KALOGEROPOULOS S.A.

Δελτίο δεδομένων ασφαλείας σύμφωνα με τους Κανονισμούς 1907/2006/ΕΚ (REACH) Άρθρο 31, τον (ΕΕ) 2015/830 και τον 1272/2008/ΕΚ (CLP)

Ημερομηνία εκτύπωσης 01.02.2019 **Αριθμός έκδοσης 1** **Αναθεώρηση 01.02.2019**

ΤΜΗΜΑ 1: Αναγνωριστικός κωδικός ουσίας/μείγματος και εταιρείας/επιχείρησης

1.1 Αναγνωριστικός κωδικός προϊόντος

Ονομασία του προϊόντος στο εμπόριο: Αιθυλενογλυκόλη
Αριθμός CAS:
107-21-1
Αριθμός EC:
203-473-3
Αριθμός ευρετηρίου:
603-027-00-1
Αριθμός καταχώρισης REACH: 01-2119456816-28-XXXX

1.2 Συναφείς προσδιοριζόμενες χρήσεις της ουσίας ή του μείγματος και αντενδεικνυόμενες χρήσεις

Τομέας χρήσης
SU10 Τυποποίηση [ανάμειξη] παρασκευασμάτων και/ή επανασυσκευασία (εκτός κραμάτων)
SU9 Μεταποίηση ευγενών χημικών ουσιών
SU8 Μεταποίηση χύμα χημικών προϊόντων, μεγάλης κλίμακας (συμπεριλαμβανομένων των προϊόντων πετρελαίου)
Κατηγορία χημικού προϊόντος
PC35 Προϊόντα έκπλυσης και καθαρισμού (συμπεριλαμβανομένων των προϊόντων με βάση διαλύτες)
PC9a Επιχρίσματα και βαφές, αραιωτικά, υλικά αφαίρεσης βαφής
PC15 Προϊόντα επεξεργασίας μη μεταλλικών επιφανειών
PC18 Μελάνη και τόνερ
PC23 Προϊόντα κατεργασίας δέρματος
PC24 Λιπαντικά, γράσα, προϊόντα απελευθέρωσης
PC31 Μείγματα στιλβωτικών ουσιών και κεριών
PC34 Βαφές υφασμάτων και προϊόντα εμποτισμού
PC4 Αντιπηκτικά και αντιπαγωτικά προϊόντα
PC16 Υγρά μεταφοράς θερμότητας
PC17 Υδραυλικά υγρά
PC1 Συγκολλητικά μέσα, στεγανωτικά
PC32 Παρασκευάσματα και ενώσεις πολυμερών
PC27 Φυτοπροστατευτικά προϊόντα
PC8 Βιοκτόνα προϊόντα
PC29 Φαρμακευτικά προϊόντα
Κατηγορία διαδικασίας
PROC1 Παραγωγή ή διύλιση χημικών ουσιών υπό κλειστή διαδικασία χωρίς την πιθανότητα έκθεσης, ή διαδικασίες με αντίστοιχες συνθήκες περιορισμού.
PROC2 Παραγωγή ή διύλιση χημικών ουσιών υπό κλειστή συνεχόμενη διαδικασία με περιστασιακή ελεγχόμενη έκθεση ή διαδικασίες με αντίστοιχες συνθήκες περιορισμού
PROC3 Παρασκευή ή τυποποίηση στη χημική βιομηχανία, με διαδικασίες ασυνεχούς ροής και περιστασιακή ελεγχόμενη έκθεση ή διαδικασίες με αντίστοιχες συνθήκες περιορισμού
PROC4 Παραγωγή χημικής ουσίας όπου υφίσταται πιθανότητα έκθεσης
PROC5 Ανάμειξη ή ενσωμάτωση σε διαδικασίες ασυνεχούς ροής
PROC8a Μεταφορά ουσίας ή μείγματος (φόρτωση και εκφόρτωση) σε μη ειδικές εγκαταστάσεις
PROC8b Μεταφορά ουσίας ή μείγματος (φόρτωση και εκφόρτωση) σε ειδικές εγκαταστάσεις
PROC9 Μεταφορά ουσίας ή μείγματος σε μικρούς περιέκτες (ειδική γραμμή πλήρωσης, συμπεριλαμβανομένης της ζύγισης)
PROC10 Εφαρμογή με ρολό ή με πινέλο
PROC11 Μη βιομηχανικός ψεκασμός
PROC13 Επεξεργασία προϊόντων με εμβάπτιση και έκχυση
PROC14 Δισκιοποίηση, συμπίεση, εξώθηση, πελλετοποίηση, κοκκοποίηση
PROC15 Χρήση ως εργαστηριακού αντιδραστηρίου

(συνέχεια στη σελίδα 2)

Δελτίο δεδομένων ασφαλείας
σύμφωνα με τους Κανονισμούς 1907/2006/ΕΚ (REACH) Άρθρο 31, τον (ΕΕ) 2015/830 και τον 1272/2008/ΕΚ (CLP)

Ημερομηνία εκτύπωσης 01.02.2019 **Αριθμός έκδοσης 1** **Αναθεώρηση 01.02.2019**

Ονομασία του προϊόντος στο εμπόριο: Αιθυλενογλυκόλη

(συνέχεια από τη σελίδα 1)

PROC19 Χειρωνακτικές δραστηριότητες που περιλαμβάνουν την επαφή με τα χέρια
PROC7 Βιομηχανικός ψεκασμός
PROC17 Λίπανση σε συνθήκες υψηλής ενέργειας σε εργασίες κατεργασίας μετάλλων
PROC20 Χρήση λειτουργικών υγρών σε μικρές συσκευές

Κατηγορία απελευθέρωσης στο περιβάλλον

ERC8f Ευρεία χρήση που οδηγεί σε ενσωμάτωση μέσα/πάνω σε αντικείμενο (εξωτερική)
ERC8a Ευρεία χρήση μη αντιδραστικού βοηθήματος μεταποίησης σε βιομηχανική εγκατάσταση (δεν ενσωματώνεται μέσα ή πάνω σε αντικείμενο)
ERC8c Ευρεία χρήση που οδηγεί σε ενσωμάτωση μέσα/πάνω σε αντικείμενο (εσωτερική)
ERC8d Ευρεία χρήση μη αντιδραστικού βοηθήματος μεταποίησης σε βιομηχανική εγκατάσταση (δεν ενσωματώνεται μέσα ή πάνω σε αντικείμενο, εξωτερική χρήση)
ERC4 Χρήση μη αντιδραστικού βοηθήματος μεταποίησης σε βιομηχανική εγκατάσταση (δεν ενσωματώνεται μέσα ή πάνω σε αντικείμενο)
ERC7 Χρήση λειτουργικού υγρού σε βιομηχανική εγκατάσταση
ERC9a Ευρεία χρήση λειτουργικού υγρού (εσωτερική)
ERC9b Ευρεία χρήση λειτουργικού υγρού (εξωτερική)
ERC3 Τυποποίηση μέσα σε στερεή θεμελιώδη μάζα
ERC2 Τυποποίηση μέσα σε μείγμα
ERC5 Χρήση σε βιομηχανική εγκατάσταση που οδηγεί σε ενσωμάτωση μέσα/πάνω σε αντικείμενο
ERC6c Χρήση μονομερούς σε διαδικασίες πολυμερισμού σε βιομηχανική εγκατάσταση (ενσωματώνεται ή δεν ενσωματώνεται μέσα/πάνω σε αντικείμενο)

Χρήση του υλικού / της σύνθεσης

Παραγωγή ουσίας- (Βιομηχανική χρήση)
Κατανομή της ουσίας - (Βιομηχανική χρήση)
Χρησιμοποιήστε ως ενδιάμεσο - (Βιομηχανική χρήση)
Χρησιμοποιήστε ως χημικό επεξεργασίας - (Βιομηχανική χρήση)
Σύνθεση και (επανα)- συσκευασία ουσιών και μειγμάτων - (Βιομηχανική χρήση)
Παραγωγή πολυμερών - (Βιομηχανική & Καταναλωτική χρήση)
Χρήση σε επικαλύψεις - (Βιομηχανική,Επαγγελματική & Καταναλωτική χρήση)
Χρήση σε καθαριστικούς παράγοντες - (Βιομηχανική,Επαγγελματική & Καταναλωτική χρήση)
Λιπαντικά - (Βιομηχανική χρήση)
Υγρά επεξεργασίας μετάλλων / λάδια έλασης - (Βιομηχανική & Επαγγελματική χρήση)
Χρήση σε αγροχημικά προϊόντα - (Επαγγελματική & Καταναλωτική χρήση)
Λειτουργικά υγρά - (Βιομηχανική,Επαγγελματική & Καταναλωτική χρήση)
Χρήση σε / ως εφαρμογές αποπάγωσης / αντι-παγοποίησης / παράγοντες - (Επαγγελματική & Καταναλωτική χρήση)
Χρήση σε εργαστήρια - (Βιομηχανική & Επαγγελματική χρήση)
Επεξεργασία νερού - (Βιομηχανική & Επαγγελματική χρήση)
Χρήση σε κόλλες και σφραγιστικά - (Καταναλωτική χρήση)
Παραγωγή πολυμερών, γεμισμένων πολυμερών, αφρών, επικαλύψεων, συγκολλητικών ουσιών, στεγανωτικών - (Βιομηχανική χρήση)

1.3 Στοιχεία του προμηθευτή του δελτίου δεδομένων ασφαλείας

Παραγωγός/προμηθευτής:

ΧΗΜΙΚΑ ΚΑΛΟΓΕΡΟΠΟΥΛΟΣ Α.Ε.
Δ. Γούναρη 35
185 31 Πειραιάς
Τηλ: 210 4124518
Φαξ: 210 4101607
e-mail: info@kalochem.gr
website: www.kalochem.gr

(συνέχεια στη σελίδα 3)

Δελτίο δεδομένων ασφαλείας
σύμφωνα με τους Κανονισμούς 1907/2006/ΕΚ (REACH) Άρθρο 31, τον (ΕΕ) 2015/830 και τον 1272/2008/ΕΚ (CLP)

Ημερομηνία εκτύπωσης 01.02.2019 **Αριθμός έκδοσης 1** **Αναθεώρηση 01.02.2019**

Ονομασία του προϊόντος στο εμπόριο: Αιθυλενογλυκόλη

(συνέχεια από τη σελίδα 2)

1.4 Αριθμός τηλεφώνου επείγουσας ανάγκης:

Τηλ. Κέντρου Δηλητηριάσεων: +30 210 7793777 (Ελλάδα)

ΤΜΗΜΑ 2: Προσδιορισμός επικινδυνότητας

2.1 Ταξινόμηση της ουσίας ή του μείγματος
Ταξινόμηση σύμφωνα με τον κανονισμό (ΕΚ) αριθ. 1272/2008

GHS08 κίνδυνος για την υγεία

STOT RE 2 H373 Μπορεί να προκαλέσει βλάβες στα όργανα ύστερα από παρατεταμένη ή επανειλημμένη έκθεση.

GHS07

Acute Tox. 4 H302 Επιβλαβές σε περίπτωση κατάποσης.

2.2 Στοιχεία επισήμανσης
Επισήμανση σύμφωνα με τον κανονισμό (ΕΚ) αριθ. 1272/2008
Η ουσία ταξινομείται και επισημαίνεται σύμφωνα με τον κανονισμό CLP.
Εικονογράμματα κινδύνου

GHS07 GHS08

Προειδοποιητική λέξη Προσοχή

Επικίνδυνα συστατικά πρέπει να αναφέρονται στις ετικέτες:
αιθυλενογλυκόλη

Δηλώσεις επικινδυνότητας
H302 Επιβλαβές σε περίπτωση κατάποσης.
H373 Μπορεί να προκαλέσει βλάβες στα όργανα ύστερα από παρατεταμένη ή επανειλημμένη έκθεση.

Δηλώσεις προφυλάξεων
P260 Μην αναπνέετε σκόνη/αναθυμιάσεις/αέρια/σταγονίδια/ατμούς/εκνεφώματα.
P264 Πλύνετε σχολαστικά μετά το χειρισμό.
P270 Μην τρώτε, πίνετε ή καπνίζετε, όταν χρησιμοποιείτε αυτό το προϊόν.
P301+P312 ΣΕ ΠΕΡΙΠΤΩΣΗ ΚΑΤΑΠΟΣΗΣ: Καλέστε το ΚΕΝΤΡΟ ΔΗΛΗΤΗΡΙΑΣΕΩΝ/γιατρό, αν αισθανθείτε αδιαθεσία.
P330 Ξεπλύνετε το στόμα.
P314 Συμβουλευθείτε/Επισκεφθείτε γιατρό εάν αισθανθείτε αδιαθεσία.
P501 Διάθεση του περιεχομένου/περιέκτη σύμφωνα με τους τοπικούς/εθνικούς/διεθνείς κανονισμούς.

(συνέχεια στη σελίδα 4)

Δελτίο δεδομένων ασφαλείας
σύμφωνα με τους Κανονισμούς 1907/2006/ΕΚ (REACH) Άρθρο 31, τον (ΕΕ) 2015/830 και τον 1272/2008/ΕΚ (CLP)

Ημερομηνία εκτύπωσης 01.02.2019 **Αριθμός έκδοσης 1** **Αναθεώρηση 01.02.2019**

Ονομασία του προϊόντος στο εμπόριο: Αιθυλενογλυκόλη

(συνέχεια από τη σελίδα 3)

2.3 Άλλοι κίνδυνοι
Αποτελέσματα της αξιολόγησης ΑΒΤ και αΑαΒ
ΑΒΤ: Μη εφαρμόσιμο
αΑαΒ: Μη εφαρμόσιμο

ΤΜΗΜΑ 3: Σύνθεση/πληροφορίες για τα συστατικά

3.1 Χημικός καθορισμός: Ουσίες
Αριθ. CAS, όνομα
107-21-1 αιθυλενογλυκόλη 100% w/w
Αριθμοί ταυτότητας προϊόντος
Αριθμός ΕC: 203-473-3
Αριθμός ευρετηρίου: 603-027-00-1
Συμπληρωματικές υποδείξεις: Δεν απαιτούνται.

ΤΜΗΜΑ 4: Μέτρα πρώτων βοηθειών

4.1 Περιγραφή των μέτρων πρώτων βοηθειών
Γενικές οδηγίες:
Ελέγξτε τις ζωτικές λειτουργίες. Να διατηρείται επαρκής αεραγωγός και αναπνοή.
Αναπνευστική ανακοπή: τεχνητή αναπνοή ή οξυγόνο.
Καρδιακή ανακοπή: πραγματοποιήστε ανάνηψη.
Θύμα συνειδητό με έντονη αναπνοή: μισό κάθισμα.
Θύμα στο σοκ: στην πλάτη του με τα πόδια να ανεβαίνουν ελαφρά.
Εμετός: αποτρέψτε την πνευμονία ασφυξίας / αναρρόφησης. Αποφύγετε την ψύξη καλύπτοντας το θύμα (χωρίς θέρμανση). Παρακολουθήστε συνεχώς το θύμα. Δώστε ψυχολογική βοήθεια. Κρατήστε το θύμα ήρεμο, αποφύγετε τη φυσική καταπόνηση.
Ανάλογα με την κατάσταση του θύματος: γιατρό / νοσοκομείο.
μετά από εισπνοή:
Μεταφέρετε τον πάθοντα στον καθαρό αέρα και αφήστε τον να ξεκουραστεί σε στάση που διευκολύνει την αναπνοή.
Συμβουλευτείτε αμέσως το γιατρό.
μετά από επαφή με το δέρμα:
Ξεπλύνετε με άφθονο νερό και σαπούνι.
Αφαιρέστε την μολυσμένη ενδυμασία.
Πλύνετε τα ρούχα που λερώθηκαν με το προϊόν πριν την επαναχρησιμοποίηση τους.
Σε περίπτωση ενοχλήσεων συμβουλευτείτε γιατρό.
μετά από επαφή με τα μάτια:
Να πλύνετε τα μάτια με ανοιχτά τα βλέφαρα κάτω από τρεχούμενο νερό για 15 λεπτά τουλαχιστόν.
Εάν υπάρχουν αφαιρέστε τους φακούς επαφής μετά από τα 1-2 πρώτα λεπτά και συνεχίστε να ξεπλένετε για αρκετά ακόμη λεπτά.
Προσοχή κατα τη πλύση των οφθαλμών, η εκτόξευση νερού με μεγάλη πίεση ενέχει κίνδυνο καταστροφής του κερατοειδούς, συμβουλευτείτε ένα γιατρό.
Σε περίπτωση συνεχιζόμενου ερεθισμού, επισκεφθείτε γιατρό.
μετά από κατάποση:
Πιείτε άφθονο νερό.
Αμέσως μετά την κατάποση: δώστε πολύ νερό για να πιείτε. Το θύμα είναι πλήρως συνειδητό: αμέσως προκαλεί εμετό. Προκαλείτε εμετό δίνοντας διάλυμα αλατόνερου 0,9%. Δώστε ενεργό άνθρακα.
Συμβουλευτείτε ιατρό / ιατρική υπηρεσία εάν αισθανθείτε αδιαθεσία.
4.2 Σημαντικότερα συμπτώματα και επιδράσεις, άμεσες ή μεταγενέστερες
Μετά από εισπνοή:
ΕΚΘΕΣΗ ΣΕ ΥΨΗΛΕΣ ΣΥΓΚΕΝΤΡΩΣΕΙΣ: Ερεθισμός του αναπνευστικού συστήματος. Ξηρός / πονόλαιμος.

(συνέχεια στη σελίδα 5)

Δελτίο δεδομένων ασφαλείας
σύμφωνα με τους Κανονισμούς 1907/2006/ΕΚ (REACH) Άρθρο 31, τον (ΕΕ) 2015/830 και τον 1272/2008/ΕΚ (CLP)

Ημερομηνία εκτύπωσης 01.02.2019 **Αριθμός έκδοσης 1** **Αναθεώρηση 01.02.2019**

Ονομασία του προϊόντος στο εμπόριο: Αιθυλενογλυκόλη

(συνέχεια από τη σελίδα 4)

Ερεθισμός των ρινικών βλεννογόνων μεμβρανών.
Μετά από επαφή με το δέρμα:
Δεν υπάρχουν διαθέσιμα δεδομένα.
Μετά από επαφή με τα μάτια:
ΣΕ ΣΥΝΕΧΗΣ ΕΚΘΕΣΗ / ΕΠΙΚΟΙΝΩΝΙΑ: Ερεθισμός του οφθαλμικού ιστού. Ερυθρότητα του ιστού των ματιών. Λακτισμός.
Μετά την κατάποση:
ΜΕΤΑ ΤΗΝ ΚΑΤΑΠΟΣΗ ΥΨΗΛΩΝ ΠΟΣΟΤΗΤΩΝ: Αίσθημα αδυναμίας. Καταστολή του κεντρικού νευρικού συστήματος. Πτώση θερμοκρασίας σώματος. Αύξηση θερμοκρασίας σώματος. Γαστρεντερικές καταγγελίες. Δυσκολία στην κατάποση. Πονοκέφαλο. Ζάλη. Νάρκωση. Πόσιμο. Διαταραχή της απτικής ευαισθησίας. Διαταραχή απόκρισης κινητήρα. Οπτικές διαταραχές. Διαταραχές της συνείδησης. Η στοργή του εγκεφάλου. Ταχεία δράση της καρδιάς. Χαμηλή αρτηριακή πίεση. Αλλαγή στο αιμόγραμμα / αίμα σύνθεση. Ταχεία αναπνοή. Κράμπες / ανεξέλεγκτες μυϊκές συσπάσεις. Τα παρακάτω συμπτώματα μπορεί να εμφανιστούν αργότερα: Μπλε / γκρι αποχρωματισμός του δέρμα. Διεύρυνση / στοργή του ήπατος. Μειωμένη νεφρική λειτουργία. Αλλαγή της σύνθεσης των ούρων. Αλλαγή της παραγωγής ούρων.

4.3 Ένδειξη οποιασδήποτε απαιτούμενης άμεσης ιατρικής φροντίδας και ειδικής θεραπείας
Δεν διατίθενται άλλες σχετικές πληροφορίες.

ΤΜΗΜΑ 5: Μέτρα για την καταπολέμηση της πυρκαγιάς

5.1 Πυροσβεστικά μέσα
Κατάλληλα πυροσβεστικά μέσα: CO2, ψεκασμός νερού, ξηρή σκόνη και αφρός ανθεκτικός σε αλκοόλες.
Πυροσβεστικά μέσα που για λόγους ασφαλείας είναι ακατάλληλα: Νερό με πλήρη εκτίναξη

5.2 Ειδικοί κίνδυνοι που προκύπτουν από την ουσία ή το μείγμα
Κατά την καύση: σχηματίζονται CO και CO2. Αντιδρά με την έκθεση σε αύξηση θερμοκρασίας με (μερικές) βάσεις. Αντιδρά με την έκθεση σε νερό και θερμότητα με (μερικά) μέταλλα.

5.3 Συστάσεις για τους πυροσβέστες
Ειδικός προστατευτικός εξοπλισμός:
Χρησιμοποιείστε αναπνευστική συσκευή.
Αυτόνομη αναπνευστική συσκευή και προστατευτική ενδυμασία σε περίπτωση πυρκαγιάς.
Ψύξτε τις δεξαμενές / δοχεία με ψεκασμό νερού / αφαιρέστε τα σε ασφάλεια.
Περαιτέρω δηλώσεις:
Μολυσμένα νερά πυρόσβεσης συλλέγονται ξεχωριστά, δεν επιτρέπεται να αδειάζονται στην αποχέτευση.

ΤΜΗΜΑ 6: Μέτρα για την αντιμετώπιση τυχαίας έκλυσης

6.1 Προσωπικές προφυλάξεις, προστατευτικός εξοπλισμός και διαδικασίες έκτακτης ανάγκης
Χρησιμοποιείστε αναπνευστική συσκευή.
Χρησιμοποιείστε προστατευτικό εξοπλισμό. Απομακρύνετε τα απροστάτευτα πρόσωπα.
Προστατευτική ενδυμασία και γάντια.
6.1.1 Για προσωπικό μη έκτακτης ανάγκης Αποφύγετε την επαφή με διαρρέον ή εκλυόμενο υλικό.
6.1.2 Για άτομα που προσφέρουν πρώτες βοήθειες
Αποτρέψτε περεταίρω διαρροή εφόσον αυτό είναι δυνατό.
Τα άτομα που προσφέρουν πρώτες βοήθειες πρέπει να φορούν προστατευτική ενδυμασία, προστατευτικά γάντια, προστατευτικά γυαλιά και αναπνευστική συσκευή.

6.2 Περιβαλλοντικές προφυλάξεις
Μην το αδειάζετε στην αποχέτευση και σε επιφάνειες υδάτων. Δεν πρέπει να διεισδύσει στον υδροφόρο ορίζοντα.

(συνέχεια στη σελίδα 6)

Δελτίο δεδομένων ασφαλείας
σύμφωνα με τους Κανονισμούς 1907/2006/ΕΚ (REACH) Άρθρο 31, τον (ΕΕ) 2015/830 και τον 1272/2008/ΕΚ (CLP)

Ημερομηνία εκτύπωσης 01.02.2019 **Αριθμός έκδοσης 1** **Αναθεώρηση 01.02.2019**

Ονομασία του προϊόντος στο εμπόριο: Αιθυλενογλυκόλη

(συνέχεια από τη σελίδα 5)

6.3 Μέθοδοι και υλικά για περιορισμό και καθαρισμό
Συλλέγεται με απορροφητικά υλικά υγρών (άμμο, εναποθέσεις πυρολίθου, πριονόσκονη).
Εναποθέστε μολυσμένα υλικά ως επικίνδυνα απόβλητα κατά το σημείο 13.
6.4 Παραπομπή σε άλλα τμήματα
Πληροφορίες για τον χειρισμό βλέπε κεφάλαιο 7.
Πληροφορίες για τον ατομικό προστατευτικό εξοπλισμό βλέπε κεφάλαιο 8.
Πληροφορίες για την απόρριψη βλέπε κεφάλαιο 13.

ΤΜΗΜΑ 7: Χειρισμός και αποθήκευση

7.1 Προφυλάξεις για ασφαλή χειρισμό
Χρησιμοποιήστε γειωμένο εξοπλισμό. Κρατήστε μακριά από γυμνή φλόγα / θερμότητα.
Κρατήστε το μακριά από συσκευές με σπινθήρες και εκρηκτικά.
Κρατήστε μακριά από πηγές ανάφλεξης / σπινθήρες.
Αέρια / ατμοί βαρύτερα από τον αέρα στους 20 ° C.
Τηρείτε τα κανονικά πρότυπα υγιεινής. Κρατήστε το δοχείο ερμητικά κλειστό. Αφαιρέστε αμέσως τα μολυσμένα ρούχα.
7.2 Συνθήκες ασφαλούς φύλαξης, συμπεριλαμβανομένων τυχόν ασυμβίβαστων καταστάσεων
Τεχνικά μέτρα και συνθήκες αποθήκευσης:
Να αποθηκεύεται σε καλά κλεισμένους περιέκτες, σε δροσερό και ξηρό μέρος.
Αποθήκευση μακριά από όλες τις πηγές ανάφλεξης και από θερμότητα.
Απαιτήσεις για χώρους και δοχεία αποθήκευσης:
Αποθηκεύεται σε δροσερό μέρος.
Κατάλληλο υλικό για δοχεία και σωλήνες: Ανοξείδωτος χάλυβας
Κατάλληλο υλικό για δοχεία και σωλήνες: Γυαλί
Υποδείξεις συναποθήκευσης:
Αποθηκεύστε μακριά από οξειδωτικούς παράγοντες.
Αποθηκεύεται μακριά από τρόφιμα και ζωοτροφές.
Δεν αποθηκεύεται μαζί με οξέα.
Διατηρείται χωριστά από υγρασία.
Διατηρείται χωριστά από βάσεις.
Περαιτέρω δηλώσεις για τους όρους αποθήκευσης: Καμία
7.3 Ειδική τελική χρήση ή χρήσεις Δεν διατίθενται άλλες σχετικές πληροφορίες.

ΤΜΗΜΑ 8: Έλεγχος της έκθεσης/ατομική προστασία

8.1 Παράμετροι ελέγχου

Συστατικά στοιχεία με οριακές τιμές επαγγελματικής έκθεσης:	
CAS: 107-21-1 αιθυλενογλυκόλη	
TWA (GR)	Μικρότερο χρονικό όριο: 125 mg/m³, 50 ppm Μεγαλύτερο χρονικό όριο: 125 mg/m³, 50 ppm
IOELV (EU)	Μικρότερο χρονικό όριο: 104 mg/m³, 40 ppm Μεγαλύτερο χρονικό όριο: 52 mg/m³, 20 ppm δέρμα

DNELs
ΕΡΓΑΖΟΜΕΝΟΙ
Μακροχρόνια εισπνοή τοπικών επιδράσεων: 35 mg/m³
Μακροπρόθεσμες συστηματικές επιδερμικές επιδράσεις: 106 mg/kg bw/day

ΓΕΝΙΚΟΣ ΠΛΗΘΥΣΜΟΣ
Μακροχρόνια εισπνοή τοπικών επιδράσεων: 7 mg/m³

(συνέχεια στη σελίδα 7)

Δελτίο δεδομένων ασφαλείας
σύμφωνα με τους Κανονισμούς 1907/2006/ΕΚ (REACH) Άρθρο 31, τον (ΕΕ) 2015/830 και τον 1272/2008/ΕΚ (CLP)

(συνέχεια από τη σελίδα 6)

Μακροπρόθεσμες συστηματικές επιδερμικές επιδράσεις: 53 mg/kg bw/day
PNECs
Γλυκό νερό: 10 mg / l
Θαλασσινό νερό: 1 mg / l
Νερό(διαλείπουσες απελευθερώσεις): 10 mg / l
Ίζημα γλυκού νερού :37 mg / kg ιζήματος dw
Θαλάσσιο ίζημα νερού: 3.7 mg / kg ιζήματος dw
STP: 199,5 mg / l
Έδαφος: 1,53 mg / kg εδάφους dw

8.2 Έλεγχοι έκθεσης

8.2.1 Κατάλληλοι μηχανικοί έλεγχοι:
Να λαμβάνονται τα κατάλληλα προστατευτικά μέτρα, όσον αφορά το χειρισμό χημικών ουσιών και μειγμάτων.
Παροχή επαρκούς εξαερισμού.

8.2.2 Ατομικός εξοπλισμός προστασίας:
Γενικά μέτρα προστασίας και υγιεινής:
Να πλένετε τα χέρια πριν το διάλειμμα και στο τέλος της εργασίας.
Όταν χρησιμοποιείτε το προϊόν μην τρώτε, πίνετε, και μην καπνίζετε.
Να βάζετε τη προστατευτική ενδυμασία ξεχωριστά.
Φροντίστε για επαρκή αερισμό κατά την χρήση.
Πλύνετε τα λερωμένα ρούχα πριν την επαναχρησιμοποίησή τους.
Προστασία για την αναπνοή:

Όταν παράγονται ατμοί: αναπνευστική προστασία και συσκευή φιλτραρίσματος με φίλτρο αερίου Α, χαρακτηριστικό
χρώμα: καφέ (A1 έως 0,1% vv, A2 έως 0,5% vv, A3 έως 1% VV). Σε περίπτωση των υψηλών συγκεντρώσεων ανα χρησιμοποιηθεί αυτόνομη αναπνευστική συσκευή.
Προστασία για τα χέρια:

Προστατευτικά γάντια.

Το υλικό των γαντιών θα πρέπει να είναι αδιαπέραστο και ανθεκτικό έναντι του προϊόντος / του υλικού / του παρασκευάσματος.
Λόγω μη πραγματοποίησης δοκιμών δεν μπορεί να προταθεί κανένα υλικό γαντιών για το προϊόν / το παρασκεύασμα / το χημικό μείγμα.
Επιλέξτε το υλικό του γαντιού λαμβάνοντας υπ' όψη τους χρόνους διέλευσης, το βαθμό διαπερατότητας και την υποβάθμιση.
Υλικό γαντιών:
Η επιλογή του κατάλληλου γαντιού δεν εξαρτάται μόνον από το υλικό, αλλά και τα επιπλέον χαρακτηριστικά ποιότητας, τα οποία διαφέρουν ανάλογα με τον κατασκευαστή. Επειδή το προϊόν είναι ένα μείγμα που αποτελείται από περισσότερα συστατικά δεν μπορεί να εξακριβωθεί η ανθεκτικότητα του υλικού κατασκευής των γαντιών και θα πρέπει να ελεγχθούν πριν από τη χρήση.
Χρόνος διείσδυσης του υλικού γαντιών:
Οι χρόνοι διέλευσης σύμφωνα με τον κανονισμό EN 374 Μέρος III ενίοτε δεν ισχύουν υπό πραγματικές συνθήκες. Προτείνεται μέγιστος χρόνος χρήσης που αντιστοιχεί στο 50% του χρόνου διέλευσης.
Για τη διαρκή επαφή σε περιοχές χωρίς αυξημένο κίνδυνο τραυματισμού (π.χ. εργαστήριο) είναι κατάλληλα τα γάντια που έχουν κατασκευαστεί από το εξής υλικό:
Γάντια από PVA

(συνέχεια στη σελίδα 8)

Δελτίο δεδομένων ασφαλείας
σύμφωνα με τους Κανονισμούς 1907/2006/ΕΚ (REACH) Άρθρο 31, τον (ΕΕ) 2015/830 και τον 1272/2008/ΕΚ (CLP)

Ημερομηνία εκτύπωσης 01.02.2019 **Αριθμός έκδοσης 1** **Αναθεώρηση 01.02.2019**

Ονομασία του προϊόντος στο εμπόριο: Αιθυλενογλυκόλη

(συνέχεια από τη σελίδα 7)

Γάντια από τεχνητό λάστιχο (Neopren) ή ανθεκτικό υλικό (Nitrile)
Καουτσούκ χλωροπρενίου

Προστασία για τα μάτια:

Για τις μεταγγίσεις συνιστάται να βάζετε προστατευτικά γυαλιά.

Προστασία για το σώμα:

Προστατευτική ενδυμασία εργασίας.

8.2.3 Έλεγχοι περιβαλλοντικής έκθεσης:
Αποτρέψτε την διοχέτευση του προϊόντος στην αποχέτευση, στα επιφανειακά και υπόγεια ύδατα και στο έδαφος.
Απορρίψτε τα υγρά πλυσίματος σύμφωνα με τους τοπικούς και εθνικούς κανονισμούς.

ΤΜΗΜΑ 9: Φυσικές και χημικές ιδιότητες

9.1 Στοιχεία για τις βασικές φυσικές και χημικές ιδιότητες
Γενικές πληροφορίες

Όψη:	
Μορφή:	Υγρό
Χρώμα:	Άχρωμο
Οσμή:	άοσμο
Όριο οσμής:	Μη καθορισμένο
Τιμή pH:	Μη καθορισμένο
Σημείο τήξεως/σημείο πήξεως:	-13 °C
Αρχικό σημείο ζέσεως και περιοχή ζέσεως:	197,4 °C
Σημείο ανάφλεξης:	111 °C Μη εύφλεκτο
Αναφλεξιμότητα (στερεό/αέριο):	Μη χρησιμοποιήσιμο
Θερμοκρασία αυτοανάφλεξης:	398 °C Μη καθορισμένη
Θερμοκρασία αποσύνθεσης:	Μη καθορισμένο
Εκρηκτικές ιδιότητες:	Δεν υφίσταται κίνδυνος εκρήξεως του προϊόντος.
Όρια κινδύνου εκρήξεως:	
κατώτερα:	Μη καθορισμένο
ανώτερα:	Μη καθορισμένο
Πίεση ατμού σε 25 °C	0,123 hPa Μη καθορισμένο
Πυκνότητα σε 20 °C:	1,1 g/cm³
Σχετική πυκνότητα	Μη καθορισμένο

(συνέχεια στη σελίδα 9)

Δελτίο δεδομένων ασφαλείας
σύμφωνα με τους Κανονισμούς 1907/2006/ΕΚ (REACH) Άρθρο 31, τον (ΕΕ) 2015/830 και τον 1272/2008/ΕΚ (CLP)

Ημερομηνία εκτύπωσης 01.02.2019 **Αριθμός έκδοσης 1** **Αναθεώρηση 01.02.2019**

Ονομασία του προϊόντος στο εμπόριο: Αιθυλενογλυκόλη

(συνέχεια από τη σελίδα 8)

Πυκνότητα ατμών	Μη καθορισμένο
Ταχύτητα εξάτμισης:	Μη καθορισμένο
Διαλυτότητα σε / αναμείξιμο με νερό:	Αναμειγνύεται πλήρως
Συντελεστής κατανομής: n-οκτανόλη/νερό:	Μη καθορισμένο
Ιξώδες	
δυναμικό:	Μη καθορισμένο
κινηματικό:	Μη καθορισμένο
9.2 Άλλες πληροφορίες	Δεν διατίθενται άλλες σχετικές πληροφορίες.

ΤΜΗΜΑ 10: Σταθερότητα και αντιδραστικότητα

10.1 Αντιδραστικότητα Το προϊόν δεν αντιδρά υπό κανονικές συνθήκες.
10.2 Χημική σταθερότητα Σταθερό υπό κανονικές συνθήκες.
Θερμική αποσύνθεση / Όροι που πρέπει να αποφεύγονται: Ευσταθές στη θερμοκρασία περιβάλλοντος.
10.3 Πιθανότητα επικίνδυνων αντιδράσεων Δεν είναι γνωστή καμία επικίνδυνη αντίδραση.
10.4 Συνθήκες προς αποφυγήν Να αποφεύγεται η επαφή με οξειδωτικούς παράγοντες.
10.5 Μη συμβατά υλικά: Δεν διατίθενται άλλες σχετικές πληροφορίες.
10.6 Επικίνδυνα προϊόντα αποσύνθεσης: Δεν είναι γνωστά επικίνδυνα προϊόντα αποσυνθέσεως.

ΤΜΗΜΑ 11: Τοξικολογικές πληροφορίες

11.1 Πληροφορίες για τις τοξικολογικές επιπτώσεις
Οξεία τοξικότητα
Επιβλαβές σε περίπτωση κατάποσης.

Εκτίμηση Οξείας Τοξικότητας -LD/LC50		
Αιθανο-1,2-διόλη		
Από το στόμα	LD50	7712 mg/kg (rat) (BASF - internal Standards)
		500 mg/kg
Από το δέρμα	LD50	>3500 mg/kg bw (rat) (Develpmental toxicity study)
Εισπνοή	LD50(6h)	> 2,5 mg/l air (rat) (Teratogenicity study)

Διάβρωση και ερεθισμός του δέρματος
Βάσει των διαθέσιμων δεδομένων, τα κριτήρια ταξινόμησης δεν πληρούνται.
Σοβαρή βλάβη/ερεθισμός των ματιών
Βάσει των διαθέσιμων δεδομένων, τα κριτήρια ταξινόμησης δεν πληρούνται.
Ευαισθητοποίηση του αναπνευστικού συστήματος ή του δέρματος
Βάσει των διαθέσιμων δεδομένων, τα κριτήρια ταξινόμησης δεν πληρούνται.
Επιπτώσεις ΚΜΤ (καρκινογένεση, μεταλλαξιγένεση και τοξικότητα για την αναπαραγωγή)
Μεταλλαξιγένεση γεννητικών κυττάρων
Βάσει των διαθέσιμων δεδομένων, τα κριτήρια ταξινόμησης δεν πληρούνται.
Καρκινογένεση Βάσει των διαθέσιμων δεδομένων, τα κριτήρια ταξινόμησης δεν πληρούνται.
Τοξικότητα για την αναπαραγωγή
Βάσει των διαθέσιμων δεδομένων, τα κριτήρια ταξινόμησης δεν πληρούνται.
STOT-εφάπαξ έκθεση Βάσει των διαθέσιμων δεδομένων, τα κριτήρια ταξινόμησης δεν πληρούνται.
STOT-επανειλημμένη έκθεση
Ειδική Τοξικότητα σε όργανα στόχους Κατηγορία 2 κατόπιν επαναλαμβανόμενης έκθεσης
Μπορεί να προκαλέσει βλάβες στα όργανα ύστερα από παρατεταμένη ή επανειλημμένη έκθεση.

(συνέχεια στη σελίδα 10)

Δελτίο δεδομένων ασφαλείας
σύμφωνα με τους Κανονισμούς 1907/2006/ΕΚ (REACH) Άρθρο 31, τον (ΕΕ) 2015/830 και τον 1272/2008/ΕΚ (CLP)

Ημερομηνία εκτύπωσης 01.02.2019 **Αριθμός έκδοσης 1** **Αναθεώρηση 01.02.2019**

Ονομασία του προϊόντος στο εμπόριο: Αιθυλενογλυκόλη

(συνέχεια από τη σελίδα 9)

Κίνδυνος από αναρρόφηση Βάσει των διαθέσιμων δεδομένων, τα κριτήρια ταξινόμησης δεν πληρούνται.

ΤΜΗΜΑ 12: Οικολογικές πληροφορίες

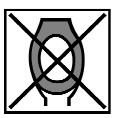
12.1 Τοξικότητα
Υδατική τοξικότητα:
LC50 EPA 600/4-90/027 :72860 mg/l Pimephalespromelas Acute toxicity fishes 96 h Static system Fresh water Experimental value.
Acute toxicity invertebrates EC50 OECD 202: > 100 mg/l 48 h Daphnia magna Static system Fresh water Experimental value.
Toxicity algae and other aquatic 96 h plants: EC50 EPA 600/9-78-018: 6500 mg/l - 13000 mg/l Pseudokirchnerie lla subcapitata Experimental value;Growth rate.
NOEC EPA 600/4-90/027: 15380 mg/l Pimephales promelas Long-term toxicity fish 7 day(s) Experimental value.
NOEC EPA 600/4-90/027 Long-term toxicity invertebrates: 8590 mg/l 7 day(s) Ceriodaphnia sp. Fresh water Experimental value.
Toxicity aquatic micro-organisms- EC20 ISO 8192: > 1995 mg/l 30 minutes Activated sludge Static system Fresh water Read-across.
12.2 Ανθεκτικότητα και ικανότητα αποδόμησης
OECD 301A: DOC Die-Away Test 90 % - 100 % 10 day(s) Experimental value
12.3 Δυνατότητα βιοσυσσώρευσης Log Kow: -1.36
12.4 Κινητικότητα στο έδαφος log Koc: 0
Περαιτέρω οικολογικές ενδείξεις:
Γενικές οδηγίες: Επικίνδυνο για το υδάτινο περιβάλλον - Κλάση 2 (Δική μας εκτίμηση): επικίνδυνο
12.5 Αποτελέσματα της αξιολόγησης ΑΒΤ και αΑαΒ
ΑΒΤ: Μη εφαρμόσιμο
αΑαΒ: Μη εφαρμόσιμο
12.6 Άλλες αρνητικές επιπτώσεις Δεν διατίθενται άλλες σχετικές πληροφορίες.

ΤΜΗΜΑ 13: Στοιχεία σχετικά με τη διάθεση

13.1 Μέθοδοι διαχείρισης αποβλήτων
Σύσταση:

Η διάθεση του υλικού πρέπει να είναι σύμφωνη με την Εθνική Νομοθεσία.

Επικίνδυνα απόβλητα σύμφωνα με την οδηγία 2008/98 / ΕΚ.
Κωδικός υλικού αποβλήτων (οδηγία 2008/98 / ΕΚ, απόφαση 2000/0532 / ΕΚ).
07 01 04 * (απόβλητα από την παρασκευή, τη διαμόρφωση, την προμήθεια και τη χρήση βασικών οργανικών χημικών ουσιών: άλλοι οργανικοί διαλύτες, υγρά πλυσίματος και μητρικά υγρά). Ανάλογα με τον κλάδο της βιομηχανίας και την παραγωγική διαδικασία, μπορεί να ισχύουν και άλλοι κωδικοί αποβλήτων.



Δεν επιτρέπεται να εναποτεθεί μαζί με τα κοινά απορρίμματα. Μην το αδειάζετε στην αποχέτευση.

Για ανακύκλωση απευθυνθείτε στον παραγωγό.
Ανακυκλώστε με απόσταξη. Αφαιρέστε σε έναν εξουσιοδοτημένο αποτεφρωτήρα αποβλήτων για διαλύτες με ανάκτηση ενέργειας. Απομακρύνετε τα απόβλητα σύμφωνα με τους τοπικούς και / ή εθνικούς κανονισμούς. Τα επικίνδυνα απόβλητα δεν πρέπει να αναμιγνύονται μαζί με άλλα απόβλητα. Οι διαφορετικοί τύποι επικίνδυνων αποβλήτων δεν πρέπει να αναμιγνύονται μεταξύ τους, εάν αυτό μπορεί να συνεπάγεται κίνδυνο ρύπανσης ή να δημιουργήσει προβλήματα για την περαιτέρω διαχείριση των αποβλήτων. Τα επικίνδυνα

(συνέχεια στη σελίδα 11)

Δελτίο δεδομένων ασφαλείας
σύμφωνα με τους Κανονισμούς 1907/2006/ΕΚ (REACH) Άρθρο 31, τον (ΕΕ) 2015/830 και τον 1272/2008/ΕΚ (CLP)

Ημερομηνία εκτύπωσης 01.02.2019 **Αριθμός έκδοσης 1** **Αναθεώρηση 01.02.2019**

Ονομασία του προϊόντος στο εμπόριο: Αιθυλενογλυκόλη

(συνέχεια από τη σελίδα 10)

απόβλητα διαχειρίζονται υπεύθυνα. Όλες οι οντότητες που αποθηκεύουν, μεταφέρουν ή χειρίζονται επικίνδυνα απόβλητα λαμβάνουν τα απαραίτητα μέτρα για την πρόληψη των κινδύνων ρύπανσης ή ζημιάς σε ανθρώπους ή ζώα. Αποκτήστε τη συγκατάθεση των αρχών ελέγχου της ρύπανσης πριν από την απόρριψή τους σε εγκαταστάσεις επεξεργασίας λυμάτων. Μην εκφορτώνετε σε επιφανειακά νερά.
Αριθμός απόβλητου.
Συσκευασία κωδικών υλικών αποβλήτων (οδηγία 2008/98 / ΕΚ).
15 01 10 * (συσκευασία που περιέχει υπολείμματα ή μολύνσεις από επικίνδυνες ουσίες).

Ακάθαρτες συσκευασίες:
Σύσταση:
Η εναπόθεση γίνεται σύμφωνα με τις επίσημες οδηγίες.
Ο περιέκτης μπορεί όταν καθαριστεί να επαναχρησιμοποιηθεί ή να αξιοποιηθεί το υλικό του.

ΤΜΗΜΑ 14: Πληροφορίες σχετικά με τη μεταφορά

14.1 Αριθμός ΟΗΕ	
ADR, ADN, IMDG, IATA	εκπίπτει
14.2 Οικεία ονομασία αποστολής ΟΗΕ	
ADR, ADN, IMDG, IATA	εκπίπτει
14.3 Τάξης/-εις κινδύνου κατά τη μεταφορά	
ADR, ADN, IMDG, IATA	
Κλάση	εκπίπτει
14.4 Ομάδα συσκευασίας	
ADR, IMDG, IATA	εκπίπτει
14.5 Περιβαλλοντικοί κίνδυνοι	Μη εφαρμόσιμο
14.6 Ειδικές προφυλάξεις για τον χρήστη	Μη χρησιμοποιήσιμο
14.7 Χύδην μεταφορά σύμφωνα με το παράρτημα II της σύμβασης MARPOL και τον κώδικα IBC	Μη χρησιμοποιήσιμο
UN "Model Regulation":	εκπίπτει

ΤΜΗΜΑ 15: Στοιχεία νομοθετικού χαρακτήρα

15.1 Κανονισμοί/νομοθεσία σχετικά με την ασφάλεια, την υγεία και το περιβάλλον για την ουσία ή το μείγμα
Κανονισμός (ΕΕ) 2015/830
Κανόνισμός CLP 1272/2008/ΕΚ
Κανονισμός REACH 1907/2006/ΕΚ
Οδηγία 98/24/ΕΚ του Συμβουλίου της 7ης Απριλίου 1998 για την Προστασία της Υγείας και Ασφάλειας των Εργαζομένων κατά την Εργασία από Κινδύνους Οφειλόμενους σε Χημικούς Παράγοντες
Οδηγία 94/33/ΕΚ για την προστασία των νέων κατά την εργασία, όπως έχει τροποποιηθεί και ισχύει.
Οδηγία 92/85/ΕΟΚ σχετικά με την εφαρμογή μέτρων που αποβλέπουν στη βελτίωση της υγείας και της ασφάλειας κατά την εργασία των εγκύων, λεχώνων και γαλουχουσων εργαζομένων, όπως έχει τροποποιηθεί και ισχύει.

Οδηγία 2012/18 / ΕΕ
Κατονομαζόμενες επικίνδυνες ουσίες - ΠΑΡΑΡΤΗΜΑ I
Κανένα από συστατικά στοιχεία δεν περιέχεται στη λίστα.
Η ουσία δεν περιλαμβάνεται στο Παράρτημα I.
ΚΑΝΟΝΙΣΜΟΣ (ΕΚ) αριθ. 1907/2006 ΠΑΡΑΡΤΗΜΑ XVII Όροι περιορισμού : 3

(συνέχεια στη σελίδα 12)

Δελτίο δεδομένων ασφαλείας
σύμφωνα με τους Κανονισμούς 1907/2006/ΕΚ (REACH) Άρθρο 31, τον (ΕΕ) 2015/830 και τον 1272/2008/ΕΚ (CLP)

Ημερομηνία εκτύπωσης 01.02.2019 **Αριθμός έκδοσης 1** **Αναθεώρηση 01.02.2019**

Ονομασία του προϊόντος στο εμπόριο: Αιθυλενογλυκόλη

(συνέχεια από τη σελίδα 11)

Εθνικές διατάξεις

Άλλες διατάξεις, περιορισμοί και απαγορεύσεις

Ουσίες που προκαλούν πολύ μεγάλη ανησυχία (SVHC) σύμφωνα με το REACH, άρθρο 57
Δεν ανήκει στις ουσίες που προκαλούν πολύ μεγάλη ανησυχια (SVHC).

