Fisa cu date de securitate
In conformitate cu prevederile Regulamentului (UE) nr. 2015/830

Gaz Petrolier Lichefiat

SECTIUNEA 1: IDENTIFICAREA SUBSTANTEI/AMESTECULUI SI A SOCIETATII/INTREPRINDERII

1.1. Element de identificare a produsului

Denumirea substantei	GPL (Gaz petrolier lichefiat) Nr. CAS 68476-85-7
Nr. Inregistrare ECHA	01-2119485911-31-0004
Alte mijloace de identificare	GPL, Gaz petrolier lichefiat, GPL consum casnic

1.2. Utilizari relevante identificate ale substantei sau amestecului si utilizari contraindicate

Utilizari identificate	Combustibil pentru uz industrial (gaz petrolier lichefiat) Combustibil pentru uz casnic (GPL - consum casnic pentru butelii)
Utilizari identificate conform Raport de Securitate Chimica (Anexa)	**SU3, SU8, SU9- Uz Industrial** Productie, Distributie, Amestecare si finisare, Combustibil pentru uz industrial **SU 21- Uz Profesional -** Combustibil pentru uz professional **SU 22- Utilizare la consumator final (public larg) –** Combustibil casnic
Utilizari contraindicate	Acest produs nu este recomandat a se utiliza in oricare alt scop diferit de utilizarile identificate mai sus

1.3. Detalii privind furnizorul fisei cu date de securitate

Producator	**ROMPETROL RAFINARE SA** (COMPANIE A GRUPULUI KMG INTERNATIONAL) ADRESA: B-dul Navodari, Nr. 215, Pavilion Administrativ, 905700 Navodari, Jud. Constanta Telefon: + (40) 241 506 656 Fax : + (40) 241 506 933 office.rafinare@rompetrol.com

1.4 Numar de telefon care poate fi apelat in caz de urgenta

+ (40)-241-506 158 (intre orele 08:00-16:00)
+ (40)-241-506 040 (intre orele 16:00-08:00)

SECTIUNEA 2: IDENTIFICAREA PERICOLELOR

2.1 Efecte adverse ale proprietatilor fizice si chimice asupra sanatatii umane si mediului

Produsul este clasificat periculos in conformitae cu Regulamentul 1272/2008, respectiv este incadrat in categoria 1 de gaze inflamabile. In functie de continutul de 1,3 butadiena, GPL trebuie clasificat corespunzator

Clasificarea substantei conform Regulamentului CLP(1272/2008)	**Gaze inflamabile cat 1** H220 Gaze extreme de inflamabile **Gaze lichefiate /Gaze comprimate** H280 – Contine gaz sub presiune-poate exploda daca este incalzit
Se aplica nota K Pericole pentru sanatate - GPL cu continut de 1,3 Butadiena mai mic de 0.1%	Gazul petrolier lichefiat cu continut mai mic de 0.1 % de benzen sau 1,3 butadiena, hidrogen sulfurat mai putin 0.5% si mai putin 0.3% monoxid de carbon, nu este clasificat periculos pentru sanatate

GPL cu continut de 1,3 Butadiena >0.1%	Mutagen cat 1 B Poate provoca anomalii genetice (indicati calea de expunere, daca exista probe concludente ca nici o alta cale de expunere nu provoaca acest pericol) Canc cat 1B H350: Poate provoca cancer (indicati calea de expunere, dacă există probe concludente că nici o altă cale de expunere nu provoacă acest pericol)
Se aplica nota K	*Nu este necesara clasificarea unei substante cancerigena sau mutagena in cazul in care se poate demonstra ca aceasta contine mai putin de 0.1% 1,3 butadiena* *Produsul nu contine urme de benzen*
Proprietati fizico-chimice	Gaz extrem de inflamabil; poate forma amestecuri explozive impreuna cu aerul in domeniul 1.8-15%; Gaz lichefiat. Gaz, in conditii nnormale de presiune si temperatura (20° C, 1013 hPa), fara culoare, fara miros.
Pericole pentru sanatate	Nu sunt
Pericole pentru mediu	Gazele petroliere din aceasta categorie nu sunt clasificate din punct de vedere al pericolului pentru mediu

2.2. Elemente pentru eticheta

In conformitate cu Regulamentul 1272/2008

Pictograma, Cuvânt de avertizare Cod(uri)

GPL cu continut <0.1 % 1,3 butadiena

GHS02

Gaze inflamabile categoria de pericol 1

GHS04

Gaz lichefiat

GPL cu continut> 0.1% 1,3 butadiena

GHS08

Pericol

GHS02

Gaze inflamabile categoria de pericol 1

GHS04

Gaz lichefiat

Fraze de pericol (H) GPL cu continut <0.1 % 1,3 butadiena	H220: Gaze inflamabile de categoria de pericol 1 H280: Contine gaz sub presiune, pericol de explozie in caz de incalzire
GPL cu continut> 0.1% 1,3 butadiena	H340: Poate provoca anomalii genetice (indicati calea de expunere,daca exista probe concludente ca nici o altă cale de expunere nu provoaca acest pericol) H350: Poate provoca cancer (indicati calea de expunere, daca exista probe concludente caă nici o alta cale de expunere nu provoaca acest pericol)
Fraza de precautie (P) Prevenire	P102 A nu se lasa la indemana copiilor P210 A se pastra departe de surse de caldură/scântei/flacari deschise sau suprafete încinse. – Fumatul interzis. P202: A nu se manipula decât dupa ce au fost citite si întelese toate masurile de securitate. P281: Utilizati echipamentul de protecţie individuală, conform cerinţelor
Fraza de precautie (P) Interventie	P377- Incendiu cauzat de o scurgere de gaz: nu încercati sa stingeti, decât daca scurgerea poate fi oprita în siguranta. P381 : Eliminati toate sursele de aprindere, daca acest lucru se poate face în siguranta P308+P313 ÎN CAZ DE expunere sau de posibila expunere:Consultati medicul

Fraza de precautie (P)	P410+P403 A se proteja de lumina solara-A se depozita intr-un spatiu bine vetilat
Depozitare	P405 A se depozita sub cheie
Fraza de precautie (P) Eliminare	P501: Aruncati conţinutul/recipientul prin firme autorizate numai in depozite autorizate
2.3 Alte pericole	NA

SECTIUNEA 3: COMPOZITIE/INFORMATII PRIVIND COMPONENTII

3.1 Substanta

GPL uz casnic este o fractie care contine n-butan, i-butan si max 12% propan. Produsul se odorizeaza cu etilmercaptan intre 50 ppm si 300 ppm. .
Continutul de 1,3 butadiena este <0.1% in GPL; se vor consulta specificatia standard si raportul de incercare al produsului.
Produs stabil, nu este coroziv si nu degradeaza materiale; este foarte inflamabil.

Substanta	Procent	EC	CAS	Clasificare conform (UE)1272/2008
GPL	<100%	270-704-2	68476-85-7	Gaz inflamabil, Categ 1, H220 Gaz sub presiune, H280

GPL – Numar inregistrare ECHA 01-2119485911-31-0004

SECTIUNEA 4: MASURI DE PRIM AJUTOR

4.1. Descrierea masurilor de prim ajutor
Substanta este extrem de inflamabila: orice scapare accidentala reprezinta un risc din punct de vedere al sanatati sii sigurantei. GPL este mai greu decat aerul si in caz de scapare se poate acumula in spatiile inchise si la nivelul solului astfel ca pot foarte usor sa se aprinda accidental
4.1.1. Instructiuni de prim ajutor furnizate in functie de caile de expunere relevante

Contact cu ochii:
Fraze de precautie aplicabile: ***P315***
Simptome: iritatie, vedere neclara (in ceata)-Vezi si sectiunea 2 din SDS
Verifica si indeparteaza lentilele de contact
In caz de arsura la ochi , spitalizati imediat accidentatul

Contact cu pielea:
Fraze de precautie aplicabile: P336, P315
Simptome: Iritare-vezi si sect 2 din SDS
- In cazul arsurilor datorate gazului lichefiat(congelare) protejati zona afectata cu un prosop curat din bumbac. Nu apasati, nu frecati pentru a se restabili circulatia locala a sangelui. Trimiteti pacientul la spital
- In cazul unor arsuri fierbinti de gradul 1 si/sau 2 raciti arsura. Tineti zona afectata sub jet de apa rece minim 5 minute sau pana durerea se atenueaza. Nu puneti gheata direct pe arsura. Indepartati cu grija hainele Nu incercati sa indepartati bucati de haine lipite de pielea arsa, dar taiati de jur imprejurul ranii.

