk characterisation ratio* |
|---|------------------------------|
| Inhalation- systemic (long-term) | 0.0000680 |
| Oral- systemic (long-term) | 0.00000912 |
| * worst case selected from local and regional | |

Risk characterisation for the aquatic compartment (ES 1)

| Compartments | Risk characterisation ratio |
|-----------------------|-----------------------------|
| Freshwater | 0.00000196 |
| Marine water | 0.0000104 |
| Sediment freshwater | 0.000002 |
| Sediment marine water | 0.0000106 |

Risk characterisation for the terrestrial compartment (ES 1)

| Compartments | Risk characterisation ratio |
|-------------------------------------|-----------------------------|
| Agricultural soil (average 30 days) | 0.179 |
| Grassland | 0.179 |

Assessment method: (defaults used)

Ecetoc TRA (release 5 May 2010) plus manual amendments for acute local dermal assessment and dilution in mixtures

Release factors:

Air: Release maximum 2.5% (ERC 2 default) for maximum use rate of 9300 kg/day per site or maximum release of 232 kg/day per site

Waste water: Process containment: No processes/process steps leading to release to waste water or aquatic environment.



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Soil: Process containment: No processes/process steps leading to release to soil.

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

Environmental exposure

If conditions differ from those listed in ES Parts 2.1 & 3, downstream user (DU) should check whether they are still within the boundaries of the ES (i.e., RCR < 1). The following equation may be used for scaling:

$$RCR_{Actual} = RCR_{ES} \times \frac{M_{Actual}}{M_{ES}} \times \frac{T_{em,ES}}{T_{em,Actual}} \times \frac{f_{em,Actual}}{f_{em,ES}}$$

Where

RCR_{ES} is the risk characterisation ratio (unitless) (see ES Part 3)

M_{ES} is the quantity of substance processed or used per year per site (tonnes/year) (see ES Part 2.1)

T_{em,ES} is the duration of emission (days/year) (see ES Part 2.1)

f_{em,ES} is the fraction of substance emitted from the process or use to air, water or soil (unitless) (see ES Part 3)

Instead of f_{em,ES}, the actual release rates of substance emitted may be used and the following values were used in the assessment:

| Compartments | Release from point source (local exposure estimation) In kg/d |
|-------------------|--|
| Air | 233 |
| Wastewater | 0 |
| Surface water | 0 |
| Industrial soil | 0 |
| Agricultural soil | 0 |

M_{Actual}, T_{em,Actual} and f_{em,Actual} (or release rates) are the corresponding actual parameters as known to the DU, and RCR_{Actual} is the resulting scaled risk characterisation ratio.

Note: While scaling on conditions and RMMs related to the primary risk driving environmental compartment (i.e. highest RCR), be cautious not to exceed limitations set through the next limiting compartment (compare RCRs).

Worker exposure

Scaling information for worker assessments based on ECETOC TRA:

RCRs = RCRo * CFs / CFo

can be used for multiple determinants in series
e.g. CF1, CF2, CF3

RCRo = original exposure prediction
PCRs = scaled exposure prediction
CFo = original correction factor
CFs = correction factor for scaling



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| Duration of activity [DA] | Non-solid substance* in preparation [PREP] | Correction factor | RPE efficiency [%] | RPE efficiency [-] | Correction factor |
|------------------------------|--|----------------------|--------------------------|--------------------------|----------------------|
| > 4 hours | > 25% | 1 | No RMM = 0% | 0 | 1 |
| 1-4 hours | 5-25% | 0.6 | 90% | 0.9 | 0.1 |
| 15 minutes to 1 hour | 1-5% | 0.2 | 95% | 0.95 | 0.05 |
| < 15 minutes | < 1% | 0.1 | | fraction | (1-fraction) |

Scaling for LEV:

LEV efficiency in professional settings: PROC 24 = 75%; PROC 8b - volatiles; PROC 17, PROC 18 = 90%, all other PROCs = 80%