15.2 Αξιολόγηση χημικής ασφάλειας:

Η αξιολόγηση χημικής ασφάλειας πραγματοποιήθηκε

ΤΜΗΜΑ 16: Άλλες πληροφορίες

Αυτές οι δηλώσεις βασίζονται στο σημερινό επίπεδο των γνώσεών μας, δεν αποτελούν εγγύηση για τις ιδιότητες των προϊόντων ούτε αιτιολογούν νομικές συνέπειες.

Υποδείξεις εκπαίδευσης

Κατάλληλη εκπαίδευση για την ασφάλεια και τον χειρισμό θα πρέπει να παρέχεται σε όλους τους εργαζόμενους σύμφωνα με τις υπάρχουσες πληροφορίες.

Δελτίο Δεδομένων Ασφαλείας, συντάχτηκε από:

SUSTCHEM A.E.
Τμήμα REACH & Χημικών Υπηρεσιών
Α: 3ης Σεπτεμβρίου 144 | 112 51, Αθήνα
Τ: +30 210 8252510 | F: +30 210 8252575
W: www.sustchem.gr | E: info@suschem.gr

Συντμήσεις και αρκτικόλεξα:

RID: Règlement international concernant le transport des marchandises dangereuses par chemin de fer (Regulations Concerning the International Transport of Dangerous Goods by Rail)
ICAO: International Civil Aviation Organisation
ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)
IMDG: International Maritime Code for Dangerous Goods
IATA: International Air Transport Association
GHS: Globally Harmonised System of Classification and Labelling of Chemicals
EINECS: European Inventory of Existing Commercial Chemical Substances
CAS: Chemical Abstracts Service (division of the American Chemical Society)
DNEL: Derived No-Effect Level (REACH)
PNEC: Predicted No-Effect Concentration (REACH)
LC50: Lethal concentration, 50 percent
LD50: Lethal dose, 50 percent
PBT: Persistent, Bioaccumulative and Toxic
SVHC: Substances of Very High Concern
vPvB: very Persistent and very Bioaccumulative
Acute Tox. 4: Οξεία τοξικότητα μέσω του – Κατηγορία 4
STOT RE 2: Ειδική τοξικότητα στα όργανα στόχους (επαναλαμβανόμενη έκθεση) – Κατηγορία 2

SAFETY DATA SHEET

Annex II

Ethane-1,2-Diol

Exposure scenario

EC Number: 203-473-3
CAS Number: 107-21-1

1. EXPOSURE ASSESSMENT

General remarks

Environment

In the chemical safety assessment performed according to Article 14(3) in connection with Annex I section 3 (Environmental Hazard Assessment) and section 4 (PBT/ vPvB Assessment) no hazard was identified. Also, according to Annex VI of Directive 67/548/EEC, there is no environmental classification for monoethylene glycol.

Article 14 (4) of REACH, however, establishes that exposure assessment and risk characterisation according to Annex I are to be carried out in the CSA/CSR for substances (> 10 mt/y), classified as hazardous or as PBT/vPvB. Annex I, section 5.0 requires to cover any exposure that may relate to the "hazards identified" in the hazard assessment (section 1 to 4). The hazards addressed in Annex I are not limited to hazards that lead to a classification under CLP (see Guidance Document A, footnote 7).

The aquatic toxicity of the five short chain ethylene glycols (mono-, di-, tri-, tetra- and pentaethylene glycol) were evaluated as a single category. Data on the acute toxicity are available for all three trophic levels (fish, aquatic invertebrates and algae). In the majority of tests no effect was observed, even at concentrations beyond 100 mg/L. All the available data indicate that the members of the category should exhibit low toxicity. Therefore all category members can be evaluated as not harmful to aquatic life.

In addition, monoethylene glycol has a low Kow of 0.044, is not expected to bioaccumulate, and is readily biodegradable. Thus, environmental classification of monoethylene glycol for acute or chronic aquatic hazards is not indicated.

The environmental assessment was performed using the latest available version of ECETOC TRA. Each scenario was assessed using an Environmental Release Category (ERC) in a Tier I assessment. If the assessment resulted in a risk characterisation ratio greater than 1.0, then a Specific Environmental Release Category (SpERC) approach was used in the ECETOC TRA tool.

Tonnages used in the estimation of exposures and risks represent industry-wide tonnages or maximum passing tonnages for the sake of conservatism. Tonnages of 1,000,000 per year have their basis in manufacturing volume, where the value of 1,000,000 tonnes represents an estimate of the industry-wide manufacturing of monoethylene glycol. Tonnages other than 1,000,000 tonnes per year represent the maximum tonnage that would pass (referred to as the "maximum passing tonnage") for a particular scenario, as determined using the latest version of ECETOC TRA. This approach leads to a worst case assessment since actual tonnages are expected to be much lower than the values used in the assessment.

Human health – Worker

Short-term exposure: Ethan-1,2-diol is not classified regarding acute inhalative or dermal toxicity. Thus, short-term exposure (peak exposure) has not been assessed.

Exposure estimation for PROCs using the ECETOC TRA worker v2.0:

In case the ECETOC TRA worker v2.0 has been used for the calculation of PROCs the following modifications has been applied:

LEV: The LEV exposure modifying factors for dermal exposure implemented in the ECETOC TRA v2.0 are not considered

Gloves: Implemented as an additional RMM. The following effectiveness values are assumed: Use of suitable gloves: 80%; Use of suitable gloves in combination with basic employee training: 90%; Use of suitable gloves in combination with specific activity training: 95%; Use of suitable gloves in combination with intensive management supervision controls: 98%

Description of ECETOC TRA details can be found in the Technical Report 93 (2004) or at

https://www.ecetoc-tra.org/. (version used: ECETOC TRA v2.0)
Human health – Consumer
Short-term exposure: Ethan-1,2-diol is not classified regarding acute inhalative or dermal toxicity. Thus, short-term exposure (peak exposure) has not been assessed.

Exposure estimation for PCs using the ConsExpo v4.1:
The inhalative long-term DNEL is based on local effects observed at long-term exposure (20-22 hours) towards Ethan-1,2-diol aerosols in humans. (This local DNEL is considered to be protective also from systemic effects.) Thus, the consumer use was assumed to be of no concern in case the "mean concentration on day of exposure" does not exceed the inhalative long-term DNEL.

Short description of all exposure scenarios

Table 1: Short description of all exposure scenarios with their use descriptors and life cycle stage

Number (ES)	Short description of exposure scenario	Product Category (PC)	Life cycle stage covered by ES						Sector of use (SU)	Process category (PROC)	Article Category (AC)	Environmental release category (ERC)
			Manufacture	Formulation	End use			Service Life				
					Industrial	Professional	Consumer					
1	Manufacturing of substance				X				3	1, 2, 3, 4, 8a, 8b, 15		1
2	Use as Intermediate				X				3	1, 2, 3, 4, 5, 8a, 8b, 9, 15		6a
3	Use as Process chemical				X				3	1, 2, 3, 4, 5, 8a, 8b, 9, 13, 14,		4

Number (ES)	Short description of exposure scenario	Product Category (PC)	Life cycle stage covered by ES						Sector of use (SU)	Process category (PROC)	Article Category (AC)	Environmental release category (ERC)
			Manufacture	Formulation	End use			Service Life				
					Industrial	Professional	Consumer					
										15		
4	Distribution of substance				X				3	1, 2, 3, 4, 8a, 8b, 9, 15		1,
5	Formulation & (re)packing of substances and mixtures				X				3	1, 2, 3, 4, 5, 8a, 8b, 9, 14, 15		2
6	Production of Polymers				X				3	1, 2, 3, 4, 5, 6, 8a, 8b, 9, 15		6c
7	Use in Paints/ Coatings (industrial)				X				3	1, 2, 3, 4, 5, 7, 8a, 8b, 10, 13,		4

Number (ES)	Short description of exposure scenario	Product Category (PC)	Life cycle stage covered by ES						Sector of use (SU)	Process category (PROC)	Article Category (AC)	Environmental release category (ERC)
			Manufacture	Formulation	End use			Service Life				
					Industrial	Professional	Consumer					
										15		
8	Use in Paints/ Coatings /Adhesives/ Sealants/ Foams/ Polymers / filled Polymers (professional)					X			22	1, 2, 3, 4, 5, 8a, 8b, 9, 10, 11, 13, 14, 15, 19		8d,
9	Use in Paints/ Coatings / Surface treatment products (Consumer use)	9a, 15, 18, 23, 31, 34					X		21			8d,
10	Use in Cleaning agents (industrial)				X				3	1, 2, 3, 4, 7, 8a, 8b, 10, 13		4
11	Use in Cleaning agents (professional)					X			22	1, 2, 3, 4, 8a, 8b, 10, 11, 13		8a,

Number (ES)	Short description of exposure scenario	Product Category (PC)	Life cycle stage covered by ES						Sector of use (SU)	Process category (PROC)	Article Category (AC)	Environmental release category (ERC)
			Manufacture	Formulation	End use			Service Life				
					Industrial	Professional	Consumer					
12	Use in Cleaning agents (Consumer use)	35					X		21			8a,
13	Use in Lubricants (industrial)				X				3	1, 2, 3, 4, 7, 8a, 8b, 9, 10, 13, 17, 18		4
14	Use in Metal-working fluids (industrial)				X				3	1, 2, 3, 4, 5, 7, 8a, 8b, 9, 10, 13, 17		4
15	Use in Metal-working fluids (professional)					X			22	1, 2, 3, 5, 8a, 8b, 9, 10, 11, 13, 17		8a
16	Use in Agrochemicals (professional)					X			22	1, 2, 4,		8d

Number (ES)	Short description of exposure scenario	Product Category (PC)	Life cycle stage covered by ES						Sector of use (SU)	Process category (PROC)	Article Category (AC)	Environmental release category (ERC)
			Manufacture	Formulation	End use			Service Life				
					Industrial	Professional	Consumer					
										8a, 8b, 9, 11, 13		
17	Use in/as Functional fluids (industrial)				X				3	1, 2, 3, 4, 8a, 8b, 9		7
18	Use in/as Functional fluids (professional)					X			22	1, 2, 3, 4, 8a, 9, 20		9b
19	Use in Heat transfer and Hydraulic fluids (Consumer)	16, 17					X		21			9b
20	Use in/as De-icing/Anti-icing applications/agents (professional)					X			22	1, 2, 8a, 8b, 11		8d
21	Use in/as De-icing/Anti-icing applications/agents (Consumer use)	4					X		21			8d
22	Use in laboratories (industrial and professional)				X	X			3, 22	15		8a
23	Use in Water-treatment chemicals (industrial)				X				3	1, 2, 3, 4, 8a, 8b,		3

Number (ES)	Short description of exposure scenario	Product Category (PC)	Life cycle stage covered by ES						Sector of use (SU)	Process category (PROC)	Article Category (AC)	Environmental release category (ERC)
			Manufacture	Formulation	End use			Service Life				
					Industrial	Professional	Consumer					
										13		
24	Use in Adhesives and Sealants (Consumer)	1					X		21			8c
25	Production of Polymers, filled polymers, Foams, Coatings, Adhesives, Sealants				X				3	1, 2, 3, 4, 5, 7, 8a, 8b, 9, 10 13, 14, 15		6c
26	Production of rigid foam	32					X		21			8f

1.1 Manufacturing of substance

1.1.1. Exposure scenario 1

The relevant operational conditions (OCs) used for calculation of environmental exposure are mentioned under paragraph 1.1.2.4.

Table 2: Description of ES 1

Reference Number	1
1.1.1.1 Title	
Free short title	Manufacturing of substance
Systematic title based on use descriptor	SU3; PROC 1, 2, 3, 4, 8a, 8b and 15; ERC 1
1.1.1.2 Operational conditions and Risk management measures	
1.1.1.2.1Control of workers exposure for PROC 1	
Name of contributing scenario	Use in closed process, no likelihood of exposure
Use descriptor covered	PROC 1
Assessment Method	ECETOC TRA Worker v2.0 with modifications

	(see 1. General remarks)	
Product characteristic		
Physical state	Liquid	
Fugacity	High	
Concentration of substance	100	%
Vapour pressure of the substance	1067	hPa
(Vapour pressure corresponds to temperatures of ca. 200 °C)		
Amounts used		
Not relevant		
Frequency and duration of use/exposure		
Duration of exposure	> 4	hours/day
Frequency of exposure	≤ 240	days/year
Human factors not influenced by risk management		
Exposed skin surface	Palm of one hand (240 cm²)	
Other given operational conditions affecting workers exposure		
Location	Indoor	
Domain	Industrial	
Technical conditions and measures at process level (source) to prevent release		
None		
Technical conditions and measures to control dispersion from source towards the worker		
Local exhaust ventilation required	No	
Organisational measures to prevent /limit releases, dispersion and exposure		
Not relevant in ECETOC TRA		
Conditions and measures related to personal protection, hygiene and health evaluation		
Respiratory protection required	No	
1.1.1.2.2Control of workers exposure for PROC 2		
Name of contributing scenario	Use in closed, continuous process with occasional controlled exposure	
Use descriptor covered	PROC 2	
Assessment Method	ECETOC TRA Worker v2.0 with modifications (see 1. General remarks)	
Product characteristic		
Physical state	Liquid	
Fugacity	High	
Concentration of substance	100	%
Vapour pressure of the substance	1067	hPa
(Vapour pressure corresponds to temperatures of ca. 200 °C)		

Amounts used		
Not relevant		
Frequency and duration of use/exposure		
Duration of exposure	> 4	hours/day
Frequency of exposure	≤ 240	days/year
Human factors not influenced by risk management		
Exposed skin surface	Palm of both hands (480 cm²)	
Other given operational conditions affecting workers exposure		
Location	Indoor	
Domain	Industrial	
Technical conditions and measures at process level (source) to prevent release		
None		
Technical conditions and measures to control dispersion from source towards the worker		
Local exhaust ventilation required	Yes	Effectiveness: 90%
Organisational measures to prevent /limit releases, dispersion and exposure		
Not relevant in ECETOC TRA		
Conditions and measures related to personal protection, hygiene and health evaluation		
Respiratory protection required	No	
1.1.2.2.3 Control of workers exposure for PROC 3 and 4		
Workers related free short title	Use in closed batch process (synthesis or formulation). Use in batch and other process (synthesis) where opportunity for exposure arises.	
Use descriptor covered	PROC 3 and 4	
Assessment Method	ECETOC TRA Worker v2.0 with modifications (see 1. General remarks)	
Product characteristic		
Physical state	Liquid	
Fugacity	Low	
Concentration of substance	100	%
Vapour pressure of the substance	0.123	hPa
Amounts used		
Not relevant		
Frequency and duration of use/exposure		
Duration of exposure	> 4	hours/day
Frequency of exposure	≤ 240	days/year
Human factors not influenced by risk management		
Exposed skin surface	Palm of one hand (240 cm²): PROC 3	

	Palm of both hands (480 cm²): PROC 4	
Other given operational conditions affecting workers exposure		
Location	Indoor	
Domain	Industrial	
Technical conditions and measures at process level (source) to prevent release		
None		
Technical conditions and measures to control dispersion from source towards the worker		
Local exhaust ventilation required	No	
Organisational measures to prevent /limit releases, dispersion and exposure		
Not relevant in ECETOC TRA		
Conditions and measures related to personal protection, hygiene and health evaluation		
Respiratory protection required	No	
1.1.1.2.4 Control of workers exposure for PROC 8a		
Workers related free short title	Transfer of substance or preparation (charging/discharging) from/to ves-sels/large containers at non-dedicated facilities	
Use descriptor covered	PROC 8a	
Assessment Method	ECETOC TRA Worker v2.0 with modifications (see 1. General remarks)	
Product characteristic		
Physical state	Liquid	
Fugacity	Low	
Concentration of substance	100	%
Vapour pressure of the substance	0.123	hPa
Amounts used		
Not relevant		
Frequency and duration of use/exposure		
Duration of exposure	> 4	hours/day
Frequency of exposure	≤ 240	days/year
Human factors not influenced by risk management		
	Both hands (960 cm²)	
Other given operational conditions affecting workers exposure		
Location	Indoor	
Domain	Industrial	
Technical conditions and measures at process level (source) to prevent release		
None		
Technical conditions and measures to control dispersion from source towards the worker		
Local exhaust ventilation required	Yes	Effectiveness: 90%
In case no LEV is present, a suitable respiratory protection with adequate effectiveness is required		

Organisational measures to prevent /limit releases, dispersion and exposure		
Not relevant in ECETOC TRA		
Conditions and measures related to personal protection, hygiene and health evaluation		
Respiratory protection required	No	
1.1.1.2.5 Control of workers exposure for PROC 8b		
Workers related free short title	Transfer of substance or preparation (charging/discharging) from/to ves-sels/large containers at dedicated facilities	
Use descriptor covered	PROC 8a	
Assessment Method	ECETOC TRA Worker v2.0 with modifications (see 1. General remarks)	
Product characteristic		
Physical state	Liquid	
Fugacity	Low	
Concentration of substance	100	%
Vapour pressure of the substance	0.123	hPa
Amounts used		
Not relevant		
Frequency and duration of use/exposure		
Duration of exposure	> 4	hours/day
Frequency of exposure	≤ 240	days/year
Human factors not influenced by risk management		
	Palm of both hands (480 cm²)	
Other given operational conditions affecting workers exposure		
Location	Indoor	
Domain	Industrial	
Technical conditions and measures at process level (source) to prevent release		
None		
Technical conditions and measures to control dispersion from source towards the worker		
Local exhaust ventilation required	No	
Organisational measures to prevent /limit releases, dispersion and exposure		
Not relevant in ECETOC TRA		
Conditions and measures related to personal protection, hygiene and health evaluation		
Respiratory protection required	No	
1.1.1.2.6 Control of workers exposure for PROC 15		
Workers related free short title	Use of substances at small scale laboratory (< 1 l or 1 kg present at workplace). Larger laboratories and R+D in-stallations should be treated as industrial processes	
Use descriptor covered	PROC 15	
Assessment Method	ECETOC TRA Worker v2.0 with modifications	

	(see 1. General remarks)	
Product characteristic		
Physical state	Liquid	
Fugacity	Low	
Concentration of substance	100	%
Vapour pressure of the substance	0.123	hPa
Amounts used		
Not relevant		
Frequency and duration of use/exposure		
Duration of exposure	> 4	hours/day
Frequency of exposure	≤ 240	days/year
Human factors not influenced by risk management		
	Palm one both hand (240 cm²)	
Other given operational conditions affecting workers exposure		
Location	Indoor	
Domain	Industrial	
Technical conditions and measures at process level (source) to prevent release		
None		
Technical conditions and measures to control dispersion from source towards the worker		
Local exhaust ventilation required	No	
Organisational measures to prevent /limit releases, dispersion and exposure		
Not relevant in ECETOC TRA		
Conditions and measures related to personal protection, hygiene and health evaluation		
Respiratory protection required	No	

Additional good practice advice (for environment) beyond the REACH CSA
Use of tightly fitting safety goggles (The substance has shown to cause mucosal irritations at relatively high concentrations. Thus, it is recommended to protect the eyes.)

1.1.2. Exposure estimation

1.1.2.1 Worker Exposure

Table 3: Estimated exposure for workers – PROC 1
Calculation tool used: ECETOC TRA v2.0 modified (see 1. General remarks)

Route of exposure	**Concentrations**		**Justification**
	Value	Unit	
Long-term exposure, systemic/local, inhalative	0.03	mg/m³	NA

Long-term exposure, systemic, dermal	0.34	mg/kg bw/d	NA

NA = Not applicable

Table 4: Estimated exposure for workers – PROC 2
Calculation tool used: ECETOC TRA v2.0 modified (see 1. General remarks)

Route of exposure	**Concentrations**		**Justification**
	Value	Unit	
Long-term exposure, systemic/local, inhalative	12.92	mg/m³	NA
Long-term exposure, systemic, dermal	1.37	mg/kg bw/d	NA

NA = Not applicable

Table 5: Estimated exposure for workers – PROC 3
Calculation tool used: ECETOC TRA v2.0 modified (see 1. General remarks)

Route of exposure	**Concentrations**		**Justification**
	Value	Unit	
Long-term exposure, systemic/local, inhalative	7.76	mg/m³	NA
Long-term exposure, systemic, dermal	0.34	mg/kg bw/d	NA

NA = Not applicable

Table 6: Estimated exposure for workers – PROC 4
Calculation tool used: ECETOC TRA v2.0 modified (see 1. General remarks)

Route of exposure	**Concentrations**		**Justification**
	Value	Unit	
Long-term exposure, systemic/local, inhalative	12.94	mg/m³	NA
Long-term exposure, systemic, dermal	6.86	mg/kg bw/d	NA

NA = Not applicable

Table 7: Estimated exposure for workers – PROC 8a
Calculation tool used: ECETOC TRA v2.0 modified (see 1. General remarks)

Route of exposure	**Concentrations**		**Justification**
	Value	Unit	
Long-term exposure, systemic/local, inhalative	2.59	mg/m³	NA
Long-term exposure, systemic, dermal	13.71	mg/kg bw/d	NA

NA = Not applicable

Table 8: Estimated exposure for workers – PROC 8b
Calculation tool used: ECETOC TRA v2.0 modified (see 1. General remarks)

Route of exposure	**Concentrations**		**Justification**
	Value	Unit	
Long-term exposure, systemic/local, inhalative	12.94	mg/m³	NA
Long-term exposure, systemic, dermal	6.86	mg/kg bw/d	NA

NA = Not applicable

Table 9: Estimated exposure for workers – PROC 15
Calculation tool used: ECETOC TRA v2.0 modified (see 1. General remarks)

Route of exposure	**Concentrations**		**Justification**
	Value	Unit	
Long-term exposure, systemic/local, inhalative	12.94	mg/m³	NA
Long-term exposure, systemic, dermal	0.34	mg/kg bw/d	NA

NA = Not applicable

1.1.2.2. Consumer Exposure

Not Applicable

1.1.2.3 Indirect Exposure of Humans via the Environment (oral)

The bioaccumulation potential of this substance is very low, with a Kow of 0.044; therefore, indirect exposure of humans via the environment can be considered negligible.

1.1.2.4 Environmental Exposure

The environmental exposure scenario is evaluated below. Exposure has been estimated using the version of the ECETOC TRA Integrated Tool current at the time of preparation of this document. The environmental assessment was performed using the SpERC ESVOC 1, which is described as "Manufacture of the substance and subsequent recycling/ recovery, including material transfers, storage, and maintenance“ (Cefic SpERC Overview Table, April 2010). Given its focus on substance manufacturing, this particular SpERC was selected as being the most appropriate SpERC for this particular exposure scenario.

Table 10: Environmental Exposure Scenario ES1-E1

Section 1	**Operational conditions and risk management measures**
Section 1.2	**Control of environmental exposure**
Identifier*	ES1-E1
Contributing scenario	Manufacturing Of Substance
Environmental Release Category	ERC1
Specific ERC	ESVOC 1
Assessment scenario	
Operational Conditions	
Amounts used	
Amounts used in the EU (tonnes/year)	26,032 (maximum passing tonnage)
Fraction of EU tonnage used in region	1
Fraction of main source to local environment	1
Fraction of substance in end-use products	1
Maximum daily site tonnage (kg/day)	86773
Frequency and duration of use	
Type of release	Continuous
Emission days (days/year)	300 - ESVOC 1
Site specific monitoring data results for surface water effluent	
Location of sample	
Environmental factors not influenced by risk management	
Local freshwater dilution factor	10 (default)
Local marine water dilution factor	100 (default)
Other given operational conditions affecting environmental exposure	
Risk Management Measures	
Technical conditions and measures at process level (source) to prevent release	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Treat air emissions to provide a typical removal efficiency of (%)	
Treat wastewater (prior to discharge to receiving water) to provide the required removal efficiency of (%)	87%
Organizational measures to prevent/limit release from site	

Conditions and measures related to municipal sewage treatment plant	
Conditions and measures related to external treatment of waste for disposal	
Conditions and measures related to external recovery of waste	
Other environmental control measures additional to above	
Identifier	***ES1-E1***
Narrative	Release fraction derived from SpERC (ESVOC 1)
Release fraction to air from process	1.00E-04
Release fraction to wastewater from process	1.00E-02
Release fraction to soil from process (regional only)	1.00E-04
Local release to air (kg/d)	8.68E+00
Local release to sewage (kg/d)	8.68E+02
Local release to soil (kg/d)	8.68E+00
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	
Total efficiency of removal from air emissions (%)	
The maximum allowable site tonnage (M_{Safe}) based on removal from domestic sewage treatment (kg/d)	86774
Scaling	

The downstream user can check the compliance of his site by comparing site specific data with defaults used in the exposure assessment. The site specific quotient should be inferior or equal to the spERC quotient.

$$\frac{m_{spERC} * (1 - E_{ER,spERC}) * F_{release,spERC}}{DF_{spERC}} \geq \frac{m_{site} * (1 - E_{ER,site}) * F_{release,site}}{DF_{site}}$$

m_{spERC}: Substance use rate in spERC
$E_{ER,spERC}$: Efficacy of RMM in spERC
$F_{release,,spERC}$: Initial release fraction in spERC
DF_{spERC}: dilution factor of STP effluent in river

m_{site}: Substance use rate at site
$E_{ER,site}$: Efficacy of RMM at site
$F_{release,,site}$: Initial release fraction at site
DF_{site}: dilution factor of STP effluent in river

1.1.2.4.1. Predicted exposure concentrations in the STP and in aquatic compartments (freshwater, seawater and sediment)

Table 11: Predicted exposure concentrations in the STP and in aquatic compartments (freshwater, seawater and sediment)

Local Concentration, Compartment: STP and aquatic	***unit***	***ES1-E1***
Local PEC in surface water during emission episode (dissolved)	mg/L	5.492E+00
Annual average local PEC in surface water (dissolved)	mg/L	4.514E+00
Local PEC in fresh water sediment during emission episode	mg/kg dwt	2.090E+01
Local PEC in sea water during emission episode	mg/L	5.492E-01
Annual average local PEC in sea water (dissolved)	mg/L	4.514E-01
Local PEC in marine sediment during emission episode	mg/kg dwt	2.090E+00
PEC for microorganisms in STP	mg/L	5.491E+01
Comments		

1.1.2.4.2. Predicted exposure concentration in soils

Table 12: Predicted exposure concentration in soils

Local Concentration, Compartment: soil	***unit***	***ES1-E1***
Local PEC in agricultural soil, averaged over 30 days	mg/kg dwt	2.281E-01
Local PEC agricultural soil, averaged over 180 days	mg/kg dwt	6.137E-02
Local PEC in grass land, averaged over 180 days	mg/kg dwt	1.964E-02
Comments		

1.1.2.4.3. Predicted exposure concentration in the atmospheric compartment

Table 13: Predicted exposure concentration in the atmospheric compartment

Local Concentration, Compartment: air	***unit***	***ES1-E1***
Annual average local PEC in air (total)	kg/m^3	1.983E-09
Comments		

1.1.2.4.4. Predicted exposure concentration in food for secondary poisoning

The bioaccumulation potential of this substance is very low, therefore secondary poisoning can be considered negligible. The Kow for MEG is 0.044.

1.2. Use as intermediate

1.2.1. Exposure scenario 2

The relevant operational conditions (OCs) used for calculation of environmental exposure are mentioned under paragraph 1.2.2.4.

Table 14: Description of ES 2

Reference Number	2	
1.2.1.1 Title		
Free short title	Use as Intermediate	
Systematic title based on use descriptor	SU3; PROC 1, 2, 3, 4, 5, 8a, 8b, 9 and 15; ERC 6a	
1.2.1.2 Operational conditions and Risk management measures		
1.2.1.2.1 Control of workers exposure for PROC 1		
Workers related free short title	Use in closed process, no likelihood of exposure	
Use descriptor covered	PROC 1	
Processes, tasks, activities covered	Use of the substance in high integrity contained system where little potential exists for exposures, e.g. any sampling via closed loop systems	
Assessment Method	ECETOC TRA Worker v2.0 with modifications (see 1. General remarks)	
Product characteristic		
Physical state	Liquid	
Fugacity	Low	
Concentration of substance	100	%
Vapour pressure of the substance	0.123	hPa
Amounts used		
Not relevant		
Frequency and duration of use/exposure		
Duration of exposure	> 4	hours/day
Frequency of exposure	≤ 240	days/year
Human factors not influenced by risk management		
Exposed skin surface	Palm of one hand (240 cm²)	
Other given operational conditions affecting workers exposure		
Location	Indoor	
Domain	Industrial	
Technical conditions and measures at process level (source) to prevent release		
None		
Technical conditions and measures to control dispersion from source towards the worker		
Local exhaust ventilation required	No	
Organisational measures to prevent /limit releases, dispersion and exposure		

Not relevant in ECETOC TRA		
Conditions and measures related to personal protection, hygiene and health evaluation		
Respiratory protection required	No	
1.2.1.2.2 Control of workers exposure for PROC 2		
Workers related free short title	Use in closed, continuous process with occasional controlled exposure	
Use descriptor covered	PROC 2	
Processes, tasks, activities covered	Continuous process but where the design philosophy is not specifically aimed at minimizing emissions. Occasional exposure will arise e.g. through maintenance, sampling and equipment breakages	
Assessment Method	ECETOC TRA Worker v2.0 with modifications (see 1. General remarks)	
Product characteristic		
Physical state	Liquid	
Fugacity	Low	
Concentration of substance	100	%
Vapour pressure of the substance	0.123	hPa
Amounts used		
Not relevant		
Frequency and duration of use/exposure		
Duration of exposure	> 4	hours/day
Frequency of exposure	≤ 240	days/year
Human factors not influenced by risk management		
	Palm of both hands (480 cm²)	
Other given operational conditions affecting workers exposure		
Location	Indoor	
Domain	Industrial	
Technical conditions and measures at process level (source) to prevent release		
None		
Technical conditions and measures to control dispersion from source towards the worker		
Local exhaust ventilation required	No	
Organisational measures to prevent /limit releases, dispersion and exposure		
Not relevant in ECETOC TRA		
Conditions and measures related to personal protection, hygiene and health evaluation		
Respiratory protection required	No	
1.2.1.2.3 Control of workers exposure for PROC 3 and 4		
Workers related free short title	Use in closed batch process (synthesis or formulation). Use in batch and other process (synthesis) where opportunity for exposure arises.	

Use descriptor covered	PROC 3 and 4	
Processes, tasks, activities covered	Batch manufacture of a chemical or formulation where the predominant handling is in a contained manner, e.g. through enclosed transfers, but where some opportunity for contact with chemicals occurs, e.g. through sampling Use in batch manufacture of a chemical where significant opportunity for exposure arises, e.g. during charging, sampling or discharge of material, and when the nature of the design is likely to result in exposure.	
Assessment Method	ECETOC TRA Worker v2.0 with modifications (see 1. General remarks)	
For further details on OCs and RMMs see Table 2		
1.2.1.2.4 Control of workers exposure for PROC 5		
Workers related free short title	Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact).	
Use descriptor covered	PROC 5	
Processes, tasks, activities covered	Manufacture or formulation of chemical products or articles using technologies related to mixing and blending of solid or liquid materials, and where the process is in stages and provides the opportunity for significant contact at any stage	
Assessment Method	ECETOC TRA Worker v2.0 with modifications (see 1. General remarks)	
Product characteristic		
Physical state	Liquid	
Fugacity	Low	
Concentration of substance	100	%
Vapour pressure of the substance	0.123	hPa
Amounts used		
Not relevant		
Frequency and duration of use/exposure		
Duration of exposure	> 4	hours/day
Frequency of exposure	≤ 240	days/year
Human factors not influenced by risk management		
	Palm of both hands (480 cm²)	
Other given operational conditions affecting workers exposure		
Location	Indoor	
Domain	Industrial	
Technical conditions and measures at process level (source) to prevent release		
None		

Technical conditions and measures to control dispersion from source towards the worker		
Local exhaust ventilation required	No	
Organisational measures to prevent /limit releases, dispersion and exposure		
Not relevant in ECETOC TRA		
Conditions and measures related to personal protection, hygiene and health evaluation		
Respiratory protection required	No	
Use of suitable gloves with specific activity training	Yes	Effectiveness: 90%

1.2.1.2.5 Control of workers exposure for PROC 8a	
Workers related free short title	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities.
Use descriptor covered	PROC 8a
Processes, tasks, activities covered	Sampling, loading, filling, transfer, dumping, bagging in non- dedicated facilities. Exposure related to dust, vapour, aerosols or spillage, and cleaning of equipment to be expected.
Assessment Method	ECETOC TRA Worker v2.0 with modifications (see 1. General remarks)
For further details on OCs and RMMs see Table 2	
1.2.1.2.6 Control of workers exposure for PROC 8b and 9	
Workers related free short title	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities. Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
Use descriptor covered	PROC 8b and 9
Processes, tasks, activities covered	Sampling, loading, filling, transfer, dumping, bagging in dedicated facilities. Exposure related to dust, vapour, aerosols or spillage, and cleaning of equipment to be expected. Filling lines specifically designed to both capture vapour and aerosol emissions and minimise spillage
Assessment Method	ECETOC TRA Worker v2.0 with modifications (see 1. General remarks)
For further details on OCs and RMMs see Table 2 of PROC 8b (OCs/RMMs for PROC 8b and 9 are identical)	
1.2.1.2.7 Control of workers exposure for PROC 15	
Workers related free short title	Use as laboratory reagent
Use descriptor covered	PROC 15
Processes, tasks, activities covered	Use of substances at small scale laboratory (< 1 l or 1 kg present at workplace). Larger laboratories and R+D installations should be treated as industrial processes.

Assessment Method	ECETOC TRA Worker v2.0 with modifications (see 1. General remarks)
For further details on OCs and RMMs see Table 2	

Additional good practice advice (for environment) beyond the REACH CSA
Use of tightly fitting safety goggles (The substance has shown to cause mucosal irritations at relatively high concentrations. Thus, it is recommended to protect the eyes.)

1.2.2. Exposure estimation

1.2.2.1 Worker Exposure

For the estimated exposure for workers / PROC 3 see Table 5
For the estimated exposure for workers / PROC 4 see Table 6
For the estimated exposure for workers / PROC 8a see Table 7
For the estimated exposure for workers / PROC 8b see Table 8
For the estimated exposure for workers / PROC 15 see Table 9

Table 15: Estimated exposure for workers – PROC 1
Calculation tool used: ECETOC TRA v2.0 modified (see 1. General remarks)

Route of exposure	**Concentrations**		**Justification**
	Value	Unit	
Long-term exposure, systemic/local, inhalative	0.03	mg/m³	NA
Long-term exposure, systemic, dermal	0.34	mg/kg bw/d	NA

NA = Not applicable

Table 16: Estimated exposure for workers – PROC 2
Calculation tool used: ECETOC TRA v2.0 modified (see 1. General remarks)

Route of exposure	**Concentrations**		**Justification**
	Value	Unit	
Long-term exposure, systemic/local, inhalative	2.59	mg/m³	NA
Long-term exposure, systemic, dermal	1.37	mg/kg bw/d	NA

NA = Not applicable

Table 17: Estimated exposure for workers – PROC 5
Calculation tool used: ECETOC TRA v2.0 modified (see 1. General remarks)

Route of exposure	**Concentrations**		**Justification**
	Value	Unit	
Long-term exposure, systemic/local, inhalative	12.94	mg/m³	NA
Long-term exposure, systemic, dermal	1.37	mg/kg bw/d	NA

NA = Not applicable

Table 18: Estimated exposure for workers – PROC 9
Calculation tool used: ECETOC TRA v2.0 modified (see 1. General remarks)

Route of exposure	Concentrations		Justification
	Value	Unit	
Long-term exposure, systemic/local, inhalative	12.94	mg/m³	NA
Long-term exposure, systemic, dermal	6.86	mg/kg bw/d	NA

NA = Not applicable

1.2.2.2. Consumer Exposure

Not Applicable

1.2.2.3 Indirect Exposure of Humans via the Environment (oral)

The bioaccumulation potential of this substance is very low, with a Kow of 0.044; therefore, indirect exposure of humans via the environment can be considered negligible.

1.2.2.4 Environmental Exposure

The environmental exposure scenario is evaluated below. Exposure has been estimated using the version of the ECETOC TRA Integrated Tool current at the time of preparation of this document. The environmental assessment was performed using the SpERC ESVOC 2, described as "Use as a isolated intermediate not under strictly controlled conditions“ (Cefic SpERC Overview Table, April 2010). Given its description as relating to use as an intermediate, this SpERC was selected as the most appropriate for evaluating this particular exposure scenario.

Table 19 Environmental Exposure Scenario ES2-E1

Section 1	**Operational conditions and risk management measures**
Section 1.2	**Control of environmental exposure**
Identifier*	ES2-E1
Contributing scenario	Use As Intermediate
Environmental Release Category	ERC6a
Specific ERC	ESVOC 2
Assessment scenario	
Operational Conditions	
Amounts used	
Amounts used in the EU (tonnes/year)	1,000,000 (total industry tonnage for production of MEG)
Fraction of EU tonnage used in region	1
Fraction of main source to local environment	0.015
Fraction of substance in end-use products	1
Maximum daily site tonnage (kg/day)	50000
Frequency and duration of use	

Type of release	Continuous
Emission days (days/year)	300 - ESVOC 2
Site specific monitoring data results for surface water effluent	
Location of sample	
Environmental factors not influenced by risk management	
Local freshwater dilution factor	10 (default)
Local marine water dilution factor	100 (default)
Other given operational conditions affecting environmental exposure	
Risk Management Measures	
Technical conditions and measures at process level (source) to prevent release	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Treat air emissions to provide a typical removal efficiency of (%)	
Treat wastewater (prior to discharge to receiving water) to provide the required removal efficiency of (%) ETotal,RMM = 1 – ((1 – ERMM, 1) x (1 – ERMM,2))	87%
Organizational measures to prevent/limit release from site	
Conditions and measures related to municipal sewage treatment plant	
Conditions and measures related to external treatment of waste for disposal	
Conditions and measures related to external recovery of waste	
Other environmental control measures additional to above	
Identifier	***ES2-E1***
Narrative	Release fraction derived from SpERC (ESVOC 2)
Release fraction to air from process	2.00E-05
Release fraction to wastewater from process	1.00E-02
Release fraction to soil from process (regional only)	1.00E-03
Local release to air (kg/d)	1.00E+00
Local release to sewage (kg/d)	5.00E+02
Local release to soil (kg/d)	5.00E+01
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	

Total efficiency of removal from air emissions (%)	
The maximum allowable site tonnage (M_{Safe}) based on removal from domestic sewage treatment (kg/d)	85827
Scaling	

The downstream user can check the compliance of his site by comparing site specific data with defaults used in the exposure assessment. The site specific quotient should be inferior or equal to the spERC quotient.

$$\frac{m_{spERC} * (1 - E_{ER,spERC}) * F_{release,spERC}}{DF_{spERC}} \geq \frac{m_{site} * (1 - E_{ER,site}) * F_{release,site}}{DF_{site}}$$

m_{spERC}: Substance use rate in spERC
$E_{ER,spERC}$: Efficacy of RMM in spERC
$F_{release,,spERC}$: Initial release fraction in spERC
DF_{spERC}: dilution factor of STP effluent in river

m_{site}: Substance use rate at site
$E_{ER,site}$: Efficacy of RMM at site
$F_{release,,site}$: Initial release fraction at site
DF_{site}: dilution factor of STP effluent in river

Predicted exposure concentrations in the STP and in aquatic compartments (freshwater, seawater and sediment)

Table 20: Predicted exposure concentrations in the STP and in aquatic compartments (freshwater, seawater and sediment)

Local Concentration, Compartment: STP and aquatic	***unit***	***ES2-E1***
Local PEC in surface water during emission episode (dissolved)	mg/L	3.199E+00
Annual average local PEC in surface water (dissolved)	mg/L	2.636E+00
Local PEC in fresh water sediment during emission episode	mg/kg dwt	1.218E+01
Local PEC in sea water during emission episode	mg/L	3.198E-01
Annual average local PEC in sea water (dissolved)	mg/L	2.634E-01
Local PEC in marine sediment during emission episode	mg/kg dwt	1.217E+00
PEC for microorganisms in STP	mg/L	3.164E+01
Comments		

Predicted exposure concentration in soils

Table 21: Predicted exposure concentration in soils

Local Concentration, Compartment: soil	***unit***	***ES2-E1***
Local PEC in agricultural soil, averaged over 30 days	mg/kg dwt	1.314E-01

Local PEC agricultural soil, averaged over 180 days	mg/kg dwt	3.537E-02
Local PEC in grass land, averaged over 180 days	mg/kg dwt	1.123E-02
Comments		

Predicted exposure concentration in the atmospheric compartment

Table 22: Predicted exposure concentration in the atmospheric compartment

Local Concentration, Compartment: air	***unit***	***ES2-E1***
Annual average local PEC in air (total)	kg/m^3	2.285E-10
Comments		

Predicted exposure concentration in food for secondary poisoning

The bioaccumulation potential of this substance is very low, therefore secondary poisoning can be considered negligible. The Kow for MEG is 0.044.

1.3 Use as Process chemical

1.3.1 Exposure Scenario 3

The relevant operational conditions (OCs) used for calculation of environmental exposure are mentioned under paragraph 1.3.2.4.

Table 23: Description of ES 3

Reference Number	3
1.3.1.1 Title	
Free short title	Use as Process chemical
Systematic title based on use descriptor	SU3; PROC 1, 2, 3, 4, 5, 8a, 8b, 9, 13, 14, and 15; ERC 4
1.3.1.2 Operational conditions and Risk management measures	
1.3.1.2.1 Control of workers exposure for PROC 1	
Workers related free short title	Use in closed process, no likelihood of exposure
Use descriptor covered	PROC 1
Processes, tasks, activities covered	Use of the substance in high integrity contained system where little potential exists for exposures, e.g. any sampling via closed loop systems
Assessment Method	ECETOC TRA Worker v2.0 with modifications (see 1. General remarks)
For further details on OCs and RMMs see Table 14	
1.3.1.2.2 Control of workers exposure for PROC 2	
Workers related free short title	Use in closed, continuous process with occasional controlled exposure
Use descriptor covered	PROC 2
Processes, tasks, activities covered	Continuous process but where the design philosophy is not specifically aimed at minimizing emissions. Occasional exposure will arise e.g. through maintenance, sampling and equipment breakages
Assessment Method	ECETOC TRA Worker v2.0 with modifications (see 1. General remarks)
For further details on OCs and RMMs see Table 14	
1.3.1.2.3 Control of workers exposure for PROC 3 and 4	
Workers related free short title	Use in closed batch process (synthesis or formulation). Use in batch and other process (synthesis) where opportunity for exposure arises.
Use descriptor covered	PROC 3 and 4
Processes, tasks, activities covered	Batch manufacture of a chemical or formulation where the predominant handling is in a contained manner, e.g. through enclosed transfers, but where some opportunity for contact with chemicals occurs, e.g. through sampling Use in batch manufacture of a chemical where significant opportunity for exposure arises, e.g. during charging, sampling or discharge of material, and when

	the nature of the design is likely to result in exposure.
Assessment Method	ECETOC TRA Worker v2.0 with modifications (see 1. General remarks)
For further details on OCs and RMMs see Table 2	
1.3.1.2.4 Control of workers exposure for PROC 5	
Workers related free short title	Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact).
Use descriptor covered	PROC 5
Processes, tasks, activities covered	Manufacture or formulation of chemical products or articles using technologies related to mixing and blending of solid or liquid materials, and where the process is in stages and provides the opportunity for significant contact at any stage
Assessment Method	ECETOC TRA Worker v2.0 with modifications (see 1. General remarks)
For further details on OCs and RMMs see Table 14	
1.3.1.2.5 Control of workers exposure for PROC 8a	
Workers related free short title	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities.
Use descriptor covered	PROC 8a
Processes, tasks, activities covered	Sampling, loading, filling, transfer, dumping, bagging in non- dedicated facilities. Exposure related to dust, vapour, aerosols or spillage, and cleaning of equipment to be expected.
Assessment Method	ECETOC TRA Worker v2.0 with modifications (see 1. General remarks)
For further details on OCs and RMMs see Table 2	
1.3.1.2.6 Control of workers exposure for PROC 8b and 9	
Workers related free short title	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities. Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
Use descriptor covered	PROC 8b
Processes, tasks, activities covered	Sampling, loading, filling, transfer, dumping, bagging in dedicated facilities. Exposure related to dust, vapour, aerosols or spillage, and cleaning of equipment to be expected. Filling lines specifically designed to both capture vapour and aerosol emissions and minimise spillage
Assessment Method	ECETOC TRA Worker v2.0 with modifications (see 1. General remarks)

For further details on OCs and RMMs see Table 2 and 59		
1.3.1.2.7 Control of workers exposure for PROC 13		
Workers related free short title	Treatment of articles by dipping and pouring.	
Use descriptor covered	PROC 13	
Processes, tasks, activities covered	Immersion operations. Treatment of articles by dipping, pouring, immersing, soaking, washing out or washing in substances; including cold formation or resin type matrix. Includes handling of treated objects (e.g. after dying, plating). Substance is applied to a surface by low energy techniques such as dipping the article into a bath or pouring a preparation onto a surface.	
Assessment Method	ECETOC TRA Worker v2.0 with modifications (see 1. General remarks)	
Product characteristic		
Physical state	liquid	
Fugacity	Low	
Concentration of substance	100	%
Vapour pressure of the substance	0.123	hPa
Amounts used		
Not relevant		
Frequency and duration of use/exposure		
Duration of exposure	> 4	hours/day
Frequency of exposure	≤ 240	days/year
Human factors not influenced by risk management		
Exposed skin surface	Palm of both hands (480 cm²)	
Other given operational conditions affecting workers exposure		
Location	Indoor	
Domain	Industrial	
Technical conditions and measures at process level (source) to prevent release		
None		
Technical conditions and measures to control dispersion from source towards the worker		
Local exhaust ventilation required	No	
Organisational measures to prevent /limit releases, dispersion and exposure		
Not relevant in ECETOC TRA		
Conditions and measures related to personal protection, hygiene and health evaluation		
Respiratory protection required	No	
Use of suitable gloves with basic training	Yes	Effectiveness: 90%
1.3.1.2.8 Control of workers exposure for PROC 14		
Workers related free short title	Production of preparations or articles by tabletting,	

	compression, extrusion, pelletisation.	
Use descriptor covered	PROC 14	
Processes, tasks, activities covered	Processing of preparations and/or substances (liquid and solid) into preparations or articles. Substances in the chemical matrix may be exposed to elevated mechanical and/or thermal energy conditions. Exposure is predominantly related to volatiles and/or generated fumes, dust may be formed as well.	
Assessment Method	ECETOC TRA Worker v2.0 with modifications (see 1. General remarks)	
Product characteristic		
Physical state	liquid	
Fugacity	Low	
Concentration of substance	100	%
Vapour pressure of the substance	0.123	hPa
Amounts used		
Not relevant		
Frequency and duration of use/exposure		
Duration of exposure	> 4	hours/day
Frequency of exposure	≤ 240	days/year
Human factors not influenced by risk management		
Exposed skin surface	Palm of both hands (480 cm²)	
Other given operational conditions affecting workers exposure		
Location	Indoor	
Domain	Industrial	
Technical conditions and measures at process level (source) to prevent release		
None		
Technical conditions and measures to control dispersion from source towards the worker		
Local exhaust ventilation required	No	
Organisational measures to prevent /limit releases, dispersion and exposure		
Not relevant in ECETOC TRA		
Conditions and measures related to personal protection, hygiene and health evaluation		
Respiratory protection required	No	

1.3.1.2.9 Control of workers exposure for PROC 15	
Workers related free short title	Use as laboratory reagent
Use descriptor covered	PROC 15
Processes, tasks, activities covered	Use of substances at small scale laboratory (< 1 l or 1 kg present at workplace). Larger laboratories and R+D installations should be treated as industrial processes.
Assessment Method	ECETOC TRA Worker v2.0 with modifications (see 1. General remarks)

For further details on OCs and RMMs see Table 2

Additional good practice advice (for environment) beyond the REACH CSA
Use of tightly fitting safety goggles (The substance has shown to cause mucosal irritations at relatively high concentrations. Thus, it is recommended to protect the eyes.)