Ingerare:
NA

In caz de Inhalare:
Simptome: dureri de cap, senzatie de greata si ameteala. In caz ca doza creste pot apare si efecte de depresie. Vezi sectiunea 2 din Fisa cu date de securitate
Inhalarea deliberata produce leziuni permanente ale creierului si poate provoca moartea
- *In cazul aparitiei simptomelor cauzate de inhalarea vaporilor:*
  - Mutati accidentatul intr-un loc ventilat si efectuati toate demersurile pentru a evita explozia si/sau incendiul, ca si riscul inhalarii pentru salvatori inclusiv folosirea aparatelor de respirat
  - Asigurati asistenta medicala imediat
  - Nu administrati adrenalina decat cu avizul medicului

-In cazul oricarei suspiciuni de inhalare a hidrogenului sulfurat:
- Inainte de acordarea primului ajutor, evaluati urgent riscul si luati decizii

cat mai repede
- Salvatorii trebuie sa aiba aparate de respiratie, echipate cu centura si curea de siguranta si sa urmeze procedurile de salvare
- Mutati accidentatul la aer curat cat mai repede posibil
- Incepeti imediat respiratie artificiala, daca accidentatul nu mai respira
- Furnizarea de oxigen poate fi de ajutor
- Btineti asistenta medicala pentru tratamentul ulterior

Fraze de precautie aplicabile: P304+P340, P315

4.1.2. Recomandari furnizate catre:

Inainte de a da primul ajutor, izolati zona de orice sursa potentiala de aprindere, incluzand deconectarea de al alimentarea cu energie electrica

A se asigura o ventilatie adecvata si verificata daca atmosfera este respirabila inainte de a patrunde in spatiile inchise

4.2. Cele mai importante simptome si efecte, atat acute cat si intarziate

Vezi sectiunea 4.1 si sect 2

4.3. Indicatii privind orice fel de asistenta medicala imediata si tratamentele speciale necesare

Inhalare	Inhalarea unor concentratii crecande (>10%) poate produce efecte narcotice. Inhalarea unor concentratii mari poate conduce la asfixiere ca o consecinta a lipsei de oxigen Monitorizati pulsul si respiratia Tratamentul trebuie sa fie simptomatic pentru a preveni efectele Persoanele cu probleme la plamani sunt cele mai susceptibile la expunere
Contactul cu pielea	In cazul arsurii prin inghetare a se evalua imediat severitatea arsurii. Daca arsura nu este grava dati primul ajutor privind inlaturarea hainelor de pe partea expusa si tineti degetele de la maini si picioare separate prin straturi de haine. Administrati tratament oral pentru indepartarea durerii. Incalziti usor zona afectata Tratati arsurile termice in aceeas maniera ca si arsurile prin inghet
Contactul cu ochii	Este recomandat un control oftalmologic, imediat ce a avut loc stropirea si arsura ochilor cu gazul lichefiat.

SECTIUNEA 5: MASURI DE COMBATERE A INCENDIILOR

Consideratii generale:
- Asigurati-va ca este disponibila o cale de evacuare
- Ramâneti in directia opusa vântului
- Opriti sursa de combustibil, daca acest lucru este posibil
- Folositi perdele de apa pentru a proteja personalul

5.1. Mijloace de stingere a incendiilor

Mijloace de stingere corespunzatoare	➢ Incendii mari o Spuma o Perdele de abur	➢ Incendii mici o Pulbere uscata o Bioxid de carbon o Nisip/pamant
Mijloace de stingere necorespunzatoare:	Nu aplicati jet de apa direct peste produsul care arde Evitati aplicarea simultana de apa si spuma pe aceeasi suprafata, deoarece apa distruge spuma	

5.2. Pericole speciale cauzate de substanta sau amestecul în cauza

Arderea incompleta poate duce la formarea de amestecuri de particule solide, lichide si gaze arse (continut de CO si compusi organici si anorganici)

5.3. Recomandari destinate pompierilor

In caz de scurgeri de gaz (aprins) - nu aplicati materiale de stingere daca scurgerea poate fi oprita in siguranta

Daca incendiul nu poate fi stins, lasati sa arda in mod controlat pana se consuma produsul.

Daca este posibil fara risc pentru personal, indepartati recipientele din zona de foc pentru a preveni riscul de explozie. Daca acest lucru nu este posibil aplicati jet de apa peste recipienti/rezervoare, pentru a raci suprafetele expuse flacarilor
In cazul unor incendii mari sau in spatii inchise /in spatii insuficient ventilate, purtati echipament complet, rezistent la foc, echipat cu aparat de respiratie si masca de protectie
A se Respecta legislatia nationala si internationala din pomeniul PSI
A NU se descarca direct in mediul acvatic substantele de stingere utilizate la stingerea incendiului
Alte materiale de stingere trebuie eliminate in conformitate cu reglementari locale

SECTIUNEA 6: MASURI DE LUAT IN CAZ DE DISPERSIE ACCIDENTALA

6.1. Precautii personale, echipament de protectie si proceduri de urgenta

6.1.1. Pentru personalul care nu este implicat in situatii de urgenta	Prezenta compusilor periculosi ai sulfului, inclusiv hidrogenul sulfurat (H2S), în mediul din preajma produsului poate, **în cazuri speciale**, sa genereze conditii periculoase specifice si sa necesite actiuni sau masuri specifice de precautie pe langa celelalte masuri standard. Opriti sau limitati scurgerea la sursa daca acest lucru prezinta siguranta. Evitati contactul direct cu materialul degajat. Stati contra vantului. Tineti personalul neimplicat la distanta de zona deversarii. Alertati personalul de urgenta. Intrati în zona doar daca este strict necesar. Se poate utiliza un detector de gaze combustibile pentru a verifica prezenta gazelor sau vaporilor inflamabili. Eliminati toate sursele de aprindere daca acest lucru prezinta siguranta (P381) (de exemplu, electricitate, scantei, incendii, flacari intermitente).
6.1.2. Pentru personalul care intervine în situatii de urgenta	Deversari de mica amploare: hainele de lucru antistatice normale sunt, de obicei, suficiente. Deversari de amploare: costum pentru întregul corp din material antistatic si rezistent la substante chimice Manusi de lucru (de preferinta cu mansete protectoare) care asigura rezistentaă adecvata la substante chimice. Intrerupeti alimentarea cu energie electrica, Nu fumati! Utilizati echipamente electrice/de ventilatie/de iluminat rezistente la explozie. Utilizati doar unelte care nu produc scântei. Luati masuri de precautie împotriva electricitatii statice. Asigurati legarea la pamant si fixarea corespunzatoare a echipamentului Ochelari de protectie si/sau masca de protectie a fetei, daca este posibil sau se anticipează stropirea sau contactul cu ochii. Protectie respiratorie: Se pot utiliza masti de gaze cu filtru de vapori organici/H2S doar în cazul unei mici scurgeri de GPL care contine H2S şi alţi compuşi nocivi. Cantitaţile mari de vapori de GPL (gaz petrolier lichefiat) creează o atmosferă săracă în oxigen şi, în acest caz, trebuie să se utilizeze doar un aparat de respirat
6.2. Precautii pentru mediul inconjurator	Deversarile produsului genereaza volume mari de gaze extrem de inflamabile care sunt mai grele decât aerul si se acumuleaza în zonele joase. Preveniti patrunderea produsului in canalele de scurgere, rauri sau alte cursuri de apa sau în spatii subterane (tuneluri, pivnite etc.) Lasati produsul sa se vaporizeze si sa se disperseze natural. Asigurati o ventilatie suficienta si verificati daca este prezenta o atmosfera sigura si respirabila înainte de intrarea în spatii închise. Deversarile maritime trebuie tratate în conformitate cu un Plan de urgenţă privind poluarea cu petrol la bordul navelor (SOPEP), conform cerintelor MARPOL Anexa 1 Regulamentul 26.

6.3. Metode si material pentru izolarea incendiilor si pentru curatenie

6.3.1. Masuri de izolare a unei cantitati varsate	Recuperarea produsului nu este posibila, in mod obisnuit.
6.3.2. Masuri de curatare a unei cantitati varsate	Deversarile produsului lichid în apa vor cauza probabil o vaporizare rapida si completa a produsului. Izolati zona si preveniti pericolul de incendiu/ explozie pentru nave si alte structuri, tinand seama de directia si viteza vantului, pana cand produsul este complet dispersat.
6.3.3 Alte informatii	Deversarile unor cantitaţi limitate de produs, în special în aer liber când vaporii sunt, de obicei, dispersaţi rapid, reprezintă situaţii dinamice, care limitează probabil expunerea la concentraţii periculoase.
6.4. Trimiteri catre alte sectiuni	În acele cazuri în care se suspecteaza sau se demonstreaza prezenţa unor cantităţi periculoase de SO2 sau H2S, pot fi justificate acţiuni suplimentare sau speciale, inclusiv restricţionări ale accesului, utilizarea de echipamente speciale de protecţie, proceduri speciale şi instruirea personalului

SECTIUNEA 7: MANIPULAREA SI DEPOZITAREA

Pericole specifice pe care le prezinta produsul: GPL este extreme de inflamabil si mai greu decat aerul. In cazul unor scapari, vaporii se pot acumula in spatiile inchise la nivelul solului. Concentratii ridicate de gaz disloca oxigenul din aer. Exista risc de explozie ale amestecurilor de aer si GPL.

7.1. Precautii pentru manipularea in conditii de securitate

7.1.1. Recomandari pentru manipulare	Fraze de precautie aplicabile: P240, 241, 242, 243, 281 A se tine la distanta de caldura/scantei/flacari deschise/ suprafete fierbinti.- A nu se fuma Luati masuri de precautie impotriva electricitatii statice. Container si echipamente de colectare legate la pamant/fixate Vaporii sunt mai grei decat aerul. Aveti grija la acumularea in puturi si spatiile inchise
7.1.2. Recomandari privind igiena generala la locul de munca	Evitati contactul cu pielea si ochii. Evitati inhalarea vaporilor. Trebuie evitat contactul cu lichidul si cu containerele si liniile de livrare de pe care tocmai a fost extras GPL pentru a preveni degeraturile. Utilizati echipamente individuale de protectie adecvate după cum este necesar.