LEV efficiency in industrial settings: PROC 12 - volatiles, PROC 24 - solids = 80%; PROC 8b - volatiles = 97%; PROC 7, PROC 8b - solids, PROC 17, PROC 18 = 95%, all other PROCs = 90%



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| 1 Exposure Scenario (2) [1,1-Difluoroethane] | | |
| Propellant – Industrial Use | | |
| SU 3 PROC 1, 2, 3, 4, 5, 7, 8a, 8b PC 1, 3, 4, 8, 9a, 9b, 14, 15, 20, 21, 23, 24, 25, 26, 27, 28, 29, 31, 32, 34, 35, 38, 39, 40 ERC 4 | | |
| Various closed and batch processes at different containment levels, blending, transfers and spraying in industrial settings will describe the group of contributing scenarios listed below: | | |
| Contributing Scenario | Activity | Process Category |
| CS 1 | Closed continuous process | PROC 1 |
| CS 2 | Closed continuous process – controlled exposure | PROC 2 |
| CS 3 | Closed batch process | PROC 3 |
| CS 4 | Batch / other process – opportunity for exposure | PROC 4 |
| CS 5 | Mixing and blending | PROC 5 |
| CS 6 | Industrial spraying | PROC 7 |
| CS 7 | Transfers – non-dedicated equipment | PROC 8a |
| CS 8 | Transfers - dedicated equipment | PROC 8b |
| 2.1 Contributing scenario (1) controlling environmental exposure for ... | | |
| Various closed and batch processes at different containment levels, blending, transfers and spraying in industrial settings | | |
| Product characteristics | | |
| Physical state: gas/liquefied gas Concentration: max. 100% | | |
| Amounts used | | |
| Largest site tonnage 250 t/year or 833 kg/day [assessed with OC and RMM as specified below] Fregion 1, Fmainsource 0.185 (from tonnages) ERC 4 default based Msafe: Maximum amount for safe handling (Msafe) without any further OC / RMM beyond STP for wastewater: 0.9 kg/day corresponding to 0.018 tonnes per year (20 emission days). | | |
| Frequency and duration of use | | |
| Continuous, Release/emission: ≥ 300 days/year | | |
| Environment factors not influenced by risk management | | |
| Dilution factor river: 10 Dilution factor marine: 100 | | |
| Other given operational conditions affecting environmental exposure | | |
| None | | |
| Technical conditions and measures at process level (source) to prevent release | | |
| Containment in process | | |
| Technical onsite conditions and measures to reduce or limit discharges, air emissions | | |



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| | | |
|---|------|-----------------------------|
| and releases to soil | | |
| ≥ 98% flare efficiency | | |
| Organizational measures to prevent/limit release from site | | |
| None | | |
| Conditions and measures related to municipal sewage treatment plant | | |
| Effluent rate of municipal STP: 2000 m3/days River flow rate: 18000 m3/days | | |
| Conditions and measures related to external treatment of waste for disposal | | |
| No waste generated as substance is a gas and will evaporate to air. | | |
| Conditions and measures related to external recovery of waste | | |
| None | | |
| 2.2 Contributing scenario (2) controlling worker exposure for ... | | |
| Various closed and batch processes at different containment levels, blending, transfers and spraying in industrial settings | | |
| Product characteristic | | |
| Physical state: gas/liquefied gas Concentration: max. 100% | | |
| Amounts used | | |
| Not applicable | | |
| Frequency and duration of use/exposure | | |
| Exposure frequency: daily for all PROCs Exposure duration: >4 hours (default) for all PROCs | | |
| Human factors not influenced by risk management | | |
| None | | |
| Other given operational conditions affecting workers exposure | | |
| Ventilation: Indoors without LEV for all PROCs | | |
| Technical conditions and measures at process level (source) to prevent release | | |
| Handling in industrial settings Containment according to definition of PROCs for liquefied gas See SDS section 7. | | |
| Technical conditions and measures to control dispersion from source towards the worker | | |
| None | | |
| Organisational measures to prevent / limit releases, dispersion and exposure | | |
| See SDS. | | |
| Conditions and measures related to personal protection, hygiene and health evaluation | | |
| See SDS section 8. | | |
| 3. Exposure estimation and reference to its source | | |
| Quantitative risk characterisation for workers (ES 2) | | |
| Toxicity Endpoint | CS # | Risk Characterisation Ratio |