1.3.2 Exposure Estimation

1.3.2.1 Worker Exposure

For the estimated exposure for workers / PROC 1 see Table 15
For the estimated exposure for workers / PROC 2 see Table 16
For the estimated exposure for workers / PROC 3 see Table 5
For the estimated exposure for workers / PROC 4 see Table 6
For the estimated exposure for workers / PROC 5 see Table 17
For the estimated exposure for workers / PROC 8a see Table 7
For the estimated exposure for workers / PROC 8b see Table 8
For the estimated exposure for workers / PROC 9 see Table 18
For the estimated exposure for workers / PROC 15 see Table 9

Table 24: Estimated exposure for workers – PROC 13
Calculation tool used: ECETOC TRA 2.0 modified (see 1. General remarks)

Route of exposure	**Concentrations**		**Justification**
	Value	Unit	
Long-term exposure, systemic/local, inhalative	25.87	mg/m³	NA
Long-term exposure, systemic, dermal	1.37	mg/kg bw/d	NA

NA = Not applicable

Table 25: Estimated exposure for workers – PROC 14
Calculation tool used: ECETOC TRA 2.0 modified (see 1. General remarks)

Route of exposure	**Concentrations**		**Justification**
	Value	Unit	
Long-term exposure, systemic/local, inhalative	12.94	mg/m³	NA
Long-term exposure, systemic, dermal	3.43	mg/kg bw/d	NA

NA = Not applicable

1.3.2.2. Consumer Exposure

Not Applicable

1.3.2.3 Indirect Exposure of Humans via the Environment (oral)

The bioaccumulation potential of this substance is very low, with a Kow of 0.044; therefore, indirect exposure of humans via the environment can be considered negligible.

1.3.2.4 Environmental Exposure

Table 26: Environmental Exposure Scenario ES3-E1

Section 1	**Operational conditions and risk management measures**
Section 1.2	**Control of environmental exposure**
Identifier*	ES3-E1
Contributing scenario	Use As Process Chemical
Environmental Release Category	ERC4
Specific ERC	ESVOC 44
Assessment scenario	
Operational Conditions	
Amounts used	
Amounts used in the EU (tonnes/year)	1,000,000 (total industry tonnage for production of MEG)
Fraction of EU tonnage used in region	1
Fraction of main source to local environment	0.015
Fraction of substance in end-use products	1
Maximum daily site tonnage (kg/day)	50000
Frequency and duration of use	
Type of release	Continuous
Emission days (days/year)	300 - ESVOC 44
Site specific monitoring data results for surface water effluent	
Location of sample	
Environmental factors not influenced by risk management	
Local freshwater dilution factor	10 (default)
Local marine water dilution factor	100 (default)
Other given operational conditions affecting environmental exposure	
Risk Management Measures	
Technical conditions and measures at process level (source) to prevent release	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	

Treat air emissions to provide a typical removal efficiency of (%)	
Treat wastewater (prior to discharge to receiving water) to provide the required removal efficiency of (%) ETotal,RMM = 1 – ((1 – ERMM, 1) x (1 – ERMM,2))	87%
Organizational measures to prevent/limit release from site	
Conditions and measures related to municipal sewage treatment plant	
Conditions and measures related to external treatment of waste for disposal	
Conditions and measures related to external recovery of waste	
Other environmental control measures additional to above	
Identifier	***ES3-E1***
Narrative	Release fraction derived from SpERC (ESVOC 44)
Release fraction to air from process	2.00E-02
Release fraction to wastewater from process	0.00E+00
Release fraction to soil from process (regional only)	1.00E-05
Local release to air (kg/d)	1.00E+03
Local release to sewage (kg/d)	0.00E+00
Local release to soil (kg/d)	5.00E-01
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	
Total efficiency of removal from air emissions (%)	
The maximum allowable site tonnage (M_{Safe}) based on removal from domestic sewage treatment (kg/d)	333595
Scaling	

The downstream user can check the compliance of his site by comparing site specific data with defaults used in the exposure assessment. The site specific quotient should be inferior or equal to the spERC quotient.

$$\frac{m_{spERC} * (1 - E_{ER,spERC}) * F_{release,spERC}}{DF_{spERC}} \geq \frac{m_{site} * (1 - E_{ER,site}) * F_{release,site}}{DF_{site}}$$

m_{spERC}: Substance use rate in spERC
$E_{ER,spERC}$: Efficacy of RMM in spERC
$F_{release,,spERC}$: Initial release fraction in spERC
DF_{spERC}: dilution factor of STP effluent in river

m_{site}: Substance use rate at site
$E_{ER,site}$: Efficacy of RMM at site
$F_{release,,site}$: Initial release fraction at site
DF_{site}: dilution factor of STP effluent in river

1.3.2.4.1 Predicted exposure concentrations in the STP and in the aquatic compartments (freshwater, seawater and sediments)

Table 27: Predicted exposure concentrations in the STP and in the aquatic compartments (freshwater, seawater and sediments)

Local Concentration, Compartment: STP and aquatic	***unit***	***ES3-E1***
Local PEC in surface water during emission episode (dissolved)	mg/L	6.534E-02
Annual average local PEC in surface water (dissolved)	mg/L	6.534E-02
Local PEC in fresh water sediment during emission episode	mg/kg dwt	2.486E-01
Local PEC in sea water during emission episode	mg/L	6.728E-03
Annual average local PEC in sea water (dissolved)	mg/L	6.728E-03
Local PEC in marine sediment during emission episode	mg/kg dwt	2.560E-02
PEC for microorganisms in STP	mg/L	0.000E+00
Comments		

1.3.2.4.2 Predicted exposure concentration in soils

Table 28: Predicted exposure concentration in soils

Local Concentration, Compartment: soil	***unit***	***ES3-E1***
Local PEC in agricultural soil, averaged over 30 days	**mg/kg dwt**	2.293E-01
Local PEC agricultural soil, averaged over 180 days	**mg/kg dwt**	2.291E-01
Local PEC in grass land, averaged over 180 days	**mg/kg dwt**	2.531E-01
Comments		

1.3.2.4.3 Predicted exposure concentration in the atmospheric compartment

Table 29: Predicted exposure concentration in the atmospheric compartment

Local Concentration, Compartment: air	***unit***	***ES3-E1***
Annual average local PEC in air (total)	kg/m^3	2.285E-07
Comments		

1.3.2.4.4 Predicted exposure concentration in food for secondary poisoning

The bioaccumulation potential of this substance is very low, therefore secondary poisoning can be considered negligible. The Kow for MEG is 0.044.

1.4 Distribution of substance

1.4.1 Exposure Scenario 4

The relevant operational conditions (OCs) used for calculation of environmental exposure are mentioned under paragraph 1.4.2.4.

Table 30: Description of ES 4

Reference Number	4
1.4.1.1 Title	
Free short title	Distribution of substance
Systematic title based on use descriptor	SU3; PROC 1, 2, 3, 4, 8a, 8b, 9, and 15; ERC 1
1.4.1.2 Operational conditions and Risk management measures	
1.4.1.2.1 Control of workers exposure for PROC 1	
Workers related free short title	Use in closed process, no likelihood of exposure
Use descriptor covered	PROC 1
Processes, tasks, activities covered	Use of the substance in high integrity contained system where little potential exists for exposures, e.g. any sampling via closed loop systems
Assessment Method	ECETOC TRA Worker v2.0 with modifications (see 1. General remarks)
For further details on OCs and RMMs see Table 14	
1.4.1.2.2 Control of workers exposure for PROC 2	
Workers related free short title	Use in closed, continuous process with occasional controlled exposure
Use descriptor covered	PROC 2
Processes, tasks, activities covered	Continuous process but where the design philosophy is not specifically aimed at minimizing emissions. Occasional exposure will arise e.g. through maintenance, sampling and equipment breakages
Assessment Method	ECETOC TRA Worker v2.0 with modifications (see 1. General remarks)
For further details on OCs and RMMs see Table 14	
1.4.1.2.3 Control of workers exposure for PROC 3 and 4	
Workers related free short title	Use in closed batch process (synthesis or formulation). Use in batch and other process (synthesis) where opportunity for exposure arises.
Use descriptor covered	PROC 3 and 4
Processes, tasks, activities covered	Batch manufacture of a chemical or formulation where the predominant handling is in a contained manner, e.g. through enclosed transfers, but where some opportunity for contact with chemicals occurs, e.g. through sampling Use in batch manufacture of a chemical where significant opportunity for exposure arises, e.g. during

	charging, sampling or discharge of material, and when the nature of the design is likely to result in exposure.
Assessment Method	ECETOC TRA Worker v2.0 with modifications (see 1. General remarks)
For further details on OCs and RMMs see Table 2	
1.4.1.2.4 Control of workers exposure for PROC 8a	
Workers related free short title	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities.
Use descriptor covered	PROC 8a
Processes, tasks, activities covered	Sampling, loading, filling, transfer, dumping, bagging in non- dedicated facilities. Exposure related to dust, vapour, aerosols or spillage, and cleaning of equipment to be expected.
Assessment Method	ECETOC TRA Worker v2.0 with modifications (see 1. General remarks)
For further details on OCs and RMMs see Table 2	
1.4.1.2.5 Control of workers exposure for PROC 8b and 9	
Workers related free short title	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities. Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
Use descriptor covered	PROC 8b and 9
Processes, tasks, activities covered	Sampling, loading, filling, transfer, dumping, bagging in dedicated facilities. Exposure related to dust, vapour, aerosols or spillage, and cleaning of equipment to be expected. Filling lines specifically designed to both capture vapour and aerosol emissions and minimise spillage
Assessment Method	ECETOC TRA Worker v2.0 with modifications (see 1. General remarks)
For further details on OCs and RMMs see Table 2 and 59	
1.4.1.2.6 Control of workers exposure for PROC 15	
Workers related free short title	Use as laboratory reagent
Use descriptor covered	PROC 15
Processes, tasks, activities covered	Use of substances at small scale laboratory (< 1 l or 1 kg present at workplace). Larger laboratories and R+D installations should be treated as industrial processes.
Assessment Method	ECETOC TRA Worker v2.0 with modifications (see 1. General remarks)
For further details on OCs and RMMs see Table 2	

Additional good practice advice (for environment) beyond the REACH CSA
Use of tightly fitting safety goggles (The substance has shown to cause mucosal irritations at relatively high concentrations. Thus, it is recommended to protect the eyes.)

1.4.2 Exposure Estimation

1.4.2.1 Worker Exposure

For the estimated exposure for workers / PROC 1 see Table 15
For the estimated exposure for workers / PROC 2 see Table 16
For the estimated exposure for workers / PROC 3 see Table 5
For the estimated exposure for workers / PROC 4 see Table 6
For the estimated exposure for workers / PROC 8a see Table 7
For the estimated exposure for workers / PROC 8b see Table 8
For the estimated exposure for workers / PROC 9 see Table 18
For the estimated exposure for workers / PROC 15 see Table 9

1.4.2.2. Consumer Exposure

Not Applicable

1.4.2.3 Indirect Exposure of Humans via the Environment (oral)

The bioaccumulation potential of this substance is very low, with a Kow of 0.044; therefore, indirect exposure of humans via the environment can be considered negligible.

1.4.2.4 Environmental Exposure

Table 31: Environmental Exposure Scenario ES4-E1

Section 1	**Operational conditions and risk management measures**
Section 1.2	**Control of environmental exposure**
Identifier*	ES4-E1
Contributing scenario	Distribution Of Substance
Environmental Release Category	ERC1
Specific ERC	ESVOC 3
Assessment scenario	
Operational Conditions	
Amounts used	
Amounts used in the EU (tonnes/year)	1,000,000 (total industry tonnage for production of MEG)
Fraction of EU tonnage used in region	1
Fraction of main source to local environment	0.002
Fraction of substance in end-use products	1
Maximum daily site tonnage (kg/day)	6667
Frequency and duration of use	
Type of release	Continuous
Emission days (days/year)	300 - ESVOC 3

Site specific monitoring data results for surface water effluent	
Location of sample	
Environmental factors not influenced by risk management	
Local freshwater dilution factor	10 (default)
Local marine water dilution factor	100 (default)
Other given operational conditions affecting environmental exposure	
Risk Management Measures	
Technical conditions and measures at process level (source) to prevent release	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Treat air emissions to provide a typical removal efficiency of (%)	
Treat wastewater (prior to discharge to receiving water) to provide the required removal efficiency of (%) ETotal,RMM = 1 – ((1 – ERMM, 1) x (1 – ERMM,2))	87%
Organizational measures to prevent/limit release from site	
Conditions and measures related to municipal sewage treatment plant	
Conditions and measures related to external treatment of waste for disposal	
Conditions and measures related to external recovery of waste	
Other environmental control measures additional to above	
Identifier	***ES4-E1***
Narrative	SpERC (ESVOC 3)
Release fraction to air from process	1.00E-05
Release fraction to wastewater from process	1.00E-05
Release fraction to soil from process (regional only)	1.00E-05
Local release to air (kg/d)	6.67E-02
Local release to sewage (kg/d)	6.67E-02
Local release to soil (kg/d)	6.67E-02
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	
Total efficiency of removal from air emissions (%)	

The maximum allowable site tonnage (M_{Safe}) based on removal from domestic sewage treatment (kg/d)	71543822
Scaling	

The downstream user can check the compliance of his site by comparing site specific data with defaults used in the exposure assessment. The site specific quotient should be inferior or equal to the spERC quotient.

$$\frac{m_{spERC}*(1-E_{ER,spERC})*F_{releasespERC}}{DF_{spERC}} \geq \frac{m_{site}*(1-E_{ER,site})*F_{releasesite}}{DF_{site}}$$

m_{spERC}: Substance use rate in spERC
$E_{ER,spERC}$: Efficacy of RMM in spERC
$F_{release,,spERC}$: Initial release fraction in spERC
DF_{spERC}: dilution factor of STP effluent in river

m_{site}: Substance use rate at site
$E_{ER,site}$: Efficacy of RMM at site
$F_{release,,site}$: Initial release fraction at site
DF_{site}: dilution factor of STP effluent in river

1.4.2.4.1 Predicted exposure concentrations in the STP and in the aquatic compartments (freshwater, seawater and sediments)

Table 32: Predicted exposure concentrations in the STP and in the aquatic compartments (freshwater, seawater and sediments)

Local Concentration, Compartment: STP and aquatic	***unit***	***ES4-E1***
Local PEC in surface water during emission episode (dissolved)	mg/L	5.118E-04
Annual average local PEC in surface water (dissolved)	mg/L	4.366E-04
Local PEC in fresh water sediment during emission episode	mg/kg dwt	1.948E-03
Local PEC in sea water during emission episode	mg/L	5.097E-05
Annual average local PEC in sea water (dissolved)	mg/L	4.346E-05
Local PEC in marine sediment during emission episode	mg/kg dwt	1.940E-04
PEC for microorganisms in STP	mg/L	4.219E-03
Comments		

1.4.2.4.2 Predicted exposure concentration in soils

Table 33: Predicted exposure concentration in soils

Local Concentration, Compartment: soil	***unit***	***ES4-E1***
Local PEC in agricultural soil, averaged over 30 days	mg/kg dwt	1.134E-04
Local PEC agricultural soil, averaged over 180	mg/kg	1.006E-04

days	dwt	
Local PEC in grass land, averaged over 180 days	mg/kg dwt	9.893E-05
Comments		

1.4.2.4.3 Predicted exposure concentration in the atmospheric compartment

Table 34: Predicted exposure concentration in the atmospheric compartment

Local Concentration, Compartment: air	***unit***	***ES4-E1***
Annual average local PEC in air (total)	kg/m^3	1.524E-11
Comments		

1.4.2.4.4 Predicted exposure concentration in food for secondary poisoning

The bioaccumulation potential of this substance is very low, therefore secondary poisoning can be considered negligible. The Kow for MEG is 0.044.

1.5 Formulation &(re)packing of substance and mixtures

1.5.1 Exposure Scenario 5

The relevant operational conditions (OCs) used for calculation of environmental exposure are mentioned under paragraph 1.5.2.4.

Table 35: Description of ES 5

Reference Number	5
1.5.1.1 Title	
Free short title	Formulation & (re)packing of substance and mixtures
Systematic title based on use descriptor	SU3; PROC 1, 2, 3, 4, 5, 8a, 8b, 9, 14, and 15; ERC 2
1.5.1.2 Operational conditions and Risk management measures	
1.5.1.2.1 Control of workers exposure for PROC 1	
Workers related free short title	Use in closed process, no likelihood of exposure
Use descriptor covered	PROC 1
Processes, tasks, activities covered	Use of the substance in high integrity contained system where little potential exists for exposures, e.g. any sampling via closed loop systems
Assessment Method	ECETOC TRA Worker v2.0 with modifications (see 1. General remarks)
For further details on OCs and RMMs see Table 14	
1.5.1.2.2 Control of workers exposure for PROC 2	
Workers related free short title	Use in closed, continuous process with occasional controlled exposure
Use descriptor covered	PROC 2
Processes, tasks, activities covered	Continuous process but where the design philosophy is not specifically aimed at minimizing emissions. Occasional exposure will arise e.g. through maintenance, sampling and equipment breakages
Assessment Method	ECETOC TRA Worker v2.0 with modifications (see 1. General remarks)
For further details on OCs and RMMs see Table 14	
1.5.1.2.3 Control of workers exposure for PROC 3 and 4	
Workers related free short title	Use in closed batch process (synthesis or formulation). Use in batch and other process (synthesis) where opportunity for exposure arises.
Use descriptor covered	PROC 3 and 4
Processes, tasks, activities covered	Batch manufacture of a chemical or formulation where the predominant handling is in a contained manner, e.g. through enclosed transfers, but where some opportunity for contact with chemicals occurs, e.g. through sampling Use in batch manufacture of a chemical where

	significant opportunity for exposure arises, e.g. during charging, sampling or discharge of material, and when the nature of the design is likely to result in exposure.
Assessment Method	ECETOC TRA Worker v2.0 with modifications (see 1. General remarks)
For further details on OCs and RMMs see Table 2	
1.5.1.2.4 Control of workers exposure for PROC 5	
Workers related free short title	Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact).
Use descriptor covered	PROC 5
Processes, tasks, activities covered	Manufacture or formulation of chemical products or articles using technologies related to mixing and blending of solid or liquid materials, and where the process is in stages and provides the opportunity for significant contact at any stage
Assessment Method	ECETOC TRA Worker v2.0 with modifications (see 1. General remarks)
For further details on OCs and RMMs see Table 14	
1.5.1.2.5 Control of workers exposure for PROC 8a	
Workers related free short title	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities.
Use descriptor covered	PROC 8a
Processes, tasks, activities covered	Sampling, loading, filling, transfer, dumping, bagging in non- dedicated facilities. Exposure related to dust, vapour, aerosols or spillage, and cleaning of equipment to be expected.
Assessment Method	ECETOC TRA Worker v2.0 with modifications (see 1. General remarks)
For further details on OCs and RMMs see Table 2	
1.5.1.2.6 Control of workers exposure for PROC 8b and 9	
Workers related free short title	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities. Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
Use descriptor covered	PROC 8b and 9
Processes, tasks, activities covered	Sampling, loading, filling, transfer, dumping, bagging in dedicated facilities. Exposure related to dust, vapour, aerosols or spillage, and cleaning of equipment to be expected. Filling lines specifically designed to both capture vapour and aerosol emissions and minimise spillage

Assessment Method	ECETOC TRA Worker v2.0 with modifications (see 1. General remarks)
For further details on OCs and RMMs see Table 2 and 59	
1.5.1.2.7 Control of workers exposure for PROC 14	
Workers related free short title	Production of preparations or articles by tabletting, compression, extrusion, pelletisation.
Use descriptor covered	PROC 14
Processes, tasks, activities covered	Processing of preparations and/or substances (liquid and solid) into preparations or articles. Substances in the chemical matrix may be exposed to elevated mechanical and/or thermal energy conditions. Exposure is predominantly related to volatiles and/or generated fumes, dust may be formed as well.
Assessment Method	ECETOC TRA Worker v2.0 with modifications (see 1. General remarks)
For further details on OCs and RMMs see Table 23	
1.5.1.2.8 Control of workers exposure for PROC 15	
Workers related free short title	Use as laboratory reagent
Use descriptor covered	PROC 15
Processes, tasks, activities covered	Use of substances at small scale laboratory (< 1 l or 1 kg present at workplace). Larger laboratories and R+D installations should be treated as industrial processes.
Assessment Method	ECETOC TRA Worker v2.0 with modifications (see 1. General remarks)
For further details on OCs and RMMs see Table 2	

Additional good practice advice (for environment) beyond the REACH CSA
Use of tightly fitting safety goggles (The substance has shown to cause mucosal irritations at relatively high concentrations. Thus, it is recommended to protect the eyes.)

1.5.2 Exposure Estimation

1.5.2.1 Worker Exposure

For the estimated exposure for workers / PROC 1 see Table 15
For the estimated exposure for workers / PROC 2 see Table 16
For the estimated exposure for workers / PROC 3 see Table 5
For the estimated exposure for workers / PROC 4 see Table 6
For the estimated exposure for workers / PROC 5 see Table 17
For the estimated exposure for workers / PROC 8a see Table 7
For the estimated exposure for workers / PROC 8b see Table 8
For the estimated exposure for workers / PROC 9 see Table 18
For the estimated exposure for workers / PROC 14 see Table 25
For the estimated exposure for workers / PROC 15 see Table 9

1.5.2.2. Consumer Exposure

The bioaccumulation potential of this substance is very low, with a Kow of 0.044; therefore, indirect exposure of humans via the environment can be considered negligible.

1.5.2.3 Indirect Exposure of Humans via the Environment (oral)

The bioaccumulation potential of this substance is very low, with a Kow of 0.044; therefore, indirect exposure of humans via the environment can be considered negligible.

1.5.2.4 Environmental Exposure

Table 36: Environmental Exposure Scenario ES5-E1

Section 1	**Operational conditions and risk management measures**
Section 1.2	**Control of environmental exposure**
Identifier*	ES5-E1
Contributing scenario	Formulation & (Re) Packing Of Substances And Mixtures
Environmental Release Category	ERC2
Specific ERC	ESVOC 4
Assessment scenario	
Operational Conditions	
Amounts used	
Amounts used in the EU (tonnes/year)	1,000,000 (total industry tonnage for production of MEG)
Fraction of EU tonnage used in region	1
Fraction of main source to local environment	0.03
Fraction of substance in end-use products	1
Maximum daily site tonnage (kg/day)	100000
Frequency and duration of use	
Type of release	Continuous
Emission days (days/year)	300 - ESVOC 4
Site specific monitoring data results for surface water effluent	
Location of sample	
Environmental factors not influenced by risk management	
Local freshwater dilution factor	10 (default)
Local marine water dilution factor	100 (default)
Other given operational conditions affecting environmental exposure	
Risk Management Measures	
Technical conditions and measures at process level (source) to prevent release	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	

Treat air emissions to provide a typical removal efficiency of (%)	
Treat wastewater (prior to discharge to receiving water) to provide the required removal efficiency of (%) ETotal,RMM = 1 – ((1 – ERMM, 1) x (1 – ERMM,2))	87%
Organizational measures to prevent/limit release from site	
Conditions and measures related to municipal sewage treatment plant	
Conditions and measures related to external treatment of waste for disposal	
Conditions and measures related to external recovery of waste	
Other environmental control measures additional to above	
Identifier	***ES5-E1***
Narrative	Release fraction derived from SpERC (ESVOC 4)
Release fraction to air from process	5.00E-03
Release fraction to wastewater from process	5.00E-03
Release fraction to soil from process (regional only)	1.00E-04
Local release to air (kg/d)	5.00E+02
Local release to sewage (kg/d)	5.00E+02
Local release to soil (kg/d)	1.00E+01
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	
Total efficiency of removal from air emissions (%)	
The maximum allowable site tonnage (M_{Safe}) based on removal from domestic sewage treatment (kg/d)	171783
Scaling	

The downstream user can check the compliance of his site by comparing site specific data with defaults used in the exposure assessment. The site specific quotient should be inferior or equal to the spERC quotient.

$$\frac{m_{spERC} * (1 - E_{ER,spERC}) * F_{release,spERC}}{DF_{spERC}} \geq \frac{m_{site} * (1 - E_{ER,site}) * F_{release,site}}{DF_{site}}$$

m_{spERC}: Substance use rate in spERC
$E_{ER,spERC}$: Efficacy of RMM in spERC
$F_{release,,spERC}$: Initial release fraction in spERC
DF_{spERC}: dilution factor of STP effluent in river

m_{site}: Substance use rate at site
$E_{ER,site}$: Efficacy of RMM at site
$F_{release,,site}$: Initial release fraction at site
DF_{site}: dilution factor of STP effluent in river

1.5.2.4.1 Predicted exposure concentrations in the STP and in the aquatic compartments (freshwater, seawater and sediments)

Table 37: Predicted exposure concentrations in the STP and in the aquatic compartments (freshwater, seawater and sediments)

Local Concentration, Compartment: STP and aquatic	***unit***	***ES5-E1***
Local PEC in surface water during emission episode (dissolved)	mg/L	3.197E+00
Annual average local PEC in surface water (dissolved)	mg/L	2.634E+00
Local PEC in fresh water sediment during emission episode	mg/kg dwt	1.217E+01
Local PEC in sea water during emission episode	mg/L	3.197E-01
Annual average local PEC in sea water (dissolved)	mg/L	2.633E-01
Local PEC in marine sediment during emission episode	mg/kg dwt	1.217E+00
PEC for microorganisms in STP	mg/L	3.164E+01
Comments		

1.5.2.4.2 Predicted exposure concentration in soils

Table 38: Predicted exposure concentration in soils

Local Concentration, Compartment: soil	***unit***	***ES5-E1***
Local PEC in agricultural soil, averaged over 30 days	mg/kg dwt	1.992E-01
Local PEC agricultural soil, averaged over 180 days	mg/kg dwt	1.032E-01
Local PEC in grass land, averaged over 180 days	mg/kg dwt	9.107E-02
Comments		

1.5.2.4.3 Predicted exposure concentration in the atmospheric compartment

Table 39: Predicted exposure concentration in the atmospheric compartment

Local Concentration, Compartment: air	***unit***	***ES5-E1***
Annual average local PEC in air (total)	kg/m^3	1.142E-07
Comments		

1.5.2.4.4 Predicted exposure concentration in food for secondary poisoning

The bioaccumulation potential of this substance is very low, therefore secondary poisoning can be considered negligible. The Kow for MEG is 0.044.

1.6 Production of Polymers

1.6.1 Exposure Scenario 6

The relevant operational conditions (OCs) used for calculation of environmental exposure are mentioned under paragraph 1.6.2.4.

Table 40: Description of ES 6

Reference Number	6
1.6.1.1 Title	
Free short title	Production of polymers
Systematic title based on use descriptor	SU3; PROC 1, 2, 3, 4, 5, 6, 8a, 8b, 9, and 15; ERC 6c
1.6.1.2 Operational conditions and Risk management measures	
1.6.1.2.1 Control of workers exposure for PROC 1	
Workers related free short title	Use in closed process, no likelihood of exposure
Use descriptor covered	PROC 1
Processes, tasks, activities covered	Use of the substance in high integrity contained system where little potential exists for exposures, e.g. any sampling via closed loop systems
Assessment Method	ECETOC TRA Worker v2.0 with modifications (see 1. General remarks)
For further details on OCs and RMMs see Table 14	
1.6.1.2.2 Control of workers exposure for PROC 2	
Workers related free short title	Use in closed, continuous process with occasional controlled exposure
Use descriptor covered	PROC 2
Processes, tasks, activities covered	Continuous process but where the design philosophy is not specifically aimed at minimizing emissions. Occasional exposure will arise e.g. through maintenance, sampling and equipment breakages
Assessment Method	ECETOC TRA Worker v2.0 with modifications (see 1. General remarks)
For further details on OCs and RMMs see Table 14	
1.6.1.2.3 Control of workers exposure for PROC 3 and 4	
Workers related free short title	Use in closed batch process (synthesis or formulation). Use in batch and other process (synthesis) where opportunity for exposure arises.
Use descriptor covered	PROC 3 and 4
Processes, tasks, activities covered	Batch manufacture of a chemical or formulation where the predominant handling is in a contained manner, e.g. through enclosed transfers, but where some opportunity for contact with chemicals occurs, e.g. through sampling Use in batch manufacture of a chemical where significant opportunity for exposure arises, e.g. during charging, sampling or discharge of material, and when

	the nature of the design is likely to result in exposure.	
Assessment Method	ECETOC TRA Worker v2.0 with modifications (see 1. General remarks)	
For further details on OCs and RMMs see Table 2		
1.6.1.2.4 Control of workers exposure for PROC 5		
Workers related free short title	Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact).	
Use descriptor covered	PROC 5	
Processes, tasks, activities covered	Manufacture or formulation of chemical products or articles using technologies related to mixing and blending of solid or liquid materials, and where the process is in stages and provides the opportunity for significant contact at any stage	
Assessment Method	ECETOC TRA Worker v2.0 with modifications (see 1. General remarks)	
For further details on OCs and RMMs see Table 14		
1.6.1.2.5 Control of workers exposure for PROC 6		
Workers related free short title	Calendering operations	
Use descriptor covered	PROC 6	
Processes, tasks, activities covered	Processing of product matrix Calendering at elevated temperature an large exposed surface	
Assessment Method	ECETOC TRA Worker v2.0 with modifications (see 1. General remarks)	
Product characteristic		
Physical state	Liquid	
Fugacity	Low	
Concentration of substance	100	%
Vapour pressure of the substance	0.123	hPa
Amounts used		
Not relevant		
Frequency and duration of use/exposure		
Duration of exposure	> 4	hours/day
Frequency of exposure	≤ 240	days/year
Human factors not influenced by risk management		
Exposed skin surface	Both hands (960 cm²)	
Other given operational conditions affecting workers exposure		
Location	Indoor	
Domain	Industrial	
Technical conditions and measures at process level (source) to prevent release		
None		

Technical conditions and measures to control dispersion from source towards the worker		
Local exhaust ventilation required	No	
Organisational measures to prevent /limit releases, dispersion and exposure		
Not relevant in ECETOC TRA		
Conditions and measures related to personal protection, hygiene and health evaluation		
Respiratory protection required	No	
Use of suitable gloves with basic training	Yes	Effectiveness: 90%

1.6.1.2.6 Control of workers exposure for PROC 8a	
Workers related free short title	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities.
Use descriptor covered	PROC 8a
Processes, tasks, activities covered	Sampling, loading, filling, transfer, dumping, bagging in non- dedicated facilities. Exposure related to dust, vapour, aerosols or spillage, and cleaning of equipment to be expected.
Assessment Method	ECETOC TRA Worker v2.0 with modifications (see 1. General remarks)
For further details on OCs and RMMs see Table 2	
1.6.1.2.7 Control of workers exposure for PROC 8b and 9	
Workers related free short title	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities. Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
Use descriptor covered	PROC 8b and 9
Processes, tasks, activities covered	Sampling, loading, filling, transfer, dumping, bagging in dedicated facilities. Exposure related to dust, vapour, aerosols or spillage, and cleaning of equipment to be expected. Filling lines specifically designed to both capture vapour and aerosol emissions and minimise spillage
Assessment Method	ECETOC TRA Worker v2.0 with modifications (see 1. General remarks)
For further details on OCs and RMMs see Table 2 and 59	
1.6.1.2.8 Control of workers exposure for PROC 15	
Workers related free short title	Use as laboratory reagent
Use descriptor covered	PROC 15
Processes, tasks, activities covered	Use of substances at small scale laboratory (< 1 l or 1 kg present at workplace). Larger laboratories and R+D installations should be treated as industrial processes.
Assessment Method	ECETOC TRA Worker v2.0 with modifications

	(see 1. General remarks)
For further details on OCs and RMMs see Table 2	

Additional good practice advice (for environment) beyond the REACH CSA
Use of tightly fitting safety goggles (The substance has shown to cause mucosal irritations at relatively high concentrations. Thus, it is recommended to protect the eyes.)

1.6.2 Exposure Estimation

1.6.2.1 Worker Exposure

For the estimated exposure for workers / PROC 1 see Table 15
For the estimated exposure for workers / PROC 2 see Table 16
For the estimated exposure for workers / PROC 3 see Table 5
For the estimated exposure for workers / PROC 4 see Table 6
For the estimated exposure for workers / PROC 5 see Table 17
For the estimated exposure for workers / PROC 8a see Table 7
For the estimated exposure for workers / PROC 8b see Table 8
For the estimated exposure for workers / PROC 9 see Table 18
For the estimated exposure for workers / PROC 15 see Table 9

Table 41: Estimated exposure for workers – PROC 6
Calculation tool used: ECETOC TRA 2.0 modified (see 1. General remarks)

Route of exposure	**Concentrations**		**Justification**
	Value	Unit	
Long-term exposure, systemic/local, inhalative	12.94	mg/m³	NA
Long-term exposure, systemic, dermal	2.74	mg/kg bw/d	NA

NA = Not applicable

1.6.2.2. Consumer Exposure

Not Applicable

1.6.2.3 Indirect Exposure of Humans via the Environment (oral)

The bioaccumulation potential of this substance is very low, with a Kow of 0.044; therefore, indirect exposure of humans via the environment can be considered negligible.

1.6.2.4 Environmental Exposure

Table 42: Environmental Exposure Scenario ES6-E1

Section 1	**Operational conditions and risk management measures**
Section 1.2	**Control of environmental exposure**
Identifier*	ES6-E1
Contributing scenario	Production Of Polymers
Environmental Release Category	ERC6c
Specific ERC	ESVOC 43
Assessment scenario	
Operational Conditions	
Amounts used	
Amounts used in the EU (tonnes/year)	1,000,000 (total industry tonnage for production of MEG)
Fraction of EU tonnage used in region	1
Fraction of main source to local environment	0.015
Fraction of substance in end-use products	1
Maximum daily site tonnage (kg/day)	50000
Frequency and duration of use	
Type of release	Continuous
Emission days (days/year)	300 - ESVOC 43
Site specific monitoring data results for surface water effluent	
Location of sample	
Environmental factors not influenced by risk management	
Local freshwater dilution factor	10 (default)
Local marine water dilution factor	100 (default)
Other given operational conditions affecting environmental exposure	
Risk Management Measures	
Technical conditions and measures at process level (source) to prevent release	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Treat air emissions to provide a typical removal efficiency of (%)	
Treat wastewater (prior to discharge to receiving water) to provide the required removal efficiency of (%) ETotal,RMM = 1 – ((1 – ERMM, 1) x (1 – ERMM,2))	87%
Organizational measures to prevent/limit release from site	

Conditions and measures related to municipal sewage treatment plant	
Conditions and measures related to external treatment of waste for disposal	
Conditions and measures related to external recovery of waste	
Other environmental control measures additional to above	
Identifier	***ES6-E1***
Narrative	Release fraction derived from SpERC (ESVOC 43)
Release fraction to air from process	2.00E-03
Release fraction to wastewater from process	1.00E-02
Release fraction to soil from process (regional only)	1.00E-04
Local release to air (kg/d)	1.00E+02
Local release to sewage (kg/d)	5.00E+02
Local release to soil (kg/d)	5.00E+00
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	
Total efficiency of removal from air emissions (%)	
The maximum allowable site tonnage (M_{Safe}) based on removal from domestic sewage treatment (kg/d)	85713
Scaling	

The downstream user can check the compliance of his site by comparing site specific data with defaults used in the exposure assessment. The site specific quotient should be inferior or equal to the spERC quotient.

$$\frac{m_{spERC} * (1 - E_{ER,spERC}) * F_{release,spERC}}{DF_{spERC}} \geq \frac{m_{site} * (1 - E_{ER,site}) * F_{release,site}}{DF_{site}}$$

m_{spERC}: Substance use rate in spERC
$E_{ER,spERC}$: Efficacy of RMM in spERC
$F_{release,,spERC}$: Initial release fraction in spERC
DF_{spERC}: dilution factor of STP effluent in river

m_{site}: Substance use rate at site
$E_{ER,site}$: Efficacy of RMM at site
$F_{release,,site}$: Initial release fraction at site
DF_{site}: dilution factor of STP effluent in river

1.6.2.4.1 Predicted exposure concentrations in the STP and in the aquatic compartments (freshwater, seawater and sediments)

Table 43: Predicted exposure concentrations in the STP and in the aquatic compartments (freshwater, seawater and sediments)

Local Concentration, Compartment: STP and aquatic	***unit***	***ES6-E1***
Local PEC in surface water during emission episode (dissolved)	mg/L	3.204E+00
Annual average local PEC in surface water (dissolved)	mg/L	2.640E+00
Local PEC in fresh water sediment during emission episode	mg/kg dwt	1.219E+01
Local PEC in sea water during emission episode	mg/L	3.202E-01
Annual average local PEC in sea water (dissolved)	mg/L	2.639E-01
Local PEC in marine sediment during emission episode	mg/kg dwt	1.219E+00
PEC for microorganisms in STP	mg/L	3.164E+01
Comments		

1.6.2.4.2 Predicted exposure concentration in soils

Table 44: Predicted exposure concentration in soils

Local Concentration, Compartment: soil	***unit***	***ES6-E1***
Local PEC in agricultural soil, averaged over 30 days	mg/kg dwt	1.541E-01
Local PEC agricultural soil, averaged over 180 days	mg/kg dwt	5.804E-02
Local PEC in grass land, averaged over 180 days	mg/kg dwt	3.628E-02
Comments		

1.6.2.4.3 Predicted exposure concentration in the atmospheric compartment

Table 45: Predicted exposure concentration in the atmospheric compartment

Local Concentration, Compartment: air	***unit***	***ES6-E1***
Annual average local PEC in air (total)	kg/m^3	2.285E-08
Comments		

1.6.2.4.4 Predicted exposure concentration in food for secondary poisoning

The bioaccumulation potential of this substance is very low, therefore secondary poisoning can be considered negligible. The Kow for MEG is 0.044.

1.7 Use in Paints/Coatings (industrial)

General remarks

PROC 7:

ECETOC TRA generally is considered to be not suitable for the calculation of processes including aerosol generation. Thus, the inhalative exposure concerning the spraying process was evaluated using Stoffenmanager v4.0, whereas the dermal exposure was calculated with RISKOFDERM v2.1. Regarding Stoffenmanager the 75th percentile was taken as the relevant exposure value. Regarding RISKOFDERM the 75th percentile of the "Exposure loading per shift body" was added with the 75th percentile of the "Exposure loading per shift hand". The values given in µl was converted into mg and divided by a body weight of 70 kg which is generally assumed for workers. In addition, appropriate body protection was considered within the calculation of the final dermal exposure value.

1.7.1 Exposure Scenario 7

The relevant operational conditions (OCs) used for calculation of environmental exposure are mentioned under paragraph 1.7.2.4.

Table 46: Description of ES 7

Reference Number	7
1.7.1.1 Title	
Free short title	Use in Paints/Coatings (industrial)
Systematic title based on use descriptor	SU3; PROC 1, 2, 3, 4, 5, 7, 8a, 8b, 10, 13, and 15; ERC 4
1.7.1.2 Operational conditions and Risk management measures	
1.7.1.2.1 Control of workers exposure for PROC 1	
Workers related free short title	Use in closed process, no likelihood of exposure
Use descriptor covered	PROC 1
Processes, tasks, activities covered	Use of the substance in high integrity contained system where little potential exists for exposures, e.g. any sampling via closed loop systems
Assessment Method	ECETOC TRA Worker v2.0 with modifications (see 1. General remarks)
For further details on OCs and RMMs see Table 14	
1.7.1.2.2 Control of workers exposure for PROC 2	
Workers related free short title	Use in closed, continuous process with occasional controlled exposure
Use descriptor covered	PROC 2
Processes, tasks, activities covered	Continuous process but where the design philosophy is not specifically aimed at minimizing emissions. Occasional exposure will arise e.g. through maintenance, sampling and equipment breakages
Assessment Method	ECETOC TRA Worker v2.0 with modifications (see 1. General remarks)
For further details on OCs and RMMs see Table 14	
1.7.1.2.3 Control of workers exposure for PROC 3 and 4	

Workers related free short title	Use in closed batch process (synthesis or formulation). Use in batch and other process (synthesis) where opportunity for exposure arises.	
Use descriptor covered	PROC 3 and 4	
Processes, tasks, activities covered	Batch manufacture of a chemical or formulation where the predominant handling is in a contained manner, e.g. through enclosed transfers, but where some opportunity for contact with chemicals occurs, e.g. through sampling Use in batch manufacture of a chemical where significant opportunity for exposure arises, e.g. during charging, sampling or discharge of material, and when the nature of the design is likely to result in exposure.	
Assessment Method	ECETOC TRA Worker v2.0 with modifications (see 1. General remarks)	
For further details on OCs and RMMs see Table 2		
1.7.1.2.4 Control of workers exposure for PROC 5		
Workers related free short title	Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact).	
Use descriptor covered	PROC 5	
Processes, tasks, activities covered	Manufacture or formulation of chemical products or articles using technologies related to mixing and blending of solid or liquid materials, and where the process is in stages and provides the opportunity for significant contact at any stage	
Assessment Method	ECETOC TRA Worker v2.0 with modifications (see 1. General remarks)	
For further details on OCs and RMMs see Table 14		
1.7.1.2.5 Control of workers exposure for PROC 7		
Workers related free short title	Industrial spraying	
Use descriptor covered	PROC 7	
Processes, tasks, activities covered	Air dispersive techniques Spraying for surface coating, adhesives, polishes/cleaners, air care products, sandblasting Substances can be inhaled as aerosols. The energy of the aerosol particles may require advanced exposure controls; in case of coating, overspray may lead to waste water and waste.	
Assessment Method	Stoffenmanager v4.0 (inhalative exposure) RISKOFDERM v2.1 (dermal expsosure)	
Product characteristic		
Physical state	Liquid	
Fugacity	Low	

Concentration of substance	100		%
Vapour pressure of the substance	0.123		hPa
Amounts used			
Application rate	0.6	L/min	Parameter from RISKOFDERM
Frequency and duration of use/exposure			
Duration of exposure	6	hours/day	Parameter from RISKOFDERM (Limiting value; Assumed duration within Stoffenmanager: 4-8 hours)
Frequency of exposure	4-5	days/week	Parameter from Stoffenmanager
Human factors not influenced by risk management			
Exposed body parts	Whole body		Parameter from RISKOFDERM
Other given operational conditions affecting workers exposure			
Location	Inside		
Room volume	> 1000 m^3		Parameter from Stoffenmanager
General ventilation	No general ventilation		Parameter from Stoffenmanager
Technical conditions and measures at process level (source) to prevent release			
None			
Technical conditions and measures to control dispersion from source towards the worker			
Segregation	Ensure that worker is > 1 m from the source		Parameter from Stoffenmanager and RISKOFDERM
Local exhaust ventilation (Direction of airflow away from the worker)	Yes	Effectiveness: ca. 50%	Parameter from Stoffenmanager and RISKOFDERM
Organisational measures to prevent /limit releases, dispersion and exposure			
Work area regularly cleaned	Yes		
Equipment regularly inspected and well cleaned	Yes		
Spray direction	Level		
Conditions and measures related to personal protection, hygiene and health evaluation			
Respiratory protection required	No		
Use of suitable gloves with basic training	Yes	Effectiveness: 90%	Relevant regarding exposure of the hands
Wearing of appropriate working clothes (e.g. an overall)	Yes	Effectiveness: 80%	Relevant regarding exposure of the body

1.7.1.2.6 Control of workers exposure for PROC 8a		
Workers related free short title	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities.	
Use descriptor covered	PROC 8a	
Processes, tasks, activities covered	Sampling, loading, filling, transfer, dumping, bagging in non- dedicated facilities. Exposure related to dust, vapour, aerosols or spillage, and cleaning of equipment to be expected.	
Assessment Method	ECETOC TRA Worker v2.0 with modifications (see 1. General remarks)	
For further details on OCs and RMMs see Table 2		
1.7.1.2.7 Control of workers exposure for PROC 8b		
Workers related free short title	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities.	
Use descriptor covered	PROC 8b	
Processes, tasks, activities covered	Sampling, loading, filling, transfer, dumping, bagging in dedicated facilities. Exposure related to dust, vapour, aerosols or spillage, and cleaning of equipment to be expected.	
Assessment Method	ECETOC TRA Worker v2.0 with modifications (see 1. General remarks)	
For further details on OCs and RMMs see Table 2		
1.7.1.2.8 Control of workers exposure for PROC 10		
Workers related free short title	Roller application or brushing	
Use descriptor covered	PROC 10	
Processes, tasks, activities covered	Low energy spreading of e.g. coatings Including cleaning of surfaces. Substance can be inhaled as vapours, skin contact can occur through droplets, splashes, working with wipes and handling of treated surfaces.	
Assessment Method	ECETOC TRA Worker v2.0 with modifications (see 1. General remarks)	
Product characteristic		
Physical state	Liquid	
Fugacity	Low	
Concentration of substance	100	%
Vapour pressure of the substance	0.123	hPa
Amounts used		
Not relevant		
Frequency and duration of use/exposure		

Duration of exposure	> 4	hours/day
Frequency of exposure	≤ 240	days/year
Human factors not influenced by risk management		
Exposed skin surface	Both hands (960 cm²)	
Other given operational conditions affecting workers exposure		
Location	Indoor	
Domain	Industrial	
Technical conditions and measures at process level (source) to prevent release		
None		
Technical conditions and measures to control dispersion from source towards the worker		
Local exhaust ventilation required	No	
Organisational measures to prevent /limit releases, dispersion and exposure		
Not relevant in ECETOC TRA		
Conditions and measures related to personal protection, hygiene and health evaluation		
Respiratory protection required	No	
Use of suitable gloves with basic training	Yes	Effectiveness: 90%

1.7.1.2.9 Control of workers exposure for PROC 13	
Workers related free short title	Treatment of articles by dipping and pouring.
Use descriptor covered	PROC 13
Processes, tasks, activities covered	Immersion operations. Treatment of articles by dipping, pouring, immersing, soaking, washing out or washing in substances; including cold formation or resin type matrix. Includes handling of treated objects (e.g. after dying, plating). Substance is applied to a surface by low energy techniques such as dipping the article into a bath or pouring a preparation onto a surface.
Assessment Method	ECETOC TRA Worker v2.0 with modifications (see 1. General remarks)
For further details on OCs and RMMs see Table 23	

1.7.1.2.10 Control of workers exposure for PROC 15	
Workers related free short title	Use as laboratory reagent
Use descriptor covered	PROC 15
Processes, tasks, activities covered	Use of substances at small scale laboratory (< 1 l or 1 kg present at workplace). Larger laboratories and R+D installations should be treated as industrial processes.
Assessment Method	ECETOC TRA Worker v2.0 with modifications (see 1. General remarks)
For further details on OCs and RMMs see Table 2	

Additional good practice advice (for environment) beyond the REACH CSA

Use of tightly fitting safety goggles (The substance has shown to cause mucosal irritations at relatively high concentrations. Thus, it is recommended to protect the eyes.)

1.7.2 Exposure Estimation

1.7.2.1 Worker Exposure

For the estimated exposure for workers / PROC 1 see Table 15
For the estimated exposure for workers / PROC 2 see Table 16
For the estimated exposure for workers / PROC 3 see Table 5
For the estimated exposure for workers / PROC 4 see Table 6
For the estimated exposure for workers / PROC 5 see Table 17
For the estimated exposure for workers / PROC 8a see Table 7
For the estimated exposure for workers / PROC 8b see Table 8
For the estimated exposure for workers / PROC 13 see Table 24
For the estimated exposure for workers / PROC 15 see Table 9

Table 47: Estimated exposure for workers – PROC 7
Calculation tool used: Stoffenmanager v4.0

Route of exposure	**Concentrations**		**Justification**
	Value	Unit	
Long-term exposure, systemic/local, inhalative	9.79	mg/m³	75th percentile
Long-term exposure, systemic, dermal	54.6	mg/kg bw/d	75th percentile See 1.7: General remarks

NA = Not applicable

Table 48: Estimated exposure for workers – PROC 10
Calculation tool used: ECETOC TRA v2.0 modified (see 1. General remarks)

Route of exposure	**Concentrations**		**Justification**
	Value	Unit	
Long-term exposure, systemic/local, inhalative	25.87	mg/m³	NA
Long-term exposure, systemic, dermal	2.74	mg/kg bw/d	NA

NA = Not applicable

1.7.2.2. Consumer Exposure

Not Applicable

1.7.2.3 Indirect Exposure of Humans via the Environment (oral)

The bioaccumulation potential of this substance is very low, with a Kow of 0.044; therefore, indirect exposure of humans via the environment can be considered negligible.