7.2. Conditii de depozitare în conditii de securitate, inclusiv eventuale incompatibilitati

Depozitare	Asigurati-va ca toate reglementarile referitoare la atmosfere explosive, manipulare infrastructura de depozitare a produselor inflamabile sunt respectate. Utilizati si stocati numai in aer liber/zone bine ventilate Proiectarea zonei de stocare, a rezervoarelor, a echiapmentelor si procedurile de operare trebuie sa respecte legislatia europeana, nationala si locala. Lucrari de curatire, inspectie si mentenanta a structurilor interioare ale rezervoarelor trebuie efectuate corespunzator cu reglementari definite la nivel national, local si in cadrul companiei, numai cu personal calificat si echipat corespunzator. Cilindri se vor stoca in zone reci, bine ventilate si protejate de lumina soarelui. Cilindrii nu trebuie stocati in vecinatatea tuburilor care contin oxigen comprimat
Materiale recomandate	Pentru containere sau conducte ale containerelor utilizati materiale specific aprobate pentru utilizarea/stocarea acestui produs
Materiale nerecomandate	Materiale din metal nerecomandate: aluminiul nu trebuie utilizat atat la containere cat si conductele aferente, pentru utilizarea GPL. Anumite forme ale containerelor din fier de asemenea nu sunt recomandate. Materiale nemetalice: Cauciucul natural, plastice si cauciucul nitrilic sunt materiale nepotrivite pentru utilizarea acestui produs
7.3. Utilizare finala specifica	Combustibil gazos si lichefiat pentru uz casnic si industrial Scenarii de expunere in Anexa

SECTIUNEA 8: CONTROALE ALE EXPUNERII/PROTECTIA PERSONALA

8.1. Parametri de control	GPL vapori :Valoare limita de expunere la 8 ore: 1000 ppm (1800 mg/m3) GPL, la o expunere de 10 min (dupa Norma germana), valoare limita de expunere ocupationala este de 1250 ppm (2250 mg/m3) Propan: 1400 mg/m3(778 ppm) la 8 ore 1800 mg/m3(1000 ppm) la 15 min Benzen: 3.25 mg/m3(1 ppm), la 8 ore; Cancerigen 1A, Mutagen 1B (Directiva 2004/37) 1,3 Butadiena: 22 mg/m3(10 ppm) la 8 ore ; Cancerigen 1A, Mutagen 1B
Proceduri recomandate privind monitorizarea	Daca acest produs este sau contine substante cu limite de expunere ocupationala, poate fi ceruta monitorizarea atmosferica a personalului, si a locului de munca sau biologica, pentru a se verifica eficienta ventilatiei sau daca sunt necesare alte masuri de control / sau daca este necesara utilizarea echipamentului de protectie a respiratiei. Referinta este Standardul European EN 689 pentru metodele de evaluarea expunerii la noxele chimice cat si reglementarile nationale privind determinarea substantelor periculoase.
8.2. Controale ale expunerii	Produsul este extrem de inflamabil-in acest context, masuri de control adecvate trebuie luate avandu-se in vedere proprietatile fizico-chimice care fac aceasta substanta periculoasa (rezultate pentru Butan) Limita inferioara / superioara de formare a amestecului exploziv cu aerul 1.8-15%
8.2.1. Controale tehnice corespunzătoare	A se asigura o ventilatie adecvata. Mentineti expunerea ocupationala sub limitele prevazute, prin asigurarea unei ventilati locale, masuri de control si procese inchise. Concentratiile de gaze si vapori trebuie mentinute in afara limitelor de explozie prin masuri tehnologice si tehnice. Echipamentul de ventialtie trebuie sa fie anti-Ex.
8.2.2. Masuri de protectie individuala, precum echipamentul de protectie personala	
8.2.2.1. Utilizarea echipamentului de protectie personala	A se utiliza echipament de protectie adecvat pentru ochi si maini.
8.2.2.2. Specificatii detaliate privind tipul de echipament care va asigura protectia	
(a) Protectia ochilor/fetei	Se vor purta ochelari de protectie cu sticla sau ochelari de protectie chimica conform reglementarilor referitoare la protectia ochilor; se va evita folosirea lentilelor de contact la locul de munca.
(b) Protectia pielii	Se va evita expunerea la atmosfera incarcata de vapori fara purtarea echipamentului de protectie adecvat: imbracaminte de protectie (salopeta) din bumbac 100%, fara accesorii metalice, incaltaminte de protectie antistatica, manusi din neopren, masca cu cartus filtrant (aparat de respiratie indepent cu cartus filtrant), ochelari de protectie.
(i) Protectia mainilor	Manusi din neopren.
(ii)Altele	NA
(c) Protectia respiratiei	Masca cu cartus filtrant (aparat de respiratie indepent cu cartus filtrant).
(d) Pericole termice	NA
8.2.3 Controlul expunerii mediului	Scurgerile se vor colecta in ambalaje etanse in vederea eliminarii sau reciclarii ulterioare.

SECTIUNEA 9: PROPRIETATILE FIZICE SI CHIMICE

9.1. Informatii privind proprietatile fizice si chimice de baza

(a) Aspect	Fara culoare
(b) Miros	miros specific de hidrocarbura (mercaptan)
(c) Pragul de acceptare a mirosului	NA

(d) pH	NA
(e) Punctul de topire/punctul de înghetare	De la - 187.6 °C pana la -138.3 °C
(f) Punctul initial de fierbere si intervalul de fierbere	-161.48°C la -0.5°C.
(g) Punctul de aprindere	In domeniul: -104 °C pana la - 60.0°C
(h) Viteza de evaporare	NA
(i) Inflamabilitatea (solid, gaz)	NA
(j) Limita inferioară/superioara de inflamabilitate sau de explozie	1.8- 15 %
(k) Presiunea de vapori absoluta	min 170 kPa la 10 ^{o}C – max 750 kPa la 50 ^{o}C
(l) Densitate produs vaporizat	min 2550 kg/m3 (t=0 ^{o}C, p=101,325 kPa)
(m) Densitatea absoluta	0.4228-0.599 g/ cm3 la 25°C.
(n) Solubilitatea in apa	24.4 la 60.4 mg/l
(o) Coeficient partitie n-octanol/apa	Log Kow 1.09 to 2.8
(p) Temperatura de auto-aprindere	De la 287°C pana la 537°C.
(q) Temperatura descompunere	NA
(r) Vascozitatea	NA
(s) Proprietati explozive	NA
(t) Proprietati oxidante	NA
9.2 Alte informatii	NA

SECTIUNEA 10: STABILITATE SI REACTIVITATE

10.1. Reactivitate	Gazele petroliere nu sunt autoreactive iar in cazul incalzirii descompunerea nu este exoterma. GPL nu este considerat oxidant, avandu-se in vedere formula structurala
10.2. Stabilitate chimica	Produs stabil; nu este coroziv si nu degradeaza materialele; este extrem de inflamabil. Conform structurii chimice nu sunt considerate oxidante
10.3. Posibilitatea de reactii periculoase	GPL este extrem de inflamabil si mai greu decat aerul. Exista riscul formarii de amestecuri explozive 1.8-15%.
10.4. Conditii de evitat	Caldura, Temperaturi>50 °C, Scatei, Flacara deschisa, suprafete fierbinti
10.5. Materiale incompatibile	Agenti oxidanti
10.6. Produsi de descompunere periculosi	Exista riscul de incendiu prin autoaprindere la temp sau formarii de amestecuri explozive cu aerul intre min 1.8 % si max 9.5 % Incompleta ardere poate conduce la formarea de amestecuri de particule solide, lichide si gaze arse (continut de CO si compusi organici si anorganici)

SECTIUNEA 11: INFORMATII TOXICOLOGICE

11.1. Informatii privind efectele toxicologice

11.1.1. Substante	C1-C4 (alcani + propilena)
11.1.1.1. Diferitele clase de pericole relevante	Extrem de inflamabile pentru domeniul cuprins intre 1.8-15% (substante testate: i-butan, n-butan, propan) Punct de inflamabilitate: -60 °C la 1013 hPa (butan) Punct de inflamabilitate: -87 °C la 1013 hPa (i-butan) Punct de inflamabilitate: -104 °C la 1013 hPa (Propan) Datele disponibile privind componentele C1-C4 (alcani si propilena), indica faptul ca substantele din aceasta categorie au o toxicitate scazuta la inhalare. Acestea sunt practic netoxice la o singura expunere , sub limita inferioara de inflamabilitate, cea mai mare parte a acestora aflarta in domeniul 1.8% - 2.4 % (34000-42000 mg/m^3) Asfixierea, ca o consecinta a deficitului de oxigen, reprezinta un potential risc la doze mari peste limita inferioara de imflamabilitate. Propanul si butanul provoaca depresii. Isobutanul si butanul pot provoca efecte cardiovasculare reversibile daca expunerea inceteaza imediat. Inhalarea

	intentionata provoca euforie, halucinatii, greata, convulsii, coma. Moartea poate interveni ca urmare a toxicitatii cardiace directe sau asupra sistemului nervos central. Pentru propilena concentratia limita la care poate apare efectul anestezic este 40% = 688000 mg/m^3
(a) toxicitate acuta la inhalare	Probe de gaze petroliere au fost testate in cadrul studiilor de toxicitate in caz de inhalare, Rezultatele au indicat: o Inhalare (sobolan) LC_{50} > 20 mg/l tract Studiile indica faptul ca iso-butanul, CAS nr. 75-28-5, are o toxicitate acuta la inhalare scazuta. Nu sunt efecte toxice sub limita de inflamabilitate de 18000 ppm (42787 mg/m^3 42.8 mg/L) Benzen: DN(M)EL $_{inhalare}$=3.24 mg/m3 la 8 ore; ruta de expunere cea mai probabila la benzen este inhalarea 1,3 Butadiena: DN(M)EL $_{inhalare}$= 2,21 mg/m3 la 8 ore studiile effectuate pe rozatoare au arata ca 1,3 butadiena se absoarbe prin plamani.
(b) corodarea/iritarea pielii	Gazele petroliere sunt foarte inflamabile la temperatura mediului ambiant. Nu s-au realizat studii privind efecte de iritare/corodare a pielii si nu exista indicii in literatura de specialitate. Contactul direct cu pielea al gazelor petroliere lichefiate poate conduce la degeraturi datorita evaporarii rapide care conduce la scaderea brusca a temperaturii pielii Benzen: DN(M)EL $_{piele}$= 23.4 mg/kg, la 8 ore >0.1% - <5% 1,3 Butadiena , DN(M)EL:NA
(c) lezarea grava/iritarea ochilor	Gazele petroliere sunt foarte inflamabile la temperatura mediului ambiant.. Nu s-au realizat studii privind efecte de iritare ale ochilor; nu sunt indicatii in acest sens nici in literatura de specialitate. Contactul direct cu ochii al gazelor petroliere lichefiate poate conduce la degaraturi datorita evaporarii rapide si a scaderii bruste a temperaturii mucoasei conjunctive.
(d) sensibilizarea cailor respiratorii sau a pielii	Gazele petroliere sunt foarte inflamabile la temperatura mediului ambiant. Nu sunt studii prinvind sensibilizarea pielii sau a aparatului respirator. Nu sunt date in acest sens in literatura de specialitate Iritarea cailor respiratorii: Nu s-au inregistrat efecte adverse la 688000 /861000 mg/m^3
(e) mutagenitatea celulelor germinative	Potentialul mutagenic al gazelor petroliere a fost studiat in vivo si in vitro . Nu exista evidente privind activitatea mutagenica. Fractiile GPL continand <0.1% benzen si < 0.1 % 1,3 butadiena nu sunt mutagene si nu este necesara etichetarea conform cu DSD si CLP Unele fractii petroliere pot contine 1,3 Butadiena si benzen. Benzenul se poate intalni in unele fractii GPL <0.3%; benzenul este identificat ca mutagen. 1,3 budadiena este clasificata ca Mutagena. Fractiile GPL continand ≥0.1% benzene sau ≥0.1% 1,3-butadiena sunt clasificate Mutagenic Cat 2, R46 /DPD (Dir 1999/45/EC) si Cat 1B, H340 conform GHS/CLP
(f) cancerogenitatea	Nu sunt date privind efectele cancerigene ale fractiilor C1-C4 saturate. 1,3 Butadiena si benzenul sunt cancerigene, prin urmare continutul acestei substante in fractiile de gaze petroliere poate influenta clasificarea. Cu toate aceste fractiile de GPL care contin ≥0.1% benzene or 1,3-butadiene sunt considerate cancerigene pentru om si animale.
(g) toxicitatea pentru reproducere	Nu exista evidente privind toxicitatea pentru reproducere a GPL