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| | | Inhalation |
|------------------------------|------|------------|
| Long-term - systemic effects | CS 1 | 0.0000101 |
| | CS 2 | 0.0507 |
| | CS 3 | 0.101 |
| | CS 4 | 0.101 |
| | CS 5 | 0.254 |
| | CS 6 | 0.507 |
| | CS 7 | 0.254 |
| | CS 8 | 0.152 |

Quantitative risk characterisation for humans exposed via the environment (ES 2)

| Route | Risk characterisation ratio* |
|---|------------------------------|
| Inhalation- systemic (long-term) | 0.000242 |
| Oral- systemic (long-term) | 0.0000326 |
| * worst case selected from local and regional | |

Risk characterisation for the aquatic compartment (ES 2)

| Compartments | Risk characterisation ratio |
|-----------------------|-----------------------------|
| Freshwater | 0.00000196 |
| Marine water | 0.0000104 |
| Sediment freshwater | 0.0000002 |
| Sediment marine water | 0.0000106 |

Risk characterisation for the terrestrial compartment (ES 2)

| Compartments | Risk characterisation ratio |
|-------------------------------------|-----------------------------|
| Agricultural soil (average 30 days) | 0.639 |
| Grassland | 0.639 |

Assessment method: (defaults used)

Ecetoc TRA (release 5 May 2010) plus manual amendments for acute local dermal assessment and dilution in mixtures

Release factors:

Air: For site tonnages > 390 t per year, release reduction to a maximum of 2% by the use of flares (≥ 98% efficiency) up to maximum use rate of 2700 tonnes /year or maximum release of 1300 kg/day

Waste water: No processes/process steps leading to release to waste water or aquatic environment.

Soil: No processes/process steps leading to release to soil.

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

Environmental exposure



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If conditions differ from those listed in ES Parts 2.1 & 3, downstream user (DU) should check whether they are still within the boundaries of the ES (i.e., RCR < 1). The following equation may be used for scaling:

$$RCR_{Actual} = RCR_{ES} \times \frac{M_{Actual}}{M_{ES}} \times \frac{T_{em,ES}}{T_{em,Actual}} \times \frac{f_{em,Actual}}{f_{em,ES}}$$

Where

RCR_{ES} is the risk characterisation ratio (unitless) (see ES Part 3)

M_{ES} is the quantity of substance processed or used per year per site (tonnes/year) (see ES Part 2.1)

T_{em,ES} is the duration of emission (days/year) (see ES Part 2.1)

f_{em,ES} is the fraction of substance emitted from the process or use to air, water or soil (unitless) (see ES Part 3)

Instead of f_{em,ES}, the actual release rates of substance emitted may be used and the following values were used in the assessment:

| Compartments | Release from point source (local exposure estimation) In kg/d |
|-------------------|--|
| Air | 833 |
| Wastewater | 0 |
| Surface water | 0 |
| Industrial soil | 0 |
| Agricultural soil | 0 |

M_{Actual}, T_{em,Actual} and f_{em,Actual} (or release rates) are the corresponding actual parameters as known to the DU, and RCR_{Actual} is the resulting scaled risk characterisation ratio.

Note: While scaling on conditions and RMMs related to the primary risk driving environmental compartment (i.e. highest RCR), be cautious not to exceed limitations set through the next limiting compartment (compare RCRs).