1.7.2.4 Environmental Exposure

Table 49: Environmental Exposure Scenario ES7-E1

Section 1	**Operational conditions and risk management measures**
Section 1.2	**Control of environmental exposure**
Identifier*	ES7-E1
Contributing scenario	Use In Paints/Coatings
Environmental Release Category	ERC4
Specific ERC	CEPE 16a
Assessment scenario	
Operational Conditions	
Amounts used	
Amounts used in the EU (tonnes/year)	8,788 (maximum passing tonnage)
Fraction of EU tonnage used in region	1
Fraction of main source to local environment	1
Fraction of substance in end-use products	1
Maximum daily site tonnage (kg/day)	39945
Frequency and duration of use	
Type of release	Continuous
Emission days (days/year)	220 - CEPE 16a
Site specific monitoring data results for surface water effluent	
Location of sample	
Environmental factors not influenced by risk management	
Local freshwater dilution factor	10 (default)
Local marine water dilution factor	100 (default)
Other given operational conditions affecting environmental exposure	
Risk Management Measures	
Technical conditions and measures at process level (source) to prevent release	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Treat air emissions to provide a typical removal efficiency of (%)	
Treat wastewater (prior to discharge to receiving water) to provide the required removal efficiency of (%) ETotal,RMM = 1 –	87%

((1 – ERMM, 1) x (1 – ERMM,2))	
Organizational measures to prevent/limit release from site	CEPE 16a - Wet scrubber or filtration
Conditions and measures related to municipal sewage treatment plant	
Conditions and measures related to external treatment of waste for disposal	
Conditions and measures related to external recovery of waste	
Other environmental control measures additional to above	
Identifier	***ES7-E1***
Narrative	Release fraction derived from SpERC (CEPE 16a)
Release fraction to air from process	9.80E-01
Release fraction to wastewater from process	2.00E-02
Release fraction to soil from process (regional only)	0.00E+00
Local release to air (kg/d)	3.91E+04
Local release to sewage (kg/d)	7.99E+02
Local release to soil (kg/d)	0.00E+00
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	
Total efficiency of removal from air emissions (%)	
The maximum allowable site tonnage (M_{Safe}) based on removal from domestic sewage treatment (kg/d)	39947
Scaling	

The downstream user can check the compliance of his site by comparing site specific data with defaults used in the exposure assessment. The site specific quotient should be inferior or equal to the spERC quotient.

$$\frac{m_{spERC} * (1 - E_{ER,spERC}) * F_{release,spERC}}{DF_{spERC}} \geq \frac{m_{site} * (1 - E_{ER,site}) * F_{release,site}}{DF_{site}}$$

m_{spERC}: Substance use rate in spERC
$E_{ER,spERC}$: Efficacy of RMM in spERC
$F_{release,,spERC}$: Initial release fraction in spERC
DF_{spERC}: dilution factor of STP effluent in river

m_{site}: Substance use rate at site
$E_{ER,site}$: Efficacy of RMM at site
$F_{release,,site}$: Initial release fraction at site
DF_{site}: dilution factor of STP effluent in river

1.7.2.4.1 Predicted exposure concentrations in the STP and in the aquatic compartments (freshwater, seawater and sediments)

Table 50: Predicted exposure concentrations in the STP and in the aquatic compartments (freshwater, seawater and sediments)

Local Concentration, Compartment: STP and aquatic	***unit***	***ES7-E1***
Local PEC in surface water during emission episode (dissolved)	mg/L	5.084E+00
Annual average local PEC in surface water (dissolved)	mg/L	3.076E+00
Local PEC in fresh water sediment during emission episode	mg/kg dwt	1.935E+01
Local PEC in sea water during emission episode	mg/L	5.085E-01
Annual average local PEC in sea water (dissolved)	mg/L	3.077E-01
Local PEC in marine sediment during emission episode	mg/kg dwt	1.935E+00
PEC for microorganisms in STP	mg/L	5.056E+01
Comments		

1.7.2.4.2 Predicted exposure concentration in soils

Table 52: Predicted exposure concentration in soils

Local Concentration, Compartment: soil	***unit***	***ES7-E1***
Local PEC in agricultural soil, averaged over 30 days	mg/kg dwt	1.530E+00
Local PEC agricultural soil, averaged over 180 days	mg/kg dwt	1.376E+00
Local PEC in grass land, averaged over 180 days	mg/kg dwt	2.029E+00
Comments		

1.7.2.4.3 Predicted exposure concentration in the atmospheric compartment

Table 53: Predicted exposure concentration in the atmospheric compartment

Local Concentration, Compartment: air	***unit***	***ES7-E1***
Annual average local PEC in air (total)	kg/m^3	6.559E-06
Comments		

1.7.2.4.4 Predicted exposure concentration in food for secondary poisoning

The bioaccumulation potential of this substance is very low, therefore secondary poisoning can be considered negligible. The Kow for MEG is 0.044.

1.8 Use in Paints/Coatings/Adhesives/ Sealants/ Foams/ Polymers/ filled Polymers (professional)

General remarks

PROC 11:

As ECETOC TRA generally is considered to be not suitable for the calculation of processes including aerosol generation. Thus, the inhalative exposure concerning the spraying process was evaluated using Stoffenmanager v4.0; the dermal exposure was estimated using the RISKOFDERM model v2.1. Regarding Stoffenmanager the 75th percentile was taken as the relevant exposure value. Regarding RISKOFDERM the 75th percentile of the "Exposure loading per shift body" was added with the 75th percentile of the "Exposure loading per shift hand". The values given in µl was converted into mg and divided by a body weight of 70 kg which is generally assumed for workers. In addition, appropriate body protection was considered within the calculation of the final dermal exposure value.

1.8.1 Exposure Scenario 8

The relevant operational conditions (OCs) used for calculation of environmental exposure are mentioned under paragraph 1.8.2.4.

Table 54: Description of ES 8

Reference Number	8
1.8.1.1 Title	
Free short title	Use in Paints/Coatings/ Adhesives/ Sealants/ Foams/ Polymers/ filled Polymers (professional)
Systematic title based on use descriptor	SU22; PROC 1, 2, 3, 4, 5, 8a, 8b, 9, 10, 11, 13, 14, 15, and 19; ERC 8d
1.8.1.2 Operational conditions and Risk management measures	
1.8.1.2.1Control of workers exposure for PROC 1, 2, 3	
Workers related free short title	Use in closed process, no likelihood of exposure. Use in closed, continuous process with occasional controlled exposure. Use in closed batch process (synthesis or formulation).
Use descriptor covered	PROC 1, 2, 3
Processes, tasks, activities covered	Use of the substances in high integrity contained system where little potential exists for exposures, e.g. any sampling via closed loop systems. Continuous process but where the design philosophy is not specifically aimed at minimizing emissions. It is not high integrity and occasional expose will arise e.g. through maintenance, sampling and equipment breakages. Batch manufacture of a chemical or formulation where the predominant handling is in a contained manner, e.g. through enclosed transfers, but where some opportunity for contact with chemicals occurs, e.g. through sampling.
Assessment Method	ECETOC TRA workers (v2.0) modified (see 1. Genral remarks)

Product characteristic			
Physical state	Liquid		
Fugacity	Low		
Concentration of substance	100		%
Vapour pressure of the substance	0.123		hPa
Amounts used			
Not relevant			
Frequency and duration of use/exposure			
Duration of exposure	> 4	hours/day	
Frequency of exposure	≤ 240	days/year	
Human factors not influenced by risk management			
Exposed skin surface	Palm of one hand (240 cm²)	Relevant for PROC 1 and 3	
	Palm of two hands (480 cm²)	Relevant for PROC 2	
Other given operational conditions affecting workers exposure			
Location	Indoor		
Domain	Professional		
Technical conditions and measures at process level (source) to prevent release			
None			
Technical conditions and measures to control dispersion from source towards the worker			
Local exhaust ventilation	No		
Organisational measures to prevent /limit releases, dispersion and exposure			
Not relevant for ECETOC TRA			
Conditions and measures related to personal protection, hygiene and health evaluation			
Respiratory protection required	No		
1.8.1.2.2 Control of workers exposure for PROC 4 and 5			
Workers related free short title	Use in batch and other process (synthesis) where opportunity for exposure arises. Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant con-tact)		
Use descriptor covered	PROC 4 and 5		
Processes, tasks, activities covered	Use in batch manufacture of a chemical where significant opportunity for exposure arises, e.g. during charging, sampling or discharge of material, and when the nature of the design is likely to result in exposure. Manufacture or formulation of chemical products or articles using technologies related to mixing and blending of solid or liquid materials, and where the process is in stages and provides the opportunity for significant con-tact at any stage.		
Assessment Method	ECETOC TRA Worker v2.0 with modifications		

	(see 1. General remarks)	
Product characteristic		
Physical state	Liquid	
Fugacity	Low	
Concentration of substance	100	%
Vapour pressure of the substance	0.123	hPa
Amounts used		
Not relevant		
Frequency and duration of use/exposure		
Duration of exposure	> 4	hours/day
Frequency of exposure	≤ 240	days/year
Human factors not influenced by risk management		
Exposed skin surface	Palm of both hands (480 cm^2)	
Other given operational conditions affecting workers exposure		
Location	Indoor	
Domain	Professional	
Technical conditions and measures at process level (source) to prevent release		
None		
Technical conditions and measures to control dispersion from source towards the worker		
Local exhaust ventilation required	No	
Organisational measures to prevent /limit releases, dispersion and exposure		
Not relevant in ECETOC TRA		
Conditions and measures related to personal protection, hygiene and health evaluation		
Respiratory protection required	No	
1.8.1.2.3 Control of workers exposure for PROC 8a		
Workers related free short title	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities.	
Use descriptor covered	PROC 8a	
Processes, tasks, activities covered	Sampling, loading, filling, transfer, dumping, bagging in non- dedicated facilities. Exposure related to dust, vapour, aerosols or spillage, and cleaning of equipment to be expected.	
Assessment Method	ECETOC TRA Worker v2.0 with modifications (see 1. General Remarks)	
Product characteristic		
Physical state	Liquid	
Fugacity	Low	
Concentration of substance	100	%
Vapour pressure of the substance	0.123	hPa

Amounts used		
Not relevant		
Frequency and duration of use/exposure		
Duration of exposure	> 4	hours/day
Frequency of exposure	≤ 240	days/year
Human factors not influenced by risk management		
Exposed skin surface	Both hands (960 cm²)	
Other given operational conditions affecting workers exposure		
Location	Indoor	
Domain	Professional	
Technical conditions and measures at process level (source) to prevent release		
None		
Technical conditions and measures to control dispersion from source towards the worker		
Local exhaust ventilation required	Yes	Effectiveness: 80%
In case no LEV is present, a suitable respiratory protection with adequate effectiveness is required		
Organisational measures to prevent /limit releases, dispersion and exposure		
Not relevant in ECETOC TRA		
Conditions and measures related to personal protection, hygiene and health evaluation		
Respiratory protection required	No	
1.8.1.2.4 Control of workers exposure for PROC 8b and 9		
Workers related free short title	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities. Transfer of substance or preparation into small containers (dedicated filling line, including weighing).	
Use descriptor covered	PROC 8b and 9	
Processes, tasks, activities covered	Sampling, loading, filling, transfer, dumping, bagging in dedicated facilities. Exposure related to dust, vapour, aerosols or spillage, and cleaning of equipment to be expected. Filling lines specifically designed to both capture vapour and aerosol emissions and minimise spillage.	
Assessment Method	ECETOC TRA Worker v2.0 with modifications (see 1. General remarks)	
Product characteristic		
Physical state	Liquid	
Fugacity	Low	
Concentration of substance	100	%
Vapour pressure of the substance	0.123	hPa
Amounts used		
Not relevant		

Frequency and duration of use/exposure		
Duration of exposure	> 4	hours/day
Frequency of exposure	≤ 240	days/year
Human factors not influenced by risk management		
Exposed skin surface	Palm of both hands (480 cm^2)	
Other given operational conditions affecting workers exposure		
Location	Indoor	
Domain	Professional	
Technical conditions and measures at process level (source) to prevent release		
None		
Technical conditions and measures to control dispersion from source towards the worker		
Local exhaust ventilation required	No	
Organisational measures to prevent /limit releases, dispersion and exposure		
Not relevant in ECETOC TRA		
Conditions and measures related to personal protection, hygiene and health evaluation		
Respiratory protection required	No	
1.8.1.2.5 Control of workers exposure for PROC 10		
Workers related free short title	Roller application or brushing	
Use descriptor covered	PROC 10	
Processes, tasks, activities covered	Low energy spreading of e.g. coatings. Including cleaning of surfaces. Substance can be inhaled as vapours, skin contact can occur through droplets, splashes, working with wipes and handling of treated surfaces.	
Assessment Method	ECETOC TRA Worker v2.0 with modifications (see 1. General remarks)	
Product characteristic		
Physical state	Liquid	
Fugacity	Low	
Concentration of substance	100	%
Vapour pressure of the substance	0.123	hPa
Amounts used		
Not relevant		
Frequency and duration of use/exposure		
Duration of exposure	> 4	hours/day
Frequency of exposure	≤ 240	days/year
Human factors not influenced by risk management		
Exposed skin surface	Both hands (960 cm^2)	
Other given operational conditions affecting workers exposure		
Location	Indoor	

Domain	Professional		
Technical conditions and measures at process level (source) to prevent release			
None			
Technical conditions and measures to control dispersion from source towards the worker			
Local exhaust ventilation required	Yes	Effectiveness: 80%	
In case no LEV is present, a suitable respiratory protection with adequate effectiveness is required.			
Organisational measures to prevent /limit releases, dispersion and exposure			
Not relevant in ECETOC TRA			
Conditions and measures related to personal protection, hygiene and health evaluation			
Respiratory protection required	No		
Use of suitable gloves with basic training	Yes	Effectiveness: 90%	
1.8.1.2.6 Control of workers exposure for PROC 11			
Workers related free short title	Non industrial spraying		
Use descriptor covered	PROC 11		
Processes, tasks, activities covered	Air dispersive techniques Spraying for surface coating, adhesives, polishes/cleaners, air care products, sandblasting Substances can be inhaled as aerosols. The energy of the aerosol particles may require advanced exposure controls.		
Assessment Method	Stoffenmanager v4.0 – Task „Handling of liquids at high pressure resulting in substantial generation of mist or spray/haze“ RISKOFDERMv2.1 – Process „Spraying“		
Product characteristic			
Physical state	liquid		
Fugacity	low		
Concentration of substance	100		%
Vapour pressure of the substance	0.123		hPa
Amounts used			
Application rate of product	0.05		L/min
Frequency and duration of use/exposure			
Duration of exposure	150	minutes/day	Parameter from RISKOFDERM (Limiting value; Assumed duration within Stoffenmanager: 4-8 hours)
Frequency of exposure	4-5	days/week	Parameter from Stoffenmanager
Human factors not influenced by risk management			

Exposed body parts dermal	Whole body	
Other given operational conditions affecting workers exposure		
Location	Inside	
Room volume	100 -1000 m^3	Parameter from Stoffenmanager
General ventilation	General ventilation (mechanical)	Parameter from Stoffenmanager
Direction of airflow	Not clearly away from the worker	Parameter from RISKOFDERM
Work within one meter of the source	No	
Spray direction	Level	Parameter from RISKOFDERM
Technical conditions and measures at process level (source) to prevent release		
Segregation	Worker is within one meter of the source	
Technical conditions and measures to control dispersion from source towards the worker		
Control measures	No control measures at the source	Parameter from Stoffenmanager
Organisational measures to prevent /limit releases, dispersion and exposure		
Work area regularly cleaned	Yes	Parameter from Stoffenmanager
Equipment regularly inspected and well cleaned	Yes	Parameter from Stoffenmanager
Ensure that the task is not carried out by more than one worker simultaneously		
Conditions and measures related to personal protection, hygiene and health evaluation		
Respiratory protection required	Yes: Half mask respirator with filter/cartridge (gascartridge)	Effectiveness: ca. 40%
In case no respiratory protection is used, a LEV with adequate effectiveness is required.		
Use of suitable gloves with basic training	Yes	Effectiveness: 90%	Relevant regarding exposure of the hands
Wearing of appropriate working clothes (e.g. an overall)	Yes	Effectiveness: 80%	Relevant regarding exposure of the body

1.8.1.2.7 Control of workers exposure for PROC 13 and 14	
Workers related free short title	Treatment of articles by dipping and pouring. Production of preparations or articles by tabletting, compression, extrusion, pelletisation.
Use descriptor covered	PROC 13 and 14
Processes, tasks, activities covered	Immersion operations. Treatment of articles by dipping, pouring, immersing, soaking, washing out or washing in substances; including cold formation or resin type matrix. Includes handling of treated objects (e.g. after dying, plating,). Substance is applied to a surface by low energy techniques such as dipping the

	article into a bath or pouring a preparation onto a surface. Use of the substances in high integrity contained system where little potential exists for exposures, e.g. any sampling via closed loop systems.		
Assessment Method	ECETOC TRA Worker v2.0 with modifications (see 1. General remarks)		
Product characteristic			
Physical state	Liquid		
Fugacity	Low		
Concentration of substance	100	%	
Vapour pressure of the substance	0.123	hPa	
Amounts used			
Not relevant			
Frequency and duration of use/exposure			
Duration of exposure	> 4	hours/day	
Frequency of exposure	≤ 240	days/year	
Human factors not influenced by risk management			
Exposed body parts	Palm of both hands (480 cm^2)		
Other given operational conditions affecting workers exposure			
Location	Indoor		
Domain	Professional		
Technical conditions and measures at process level (source) to prevent release			
None			
Technical conditions and measures to control dispersion from source towards the worker			
Local exhaust ventilation required	No		
Organisational measures to prevent /limit releases, dispersion and exposure			
Not relevant in ECETOC TRA			
Conditions and measures related to personal protection, hygiene and health evaluation			
Respiratory protection required	No		
Use of suitable gloves with basic training	Yes	Effectiveness: 90%	Relevant for PROC 13
	No		Relevant for PROC 14
1.8.1.2.8Control of workers exposure for PROC 15			
Workers related free short title	Use as laboratory reagent.		
Use descriptor covered	PROC 15		
Processes, tasks, activities covered	Use of substances at small scale laboratory (< 1 l or 1 kg present at workplace). Larger laboratories and R+D installations should be treated as industrial processes.		
Assessment Method	ECETOC TRA workers (v2.0) modified (see 1. General remarks)		

Product characteristic			
Physical state	Liquid		
Fugacity	Low		
Concentration of substance	100		%
Vapour pressure of the substance	0.123		hPa
Amounts used			
Not relevant			
Frequency and duration of use/exposure			
Duration of exposure	> 4	hours/day	
Frequency of exposure	≤ 240	days/year	
Human factors not influenced by risk management			
Exposed skin surface	Palm of one hand (240 cm²)		
Other given operational conditions affecting workers exposure			
Location	Indoor		
Domain	Professional		
Technical conditions and measures at process level (source) to prevent release			
None			
Technical conditions and measures to control dispersion from source towards the worker			
Local exhaust ventilation	No		
Organisational measures to prevent /limit releases, dispersion and exposure			
Not relevant for ECETOC TRA			
Conditions and measures related to personal protection, hygiene and health evaluation			
Respiratory protection required	No		
1.8.1.2.9 Control of workers exposure for PROC 19[1]			
Workers related free short title	Hand-mixing with intimate contact and only PPE available		
Use descriptor covered	PROC 19		
Processes, tasks, activities covered	Addresses occupations where intimate and intentional contact with substances occurs without any specific exposure controls other than PPE.		
Assessment Method	ECETOC TRA Worker v2.0 with modifications[1]		
Product characteristic			
Physical state	liquid		
Fugacity	low		
Concentration of substance	100		%
Vapour pressure of the substance	0.123		hPa
Amounts used			
Not relevant			
Frequency and duration of use/exposure			

Duration of exposure	< 15	minutes/day
Frequency of exposure	≤ 240	days/year
Human factors not influenced by risk management		
Exposed skin surface	Both hands and main part of arms (1980 cm^2)	
Other given operational conditions affecting workers exposure		
Location	Indoor	
Domain	Professional	
Technical conditions and measures at process level (source) to prevent release		
None		
Technical conditions and measures to control dispersion from source towards the worker		
Local exhaust ventilation required	No	
Organisational measures to prevent /limit releases, dispersion and exposure		
Not relevant in ECETOC TRA		
Conditions and measures related to personal protection, hygiene and health evaluation		
Respiratory protection required	No	
Use of suitable gloves with basic training	Yes	Effectiveness: 90%

[1] **Note:** There is no immediate concern regarding the activity "Hand-mixing with immediate contact" applying in case the OCs/RMMs mentioned above are applied. However, a regular use of the substance in hand-mixing activities is strongly discouraged.

Additional good practice advice (for environment) beyond the REACH CSA
Use of tightly fitting safety goggles (The substance has shown to cause mucosal irritations at relatively high concentrations. Thus, it is recommended to protect the eyes.)

1.8.2 Exposure Estimation

1.8.2.1 Worker Exposure

Table 56: Estimated exposure for workers – PROC 1
Calculation tool used: ECETOC TRA v2.0 modified (see 1. General remarks)

Route of exposure	**Concentrations**		**Justification**
	Value	Unit	
Long-term exposure, systemic/local, inhalative	0.03	mg/m³	NA
Long-term exposure, systemic, dermal	0.34	mg/kg bw/d	NA

NA = Not applicable

Table 57: Estimated exposure for workers – PROC 2
Calculation tool used: ECETOC TRA v2.0 modified (see 1. General remarks)

Route of exposure	Concentrations		Justification
	Value	Unit	
Long-term exposure, systemic/local, inhalative	12.94	mg/m³	NA
Long-term exposure, systemic, dermal	1.37	mg/kg bw/d	NA

NA = Not applicable

Table 58: Estimated exposure for workers – PROC 3
Calculation tool used: ECETOC TRA v2.0 modified (see 1. General remarks)

Route of exposure	Concentrations		Justification
	Value	Unit	
Long-term exposure, systemic/local, inhalative	7.76	mg/m³	NA
Long-term exposure, systemic, dermal	0.34	mg/kg bw/d	NA

NA = Not applicable

Table 59: Estimated exposure for workers – PROC 4
Calculation tool used: ECETOC TRA v2.0 modified (see 1. General remarks)

Route of exposure	Concentrations		Justification
	Value	Unit	
Long-term exposure, systemic/local, inhalative	25.88	mg/m³	NA
Long-term exposure, systemic, dermal	6.86	mg/kg bw/d	NA

NA = Not applicable

Table 60: Estimated exposure for workers – PROC 5
Calculation tool used: ECETOC TRA v2.0 modified (see 1. General remarks)

Route of exposure	Concentrations		Justification
	Value	Unit	
Long-term exposure, systemic/local, inhalative	25.88	mg/m³	NA

Long-term exposure, systemic, dermal	13.71	mg/kg bw/d	NA

NA = Not applicable

Table 59: Estimated exposure for workers – PROC 8a
Calculation tool used: ECETOC TRA v2.0 modified (see 1. General remarks)

Route of exposure	**Concentrations**		**Justification**
	Value	Unit	
Long-term exposure, systemic/local, inhalative	12.94	mg/m³	NA
Long-term exposure, systemic, dermal	13.71	mg/kg bw/d	NA

NA = Not applicable

Table 60: Estimated exposure for workers – PROC 8b
Calculation tool used: ECETOC TRA v2.0 modified (see 1. General remarks)

Route of exposure	**Concentrations**		**Justification**
	Value	Unit	
Long-term exposure, systemic/local, inhalative	25.88	mg/m³	NA
Long-term exposure, systemic, dermal	6.86	mg/kg bw/d	NA

NA = Not applicable

Table 61: Estimated exposure for workers – PROC 9
Calculation tool used: ECETOC TRA v2.0 modified (see 1. General remarks)

Route of exposure	**Concentrations**		**Justification**
	Value	Unit	
Long-term exposure, systemic/local, inhalative	25.88	mg/m³	NA
Long-term exposure, systemic, dermal	6.86	mg/kg bw/d	NA

NA = Not applicable

Table 62: Estimated exposure for workers – PROC 10
Calculation tool used: ECETOC TRA v2.0 modified (see 1. General remarks)

Route of exposure	Concentrations		Justification
	Value	Unit	
Long-term exposure, systemic/local, inhalative	12.94	mg/m³	NA
Long-term exposure, systemic, dermal	2.74	mg/kg bw/d	NA

NA = Not applicable

Table 64: Estimated exposure for workers – PROC 11
Calculation tool used: Stoffenmanager v4.0 and RISKOFDERMv2.1

Route of exposure	Concentrations		Justification
	Value	Unit	
Long-term exposure, systemic/local, inhalative	14.05	mg/m³	75th percentile
Long-term exposure, systemic, dermal	53.75	mg/kg bw/d	75th percentile (see 1.8 General remarks)

NA = Not applicable

Table 65: Estimated exposure for workers – PROC 13
Calculation tool used: ECETOC TRA v2.0 modified (see 1. General remarks)

Route of exposure	Concentrations		Justification
	Value	Unit	
Long-term exposure, systemic/local, inhalative	25.88	mg/m³	NA
Long-term exposure, systemic, dermal	1.37	mg/kg bw/d	NA

NA = Not applicable

Table 66: Estimated exposure for workers – PROC 14
Calculation tool used: ECETOC TRA v2.0 modified (see 1. General remarks)

Route of exposure	Concentrations		Justification
	Value	Unit	
Long-term exposure, systemic/local, inhalative	25.88	mg/m³	NA

Long-term exposure, systemic, dermal	3.43	mg/kg bw/d	NA

NA = Not applicable

Table 67: Estimated exposure for workers – PROC 15
Calculation tool used: ECETOC TRA v2.0 modified (see 1. General remarks)

Route of exposure	**Concentrations**		**Justification**
	Value	Unit	
Long-term exposure, systemic/local, inhalative	12.94	mg/m³	NA
Long-term exposure, systemic, dermal	0.34	mg/kg bw/d	NA

NA = Not applicable

Table 68: Estimated exposure for workers – PROC 19
Calculation tool used: ECETOC TRA v2.0 modified (see 1. General remarks)

Route of exposure	**Concentrations**		**Justification**
	Value	Unit	
Long-term exposure, systemic/local, inhalative	6.47	mg/m³	NA
Long-term exposure, systemic, dermal	14.14	mg/kg bw/d	NA

NA = Not applicable

1.8.2.2. Consumer Exposure

Not Applicable

1.8.2.3 Indirect Exposure of Humans via the Environment (oral)

The bioaccumulation potential of this substance is very low, with a Kow of 0.044; therefore, indirect exposure of humans via the environment can be considered negligible.

1.8.2.4 Environmental Exposure

Table 68: Environmental Exposure Scenario ES8-E1

Section 1	**Operational conditions and risk management measures**
Section 1.2	**Control of environmental exposure**
Identifier*	ES8-E1
Contributing scenario	Use In Paints/Coatings
Environmental Release Category	ERC8d
Specific ERC	CEPE 16b
Assessment scenario	
Operational Conditions	
Amounts used	
Amounts used in the EU (tonnes/year)	1,000,000 (total industry tonnage for production of MEG)
Fraction of EU tonnage used in region	0.1
Fraction of main source to local environment	0.002
Fraction of substance in end-use products	1
Maximum daily site tonnage (kg/day)	5479
Frequency and duration of use	
Type of release	Continuous
Emission days (days/year)	365 - CEPE 16b
Site specific monitoring data results for surface water effluent	
Location of sample	
Environmental factors not influenced by risk management	
Local freshwater dilution factor	10 (default)
Local marine water dilution factor	100 (default)
Other given operational conditions affecting environmental exposure	
Risk Management Measures	
Technical conditions and measures at process level (source) to prevent release	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Treat air emissions to provide a typical removal efficiency of (%)	
Treat wastewater (prior to discharge to receiving water) to provide the required removal efficiency of (%) ETotal,RMM = 1 – ((1 – ERMM, 1) x (1 – ERMM,2))	87%

Organizational measures to prevent/limit release from site	CEPE 16b - Wet Scrubber or Filtration
Conditions and measures related to municipal sewage treatment plant	
Conditions and measures related to external treatment of waste for disposal	
Conditions and measures related to external recovery of waste	
Other environmental control measures additional to above	
Identifier	***ES8-E1***
Narrative	Release fraction derived from SpERC (CEPE 16b)
Release fraction to air from process	9.80E-01
Release fraction to wastewater from process	2.00E-02
Release fraction to soil from process (regional only)	0.00E+00
Local release to air (kg/d)	5.37E+02
Local release to sewage (kg/d)	1.10E+01
Local release to soil (kg/d)	0.00E+00
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	
Total efficiency of removal from air emissions (%)	
The maximum allowable site tonnage (M_{Safe}) based on removal from domestic sewage treatment (kg/d)	9177

1.8.2.4.1 Predicted exposure concentrations in the STP and in the aquatic compartments (freshwater, seawater and sediments)

Table 69: Predicted exposure concentrations in the STP and in the aquatic compartments (freshwater, seawater and sediments)

Local Concentration, Compartment: STP and aquatic	***unit***	***ES8-E1***
Local PEC in surface water during emission episode (dissolved)	mg/L	3.961E-01
Annual average local PEC in surface water (dissolved)	mg/L	3.961E-01
Local PEC in fresh water sediment during emission episode	mg/kg dwt	1.507E+00
Local PEC in sea water during emission episode	mg/L	4.053E-02
Annual average local PEC in sea water (dissolved)	mg/L	4.053E-02
Local PEC in marine sediment during emission episode	mg/kg dwt	1.543E-01
PEC for microorganisms in STP	mg/L	6.935E-01
Comments		

1.8.2.4.2 Predicted exposure concentration in soils

Table 70: Predicted exposure concentration in soils

Local Concentration, Compartment: soil	***unit***	***ES8-E1***
Local PEC in agricultural soil, averaged over 30 days	mg/kg dwt	9.136E-01
Local PEC agricultural soil, averaged over 180 days	mg/kg dwt	9.114E-01
Local PEC in grass land, averaged over 180 days	mg/kg dwt	9.109E-01
Comments		

1.8.2.4.3 Predicted exposure concentration in the atmospheric compartment

Table 71: Predicted exposure concentration in the atmospheric compartment

Local Concentration, Compartment: air	***unit***	***ES8-E1***
Annual average local PEC in air (total)	kg/m^3	5.305E-11
Comments		

1.8.2.4.4 Predicted exposure concentration in food for secondary poisoning

The bioaccumulation potential of this substance is very low, therefore secondary poisoning can be considered negligible. The Kow for MEG is 0.044.

1.9 Use in Paints/Coatings /Surface treatment products (Consumer use)

General remarks
PC9a and PC15:
Regarding PC 9a and PC 15 two Sub-scenarios have been evaluated.
Sub-Scenario 1: Use in Paints/Coatings – non-spraying products (Water borne wall paint)
Sub-Scenario 2: Use in Paints/Coatings – spraying products
These Sub-Scenarios are intended to represent reasonable worst-case scenarios for PC9a and 15.

PC18:
To reflect a reasonable worst case scenario, the following assumptions have been made:
- An ink cartridge contains 50g of printing ink
- 50g printink ink are sufficient to print 300 pages
- 100 pages per day are printed

Generally, two steps have been assessed. Refilling of cartridges (Part A) and the printing process itself (Part B). For the step "Refilling of toners" the ConsExpo default database for Cleaning and washing/All-purpose cleaner/Liquid/Mixing and Loading was regarded to be suitable as a basis for the inhalative and dermal exposure estimation (in case the ConsExpo default values have been used, this is stated below). Exposure via the oral route is anticipated to be not relevant.
The step "Printing process" was calculated using the evaporation model postulating instantaneous release as a worst case regarding inhalative exposure. With regard to the printing process dermal and oral exposure is considered to be negligible.

PC31:
For PC 31 the use of a floor/furniture polish reflects a representative worst case scenario.

1.9.1 Exposure Scenario

The relevant operational conditions (OCs) used for calculation of environmental exposure are mentioned under paragraph 1.9.2.4.

Table 72 Description of the ES

Reference Number	9
1.9.1.1. Title	
Free short title	Use in Paints/Coatings /Surface treatment products (Consumer use)
Systematic title based on use descriptor	SU21; PC 9a, 15, 18, 24, 31and 34; ERC 8d
1.9.1.2. Operational conditions and risk management measures	
1.9.1.2.1 Control of consumer exposure for PC 9a and 15	
1.9.1.2.1.1 Sub-Scenario 1/Use in Paints/Coatings - non-spraying products	
Name of contributing scenario	Use in Paints/Coatings - non-spraying products
Use descriptor covered	PC 9a, PC 15
Processes, tasks, activities covered	see above (General Remarks); see corresponding Fact Sheet[1]
Assessment Method	ConsExpo 4.1 Based on the ConsExpo default database for Painting products/Brush and roller painting/Water borne wall paint
Product characteristic	

Physical state	liquid	
Concentration of substance	max 5.0 %	
Vapour pressure of the substance	0.123 hPa	
Mol weight matrix of the product	45 g/mol	(Default value)
Mass transfer rate	0.331 m/min	Thibodeaux´s method; (as stated in the corresponding Fact Sheet See footnote 1)
Amounts used		
Applied amount	1250 g/day	(Default value)
Frequency and duration of use/exposure		
Duration of exposure	132 min	(Default value)
Duration of application	120 min	(Default value)
Frequency of exposure	1day/year	(Default value – not relevant for the calculation of the mean concentration on day of exposure)
Human factors not influenced by risk management		
Exposed skin surface	Hands and forearms (1900 cm²)	
Contact rate	30 mg/min	(Default value)
Release duration	7200 s	(Default value)
Type of activity (inhalation rate)	Light activity	See footnote 2
Other given operational conditions affecting consumers exposure		
Location	Inside	
Room volume	20 m³	(Default value)
Ventilation rate	0.6 per hour	(Default value)
Release area	10 m²	(Default value)
Application temperature	25°C	
Conditions and measures related to information and behavioural advice to consumers		
Not applicable		
Conditions and measures related to personal protection and hygiene		
Not applicable		
1.9.1.2.1.2 Sub-Scenario 2/Use in Paints/Coatings - spraying products		
Name of contributing scenario	Use in Paints/Coatings–spraying products	
Use descriptor covered	PC 9a, PC 15	
Processes, tasks, activities covered	see above (General Remarks); see corresponding Fact Sheet[1]	
Assessment Method	ConsExpo 4.1 Based on the ConsExpo default database for Painting	

	products/Spray painting/Spray cans	
Product characteristic		
Physical state	liquid	
Concentration of substance	Max. 5.0 %	
Vapour pressure of the substance	0.123 hPa	
Airborn fraction	1	(Default value)
Weight fraction non-volatile	0.3	(Default value)
Density non-volatile	1.5 g/cm³	(Default value)
Amounts used		
Mass generation rate	0.33 g/s	(Default value)
Frequency and duration of use/exposure		
Duration of spraying	15 min	(Default value)
Duration of exposure	15 min	(Default value)
Frequency of exposure	2 days/year	(Default value – not relevant for the calculation of the mean concentration on day of exposure)
Human factors not influenced by risk management		
Inhalation cut-off diameter	15 µm	(Default value)
Non-respirable uptake fraction	1	(Default value)
Exposed skin surface	Hands and forearms (1900 cm²)	
Contact rate	100 mg/min	(Default value)
Release duration	900 s	(Default value)
Type of activity (inhalation rate)	Light activity	See footnote 2
Other given operational conditions affecting consumers exposure		
Location	Inside	(Default assumption)
Room volume	34 m³	(Default value)
Room height	2.25 m	(Default value)
Ventilation rate	1.5 per hour	(Default value)
Application temperature	25°C	
Conditions and measures related to information and behavioural advice to consumers		
Spraying away from exposed person		
Conditions and measures related to personal protection and hygiene		
Not applicable		
1.9.1.2.2 Control of consumer exposure for PC 18		
Name of contributing scenario	Use in Printing inks	
Use descriptor covered	PC 18	
Processes, tasks, activities covered	Refilling of toners (cartridges) – Part A; Printing process – Part B:	

	Continuous printing of pages over a longer period of time (e.g. 500 pages over a period of 8 hours)	
Assessment Method	ConsExpo 4.1 Refilling of toners: Based on the ConsExpo default database for Cleaning and washing/All-purpose cleaner/Liquid/Mixing and Loading Printing process: Inhalation – evaporation model/instantaneous release	
Part A. Refilling step		
Product characteristic		
Physical state	Liquid	
Concentration of substance	max. 5%	
Vapour pressure of the substance	0,123 hPa	
Mol weight matrix	22 g/mol	(Default value) High fraction of water is assumed
Mass transfer rate	0.331 m/min	Thibodeaux´s method See footnote 3;
Amounts used		
Applied amount	50 g	Amount of printing ink contained in a cartridge See footnote 4
Frequency and duration of use/exposure		
Duration of exposure	0.75 min	(Default value)
Duration of application	0.3 min	(Default value)
Frequency of exposure	104 days/year	(Default value - Not relevant for the calculation of the mean concentration on day of exposure)
Human factors not influenced by risk management		
Exposed skin surface	Palm of one hand (215 cm^2)	(Default value)
Type of activity (inhalation rate)	Light activity	See footnote 2
Other given operational conditions affecting workers exposure		
Location	Inside	
Room volume	-	A “personal volume” of 1 m^3 is assumed (Default value)
Ventilation rate	0.5 per hour	(Default value)
Release area	20 cm^2	(Default value)
Application temperature	25°C	
Conditions and measures related to information and behavioural advice to consumers		

Not applicable		
Conditions and measures related to personal protection and hygiene		
Not applicable		
Part B. Printing process		
Product characteristic		
Physical state	Liquid	
Concentration of substance	max. 5%	
Vapour pressure of the substance	0,123 hPa	
Amounts used		
Applied amount	16 g/day	Amount of printing ink needed to print 100 pages
Frequency and duration of use/exposure		
Duration of exposure	10 hours	
Frequency of exposure	365 days/year	Not relevant for the calculation of the mean concentration on day of exposure)
Human factors not influenced by risk management		
Type of activity (inhalation rate)	Light activity	See footnote 2
Other given operational conditions affecting workers exposure		
Location	Inside	
Room volume	25 m³	See footnote 5
Ventilation rate	0.6 per hour	See footnote 6
Application temperature	25°C	
Organisational measures to prevent /limit releases, dispersion and exposure		
Not applicable		
Conditions and measures related to personal protection, hygiene and health evaluation		
Not applicable		
1.9.1.2.3 Control of consumer exposure for PC 31		
Name of contributing scenario	Use in surface treatment products – non-spraying products	
Use descriptor covered	PC 31	
Processes, tasks, activities covered	see above (General Remarks); see corresponding Fact Sheet[7]	
Assessment Method	ConsExpo 4.1 Based on the ConsExpo default database for Cleaning and washing/Floor carpet and furniture products/Furniture polish	
Product characteristic		
Physical state	Liquid	
Concentration of substance	max 2.5 %	

Vapour pressure of the substance	0.123 hPa	
Mol weight matrix of the product	272 g/mol	(Default value)
Mass transfer rate	4740 m/min	Langmuirs method; (as stated in the corresponding Fact Sheet[7])
Amounts used		
Applied amount	550 g/day	(Default value) See footnote 8
Frequency and duration of use/exposure		
Duration of exposure	240 min	(Default value)
Duration of application	900 min	(Default value)
Frequency of exposure	1day/year	(Default value – not relevant for the calculation of the mean concentration on day of exposure)
Human factors not influenced by risk management		
Exposed skin surface	One hand or palm of both hands (430 cm²)	(Default value)
Contact rate	30 mg/min	(Default value)
Release duration	7200 s	(Default value)
Type of activity (inhalation rate)	Light activity	See footnote 2
Other given operational conditions affecting consumers exposure		
Location	Inside	
Room volume	58 m³	(Default value)
Ventilation rate	0.5 per hour	(Default value)
Release area	22 m²	(Default value)
Application temperature	25°C	
Conditions and measures related to information and behavioural advice to consumers		
Not applicable		
Conditions and measures related to personal protection and hygiene		
Not applicable		

1.9.2 Exposure Estimation

1.9.2.1 Worker Exposure

Not applicable.

1.9.2.2. Consumer Exposure

General Remarks

PC18:

In order to reflect the worst case regarding the long-term inhalative and dermal exposure, the exposure resulting from the refilling step and the printing process are added up.

Table 73: Estimated exposure for consumers / Contributing Scenario for PC9a and 15 Sub-Scenario 1/Use in Paints/Coatings – non-spraying products

Calculation tool used: ConsExpo 4.1

Route of exposure	dose / conc	Unit	Justification
Long-term exposure, systemic/local, inhalative	0.72	mg/m³	
Long-term exposure, systemic, dermal	2.77	mg/kg bw/d	
Long-term exposure, systemic, oral	NA	mg/kg bw/d	

NA = Not applicable

Table 74: Estimated exposure for consumers / Contributing Scenario for PC9 and 15 Sub-Scenario 2/Use in Paints/Coatings - spraying products

Calculation tool used: ConsExpo 4.1

Route of exposure	dose / conc	Unit	Justification
Long-term exposure, systemic/local , inhalative	0.26	mg/m³	
Long-term exposure, systemic, dermal	1.15	mg/kg bw/d	
Long-term exposure, systemic, oral	0.13	mg/kg bw/d	

Table 75: Estimated exposure for consumers / Contributing Scenario for PC18

Calculation tool used: ConsExpo 4.1

Route of exposure	dose / conc	Unit	Justification
Part A. Refilling step			
Long-term exposure, systemic/local, inhalative	NA	mg/m³	Extimated exposure value is regarded to be neglibible (4.66E-9 mg/m³)
Long-term exposure, systemic, dermal	0.008	mg/kg bw/d	
Long-term exposure, systemic, oral	NA	mg/kg bw/d	See General remarks 9.9.1
Part B. Printing process			
Long-term exposure, systemic/local, inhalative	1,29	mg/m³	

Long-term exposure, systemic, dermal	NA	mg/kg bw/d	See General remarks 9.9.1
Long-term exposure, systemic, oral	NA	mg/kg bw/d	See General remarks 9.9.1
Combined exposure (Part A + Part B)			
Long-term exposure, systemic/local, inhalative	1,29	mg/m³	
Long-term exposure, systemic, dermal	0.008	mg/kg bw/d	

Table 76: Estimated exposure for consumers / Contributing Scenario for PC31
Calculation tool used: ConsExpo 4.1

Route of exposure	dose / conc	Unit	Justification
Long-term exposure, systemic/local, inhalative	3.93	mg/m³	
Long-term exposure, systemic, dermal	2.12	mg/kg bw/d	
Long-term expsoure, systemic, oral	NA	mg/kg bw/d	

1.9.2.3 Indirect Exposure of Humans via the Environment (oral)

The bioaccumulation potential of this substance is very low, with a Kow of 0.044; therefore, indirect exposure of humans via the environment can be considered negligible.

1.9.2.4 Environmental Exposure

The environmental exposure assessment for this scenario is covered under the environmental assessment for Exposure Scenario 8 (Use in Paints/Coatings/ Adhesives/ Sealants/ Foams/ Polymers/ filled Polymers (professional)) in Section 1.8.2.4.

1.10 Use in Cleaning agents (industrial)

General remarks

PROC 7:

See 1.7

1.10.1 Exposure Scenario 10

The relevant operational conditions (OCs) used for calculation of environmental exposure are mentioned under paragraph 1.10.2.4.

Table 77: Description of ES 10

Reference Number	10
1.10.1.1 Title	
Free short title	Use in Cleaning agents (industrial)
Systematic title based on use descriptor	SU3; PROC 1, 2, 3, 4, 7, 8a, 8b, 10, and 13; ERC 4
1.10.1.2 Operational conditions and Risk management measures	
1.10.1.2.1 Control of workers exposure for PROC 1	
Workers related free short title	Use in closed process, no likelihood of exposure
Use descriptor covered	PROC 1
Processes, tasks, activities covered	Use of the substance in high integrity contained system where little potential exists for exposures, e.g. any sampling via closed loop systems
Assessment Method	ECETOC TRA Worker v2.0 with modifications (see 1. General remarks)
For further details on OCs and RMMs see Table 14	
1.10.1.2.2 Control of workers exposure for PROC 2	
Workers related free short title	Use in closed, continuous process with occasional controlled exposure
Use descriptor covered	PROC 2
Processes, tasks, activities covered	Continuous process but where the design philosophy is not specifically aimed at minimizing emissions. Occasional exposure will arise e.g. through maintenance, sampling and equipment breakages
Assessment Method	ECETOC TRA Worker v2.0 with modifications (see 1. General remarks)
For further details on OCs and RMMs see Table 14	
1.10.1.2.3 Control of workers exposure for PROC 3 and 4	
Workers related free short title	Use in closed batch process (synthesis or formulation). Use in batch and other process (synthesis) where opportunity for exposure arises.
Use descriptor covered	PROC 3 and 4
Processes, tasks, activities covered	Batch manufacture of a chemical or formulation where the predominant handling is in a contained manner, e.g.

	through enclosed transfers, but where some opportunity for contact with chemicals occurs, e.g. through sampling Use in batch manufacture of a chemical where significant opportunity for exposure arises, e.g. during charging, sampling or discharge of material, and when the nature of the design is likely to result in exposure.
Assessment Method	ECETOC TRA Worker v2.0 with modifications (see 1. General remarks)
For further details on OCs and RMMs see Table 2	
1.10.1.2.4 Control of workers exposure for PROC 7	
Workers related free short title	Industrial spraying
Use descriptor covered	PROC 7
Processes, tasks, activities covered	Air dispersive techniques Spraying for surface coating, adhesives, polishes/cleaners, air care products, sandblasting Substances can be inhaled as aerosols. The energy of the aerosol particles may require advanced exposure controls; in case of coating, overspray may lead to waste water and waste.
Assessment Method	Stoffenmanager v4.0
For further details on OCs and RMMs see Table 46	
1.10.1.2.5 Control of workers exposure for PROC 8a	
Workers related free short title	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities.
Use descriptor covered	PROC 8a
Processes, tasks, activities covered	Sampling, loading, filling, transfer, dumping, bagging in non- dedicated facilities. Exposure related to dust, vapour, aerosols or spillage, and cleaning of equipment to be expected.
Assessment Method	ECETOC TRA Worker v2.0 with modifications (see 1. General remarks)
For further details on OCs and RMMs see Table 2	
1.10.1.2.6 Control of workers exposure for PROC 8b	
Workers related free short title	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities.
Use descriptor covered	PROC 8b
Processes, tasks, activities covered	Sampling, loading, filling, transfer, dumping, bagging in dedicated facilities. Exposure related to dust, vapour, aerosols or spillage, and cleaning of equipment to be expected.
Assessment Method	ECETOC TRA Worker v2.0 with modifications

	(see 1. General remarks)
For further details on OCs and RMMs see Table 2	
1.10.1.2.7 Control of workers exposure for PROC 10	
Workers related free short title	Roller application or brushing
Use descriptor covered	PROC 10
Processes, tasks, activities covered	Low energy spreading of e.g. coatings Including cleaning of surfaces. Substance can be inhaled as vapours, skin contact can occur through droplets, splashes, working with wipes and handling of treated surfaces.
Assessment Method	ECETOC TRA Worker v2.0 with modifications (see 1. General remarks)
For further details on OCs and RMMs see Table 46	
1.10.1.2.8 Control of workers exposure for PROC 13	
Workers related free short title	Treatment of articles by dipping and pouring.
Use descriptor covered	PROC 13
Processes, tasks, activities covered	Immersion operations. Treatment of articles by dipping, pouring, immersing, soaking, washing out or washing in substances; including cold formation or resin type matrix. Includes handling of treated objects (e.g. after dying, plating). Substance is applied to a surface by low energy techniques such as dipping the article into a bath or pouring a preparation onto a surface.
Assessment Method	ECETOC TRA Worker v2.0 with modifications (see 1. General remarks)
For further details on OCs and RMMs see Table 23	

Additional good practice advice (for environment) beyond the REACH CSA
Use of tightly fitting safety goggles (The substance has shown to cause mucosal irritations at relatively high concentrations. Thus, it is recommended to protect the eyes.)