(h) STOT (toxicitate asupra organelor tinta specifice) – expunere unica	Nu exista evidenta. In cazul unei expuneri pe termen scurt, poate interveni efectul de narcoze. In general GPL si substantele din aceasta categorie sunt netoxice la o singura expunere, sub limita inferioara de inflamabilitate, la o concentratie de 1.8%-2.4 %,(cca 34,000 – 42,000 mg/$m^{3)}$.)
(i) STOT (toxicitate asupra organelor tintă specifice) – expunere repetata	In cazul unor expuneri repetate, s-au efectuat teste pe sobolani, la expuneri repetate timp de 13 saptamani. Nu s-au observat efecte privind toxicitatea supra unor organe. Sobolan : NOAEC (systemic toxicity): 21394 mg/m³ air (male/female) (la cea mai inalta concentratie testate de i-butan) Sobolan : NOAEC (systemic toxicity):10000ppm (male/female) (la cea mai inalta concentratie testate de GPL)
(ii) inhalare	Om: la maximum de doza inhalare, de 10000 ppm(GPL) nu s-au observat efecte adverse
(j) pericol prin aspirare	Nerelevant- Gazele petroliere nu sunt in stare lichida la temperatura mediului ambiant

SECTIUNEA 12: INFORMATII ECOLOGICE

12.1. Toxicitate Toxicitate acuta pe termen scurt	Datorita volatilitatii foarte mari, fractiile de gaze petroliere nu au efecte asupra speciilor acvatice. Pesti : LC50 (96 h): 49.47 mg/L (propan) Pesti: LC50 (96 h): 24.11 mg/L test mat. (estimat) (butan) Pesti: LC50 (96 h): 27.98 mg/Ltest mat. (estimat) (i-butan) Daphnea: LC50 (48 h): 27.14 mg/L test mat. (estimat) (propan) LC50 (48 h): 14.22 mg/L test mat. (estimat) (butan) Pentru nevertebrate LC50(96 h) : 14.22-69.43 mg/l in apa proaspata
Toxicitate cronica pentru mediul acvatic	Alge si plante acvatice: EC50 (96 h): 11.89 mg/L test mat. (estimat) (propan) EC50 (96 h): 8.57 mg/L test mat. (estimat) (i-butan) EC50 (96 h): 7.71 mg/L test mat. (estimat) (butan)
12.2. Persistenta si degradabilitate	Date experimentale privind biodegradarea nu sunt disponibile, avand in vedere repartitia acestora in principal in atmosfera. In absenta acestor date se considera ca se biodegradeaza rapid
12.3. Potential de bioacumulare	Datorita coeficientului Low Kow< 3, fractiile de gaze petroliere au un potential de bioacumulare si/sau de adsorbtie in sol foarte mic. Solubilitatea in apa se afla intr-un domeniu 24.4-60.4 mg/l GPL: Log Kow = 2.8 Propan(C3) :Log Kow= 1.8
12.4. Mobilitate în sol	Nu e cazul
12.5. Rezultatele evaluarii PBT si vPvB	Avand in vedere criteriile de evaluare a unei substante privind persistenta in mediu, bioacumularea si toxicitatea, GPL nu este PBT sau vPvBvT. Criteriile sunt urmatoarele: **Date privind Persistenta(P) si Foarte Persistent(vP)**: Folosind modelul de predictiv BioHCwin rezultatele privind timpul de injumatatire al fractiilor din categoria GPL se situeaza in domeniul 2.55-4.05 zile Timp de injumatatire (T½) > 60 zile in apa marina/ sau Timp de injumatatire (T½) > 40 zile in apa de rau/estuare/ sau Timp de injumatatire (T½) > 180 zile in sedimente marine /sau Timp de injumatatire (T½) > 120 zile in sedimente de apa de rau sau estuare Timp de injumatatire (T½) in sol > 120 zile GPL - **Date privind Bioacumularea(B) /foarte bioaculuative(vB)** LPG: Log Kow=2.8, BCF=80.1 L/kg

	BCF > 2000 L/kg specii acvatice marine si de apa dulce Substantele avand log Kow <4.5 nu sunt Bioacumulative GPL –**Date de Toxicicitate(T)/Toxicitate inalta(vT)** - Pește LC50 apă proaspăta, variază: 11,07 mg / L 147.54 mg / l (modelul QSAR) EC50 (96 ore) pentru nevertebrate în apă proaspătă este estimat in intervalul 7.02-69.43 mg / l (modelul QSAR) EC50 pentru alge in apă proaspătă este estimată cuprins în intervalul 4.71 - 16.5 mg / l (modelul QSAR) Prin urmare, substanțele GPL nu sunt considerate ca fiind potențial toxice
12.6. Alte efecte adverse	GPL si fractii gazoase din aceeasi categorie nu sunt clasificate periculoase pentru mediu

SECTIUNEA 13: CONSIDERATII PRIVIND ELIMINAREA

13.1. Metode de tratare a deseurilor	
Instructiuni pentru indepartarea produsului si a deseurilor	Produsul eliminat ca si deseu va trebui colectat si retransmis la utilizare.
Ambalaj contaminat	Daca este necesara depozitarea oricaror materiale contaminate în vederea eliminarii în siguranta, trebuie utilizate doar containere adecvate (etanse la aer, etichetate, sigilate, impermeabile, împamântate si fixate). In cazul deversarilor mari, indepartarea solului contaminat in scopul remedierii sau eliminarea in conditii de siguranta poate fi avuta in vedere.

SECTIUNEA 14: INFORMATII REFERITOARE LA TRANSPORT

14.1. Numarul ONU	UN 1965
14.2. Denumirea oficiala ONU pentru transport	HIDRO-CARBURI GAZOASE IN AMESTEC LICHEFIAT,N.S.A.ca amestecuri A, A01, A02, A0, A1, B1, B2, B sau C
14.3. Clasa de pericol pentru transport	2
14.4. Grupa de ambalare	Nu se aplica
14.5. Pericole pentru mediul înconjurator	Da
14.6. Precautii speciale pentru utilizatori	
Numar de identificare pericol	23
Etichete	2.1, gaz inflamabil
Cod restrictie tunel	B/D – Nota: cerinta numai ADR

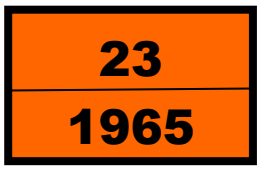

Fig.1

Fig.2

14.7. Transport în vrac, în conformitate cu anexa II la MARPOL 73/78 si Codul IBC – nu se aplica

SECTIUNEA 15: INFORMATII DE REGLEMENTARE

15.1. Regulamente/legislatie in domeniul securitatii, sanatatii si al mediului specifice (specifica) pentru substanta sau amestecul în cauza

Dispozitii comunitare privind sanatatea si mediu:

Legea 59/11 aprilie 2015 privind privind controlul asupra pericolelor de accident major in care sunt implicate substante periculoase (abroga HG 804/2007) si care implementeaza **Directiva 2012/18/UE** a Parlamentului European si a Consiliului din 4 Iulie 2012(SEVESO III)	**Categorii de pericol**	Cantităţile relevante (tone) de substanţe periculoase astfel cum sunt menţionate la art. 3 pct. 21 pentru încadrarea amplasamentelor de nivel inferior/nivel superior
	Anexa 1 Partea 1 P2 Gaze Inflamabile Gaze inflamabile, categoria 1 sau 2	10 / 50
REGULAMENT(CE) Nr 1907/2006 a Parlamentului European si Consiliului Referitor la Inregistrarea, Evaluarea, Autorizarea si Restructionarea Substantelor Chimice (REACH)	Substanta este inregistrata in conformitate cu Regulamentul REACH In Anexa XVII, substanta este mentionata la pct.3 din Anexa 17- cu referire la Gaze inflamabile mentionate la pct.2.2 din Anexa 1 la Regulament 1272/2008 cu actualizari	
Directiva 2008/68/CE privind transportul substantelor periculoase	Produsul face obiectul Directiva 2008/68/CE transpusa in legislatia nationala	
Directiva Consiliului 1999/13/EC privind reducerea emisiilor de compusi organici volatili datorate utilizarii solventilor datorate utilizarii solventilor organici in anumite activitati si instalatii	Produsul nu face obiectul Directivei 1999/13/CE.	
Directive 94/63/CE a Parlamentului European si a Consiliului privind controlul emisiilor de compusi oraganici volatile(COV) rezultati din depozitarea carburantilor si distributia acestora de la terminale la statii de distributie a carburantilor *Directiva no.2009/126/CE a Parlamentului European si a Consiliului* privind etapa II de recuperare a vaporilor de benzina in timpul alimentarii autovehiculelor de la statiile de benzina	Produsul nu face obiectul restrictiilor prevazute in legislatia nationala de transpunere a Directivei	
Directiva 92/85/EEC din 19 Octombrie 1992 privind introducerea de masuri de imbunatatire a sanatatii si securitatii la locul de munca pentru lucratoarele gravide, care au nascut de curand sau care alapteaza (a 10-a Directiva speciala coform art.16(1) din Directiva 89/391/EEC)	Doar daca se aplica Notele K, produsul nu face obiectul restrictiilor prevazute in legislatia nationala de transpunere a Directivei	
Directiva 94/33/EC privind protectia tinerilor la locul de munca	Produsul face obiectul Directivei, Anexa nr.crt.3-pentru categoria *Agenti chimici-Gaze inflamabile H220*	