Worker exposure

Scaling information for worker assessments based on ECETOC TRA:

$$RCRs = RCRo * CFs / CFo$$

can be used for multiple determinants in series
e.g. CF1, CF2, CF3

RCRo = original exposure prediction

PCRs = scaled exposure prediction

CFo = original correction factor

CFs = correction factor for scaling



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| Duration of activity [DA] | Non-solid substance* in preparation [PREP] | Correction factor | RPE efficiency [%] | RPE efficiency [-] | Correction factor |
|------------------------------|--|----------------------|--------------------------|--------------------------|----------------------|
| > 4 hours | > 25% | 1 | No RMM = 0% | 0 | 1 |
| 1-4 hours | 5-25% | 0.6 | 90% | 0.9 | 0.1 |
| 15 minutes to 1 hour | 1-5% | 0.2 | 95% | 0.95 | 0.05 |
| < 15 minutes | < 1% | 0.1 | | fraction | (1-fraction) |

Scaling for LEV:

LEV efficiency in professional settings: PROC 24 = 75%; PROC 8b - volatiles; PROC 17, PROC 18 = 90%, all other PROCs = 80%

LEV efficiency in industrial settings: PROC 12 - volatiles, PROC 24 - solids = 80%; PROC 8b - volatiles = 97%; PROC 7, PROC 8b - solids, PROC 17, PROC 18 = 95%, all other PROCs = 90%



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| 1 Exposure Scenario (4) [1,1-Difluoroethane] | | | | | | | | | | | | |
|---|-------------------------------------|------------------|------------------|------|-------------------------------------|---------|------|---------------------------------|---------|------|------------------------------------|---------|
| Propellant (incl. one component foam) – Professional use | | | | | | | | | | | | |
| SU 19, 22 PROC 8a, 8b, 11 PC 0 (UCN D 15100 propellants), 1, 3, 4, 8, 9a, 9b, 14, 15, 21, 23, 24, 25, 26, 27, 28, 29, 31, 32, 34, 35, 38, 39, 40 ERC 8a, 8d (ERC 8d assessment covering 8a) | | | | | | | | | | | | |
| Transfers (dedicated and non-dedicated equipment), spraying in professional settings will describe the group of contributing scenarios listed below: | | | | | | | | | | | | |
| <table border="0"> <thead> <tr> <th>Contributing Scenario</th> <th>Activity</th> <th>Process Category</th> </tr> </thead> <tbody> <tr> <td>CS 1</td> <td>Transfers – non-dedicated equipment</td> <td>PROC 8a</td> </tr> <tr> <td>CS 2</td> <td>Transfers – dedicated equipment</td> <td>PROC 8b</td> </tr> <tr> <td>CS 3</td> <td>Spraying – non-industrial settings</td> <td>PROC 11</td> </tr> </tbody> </table> | Contributing Scenario | Activity | Process Category | CS 1 | Transfers – non-dedicated equipment | PROC 8a | CS 2 | Transfers – dedicated equipment | PROC 8b | CS 3 | Spraying – non-industrial settings | PROC 11 |
| Contributing Scenario | Activity | Process Category | | | | | | | | | | |
| CS 1 | Transfers – non-dedicated equipment | PROC 8a | | | | | | | | | | |
| CS 2 | Transfers – dedicated equipment | PROC 8b | | | | | | | | | | |
| CS 3 | Spraying – non-industrial settings | PROC 11 | | | | | | | | | | |
| 2.1 Contributing scenario (1) controlling environmental exposure for ... | | | | | | | | | | | | |
| Transfers (dedicated and non-dedicated equipment), spraying in professional settings | | | | | | | | | | | | |
| Product characteristics | | | | | | | | | | | | |
| Physical state: gas/liquefied gas Concentration: max. 100% | | | | | | | | | | | | |
| Amounts used | | | | | | | | | | | | |
| Annual amount supplied to professionals: max. 1350 t/year – wide dispersive use, fraction to region 0.1 (ERC 8d default), Fmainsource: 0.002 (ERC default for wide dispersive uses) | | | | | | | | | | | | |
| Frequency and duration of use | | | | | | | | | | | | |
| Continuous release – wide dispersive use; 365 days/year (ERC default) | | | | | | | | | | | | |
| Environment factors not influenced by risk management | | | | | | | | | | | | |
| Dilution factor river: 10 Dilution factor marine: 100 | | | | | | | | | | | | |
| Other given operational conditions affecting environmental exposure | | | | | | | | | | | | |
| None | | | | | | | | | | | | |
| Technical conditions and measures at process level (source) to prevent release | | | | | | | | | | | | |
| None – 100% release to air | | | | | | | | | | | | |
| Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil | | | | | | | | | | | | |
| None | | | | | | | | | | | | |
| Organizational measures to prevent/limit release from site | | | | | | | | | | | | |
| None | | | | | | | | | | | | |
| Conditions and measures related to municipal sewage treatment plant | | | | | | | | | | | | |
| Effluent rate of municipal STP: 2000 m3/days River flow rate: 18000 m3/days | | | | | | | | | | | | |
| Conditions and measures related to external treatment of waste for disposal | | | | | | | | | | | | |
| No waste generated as substance is a gas and will evaporate to air. | | | | | | | | | | | | |