1.10.2 Exposure Estimation

1.10.2.1 Worker Exposure

For the estimated exposure for workers / PROC 1 see Table 15
For the estimated exposure for workers / PROC 2 see Table 16
For the estimated exposure for workers / PROC 3 see Table 5
For the estimated exposure for workers / PROC 4 see Table 6
For the estimated exposure for workers / PROC 7 see Table 47
For the estimated exposure for workers / PROC 8a see Table 7
For the estimated exposure for workers / PROC 8b see Table 8
For the estimated exposure for workers / PROC 10 see Table 48
For the estimated exposure for workers / PROC 13 see Table 24

1.10.2.2. Consumer Exposure

Not Applicable

1.10.2.3 Indirect Exposure of Humans via the Environment (oral)

The bioaccumulation potential of this substance is very low, with a Kow of 0.044; therefore, indirect exposure of humans via the environment can be considered negligible.

1.10.2.4 Environmental Exposure

Table 78: Environmental Exposure Scenario ES10-E1

Section 1	**Operational conditions and risk management measures**
Section 1.2	**Control of environmental exposure**
Identifier*	ES10-E1
Contributing scenario	Use In Cleaning Agents
Environmental Release Category	ERC4
Specific ERC	AISE 13
Assessment scenario	
Operational Conditions	
Amounts used	
Amounts used in the EU (tonnes/year)	1,000,000 (total industry tonnage for production of MEG)
Fraction of EU tonnage used in region	1
Fraction of main source to local environment	0.000011
Fraction of substance in end-use products	1
Maximum daily site tonnage (kg/day)	50
Frequency and duration of use	
Type of release	Continuous
Emission days (days/year)	220 - AISE 13
Site specific monitoring data results for surface water effluent	
Location of sample	
Environmental factors not influenced by risk management	
Local freshwater dilution factor	10 (default)
Local marine water dilution factor	100 (default)
Other given operational conditions affecting environmental exposure	
Risk Management Measures	
Technical conditions and measures at process level (source) to prevent release	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	

Treat air emissions to provide a typical removal efficiency of (%)	
Treat wastewater (prior to discharge to receiving water) to provide the required removal efficiency of (%) ETotal,RMM = 1 – ((1 – ERMM, 1) x (1 – ERMM,2))	87%
Organizational measures to prevent/limit release from site	
Conditions and measures related to municipal sewage treatment plant	
Conditions and measures related to external treatment of waste for disposal	
Conditions and measures related to external recovery of waste	
Other environmental control measures additional to above	
Identifier	***ES10-E1***
Narrative	Release fraction derived from SpERC (AISE 13)
Release fraction to air from process	0.00E+00
Release fraction to wastewater from process	1.00E+00
Release fraction to soil from process (regional only)	0.00E+00
Local release to air (kg/d)	0.00E+00
Local release to sewage (kg/d)	5.00E+01
Local release to soil (kg/d)	0.00E+00
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	
Total efficiency of removal from air emissions (%)	
The maximum allowable site tonnage (M_{Safe}) based on removal from domestic sewage treatment (kg/d)	76
Scaling	

The downstream user can check the compliance of his site by comparing site specific data with defaults used in the exposure assessment. The site specific quotient should be inferior or equal to the spERC quotient.

$$\frac{m_{spERC} * (1 - E_{ER,spERC}) * F_{release,spERC}}{DF_{spERC}} \geq \frac{m_{site} * (1 - E_{ER,site}) * F_{release,site}}{DF_{site}}$$

m_{spERC}: Substance use rate in spERC
$E_{ER,spERC}$: Efficacy of RMM in spERC
$F_{release,,spERC}$: Initial release fraction in spERC
DF_{spERC}: dilution factor of STP effluent in river

m_{site}: Substance use rate at site
$E_{ER,site}$: Efficacy of RMM at site
$F_{release,,site}$: Initial release fraction at site
DF_{site}: dilution factor of STP effluent in river

1.10.2.4.1 Predicted exposure concentrations in the STP and in the aquatic compartments (freshwater, seawater and sediments)

Table 79: Predicted exposure concentrations in the STP and in the aquatic compartments (freshwater, seawater and sediments)

Local Concentration, Compartment: STP and aquatic	***unit***	***ES10-E1***
Local PEC in surface water during emission episode (dissolved)	mg/L	3.607E+00
Annual average local PEC in surface water (dissolved)	mg/L	3.482E+00
Local PEC in fresh water sediment during emission episode	mg/kg dwt	1.373E+01
Local PEC in sea water during emission episode	mg/L	3.461E-01
Annual average local PEC in sea water (dissolved)	mg/L	3.335E-01
Local PEC in marine sediment during emission episode	mg/kg dwt	1.317E+00
PEC for microorganisms in STP	mg/L	3.164E+00
Comments		

1.10.2.4.2 Predicted exposure concentration in soils

Table 80: Predicted exposure concentration in soils

Local Concentration, Compartment: soil	***unit***	***ES10-E1***
Local PEC in agricultural soil, averaged over 30 days	mg/kg dwt	1.323E-02
Local PEC agricultural soil, averaged over 180 days	mg/kg dwt	3.624E-03
Local PEC in grass land, averaged over 180 days	mg/kg dwt	1.208E-03
Comments		

1.10.2.4.3 Predicted exposure concentration in the atmospheric compartment

Table 81: Predicted exposure concentration in the atmospheric compartment

Local Concentration, Compartment: air	***unit***	***ES10-E1***
Annual average local PEC in air (total)	kg/m^3	7.816E-15
Comments		

1.10.2.4.4 Predicted exposure concentration in food for secondary poisoning

The bioaccumulation potential of this substance is very low, therefore secondary poisoning can be considered negligible. The Kow for MEG is 0.044.

1.11 Use in Cleaning agents (Professional use)

General remarks
PROC 11:
See 1.8

1.11.1 Exposure Scenario 11

The relevant operational conditions (OCs) used for calculation of environmental exposure are mentioned under paragraph 1.11.2.4.

Table 82: Description of ES 11

Reference Number	11
1.11.1.1 Title	
Free short title	Use in Cleaning agents (professional)
Systematic title based on use descriptor	SU22; PROC 1, 2, 3, 4, 8a, 8b, 10, 11, and 13; ERC 8a
1.11.1.2 Operational conditions and Risk management measures	
1.11.1.2.1Control of workers exposure for PROC 1, 2, 3	
Workers related free short title	Use in closed process, no likelihood of exposure. Use in closed, continuous process with occasional controlled exposure. Use in closed batch process (synthesis or formulation).
Use descriptor covered	PROC 1, 2, 3
Processes, tasks, activities covered	Use of the substances in high integrity contained system where little potential exists for exposures, e.g. any sampling via closed loop systems. Continuous process but where the design philosophy is not specifically aimed at minimizing emissions. It is not high integrity and occasional expose will arise e.g. through maintenance, sampling and equipment breakages. Batch manufacture of a chemical or formulation where the predominant handling is in a contained manner, e.g. through enclosed transfers, but where some opportunity for contact with chemicals occurs, e.g. through sampling.
Assessment Method	ECETOC TRA workers (v2.0) modified (see 1. Genral remarks)
For further details on OCs and RMMs see Table 54	
1.11.1.2.2 Control of workers exposure for PROC 4	
Workers related free short title	Use in batch and other process (synthesis) where opportunity for exposure arises.
Use descriptor covered	PROC 4
Processes, tasks, activities covered	Use in batch manufacture of a chemical where significant opportunity for exposure arises, e.g. during charging, sampling or discharge of material, and when

	the nature of the design is likely to result in exposure.
Assessment Method	ECETOC TRA Worker v2.0 with modifications (see 1. General remarks)
For further details on OCs and RMMs see Table 54	
1.11.1.2.3 Control of workers exposure for PROC 8a	
Workers related free short title	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities.
Use descriptor covered	PROC 8a
Processes, tasks, activities covered	Sampling, loading, filling, transfer, dumping, bagging in non- dedicated facilities. Exposure related to dust, vapour, aerosols or spillage, and cleaning of equipment to be expected.
Assessment Method	ECETOC TRA Worker v2.0 with modifications (see 1. General Remarks)
For further details on OCs and RMMs see Table 54	
1.11.1.2.4 Control of workers exposure for PROC 8b	
Workers related free short title	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities.
Use descriptor covered	PROC 8b
Processes, tasks, activities covered	Sampling, loading, filling, transfer, dumping, bagging in dedicated facilities. Exposure related to dust, vapour, aerosols or spillage, and cleaning of equipment to be expected.
Assessment Method	ECETOC TRA Worker v2.0 with modifications (see 1. General remarks)
For further details on OCs and RMMs see Table 54	
1.11.1.2.5 Control of workers exposure for PROC 10	
Workers related free short title	Roller application or brushing
Use descriptor covered	PROC 10
Processes, tasks, activities covered	Low energy spreading of e.g. coatings. Including cleaning of surfaces. Substance can be inhaled as vapours, skin contact can occur through droplets, splashes, working with wipes and handling of treated surfaces.
Assessment Method	ECETOC TRA Worker v2.0 with modifications (see 1. General remarks)
For further details on OCs and RMMs see Table 54	
1.11.1.2.6 Control of workers exposure for PROC 11	
Workers related free short title	Non industrial spraying
Use descriptor covered	PROC 11

Processes, tasks, activities covered	Air dispersive techniques Spraying for surface coating, adhesives, polishes/cleaners, air care products, sandblasting Substances can be inhaled as aerosols. The energy of the aerosol particles may require advanced exposure controls.
Assessment Method	Stoffenmanager v4.0 and RISKOFDERMv2.1
For further details on OCs and RMMs see Table 54	
1.11.1.2.7 Control of workers exposure for PROC 13	
Workers related free short title	Treatment of articles by dipping and pouring.
Use descriptor covered	PROC 13
Processes, tasks, activities covered	Immersion operations. Treatment of articles by dipping, pouring, immersing, soaking, washing out or washing in substances; including cold formation or resin type matrix. Includes handling of treated objects (e.g. after dying, plating,). Substance is applied to a surface by low energy techniques such as dipping the article into a bath or pouring a preparation onto a surface.
Assessment Method	ECETOC TRA Worker v2.0 with modifications (see 1. General remarks)
For further details on OCs and RMMs see Table 54	

Additional good practice advice (for environment) beyond the REACH CSA
Use of tightly fitting safety goggles (The substance has shown to cause mucosal irritations at relatively high concentrations. Thus, it is recommended to protect the eyes.)

1.11.2 Exposure Estimation

1.11.2.1 Worker Exposure

For the estimated exposure for workers / PROC 1 see Table 56
For the estimated exposure for workers / PROC 2 see Table 57
For the estimated exposure for workers / PROC 3 see Table 58
For the estimated exposure for workers / PROC 4 see Table 59
For the estimated exposure for workers / PROC 8a see Table 59
For the estimated exposure for workers / PROC 8b see Table 60
For the estimated exposure for workers / PROC 10 see Table 62
For the estimated exposure for workers / PROC 11 see Table 64
For the estimated exposure for workers / PROC 13 see Table 65

1.11.2.2. Consumer Exposure

Not Applicable

1.11.2.3 Indirect Exposure of Humans via the Environment (oral)

The bioaccumulation potential of this substance is very low, with a Kow of 0.044; therefore, indirect exposure of humans via the environment can be considered negligible.

1.11.2.4 Environmental Exposure

Table 82: Environmental Exposure Scenario ES11-E1

Section 1	**Operational conditions and risk management measures**
Section 1.2	**Control of environmental exposure**
Identifier*	ES11-E1
Contributing scenario	Use In Cleaning Agents
Environmental Release Category	ERC8a
Specific ERC	AISE 16
Assessment scenario	
Operational Conditions	
Amounts used	
Amounts used in the EU (tonnes/year)	769,067 (maximum passing tonnage)
Fraction of EU tonnage used in region	0.1
Fraction of main source to local environment	0.00075
Fraction of substance in end-use products	1
Maximum daily site tonnage (kg/day)	1580
Frequency and duration of use	
Type of release	Continuous
Emission days (days/year)	365 - AISE 16
Site specific monitoring data results for surface water effluent	
Location of sample	
Environmental factors not influenced by risk management	
Local freshwater dilution factor	10 (default)
Local marine water dilution factor	100 (default)
Other given operational conditions affecting environmental exposure	
Risk Management Measures	
Technical conditions and measures at process level (source) to prevent release	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Treat air emissions to provide a typical removal efficiency of (%)	
Treat wastewater (prior to discharge to receiving water) to provide the required removal efficiency of (%) ETotal,RMM = 1 –	87%

((1 – ERMM, 1) x (1 – ERMM,2))	
Organizational measures to prevent/limit release from site	
Conditions and measures related to municipal sewage treatment plant	
Conditions and measures related to external treatment of waste for disposal	
Conditions and measures related to external recovery of waste	
Other environmental control measures additional to above	
Identifier	***ES11-E1***
Narrative	Release fraction derived from SpERC (AISE 16)
Release fraction to air from process	0.00E+00
Release fraction to wastewater from process	1.00E+00
Release fraction to soil from process (regional only)	0.00E+00
Local release to air (kg/d)	0.00E+00
Local release to sewage (kg/d)	1.58E+02
Local release to soil (kg/d)	0.00E+00
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	
Total efficiency of removal from air emissions (%)	
The maximum allowable site tonnage (M_{Safe}) based on removal from domestic sewage treatment (kg/d)	6894

1.11.2.4.1 Predicted exposure concentrations in the STP and in the aquatic compartments (freshwater, seawater and sediments)

Table 84: Predicted exposure concentrations in the STP and in the aquatic compartments (freshwater, seawater and sediments)

Local Concentration, Compartment: STP and aquatic	***unit***	***ES11-E1***
Local PEC in surface water during emission episode (dissolved)	mg/L	1.259E+00
Annual average local PEC in surface water (dissolved)	mg/L	1.259E+00
Local PEC in fresh water sediment during emission episode	mg/kg dwt	4.791E+00
Local PEC in sea water during emission episode	mg/L	1.247E-01
Annual average local PEC in sea water (dissolved)	mg/L	1.247E-01
Local PEC in marine sediment during emission episode	mg/kg dwt	4.746E-01
PEC for microorganisms in STP	mg/L	1.000E+01
Comments		

1.11.2.4.2 Predicted exposure concentration in soils

Table 85: Predicted exposure concentration in soils

Local Concentration, Compartment: soil	***unit***	***ES11-E1***
Local PEC in agricultural soil, averaged over 30 days	mg/kg dwt	4.147E-02
Local PEC agricultural soil, averaged over 180 days	mg/kg dwt	1.111E-02
Local PEC in grass land, averaged over 180 days	mg/kg dwt	3.475E-03
Comments		

1.11.2.4.3 Predicted exposure concentration in the atmospheric compartment

Table 86: Predicted exposure concentration in the atmospheric compartment

Local Concentration, Compartment: air	***unit***	***ES11-E1***
Annual average local PEC in air (total)	kg/m^3	7.505E-15
Comments		

1.11.2.4.4 Predicted exposure concentration in food for secondary poisoning

The bioaccumulation potential of this substance is very low, therefore secondary poisoning can be considered negligible. The Kow for MEG is 0.044.

1.12. Use in Cleaning agents (Consumer use)

General remarks

In order to assess products included in PC35, the following three Sub-Scenarios have been calculated.
Sub-Scenario 1: Use in All-purpose cleaners - non-spraying products
Sub-Scenario 2: Use in All-purpose cleaner/spraying products
Sub-Scenario 3: Use in Floor cleaning products
These Sub-Scenarios are intended to represent resonable worst case scenarios for PC35.

Sub-Scenario 1:
Sub-Scenario 1 consists of two parts.
Part A considers the mixing and loading step in which the concentrated cleaner liquid is diluted with water; Part B considers the application of this solution. As a worst case scenario it was assumed that the concentrated cleaner liquid is diluted in a ratio of 1:5.

Sub-Scenario 2:
Sub-Scenario 2 consits of two parts.
Part A considers the spraying step, whereas Part B refers to the application step.

Sub-Scenario 1:
Sub-Scenario 1 consists of two parts.
Part A considers the mixing and loading step in which the concentrated cleaner liquid is diluted with water; Part B considers the application of this solution. As a worst case scenario it was assumed that the concentrated cleaner liquid is diluted in a ratio of 1:10.

1.12.1. Exposure Scenario 12

The relevant operational conditions (OCs) used for calculation of environmental exposure are mentioned under paragraph 1.12.2.4.

Table 87 Description of the ES 12

Reference Number	11
1.12.1.1. Title	
Free short title	Use in Cleaning agents (Consumer use)
Systematic title based on use descriptor	SU21; PC 35; ERC 8a
1.12.1.2. Operational conditions and risk management measures	
1.12.1.2.1 Control of consumer exposure for PC 35	
1.12.1.2.1.1 Sub-Scenario 1/Use in All-purpose cleaners - non-spraying products	
Name of contributing scenario	Use in All-purpose cleaners – non-spraying products
Use descriptor covered	PC 35
Processes, tasks, activities covered	see above (General Remarks); see corresponding Fact Sheet
Assessment Method	ConsExpo 4.1 Based on the ConsExpo default database for Cleaning and Washing/All-purpose cleanrs/Liquid
Part A. Mixing and Loading	
Product characteristic	
Physical state	Liquid

Concentration of substance	max 20 %	
Vapour pressure of the substance	0.123 hPa	
Mol weight matrix of the product	22 g/mol	(Default value)
Mass transfer rate	4740 m/min	Langmuirs method (as stated in the corresponding Fact Sheet)
Amounts used		
Applied amount	500 g/day	(Default value – refers to half of the bottle content) See footnote 2
Frequency and duration of use/exposure		
Duration of exposure	0.75 min	(Default value)
Duration of application	0.3 min	(Default value)
Frequency of exposure	104 days/year	(Default value – not relevant for the calculation of the mean concentration on day of exposure)
Human factors not influenced by risk management		
Exposed skin surface	Palm of one hand (215 cm²)	(Default value)
Type of activity (inhalation rate)	Light activity	See footnote 5
Other given operational conditions affecting consumers exposure		
Location	Inside	
Room volume		A "personal volume" of 1 m³ is assumed (Default value)
Ventilation rate	0.5 per hour	(Default value)
Release area	20 cm²	(Default value)
Application temperature	25°C	
Conditions and measures related to information and behavioural advice to consumers		
Not applicable		
Conditions and measures related to personal protection and hygiene		
Not applicable		
Part B. Application		
Product characteristic		
Physical state	Liquid	
Concentration of substance	max. 4 %	
Vapour pressure of the substance	0.123 hPa	
Mol weight matrix of the product	18 g/mol	(Default value)
Mass transfer rate	4740 m/min	Langmuirs method

		(as stated in the corresponding Fact Sheet)
Amounts used		
Applied amount	400 g/day	(Default value) See footnote 3
Frequency and duration of use/exposure		
Duration of exposure	240 min	(Default value)
Duration of application	20 min	(Default value)
Frequency of exposure	104 days/year	(Default value – not relevant for the calculation of the mean concentration on day of exposure)
Human factors not influenced by risk management		
Exposed skin surface	Palm of one hand (215 cm²)	(Default value)
Type of activity (inhalation rate)	Light activity	See footnote 5
Other given operational conditions affecting consumers exposure		
Location	Inside	
Room volume	58 m³	(Default value)
Ventilation rate	0.5 per hour	(Default value)
Release area	10 m²	(Default value)
Application temperature	25°C	
Conditions and measures related to information and behavioural advice to consumers		
Not applicable		
Conditions and measures related to personal protection and hygiene		
Not applicable		
1.12.1.2.1.2 Sub-Scenario 2/Use in All-purpose cleaners - spraying products		
Name of contributing scenario	Use in All-purpose cleaners – spraying products	
Use descriptor covered	PC 35	
Processes, tasks, activities covered	see above (General Remarks); see corresponding Fact Sheet	
Assessment Method	ConsExpo 4.1 Based on the ConsExpo default database for Cleaning and Washing/All-purpose cleanrs/Spraying	
Part A. Spraying		
Product characteristic		
Physical state	Liquid	
Concentration of substance	max 5 %	
Vapour pressure of the substance	0.123 hPa	
Airborn fraction	0.2	(Default value)

Weight fraction non-volatile	0.05	(Default value)
Density non-volatile	1.8 g/cm³	(Default value)
Amounts used		
Mass generation rate	0.78 g/s	(Default value)
Frequency and duration of use/exposure		
Duration of spraying	0.41 min	(Default value)
Duration of exposure	60 min	(Default value)
Frequency of exposure	365 days/year	(Default value – not relevant for the calculation of the mean concentration on day of exposure)
Human factors not influenced by risk management		
Inhalation cut-off diameter	15 µm	(Default value)
Non-respirable uptake fraction	1	(Default value)
Exposed skin surface	Hands and forearms (1900 cm²)	
Contact rate	46 mg/min	(Default value)
Release duration	2.6 s	(Default value)
Type of activity (inhalation rate)	Light activity	See footnote 5
Other given operational conditions affecting consumers exposure		
Location	Inside	(Default assumption)
Room volume	15 m³	(Default value)
Room height	2.5 m	(Default value)
Ventilation rate	2.5 per hour	(Default value)
Application temperature	25°C	
Conditions and measures related to information and behavioural advice to consumers		
Spraying away from exposed person		
Conditions and measures related to personal protection and hygiene		
Not applicable		
Part B. Cleaning		
Product characteristic		
Physical state	Liquid	
Concentration of substance	max. 5 %	
Vapour pressure of the substance	0.123 hPa	
Mol weight matrix of the product	22 g/mol	(Default value)
Mass transfer rate	4740 m/min	Langmuirs method (as stated in the corresponding Fact Sheet[1])
Amounts used		
Applied amount	16.2 g/day	(Default value)

		See footnote 4
Frequency and duration of use/exposure		
Duration of exposure	60 min	(Default value)
Duration of application	10 min	(Default value)
Frequency of exposure	365 days/year	(Default value – not relevant for the calculation of the mean concentration on day of exposure)
Human factors not influenced by risk management		
Exposed skin surface	Palm of one hand (215 cm²)	(Default value)
Type of activity (inhalation rate)	Light activity	See footnote 5
Other given operational conditions affecting consumers exposure		
Location	Inside	
Room volume	15 m³	(Default value)
Ventilation rate	2.5 per hour	(Default value)
Release area	1.71 m²	(Default value)
Application temperature	25°C	
Conditions and measures related to information and behavioural advice to consumers		
Not applicable		
Conditions and measures related to personal protection and hygiene		
Not applicable		
1.12.1.2.1.3 Sub-Scenario 3/Use in Floor cleaning products		
Name of contributing scenario	Use in Floor cleaning products	
Use descriptor covered	PC 35	
Processes, tasks, activities covered	see above (General Remarks); see corresponding Fact Sheet[1]	
Assessment Method	ConsExpo 4.1 Based on the ConsExpo default database for Cleaning and Washing/Floor, carpet and furniture products/Floor cleaning liquid	
Part A. Mixing and Loading		
Product characteristic		
Physical state	Liquid	
Concentration of substance	max 2.5 %	
Vapour pressure of the substance	0.123 hPa	
Mol weight matrix of the product	22 g/mol	(Default value)
Mass transfer rate	4740 m/min	Langmuirs method (as stated in the corresponding Fact Sheet[1])

Amounts used		
Applied amount	500 g/day	(Default value – refers to half of the bottle content) See footnote 2
Frequency and duration of use/exposure		
Duration of exposure	0.75 min	(Default value)
Duration of application	0.3 min	(Default value)
Frequency of exposure	104 days/year	(Default value – not relevant for the calculation of the mean concentration on day of exposure)
Human factors not influenced by risk management		
Exposed skin surface	Palm of one hand (215 cm²)	(Default value)
Type of activity (inhalation rate)	Light activity	See footnote 5
Other given operational conditions affecting consumers exposure		
Location	Inside	
Room volume		A "personal volume" of 1 m³ is assumed (Default value)
Ventilation rate	1 per hour	(Default value)
Release area	20 cm²	(Default value)
Application temperature	25°C	
Conditions and measures related to information and behavioural advice to consumers		
Not applicable		
Conditions and measures related to personal protection and hygiene		
Not applicable		
Part B. Application		
Product characteristic		
Physical state	Liquid	
Concentration of substance	max. 2.5 %	
Vapour pressure of the substance	0.123 hPa	
Mol weight matrix of the product	18 g/mol	(Default value)
Mass transfer rate	4740 m/min	Langmuirs method (as stated in the corresponding Fact Sheet[1])
Amounts used		
Applied amount	880 g/day	(Default value) See footnote 3
Frequency and duration of use/exposure		

Duration of exposure	240 min	(Default value)
Duration of application	30 min	(Default value)
Frequency of exposure	104 days/year	(Default value – not relevant for the calculation of the mean concentration on day of exposure)
Human factors not influenced by risk management		
Exposed skin surface	Palm of one hand (215 cm²)	(Default value)
Type of activity (inhalation rate)	Light activity	See footnote 5
Other given operational conditions affecting consumers exposure		
Location	Inside	
Room volume	58 m³	(Default value)
Ventilation rate	0.5 per hour	(Default value)
Release area	22 m²	(Default value)
Application temperature	25°C	
Conditions and measures related to information and behavioural advice to consumers		
Not applicable		
Conditions and measures related to personal protection and hygiene		
Not applicable		

1.12.2 Exposure Estimation

1.12.2.1 Worker Exposure

Not applicable.

1.12.2.2. Consumer Exposure

General Remarks
All Sub-Scenarios consists of two parts (Part A: Mixing and Loading and Part B: Application or Part A: Spraying and Part B Cleaning). To calculate the exposure resulting in each Sub-Scenario the exposure estimates resulting from Part A and Part B are added.

Table 88: Estimated exposure for consumers / Contributing Scenario for PC35 Sub-Scenario 1/Use in All-purpose cleaners – non-spraying products

Calculation tool used: ConsExpo 4.1

Route of exposure	dose / conc	Unit	Justification
Part A. Mixing and Loading			
Long-term exposure, systemic/local, inhalative	0.01	mg/m³	
Long-term exposure, systemic, dermal	0.03	mg/kg bw/d	

Long-term exposure, systemic, oral	NA	mg/kg bw/d	
Part B. Application			
Long-term exposure, systemic/local, inhalative	0.61	mg/m³	
Long-term exposure, systemic, dermal	11.70	mg/kg bw/d	
Long-term exposure, systemic, oral	NA	mg/kg bw/d	
Part A and B. Mixing/Loading and Application			
Long-term exposure, systemic/local, inhalative	0.62	mg/m³	
Long-term exposure, systemic, dermal	11.73	mg/kg bw/d	

NA = Not applicable

Table 89: Estimated exposure for consumers / Contributing Scenario for PC35 Sub-Scenario 2/Use in All-purpose cleaners – spraying products

Calculation tool used: ConsExpo 4.1

Route of exposure	dose / conc	Unit	Justification
Part A. Spraying			
Long-term exposure, systemic/local, inhalative	NA	mg/m³	Extimated exposure value is regarded to be neglibible (1,1E-5 mg/m³)
Long-term exposure, systemic, dermal	0.01	mg/kg bw/d	
Long-term exposure, systemic, oral	NA	mg/kg bw/d	Estimated exposure value is regarded to be negligible (0.0006 mg/kg bw/day)
Part B. Cleaning			
Long-term exposure, systemic/local, inhalative	0.11	mg/m³	
Long-term exposure, systemic, dermal	0.12	mg/kg bw/d	

Long-term exposure, systemic, oral	NA	mg/kg bw/d	
Part A and B. Spraying and Cleaning			
Long-term exposure, systemic/local, inhalative	0.11	mg/m³	
Long-term exposure, systemic, dermal	0.13	mg/kg bw/d	

NA = Not applicable

Table 90: Estimated exposure for consumers / Contributing Scenario for PC35 Sub-Scenario 3/Use in Floor cleaning products

Calculation tool used: ConsExpo 4.1

Route of exposure	dose / conc	Unit	Justification
Part A. Mixing and Loading			
Long-term exposure, systemic/local, inhalative	0.01	mg/m³	
Long-term exposure, systemic, dermal	0.04	mg/kg bw/d	
Long-term exposure, systemic, oral	NA	mg/kg bw/d	
Part B. Application			
Long-term exposure, systemic/local, inhalative	0.38	mg/m³	
Long-term exposure, systemic, dermal	7.31	mg/kg bw/d	
Long-term exposure, systemic, oral	NA	mg/kg bw/d	
Part A and B. Mixing/Loading and Application			
Long-term exposure, systemic/local, inhalative	0.39	mg/m³	
Long-term exposure, systemic, dermal	7.35	mg/kg bw/d	

NA = Not applicable

1.12.2.3 Indirect Exposure of Humans via the Environment (oral)

The bioaccumulation potential of this substance is very low, with a Kow of 0.044; therefore, indirect exposure of humans via the environment can be considered negligible.

1.12.2.4 Environmental Exposure

The environmental exposure scenario is covered under the environmental assessment for Use in Cleaning agents (professional) in Section 1.11.2.4.

9.13 Use in Lubricants (industrial)

1.13.1 Exposure Scenario 13

The relevant operational conditions (OCs) used for calculation of environmental exposure are mentioned under paragraph 1.13.2.4.

Table 91: Description of ES 13

Reference Number	13
1.13.1.1 Title	
Free short title	Use in lubricants (industrial)
Systematic title based on use descriptor	SU3; PROC 1, 2, 3, 4, 5, 7, 8a, 8b, 9, 10, 13, 17 and 18; ERC 4
1.13.1.2. Operational conditions and risk management measures	
1.13.1.2.1 Control of workers exposure for PROC 1	
Workers related free short title	Use in closed process, no likelihood of exposure
Use descriptor covered	PROC 1
Processes, tasks, activities covered	Use of the substance in high integrity contained system where little potential exists for exposures, e.g. any sampling via closed loop systems
Assessment Method	ECETOC TRA Worker v2.0 with modifications (see 1. General remarks)
For further details on OCs and RMMs see Table 14	
1.13.1.2.2 Control of workers exposure for PROC 2	
Workers related free short title	Use in closed, continuous process with occasional controlled exposure
Use descriptor covered	PROC 2
Processes, tasks, activities covered	Continuous process but where the design philosophy is not specifically aimed at minimizing emissions. Occasional exposure will arise e.g. through maintenance, sampling and equipment breakages
Assessment Method	ECETOC TRA Worker v2.0 with modifications (see 1. General remarks)
For further details on OCs and RMMs see Table 14	
1.13.1.2.3 Control of workers exposure for PROC 3 and 4	
Workers related free short title	Use in closed batch process (synthesis or formulation). Use in batch and other process (synthesis) where opportunity for exposure arises.
Use descriptor covered	PROC 3 and 4
Processes, tasks, activities covered	Batch manufacture of a chemical or formulation where the predominant handling is in a contained manner, e.g. through enclosed transfers, but where some opportunity for contact with chemicals occurs, e.g. through sampling Use in batch manufacture of a chemical where

	significant opportunity for exposure arises, e.g. during charging, sampling or discharge of material, and when the nature of the design is likely to result in exposure.
Assessment Method	ECETOC TRA Worker v2.0 with modifications (see 1. General remarks)
For further details on OCs and RMMs see Table 2	
1.13.1.2.4 Control of workers exposure for PROC 5	
Workers related free short title	Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact).
Use descriptor covered	PROC 5
Processes, tasks, activities covered	Manufacture or formulation of chemical products or articles using technologies related to mixing and blending of solid or liquid materials, and where the process is in stages and provides the opportunity for significant contact at any stage
Assessment Method	ECETOC TRA Worker v2.0 with modifications (see 1. General remarks)
For further details on OCs and RMMs see Table 14	
1.13.1.2.5 Control of workers exposure for PROC 7	
Workers related free short title	Industrial spraying
Use descriptor covered	PROC 7
Processes, tasks, activities covered	Air dispersive techniques Spraying for surface coating, adhesives, polishes/cleaners, air care products, sandblasting Substances can be inhaled as aerosols. The energy of the aerosol particles may require advanced exposure controls; in case of coating, overspray may lead to waste water and waste.
Assessment Method	Stoffenmanager v4.0
For further details on OCs and RMMs see Table 46	
1.13.1.2.6 Control of workers exposure for PROC 8a	
Workers related free short title	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities.
Use descriptor covered	PROC 8a
Processes, tasks, activities covered	Sampling, loading, filling, transfer, dumping, bagging in non- dedicated facilities. Exposure related to dust, vapour, aerosols or spillage, and cleaning of equipment to be expected.
Assessment Method	ECETOC TRA Worker v2.0 with modifications (see 1. General remarks)
For further details on OCs and RMMs see Table 2	

1.13.1.2.7 Control of workers exposure for PROC 8b and 9	
Workers related free short title	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities. Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
Use descriptor covered	PROC 8b and 9
Processes, tasks, activities covered	Sampling, loading, filling, transfer, dumping, bagging in dedicated facilities. Exposure related to dust, vapour, aerosols or spillage, and cleaning of equipment to be expected. Filling lines specifically designed to both capture vapour and aerosol emissions and minimise spillage
Assessment Method	ECETOC TRA Worker v2.0 with modifications (see 1. General remarks)
For further details on OCs and RMMs see Table 2 and 59	
1.713.1.2.8 Control of workers exposure for PROC 10	
Workers related free short title	Roller application or brushing
Use descriptor covered	PROC 10
Processes, tasks, activities covered	Low energy spreading of e.g. coatings Including cleaning of surfaces. Substance can be inhaled as vapours, skin contact can occur through droplets, splashes, working with wipes and handling of treated surfaces.
Assessment Method	ECETOC TRA Worker v2.0 with modifications (see 1. General remarks)
For further details on OCs and RMMs see Table 46	
1.13.1.2.9 Control of workers exposure for PROC 13	
Workers related free short title	Treatment of articles by dipping and pouring.
Use descriptor covered	PROC 13
Processes, tasks, activities covered	Immersion operations. Treatment of articles by dipping, pouring, immersing, soaking, washing out or washing in substances; including cold formation or resin type matrix. Includes handling of treated objects (e.g. after dying, plating). Substance is applied to a surface by low energy techniques such as dipping the article into a bath or pouring a preparation onto a surface.
Assessment Method	ECETOC TRA Worker v2.0 with modifications (see 1. General remarks)
For further details on OCs and RMMs see Table 23	
1.13.1.2.10 Control of workers exposure for PROC 17 and 18	
Workers related free short title	Lubrication at high energy conditions and in partly open process.

	Greasing at high energy conditions.		
Use descriptor covered	PROC 17 and 18		
Processes, tasks, activities covered	Lubrication at high energy conditions (temperature, friction) between moving parts and substance; significant part of process is open to workers. The metal working fluid may form aerosols or fumes due to rapidly moving metal parts. Use as lubricant where significant energy or temperature is applied between the substance and the moving parts.		
Assessment Method	ECETOC TRA Worker v2.0 with modifications (see 1. General remarks)		
Product characteristic			
Physical state	Liquid		
Fugacity	Low		
Concentration of substance	100	%	
Vapour pressure of the substance	0.123	hPa	
Amounts used			
Not relevant			
Frequency and duration of use/exposure			
Duration of exposure	> 4	hours/day	
Frequency of exposure	≤ 240	days/year	
Human factors not influenced by risk management			
Exposed skin surface	Both hands (960 cm²)		
Other given operational conditions affecting workers exposure			
Location	Indoor		
Domain	Industrial		
Technical conditions and measures at process level (source) to prevent release			
None			
Technical conditions and measures to control dispersion from source towards the worker			
Local exhaust ventilation required	Yes	Effectiveness: 90%	
Organisational measures to prevent /limit releases, dispersion and exposure			
Not relevant in ECETOC TRA			
Conditions and measures related to personal protection, hygiene and health evaluation			
Respiratory protection required	No		
Use of suitable gloves with basic training	Yes	Effectiveness: 90%	Relevant for PROC 17

Additional good practice advice (for environment) beyond the REACH CSA
Use of tightly fitting safety goggles (The substance has shown to cause mucosal irritations at relatively high concentrations. Thus, it is recommended to protect the eyes.)

1.13.2 Exposure Estimation

1.13.2.1 Worker Exposure

For the estimated exposure for workers / PROC 1 see Table 15
For the estimated exposure for workers / PROC 2 see Table 16
For the estimated exposure for workers / PROC 3 see Table 5
For the estimated exposure for workers / PROC 4 see Table 6
For the estimated exposure for workers / PROC 7 see Table 47
For the estimated exposure for workers / PROC 8a see Table 7
For the estimated exposure for workers / PROC 8b see Table 8
For the estimated exposure for workers / PROC 9 see Table 18
For the estimated exposure for workers / PROC 10 see Table 48
For the estimated exposure for workers / PROC 13 see Table 24

Table 92: Estimated exposure for workers – PROC 17
Calculation tool used: ECETOC TRA v2.0 modified (see 1. General remarks)

Route of exposure	Concentrations		Justification
	Value	Unit	
Long-term exposure, systemic/local, inhalative	2.59	mg/m³	NA
Long-term exposure, systemic, dermal	2.74	mg/kg bw/d	NA

NA = Not applicable

Table 93: Estimated exposure for workers – PROC 18
Calculation tool used: ECETOC TRA v2.0 modified (see 1. General remarks)

Route of exposure	Concentrations		Justification
	Value	Unit	
Long-term exposure, systemic/local, inhalative	2.59	mg/m³	NA
Long-term exposure, systemic, dermal	13.71	mg/kg bw/d	NA

NA = Not applicable

1.13.2.2. Consumer Exposure

Not Applicable

1.13.2.3 Indirect Exposure of Humans via the Environment (oral)

The bioaccumulation potential of this substance is very low, with a Kow of 0.044; therefore, indirect exposure of humans via the environment can be considered negligible.

1.13.2.4 Environmental Exposure

Table 94: Environmental Exposure Scenario ES13-E1

Section 1	**Operational conditions and risk management measures**
Section 1.2	**Control of environmental exposure**
Identifier*	ES13-E1
Contributing scenario	Use In Lubricants
Environmental Release Category	ERC4
Specific ERC	ESVOC 13
Assessment scenario	
Operational Conditions	
Amounts used	
Amounts used in the EU (tonnes/year)	1,000,000 (total industry tonnage for production of MEG)
Fraction of EU tonnage used in region	1
Fraction of main source to local environment	0.0001
Fraction of substance in end-use products	1
Maximum daily site tonnage (kg/day)	5000
Frequency and duration of use	
Type of release	Continuous
Emission days (days/year)	20 - ESVOC 13
Site specific monitoring data results for surface water effluent	
Location of sample	
Environmental factors not influenced by risk management	
Local freshwater dilution factor	10 (default)
Local marine water dilution factor	100 (default)
Other given operational conditions affecting environmental exposure	
Risk Management Measures	
Technical conditions and measures at process level (source) to prevent release	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Treat air emissions to provide a typical removal efficiency of (%)	
Treat wastewater (prior to discharge to	87%

receiving water) to provide the required removal efficiency of (%) ETotal,RMM = 1 – ((1 – ERMM, 1) x (1 – ERMM,2))	
Organizational measures to prevent/limit release from site	
Conditions and measures related to municipal sewage treatment plant	
Conditions and measures related to external treatment of waste for disposal	
Conditions and measures related to external recovery of waste	
Other environmental control measures additional to above	

Identifier	***ES13-E1***
Narrative	Release fraction derived from SpERC (ESVOC 13)
Release fraction to air from process	3.00E-04
Release fraction to wastewater from process	1.00E-03
Release fraction to soil from process (regional only)	1.00E-03
Local release to air (kg/d)	1.50E-01
Local release to sewage (kg/d)	5.00E-01
Local release to soil (kg/d)	5.00E-01
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	
Total efficiency of removal from air emissions (%)	
The maximum allowable site tonnage (M_{Safe}) based on removal from domestic sewage treatment (kg/d)	2614878
Scaling	

The downstream user can check the compliance of his site by comparing site specific data with defaults used in the exposure assessment. The site specific quotient should be inferior or equal to the spERC quotient.

$$\frac{m_{spERC} * (1 - E_{ER,spERC}) * F_{releasespERC}}{DF_{spERC}} \geq \frac{m_{site} * (1 - E_{ER,site}) * F_{releasesite}}{DF_{site}}$$

m_{spERC}: Substance use rate in spERC
$E_{ER,spERC}$: Efficacy of RMM in spERC
$F_{release,,spERC}$: Initial release fraction in spERC
DF_{spERC}: dilution factor of STP effluent in river

m_{site}: Substance use rate at site
$E_{ER,site}$: Efficacy of RMM at site

$F_{release,,site}$: Initial release fraction at site
DF_{site}: dilution factor of STP effluent in river

1.13.2.4.1 Predicted exposure concentrations in the STP and in the aquatic compartments (freshwater, seawater and sediments)

Table 95: Predicted exposure concentrations in the STP and in the aquatic compartments (freshwater, seawater and sediments)

Local Concentration, Compartment: STP and aquatic	***unit***	***ES13-E1***
Local PEC in surface water during emission episode (dissolved)	mg/L	9.867E-03
Annual average local PEC in surface water (dissolved)	mg/L	6.876E-03
Local PEC in fresh water sediment during emission episode	mg/kg dwt	3.755E-02
Local PEC in sea water during emission episode	mg/L	9.596E-04
Annual average local PEC in sea water (dissolved)	mg/L	6.606E-04
Local PEC in marine sediment during emission episode	mg/kg dwt	3.652E-03
PEC for microorganisms in STP	mg/L	3.164E-02
Comments		

1.13.2.4.2 Predicted exposure concentration in soils

Table 96: Predicted exposure concentration in soils

Local Concentration, Compartment: soil	***unit***	***ES13-E1***
Local PEC in agricultural soil, averaged over 30 days	mg/kg dwt	2.926E-03
Local PEC agricultural soil, averaged over 180 days	mg/kg dwt	2.830E-03
Local PEC in grass land, averaged over 180 days	mg/kg dwt	2.806E-03
Comments		

1.13.2.4.3 Predicted exposure concentration in the atmospheric compartment

Table 97: Predicted exposure concentration in the atmospheric compartment

Local Concentration, Compartment: air	***unit***	***ES13-E1***
Annual average local PEC in air (total)	kg/m^3	2.448E-12
Comments		

1.13.2.4.4 Predicted exposure concentration in food for secondary poisoning

The bioaccumulation potential of this substance is very low, therefore secondary poisoning can be considered negligible. The Kow for MEG is 0.044.

1.14 Use in Metal-working fluids (industrial)

1.14.1 Exposure Scenario 14

The relevant operational conditions (OCs) used for calculation of environmental exposure are mentioned under paragraph 1.14.2.4.

Table 98: Description of ES 14

Reference Number	14
1.14.1.1 Title	
Free short title	Use in metal-working fluids (industrial)
Systematic title based on use descriptor	SU3; PROC 1, 2, 3, 4, 5, 7, 8a, 8b, 9, 10, 13, and 17; ERC 4
1.13.1.2. Operational conditions and risk management measures	
1.14.1.2.1 Control of workers exposure for PROC 1	
Workers related free short title	Use in closed process, no likelihood of exposure
Use descriptor covered	PROC 1
Processes, tasks, activities covered	Use of the substance in high integrity contained system where little potential exists for exposures, e.g. any sampling via closed loop systems
Assessment Method	ECETOC TRA Worker v2.0 with modifications (see 1. General remarks)
For further details on OCs and RMMs see Table 14	
1.14.1.2.2 Control of workers exposure for PROC 2	
Workers related free short title	Use in closed, continuous process with occasional controlled exposure
Use descriptor covered	PROC 2
Processes, tasks, activities covered	Continuous process but where the design philosophy is not specifically aimed at minimizing emissions. Occasional exposure will arise e.g. through maintenance, sampling and equipment breakages
Assessment Method	ECETOC TRA Worker v2.0 with modifications (see 1. General remarks)
For further details on OCs and RMMs see Table 14	
1.14.1.2.3 Control of workers exposure for PROC 3 and 4	
Workers related free short title	Use in closed batch process (synthesis or formulation). Use in batch and other process (synthesis) where opportunity for exposure arises.
Use descriptor covered	PROC 3 and 4
Processes, tasks, activities covered	Batch manufacture of a chemical or formulation where the predominant handling is in a contained manner, e.g. through enclosed transfers, but where some opportunity for contact with chemicals occurs, e.g. through sampling Use in batch manufacture of a chemical where significant opportunity for exposure arises, e.g. during

	charging, sampling or discharge of material, and when the nature of the design is likely to result in exposure.
Assessment Method	ECETOC TRA Worker v2.0 with modifications (see 1. General remarks)
For further details on OCs and RMMs see Table 2	
1.14.1.2.4 Control of workers exposure for PROC 5	
Workers related free short title	Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact).
Use descriptor covered	PROC 5
Processes, tasks, activities covered	Manufacture or formulation of chemical products or articles using technologies related to mixing and blending of solid or liquid materials, and where the process is in stages and provides the opportunity for significant contact at any stage
Assessment Method	ECETOC TRA Worker v2.0 with modifications (see 1. General remarks)
For further details on OCs and RMMs see Table 14	
1.14.1.2.5 Control of workers exposure for PROC 7	
Workers related free short title	Industrial spraying
Use descriptor covered	PROC 7
Processes, tasks, activities covered	Air dispersive techniques Spraying for surface coating, adhesives, polishes/cleaners, air care products, sandblasting Substances can be inhaled as aerosols. The energy of the aerosol particles may require advanced exposure controls; in case of coating, overspray may lead to waste water and waste.
Assessment Method	Stoffenmanager v4.0
For further details on OCs and RMMs see Table 46	
1.14.1.2.6 Control of workers exposure for PROC 8a	
Workers related free short title	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities.
Use descriptor covered	PROC 8a
Processes, tasks, activities covered	Sampling, loading, filling, transfer, dumping, bagging in non- dedicated facilities. Exposure related to dust, vapour, aerosols or spillage, and cleaning of equipment to be expected.
Assessment Method	ECETOC TRA Worker v2.0 with modifications (see 1. General remarks)
For further details on OCs and RMMs see Table 2	
1.14.1.2.7 Control of workers exposure for PROC 8b and 9	

Workers related free short title	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities. Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
Use descriptor covered	PROC 8b and 9
Processes, tasks, activities covered	Sampling, loading, filling, transfer, dumping, bagging in dedicated facilities. Exposure related to dust, vapour, aerosols or spillage, and cleaning of equipment to be expected. Filling lines specifically designed to both capture vapour and aerosol emissions and minimise spillage
Assessment Method	ECETOC TRA Worker v2.0 with modifications (see 1. General remarks)
For further details on OCs and RMMs see Table 2 and 59	
1.14.1.2.8 Control of workers exposure for PROC 10	
Workers related free short title	Roller application or brushing
Use descriptor covered	PROC 10
Processes, tasks, activities covered	Low energy spreading of e.g. coatings Including cleaning of surfaces. Substance can be inhaled as vapours, skin contact can occur through droplets, splashes, working with wipes and handling of treated surfaces.
Assessment Method	ECETOC TRA Worker v2.0 with modifications (see 1. General remarks)
For further details on OCs and RMMs see Table 46	
1.14.1.2.9 Control of workers exposure for PROC 13	
Workers related free short title	Treatment of articles by dipping and pouring.
Use descriptor covered	PROC 13
Processes, tasks, activities covered	Immersion operations. Treatment of articles by dipping, pouring, immersing, soaking, washing out or washing in substances; including cold formation or resin type matrix. Includes handling of treated objects (e.g. after dying, plating). Substance is applied to a surface by low energy techniques such as dipping the article into a bath or pouring a preparation onto a surface.
Assessment Method	ECETOC TRA Worker v2.0 with modifications (see 1. General remarks)
For further details on OCs and RMMs see Table 23	
1.14.1.2.10 Control of workers exposure for PROC 17	
Workers related free short title	Lubrication at high energy conditions and in partly open process.
Use descriptor covered	PROC 17

Processes, tasks, activities covered	Lubrication at high energy conditions (temperature, friction) between moving parts and substance; significant part of process is open to workers. The metal working fluid may form aerosols or fumes due to rapidly moving metal parts.
Assessment Method	ECETOC TRA Worker v2.0 with modifications (see 1. General remarks)

For further details on OCs and RMMs see Table 91

Additional good practice advice (for environment) beyond the REACH CSA
Use of tightly fitting safety goggles (The substance has shown to cause mucosal irritations at relatively high concentrations. Thus, it is recommended to protect the eyes.)