Alte Reglementari:

- Regulamentul UE 2015/830 de modificare a Regulamentului (CE) nr. 1907/2006 al Parlamentului European și al Consiliului privind înregistrarea, evaluarea, autorizarea și restricționarea substanțelor chimice (REACH)
- Regulament (EC) 1272/2008 privind clasificarea, etichetarea si ambalarea substantelor si a amestecurilor, de modificare si de abrogare a Directivelor 67/548/CEE si 1999/45/CE, precum si de modificare a Regulamentului (CE) nr. 1907/2006
- Regulamentul (CE) nr 1907/2006 privind înregistrarea, evaluarea si autorizarea substanţelor chimice si restricţiile aplicabile acestor substanţe
- Regulamentul nr. 944/2013 de modificare, în vederea adaptării la progresul tehnic şi ştiinţific, a Regulamentului (CE) nr. 1272/2008 al Parlamentului European şi al Consiliului privind clasificarea,

etichetarea şi ambalarea substanţelor şi a amestecurilor Legea 319/2006, Legea securitatii si sanatatii in munca
- Directiva 89/656/CEE privind stabilirea regulilor minime de sanatate si securitate in munca, la utilizarea echipamentului individual de protectie la locul de munca
- Directiva 2012/18/UE a Parlamentului European și a Consiliului din 4 iulie 2012 privind controlul pericolelor de accidente majore care implică substanțe periculoase, de modificare și ulterior de abrogare a Directivei 96/82/CE a Consiliului
- Directiva 2004/37/EC privind Protectia lucratorilor la locul de munca de riscurile legate de expunerea la substante cancerigene si mutagene
- Directivele 2006/12/EC si 2008/98/EC privind deseurile
- Directiva 89/391/CEE privind stabilirea masurilor de promovare a imbunatatirii sanatatii si securitatii lucratorilor
- Directiva Consiliului 92/85/CEE din 19 octombrie 1992 privind aplicarea măsurilor de promovare a îmbunătăţirii securităţii şi sănătăţii la locul de muncă în cazul lucrătoarelor gravide, al celor care au născut de curând sau care alăptează (a zecea directivă specială în sensul art. 16 alin. (1) din Directiva 89/391/CEE)
- Directiva 94/33/CE a Consiliului privind protectia tinerilor la locul de munca
- Legea no.319 / 2006, Legea securității și sănătății muncă
- H.G. 347/2003, Anexa 11, sectiunea 29
- H.G. 852/2002 cu privire la gestionarea deseurilor
- H.G. no.1218/2006 privind stabilirea cerintelor minime de securitate si sanatate în munca pentru asigurarea protectiei lucratorilor împotriva riscurilor legate de prezenta agentilor chimici completata de HG nr.1/2012
- HG nr. 355/2007 privind supravegherea sanatatii lucratorilor
- Legea nr. 59/2016 privind controlul asupra pericolelor de accident major în care sunt implicate substanţe periculoase
- Reguli pentru transportul CF international al marfurilor periculoase (RID)
- Tratat European pentru transportul auto international al marfurilor periculoase (ADR)
- Cod Maritim international pentru transportul marfurilor periculoase (IMDG)
- Tratat European pentru transportul international al marfurilor periculoase pe cai maritime, fluvii, rauri (ADN)

15.2. Evaluarea securitatii chimice — Scenarii expunere realizate in cadrul procesului de inregistrare REACH. Sunt anexate scenarii de expunere relevante

SECTIUNEA 16: ALTE INFORMATII

16.1. Evidentierea informatiilor care au fost adaugate, sterse sau modificate

Au fost completate sectiunile 1, 2, 3, 12, 15 si 16

16.2. Legenda abrevierilor sau acronimelor utilizate

ECHA	The European Chemicals Agency – Agentia Europeana pentru Substante Chimice
GHS	Globally Harmonised System – Sistemul armonizat de clasificare
CLP	Classification, Labelling and Packaging – Clasificare, Etichetare si ambalare
DSD	Dangerous Substances Directive – Directiva substantelor periculoase
TLV-TWA	Treshold Limit value – Valoare limita de prag (Norma germana)
ACGIH	American Conference of Governmental Industrial Hygienists – Conferinta Americana a Igienistilor din Industrie
BCF	Bio Concentration Factor – Factor de bioconcentrare
NOEC	No-observed effect concentration – Concentratia la care nu exista efecte observabile
NOAEC	No observed adverse effect concentration- Concentratia la care nu exista efecte adverse observabile
PBT	Persistenta, Bioacumulare, Toxicitate
vPvBvT	Foarte Persistent, Foarte Bioacumulabil, Foarte Toxic
NA	Not applicable – Nu se aplica

16.3. Literatura de specialitate si sursele de date

- Fise cu date de securitate chimica internationale
- ESIS (European Chemical Substances Information System - Sistem informatizat european al substantelor chimice) - http://ecb.jrc.ec.europa.eu/esis/ - baza date IUCLID
- Dosare produse REACH - http://echa.europa.eu/ro/information-on-chemicals/registered-substances
- LOA-Raport de securitate chimica
- Specificatie standard

16.4. Lista completa a frazelor de pericol (H)si de precautie (P) relevante conform cu Regulamentul 1272/2008 (CLP)

Fraze de pericol:	H220 : Gaze inflamabile de categoria de pericol 1 H280: Contine gaz sub presiune, pericol de explozie in caz de incalzire + H340: Poate provoca anomalii genetice (indicati calea de expunere,daca exista probe concludente ca nici o altă cale de expunere nu provoaca acest pericol) H350: Poate provoca cancer (indicati calea de expunere, daca exista probe concludente ca nici o altă cale de expunere nu provoaca acest pericol)
Fraze de precautie:	P102 A nu se lasa la indemana copiilor P210 A se pastra departe de surse de caldură/scântei/flacari deschise sau suprafete încinse. – Fumatul interzis. P202: A nu se manipula decât dupa ce au fost citite si întelese toate masurile de securitate. P260 Nu inspirați praful/fumul/ gazul/ceața/ vaporii/spray-ul. P377- Incendiu cauzat de o scurgere de gaz: nu încercati sa stingeti, decât daca scurgerea poate fi oprita în siguranta P381: Eliminati toate sursele de aprindere, daca acest lucru se poate face în siguranta P308+P313 ÎN CAZ DE expunere sau de posibila expunere: Consultati medical P410+P403 A se proteja de lumina solara-A se depozita intr-un spatiu bine ventilat

Sistemul integrat de management calitate-mediu-sanatate si securitate in munca este in conformitate cu standardele:

- ISO 9001:2008
- ISO 14001:2004
- OHSAS 18001:2007

Laboratorul de incercari este acreditat de RENAR in conformitate cu SR EN ISO/CEI 17025: 2005.

ANNEX –LPG –EXPOSURE SCENARIOS for identified uses

9.1. Exposure scenario 1: Manufacture of petroleum gases streams in Other Petroleum Gases

9.1.1. Exposure scenario

Section 1	**Exposure Scenario Title**
Title	**Manufacture of Other Petroleum Gases**
Use Descriptor	Sector of Use: Industrial (SU3, SU8, SU9)
	Process Categories: PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC15
	Environmental Release Categories: ERC1, ERC4
Processes, tasks, activities covered	Manufacture of the Substance or use as an intermediate or process chemical or extraction agent. Includes recycling/ recovery, material transfers, storage, sampling, associated laboratory activities, maintenance and loading (including marine vessel/barge, road/rail car and bulk container).
Section 2	**Operational conditions and risk management measures**
Field for additional statements to explain scenario if required.	
Section 2.1	**Control of worker exposure**
Product characteristics	
Physical form of product	Liquid, vapour pressure > 10 kPa [OC5].
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently) [G13].
Amounts used	*Not applicable*
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently) [G2]
Human factors not influenced by risk management	*Not applicable*
Other Operational Conditions affecting worker exposure	Assumes use at not > 20°C above ambient [G15]; Assumes a maximum Butadiene content of 1% and a maximum Benzene content of 1%. Assumes a good basic standard of occupational hygiene is implemented [G1].
Contributing Scenarios	**Risk Management Measures** *Note: list RMM standard phrases according to the control hierarchy indicated in the ECHA template: 1. Technical measures to prevent release, 2. Technical measures to prevent dispersion, 3. Organisational measures , 4. Personal protection. Phrases between brackets are good practice advice only, beyond REACH Chemical Safety Assessment and may be communicated in Section 5 of the ES or within the main sections of the SDS.*