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| | | |
|---|-------------------------------------|------------------------------------|
| Conditions and measures related to external recovery of waste | | |
| None | | |
| 2.2 Contributing scenario (2) controlling worker exposure for ... | | |
| Transfers (dedicated and non-dedicated equipment), spraying in professional settings | | |
| Product characteristic | | |
| Physical state: gas/liquefied gas Concentration: max. 100% | | |
| Amounts used | | |
| Not applicable | | |
| Frequency and duration of use/exposure | | |
| Exposure frequency: daily for all PROCs | | |
| Contributing Scenario | Duration | |
| CS 1 | >4 hours (default) | |
| CS 2 | >4 hours (default) | |
| CS 3 | 1 - 4 hours | |
| Human factors not influenced by risk management | | |
| None | | |
| Other given operational conditions affecting workers exposure | | |
| Ventilation: Indoors without LEV for all PROCs | | |
| Technical conditions and measures at process level (source) to prevent release | | |
| Handling in industrial settings Containment according to definition of PROCs for liquefied gas See SDS section 7. | | |
| Technical conditions and measures to control dispersion from source towards the worker | | |
| None | | |
| Organisational measures to prevent / limit releases, dispersion and exposure | | |
| See SDS. | | |
| Conditions and measures related to personal protection, hygiene and health evaluation | | |
| See SDS section 8. | | |
| 3. Exposure estimation and reference to its source | | |
| Quantitative risk characterisation for workers (ES 4) | | |
| Toxicity Endpoint | CS # | Risk Characterisation Ratio |
| | | Inhalation |
| Long-term - systemic effects | CS 1 | 0.507 |
| | CS 2 | 0.254 |
| | CS 3 | 0.609 |
| Quantitative risk characterisation for humans exposed via the environment (ES 4) | | |
| Route | Risk characterisation ratio* | |



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| | |
|---|-----------------|
| Inhalation- systemic (long-term) | 0.000000252 |
| Oral- systemic (long-term) | 0.0000000000547 |
| * worst case selected from local and regional | |

Risk characterisation for the aquatic compartment (ES 4)

| Compartments | Risk characterisation ratio |
|-----------------------|-----------------------------|
| Freshwater | 0.00000196 |
| Marine water | 0.0000104 |
| Sediment freshwater | 0.000002 |
| Sediment marine water | 0.0000106 |

Risk characterisation for the terrestrial compartment (ES 3)

| Compartments | Risk characterisation ratio |
|-------------------------------------|-----------------------------|
| Agricultural soil (average 30 days) | 0.000000547 |
| Grassland | 0.000000547 |

Assessment method: (defaults used)

Ecetoc TRA (release 5 May 2010) plus manual amendments for acute local dermal assessment and dilution in mixtures

Release factors:

Wastewater: no release to wastewater as 100% goes to air

Soil: no direct release to soil as 100 % goes to air

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

Environmental exposure

If conditions differ from those listed in ES Parts 2.1 & 3, downstream user (DU) should check whether they are still within the boundaries of the ES (i.e., RCR < 1). The following equation may be used for scaling:

$$RCR_{Actual} = RCR_{ES} \times \frac{M_{Actual}}{M_{ES}} \times \frac{T_{em,ES}}{T_{em,Actual}} \times \frac{f_{em,Actual}}{f_{em,ES}}$$

Where

RCR_{ES} is the risk characterisation ratio (unitless) (see ES Part 3)