1.14.2 Exposure Estimation

1.14.2.1 Worker Exposure

For the estimated exposure for workers / PROC 1 see Table 15
For the estimated exposure for workers / PROC 2 see Table 16
For the estimated exposure for workers / PROC 3 see Table 5
For the estimated exposure for workers / PROC 4 see Table 6
For the estimated exposure for workers / PROC 7 see Table 47
For the estimated exposure for workers / PROC 8a see Table 7
For the estimated exposure for workers / PROC 8b see Table 8
For the estimated exposure for workers / PROC 9 see Table 18
For the estimated exposure for workers / PROC 10 see Table 48
For the estimated exposure for workers / PROC 13 see Table 24
For the estimated exposure for workers / PROC 17 see Table 92

1.14.2.2. Consumer Exposure

Not Applicable

1.14.2.3 Indirect Exposure of Humans via the Environment (oral)

The bioaccumulation potential of this substance is very low, with a Kow of 0.044; therefore, indirect exposure of humans via the environment can be considered negligible.

1.14.2.4 Environmental Exposure

Table 99: Environmental Exposure Scenario ES14-E1

Section 1	**Operational conditions and risk management measures**
Section 1.2	**Control of environmental exposure**
Identifier*	ES14-E1
Contributing scenario	Use In Metal Working Fluids
Environmental Release Category	ERC4
Specific ERC	ESVOC 18

Assessment scenario	
Operational Conditions	
Amounts used	
Amounts used in the EU (tonnes/year)	1,000,000 (total industry tonnage for production of MEG)
Fraction of EU tonnage used in region	1
Fraction of main source to local environment	0.0001
Fraction of substance in end-use products	1
Maximum daily site tonnage (kg/day)	5000
Frequency and duration of use	
Type of release	Continuous
Emission days (days/year)	20 - ESVOC 18
Site specific monitoring data results for surface water effluent	
Location of sample	
Environmental factors not influenced by risk management	
Local freshwater dilution factor	10 (default)
Local marine water dilution factor	100 (default)
Other given operational conditions affecting environmental exposure	
Risk Management Measures	
Technical conditions and measures at process level (source) to prevent release	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Treat air emissions to provide a typical removal efficiency of (%)	
Treat wastewater (prior to discharge to receiving water) to provide the required removal efficiency of (%) ETotal,RMM = 1 – ((1 – ERMM, 1) x (1 – ERMM,2))	87%
Organizational measures to prevent/limit release from site	
Conditions and measures related to municipal sewage treatment plant	
Conditions and measures related to external treatment of waste for disposal	
Conditions and measures related to external recovery of waste	
Other environmental control measures additional to above	
Identifier	***ES14-E1***
Narrative	Release fraction derived from SpERC (ESVOC 18)

Release fraction to air from process	6.00E-03
Release fraction to wastewater from process	1.00E-03
Release fraction to soil from process (regional only)	0.00E+00
Local release to air (kg/d)	3.00E+01
Local release to sewage (kg/d)	5.00E+00
Local release to soil (kg/d)	0.00E+00

Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)

Total efficiency of removal from air emissions (%)	
The maximum allowable site tonnage (M_{Safe}) based on removal from domestic sewage treatment (kg/d)	133849
Scaling	

The downstream user can check the compliance of his site by comparing site specific data with defaults used in the exposure assessment. The site specific quotient should be inferior or equal to the spERC quotient.

$$\frac{m_{spERC} * (1 - E_{ER,spERC}) * F_{release,spERC}}{DF_{spERC}} \geq \frac{m_{site} * (1 - E_{ER,site}) * F_{release,site}}{DF_{site}}$$

m_{spERC}: Substance use rate in spERC
$E_{ER,spERC}$: Efficacy of RMM in spERC
$F_{release,,spERC}$: Initial release fraction in spERC
DF_{spERC}: dilution factor of STP effluent in river

m_{site}: Substance use rate at site
$E_{ER,site}$: Efficacy of RMM at site
$F_{release,,site}$: Initial release fraction at site
DF_{site}: dilution factor of STP effluent in river

1.14.2.4.1 Predicted exposure concentrations in the STP and in the aquatic compartments (freshwater, seawater and sediments)

Table 100: Predicted exposure concentrations in the STP and in the aquatic compartments (freshwater, seawater and sediments)

Local Concentration, Compartment: STP and aquatic	***unit***	***ES14-E1***
Local PEC in surface water during emission episode (dissolved)	mg/L	5.452E-02
Annual average local PEC in surface water (dissolved)	mg/L	2.462E-02
Local PEC in fresh water sediment during emission episode	mg/kg dwt	2.075E-01
Local PEC in sea water during emission episode	mg/L	5.496E-03

Annual average local PEC in sea water (dissolved)	mg/L	2.505E-03
Local PEC in marine sediment during emission episode	mg/kg dwt	2.092E-02
PEC for microorganisms in STP	mg/L	3.164E-01
Comments		

1.14.2.4.2 Predicted exposure concentration in soils

Table 101: Predicted exposure concentration in soils

Local Concentration, Compartment: soil	***unit***	***ES14-E1***
Local PEC in agricultural soil, averaged over 30 days	mg/kg dwt	5.715E-02
Local PEC agricultural soil, averaged over 180 days	mg/kg dwt	5.619E-02
Local PEC in grass land, averaged over 180 days	mg/kg dwt	5.600E-02
Comments		

1.14.2.4.3 Predicted exposure concentration in the atmospheric compartment

Table 102: Predicted exposure concentration in the atmospheric compartment

Local Concentration, Compartment: air	***unit***	***ES14-E1***
Annual average local PEC in air (total)	kg/m^3	4.602E-10
Comments		

1.14.2.4.4 Predicted exposure concentration in food for secondary poisoning

The bioaccumulation potential of this substance is very low, therefore secondary poisoning can be considered negligible. The Kow for MEG is 0.044.

1.15 Use in Metal-working fluids (professional)

1.15.1 Exposure Scenario 15

The relevant operational conditions (OCs) used for calculation of environmental exposure are mentioned under paragraph 1.15.2.4.

Table 103: Description of ES 15

Reference Number	15
1.15.1.1 Title	
Free short title	Use in metal-working fluids (professional)
Systematic title based on use descriptor	SU22; PROC 1, 2, 3, 5, 8a, 8b, 9, 10, 11, 13, and 17; ERC 8a
1.15.1.2 Operational conditions and Risk management measures	
1.15.1.2.1Control of workers exposure for PROC 1, 2, 3	
Workers related free short title	Use in closed process, no likelihood of exposure. Use in closed, continuous process with occasional controlled exposure. Use in closed batch process (synthesis or formulation).
Use descriptor covered	PROC 1, 2, 3
Processes, tasks, activities covered	Use of the substances in high integrity contained system where little potential exists for exposures, e.g. any sampling via closed loop systems. Continuous process but where the design philosophy is not specifically aimed at minimizing emissions. It is not high integrity and occasional expose will arise e.g. through maintenance, sampling and equipment breakages. Batch manufacture of a chemical or formulation where the predominant handling is in a contained manner, e.g. through enclosed transfers, but where some opportunity for contact with chemicals occurs, e.g. through sampling.
Assessment Method	ECETOC TRA workers (v2.0) modified (see 1. Genral remarks)
For further details on OCs and RMMs see Table 54	
1.15.1.2.2 Control of workers exposure for PROC 5	
Workers related free short title	Use in batch and other process (synthesis) where opportunity for exposure arises.
Use descriptor covered	PROC 5
Processes, tasks, activities covered	Manufacture or formulation of chemical products or arti-cles using technologies related to mixing and blending of solid or liquid materials, and where the process is in stages and provides the opportunity for significant con-tact at any stage
Assessment Method	ECETOC TRA Worker v2.0 with modifications

	(see 1. General remarks)
For further details on OCs and RMMs see Table 54	
1.15.1.2.3 Control of workers exposure for PROC 8a	
Workers related free short title	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities.
Use descriptor covered	PROC 8a
Processes, tasks, activities covered	Sampling, loading, filling, transfer, dumping, bagging in non- dedicated facilities. Exposure related to dust, vapour, aerosols or spillage, and cleaning of equipment to be expected.
Assessment Method	ECETOC TRA Worker v2.0 with modifications (see 1. General Remarks)
For further details on OCs and RMMs see Table 54	
1.15.1.2.4 Control of workers exposure for PROC 8b and 9	
Workers related free short title	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities. Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
Use descriptor covered	PROC 8b
Processes, tasks, activities covered	Sampling, loading, filling, transfer, dumping, bagging in dedicated facilities. Exposure related to dust, vapour, aerosols or spillage, and cleaning of equipment to be expected. Filling lines specifically designed to both capture vapour and aerosol emissions and minimise spillage
Assessment Method	ECETOC TRA Worker v2.0 with modifications (see 1. General remarks)
For further details on OCs and RMMs see Table 54	
1.15.1.2.5 Control of workers exposure for PROC 10	
Workers related free short title	Roller application or brushing
Use descriptor covered	PROC 10
Processes, tasks, activities covered	Low energy spreading of e.g. coatings. Including cleaning of surfaces. Substance can be inhaled as vapours, skin contact can occur through droplets, splashes, working with wipes and handling of treated surfaces.
Assessment Method	ECETOC TRA Worker v2.0 with modifications (see 1. General remarks)
For further details on OCs and RMMs see Table 54	
1.15.1.2.6 Control of workers exposure for PROC 11	

Workers related free short title	Non industrial spraying	
Use descriptor covered	PROC 11	
Processes, tasks, activities covered	Air dispersive techniques Spraying for surface coating, adhesives, polishes/cleaners, air care products, sandblasting Substances can be inhaled as aerosols. The energy of the aerosol particles may require advanced exposure controls.	
Assessment Method	Stoffenmanager v4.0 and RISKOFDERMv2.1	
For further details on OCs and RMMs see Table 54		
1.15.1.2.7 Control of workers exposure for PROC 13		
Workers related free short title	Treatment of articles by dipping and pouring.	
Use descriptor covered	PROC 13	
Processes, tasks, activities covered	Immersion operations. Treatment of articles by dipping, pouring, immersing, soaking, washing out or washing in substances; including cold formation or resin type matrix. Includes handling of treated objects (e.g. after dying, plating,). Substance is applied to a surface by low energy techniques such as dipping the article into a bath or pouring a preparation onto a surface.	
Assessment Method	ECETOC TRA Worker v2.0 with modifications (see 1. General remarks)	
For further details on OCs and RMMs see Table 54		
1.15.1.2.8 Control of workers exposure for PROC 17		
Workers related free short title	Lubrication at high energy conditions and in partly open process.	
Use descriptor covered	PROC 17	
Processes, tasks, activities covered	Lubrication at high energy conditions (temperature, friction) between moving parts and substance; significant part of process is open to workers.	
Assessment Method	ECETOC TRA workers (v2.0) modified (see 1. General remarks)	
Product characteristic		
Physical state	Liquid	
Fugacity	Low	
Concentration of substance	100	%
Vapour pressure of the substance	0.123	hPa
Amounts used		
Not relevant		
Frequency and duration of use/exposure		
Duration of exposure	> 4	hours/day

Frequency of exposure	≤ 240	days/year
Human factors not influenced by risk management		
Exposed skin surface	Both hands (960 cm²)	
Other given operational conditions affecting workers exposure		
Location	Indoor	
Domain	Professional	
Technical conditions and measures at process level (source) to prevent release		
None		
Technical conditions and measures to control dispersion from source towards the worker		
Local exhaust ventilation	Yes	Effectiveness: 90%
In case no LEV is present, a suitable respiratory protection with adequate effectiveness is required		
Organisational measures to prevent /limit releases, dispersion and exposure		
Not relevant for ECETOC TRA		
Conditions and measures related to personal protection, hygiene and health evaluation		
Respiratory protection required	No	
Use of suitable gloves with basic training	Yes	Effectiveness: 90%

Additional good practice advice (for environment) beyond the REACH CSA
Use of tightly fitting safety goggles (The substance has shown to cause mucosal irritations at relatively high concentrations. Thus, it is recommended to protect the eyes.)

1.15.2 Exposure Estimation

1.15.2.1 Worker Exposure

For the estimated exposure for workers / PROC 1 see Table 56
For the estimated exposure for workers / PROC 2 see Table 57
For the estimated exposure for workers / PROC 3 see Table 58
For the estimated exposure for workers / PROC 5 see Table 60
For the estimated exposure for workers / PROC 8a see Table 59
For the estimated exposure for workers / PROC 8b see Table 60
For the estimated exposure for workers / PROC 9 see Table 61
For the estimated exposure for workers / PROC 10 see Table 62
For the estimated exposure for workers / PROC 11 see Table 64
For the estimated exposure for workers / PROC 13 see Table 65

Table 104: Estimated exposure for workers – PROC 17

Route of exposure	Concentrations		Justification
	Value	Unit	
Long-term exposure, systemic/local, inhalative	12.94	mg/m³	NA
Long-term exposure, systemic, dermal	2.74	mg/kg bw/d	NA

NA = Not applicable

1.15.2.2. Consumer Exposure

Not Applicable

1.15.2.3 Indirect Exposure of Humans via the Environment (oral)

The bioaccumulation potential of this substance is very low, with a Kow of 0.044; therefore, indirect exposure of humans via the environment can be considered negligible.

1.15.2.4 Environmental Exposure

Table 105: Environmental Exposure Scenario ES15-E1

Section 1	**Operational conditions and risk management measures**
Section 1.2	**Control of environmental exposure**
Identifier*	ES15-E1
Contributing scenario	Use In Metal Working Fluids
Environmental Release Category	ERC8a
Specific ERC	ESVOC 20
Assessment scenario	
Operational Conditions	
Amounts used	
Amounts used in the EU (tonnes/year)	1,000,000 (total industry tonnage for production of MEG)
Fraction of EU tonnage used in region	0.1
Fraction of main source to local environment	0.0005
Fraction of substance in end-use products	1
Maximum daily site tonnage (kg/day)	1370
Frequency and duration of use	
Type of release	Continuous
Emission days (days/year)	365 - ESVOC 20
Site specific monitoring data results for surface water effluent	
Location of sample	
Environmental factors not influenced by risk management	
Local freshwater dilution factor	10 (default)

Local marine water dilution factor	100 (default)
Other given operational conditions affecting environmental exposure	
Risk Management Measures	
Technical conditions and measures at process level (source) to prevent release	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Treat air emissions to provide a typical removal efficiency of (%)	
Treat wastewater (prior to discharge to receiving water) to provide the required removal efficiency of (%) ETotal,RMM = 1 – ((1 – ERMM, 1) x (1 – ERMM,2))	87%
Organizational measures to prevent/limit release from site	
Conditions and measures related to municipal sewage treatment plant	
Conditions and measures related to external treatment of waste for disposal	
Conditions and measures related to external recovery of waste	
Other environmental control measures additional to above	
Identifier	***ES15-E1***
Narrative	Release fraction derived from SpERC (ESVOC 20)
Release fraction to air from process	1.50E-02
Release fraction to wastewater from process	5.00E-02
Release fraction to soil from process (regional only)	5.00E-02
Local release to air (kg/d)	2.05E+00
Local release to sewage (kg/d)	6.85E+00
Local release to soil (kg/d)	6.85E+00
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	
Total efficiency of removal from air emissions (%)	
The maximum allowable site tonnage (M_{Safe}) based on removal from domestic sewage treatment (kg/d)	97415

1.15.2.4.1 Predicted exposure concentrations in the STP and in the aquatic compartments (freshwater, seawater and sediments)

Table 106: Predicted exposure concentrations in the STP and in the aquatic compartments (freshwater, seawater and sediments)

Local Concentration, Compartment: STP and aquatic	***unit***	***ES15-E1***
Local PEC in surface water during emission episode (dissolved)	mg/L	7.723E-02
Annual average local PEC in surface water (dissolved)	mg/L	7.723E-02
Local PEC in fresh water sediment during emission episode	mg/kg dwt	2.939E-01
Local PEC in sea water during emission episode	mg/L	7.585E-03
Annual average local PEC in sea water (dissolved)	mg/L	7.585E-03
Local PEC in marine sediment during emission episode	mg/kg dwt	2.887E-02
PEC for microorganisms in STP	mg/L	4.334E-01
Comments		

1.15.2.4.2 Predicted exposure concentration in soils

Table 107: Predicted exposure concentration in soils

Local Concentration, Compartment: soil	***unit***	***ES15-E1***
Local PEC in agricultural soil, averaged over 30 days	mg/kg dwt	1.577E-02
Local PEC agricultural soil, averaged over 180 days	mg/kg dwt	1.445E-02
Local PEC in grass land, averaged over 180 days	mg/kg dwt	1.412E-02
Comments		

1.15.2.4.3 Predicted exposure concentration in the atmospheric compartment

Table 108: Predicted exposure concentration in the atmospheric compartment

Local Concentration, Compartment: air	***unit***	***ES15-E1***
Annual average local PEC in air (total)	kg/m^3	8.140E-13
Comments		

1.15.2.4.4 Predicted exposure concentration in food for secondary poisoning

The bioaccumulation potential of this substance is very low, therefore secondary poisoning can be considered negligible. The Kow for MEG is 0.044.

1.16 Use in Agrochemicals (professional)

1.16.1 Exposure Scenario 16

The relevant operational conditions (OCs) used for calculation of environmental exposure are mentioned under paragraph 1.16.2.4.

Table 109: Description of ES 16

Reference Number	16
1.16.1.1 Title	
Free short title	Use in Agrochemicals (professional)
Systematic title based on use descriptor	SU22; PROC 1, 2, 4, 8a, 8b, 9, 11, and 13; 8d
1.16.1.2 Operational conditions and Risk management measures	
1.16.1.2.1Control of workers exposure for PROC 1 and 2	
Workers related free short title	Use in closed process, no likelihood of exposure. Use in closed, continuous process with occasional controlled exposure.
Use descriptor covered	PROC 1 and 2
Processes, tasks, activities covered	Use of the substances in high integrity contained system where little potential exists for exposures, e.g. any sampling via closed loop systems. Continuous process but where the design philosophy is not specifically aimed at minimizing emissions. It is not high integrity and occasional expose will arise e.g. through maintenance, sampling and equipment breakages.
Assessment Method	ECETOC TRA workers (v2.0) modified (see 1. Genral remarks)
For further details on OCs and RMMs see Table 54	
1.16.1.2.2 Control of workers exposure for PROC 4	
Workers related free short title	Use in batch and other process (synthesis) where opportunity for exposure arises.
Use descriptor covered	PROC 4
Processes, tasks, activities covered	Use in batch manufacture of a chemical where significant opportunity for exposure arises, e.g. during charging, sampling or discharge of material, and when the nature of the design is likely to result in exposure.
Assessment Method	ECETOC TRA Worker v2.0 with modifications (see 1. General remarks)
For further details on OCs and RMMs see Table 54	
1.16.1.2.3 Control of workers exposure for PROC 8a	
Workers related free short title	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities.

Use descriptor covered	PROC 8a
Processes, tasks, activities covered	Sampling, loading, filling, transfer, dumping, bagging in non- dedicated facilities. Exposure related to dust, vapour, aerosols or spillage, and cleaning of equipment to be expected.
Assessment Method	ECETOC TRA Worker v2.0 with modifications (see 1. General Remarks)
For further details on OCs and RMMs see Table 54	
1.16.1.2.4 Control of workers exposure for PROC 8b and 9	
Workers related free short title	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities. Transfer of substance or preparation into small containers (dedicated filling line, including weighing).
Use descriptor covered	PROC 8b and 9
Processes, tasks, activities covered	Sampling, loading, filling, transfer, dumping, bagging in dedicated facilities. Exposure related to dust, vapour, aerosols or spillage, and cleaning of equipment to be expected. Filling lines specifically designed to both capture vapour and aerosol emissions and minimise spillage.
Assessment Method	ECETOC TRA Worker v2.0 with modifications (see 1. General remarks)
For further details on OCs and RMMs see Table 54	
1.15.1.2.5 Control of workers exposure for PROC 11	
Workers related free short title	Non industrial spraying
Use descriptor covered	PROC 11
Processes, tasks, activities covered	Air dispersive techniques Spraying for surface coating, adhesives, polishes/cleaners, air care products, sandblasting Substances can be inhaled as aerosols. The energy of the aerosol particles may require advanced exposure controls.
Assessment Method	Stoffenmanager v4.0 and RISKOFDERMv2.1
For further details on OCs and RMMs see Table 54	
1.15.1.2.6 Control of workers exposure for PROC 13	
Workers related free short title	Treatment of articles by dipping and pouring.
Use descriptor covered	PROC 13
Processes, tasks, activities covered	Immersion operations. Treatment of articles by dipping, pouring, immersing, soaking, washing out or washing in substances; including cold formation or resin type matrix. Includes handling of treated objects (e.g. after dying, plating,). Substance is applied to a

	surface by low energy techniques such as dipping the article into a bath or pouring a preparation onto a surface.
Assessment Method	ECETOC TRA Worker v2.0 with modifications (see 1. General remarks)
For further details on OCs and RMMs see Table 54	

Additional good practice advice (for environment) beyond the REACH CSA
Use of tightly fitting safety goggles (The substance has shown to cause mucosal irritations at relatively high concentrations. Thus, it is recommended to protect the eyes.)

1.16.2 Exposure Estimation

1.16.2.1 Worker Exposure

For the estimated exposure for workers / PROC 1 see Table 56
For the estimated exposure for workers / PROC 2 see Table 57
For the estimated exposure for workers / PROC 4 see Table 59
For the estimated exposure for workers / PROC 8a see Table 59
For the estimated exposure for workers / PROC 8b see Table 60
For the estimated exposure for workers / PROC 9 see Table 61
For the estimated exposure for workers / PROC 11 see Table 64
For the estimated exposure for workers / PROC 13 see Table 65

1.16.2.2. Consumer Exposure

Not Applicable

1.16.2.3 Indirect Exposure of Humans via the Environment (oral)

The bioaccumulation potential of this substance is very low, with a Kow of 0.044; therefore, indirect exposure of humans via the environment can be considered negligible.

1.16.2.4 Environmental Exposure

Table 110: Environmental Exposure Scenario ES16-E1

Section 1	**Operational conditions and risk management measures**
Section 1.2	**Control of environmental exposure**
Identifier*	ES16-E1
Contributing scenario	Use In Agrochemicals
Environmental Release Category	ERC8d
Specific ERC	ECPA 2
Assessment scenario	
Operational Conditions	
Amounts used	
Amounts used in the EU (tonnes/year)	1,000,000

	(total industry tonnage for production of MEG)
Fraction of EU tonnage used in region	0.1
Fraction of main source to local environment	0.002
Fraction of substance in end-use products	1
Maximum daily site tonnage (kg/day)	5479
Frequency and duration of use	
Type of release	Continuous
Emission days (days/year)	365 - ECPA 2
Site specific monitoring data results for surface water effluent	
Location of sample	
Environmental factors not influenced by risk management	
Local freshwater dilution factor	10 (default)
Local marine water dilution factor	100 (default)
Other given operational conditions affecting environmental exposure	
Risk Management Measures	
Technical conditions and measures at process level (source) to prevent release	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Treat air emissions to provide a typical removal efficiency of (%)	
Treat wastewater (prior to discharge to receiving water) to provide the required removal efficiency of (%) ETotal,RMM = 1 – ((1 – ERMM, 1) x (1 – ERMM,2))	0%
Organizational measures to prevent/limit release from site	
Conditions and measures related to municipal sewage treatment plant	
Conditions and measures related to external treatment of waste for disposal	
Conditions and measures related to external recovery of waste	
Other environmental control measures additional to above	
Identifier	***ES16-E1***
Narrative	Release fraction derived from SpERC (ECPA 2)
Release fraction to air from process	1.00E+00
Release fraction to wastewater from process	0.00E+00
Release fraction to soil from process (regional only)	0.00E+00

Local release to air (kg/d)	5.48E+02
Local release to sewage (kg/d)	0.00E+00
Local release to soil (kg/d)	0.00E+00
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	
Total efficiency of removal from air emissions (%)	
The maximum allowable site tonnage (M_{Safe}) based on removal from domestic sewage treatment (kg/d)	12830

1.16.2.4.1 Predicted exposure concentrations in the STP and in the aquatic compartments (freshwater, seawater and sediments)

Table 111: Predicted exposure concentrations in the STP and in the aquatic compartments (freshwater, seawater and sediments)

Local Concentration, Compartment: STP and aquatic	***unit***	***ES16-E1***
Local PEC in surface water during emission episode (dissolved)	mg/L	2.755E-02
Annual average local PEC in surface water (dissolved)	mg/L	2.755E-02
Local PEC in fresh water sediment during emission episode	mg/kg dwt	1.308E+00
Local PEC in sea water during emission episode	mg/L	4.072E-03
Annual average local PEC in sea water (dissolved)	mg/L	4.072E-03
Local PEC in marine sediment during emission episode	mg/kg dwt	1.933E-01
PEC for microorganisms in STP	mg/L	0.000E+00
Comments		

1.16.2.4.2 Predicted exposure concentration in soils

Table 112: Predicted exposure concentration in soils

Local Concentration, Compartment: soil	***unit***	***ES16-E1***
Local PEC in agricultural soil, averaged over 30 days	mg/kg dwt	6.535E-01
Local PEC agricultural soil, averaged over 180 days	mg/kg dwt	6.535E-01
Local PEC in grass land, averaged over 180 days	mg/kg dwt	6.535E-01
Comments		

1.16.2.4.3 Predicted exposure concentration in the atmospheric compartment

Table 113: Predicted exposure concentration in the atmospheric compartment

Local Concentration, Compartment: air	***unit***	***ES16-E1***
Annual average local PEC in air (total)	kg/m^3	5.046E-09
Comments		

1.16.2.4.4 Predicted exposure concentration in food for secondary poisoning

The bioaccumulation potential of this substance is very low, therefore secondary poisoning can be considered negligible. The Kow for MEG is 0.044.

1.17 Use in/as Functional fluids (industrial)

1.17.1 Exposure Scenario 17

The relevant operational conditions (OCs) used for calculation of environmental exposure are mentioned under paragraph 1.17.2.4.

Table 114: Description of ES 17

Reference Number	17
1.17.1.1 Title	
Free short title	Use in / as functional fluids (industrial)
Systematic title based on use descriptor	SU3; PROC 1, 2, 3, 4, 8a, 8b, and 9; ERC 7
1.17.1.2 Operational conditions and Risk management measures	
1.17.1.2.1 Control of workers exposure for PROC 1	
Workers related free short title	Use in closed process, no likelihood of exposure
Use descriptor covered	PROC 1
Processes, tasks, activities covered	Use of the substance in high integrity contained system where little potential exists for exposures, e.g. any sampling via closed loop systems
Assessment Method	ECETOC TRA Worker v2.0 with modifications (see 1. General remarks)
For further details on OCs and RMMs see Table 14	
1.17.1.2.2 Control of workers exposure for PROC 2	
Workers related free short title	Use in closed, continuous process with occasional controlled exposure
Use descriptor covered	PROC 2
Processes, tasks, activities covered	Continuous process but where the design philosophy is not specifically aimed at minimizing emissions. Occasional exposure will arise e.g. through maintenance, sampling and equipment breakages
Assessment Method	ECETOC TRA Worker v2.0 with modifications (see 1. General remarks)
For further details on OCs and RMMs see Table 14	
1.17.1.2.3 Control of workers exposure for PROC 3 and 4	
Workers related free short title	Use in closed batch process (synthesis or formulation). Use in batch and other process (synthesis) where opportunity for exposure arises.
Use descriptor covered	PROC 3 and 4
Processes, tasks, activities covered	Batch manufacture of a chemical or formulation where the predominant handling is in a contained manner, e.g. through enclosed transfers, but where some opportunity for contact with chemicals occurs, e.g. through sampling

	Use in batch manufacture of a chemical where significant opportunity for exposure arises, e.g. during charging, sampling or discharge of material, and when the nature of the design is likely to result in exposure.
Assessment Method	ECETOC TRA Worker v2.0 with modifications (see 1. General remarks)
For further details on OCs and RMMs see Table 2	
1.17.1.2.4 Control of workers exposure for PROC 8a	
Workers related free short title	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities.
Use descriptor covered	PROC 8a
Processes, tasks, activities covered	Sampling, loading, filling, transfer, dumping, bagging in non- dedicated facilities. Exposure related to dust, vapour, aerosols or spillage, and cleaning of equipment to be expected.
Assessment Method	ECETOC TRA Worker v2.0 with modifications (see 1. General remarks)
For further details on OCs and RMMs see Table 2	
1.17.1.2.5 Control of workers exposure for PROC 8b and 9	
Workers related free short title	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities. Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
Use descriptor covered	PROC 8b and 9
Processes, tasks, activities covered	Sampling, loading, filling, transfer, dumping, bagging in dedicated facilities. Exposure related to dust, vapour, aerosols or spillage, and cleaning of equipment to be expected. Filling lines specifically designed to both capture vapour and aerosol emissions and minimise spillage
Assessment Method	ECETOC TRA Worker v2.0 with modifications (see 1. General remarks)
For further details on OCs and RMMs see Tables 47 and 59	

Additional good practice advice (for environment) beyond the REACH CSA
Use of tightly fitting safety goggles (The substance has shown to cause mucosal irritations at relatively high concentrations. Thus, it is recommended to protect the eyes.)

1.17.2 Exposure Estimation

1.17.2.1 Worker Exposure

For the estimated exposure for workers / PROC 1 see Table 15
For the estimated exposure for workers / PROC 2 see Table 16
For the estimated exposure for workers / PROC 3 see Table 5
For the estimated exposure for workers / PROC 4 see Table 6
For the estimated exposure for workers / PROC 8a see Table 7
For the estimated exposure for workers / PROC 8b see Table 8
For the estimated exposure for workers / PROC 9 see Table 18

1.17.2.2. Consumer Exposure

Not Applicable

1.17.2.3 Indirect Exposure of Humans via the Environment (oral)

The bioaccumulation potential of this substance is very low, with a Kow of 0.044; therefore, indirect exposure of humans via the environment can be considered negligible.

1.17.2.4 Environmental Exposure

Table 115: Environmental Exposure Scenario ES17-E1

Section 1	**Operational conditions and risk management measures**
Section 1.2	**Control of environmental exposure**
Identifier*	ES17-E1
Contributing scenario	Use In/As Functional Fluids
Environmental Release Category	ERC7
Specific ERC	ESVOC 31
Assessment scenario	
Operational Conditions	
Amounts used	
Amounts used in the EU (tonnes/year)	1,000,000 (total industry tonnage for production of MEG)
Fraction of EU tonnage used in region	1
Fraction of main source to local environment	0.00001
Fraction of substance in end-use products	1
Maximum daily site tonnage (kg/day)	500
Frequency and duration of use	
Type of release	Continuous
Emission days (days/year)	20 - ESVOC 31
Site specific monitoring data results for surface water effluent	
Location of sample	
Environmental factors not influenced by risk management	
Local freshwater dilution factor	10 (default)
Local marine water dilution factor	100 (default)
Other given operational conditions affecting environmental exposure	
Risk Management Measures	

Technical conditions and measures at process level (source) to prevent release	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Treat air emissions to provide a typical removal efficiency of (%)	
Treat wastewater (prior to discharge to receiving water) to provide the required removal efficiency of (%) ETotal,RMM = 1 – ((1 – ERMM, 1) x (1 – ERMM,2))	87%
Organizational measures to prevent/limit release from site	
Conditions and measures related to municipal sewage treatment plant	
Conditions and measures related to external treatment of waste for disposal	
Conditions and measures related to external recovery of waste	
Other environmental control measures additional to above	
Identifier	***ES17-E1***
Narrative	Release fraction derived from SpERC (ESVOC 31)
Release fraction to air from process	1.00E-03
Release fraction to wastewater from process	1.00E-03
Release fraction to soil from process (regional only)	1.00E-03
Local release to air (kg/d)	5.00E-01
Local release to sewage (kg/d)	5.00E-01
Local release to soil (kg/d)	5.00E-01
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	
Total efficiency of removal from air emissions (%)	
The maximum allowable site tonnage (M_{Safe}) based on removal from domestic sewage treatment (kg/d)	81112
Scaling	
The downstream user can check the compliance of his site by comparing site specific data with defaults used in the exposure assessment. The site specific quotient should be inferior or equal to the spERC quotient.	

$$\frac{m_{spERC} * (1 - E_{ER,spERC}) * F_{releasespERC}}{DF_{spERC}} \geq \frac{m_{site} * (1 - E_{ER,site}) * F_{releasesite}}{DF_{site}}$$

m_{spERC}: Substance use rate in spERC
$E_{ER,spERC}$: Efficacy of RMM in spERC
$F_{release,,spERC}$: Initial release fraction in spERC
DF_{spERC}: dilution factor of STP effluent in river

m_{site}: Substance use rate at site
$E_{ER,site}$: Efficacy of RMM at site
$F_{release,,site}$: Initial release fraction at site
DF_{site}: dilution factor of STP effluent in river

1.17.2.4.1 Predicted exposure concentrations in the STP and in the aquatic compartments (freshwater, seawater and sediments)

Table 116: Predicted exposure concentrations in the STP and in the aquatic compartments (freshwater, seawater and sediments)

Local Concentration, Compartment: STP and aquatic	***unit***	***ES17-E1***
Local PEC in surface water during emission episode (dissolved)	mg/L	1.215E-02
Annual average local PEC in surface water (dissolved)	mg/L	9.162E-03
Local PEC in fresh water sediment during emission episode	mg/kg dwt	4.625E-02
Local PEC in sea water during emission episode	mg/L	1.195E-03
Annual average local PEC in sea water (dissolved)	mg/L	8.960E-04
Local PEC in marine sediment during emission episode	mg/kg dwt	4.548E-03
PEC for microorganisms in STP	mg/L	3.164E-02
Comments		

1.17.2.4.2 Predicted exposure concentration in soils

Table 117: Predicted exposure concentration in soils

Local Concentration, Compartment: soil	***unit***	***ES17-E1***
Local PEC in agricultural soil, averaged over 30 days	mg/kg dwt	9.431E-03
Local PEC agricultural soil, averaged over 180 days	mg/kg dwt	9.335E-03
Local PEC in grass land, averaged over 180 days	mg/kg dwt	9.312E-03
Comments		

1.17.2.4.3 Predicted exposure concentration in the atmospheric compartment

Table 118: Predicted exposure concentration in the atmospheric compartment

Local Concentration, Compartment: air	***unit***	***ES17-E1***
Annual average local PEC in air (total)	kg/m^3	8.158E-13
Comments		

1.17.2.4.4 Predicted exposure concentration in food for secondary poisoning

The bioaccumulation potential of this substance is very low, therefore secondary poisoning can be considered negligible. The Kow for MEG is 0.044.

1.18 Use in/as Functional fluids (professional)

1.18.1 Exposure Scenario

The relevant operational conditions (OCs) used for calculation of environmental exposure are mentioned under paragraph 1.18.2.4.

Table 119: Description of ES 18

Reference Number	18
1.18.1.1 Title	
Free short title	Use in/as functional fluids (professional)
Systematic title based on use descriptor	SU22; PROC 1, 2, 3, 4, 8a, 9, and 20; ERC 9b
1.18.1.2 Operational conditions and Risk management measures	
1.18.1.2.1Control of workers exposure for PROC 1, 2, 3	
Workers related free short title	Use in closed process, no likelihood of exposure. Use in closed, continuous process with occasional controlled exposure. Use in closed batch process (synthesis or formulation).
Use descriptor covered	PROC 1, 2, 3
Processes, tasks, activities covered	Use of the substances in high integrity contained system where little potential exists for exposures, e.g. any sampling via closed loop systems. Continuous process but where the design philosophy is not specifically aimed at minimizing emissions. It is not high integrity and occasional expose will arise e.g. through maintenance, sampling and equipment breakages. Batch manufacture of a chemical or formulation where the predominant handling is in a contained manner, e.g. through enclosed transfers, but where some opportunity for contact with chemicals occurs, e.g. through sampling.
Assessment Method	ECETOC TRA workers (v2.0) modified (see 1. Genral remarks)
For further details on OCs and RMMs see Table 54	
1.8.1.2.2 Control of workers exposure for PROC 4	
Workers related free short title	Use in batch and other process (synthesis) where opportunity for exposure arises.
Use descriptor covered	PROC 4
Processes, tasks, activities covered	Use in batch manufacture of a chemical where significant opportunity for exposure arises, e.g. during charging, sampling or discharge of material, and when the nature of the design is likely to result in exposure.
Assessment Method	ECETOC TRA Worker v2.0 with modifications (see 1. General remarks)
For further details on OCs and RMMs see Table 54	

1.18.1.2.3 Control of workers exposure for PROC 8a		
Workers related free short title	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities.	
Use descriptor covered	PROC 8a	
Processes, tasks, activities covered	Sampling, loading, filling, transfer, dumping, bagging in non- dedicated facilities. Exposure related to dust, vapour, aerosols or spillage, and cleaning of equipment to be expected.	
Assessment Method	ECETOC TRA Worker v2.0 with modifications (see 1. General Remarks)	
For further details on OCs and RMMs see Table 54		
1.18.1.2.4 Control of workers exposure for PROC 9		
Workers related free short title	Transfer of substance or preparation into small containers (dedicated filling line, including weighing).	
Use descriptor covered	PROC 9	
Processes, tasks, activities covered	Filling lines specifically designed to both capture vapour and aerosol emissions and minimise spillage.	
Assessment Method	ECETOC TRA Worker v2.0 with modifications (see 1. General remarks)	
For further details on OCs and RMMs see Table 54		
1.18.1.2.4 Control of workers exposure for PROC 20		
Workers related free short title	Heat and pressure transfer fluids in dispersive, professional use but closed systems.	
Use descriptor covered	PROC 20	
Processes, tasks, activities covered	Motor and engine oils, brake fluids. Also in these applications, the lubricant may be exposed to high energy conditions and chemical reactions may take place during use. Exhausted fluids need to be disposed of as waste. Repair and maintenance may lead to skin contact.	
Assessment Method	ECETOC TRA Worker v2.0 with modifications (see 1. General remarks)	
Product characteristic		
Physical state	Liquid	
Fugacity	Low	
Concentration of substance	100	%
Vapour pressure of the substance	0.123	hPa
Amounts used		
Not relevant		
Frequency and duration of use/exposure		

Duration of exposure	> 4	hours/day
Frequency of exposure	≤ 240	days/year
Human factors not influenced by risk management		
Exposed skin surface	Palm of both hands (480 cm^2)	
Other given operational conditions affecting workers exposure		
Location	Indoor	
Domain	Professional	
Technical conditions and measures at process level (source) to prevent release		
None		
Technical conditions and measures to control dispersion from source towards the worker		
Local exhaust ventilation	No	
Organisational measures to prevent /limit releases, dispersion and exposure		
Not relevant for ECETOC TRA		
Conditions and measures related to personal protection, hygiene and health evaluation		
Respiratory protection required	No	

Additional good practice advice (for environment) beyond the REACH CSA
Use of tightly fitting safety goggles (The substance has shown to cause mucosal irritations at relatively high concentrations. Thus, it is recommended to protect the eyes.)

1.18.2 Exposure Estimation

1.18.2.1 Worker Exposure

For the estimated exposure for workers / PROC 1 see Table 56
For the estimated exposure for workers / PROC 2 see Table 57
For the estimated exposure for workers / PROC 3 see Table 58
For the estimated exposure for workers / PROC 4 see Table 59
For the estimated exposure for workers / PROC 8a see Table 59
For the estimated exposure for workers / PROC 9 see Table 61

Table 120: Estimated exposure for workers – PROC 20
Calculation tool used: ECETOC TRA v2.0 modified (see 1. General remarks)

Route of exposure	**Concentrations**		**Justification**
	Value	Unit	
Long-term exposure, systemic/local, inhalative	12.94	mg/m³	NA
Long-term exposure, systemic, dermal	1.71	mg/kg bw/d	NA

NA = Not applicable

1.18.2.2. Consumer Exposure

Not Applicable

1.18.2.3 Indirect Exposure of Humans via the Environment (oral)

The bioaccumulation potential of this substance is very low, with a Kow of 0.044; therefore, indirect exposure of humans via the environment can be considered negligible.

1.18.2.4 Environmental Exposure

The environmental exposure scenario is evaluated below. Exposure has been estimated using the version of the ECETOC TRA Integrated Tool current at the time of preparation of this document. Given the similar manner in which environmental exposures would be expected to occur in association with both the professional and consumer use of functional fluids, and given the conservative nature of the high tonnage (based on the estimated EU-wide manufacture of MEG) used in the assessment, this environmental assessment also covers the environmental assessment for Exposure Scenario 19 (Use in Heat transfer and Hydraulic fluids (Consumer use)).

Table 121: Environmental Exposure Scenario ES18-E1

Section 1	**Operational conditions and risk management measures**
Section 1.2	**Control of environmental exposure**
Identifier*	ES18-E1
Contributing scenario	Use In/As Functional Fluids
Environmental Release Category	ERC9b
Specific ERC	
Assessment scenario	
Operational Conditions	
Amounts used	
Amounts used in the EU (tonnes/year)	1,000,000 (total industry tonnage for production of MEG)
Fraction of EU tonnage used in region	0.1
Fraction of main source to local environment	0.002
Fraction of substance in end-use products	1
Maximum daily site tonnage (kg/day)	5479
Frequency and duration of use	
Type of release	Continuous
Emission days (days/year)	365 - ERC9b
Site specific monitoring data results for surface water effluent	
Location of sample	
Environmental factors not influenced by risk management	
Local freshwater dilution factor	10 (default)
Local marine water dilution factor	100 (default)
Other given operational conditions affecting environmental exposure	
Risk Management Measures	

Technical conditions and measures at process level (source) to prevent release	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Treat air emissions to provide a typical removal efficiency of (%)	
Treat wastewater (prior to discharge to receiving water) to provide the required removal efficiency of (%) ETotal,RMM = 1 – ((1 – ERMM, 1) x (1 – ERMM,2))	87%
Organizational measures to prevent/limit release from site	
Conditions and measures related to municipal sewage treatment plant	
Conditions and measures related to external treatment of waste for disposal	
Conditions and measures related to external recovery of waste	
Other environmental control measures additional to above	
Identifier	***ES18-E1***
Narrative	Release fraction derived from ERC (9b)
Release fraction to air from process	5.00E-02
Release fraction to wastewater from process	5.00E-02
Release fraction to soil from process (regional only)	5.00E-02
Local release to air (kg/d)	2.74E+01
Local release to sewage (kg/d)	2.74E+01
Local release to soil (kg/d)	2.74E+01
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	
Total efficiency of removal from air emissions (%)	
The maximum allowable site tonnage (M_{Safe}) based on removal from domestic sewage treatment (kg/d)	137608

1.18.2.4.1 Predicted exposure concentrations in the STP and in the aquatic compartments (freshwater, seawater and sediments)

Table 122: Predicted exposure concentrations in the STP and in the aquatic compartments (freshwater, seawater and sediments)

Local Concentration, Compartment: STP and aquatic	***unit***	***ES18-E1***
Local PEC in surface water during emission	mg/L	2.187E-01

episode (dissolved)		
Annual average local PEC in surface water (dissolved)	mg/L	2.187E-01
Local PEC in fresh water sediment during emission episode	mg/kg dwt	8.322E-01
Local PEC in sea water during emission episode	mg/L	2.177E-02
Annual average local PEC in sea water (dissolved)	mg/L	2.177E-02
Local PEC in marine sediment during emission episode	mg/kg dwt	8.283E-02
PEC for microorganisms in STP	mg/L	1.734E+00
Comments		

1.18.2.4.2 Predicted exposure concentration in soils

Table 123: Predicted exposure concentration in soils

Local Concentration, Compartment: soil	***unit***	***ES18-E1***
Local PEC in agricultural soil, averaged over 30 days	mg/kg dwt	5.368E-02
Local PEC agricultural soil, averaged over 180 days	mg/kg dwt	4.842E-02
Local PEC in grass land, averaged over 180 days	mg/kg dwt	4.709E-02
Comments		

1.18.2.4.3 Predicted exposure concentration in the atmospheric compartment

Table 124: Predicted exposure concentration in the atmospheric compartment

Local Concentration, Compartment: air	***unit***	***ES18-E1***
Annual average local PEC in air (total)	kg/m^3	2.709E-12
Comments		

1.18.2.4.4 Predicted exposure concentration in food for secondary poisoning

The bioaccumulation potential of this substance is very low, therefore secondary poisoning can be considered negligible. The Kow for MEG is 0.044.

9.19 Use in Heat transfer and Hydraulic fluids (Consumer use)

General remarks

Generally, heat transfer and hydraulic fluids are products being in closed systems. Thus, exposure towards the substance is considered to be negligible within that stage of use. Relevant exposure may occur during charging and/or discharging.

Several scenarios (default databases) in ConsExpo 4.1 address a "Mixing and Loading" step. However, usually these scenarios are based on the assumption that relatively small amounts of prooduct (<100g) are charged. Regarding the charging/discharging of heat transfer and hydraulic fluids presumably greater amounts of product are handled. Thus, the exposure resulting from charging/discharging of heat transfer and hydraulic fluids is assessed by means of a calculation of PROC 8a for the professional domain which is considered to represent the charging/discharging process performed by consumers in a appropriate way.

To calculate PROC 8a the ECETOC TRA worker tool (v2.0) was used. Deviating from the ECETOC TRA calculation algorithms a direct multiplication of the basic estimate by the fraction of the substance in the preparation used was done. This approach is considered to be applicable due to the low volatility of the substance.

Oral exposure is regarded to be no relevant route of exposure for the ES.

1.19.1 Exposure Scenario 19

The relevant operational conditions (OCs) used for calculation of environmental exposure are mentioned under paragraph 1.19.2.4.

Table 125 Description of the ES 19

Reference Number	19	
1.19.1.1. Title		
Free short title	Use in Heat transfer and Hydraulic fluids (Consumer use)	
Systematic title based on use descriptor	SU21; PC 16, PC17; (PROC8a); ERC 9b	
1.19.1.2. Operational conditions and risk management measures		
1.19.1.2.1 Control of consumer exposure for PC16 and PC17		
Name of contributing scenario	Use in Heat transfer and Hydraulic fluids	
Use descriptor covered	PC16 and PC17	
Processes, tasks, activities covered	see above (General Remarks);	
Assessment Method	ECETOC TRA (worker) v2.0 with modifications (see 1.19 General remarks)	
Product characteristic		
Physical state	Liquid	
Concentration of substance	max 30 %	
Vapour pressure of the substance	0.123 hPa	
Amounts used		
Not applicable		
Frequency and duration of use/exposure		
Duration of exposure	< 15 min	
Human factors not influenced by risk management		
Exposed skin surface	Both hands	

	(960 cm²)	
Type of activity (inhalation rate)	Light activity	See footnote 1
Other given operational conditions affecting consumers exposure		
Location	Inside	
Application temperature	25°C	
Conditions and measures related to information and behavioural advice to consumers		
Not applicable		
Conditions and measures related to personal protection and hygiene		
Not applicable		

1.19.2.1 Worker Exposure

Not applicable.

1.19.2.2. Consumer Exposure

Table 126: Estimated exposure for consumers / Contributing Scenario for PC16 and PC 17
Calculation tool used: ECETOC TRA (worker) v2.0

Route of exposure	dose / conc	Unit	Justification
Long-term exposure, systemic/local, inhalative	1.93	mg/m³	
Long-term exposure, systemic, dermal	4.11	mg/kg bw/d	
Long-term exposure, systemic, oral	NA	mg/kg bw/d	See 1.19 General remarks

1.19.2.3 Indirect Exposure of Humans via the Environment (oral)

The bioaccumulation potential of this substance is very low, with a Kow of 0.044; therefore, indirect exposure of humans via the environment can be considered negligible.

1.19.2.4 Environmental Exposure

The environmental exposure scenario is covered under the environmental assessment for Exposure Scenario 18 (Use in/as functional fluids (professional)) in Section 1.18.2.4.