General measures (carcinogens) [G18].	Consider technical advances and process upgrades (including automation) for the elimination of releases. Minimise exposure using measures such as closed systems, dedicated facilities and suitable general / local exhaust ventilation. Drain down systems and clear transfer lines prior to breaking containment. Clean / flush equipment, where possible, prior to maintenance. Where there is potential for exposure: Restrict access to authorised persons; provide specific activity training to operators to minimise exposures; wear suitable gloves and coveralls to prevent skin contamination; wear respiratory protection when its use is identified for certain contributing scenarios; clear up spills immediately and dispose of wastes safely. Ensure safe systems of work or equivalent arrangements are in place to manage risks. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance. [G20].
General exposures (closed systems) [CS15].	Handle substance within a closed system [E47].
General exposures (closed systems) [CS15]. With sample collection [CS56]. With occasional controlled exposure [CS140].	Handle substance within a closed system [E47].
General exposures (closed systems) [CS15]. Use in contained batch processes [CS37].	Handle substance within a closed system [E47].
General exposures (open systems) [CS16]. Batch process [CS55]. With sample collection [CS56].	Handle substance within a predominantly closed system provided with extract ventilation [E49]. Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) [E11], OR [G9] Ensure activity is undertaken outdoor [69]. Avoid carrying out activities involving exposure for more than 1 hour [OC27].
Process sampling [CS2].	Handle substance within a closed system [E47]. Use a sampling system designed to control exposure [E89]. Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) [E11], OR [G9] Ensure activity is undertaken outdoor [69].
Laboratory activities [CS36].	Handle within a fume cupboard or implement suitable equivalent methods to minimise exposure [E12].
Bulk transfers [CS14]. (open systems) [CS108].	Handle substance within a closed system [E47]. Ensure material transfers are under containment or extract ventilation [E66].
Bulk transfers [CS14]. (closed systems) [CS107].	Ensure material transfers are under containment or extract ventilation [E66].
Equipment cleaning and maintenance [CS39].	Drain down system prior to equipment break-in or maintenance [E65]. Provide extract ventilation to points where emissions occur [E54].
Storage [CS67]. With occasional controlled exposure [CS140].	Ensure material transfers are under containment or extract ventilation [E66]. Store substance within a closed system [E84].

Section 2.2	**Control of environmental exposure**
Substance is not classified – environmental exposure assessment not required	
Section 3	**Exposure Estimation**
3.1. Health	The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise

	indicated. G21 *When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposures are not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1 as indicated in Appendix A.*
3.2. Environment	Qualitative approach used to conclude safe use.[EE8]
Section 4	**Guidance to check compliance with the Exposure Scenario**
4.1. Health	*Confirm that RMMs and OCs are as described or of equivalent efficiency. See Appendix A for details of efficiencies and OC.*
4.2. Environment	No additional risk management measures required.[DSU7]
Section 5	**Additional good practice advice beyond the REACH Chemical Safety Assessment - (Section Optional)**
Note: The measures reported in this section have not been taken into account in the exposure estimates related to the exposure scenario above. They are not subject to obligation laid down in Article 37 (4) of REACH.	
Control of Worker Exposure	
Selection of relevant Contributing Scenario phrases	*Good practice RMM phrases may be incorporated in this section or consolidated into the main sections of the SDS, depending on the preference of the Registrant and functionality of the available e-SDS system.*
Control of environmental exposure	
	Not applicable

9.1.2. Exposure estimation

9.1.2.1. Workers exposure

The worker exposure estimates for the activities associated with the manufacturing of petroleum gases streams in Other Petroleum Gases were assessed using ECETOC TRAv2 (See Appendix A). Appendix A contains Tables 1 and 2 used to model the worker exposures. These tables contain all the operating conditions, and the efficiencies of the exposure modifiers including RPE, PPE and LEV. A separate table (also in Appendix A) contains the associated RMMs.

9.2. Exposure scenario 2: Distribution of Other Petroleum Gases

9.2.1. Exposure scenario

Section 1	**Exposure Scenario Title**
Title	**Distribution of Other Petroleum Gases**
Use Descriptor	Sector of Use: Industrial (SU3, SU8, SU9)
	Process Categories: PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9, PROC15
	Environmental Release Categories: ERC1 - 7
Processes, tasks, activities covered	Loading (including marine vessel/barge, rail/road car and IBC loading) and repacking (including drums and small packs) of substance, including its distribution and associated laboratory activities
Section 2	**Operational conditions and risk management measures**
Field for additional statements to explain scenario if required.	
Section 2.1	**Control of worker exposure**
Product characteristics	
Physical form of product	Liquid, vapour pressure > 10 kPa [OC5].
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently) [G13].
Amounts used	*Not applicable*
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently) [G2]
Human factors not influenced by risk management	*Not applicable*
Other Operational Conditions affecting worker exposure	Assumes use at not > 20°C above ambient [G15]; Assumes Butadiene content 1% and Benzene content 1% Assumes a good basic standard of occupational hygiene is implemented [G1].
Contributing Scenarios	**Risk Management Measures** *Note: list RMM standard phrases according to the control hierarchy indicated in the ECHA template: 1. Technical measures to prevent release, 2. Technical measures to prevent dispersion, 3. Organisational measures , 4. Personal protection. Phrases between brackets are good practice advice only, beyond REACH Chemical Safety Assessment and may be communicated in Section 5 of the ES or within the main sections of the SDS.*

General measures (carcinogens) [G18]	Consider technical advances and process upgrades (including automation) for the elimination of releases. Minimise exposure using measures such as closed systems, dedicated facilities and suitable general / local exhaust ventilation. Drain down systems and clear transfer lines prior to breaking containment. Clean / flush equipment, where possible, prior to maintenance. Where there is potential for exposure: Restrict access to authorised persons; provide specific activity training to operators to minimise exposures; wear suitable gloves and coveralls to prevent skin contamination; wear respiratory protection when its use is identified for certain contributing scenarios; clear up spills immediately and dispose of wastes safely. Ensure safe systems of work or equivalent arrangements are in place to manage risks. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance. [G20].
General exposures (closed systems) [CS15].	Handle substance within a closed system [E47].
General exposures (closed systems) [CS15]. With sample collection [CS56]. With occasional controlled exposure [CS140].	Handle substance within a closed system [E47]. Sample via a closed loop or other system to avoid exposure [E8]
General exposures (closed systems) [CS15]. Use in contained batch processes [CS37].	Handle substance within a closed system [E47]. Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) [E11]. Ensure material transfers are under containment or extract ventilation [E66].
General exposures (open systems) [CS16]. Batch process [CS55]. With sample collection [CS56].	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) [E11]. Sample via a closed loop or other system to avoid exposure [E8]
Process sampling [CS2].	Sample via a closed loop or other system to avoid exposure [E8].
Laboratory activities [CS36].	Handle within a fume cupboard or implement suitable equivalent methods to minimise exposure [E12].
Bulk transfers [CS14]. (closed systems) [CS107].	Handle substance within a closed system [E47]. Ensure material transfers are under containment or extract ventilation [E66].
Drum and small package filling [CS6].	Provide a good standard of general or controlled ventilation (10 to 15 air changes per hour) [E40]. Ensure material transfers are under containment or extract ventilation [E66].
Equipment cleaning and maintenance [CS39].	Drain down and flush system prior to equipment break-in or maintenance [E55]. Provide a good standard of general or controlled ventilation (10 to 15 air changes per hour) [E40].
Storage [CS67]. With occasional controlled exposure [CS140].	Store substance within a closed system [E84]. Ensure operation is undertaken outdoors [E69].

Section 2.2	**Control of environmental exposure**
Substance is not classified – environmental exposure assessment not required	
Section 3	**Exposure Estimation**

3.1. Health	The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated. G21 *When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposures are not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1 as indicated in Appendix A.*
3.2. Environment	Qualitative approach used to conclude safe use.[EE8]
Section 4	**Guidance to check compliance with the Exposure Scenario**
4.1. Health	*Confirm that RMMs and OCs are as described or of equivalent efficiency. See Appendix A for details of efficiencies and OC.*
4.2. Environment	No additional risk management measures required.[DSU7]
Section 5	**Additional good practice advice beyond the REACH Chemical Safety Assessment - (Section Optional)**
Note: The measures reported in this section have not been taken into account in the exposure estimates related to the exposure scenario above. They are not subject to obligation laid down in Article 37 (4) of REACH.	
Control of Worker Exposure	
Selection of relevant Contributing Scenario phrases	*Good practice RMM phrases may be incorporated in this section or consolidated into the main sections of the SDS, depending on the preference of the Registrant and functionality of the available e-SDS system.*
Control of environmental exposure	
	Not applicable

9.2.2. Exposure estimation

9.2.2.1. Workers exposure

The worker exposure estimates for the activities associated with the distribution of petroleum gases streams in Other Petroleum Gases were assessed using ECETOC TRAv2 (See Appendix A). Appendix A contains Tables 1 and 2 used to model the worker exposures. These tables contain all the operating conditions, and the efficiencies of the exposure modifiers including RPE, PPE and LEV. A separate table (also in Appendix A) contains the associated RMMs.