M_{ES} is the quantity of substance processed or used per year per site (tonnes/year) (see ES Part 2.1)

T_{em,ES} is the duration of emission (days/year) (see ES Part 2.1)

f_{em,ES} is the fraction of substance emitted from the process or use to air, water or soil (unitless) (see ES Part 3)

Instead of f_{em,ES}, the actual release rates of substance emitted may be used and the following values were used in the assessment:

| Compartments | Release from point source (local exposure estimation) In kg/d |
|--------------|--|
| Air | 0 |
| Wastewater | 0 |



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| | |
|-------------------|---|
| Surface water | 0 |
| Industrial soil | 0 |
| Agricultural soil | 0 |

M_{Actual} , $T_{em,Actual}$ and $f_{em,Actual}$ (or release rates) are the corresponding actual parameters as known to the DU, and RCR_{Actual} is the resulting scaled risk characterisation ratio.

Note: While scaling on conditions and RMMs related to the primary risk driving environmental compartment (i.e. highest RCR), be cautious not to exceed limitations set through the next limiting compartment (compare RCRs).

Worker exposure

Scaling information for worker assessments based on ECETOC TRA:

$$RCRs = RCRo * CFs / CFo$$

can be used for multiple determinants in series
e.g. CF1, CF2, CF3

RCRo = original exposure prediction

PCRs = scaled exposure prediction

CFo = original correction factor

CFs = correction factor for scaling

| Duration of activity [DA] | Non-solid substance* in preparation [PREP] | Correction factor | RPE efficiency [%] | RPE efficiency [-] | Correction factor |
|---------------------------|--|-------------------|--------------------|--------------------|-------------------|
| > 4 hours | > 25% | 1 | No RMM = 0% | 0 | 1 |
| 1-4 hours | 5-25% | 0.6 | 90% | 0.9 | 0.1 |
| 15 minutes to 1 hour | 1-5% | 0.2 | 95% | 0.95 | 0.05 |
| < 15 minutes | < 1% | 0.1 | | fraction | (1-fraction) |

Scaling for LEV:

LEV efficiency in professional settings: PROC 24 = 75%; PROC 8b - volatiles; PROC 17, PROC 18 = 90%, all other PROCs = 80%

LEV efficiency in industrial settings: PROC 12 - volatiles, PROC 24 - solids = 80%; PROC 8b - volatiles = 97%; PROC 7, PROC 8b - solids, PROC 17, PROC 18 = 95%, all other PROCs = 90%



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| | |
|--|------------|
| 1 Exposure Scenario (5) [1,1-Difluoroethane] | |
| Propellant/one component foam – Consumer use | |
| SU 21 PC 0 - UCN D 15100 propellants, 1, 3, 4, 8, 9a, 9b, 14, 15, 21, 23, 24, 25, 26, 27, 28, 29, 31, 32, 34, 35, 38, 39, 40 ERC 8d, 8a (ERC 8a covered by ERC 8d) | |
| 2.1 Contributing scenario (1) controlling environmental exposure for ... | |
| Consumer use of propellant in various applications | |
| Product characteristics | |
| Concentration: maximum 50% (w/w) in product Physical state: liquid in a pressurized container, released as a gas when used properly | |
| Amounts used | |
| Annual amount supplied to consumers: max. 1650 t/year – wide dispersive use, fraction to region 0.1 (ERC default for wide dispersive use), Fmainsource: 0.002 (ERC default for wide dispersive uses) | |
| Frequency and duration of use | |
| Wide dispersive use; 365 days/year (ERC default) | |
| Environment factors not influenced by risk management | |
| Dilution factor freshwater: 10 (TRA/EUSES default) Dilution factor marine water: 100 (TRA/EUSES default) | |
| Other given operational conditions affecting environmental exposure | |
| None | |
| Conditions and measures related to municipal sewage treatment plant | |
| Effluent rate of municipal STP: 2000 m3/days [TRA/EUSES default] River flow rate: 18000 m3/days [TRA/EUSES default] | |
| Conditions and measures related to external treatment of waste for disposal | |
| None | |
| Conditions and measures related to external recovery of waste | |
| No waste generated as substance is a gas and will evaporate to air | |
| 2.2 Contributing scenario (2) controlling consumer exposure for ... | |
| Consumer use of propellant in various applications | |
| Product characteristic | |
| Concentration: maximum 50% (w/w) in product Physical state: liquid in a pressurized container, released as a gas when used properly | |
| Amounts used | |
| The following representative PCs were assessed using different modelling approaches (incl. different assumptions) to cover the PCs listed in the ES title: PC 3 (aerosol spray), PC 8 (disinfectant spray), PC 9a (aerosol spray can), PC 31 (polishes and wax blends), PC 35 (washing and cleaning products), PC 39 (Personal care products). | |
| PC3 (Air care products - aerosol) - TRAM | 10 g/event |