1.20 Use in/as De-icing/Anti-icing applications/agents (professional)

1.20.1 Exposure Scenario 20

The relevant operational conditions (OCs) used for calculation of environmental exposure are mentioned under paragraph 1.20.2.4.

Table 127: Description of ES 20

Reference Number	20
1.20.1.1 Title	
Free short title	Use in/as de-icing/anti-icing applications/agents (professional)
Systematic title based on use descriptor	SU22; PROC 1, 2, 8a, 8b, and 11; ERC 8d
1.20.1.2 Operational conditions and Risk management measures	
1.20.1.2.1Control of workers exposure for PROC 1 and 2	
Workers related free short title	Use in closed process, no likelihood of exposure. Use in closed, continuous process with occasional controlled exposure.
Use descriptor covered	PROC 1 and 2
Processes, tasks, activities covered	Use of the substances in high integrity contained system where little potential exists for exposures, e.g. any sampling via closed loop systems. Continuous process but where the design philosophy is not specifically aimed at minimizing emissions. It is not high integrity and occasional expose will arise e.g. through maintenance, sampling and equipment breakages.
Assessment Method	ECETOC TRA workers (v2.0) modified (see 1. Genral remarks)
For further details on OCs and RMMs see Table 54	
1.20.1.2.2 Control of workers exposure for PROC 8a	
Workers related free short title	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities.
Use descriptor covered	PROC 8a
Processes, tasks, activities covered	Sampling, loading, filling, transfer, dumping, bagging in non- dedicated facilities. Exposure related to dust, vapour, aerosols or spillage, and cleaning of equipment to be expected.
Assessment Method	ECETOC TRA Worker v2.0 with modifications (see 1. General Remarks)
For further details on OCs and RMMs see Table 54	
1.20.1.2.3 Control of workers exposure for PROC 8b	

Workers related free short title	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities.
Use descriptor covered	PROC 8b
Processes, tasks, activities covered	Sampling, loading, filling, transfer, dumping, bagging in dedicated facilities. Exposure related to dust, vapour, aerosols or spillage, and cleaning of equipment to be expected.
Assessment Method	ECETOC TRA Worker v2.0 with modifications (see 1. General remarks)
For further details on OCs and RMMs see Table 54	
1.20.1.2.4 Control of workers exposure for PROC 11	
Workers related free short title	Non industrial spraying
Use descriptor covered	PROC 11
Processes, tasks, activities covered	Air dispersive techniques Spraying for surface coating, adhesives, polishes/cleaners, air care products, sandblasting Substances can be inhaled as aerosols. The energy of the aerosol particles may require advanced exposure controls.
Assessment Method	Stoffenmanager v4.0 and RISKOFDERMv2.1
For further details on OCs and RMMs see Table 54	

Additional good practice advice (for environment) beyond the REACH CSA
Use of tightly fitting safety goggles (The substance has shown to cause mucosal irritations at relatively high concentrations. Thus, it is recommended to protect the eyes.)

1.20.2 Exposure Estimation

1.20.2.1 Worker Exposure

For the estimated exposure for workers / PROC 1 see Table 56
For the estimated exposure for workers / PROC 2 see Table 57
For the estimated exposure for workers / PROC 8a see Table 59
For the estimated exposure for workers / PROC 8b see Table 60
For the estimated exposure for workers / PROC 11 see Table 64

1.20.2.2. Consumer Exposure

Not Applicable

1.20.2.3 Indirect Exposure of Humans via the Environment (oral)

The bioaccumulation potential of this substance is very low, with a Kow of 0.044; therefore, indirect exposure of humans via the environment can be considered negligible.

1.20.2.4 Environmental Exposure

Table 128 Environmental Expsoure Scenario ES20-E1

Section 1	**Operational conditions and risk management measures**
Section 1.2	**Control of environmental exposure**
Identifier*	ES20-E1
Contributing scenario	Use In/As De-Icing/Anti-Icing Applications/Agents
Environmental Release Category	ERC8d
Specific ERC	ESVOC 34
Assessment scenario	
Operational Conditions	
Amounts used	
Amounts used in the EU (tonnes/year)	1,000,000 (total industry tonnage for production of MEG)
Fraction of EU tonnage used in region	0.1
Fraction of main source to local environment	0.002
Fraction of substance in end-use products	1
Maximum daily site tonnage (kg/day)	5479
Frequency and duration of use	
Type of release	Continuous
Emission days (days/year)	365 - ESVOC 34
Site specific monitoring data results for surface water effluent	
Location of sample	
Environmental factors not influenced by risk management	
Local freshwater dilution factor	10 (default)
Local marine water dilution factor	100 (default)
Other given operational conditions affecting environmental exposure	
Risk Management Measures	
Technical conditions and measures at process level (source) to prevent release	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Treat air emissions to provide a typical removal efficiency of (%)	
Treat wastewater (prior to discharge to receiving water) to provide the required removal efficiency of (%) ETotal,RMM = 1 – ((1 – ERMM, 1) x (1 – ERMM,2))	87%
Organizational measures to prevent/limit	

release from site	
Conditions and measures related to municipal sewage treatment plant	
Conditions and measures related to external treatment of waste for disposal	
Conditions and measures related to external recovery of waste	
Other environmental control measures additional to above	
Identifier	***ES20-E1***
Narrative	Release fraction derived from SpERC (ESVOC 34)
Release fraction to air from process	9.50E-01
Release fraction to wastewater from process	1.00E-02
Release fraction to soil from process (regional only)	4.00E-02
Local release to air (kg/d)	5.21E+02
Local release to sewage (kg/d)	5.48E+00
Local release to soil (kg/d)	2.19E+01
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	
Total efficiency of removal from air emissions (%)	
The maximum allowable site tonnage (M_{Safe}) based on removal from domestic sewage treatment (kg/d)	9481

1.20.2.4.1 Predicted exposure concentrations in the STP and in the aquatic compartments (freshwater, seawater and sediments)

Table 129: Predicted exposure concentrations in the STP and in the aquatic compartments (freshwater, seawater and sediments)

Local Concentration, Compartment: STP and aquatic	***unit***	***ES20-E1***
Local PEC in surface water during emission episode (dissolved)	mg/L	3.580E-01
Annual average local PEC in surface water (dissolved)	mg/L	3.580E-01
Local PEC in fresh water sediment during emission episode	mg/kg dwt	1.362E+00
Local PEC in sea water during emission episode	mg/L	3.665E-02
Annual average local PEC in sea water (dissolved)	mg/L	3.665E-02
Local PEC in marine sediment during emission episode	mg/kg dwt	1.395E-01
PEC for microorganisms in STP	mg/L	3.467E-01
Comments		

1.20.2.4.2 Predicted exposure concentration in soils

Table 130: Predicted exposure concentration in soils

Local Concentration, Compartment: soil	***unit***	***ES20-E1***
Local PEC in agricultural soil, averaged over 30 days	mg/kg dwt	8.843E-01
Local PEC agricultural soil, averaged over 180 days	mg/kg dwt	8.832E-01
Local PEC in grass land, averaged over 180 days	mg/kg dwt	8.829E-01
Comments		

1.20.2.4.3 Predicted exposure concentration in the atmospheric compartment

Table 131: Predicted exposure concentration in the atmospheric compartment

Local Concentration, Compartment: air	***unit***	***ES20-E1***
Annual average local PEC in air (total)	kg/m^3	5.142E-11
Comments		

1.20.2.4.4 Predicted exposure concentration in food for secondary poisoning

The bioaccumulation potential of this substance is very low, therefore secondary poisoning can be considered negligible. The Kow for MEG is 0.044.

1.21 Use in/as De-icing/Anti-icing applications/agents (Consumer use)

General remarks

In order to assess products included in PC4 two Sub-Scenarios have been assessed.
Sub-Scenario 1: Use in de-icing applications/agents
Sub-Scenario 2: Use in anti-icing agents
These Sub-Scenarios are intended to represent resonable worst case scenarios for PC4.

Sub-Scenario 1:
With view on different De-icing products (door lock de-icer, windhield de-icers, and others), de-icing of windows/windshields was considered to be a worst case scenario.
To calculate this scenario the ConsExpo 4.1 default database Cleaning and washing/Miscellaneous cleaning and washing products/Glass cleaner was used. The scenarios of using a glass cleaner was considered to be similar to the scenario of using a de-icing agent e.g. for windows/windshields.
Sub-Scenario 1 consists of two parts. Part A considers the spraying of the product, whereas Part B considers the cleaning process.

Sub-Scenario 2:
Generally, anti-icing agents are products being in closed systems. Thus, exposure towards the substance is considered to be negligible within that stage of use. Relevant exposure may occur during charging and/or discharging.
Several scenarios (default databases) in ConsExpo 4.1 address a "Mixing and Loading" step. However, usually these scenarios are based on the assumption that relatively small amounts of prooduct (<100g) are charged. Regarding the charging/discharging of anti-icing agents presumably greater amounts of product are handled. Thus, the exposure resulting from charging/discharging of heat transfer and hydraulic fluids is assessed by means of a calculation of PROC 8a for the professional domain which is considered to represent the charging/discharging process performed by consumers in a appropriate way. PROC 8a has been calculated as described under 1.19.
Oral exposure is regarded to be no relevant route of exposure for this ES.

1.21.1 Exposure Scenario

The relevant operational conditions (OCs) used for calculation of environmental exposure are mentioned under paragraph 1.21.2.4.

Table 132 Description of the ES 21

Reference Number	21
1.21.1.1. Title	
Free short title	Use in/as de-icing/anti-icing applications/agents (Consumer use)
Systematic title based on use descriptor	SU21; PC 4; ERC 8d
1.21.1.2. Operational conditions and risk management measures	
1.21.1.2.1 Control of consumer exposure for PC 4	
1.21.1.2.1.1 Sub-Scenario 1/Use in De-icing applications - spraying products	
Name of contributing scenario	Use in De-icing application – spraying products
Use descriptor covered	PC 4
Processes, tasks, activities covered	see above (General Remarks); see corresponding Fact Sheet[1]
Assessment Method	ConsExpo 4.1 Based on the ConsExpo default database for Cleaning

	and Washing/Miscellaneous cleaning and washing products/Glass cleaner	
Part A. Spraying		
Product characteristic		
Physical state	Liquid	
Concentration of substance	100 %	
Vapour pressure of the substance	0.123 hPa	
Airborn fraction	1.0	
Weight fraction non-volatile	1.0	
Density non-volatile	1.8 g/cm³	(Default value)
Amounts used		
Mass generation rate	0.78 g/s	(Default value)
Frequency and duration of use/exposure		
Duration of spraying	0.7 min	(Default value)
Duration of exposure	240 min	(Default value)
Frequency of exposure	365 days/year	(Default value – not relevant for the calculation of the mean concentration on day of exposure)
Human factors not influenced by risk management		
Inhalation cut-off diameter	15 µm	(Default value)
Non-respirable uptake fraction	1	(Default value)
Exposed skin surface	Hands and forearms (1900 cm²)	
Contact rate	46 mg/min	(Default value)
Release duration	42 s	(Default value)
Type of activity (inhalation rate)	Light activity	See footnote 2
Other given operational conditions affecting consumers exposure		
Location	Inside	(Default assumption)
Room volume	58 m³	(Default value)
Room height	2.5 m	(Default value)
Ventilation rate	0.5 per hour	(Default value)
Application temperature	25°C	
Conditions and measures related to information and behavioural advice to consumers		
Spraying away from exposed person		
Conditions and measures related to personal protection and hygiene		
Not applicable		
Part B. Cleaning		
Product characteristic		
Physical state	Liquid	

Concentration of substance	max. 100 %	
Vapour pressure of the substance	0.123 hPa	
Amounts used		
Applied amount	0.29 g/day	(Default value)
Frequency and duration of use/exposure		
Frequency of exposure	365 days/year	(Default value – not relevant for the calculation of the mean concentration on day of exposure)
Human factors not influenced by risk management		
Exposed skin surface	Palm of one hand (215 cm²)	(Default value)
Type of activity (inhalation rate)	Light activity	See footnote 2
Other given operational conditions affecting consumers exposure		
Application temperature	25°C	
Conditions and measures related to information and behavioural advice to consumers		
Not applicable		
Conditions and measures related to personal protection and hygiene		
Not applicable		
1.21.1.2.1.2. Sub-Scenario 2/Use in Anti-freezing agents		
Name of contributing scenario	Use in Anti-freezing agents	
Use descriptor covered	PC4	
Processes, tasks, activities covered	see above (General Remarks);	
Assessment Method	ECETOC TRA (worker) v2.0 with modifications (see 1.19 General remarks)	
Product characteristic		
Physical state	Liquid	
Concentration of substance	max 30 %	
Vapour pressure of the substance	0.123 hPa	
Amounts used		
Not applicable		
Frequency and duration of use/exposure		
Duration of exposure	< 15 min	
Human factors not influenced by risk management		
Exposed skin surface	Both hands (960 cm²)	
Type of activity (inhalation rate)	Light activity	See footnote 2
Other given operational conditions affecting consumers exposure		
Location	Inside	

Application temperature	25°C	
Conditions and measures related to information and behavioural advice to consumers		
Not applicable		
Conditions and measures related to personal protection and hygiene		
Not applicable		

1.21.2 Exposure Estimation

1.21.2.1 Worker Exposure

Not applicable.

1.21.2.2. Consumer Exposure

General Remarks
The Sub-scenarios "Use in De-icing agents-spraying products" consists of two parts (Part A: Spraying and Part B Cleaning). To calculate the exposure resulting in each Sub-Scenario the exposure estimates resulting from Part A and Part B are added.

Table 133: Estimated exposure for consumers / Contributing Scenario for PC4 Sub-Scenario/Use in De-icing agents-spraying products

Calculation tool used: ConsExpo 4.1

Route of exposure	dose / conc	Unit	Justification
Part A. Spraying			
Long-term exposure, systemic/local, inhalative	0.0006	mg/m³	
Long-term exposure, systemic, dermal	0.50	mg/kg bw/d	
Long-term exposure, systemic, oral	0.005	mg/kg bw/d	
Part B. Cleaning			
Long-term exposure, systemic/local, inhalative	NA	mg/m³	
Long-term exposure, systemic, dermal	4.46	mg/kg bw/d	
Long-term exposure, systemic, oral	NA	mg/kg bw/da	
Part A and B. Spraying and Cleaning			
Long-term exposure, systemic/local,	0.0006	mg/m³	

inhalative			
Long-term exposure, systemic, dermal	4.96	mg/kg bw/d	
Long-term exposure, systemic, oral	0.005	mg/kg bw/d	

NA = Not applicable

Table 134: Estimated exposure for consumers / Contributing Scenario for PC4 Sub-Scenario/Use in Anti-freezing agents

Calculation tool used: ECETOC TRA (worker) v2.0 (see 1. General remarks)

Route of exposure	dose / conc	Unit	Justification
Long-term exposure, systemic/local, inhalative	1.93	mg/m³	
Long-term exposure, systemic, dermal	4.11	mg/kg bw/d	
Long-term exposure, systemic, oral	NA	mg/kg bw/d	See 1.21 General remarks

1.21.2.3 Indirect Exposure of Humans via the Environment (oral)

The bioaccumulation potential of this substance is very low, with a Kow of 0.044; therefore, indirect exposure of humans via the environment can be considered negligible.

1.21.2.4 Environmental Exposure

The environmental exposure scenario is covered under the environmental assessment for Exposure Scenario 20 (Use in/as de-icing/anti-icing applications/agents (professional)) in Section 1.20.2.4.

1.22 Use in laboratories (industrial and professional)

1.22.1 Exposure Scenario 22

The relevant operational conditions (OCs) used for calculation of environmental exposure are mentioned under paragraph 1.22.2.4.

Table 135: Description of ES 22

Reference Number	22
1.22.1.1 Title	
Free short title	Use in laboratories (industrial and professional)
Systematic title based on use descriptor	SU3 and 22; PROC 15; ERC 8a
1.22.1.2 Operational conditions and Risk management measures	
1.22.1.2.1Control of workers exposure for PROC 15	
Workers related free short title	Use as laboratory reagent
Use descriptor covered	PROC 15
Processes, tasks, activities covered	Use of substances at small scale laboratory (< 1 L or 1 kg present at workplace). Larger laboratories and R+D installations should be treated as industrial processes.
Assessment Method	ECETOC TRA Worker v2.0 with modifications[1]
For further details on OCs and RMMs see Table 2 **The OCs and RMMs described apply for both industrial and professional use**	

Additional good practice advice (for environment) beyond the REACH CSA
Use of tightly fitting safety goggles (The substance has shown to cause mucosal irritations at relatively high concentrations. Thus, it is recommended to protect the eyes.)

1.22.2 Exposure Estimation

1.22.2.1 Worker Exposure

Table 136: Estimated exposure for workers – PROC 15 (industrial and professional)
Caluclation tool used: ECETOC TRA v2.0 modified (see 1. General remarks)

Route of exposure	**Concentrations**		**Justification**
	Value	Unit	
Long-term exposure, systemic/local, inhalative	12.94	mg/m³	NA
Long-term exposure, systemic, dermal	0.34	mg/kg bw/d	NA

NA = Not applicable

1.22.2.2. Consumer Exposure

Not Applicable

1.22.2.3 Indirect Exposure of Humans via the Environment (oral)

The bioaccumulation potential of this substance is very low, with a Kow of 0.044; therefore, indirect exposure of humans via the environment can be considered negligible.

1.22.2.4 Environmental Exposure

Table 137: Environmental Exposure Scenario ES22-E1

Section 1	**Operational conditions and risk management measures**
Section 1.2	**Control of environmental exposure**
Identifier*	ES22-E1
Contributing scenario	Use In Laboratories
Environmental Release Category	ERC8a
Specific ERC	ESVOC 39
Assessment scenario	
Operational Conditions	
Amounts used	
Amounts used in the EU (tonnes/year)	1,000,000 (total industry tonnage for production of MEG)
Fraction of EU tonnage used in region	0.1
Fraction of main source to local environment	0.0005
Fraction of substance in end-use products	1
Maximum daily site tonnage (kg/day)	5479
Frequency and duration of use	
Type of release	Continuous
Emission days (days/year)	365 - ESVOC 39
Site specific monitoring data results for surface water effluent	
Location of sample	
Environmental factors not influenced by risk management	
Local freshwater dilution factor	10 (default)
Local marine water dilution factor	100 (default)
Other given operational conditions affecting environmental exposure	
Risk Management Measures	
Technical conditions and measures at process level (source) to prevent release	
Technical onsite conditions and measures to reduce or limit discharges, air emissions	

and releases to soil	
Treat air emissions to provide a typical removal efficiency of (%)	
Treat wastewater (prior to discharge to receiving water) to provide the required removal efficiency of (%) ETotal,RMM = 1 – ((1 – ERMM, 1) x (1 – ERMM,2))	87%
Organizational measures to prevent/limit release from site	
Conditions and measures related to municipal sewage treatment plant	
Conditions and measures related to external treatment of waste for disposal	
Conditions and measures related to external recovery of waste	
Other environmental control measures additional to above	
Identifier	***ES22-E1***
Narrative	Release fraction derived from SpERC (ESVOC 39)
Release fraction to air from process	5.00E-01
Release fraction to wastewater from process	5.00E-01
Release fraction to soil from process (regional only)	0.00E+00
Local release to air (kg/d)	6.85E+01
Local release to sewage (kg/d)	6.85E+01
Local release to soil (kg/d)	0.00E+00
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	
Total efficiency of removal from air emissions (%)	
The maximum allowable site tonnage (M_{Safe}) based on removal from domestic sewage treatment (kg/d)	17371

1.22.2.4.1 Predicted exposure concentrations in the STP and in the aquatic compartments (freshwater, seawater and sediments)

Table 138: Predicted exposure concentrations in the STP and in the aquatic compartments (freshwater, seawater and sediments)

Local Concentration, Compartment: STP and aquatic	***unit***	***ES22-E1***
Local PEC in surface water during emission episode (dissolved)	mg/L	7.650E-01
Annual average local PEC in surface water (dissolved)	mg/L	7.650E-01
Local PEC in fresh water sediment during emission episode	mg/kg dwt	2.911E+00
Local PEC in sea water during emission episode	mg/L	7.623E-02

Annual average local PEC in sea water (dissolved)	mg/L	7.623E-02
Local PEC in marine sediment during emission episode	mg/kg dwt	2.901E-01
PEC for microorganisms in STP	mg/L	4.334E+00
Comments		

1.22.2.4.2 Predicted exposure concentration in soils

Table 139: Predicted exposure concentration in soils

Local Concentration, Compartment: soil	***unit***	***ES22-E1***
Local PEC in agricultural soil, averaged over 30 days	mg/kg dwt	4.826E-01
Local PEC agricultural soil, averaged over 180 days	mg/kg dwt	4.694E-01
Local PEC in grass land, averaged over 180 days	mg/kg dwt	4.661E-01
Comments		

1.22.2.4.3 Predicted exposure concentration in the atmospheric compartment

Table 140: Predicted exposure concentration in the atmospheric compartment

Local Concentration, Compartment: air	***unit***	***ES22-E1***
Annual average local PEC in air (total)	kg/m^3	2.707E-11
Comments		

1.22.2.4.4 Predicted exposure concentration in food for secondary poisoning

The bioaccumulation potential of this substance is very low, therefore secondary poisoning can be considered negligible. The Kow for MEG is 0.044.

1.23 Use in Water-treatment chemicals (industrial)

1.23.1 Exposure Scenario 23

The relevant operational conditions (OCs) used for calculation of environmental exposure are mentioned under paragraph 9.23.2.4.

Table 141: Description of ES 23

Reference Number	23
1.23.1.1 Title	
Free short title	Use in water-treatment chemicals (industrial)
Systematic title based on use descriptor	SU3; PROC 1, 2, 3, 4, 8a, 8b, and 13; ERC 3
1.23.1.2. Operational conditions and risk management measures	
1.23.1.2.1 Control of workers exposure for PROC 1	
Workers related free short title	Use in closed process, no likelihood of exposure
Use descriptor covered	PROC 1
Processes, tasks, activities covered	Use of the substance in high integrity contained system where little potential exists for exposures, e.g. any sampling via closed loop systems
Assessment Method	ECETOC TRA Worker v2.0 with modifications (see 1. General remarks)
For further details on OCs and RMMs see Table 14	
1.23.1.2.2 Control of workers exposure for PROC 2	
Workers related free short title	Use in closed, continuous process with occasional controlled exposure
Use descriptor covered	PROC 2
Processes, tasks, activities covered	Continuous process but where the design philosophy is not specifically aimed at minimizing emissions. Occasional exposure will arise e.g. through maintenance, sampling and equipment breakages
Assessment Method	ECETOC TRA Worker v2.0 with modifications (see 1. General remarks)
For further details on OCs and RMMs see Table 14	
1.23.1.2.3 Control of workers exposure for PROC 3 and 4	
Workers related free short title	Use in closed batch process (synthesis or formulation). Use in batch and other process (synthesis) where opportunity for exposure arises.
Use descriptor covered	PROC 3 and 4
Processes, tasks, activities covered	Batch manufacture of a chemical or formulation where the predominant handling is in a contained manner, e.g. through enclosed transfers, but where some opportunity for contact with chemicals occurs, e.g. through sampling Use in batch manufacture of a chemical where

	significant opportunity for exposure arises, e.g. during charging, sampling or discharge of material, and when the nature of the design is likely to result in exposure.
Assessment Method	ECETOC TRA Worker v2.0 with modifications (see 1. General remarks)
For further details on OCs and RMMs see Table 2	
1.23.1.2.4 Control of workers exposure for PROC 8a	
Workers related free short title	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities.
Use descriptor covered	PROC 8a
Processes, tasks, activities covered	Sampling, loading, filling, transfer, dumping, bagging in non- dedicated facilities. Exposure related to dust, vapour, aerosols or spillage, and cleaning of equipment to be expected.
Assessment Method	ECETOC TRA Worker v2.0 with modifications (see 1. General remarks)
For further details on OCs and RMMs see Table 2	
1.23.1.2.5 Control of workers exposure for PROC 8b	
Workers related free short title	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities.
Use descriptor covered	PROC 8b
Processes, tasks, activities covered	Sampling, loading, filling, transfer, dumping, bagging in dedicated facilities. Exposure related to dust, vapour, aerosols or spillage, and cleaning of equipment to be expected.
Assessment Method	ECETOC TRA Worker v2.0 with modifications (see 1. General remarks)
For further details on OCs and RMMs see Table 2	
1.23.1.2.6 Control of workers exposure for PROC 13	
Workers related free short title	Treatment of articles by dipping and pouring.
Use descriptor covered	PROC 13
Processes, tasks, activities covered	Immersion operations. Treatment of articles by dipping, pouring, immersing, soaking, washing out or washing in substances; including cold formation or resin type matrix. Includes handling of treated objects (e.g. after dying, plating). Substance is applied to a surface by low energy techniques such as dipping the article into a bath or pouring a preparation onto a surface.
Assessment Method	ECETOC TRA Worker v2.0 with modifications (see 1. General remarks)
For further details on OCs and RMMs see Table 23	

Additional good practice advice (for environment) beyond the REACH CSA
Use of tightly fitting safety goggles (The substance has shown to cause mucosal irritations at relatively high concentrations. Thus, it is recommended to protect the eyes.)

1.23.2 Exposure Estimation

1.23.2.1 Worker Exposure

For the estimated exposure for workers / PROC 1 see Table 15
For the estimated exposure for workers / PROC 2 see Table 16
For the estimated exposure for workers / PROC 3 see Table 5
For the estimated exposure for workers / PROC 4 see Table 6
For the estimated exposure for workers / PROC 8a see Table 7
For the estimated exposure for workers / PROC 8b see Table 8
For the estimated exposure for workers / PROC 13 see Table 24

1.23.2.2. Consumer Exposure

Not Applicable

1.23.2.3 Indirect Exposure of Humans via the Environment (oral)

The bioaccumulation potential of this substance is very low, with a Kow of 0.044; therefore, indirect exposure of humans via the environment can be considered negligible.

1.23.2.4 Environmental Exposure

Table 142: Environmental Exposure Scenario ES23-E1

Section 1	**Operational conditions and risk management measures**
Section 1.2	**Control of environmental exposure**
Identifier*	ES23-E1
Contributing scenario	Use In Water-Treatment Chemicals
Environmental Release Category	ERC3
Specific ERC	ESVOC 46
Assessment scenario	
Operational Conditions	
Amounts used	
Amounts used in the EU (tonnes/year)	1,000,000 (total industry tonnage for production of MEG)
Fraction of EU tonnage used in region	1
Fraction of main source to local environment	0.00003
Fraction of substance in end-use products	1
Maximum daily site tonnage (kg/day)	100
Frequency and duration of use	
Type of release	Continuous

Emission days (days/year)	300 - ESVOC 46
Site specific monitoring data results for surface water effluent	
Location of sample	
Environmental factors not influenced by risk management	
Local freshwater dilution factor	10 (default)
Local marine water dilution factor	100 (default)
Other given operational conditions affecting environmental exposure	
Risk Management Measures	
Technical conditions and measures at process level (source) to prevent release	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Treat air emissions to provide a typical removal efficiency of (%)	
Treat wastewater (prior to discharge to receiving water) to provide the required removal efficiency of (%) ETotal,RMM = 1 – ((1 – ERMM, 1) x (1 – ERMM,2))	87%
Organizational measures to prevent/limit release from site	
Conditions and measures related to municipal sewage treatment plant	
Conditions and measures related to external treatment of waste for disposal	
Conditions and measures related to external recovery of waste	
Other environmental control measures additional to above	
Identifier	***ES23-E1***
Narrative	Release fraction derived from SpERC (ESVOC 46)
Release fraction to air from process	5.00E-02
Release fraction to wastewater from process	9.50E-01
Release fraction to soil from process (regional only)	0.00E+00
Local release to air (kg/d)	5.00E+00
Local release to sewage (kg/d)	9.50E+01
Local release to soil (kg/d)	0.00E+00
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	
Total efficiency of removal from air emissions (%)	

The maximum allowable site tonnage (M_{Safe}) based on removal from domestic sewage treatment (kg/d)	141
Scaling	

The downstream user can check the compliance of his site by comparing site specific data with defaults used in the exposure assessment. The site specific quotient should be inferior or equal to the spERC quotient.

$$\frac{m_{spERC} * (1 - E_{ER,spERC}) * F_{releasespERC}}{DF_{spERC}} \geq \frac{m_{site} * (1 - E_{ER,site}) * F_{releasesite}}{DF_{site}}$$

m_{spERC}: Substance use rate in spERC
$E_{ER,spERC}$: Efficacy of RMM in spERC
$F_{release,,spERC}$: Initial release fraction in spERC
DF_{spERC}: dilution factor of STP effluent in river

m_{site}: Substance use rate at site
$E_{ER,site}$: Efficacy of RMM at site
$F_{release,,site}$: Initial release fraction at site
DF_{site}: dilution factor of STP effluent in river

1.23.2.4.1 Predicted exposure concentrations in the STP and in the aquatic compartments (freshwater, seawater and sediments)

Table 143: Predicted exposure concentrations in the STP and in the aquatic compartments (freshwater, seawater and sediments)

Local Concentration, Compartment: STP and aquatic	***unit***	***ES23-E1***
Local PEC in surface water during emission episode (dissolved)	mg/L	3.891E+00
Annual average local PEC in surface water (dissolved)	mg/L	3.784E+00
Local PEC in fresh water sediment during emission episode	mg/kg dwt	1.481E+01
Local PEC in sea water during emission episode	mg/L	3.757E-01
Annual average local PEC in sea water (dissolved)	mg/L	3.650E-01
Local PEC in marine sediment during emission episode	mg/kg dwt	1.430E+00
PEC for microorganisms in STP	mg/L	6.012E+00
Comments		

1.23.2.4.2 Predicted exposure concentration in soils

Table 144: Predicted exposure concentration in soils

Local Concentration, Compartment: soil	***unit***	***ES23-E1***
Local PEC in agricultural soil, averaged over 30 days	mg/kg dwt	4.899E-01
Local PEC agricultural soil, averaged over 180 days	mg/kg dwt	4.716E-01
Local PEC in grass land, averaged over 180 days	mg/kg dwt	4.672E-01
Comments		

1.23.2.4.3 Predicted exposure concentration in the atmospheric compartment

Table 145: Predicted exposure concentration in the atmospheric compartment

Local Concentration, Compartment: air	***unit***	***ES23-E1***
Annual average local PEC in air (total)	kg/m^3	1.170E-09
Comments		

1.23.2.4.4 Predicted exposure concentration in food for secondary poisoning

The bioaccumulation potential of this substance is very low, therefore secondary poisoning can be considered negligible. The Kow for MEG is 0.044.

1.24 Use in Adhesives and Sealants (Consumer use)

1.24.1 Exposure Scenario

The relevant operational conditions (OCs) used for calculation of environmental exposure are mentioned under paragraph 1.24.2.4.

Table 146 Description of the ES 24

Reference Number	24	
1.24.1.1. Title		
Free short title	Use in Adhesives and Sealants (Consumer use)	
Systematic title based on use descriptor	SU21; PC 1; ERC 8c	
1.24.1.2. Operational conditions and risk management measures		
1.24.1.2.1 Control of consumer exposure for PC 1		
Name of contributing scenario	Use in Adhesives and Sealants	
Use descriptor covered	PC 1	
Processes, tasks, activities covered	see above (General Remarks); see corresponding Fact Sheet[1]	
Assessment Method	ConsExpo 4.1 Based on the ConsExpo default database for Do it yourself products/Glues/Carpet glue	
Part A. Mixing and Loading		
Product characteristic		
Physical state	Liquid	
Concentration of substance	max 0.075%	
Vapour pressure of the substance	0.123 hPa	
Mol weight matrix of the product	3000 g/mol	(Default value)
Mass transfer rate	4740 m/min	Langmuirs method
Amounts used		
Applied amount	9000 g/day	(Default value – refers to half of the bottle content) See footnote 2
Frequency and duration of use/exposure		
Duration of exposure	75 min	(Default value)
Duration of application	75 min	(Default value)
Frequency of exposure	0.25 days/year	(Default value – not relevant for the calculation of the mean concentration on day of exposure)
Human factors not influenced by risk management		
Exposed skin surface	50% of one hand palm (110 cm^2)	(Default value)

Type of activity (inhalation rate)	Light activity	See footnote 2
Other given operational conditions affecting consumers exposure		
Location	Inside	
Room volume	58 m³	(Default value)
Ventilation rate	0.5 per hour	(Default value)
Release area	4 m²	(Default value)
Contact rate	30 mg/min	(Default value)
Release duration	4500 s	(Default value)
Application temperature	25°C	
Conditions and measures related to information and behavioural advice to consumers		
Not applicable		
Conditions and measures related to personal protection and hygiene		
Not applicable		

1.24.2 Exposure Estimation

1.24.2.1 Worker Exposure

Not applicable.

1.24.2.2. Consumer Exposure

Table 147: Estimated exposure for consumers / Contributing Scenario for PC 1
Calculation tool used: ConsExpo 4.1

Route of exposure	dose / conc	Unit	Justification
Long-term exposure, systemic/local, inhalative	4.1	mg/m³	
Long-term exposure, systemic, dermal	0.26	mg/kg bw/d	
Long-term exposure, systemic, oral	NA	mg/kg bw/d	

1.24.2.3 Indirect Exposure of Humans via the Environment (oral)

The bioaccumulation potential of this substance is very low, with a Kow of 0.044; therefore, indirect exposure of humans via the environment can be considered negligible.

1.24.2.4 Environmental Exposure

The environmental exposure scenario is evaluated below. Exposure has been estimated using the version of the ECETOC TRA Integrated Tool current at the time of preparation of this document.

Table 148: Environmental Exposure Scenario ES24-E1

Section 1	**Operational conditions and risk management measures**
Section 1.2	**Control of environmental exposure**
Identifier*	ES24-E1
Contributing scenario	Use In Adhesives
Environmental Release Category	ERC8c
Specific ERC	
Assessment scenario	
Operational Conditions	
Amounts used	
Amounts used in the EU (tonnes/year)	1,000,000 (total industry tonnage for production of MEG)
Fraction of EU tonnage used in region	0.1
Fraction of main source to local environment	0.002
Fraction of substance in end-use products	1
Maximum daily site tonnage (kg/day)	5479
Frequency and duration of use	
Type of release	Continuous
Emission days (days/year)	365 - ERC8c
Site specific monitoring data results for surface water effluent	
Location of sample	
Environmental factors not influenced by risk management	
Local freshwater dilution factor	10 (default)
Local marine water dilution factor	100 (default)
Other given operational conditions affecting environmental exposure	
Risk Management Measures	
Technical conditions and measures at process level (source) to prevent release	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Treat air emissions to provide a typical removal efficiency of (%)	
Treat wastewater (prior to discharge to receiving water) to provide the required removal efficiency of (%) ETotal,RMM = 1 – ((1 – ERMM, 1) x (1 – ERMM,2))	87%

Organizational measures to prevent/limit release from site	
Conditions and measures related to municipal sewage treatment plant	
Conditions and measures related to external treatment of waste for disposal	
Conditions and measures related to external recovery of waste	
Other environmental control measures additional to above	
Identifier	***ES24-E1***
Narrative	Release fraction derived from ERC (8c)
Release fraction to air from process	1.50E-01
Release fraction to wastewater from process	1.00E-02
Release fraction to soil from process (regional only)	0.00E+00
Local release to air (kg/d)	8.22E+01
Local release to sewage (kg/d)	5.48E+00
Local release to soil (kg/d)	0.00E+00
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	
Total efficiency of removal from air emissions (%)	
The maximum allowable site tonnage (M_{Safe}) based on removal from domestic sewage treatment (kg/d)	59531

1.24.2.4.1 Predicted exposure concentrations in the STP and in the aquatic compartments (freshwater, seawater and sediments)

Table 149: Predicted exposure concentrations in the STP and in the aquatic compartments (freshwater, seawater and sediments)

Local Concentration, Compartment: STP and aquatic	***unit***	***ES24-E1***
Local PEC in surface water during emission episode (dissolved)	mg/L	8.702E-02
Annual average local PEC in surface water (dissolved)	mg/L	8.702E-02
Local PEC in fresh water sediment during emission episode	mg/kg dwt	3.312E-01
Local PEC in sea water during emission episode	mg/L	8.833E-03
Annual average local PEC in sea water (dissolved)	mg/L	8.833E-03
Local PEC in marine sediment during emission episode	mg/kg dwt	3.361E-02
PEC for microorganisms in STP	mg/L	3.467E-01
Comments		

1.24.2.4.2 Predicted exposure concentration in soils

Table 150: Predicted exposure concentration in soils

Local Concentration, Compartment: soil	***unit***	***ES24-E1***
Local PEC in agricultural soil, averaged over 30 days	mg/kg dwt	1.408E-01
Local PEC agricultural soil, averaged over 180 days	mg/kg dwt	1.398E-01
Local PEC in grass land, averaged over 180 days	mg/kg dwt	1.395E-01
Comments		

1.24.2.4.3 Predicted exposure concentration in the atmospheric compartment

Table 151: Predicted exposure concentration in the atmospheric compartment

Local Concentration, Compartment: air	***unit***	***ES24-E1***
Annual average local PEC in air (total)	kg/m^3	8.120E-12
Comments		

1.24.2.4.4 Predicted exposure concentration in food for secondary poisoning

The bioaccumulation potential of this substance is very low, therefore secondary poisoning can be considered negligible. The Kow for MEG is 0.044.

1.25 Production of Polymers, filled polymers, Foams, Coatings, Adhesives, Sealants

1.25.1 Exposure Scenario 25

The relevant operational conditions (OCs) used for calculation of environmental exposure are mentioned under paragraph 1.25.2.4.

Table 152: Description of ES 25

Reference Number	25
1.25.1.1 Title	
Free short title	Production of Polymers, filled polymers, foams, coatings, adhesives, sealants
Systematic title based on use descriptor	SU3; PROC 1, 2, 3, 4, 5, 7, 8a, 8b, 9, 10, 13, 14, and 15; ERC 6c
1.25.1.2 Operational conditions and Risk management measures	
1.25.1.2.1 Control of workers exposure for PROC 1	
Workers related free short title	Use in closed process, no likelihood of exposure
Use descriptor covered	PROC 1
Processes, tasks, activities covered	Use of the substance in high integrity contained system where little potential exists for exposures, e.g. any sampling via closed loop systems
Assessment Method	ECETOC TRA Worker v2.0 with modifications (see 1. General remarks)
For further details on OCs and RMMs see Table 14	
1.25.1.2.2 Control of workers exposure for PROC 2	
Workers related free short title	Use in closed, continuous process with occasional controlled exposure
Use descriptor covered	PROC 2
Processes, tasks, activities covered	Continuous process but where the design philosophy is not specifically aimed at minimizing emissions. Occasional exposure will arise e.g. through maintenance, sampling and equipment breakages
Assessment Method	ECETOC TRA Worker v2.0 with modifications (see 1. General remarks)
For further details on OCs and RMMs see Table 14	
1.25.1.2.3 Control of workers exposure for PROC 3 and 4	
Workers related free short title	Use in closed batch process (synthesis or formulation). Use in batch and other process (synthesis) where opportunity for exposure arises.
Use descriptor covered	PROC 3 and 4
Processes, tasks, activities covered	Batch manufacture of a chemical or formulation where the predominant handling is in a contained manner, e.g. through enclosed transfers, but where some opportunity

	for contact with chemicals occurs, e.g. through sampling Use in batch manufacture of a chemical where significant opportunity for exposure arises, e.g. during charging, sampling or discharge of material, and when the nature of the design is likely to result in exposure.
Assessment Method	ECETOC TRA Worker v2.0 with modifications (see 1. General remarks)
For further details on OCs and RMMs see Table 2	
1.25.1.2.4 Control of workers exposure for PROC 5	
Workers related free short title	Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact).
Use descriptor covered	PROC 5
Processes, tasks, activities covered	Manufacture or formulation of chemical products or articles using technologies related to mixing and blending of solid or liquid materials, and where the process is in stages and provides the opportunity for significant contact at any stage
Assessment Method	ECETOC TRA Worker v2.0 with modifications (see 1. General remarks)
For further details on OCs and RMMs see Table 14	
1.25.1.2.5 Control of workers exposure for PROC 7	
Workers related free short title	Industrial spraying
Use descriptor covered	PROC 7
Processes, tasks, activities covered	Air dispersive techniques Spraying for surface coating, adhesives, polishes/cleaners, air care products, sandblasting Substances can be inhaled as aerosols. The energy of the aerosol particles may require advanced exposure controls; in case of coating, overspray may lead to waste water and waste.
Assessment Method	Stoffenmanager v4.0
For futher details on OCs and RMMs see Table 46	
1.25.1.2.6 Control of workers exposure for PROC 8a	
Workers related free short title	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities.
Use descriptor covered	PROC 8a
Processes, tasks, activities covered	Sampling, loading, filling, transfer, dumping, bagging in non- dedicated facilities. Exposure related to dust, vapour, aerosols or spillage, and cleaning of equipment to be expected.
Assessment Method	ECETOC TRA Worker v2.0 with modifications

	(see 1. General remarks)
For further details on OCs and RMMs see Table 2	
1.25.1.2.7 Control of workers exposure for PROC 8b and 9	
Workers related free short title	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities.
Use descriptor covered	PROC 8b and 9
Processes, tasks, activities covered	Sampling, loading, filling, transfer, dumping, bagging in dedicated facilities. Exposure related to dust, vapour, aerosols or spillage, and cleaning of equipment to be expected.
Assessment Method	ECETOC TRA Worker v2.0 with modifications (see 1. General remarks)
For further details on OCs and RMMs see Table 2	
1.25.1.2.8 Control of workers exposure for PROC 10	
Workers related free short title	Roller application or brushing
Use descriptor covered	PROC 10
Processes, tasks, activities covered	Low energy spreading of e.g. coatings Including cleaning of surfaces. Substance can be inhaled as vapours, skin contact can occur through droplets, splashes, working with wipes and handling of treated surfaces.
Assessment Method	ECETOC TRA Worker v2.0 with modifications (see 1. General remarks)
For futher details on OCs and RMMs see Table 46	
1.25.1.2.9 Control of workers exposure for PROC 13	
Workers related free short title	Treatment of articles by dipping and pouring.
Use descriptor covered	PROC 13
Processes, tasks, activities covered	Immersion operations. Treatment of articles by dipping, pouring, immersing, soaking, washing out or washing in substances; including cold formation or resin type matrix. Includes handling of treated objects (e.g. after dying, plating). Substance is applied to a surface by low energy techniques such as dipping the article into a bath or pouring a preparation onto a surface.
Assessment Method	ECETOC TRA Worker v2.0 with modifications (see 1. General remarks)
For further details on OCs and RMMs see Table 23	
1.25.1.2.10 Control of workers exposure for PROC 14	
Workers related free short title	Production of preparations or articles by tabletting, compression, extrusion, pelletisation.
Use descriptor covered	PROC 14

Processes, tasks, activities covered	Processing of preparations and/or substances (liquid and solid) into preparations or articles. Substances in the chemical matrix may be exposed to elevated mechanical and/or thermal energy conditions. Exposure is predominantly related to volatiles and/or generated fumes, dust may be formed as well.
Assessment Method	ECETOC TRA Worker v2.0 with modifications (see 1. General remarks)
For further details on OCs and RMMs see Table 23	

1.25.1.2.11 Control of workers exposure for PROC 15	
Workers related free short title	Use as laboratory reagent
Use descriptor covered	PROC 15
Processes, tasks, activities covered	Use of substances at small scale laboratory (< 1 l or 1 kg present at workplace). Larger laboratories and R+D installations should be treated as industrial processes.
Assessment Method	ECETOC TRA Worker v2.0 with modifications (see 1. General remarks)
For further details on OCs and RMMs see Table 2	

Additional good practice advice (for environment) beyond the REACH CSA
Use of tightly fitting safety goggles (The substance has shown to cause mucosal irritations at relatively high concentrations. Thus, it is recommended to protect the eyes.)

1.25.2 Exposure Estimation

1.25.2.1 Worker Exposure

For the estimated exposure for workers / PROC 1 see Table 15
For the estimated exposure for workers / PROC 2 see Table 16
For the estimated exposure for workers / PROC 3 see Table 5
For the estimated exposure for workers / PROC 4 see Table 6
For the estimated exposure for workers / PROC 5 see Table 17
For the estimated exposure for workers / PROC 7 see Table 47
For the estimated exposure for workers / PROC 8a see Table 7
For the estimated exposure for workers / PROC 8b see Table 8
For the estimated exposure for workers / PROC 9 see Table 18
For the estimated exposure for workers / PROC 10 see Table 48
For the estimated exposure for workers / PROC 13 see Table 24
For the estimated exposure for workers / PROC 14 see Table 25
For the estimated exposure for workers / PROC 15 see Table 9

1.25.2.2. Consumer Exposure

Not Applicable

1.25.2.3 Indirect Exposure of Humans via the Environment (oral)

The bioaccumulation potential of this substance is very low, with a Kow of 0.044; therefore, indirect exposure of humans via the environment can be considered negligible.

1.25.2.4 Environmental Exposure

Table 153: Environmental Exposure Scenario ES25-E1

Section 1	**Operational conditions and risk management measures**
Section 1.2	**Control of environmental exposure**
Identifier*	ES25-E1
Contributing scenario	Production Of Polymers, filled polymers, foams, coatings, adhesives, sealants
Environmental Release Category	ERC6c
Specific ERC	ESVOC 43
Assessment scenario	
Operational Conditions	
Amounts used	
Amounts used in the EU (tonnes/year)	1,000,000 (total industry tonnage for production of MEG)
Fraction of EU tonnage used in region	1
Fraction of main source to local environment	0.015
Fraction of substance in end-use products	1
Maximum daily site tonnage (kg/day)	50000
Frequency and duration of use	
Type of release	Continuous
Emission days (days/year)	300 - ESVOC 43
Site specific monitoring data results for surface water effluent	
Location of sample	
Environmental factors not influenced by risk management	
Local freshwater dilution factor	10 (default)
Local marine water dilution factor	100 (default)
Other given operational conditions affecting environmental exposure	
Risk Management Measures	
Technical conditions and measures at process level (source) to prevent release	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	

Treat air emissions to provide a typical removal efficiency of (%)	
Treat wastewater (prior to discharge to receiving water) to provide the required removal efficiency of (%) ETotal,RMM = 1 – ((1 – ERMM, 1) x (1 – ERMM,2))	87%
Organizational measures to prevent/limit release from site	
Conditions and measures related to municipal sewage treatment plant	
Conditions and measures related to external treatment of waste for disposal	
Conditions and measures related to external recovery of waste	
Other environmental control measures additional to above	
Identifier	***ES25-E1***
Narrative	Release fraction derived from SpERC (ESVOC 43)
Release fraction to air from process	2.00E-03
Release fraction to wastewater from process	1.00E-02
Release fraction to soil from process (regional only)	1.00E-04
Local release to air (kg/d)	1.00E+02
Local release to sewage (kg/d)	5.00E+02
Local release to soil (kg/d)	5.00E+00
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	
Total efficiency of removal from air emissions (%)	
The maximum allowable site tonnage (M_{Safe}) based on removal from domestic sewage treatment (kg/d)	85713
Scaling	

The downstream user can check the compliance of his site by comparing site specific data with defaults used in the exposure assessment. The site specific quotient should be inferior or equal to the spERC quotient.

$$\frac{m_{spERC} * (1 - E_{ER,spERC}) * F_{release,spERC}}{DF_{spERC}} \geq \frac{m_{site} * (1 - E_{ER,site}) * F_{release,site}}{DF_{site}}$$

m_{spERC}: Substance use rate in spERC
$E_{ER,spERC}$: Efficacy of RMM in spERC
$F_{release,,spERC}$: Initial release fraction in spERC
DF_{spERC}: dilution factor of STP effluent in river

m_{site}: Substance use rate at site
$E_{ER,site}$: Efficacy of RMM at site
$F_{release,,site}$: Initial release fraction at site
DF_{site}: dilution factor of STP effluent in river

1.25.2.4.1 Predicted exposure concentrations in the STP and in the aquatic compartments (freshwater, seawater and sediments)

Table 154: Predicted exposure concentrations in the STP and in the aquatic compartments (freshwater, seawater and sediments)

Local Concentration, Compartment: STP and aquatic	***unit***	***ES25-E1***
Local PEC in surface water during emission episode (dissolved)	mg/L	3.204E+00
Annual average local PEC in surface water (dissolved)	mg/L	2.640E+00
Local PEC in fresh water sediment during emission episode	mg/kg dwt	1.219E+01
Local PEC in sea water during emission episode	mg/L	3.202E-01
Annual average local PEC in sea water (dissolved)	mg/L	2.639E-01
Local PEC in marine sediment during emission episode	mg/kg dwt	1.219E+00
PEC for microorganisms in STP	mg/L	3.164E+01
Comments		

1.25.2.4.2 Predicted exposure concentration in soils

Table 155: Predicted exposure concentration in soils

Local Concentration, Compartment: soil	***unit***	***ES25-E1***
Local PEC in agricultural soil, averaged over 30 days	mg/kg dwt	1.541E-01
Local PEC agricultural soil, averaged over 180 days	mg/kg dwt	5.804E-02
Local PEC in grass land, averaged over 180 days	mg/kg dwt	3.628E-02
Comments		

1.25.2.4.3 Predicted exposure concentration in the atmospheric compartment

Table 156: Predicted exposure concentration in the atmospheric compartment

Local Concentration, Compartment: air	***unit***	***ES25-E1***
Annual average local PEC in air (total)	kg/m^3	2.285E-08
Comments		

1.25.2.4.4 Predicted exposure concentration in food for secondary poisoning

The bioaccumulation potential of this substance is very low, therefore secondary poisoning can be considered negligible. The Kow for MEG is 0.044.