9.3. Exposure scenario 3: Formulation of Other Petroleum Gases

9.3.1. Exposure scenario

Section 1	**Exposure Scenario Title**
Title	**Formulation & (re)packaging of substances and mixtures of Other Petroleum Gases**
Use Descriptor	Sector of Use: Industrial (SU3, SU10)
	Process Categories: PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC14, PROC15
	Environmental Release Categories: ERC2
Processes, tasks, activities covered	Formulation, packing and re-packing of the substance and its mixtures in batch or continuous operations, including storage, materials transfers, mixing, large and small scale packing, maintenance and associated laboratory activities
Section 2	**Operational conditions and risk management measures**
Field for additional statements to explain scenario if required.	
Section 2.1	**Control of worker exposure**
Product characteristics	
Physical form of product	Liquid, vapour pressure > 10 kPa [OC5].
Concentration of substance in product	Covers percentage substance in the product up to 100 % (unless stated differently) [G13].
Amounts used	*Not applicable*
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently) [G2]
Human factors not influenced by risk management	*Not applicable*
Other Operational Conditions affecting worker exposure	Assumes use at not > 20°C above ambient [G15]; Assumes butadiene content 1% and benzene content 1% Assumes a good basic standard of occupational hygiene is implemented [G1].
Contributing Scenarios	**Risk Management Measures** *Note: list RMM standard phrases according to the control hierarchy indicated in the ECHA template: 1. Technical measures to prevent release, 2. Technical measures to prevent dispersion, 3. Organisational measures , 4. Personal protection. Phrases between brackets are good practice advice only, beyond REACH Chemical Safety Assessment and may be communicated in Section 5 of the ES or within the main sections of the SDS.*

General measures (carcinogens) [G18]	Consider technical advances and process upgrades (including automation) for the elimination of releases. Minimise exposure using measures such as closed systems, dedicated facilities and suitable general / local exhaust ventilation. Drain down systems and clear transfer lines prior to breaking containment. Clean / flush equipment, where possible, prior to maintenance. Where there is potential for exposure: Restrict access to authorised persons; provide specific activity training to operators to minimise exposures; wear suitable gloves and coveralls to prevent skin contamination; wear respiratory protection when its use is identified for certain contributing scenarios; clear up spills immediately and dispose of wastes safely. Ensure safe systems of work or equivalent arrangements are in place to manage risks. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance. [G20].
General exposures (closed systems) [CS15].	Handle substance within a closed system [E47].
General exposures (closed systems) [CS15]. With sample collection [CS56]. With occasional controlled exposure [CS140].	Handle substance within a closed system [E47]. Sample via a closed loop or other system to avoid exposure [E8]
General exposures (closed systems) [CS15]. Use in contained batch processes [CS37].	Handle substance within a closed system [E47]. Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings [E60].
General exposures (open systems) [CS16]. Batch process [CS55]. With sample collection [CS56].	Sample via a closed loop or other system to avoid exposure [E8]
Process sampling [CS2].	Sample via a closed loop or other system to avoid exposure [E8].
Laboratory activities [CS36].	Handle within a fume cupboard or implement suitable equivalent methods to minimise exposure [E12].
Bulk transfers [CS14].	Ensure material transfers are under containment or extract ventilation [E66].
Mixing operations (open systems) [CS30].	Provide extract ventilation to points where emissions occur [E54]. Provide a good standard of general or controlled ventilation (10 to 15 air changes per hour) [E40].
Drum and small package filling [CS6].	Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings [E60]. Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) [E11].
Equipment cleaning and maintenance [CS39].	Drain down and flush system prior to equipment break-in or maintenance [E55]. Clear spills immediately [C&H13]. Wear a respirator conforming to EN140 with Type A filter or better [PPE22]. Retain drain downs in sealed storage pending disposal or for subsequent recycle [ENVT4].
Storage [CS67]. With occasional controlled exposure [CS140].	Ensure material transfers are under containment or extract ventilation [E66]. Store substance within a closed system [E84].

Section 2.2	**Control of environmental exposure**
Substance is not classified – environmental exposure assessment not required	
Section 3	**Exposure Estimation**

3.1. Health	The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated. G21 *When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposures are not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1 as indicated in Appendix A.*
3.2. Environment	Qualitative approach used to conclude safe use.[EE8]
Section 4	**Guidance to check compliance with the Exposure Scenario**
4.1. Health	*Confirm that RMMs and OCs are as described or of equivalent efficiency. See Appendix A for details of efficiencies and OC.*
4.2. Environment	No additional risk management measures required.[DSU7]
Section 5	**Additional good practice advice beyond the REACH Chemical Safety Assessment - (Section Optional)**
Note: The measures reported in this section have not been taken into account in the exposure estimates related to the exposure scenario above. They are not subject to obligation laid down in Article 37 (4) of REACH.	
Control of Worker Exposure	
Selection of relevant Contributing Scenario phrases	*Good practice RMM phrases may be incorporated in this section or consolidated into the main sections of the SDS, depending on the preference of the Registrant and functionality of the available e-SDS system.*
Control of environmental exposure	
	Not applicable

9.3.2. Exposure estimation

9.3.2.1. Workers exposure

The worker exposure estimates for the activities associated with the use in of streams in Other Petroleum Gases in formulation were assessed using ECETOC TRAv2. See Appendix A). Appendix A contains Tables 1 and 2, used to model the worker exposures. These tables contain all the operating conditions, and the efficiencies of the exposure modifiers including RPE, PPE and LEV. A separate table (also in Appendix A) contains the associated RMMs.

9.5. Exposure scenario 5: Use of Other Petroleum Gases in fuels - Industrial

9.5.1. Exposure scenario

Section 1	**Exposure Scenario Title**
Title	**Use in Fuels of Other Petroleum Gases**
Use Descriptor	Sector of Use: Industrial (SU3)
	Process Categories: PROC1, PROC2, PROC3, PROC8a, PROC8b, PROC16
	Environmental Release Categories: ERC7
Processes, tasks, activities covered	Covers the use as a fuel (or fuel additive) and includes activities associated with its transfer, use, equipment maintenance and handling of waste.
Section 2	**Operational conditions and risk management measures**
Field for additional statements to explain scenario if required.	
Section 2.1	**Control of worker exposure**
Product characteristics	
Physical form of product	Liquid, vapour pressure > 10 kPa [OC5].
Concentration of substance in product	Covers daily exposures up to 8 hours (unless stated differently) [G2]
Amounts used	*Not applicable*
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently) [G2]
Human factors not influenced by risk management	*Not applicable*
Other Operational Conditions affecting worker exposure	Assumes use at not > 20°C above ambient [G15]; Assumes Butadiene content 1% and Benzene content 1% Assumes a good basic standard of occupational hygiene is implemented [G1].
Contributing Scenarios	**Risk Management Measures** *Note: list RMM standard phrases according to the control hierarchy indicated in the ECHA template: 1. Technical measures to prevent release, 2. Technical measures to prevent dispersion, 3. Organisational measures , 4. Personal protection. Phrases between brackets are good practice advice only, beyond REACH Chemical Safety Assessment and may be communicated in Section 5 of the ES or within the main sections of the SDS.*

General measures (carcinogens) [G18].	Consider technical advances and process upgrades (including automation) for the elimination of releases. Minimise exposure using measures such as closed systems, dedicated facilities and suitable general / local exhaust ventilation. Drain down systems and clear transfer lines prior to breaking containment. Clean / flush equipment, where possible, prior to maintenance. Where there is potential for exposure: Restrict access to authorised persons; provide specific activity training to operators to minimise exposures; wear suitable gloves and coveralls to prevent skin contamination; wear respiratory protection when its use is identified for certain contributing scenarios; clear up spills immediately and dispose of wastes safely. Ensure safe systems of work or equivalent arrangements are in place to manage risks. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance. [G20].
Bulk transfers [CS14].	Provide a good of general ventilation (not less than 3 to 5 air changes per hour) [E11]. Ensure material transfers are under containment or extract ventilation [E66].
Drum/batch transfers [CS8].	Ensure material transfers are under containment or extract ventilation [E66]. {Wear suitable gloves tested to EN374 [PPE15]}.
General exposures (closed systems) [CS15].	Handle substance within a closed system [E47].{Wear suitable gloves tested to EN374 [PPE15]}.
General exposures (closed systems) [CS15]. With occasional controlled exposure [CS140].	Handle substance within a predominantly closed system provided with extract ventilation [E49].
General exposures (closed systems) [CS15]. Batch process [CS55].	Handle substance within a predominantly closed system provided with extract ventilation [E49]. Provide a good of general ventilation (not less than 3 to 5 air changes per hour) [E11].
General exposures (open systems) [CS16].	Provide a good standard of general or controlled ventilation (10 to 15 air changes per hour) [E40].
General exposures (open systems) [CS16]. (closed systems) [CS107]. Batch process [CS55].	Handle substance within a predominantly closed system provided with extract ventilation [E49]. Provide a good standard of general or controlled ventilation (10 to 15 air changes per hour) [E40].
Equipment maintenance [CS5].	Drain down and flush system prior to equipment break-in or maintenance [E55]. Provide a good standard of general or controlled ventilation (10 to 15 air changes per hour) [E40].
Vessel and container cleaning [CS103].	Drain down and flush system prior to equipment break-in or maintenance [E55]. Provide a good standard of general or controlled ventilation (10 to 15 air changes per hour) [E40]. Only allow access to authorised persons [AP1] Apply vessel entry procedures including use of forced supplied air. [AP15]
Storage [CS67].	Store substance within a closed system [E84].
Storage [CS67]. With occasional controlled exposure [CS140].	Provide extract ventilation to points where emissions occur [E54]. Store substance within a closed system [E84].

Section 2.2	**Control of environmental exposure**
Substance is not classified – environmental exposure assessment not required	

Section 3	**Exposure Estimation**
3.1. Health	The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated. G21 *When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposures are not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1 as indicated in Appendix A.*
3.2. Environment	Qualitative approach used to conclude safe use.[EE8]
Section 4	**Guidance to check compliance with the Exposure Scenario**
4.1. Health	*Confirm that RMMs and OCs are as described or of equivalent efficiency. See Appendix A for details of efficiencies and OC.*
4.2. Environment	No additional risk management measures required.[DSU7]
Section 5	**Additional good practice advice beyond the REACH Chemical Safety Assessment - (Section Optional)**
Note: The measures reported in this section have not been taken into account in the exposure estimates related to the exposure scenario above. They are not subject to obligation laid down in Article 37 (4) of REACH.	
Control of Worker Exposure	
Selection of relevant Contributing Scenario phrases	*Good practice RMM phrases may be incorporated in this section or consolidated into the main sections of the SDS, depending on the preference of the Registrant and functionality of the available e-SDS system.*
Control of environmental exposure	
	Not applicable

9.5.2.1. Workers exposure

The worker exposure estimates for the activities associated with the industrial use of petroleum gases streams in Other Petroleum Gases in fuels were assessed using ECETOC TRAv2. See Appendix A). Appendix A contains Tables 1 and 2, used to model the worker exposures. These tables contain all the operating conditions, and the efficiencies of the exposure modifiers including RPE, PPE and LEV. A separate table (also in Appendix A) contains the associated RMMs.