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| | |
|--|---|
| PC3 (Air care products - aerosol) - A.I.S.E | 8.4 g/event |
| PC 8 (disinfectant spray) - ConsExpo | 22.9 g/event |
| PC9a (paint spray can) - TRAM | 300 g/event |
| PC9a (paint spray can) - ConsExpo | 297 g/event |
| PC 31 (polishes and wax blends) – A.I.S.E | 60 g/event |
| PC 31 (polishes and wax blends)- ConsExpo | 36 g/event |
| PC35 (Washing and cleaning products – cleaners, trigger sprays) - TRA | 35 g/event |
| PC35 (Washing and cleaning products – cleaners, trigger sprays) - A.I.S.E | 30 g/event |
| PC35 (Washing and cleaning products – cleaners, trigger sprays) - ConsExpo | 135 g/event – Leather cleaner 19.2 g/event – All purpose cleaner |
| PC 39 (Personal care products) - ConsExpo | 6.8 g/event |

Frequency and duration of use/exposure

| | | |
|--|---|---|
| PC3 (Air care products - aerosol) - TRA | 0.25 hour exposure duration | 4 events/day |
| PC3 (Air care products - aerosol) - A.I.S.E | 0.25 hour exposure duration | 1 event/day |
| PC 8 (disinfectant spray) | 0.51 minutes spray duration | |
| PC9a (paint spray can) - TRA | 0.33 hour exposure duration | 1 event/day |
| PC9a (paint spray can) - ConsExpo | 15 minutes spray duration | |
| PC 31 (polishes and wax blends) – A.I.S.E | 1 hour exposure duration | 0.43 event/day |
| PC 31 (polishes and wax blends)- ConsExpo | 1.2 minutes spray duration | |
| PC35 (Washing and cleaning products – cleaners, trigger sprays) - TRA | 4 hours exposure duration | 1 event/day |
| PC35 (Washing and cleaning products – cleaners, trigger sprays) - A.I.S.E | 0.167 hour exposure duration | 1 event/day |
| PC35 (Washing and cleaning products – cleaners, trigger sprays) - ConsExpo | 3 minutes spray duration - Leather cleaner 0.41 minutes spray duration - All purpose cleaner | 1 event/year - Leather cleaner 1 event/day - All purpose cleaner |
| PC 39 (Personal care products) - ConsExpo | 0.24 minutes spray duration | 1.2 events/day |

Human factors not influenced by risk management

60 kg body weight assumed for all assessments

Other given operational conditions affecting consumers exposure

The only potential route of exposure is via inhalation since product is released as a gas into the air.

The product is used indoors and outdoors – indoor scenario is more conservative and covers outdoor scenario. Room volumes and ventilation rates of the scenarios assessed are:



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| | | |
|--|--|--|
| PC3 (Air care products - aerosol) - TRA | - | 20 m3 room volume |
| PC3 (Air care products - aerosol) - A.I.S.E | 2 /hours ventilation rate | 2.5 m3 room volume |
| PC 8 (disinfectant spray) | 2.5 /hours ventilation rate | 15 m3 room volume |
| PC9a (paint spray can) - TRA | - | 20 m3 room volume |
| PC9a (paint spray can) - ConsExpo | 1.5 /hours ventilation rate | 34 m3 room volume |
| PC 31 (polishes and wax blends) – A.I.S.E | - | 58 m3 room volume |
| PC 31 (polishes and wax blends)- ConsExpo | 1.5 /hours ventilation rate | 34 m3 room volume |
| PC35 (Washing and cleaning products – cleaners, trigger sprays) - TRA | - | 20 m3 room volume |
| PC35 (Washing and cleaning products – cleaners, trigger sprays) - A.I.S.E | - | 15 m3 room volume |
| PC35 (Washing and cleaning products – cleaners, trigger sprays) - ConsExpo | 0.5 - Leather cleaner 2.5 - All purpose cleaner | 58 m3 room volume - Leather cleaner 15 m3 room volume - All purpose cleaner |
| PC 39 (Personal care products) - ConsExpo | 2 /hours ventilation rate | 10 m3 room volume |

Conditions and measures related to information and behavioural advice to consumers

Safety and application notes on product label and/or package insert.

Flammability:

- keep containers tightly closed - do not pierce or burn, even after use
- provide sufficient air exchange and/or exhaust in work rooms.
- well ventilate after use.
- keep away from open flames or sources of sparks or ignition
- when using do not smoke
- do not use or store near sources of heat or electrical devices
- do not spray on a naked flame or any incandescent material.
- protect from sunlight and do not expose to temperatures exceeding 50°C.

Conditions and measures related to personal protection and hygiene

None

3. Exposure estimation and reference to its source

Quantitative risk characterisation for consumers (ES 5)

| Toxicity Endpoint | CS # | Risk Characterisation Ratio |
|---|--------------------------|-----------------------------|
| Long-term - systemic effects - Inhalation | | |
| TRA - PC3 - air care products | Aerosol sprays | 0.025 |
| TRA - PC9a - coatings and paints | Aerosol spray can | 0.25 |
| TRA - PC35 -Washing and cleaning products | Cleaners, trigger sprays | 0.35 |
| AISE C17 (PC3) | Aerosol i) aqueous | 0.013 |



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| | | |
|---|---------------|-----------|
| AISE C20 (PC31) | Spray | 0.036 |
| AISE C7 (PC35) | Spray | 0.0027 |
| ConsExpo - spray paint can (PC 9a) | Spray | 0.22 |
| ConsExpo - disinfectant, spray (PC 8) | Spray | 0.00025 |
| ConsExpo – Personal care products (PC 39) | Hair spray | 0.001 |
| ConsExpo - furniture cleaning (PC 35) | Leather spray | 0.0033 |
| ConsExpo – All purpose cleaner (PC 35) | Spray | 0.0000039 |
| ConsExpo – Shoe polish (PC 31) | Spray | 0.04 |
| | Worst case | 0.35 |

Quantitative risk characterisation for humans exposed via the environment (ES 5)

| Route | Risk characterisation ratio* |
|---|------------------------------|
| Inhalation- systemic (long-term) | 0.000000252 |
| Oral- systemic (long-term) | 0.0000000000547 |
| * worst case selected from local and regional | |

Risk characterisation for the aquatic compartment (ES 5)

| Compartments | Risk characterisation ratio |
|-----------------------|-----------------------------|
| Freshwater | 0.00000196 |
| Marine water | 0.0000104 |
| Sediment freshwater | 0.000002 |
| Sediment marine water | 0.0000106 |

Risk characterisation for the terrestrial compartment (ES 5)

| Compartments | Risk characterisation ratio |
|-------------------------------------|-----------------------------|
| Agricultural soil (average 30 days) | 0.000000547 |
| Grassland | 0.000000547 |

Assessment Method:

Ecetoc TRA (release May 2010), A.I.S.E. REACT Model and ConsExpo

Release factors:

Wastewater: no release to wastewater as 100% goes to air

Soil: no direct release to soil as 100 % goes to air

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

If conditions differ significantly from those listed in Section 2, downstream user (DU) should check whether they are still within the boundaries of the ES. This evaluation may be based on expert judgement or on risk assessment tools that are recommended by ECHA.