1.26 Production of rigid foam (Consumer use)

1.26.1 Exposure Scenario 26

The relevant operational conditions (OCs) used for calculation of environmental exposure are mentioned under paragraph 1.26.2.4.

Table 157 Description of the ES 26

Reference Number	26	
1.26.1.1. Title		
Free short title	Production of rigid foam (Consumer use)	
Systematic title based on use descriptor	SU21; PC 32; ERC 8f	
1.26.1.2. Operational conditions and risk management measures		
1.26.1.2.1 Control of consumer exposure for PC32		
Name of contributing scenario	Production of rigid foam (Consumer use)	
Use descriptor covered	PC32	
Processes, tasks, activities covered	see above (General Remarks);	
Assessment Method	ConsExpo 4.1 Based on the ConsExpo default database for Do it yourself products/Miscelleaneous do it yourself products/insulation foam/Application	
Product characteristic		
Physical state	Liquid	
Concentration of substance	Max. 5 %	
Vapour pressure of the substance	0.123 hPa	
Amounts used		
Applied amount	825 g	Default value See footnote 1
Frequency and duration of use/exposure		
Duration of exposure	30 min	Default value
Exposure frequency	0.2 1/year	(Default value – not relevant for the calculation of the mean concentration on day of exposure)
Human factors not influenced by risk management		
Type of activity (inhalation rate)	Light activity	See footnote 3
Eposed skin surface	1900 cm²	Default value
Other given operational conditions affecting consumers exposure		
Location	Inside	
Application temperature	25°C	
Inhalation rate	1.5 1/hr	Default value
Room volume	57.5 m³	Default value
Conditions and measures related to information and behavioural advice to consumers		

Not applicable
Conditions and measures related to personal protection and hygiene
Not applicable

1.26.2 Exposure Estimation

1.26.2.1 Worker Exposure

Not applicable.

1.26.2.2. Consumer Exposure

Table 158: Estimated exposure for consumers / Contributing Scenario for PC32
Calculation tool used: ECETOC TRA (worker) v2.0 (see 1. General remarks)

Route of exposure	dose / conc	Unit	Justification
Long-term exposure, systemic/local, inhalative	0.06	mg/m³	
Long-term exposure, systemic, dermal	0.007	mg/kg bw/d	
Long-term exposure, systemic, oral	NA	mg/kg bw/d	

1.26.2.3 Indirect Exposure of Humans via the Environment (oral)

The bioaccumulation potential of this substance is very low, with a Kow of 0.044; therefore, indirect exposure of humans via the environment can be considered negligible.

1.26.2.4 Environmental Exposure

The environmental exposure scenario is evaluated below. Exposure has been estimated using the version of the ECETOC TRA Integrated Tool current at the time of preparation of this document.

Table 159: Environmental Exposure Scenario ES26-E1

Section 1	Operational conditions and risk management measures
Section 1.2	**Control of environmental exposure**
Identifier*	ES26-E1
Contributing scenario	Production Of Rigid Foam
Environmental Release Category	ERC8f
Specific ERC	
Assessment scenario	
Operational Conditions	
Amounts used	
Amounts used in the EU (tonnes/year)	1,000,000 (total industry tonnage for production of MEG)
Fraction of EU tonnage used in region	0.1

Fraction of main source to local environment	0.002
Fraction of substance in end-use products	1
Maximum daily site tonnage (kg/day)	5479
Frequency and duration of use	
Type of release	Continuous
Emission days (days/year)	365 - ERC8f
Site specific monitoring data results for surface water effluent	
Location of sample	
Environmental factors not influenced by risk management	
Local freshwater dilution factor	10 (default)
Local marine water dilution factor	100 (default)
Other given operational conditions affecting environmental exposure	
Risk Management Measures	
Technical conditions and measures at process level (source) to prevent release	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Treat air emissions to provide a typical removal efficiency of (%)	
Treat wastewater (prior to discharge to receiving water) to provide the required removal efficiency of (%) ETotal,RMM = 1 – ((1 – ERMM, 1) x (1 – ERMM,2))	87%
Organizational measures to prevent/limit release from site	
Conditions and measures related to municipal sewage treatment plant	
Conditions and measures related to external treatment of waste for disposal	
Conditions and measures related to external recovery of waste	
Other environmental control measures additional to above	
Identifier	***ES26-E1***
Narrative	Release fraction derived from ERC (8f)
Release fraction to air from process	1.50E-01
Release fraction to wastewater from process	1.00E-02
Release fraction to soil from process (regional only)	5.00E-03
Local release to air (kg/d)	8.22E+01
Local release to sewage (kg/d)	5.48E+00

Local release to soil (kg/d)	2.74E+00
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	
Total efficiency of removal from air emissions (%)	
The maximum allowable site tonnage (M_{Safe}) based on removal from domestic sewage treatment (kg/d)	126641

1.26.2.4.1 Predicted exposure concentrations in the STP and in the aquatic compartments (freshwater, seawater and sediments)

Table 160: Predicted exposure concentrations in the STP and in the aquatic compartments (freshwater, seawater and sediments)

Local Concentration, Compartment: STP and aquatic	***unit***	***ES26-E1***
Local PEC in surface water during emission episode (dissolved)	mg/L	6.326E-02
Annual average local PEC in surface water (dissolved)	mg/L	6.326E-02
Local PEC in fresh water sediment during emission episode	mg/kg dwt	2.408E-01
Local PEC in sea water during emission episode	mg/L	6.458E-03
Annual average local PEC in sea water (dissolved)	mg/L	6.458E-03
Local PEC in marine sediment during emission episode	mg/kg dwt	2.458E-02
PEC for microorganisms in STP	mg/L	3.467E-01
Comments		

1.26.2.4.2 Predicted exposure concentration in soils

Table 161: Predicted exposure concentration in soils

Local Concentration, Compartment: soil	***unit***	***ES26-E1***
Local PEC in agricultural soil, averaged over 30 days	mg/kg dwt	6.620E-02
Local PEC agricultural soil, averaged over 180 days	mg/kg dwt	6.516E-02
Local PEC in grass land, averaged over 180 days	mg/kg dwt	6.491E-02
Comments		

1.26.2.4.3 Predicted exposure concentration in the atmospheric compartment

Table 162: Predicted exposure concentration in the atmospheric compartment

Local Concentration, Compartment: air	***unit***	***ES26-E1***
Annual average local PEC in air (total)	kg/m^3	3.878E-10
Comments		

1.26.2.4.4 Predicted exposure concentration in food for secondary poisoning

The bioaccumulation potential of this substance is very low, therefore secondary poisoning can be considered negligible. The Kow for MEG is 0.044.

1.27. Regional environmental exposure concentrations

Table 163: Regional environmental exposure concentrations

Regional concentrations	*unit*	*value*
Regional PEC in surface water (total)	mg/L	8.251E+00
Regional PEC in sea water (total)	mg/L	7.986E-01
Regional PEC in air (total)	kg/m^3	5.626E-09
Regional PEC in agricultural soil (total)	kg/kg_{wwt}	2.739E-06
Regional PEC in natural soil (total)	mg/kg dwt	4.013E+00
Regional PEC in industrial soil (total)	mg/kg dwt	4.013E+00
Regional PEC in sediment (total)	mg/kg dwt	2.831E+01
Regional PEC in sea water sediment (total)	mg/kg dwt	2.830E+00
Comments		

Although addressing different effects, the RCR inhalative and the RCR dermal are added to calculate a RCR combined.

2.1. Manufacturing of substance

2.1.1. Environment

Risk has been estimated using the version of the ECETOC TRA Integrated Tool current at the time of preparation of this document.

Table 165: RCRs ES1-E1

Compartments: Risk Characterization Ratio	***ES1-E1***
STP	2.752E-01
Freshwater	5.492E-01
Freshwater sediment	9.999E-01
Soil	1.491E-01
Marine water	5.492E-01
Marine water sediment	5.492E-01

2.1.2. Human Health

2.1.2.1. Workers

Table 166: RCR Workers / PROC 1

Calculation tool used: ECETOC TRA v2.0 modified (see 1. General remarks)

Exposure	**RCR per route** [-]	**RCR combined** [-]
Long-term exposure, systemic/local, inhalative	0.0007	0.004
Long-term exposure, systemic, dermal	0.003	

Table 167: RCR Workers / PROC 2

Calculation tool used: ECETOC TRA v2.0 modified (see 1. General remarks)

Exposure	**RCR per route** [-]	**RCR combined** [-]
Long-term exposure, systemic/local, inhalative	0.37	0.38
Long-term exposure, systemic, dermal	0.01	

Table 168: RCR Workers / PROC 3

Calculation tool used: ECETOC TRA v2.0 modified (see 1. General remarks)

Exposure	**RCR per route** [-]	**RCR combined** [-]
Long-term exposure, systemic/local, inhalative	0.22	0.23
Long-term exposure, systemic, dermal	0.003	

Table 169: RCR Workers / PROC 4

Calculation tool used: ECETOC TRA v2.0 modified (see 1. General remarks)

Exposure	**RCR per route** [-]	**RCR combined** [-]
Long-term exposure, systemic/local, inhalative	0.37	0.43
Long-term exposure, systemic, dermal	0.06	

Table 170: RCR Workers / PROC 8a
Calculation tool used: ECETOC TRA v2.0 modified (see 1. General remarks)

Exposure	**RCR per route** [-]	**RCR combined** [-]
Long-term exposure, systemic/local, inhalative	0.07	0.20
Long-term exposure, systemic, dermal	0.13	

Table 171: RCR Workers / PROC 8b
Calculation tool used: ECETOC TRA v2.0 modified (see 1. General remarks)

Exposure	**RCR per route** [-]	**RCR combined** [-]
Long-term exposure, systemic/local, inhalative	0.37	0.43
Long-term exposure, systemic, dermal	0.06	

Table 172: RCR Workers / PROC 15
Calculation tool used: ECETOC TRA v2.0 modified (see 1. General remarks)

Exposure	**RCR per route** [-]	**RCR combined** [-]
Long-term exposure, systemic/local, inhalative	0.37	0.37
Long-term exposure, systemic, dermal	0.003	

2.2. Use as Intermediate

2.2.1 Environment

Risk has been estimated using the version of the ECETOC TRA Integrated Tool current at the time of preparation of this document.

Table 173: RCRs ES2-E1

Compartments: Risk Characterization Ratio	***ES2-E1***
STP	1.586E-01
Freshwater	3.199E-01
Freshwater sediment	5.826E-01
Soil	8.589E-02
Marine water	3.198E-01
Marine water sediment	3.198E-01

2.2.2 Human Health

2.2.2.1 Workers

For PROC3 see Table 168
For PROC4 see Table 169
For PROC8a see Table 170
For PROC8b see Table 171
For PROC15 see Table 172

Table 174: RCR Workers / PROC 1

Calculation tool used: ECETOC TRA v2.0 modified (see 1. General remarks)

Exposure	**RCR per route** [-]	**RCR combined** [-]
Long-term exposure, systemic/local, inhalative	0.0007	0.004
Long-term exposure, systemic, dermal	0.003	

Table 175: RCR Workers / PROC 2

Calculation tool used: ECETOC TRA v2.0 modified (see 1. General remarks)

Exposure	**RCR per route** [-]	**RCR combined** [-]
Long-term exposure, systemic/local, inhalative	0.07	0.08
Long-term exposure, systemic, dermal	0.01	

Table 176: RCR Workers / PROC 5

Calculation tool used: ECETOC TRA v2.0 modified (see 1. General remarks)

Exposure	**RCR per route** [-]	**RCR combined** [-]
Long-term exposure, systemic/local, inhalative	0.37	0.38
Long-term exposure, systemic, dermal	0.01	

Table 177: RCR Workers / PROC 9
Calculation tool used: ECETOC TRA v2.0 modified (see 1. General remarks)

Exposure	**RCR per route** [-]	**RCR combined** [-]
Long-term exposure, systemic/local, inhalative	0.37	0.43
Long-term exposure, systemic, dermal	0.06	

2.2.2.2 Consumers
Not relevant.

2.2.2.3 Indirect exposure to humans via the environment
See 2.1.2.3

2.3. Use as Process chemical

2.3.1. Environment

Risk has been estimated using the version of the ECETOC TRA Integrated Tool current at the time of preparation of this document.

Table 178: RCRs ES3-E1

Compartments: Risk Characterization Ratio	*ES3-E1*
STP	1.586E-01
Freshwater	3.199E-01
Freshwater sediment	5.826E-01
Soil	1.499E-01
Marine water	3.198E-01
Marine water sediment	3.198E-01

2.3.2. Human Health

2.3.2.1 Workers

For PROC1 see Table 174
For PROC2 see Table 175
For PROC3 see Table 168
For PROC4 see Table 169
For PROC5 see Table 176
For PROC8a see Table 170
For PROC8b see Table 171
For PROC9 see Table 177
For PROC15 see Table 172

Table 179: RCR Workers / PROC 13

Calculation tool used: ECETOC TRA v2.0 modified (see 1. General remarks)

Exposure	**RCR per route** [-]	**RCR combined** [-]
Long-term exposure, systemic/local, inhalative	0.74	0.75
Long-term exposure, systemic, dermal	0.01	

Table 180: RCR Workers / PROC 14

Calculation tool used: ECETOC TRA v2.0 modified (see 1. General remarks)

Exposure	**RCR per route** [-]	**RCR combined** [-]
Long-term exposure, systemic/local, inhalative	0.37	0.40
Long-term exposure, systemic, dermal	0.03	

2.3.2.2 Consumers

Not relevant.

2.3.2.3 Indirect exposure to humans via the environment

See 2.1.2.3

2.4 Distribution of substance

2.4.1 Environment

Risk has been estimated using the version of the ECETOC TRA Integrated Tool current at the time of preparation of this document.

Table 181: RCRs ES4-E1

Compartments: Risk Characterization Ratio	*ES4-E1*
STP	2.115E-05
Freshwater	5.118E-05
Freshwater sediment	9.318E-05
Soil	7.409E-05
Marine water	5.097E-05
Marine water sediment	5.097E-05

20.4.2 Human Health

2.4.2.1 Workers

For PROC1 see Table 174
For PROC2 see Table 175
For PROC3 see Table 168
For PROC4 see Table 169
For PROC8a see Table 170
For PROC8b see Table 171
For PROC9 see Table 177
For PROC15 see Table 172

2.4.2.2 Consumers

Not relevant.

2.4.2.3 Indirect exposure to humans via the environment

See 2.1.2.3

2.5 Formulation & (re)packing of substances and mixtures

2.5.1 Environment

Risk has been estimated using the version of the ECETOC TRA Integrated Tool current at the time of preparation of this document.

Table 182: RCRs ES5-E1

Compartments: Risk Characterization Ratio	***ES5-E1***
STP	1.586E-01
Freshwater	3.197E-01
Freshwater sediment	5.821E-01
Soil	1.302E-01
Marine water	3.197E-01
Marine water sediment	3.197E-01

2.5.2 Human Health

2.5.2.1 Workers

For PROC1 see Table 174
For PROC2 see Table 175
For PROC3 see Table 168
For PROC4 see Table 169
For PROC5 see Table 176
For PROC8a see Table 170
For PROC8b see Table 171
For PROC9 see Table 177
For PROC14 see Table 180
For PROC15 see Table 172

2.5.2.2 Consumers

Not relevant.

2.5.2.3 Indirect exposure to humans via the environment

See 2.1.2.3

2.6 Production of polymers

2.6.1 Environment

Risk has been estimated using the version of the ECETOC TRA Integrated Tool current at the time of preparation of this document.

Table 183: RCRs ES6-E1

Compartments: Risk Characterization Ratio	*ES6-E1*
STP	1.586E-01
Freshwater	3.204E-01
Freshwater sediment	5.833E-01
Soil	1.007E-01
Marine water	3.202E-01
Marine water sediment	3.202E-01

2.6.2 Human Health

2.6.2.1 Workers

For PROC1 see Table 174
For PROC2 see Table 175
For PROC3 see Table 168
For PROC4 see Table 169
For PROC5 see Table 176
For PROC8a see Table 170
For PROC8b see Table 171
For PROC9 see Table 177
For PROC15 see Table 172

Table 184 RCR Workers / PROC 6

Calculation tool used: ECETOC TRA v2.0 modified (see 1. General remarks)

Exposure	**RCR per route** [-]	**RCR combined** [-]
Long-term exposure, systemic/local, inhalative	0.37	0.40
Long-term exposure, systemic, dermal	0.03	

2.6.2.2 Consumers

Not relevant.

2.6.2.3 Indirect exposure to humans via the environment

See 2.1.2.3

2.7 Use in Paints/Coatings (industrial)

2.7.1 Environment

Risk has been estimated using the version of the ECETOC TRA Integrated Tool current at the time of preparation of this document.

Table 185: RCRs ES7-E1

Compartments: Risk Characterization Ratio	*ES7-E1*
STP	2.534E-01
Freshwater	5.084E-01
Freshwater sediment	9.258E-01
Soil	9.999E-01
Marine water	5.085E-01
Marine water sediment	5.085E-01

2.7.2 Human Health

2.7.2.1 Workers

For PROC1 see Table 174
For PROC2 see Table 175
For PROC3 see Table 168
For PROC4 see Table 169
For PROC5 see Table 176
For PROC8a see Table 170
For PROC8b see Table 171
For PROC13 see Table 179
For PROC15 see Table 172

Table 186: RCR Workers / PROC 7

Calculation tool used: ECETOC TRA v2.0 modified (see 1. General remarks)

Exposure	**RCR per route** [-]	**RCR combined** [-]
Long-term exposure, systemic/local, inhalative	0.28	0.80
Long-term exposure, systemic, dermal	0.52 (see 1.7 General remarks)	

Table 187: RCR Workers / PROC 10

Calculation tool used: ECETOC TRA v2.0 modified (see 1. General remarks)

Exposure	**RCR per route** [-]	**RCR combined** [-]
Long-term exposure, systemic/local, inhalative	0.74	0.77
Long-term exposure, systemic, dermal	0.03	

2.7.2.2 Consumers

Not relevant.

2.7.2.3 Indirect exposure to humans via the environment

See 2.1.2.3

2.8 Use in Paints/Coatings /Adhesives/ Sealants/ Foams/ Polymers / filled Polymers (professional)

2.8.1 Environment

Risk has been estimated using the version of the ECETOC TRA Integrated Tool current at the time of preparation of this document. Given the similar manner in which environmental exposures would be expected to occur in association with both the professional and consumer use of paints and coatings, and given the conservative nature of the high tonnage (based on the estimated EU-wide manufacture of MEG) used in the assessment, this environmental assessment also covers the environmental assessment for Exposure Scenario 9 (Use in Paints/Coatings /Surface treatment products (Consumer use)).

Table 188: RCRs ES8-E1

Compartments: Risk Characterization Ratio	***ES8-E1***
STP	3.476E-03
Freshwater	3.961E-02
Freshwater sediment	7.212E-02
Soil	5.971E-01
Marine water	4.053E-02
Marine water sediment	4.053E-02

2.8.2 Human Health

2.8.2.1 Workers

Table 189: RCR Workers / PROC 1

Calculation tool used: ECETOC TRA v2.0 modified (see 1. General remarks)

Exposure	**RCR per route** [-]	**RCR combined** [-]
Long-term exposure, systemic/local, inhalative	0.0007	0.004
Long-term exposure, systemic, dermal	0.003	

Table 190: RCR Workers / PROC 2

Calculation tool used: ECETOC TRA v2.0 modified (see 1. General remarks)

Exposure	**RCR per route** [-]	**RCR combined** [-]
Long-term exposure, systemic/local, inhalative	0.37	0.38
Long-term exposure, systemic, dermal	0.01	

Table 191: RCR Workers / PROC 3

Calculation tool used: ECETOC TRA v2.0 modified (see 1. General remarks)

Exposure	**RCR per route** [-]	**RCR combined** [-]
Long-term exposure, systemic/local, inhalative	0.22	0.23
Long-term exposure, systemic, dermal	0.003	

Table 192: RCR Workers / PROC 4

Calculation tool used: ECETOC TRA v2.0 modified (see 1. General remarks)

Exposure	**RCR per route** [-]	**RCR combined** [-]
Long-term exposure, systemic/local, inhalative	0.74	0.80
Long-term exposure, systemic, dermal	0.06	

Table 193: RCR Workers / PROC 5
Calculation tool used: ECETOC TRA v2.0 modified (see 1. General remarks)

Exposure	**RCR per route** [-]	**RCR combined** [-]
Long-term exposure, systemic/local, inhalative	0.74	0.75
Long-term exposure, systemic, dermal	0.01	

Table 194: RCR Workers / PROC 8a
Calculation tool used: ECETOC TRA v2.0 modified (see 1. General remarks)

Exposure	**RCR per route** [-]	**RCR combined** [-]
Long-term exposure, systemic/local, inhalative	0.37	0.50
Long-term exposure, systemic, dermal	0.13	

Table 195: RCR Workers / PROC 8b
Calculation tool used: ECETOC TRA v2.0 modified (see 1. General remarks)

Exposure	**RCR per route** [-]	**RCR combined** [-]
Long-term exposure, systemic/local, inhalative	0.74	0.80
Long-term exposure, systemic, dermal	0.06	

Table 196: RCR Workers / PROC 9
Calculation tool used: ECETOC TRA v2.0 modified (see 1. General remarks)

Exposure	**RCR per route** [-]	**RCR combined** [-]
Long-term exposure, systemic/local, inhalative	0.74	0.80
Long-term exposure, systemic, dermal	0.06	

Table 197: RCR Workers / PROC 10
Calculation tool used: ECETOC TRA v2.0 modified (see 1. General remarks)

Exposure	**RCR per route** [-]	**RCR combined** [-]
Long-term exposure, systemic/local, inhalative	0.37	0.40
Long-term exposure, systemic, dermal	0.03	

Table 198: RCR Workers / PROC 11
Calculation tool used: ECETOC TRA v2.0 modified (see 1. General remarks)

Exposure	**RCR per route** [-]	**RCR combined** [-]
Long-term exposure, systemic/local, inhalative	0.40	0.91
Long-term exposure, systemic, dermal	0.51	

Table 199: RCR Workers / PROC 13
Calculation tool used: ECETOC TRA v2.0 modified (see 1. General remarks)

Exposure	**RCR per route** [-]	**RCR combined** [-]
Long-term exposure, systemic/local, inhalative	0.74	0.75
Long-term exposure, systemic, dermal	0.01	

Table 200: RCR Workers / PROC 14
Calculation tool used: ECETOC TRA v2.0 modified (see 1. General remarks)

Exposure	**RCR per route** [-]	**RCR combined** [-]
Long-term exposure, systemic/local, inhalative	0.74	0.77
Long-term exposure, systemic, dermal	0.03	

Table 201: RCR Workers / PROC 15
Calculation tool used: ECETOC TRA v2.0 modified (see 1. General remarks)

Exposure	**RCR per route** [-]	**RCR combined** [-]
Long-term exposure, systemic/local, inhalative	0.37	0.37
Long-term exposure, systemic, dermal	0.003	

Table 202: RCR Workers / PROC 19[1]
Calculation tool used: ECETOC TRA v2.0 modified (see 1. General remarks)

Exposure	**RCR per route** [-]	**RCR combined** [-]
Long-term exposure, systemic/local, inhalative	0.18	0.31
Long-term exposure, systemic, dermal	0.13	

2.8.2.2 Consumers
Not relevant.

2.8.2.3 Indirect exposure to humans via the environment
See 2.1.2.3

2.9 Use in Paints/Coatings/Surface treatment products (Consumer use)

2.9.1 Environment

See Section 2.8.1.

2.9.2 Human Health

2.9.2.1 Workers

Not relevant

2.9.2.2 Consumers

Table 203 RCR Consumer/ PC 9a and 15
Sub-Scenario 1/Use in Paints/Coatings - non-spraying products
Calculation tool used: ConsExpo 4.1 (see also 1.9)

Exposure	**RCR per route** [-]	**RCR combined** [-]
Long-term exposure, systemic, inhalative	0.10	0.15
Long-term exposure, systemic, dermal	0.05	
Long-term exposure, systemic, oral	NA	

NA = not applicalbe

Table 204: RCR Consumer/ PC 9a and 15
Sub-Scenario 2/Use in Paints/Coatings – spraying products
Calculation tool used: ConsExpo 4.1 (see also 1.9)

Exposure	**RCR per route** [-]	**RCR combined** [-]
Long-term exposure, systemic, inhalative	0.04	0.06 (RCR oral not included)
Long-term exposure, systemic, dermal	0.02	
Long-term exposure, systemic, oral	The RCR for oral exposure has not been addressed quantitatively. However, due to the relatively low exposure resulting from oral exposure (see 1.9) in combination with the relatively low dermal and inhalative exposure, the consumer use is considered to be of no concern	

NA = not applicalbe

Table 205: RCR Consumer/ PC 18
Calculation tool used: ConsExpo 4.1 (see also 1.9)

Exposure	**RCR per route** [-]	**RCR combined** [-]
Part A. Refilling		
Long-term exposure, systemic, inhalative	NA (see 1.9)	0.0002
Long-term exposure, systemic, dermal	0.0002	
Long-term exposure, systemic, oral	NA (see 1.9)	

Part B. Printing process		
Long-term exposure, systemic, inhalative	0.18	0.18
Long-term exposure, systemic, dermal	NA (see 1.9)	
Long-term exposure, systemic, oral	NA (see 1.9)	
Part A and B. Refilling and Printing process		
Long-term exposure, systemic, inhalative	0.18	0.18
Long-term exposure, systemic, dermal	0.0002	
Long-term exposure, systemic, oral	NA	

NA = not applicable

Table 206: RCR Consumer/ PC 31

Calculation tool used: ConsExpo 4.1 (see also 1.9)

Exposure	**RCR per route** [-]	**RCR combined** [-]
Long-term exposure, systemic, inhalative	0.56	0.60
Long-term exposure, systemic, dermal	0.04	
Long-term exposure, systemic, oral	NA	

2.9.2.3 Indirect exposure to humans via the environment

See 2.1.2.3

2.10 Use in Cleaning agents (industrial)

2.10.1 Environment

Risk has been estimated using the version of the ECETOC TRA Integrated Tool current at the time of preparation of this document.

Table 207: RCRs ES10-E1

Compartments: Risk Characterization Ratio	*ES10-E1*
STP	1.586E-02
Freshwater	3.607E-01
Freshwater sediment	6.568E-01
Soil	8.646E-03
Marine water	3.461E-01
Marine water sediment	3.461E-01

2.10.2 Human Health

2.10.2.1 Workers

For PROC1 see Table 174
For PROC2 see Table 175
For PROC3 see Table 168
For PROC4 see Table 169
For PROC7 see Table 186
For PROC8a see Table 170
For PROC8b see Table 171
For PROC10 see Table 187
For PROC13 see Table 179

2.10.2.2Consumers

Not relevant.

2.10.2.3 Indirect exposure to humans via the environment

See 2.1.2.3

2.11 Use in Cleaning agents (professional)

2.11.1 Environment

Risk has been estimated using the version of the ECETOC TRA Integrated Tool current at the time of preparation of this document. The environmental exposure scenario is evaluated below. Exposure has been estimated using the version of the ECETOC TRA Integrated Tool current at the time of preparation of this document. Given the similar manner in which environmental exposures would be expected to occur in association with both the professional and consumer use of cleaning agents, and given the conservative nature of the high tonnage (based on the "maximum passing tonnage") used in the assessment, this environmental assessment also covers the environmental assessment for Exposure Scenario 12 (Use in Cleaning agents (Consumer use)).

Table 208: RCRs ES11-E1

Compartments: Risk Characterization Ratio	***ES11-E1***
STP	5.013E-02
Freshwater	1.259E-01
Freshwater sediment	2.292E-01
Soil	2.710E-02
Marine water	1.247E-01
Marine water sediment	1.247E-01

2.11.2 Human Health

2.11.2.1 Workers

For PROC1 see Table 189
For PROC2 see Table 190
For PROC3 see Table 191
For PROC4 see Table 192
For PROC8a see Table 194
For PROC8b see Table 195
For PROC10 see Table 197
For PROC11 see Table 198
For PROC13 see Table 179

2.11.2.2 Consumers

Not relevant.

2.11.2.3 Indirect exposure to humans via the environment

See 2.1.2.3

2.12 Use in Cleaning agents (Consumer use)

2.12.1 Environment

See Section 2.11.1.

2.12.2 Human Health

2.12.2.1 Workers

Not relevant

2.12.2.2 Consumers

Table 209: RCR Consumer/ PC 35
Sub-Scenario 1/Use in All-purpose cleaners - non-spraying products

Calculation tool used: ConsExpo 4.1 (see also 1.12)

Exposure	RCR per route [-]	RCR combined [-]
Part A. Mixing and Loading		
Long-term exposure, systemic, inhalative	0.001	0.002
Long-term exposure, systemic, dermal	0.0006	
Long-term exposure, systemic, oral	NA	
Part B. Application		
Long-term exposure, systemic, inhalative	0.09	0.31
Long-term exposure, systemic, dermal	0.22	
Long-term exposure, systemic, oral	NA	
Part A and B. Mixing/Loading and Application		
Long-term exposure, systemic, inhalative	0.09	0.31
Long-term exposure, systemic, dermal	0.22	
Long-term exposure, systemic, oral	NA	

NA = not applicable

Table 208: RCR Consumer/ PC 35
Sub-Scenario 2/Use in All-purpose cleaners - spraying products

Calculation tool used: ConsExpo 4.1 (see also 1.12)

Exposure	RCR per route [-]	RCR combined [-]
Part A. Spraying		
Long-term exposure, systemic, inhalative	NA (see 1.12)	0.0002
Long-term exposure, systemic, dermal	0.0002	
Long-term exposure, systemic, oral	NA (see 1.12)	
Part B. Cleaning		
Long-term exposure, systemic,	0.02	0.02

inhalative Long-term exposure, systemic, dermal Long-term exposure, systemic, oral	0.002 NA	
Part A and B. Mixing/Loading and Application		
Long-term exposure, systemic, inhalative	0.02	0.02
Long-term exposure, systemic, dermal	0.002	
Long-term exposure, systemic, oral	NA	

Table 211: RCR Consumer/ PC 35
Sub-Scenario 3/Use in Floor cleaning products

Calculation tool used: ConsExpo 4.1 (see also 1.12)

Exposure	**RCR per route** [-]	**RCR combined** [-]
Part A. Mixing and Loading		
Long-term exposure, systemic, inhalative Long-term exposure, systemic, dermal Long-term exposure, systemic, oral	0.001 0.0008 NA	0.002
Part B. Application		
Long-term exposure, systemic, inhalative Long-term exposure, systemic, dermal Long-term exposure, systemic, oral	0.05 0.14 NA	0.19
Part A and B. Mixing/Loading and Application		
Long-term exposure, systemic, inhalative	0.06	0.20
Long-term exposure, systemic, dermal	0.14	
Long-term exposure, systemic, oral	NA	

NA = not applicable

2.13 Use in Lubricants (industrial)

2.13.1 Environment

Risk has been estimated using the version of the ECETOC TRA Integrated Tool current at the time of preparation of this document.

Table 212: RCRs ES13-E1

Compartments: Risk Characterization Ratio	*ES13-E1*
STP	1.586E-04
Freshwater	9.867E-04
Freshwater sediment	1.797E-03
Soil	1.912E-03
Marine water	9.596E-04
Marine water sediment	9.596E-04

2.13.2 Human Health

2.13.2.1 Workers

For PROC1 see Table 174
For PROC2 see Table 175
For PROC3 see Table 168
For PROC4 see Table 169
For PROC7 see Table 186
For PROC8a see Table 170
For PROC8b see Table 171
For PROC9 see Table 177
For PROC10 see Table 187
For PROC13 see Table 179

Table 213: RCR Workers / PROC 17

Calculation tool used: ECETOC TRA v2.0 modified (see 1. General remarks)

Exposure	**RCR per route** [-]	**RCR combined** [-]
Long-term exposure, systemic/local, inhalative	0.07	0.10
Long-term exposure, systemic, dermal	0.03	

Table 214: RCR Workers / PROC 18

Calculation tool used: ECETOC TRA v2.0 modified (see 1. General remarks)

Exposure	**RCR per route** [-]	**RCR combined** [-]
Long-term exposure, systemic/local, inhalative	0.07	0.20
Long-term exposure, systemic, dermal	0.13	

2.13.2.2 Consumers

Not relevant.

2.13.2.3Indirect exposure to humans via the environment

See 2.1.2.3

2.14 Use in Metal-working fluids (industrial)

2.14.1 Environment

Risk has been estimated using the version of the ECETOC TRA Integrated Tool current at the time of preparation of this document.

Table 215: RCRs ES14-E1

Compartments: Risk Characterization Ratio	***ES14-E1***
STP	1.586E-03
Freshwater	5.452E-03
Freshwater sediment	9.928E-03
Soil	3.736E-02
Marine water	5.496E-03
Marine water sediment	5.496E-03

2.14.2 Human Health

2.14.2.1 Workers

For PROC1 see Table 174
For PROC2 see Table 175
For PROC3 see Table 168
For PROC5 see Table 176
For PROC7 see Table 186
For PROC8a see Table 170
For PROC8b see Table 171
For PROC9 see Table 177
For PROC10 see Table 187
For PROC13 see Table 179
For PROC17 see Table 213

2.14.2.2 Consumers

Not relevant.

2.14.2.3 Indirect exposure to humans via the environment

See 2.1.2.3

2.15 Use in Metal-working fluids (professional)

2.15.1 Environment

Risk has been estimated using the version of the ECETOC TRA Integrated Tool current at the time of preparation of this document.

Table 216: RCRs ES15-E1

Compartments: Risk Characterization Ratio	***ES15-E1***
STP	2.173E-03
Freshwater	7.723E-03
Freshwater sediment	1.406E-02
Soil	1.031E-02
Marine water	7.585E-03
Marine water sediment	7.585E-03

2.15.2 Human Health

2.15.2.1 Workers

For PROC1 see Table 189
For PROC2 see Table 190
For PROC3 see Table 191
For PROC5 see Table 193
For PROC8a see Table 194
For PROC8b see Table 195
For PROC9 see Table 196
For PROC10 see Table 197
For PROC11 see Table 198
For PROC13 see Table 199

Table 217: RCR Workers / PROC 17

Calculation tool used: ECETOC TRA v2.0 modified (see 1. General remarks)

Exposure	**RCR per route** [-]	**RCR combined** [-]
Long-term exposure, systemic/local, inhalative	0.37	0.40
Long-term exposure, systemic, dermal	0.03	

2.15.2.2 Consumers

Not relevant.

2.15.2.3Indirect exposure to humans via the environment

See 2.1.2.3

2.16 Use in Agrochemicals (professional)

2.16.1 Environment

Risk has been estimated using the version of the ECETOC TRA Integrated Tool current at the time of preparation of this document.

Table 218: RCRs ES16-E1

Compartments: Risk Characterization Ratio	*ES16-E1*
STP	no STP
Freshwater	2.755E-03
Freshwater sediment	6.259E-02
Soil	4.271E-01
Marine water	4.072E-03
Marine water sediment	4.072E-03

2.16.2 Human Health

2.16.2.1Workers

For PROC1 see Table 189
For PROC2 see Table 190
For PROC8a see Table 194
For PROC8b see Table 195
For PROC9 see Table 196
For PROC11 see Table 198
For PROC13 see Table 179

2.16.2.2 Consumers

Not relevant.

2.16.2.3 Indirect exposure to humans via the environment

See 2.1.2.3

2.17 Use in Functional fluids (industrial)

2.17.1 Environment

Risk has been estimated using the version of the ECETOC TRA Integrated Tool current at the time of preparation of this document.

Table 219: RCRs ES17-E1

Compartments: Risk Characterization Ratio	***ES17-E1***
STP	1.586E-04
Freshwater	1.215E-03
Freshwater sediment	2.213E-03
Soil	6.164E-03
Marine water	1.195E-03
Marine water sediment	1.195E-03

2.17.2 Human Health

2.17.2.1 Workers

For PROC1 see Table 174
For PROC2 see Table 175
For PROC3 see Table 168
For PROC4 see Table 169
For PROC8a see Table 170
For PROC8b see Table 171
For PROC9 see Table 177

2.17.2.2 Consumers

Not relevant.

2.17.2.3 Indirect exposure to humans via the environment

See 2.1.2.3

2.18 Use in Functional fluids (professional)

2.18.1 Environment

Risk has been estimated using the version of the ECETOC TRA Integrated Tool current at the time of preparation of this document. Given the similar manner in which environmental exposures would be expected to occur in association with both the professional and consumer use of functional fluids, and given the conservative nature of the high tonnage (based on the estimated EU-wide manufacture of MEG) used in the assessment, this environmental assessment also covers the environmental assessment for Exposure Scenario 19 (Use in Heat transfer and Hydraulic fluids (Consumer use)).

Table 220: RCRs ES18-E1

Compartments: Risk Characterization Ratio	***ES18-E1***
STP	8.690E-03
Freshwater	2.187E-02
Freshwater sediment	3.982E-02
Soil	3.509E-02
Marine water	2.177E-02
Marine water sediment	2.177E-02

2.18.2 Human Health

2.18.2.1 Workers

For PROC1 see Table 189
For PROC2 see Table 190
For PROC3 see Table 191
For PROC5 see Table 193
For PROC8a see Table 194
For PROC9 see Table 196

Table 221: RCR Workers / PROC 20

Calculation tool used: ECETOC TRA v2.0 modified (see 1. General remarks)

Exposure	**RCR per route** [-]	**RCR combined** [-]
Long-term exposure, systemic/local, inhalative	0.37	0.39
Long-term exposure, systemic, dermal	0.02	

2.18.2.2Consumers

Not relevant.

2.18.2.3Indirect exposure to humans via the environment

See 2.1.2.3

2.19 Use in Heat transfer and Hydraulic fluids (Consumer use)

2.19.1 Environment

See section 2.18.1.

10.19.2 Human Health

2.19.2.1Workers

Not relevant

2.19.2.2Consumers

Table 222 RCR Consumer/ PC 16 and 17

Calculation tool used: ECETOC TRA (worker) v2.0 modified (see 1. General remarks)

Exposure	**RCR per route** [-]	**RCR combined** [-]
Long-term exposure, systemic, inhalative	0.28	0.36
Long-term exposure, systemic, dermal	0.08	
Long-term exposure, systemic, oral	NA (see 1.19)	

NA = not applicable

2.20 Use in/as De-icing/Anti-icing applications/agents (professional)

2.20.1 Environment

Risk has been estimated using the version of the ECETOC TRA Integrated Tool current at the time of preparation of this document. Given the similar manner in which environmental exposures would be expected to occur in association with both the professional and consumer use of de-icing products, and given the conservative nature of the high tonnage (based on the estimated EU-wide manufacture of MEG) used in the assessment, this environmental assessment also covers the environmental assessment for Exposure Scenario 21 (Use in/as De-icing/Anti-icing applications/agents (Consumer Use)).

Table 223: RCRs ES20-E1

Compartments: Risk Characterization Ratio	***ES20-E1***
STP	1.738E-03
Freshwater	3.580E-02
Freshwater sediment	6.519E-02
Soil	5.779E-01
Marine water	3.665E-02
Marine water sediment	3.665E-02

2.20.2 Human Health

2.20.2.1 Workers

For PROC1 see Table 189
For PROC2 see Table 190
For PROC8a see Table 194
For PROC8b see Table 195
For PROC11 see Table 198

2.20.2.2 Consumers

Not relevant.

2.20.2.3 Indirect exposure to humans via the environment

See 2.1.2.3

2.21 Use in/as De-icing/Anti-icing applications/agents (Consumer use)

2.21.1 Environment

See Section 2.20.1.

2.21.2 Human Health

2.21.2.1 Workers

Not relevant.

2.21.2.2Consumers

Table 224: RCR Consumer/ PC 4

Sub-Scenario 1/Use in De-icing applicatons – spraying products

Calculation tool used: ConsExpo 4.1 (see also 1.12)

Exposure	**RCR per route** [-]	**RCR combined** [-]
Part A. Spraying		
Long-term exposure, systemic, inhalative	0.0001	0.009
Long-term exposure, systemic, dermal	0.009	
Long-term exposure, systemic, oral	The RCR for oral exposure has not been addressed quantitatively. However, due to the relatively low exposure resulting from oral exposure (see 1.9) in combination with the relatively low dermal and inhalative exposure, the consumer use is considered to be of no concern	
Part B. Cleaning		
Long-term exposure, systemic, inhalative	NA (see 1.21)	0.08
Long-term exposure, systemic, dermal	0.08	
Long-term exposure, systemic, oral	NA	
Part A and B. Spraying and Cleaning		
Long-term exposure, systemic, inhalative	0.0001	0.09
Long-term exposure, systemic, dermal	0.09	
Long-term exposure, systemic, oral	NA	

NA = not applicable

Table 225: RCR Consumer/ PC 4

Sub-Scenario 2/ Use in Anti-freeing agents

Calculation tool used: ECETOC TRA (worker) v2.0 modified (see 1. General remarks)

Exposure	**RCR per route** [-]	**RCR combined** [-]
Long-term exposure, systemic, inhalative	0.28	0.36
Long-term exposure, systemic, dermal	0.08	

Long-term exposure, systemic, oral	NA (see 1.21)	

NA = not applicable

2.21.2.3Indirect exposure to humans via the environment

See 2.1.2.3

2.22 Use in laboratories (professional)

2.22.1 Environment

Risk has been estimated using the version of the ECETOC TRA Integrated Tool current at the time of preparation of this document.

Table 226: RCRs ES22-E1

Compartments: Risk Characterization Ratio	*ES22-E1*
STP	2.173E-02
Freshwater	7.650E-02
Freshwater sediment	1.393E-01
Soil	3.154E-01
Marine water	7.623E-02
Marine water sediment	7.623E-02

2.22.2 Human Health

2.22.2.1 Workers

For PROC15 (industrial) see Table 172

Table 227: RCR Workers / PROC 15 (professional)

Calculation tool used: ECETOC TRA v2.0 modified (see 1. General remarks)

Exposure	**RCR per route** [-]	**RCR combined** [-]
Long-term exposure, systemic/local, inhalative	0.37	0.37
Long-term exposure, systemic, dermal	0.003	

2.22.2.2 Consumers

Not relevant

2.22.2.3 Indirect exposure to humans via the environment

See 2.1.2.3

2.23 Use in Water treatment chemicals (industrial)

2.23.1 Environment

Risk has been estimated using the version of the ECETOC TRA Integrated Tool current at the time of preparation of this document.

Table 228: RCRs ES23-E1

Compartments: Risk Characterization Ratio	*ES23-E1*
STP	3.013E-02
Freshwater	3.891E-01
Freshwater sediment	7.085E-01
Soil	3.202E-01
Marine water	3.757E-01
Marine water sediment	3.757E-01

2.23.2 Human Health

2.23.2.1Workers

For PROC1 see Table 174
For PROC2 see Table 175
For PROC3 see Table 168
For PROC4 see Table 169
For PROC8a see Table 170
For PROC8b see Table 171
For PROC13 see Table 179

2.23.2.2Consumers

Not relevant.

2.23.2.3Indirect exposure to humans via the environment

See 2.1.2.3

2.24 Use in Adhesives and Sealants (Consumer use)

2.24.1 Environment

Risk has been estimated using the version of the ECETOC TRA Integrated Tool current at the time of preparation of this document.

Table 229: RCRs ES24-E1

Compartments: Risk Characterization Ratio	***ES24-E1***
STP	1.738E-03
Freshwater	8.702E-03
Freshwater sediment	1.585E-02
Soil	9.204E-02
Marine water	8.833E-03
Marine water sediment	8.833E-03

2.24.2 Human Health

2.24.2.1Workers

Not relevant

2.24.2.2Consumers

Table 230: RCR Consumer/ PC 1

Calculation tool used: ConsExpo 4.1 (see also 1.24)

Exposure	**RCR per route** [-]	**RCR combined** [-]
Long-term exposure, systemic, inhalative	0.59	0.60
Long-term exposure, systemic, dermal	0.005	
Long-term exposure, systemic, oral	NA	

2.24.2.3 Indirect exposure to humans via the environment

See 2.1.2.3

2.25 Production of Polymers, filled polymers, Foams, Coatings, Adhesives, Sealants (industrial)

2.25.1 Environment

Risk has been estimated using the version of the ECETOC TRA Integrated Tool current at the time of preparation of this document.

Table 231: RCRs ES25-E1

Compartments: Risk Characterization Ratio	*ES25-E1*
STP	1.586E-01
Freshwater	3.204E-01
Freshwater sediment	5.833E-01
Soil	1.007E-01
Marine water	3.202E-01
Marine water sediment	3.202E-01

2.25.2 Human Health

2.25.2.1 Workers

For PROC1 see Table 174
For PROC2 see Table 175
For PROC3 see Table 168
For PROC4 see Table 169
For PROC7 see Table 186
For PROC8a see Table 170
For PROC8b see Table 171
For PROC9 see Table 177
For PROC10 see Table 187
For PROC13 see Table 179
For PROC14 see Table 180
For PROC15 see Table 172

2.25.2.2Consumers

Not relevant.

2.25.2.3Indirect exposure to humans via the environment

See 2.1.2.3

2.26 Production of rigid foam (Consumer use)

2.26.1 Environment

Risk has been estimated using the version of the ECETOC TRA Integrated Tool current at the time of preparation of this document.

Table 232: RCRs ES26-E1

Compartments: Risk Characterization Ratio	*ES26-E1*
STP	1.738E-03
Freshwater	6.326E-03
Freshwater sediment	1.152E-02
Soil	4.327E-02
Marine water	6.458E-03
Marine water sediment	6.458E-03

2.26.2 Human Health

2.26.2.1Workers

Not relevant

2.26.2.2Consumers

Table 233: RCR Consumer/ PC 32

Calculation tool used: ConsExpo 4.1 (see also 1.26)

Exposure	**RCR per route** [-]	**RCR combined** [-]
Long-term exposure, systemic, inhalative	0.009	0.0.01
Long-term exposure, systemic, dermal	0.0008	
Long-term exposure, systemic, oral	NA	

2.26.2.3Indirect exposure to humans via the environment

See 2.1.2.3

2.27. Overall exposure (combined for all relevant emission /release sources)

2.27.1 Environment (combined for all emission sources)

Table 234: Regional Environmental RCRs

Compartments: (REGIONAL)	*RCR*
Freshwater	8.251E-01
Freshwater sediment	1.355E+00
Soil	1.791E+00
Marine water	7.986E-01
Marine water sediment	6.930E-01

2.27.2 Human health (combined for all exposure routes)

The consideration of an overall exposure is considered to be not relevant since the vast majority of the PROCs and PCs calculated do not yield to a RCR close to 1.