9.6. Exposure scenario 6: Use of Other Petroleum Gases in fuels – Professional

9.6.1. Exposure scenario

Section 1	**Exposure Scenario Title**
Title	**Use in Fuels of Other Petroleum Gases**
Use Descriptor	Sector of Use: Professional (SU22)
	Process Categories: PROC1, PROC2, PROC3, PROC8a, PROC8b, PROC16
	Environmental Release Categories: ERC 9A, ERC 9B
Processes, tasks, activities covered	Covers the use as a fuel (or fuel additive) and includes activities associated with its transfer, use, equipment maintenance and handling of waste.
Section 2	**Operational conditions and risk management measures**
Field for additional statements to explain scenario if required.	
Section 2.1	**Control of worker exposure**
Product characteristics	
Physical form of product	Liquid, vapour pressure > 10 kPa [OC5].
Concentration of substance in product	Covers daily exposures up to 8 hours (unless stated differently) [G2]
Amounts used	*Not applicable*
Frequency and duration of use	Covers daily exposures up to 8 hours (unless stated differently) [G2]
Human factors not influenced by risk management	*Not applicable*
Other Operational Conditions affecting worker exposure	Assumes use at not > 20°C above ambient [G15]; Assumes Butadiene content 1% and Benzene content 1% Assumes a good basic standard of occupational hygiene is implemented [G1].
Contributing Scenarios	**Risk Management Measures** *Note: list RMM standard phrases according to the control hierarchy indicated in the ECHA template: 1. Technical measures to prevent release, 2. Technical measures to prevent dispersion, 3. Organisational measures , 4. Personal protection. Phrases between brackets are good practice advice only, beyond REACH Chemical Safety Assessment and may be communicated in Section 5 of the ES or within the main sections of the SDS.*

LOA Other Petroleum Gases Category

General measures (carcinogens) [G18]	Consider technical advances and process upgrades (including automation) for the elimination of releases. Minimise exposure using measures such as closed systems, dedicated facilities and suitable general / local exhaust ventilation. Drain down systems and clear transfer lines prior to breaking containment. Clean / flush equipment, where possible, prior to maintenance. Where there is potential for exposure: Restrict access to authorised persons; provide specific activity training to operators to minimise exposures; wear suitable gloves and coveralls to prevent skin contamination; wear respiratory protection when its use is identified for certain contributing scenarios; clear up spills immediately and dispose of wastes safely. Ensure safe systems of work or equivalent arrangements are in place to manage risks. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance. [G20].
Bulk transfers [CS14].	Provide a good standard of general or controlled ventilation (10 to 15 air changes per hour) [E40]. Ensure material transfers are under containment or extract ventilation [E66]. Avoid carrying out activities involving exposure for more than 4 hours [OC28].
Drum/batch transfers [CS8].	Ensure material transfers are under containment or extract ventilation [E66]. Ensure operation is undertaken outdoors [E69]; or [G9]; Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) [E11]. Avoid carrying out operation involving expsoure for more than 15 minutes [OC26].
General exposures (closed systems) [CS15].	Handle substance within a closed system [E47].
General exposures (closed systems) [CS15]. With occasional controlled exposure [CS140].	Ensure material transfers are under containment or extract ventilation [E66]. Ensure operation is undertaken outdoors [E69]; or [G9]; Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) [E11].
General exposures (open systems) [CS16]. (closed systems) [CS107]. Batch process [CS55].	Provide a good standard of general or controlled ventilation (10 to 15 air changes per hour) [E40]. Ensure material transfers are under containment or extract ventilation [E66].
General exposures (open systems) [CS16].	Ensure operation is undertaken outdoors [E69]; or [G9]; Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) [E11].
Equipment cleaning and maintenance [CS39].	Drain down and flush system prior to equipment break-in or maintenance [E55]. Ensure material transfers are under containment or extract ventilation [E66]. Ensure operation is undertaken outdoors [E69]; or [G9]; Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) [E11]. Wear a respirator conforming to EN140 with Type A filter or better [PPE22].
Vessel and container cleaning [CS103]	Drain down and flush system prior to equipment break-in or maintenance [E55].Ensure material transfers are under containment or extract ventilation [E66]. Ensure operation is undertaken outdoors [E69]; or [G9]; Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) [E11]. Wear a respirator conforming to EN140 with Type A filter or better [PPE22]. Only allow access to authorised persons [AP1] Apply vessel entry procedures including use of forced supplied air. [AP15]
Storage [CS67].	Store substance within a closed system [E84].

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LOA Other Petroleum Gases Category

Section 2.2	**Control of environmental exposure**
Substance is not classified – environmental exposure assessment not required	
Section 3	**Exposure Estimation**
3.1. Health	The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated. G21 *When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposures are not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1 as indicated in Appendix A.*
3.2. Environment	Qualitative approach used to conclude safe use.[EE8]
Section 4	**Guidance to check compliance with the Exposure Scenario**
4.1. Health	*Confirm that RMMs and OCs are as described or of equivalent efficiency. See Appendix A for details of efficiencies and OC.*
4.2. Environment	No additional risk management measures required.[DSU7]
Section 5	**Additional good practice advice beyond the REACH Chemical Safety Assessment - (Section Optional)**
Note: The measures reported in this section have not been taken into account in the exposure estimates related to the exposure scenario above. They are not subject to obligation laid down in Article 37 (4) of REACH.	
Control of Worker Exposure	
Selection of relevant Contributing Scenario phrases	*Good practice RMM phrases may be incorporated in this section or consolidated into the main sections of the SDS, depending on the preference of the Registrant and functionality of the available e-SDS system.*
Control of environmental exposure	
	Not applicable

9.6.2. Exposure estimation

9.6.2.1. Workers exposure

The worker exposure estimates for the activities associated with the professional use of petroleum streams in Other Petroleum Gases in fuels were assessed using ECETOC TRAv2. See Appendix A). Appendix A contains Tables 1 and 2, used to model the worker exposures. These tables contain all the operating conditions, and the efficiencies of the exposure modifiers including RPE, PPE and LEV. A separate table (also in Appendix A) contains the associated RMMs.

9.6.2.2. Consumer exposure

See exposure scenario 9.7 for consumer use as a fuel

9.6.2.3. Indirect exposure of humans via the environment (oral)

See Appendix B.

9.6.2.4. Environmental exposure

Not applicable

9.7. Exposure scenario 7: Use of Other Petroleum Gases in fuels – Consumer

9.7.1. Exposure scenario

Section 1		**Exposure Scenario Title**
Title		**Fuels**
Sector of Use (SU code)		21
Use Descriptor (PC codes)		PC13
Processes, tasks, activities covered		Covers consumer uses in liquid fuels
Environmental Release Category		
Specific Environmental Release Category		
Section 2		**Operational conditions and risk management measures**
Field for additional statements to explain scenario if required - pending better understanding from ECHA		
Section 2.1		**Control of consumer exposure**
Product characteristics		
Physical form of product		liquid
Vapour pressure		255000
Concentration of substance in product		Unless otherwise stated, cover concentrations up to 5% [ConsOC1]
Amounts used		Unless otherwise stated, covers use amounts up to45000g [ConsOC2]; covers skin contact area up to 0cm2 [ConsOC5]
Frequency and duration of use/exposure		Unless otherwise stated, covers use frequency up to 0.143 times per day [ConsOC4]; covers exposure up to 0.05 hours per event [ConsOC14]
Other Operational Conditions affecting exposure		Unless otherwise stated assumes use at ambient temperatures [ConsOC15]; assumes use in a 20 m^3 room [ConsOC11]; assumes use with typical ventilation [ConsOC8].
Section 2.1.1		**Product categories**
PC13:Fuels--Liquid - subcategories added: Automotive Refuelling	OC	Unless otherwise stated, covers concentrations up to 5% [ConsOC1]; covers use up to 52 days/year[ConsOC3]; covers use up to 1 time/on day of use[ConsOC4]; for each use event, covers use amounts up to 45000g [ConsOC2]; covers outdoor use [ConsOC12]; covers use in room size of 100m3[ConsOC11]; for each use event, covers exposure up to

		0.05hr/event[ConsOC14];
	RMM	No specific RMMs developed beyong those OCs stated
PC13:Fuels--Domestic use of LPG cylinders uses in heating and cooking	OC	Unless otherwise stated, covers concentrations up to 5% [ConsOC1]; covers use up to 26 days/year[ConsOC3]; covers use up to 1 time/on day of use[ConsOC4]; for each use event, covers use amounts up to 13000g [ConsOC2]; covers use in room size of 20m3[ConsOC11]; for each use event, covers exposure up to 0.03hr/event[ConsOC14];
	RMM	No specific RMMs developed beyong those OCs stated
Section 2.2		**Control of environmental exposure**
Substance is not classified – environmental exposure assessment not required		
Section 3		**Exposure Estimation**
3.1. Health		The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated. G21 *When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposures are not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1 as indicated in Appendix A.*
3.2. Environment		Qualitative approach used to conclude safe use.[EE8]
Section 4		**Guidance to check compliance with the Exposure Scenario**
4.1. Health		*Confirm that RMMs and OCs are as described or of equivalent efficiency. See Appendix A for details of efficiencies and OC.*
4.2. Environment		No additional risk management measures required.[DSU7]
Section 5		**Additional good practice advice beyond the REACH Chemical Safety Assessment - (Section Optional)**
Note: The measures reported in this section have not been taken into account in the exposure estimates related to the exposure scenario above. They are not subject to obligation laid down in Article 37 (4) of REACH.		

Control of Worker Exposure	
Selection of relevant Contributing Scenario phrases	*Good practice RMM phrases may be incorporated in this section or consolidated into the main sections of the SDS, depending on the preference of the Registrant and functionality of the available e-SDS system.*
Control of environmental exposure	
	Not applicable

9.7.2. Exposure estimation

9.7.2.1. Workers exposure

Not applicable.

9.7.2.3. Indirect exposure of humans via the environment (oral)

See Appendix B.

9.7.2.3. Environmental exposure

Not applicable