



GOLDER

Klassifikation af olieforurennet jord som farligt affald.

DAKOFA

AARHUS d. 26. JUNI 2019

MSc. et Sc. Thomas Hougaard, Seniorrådgiver

Olieforurenet jord – Hvad er det ?

Olieforurenet jord er jord forurenet med olie

Det vil blandt andet sige

Benzen, benzin, bitumen, diesel, fedtgasolie, fyringsolie, heavy fuel, hydraulikolie, JP-1, JP-4, JP-5, JP-6, JP-7, JP-8, JPTS, kerosen, kondensatolie, kulbrinter, petroleum, rensebenzin, smøreolie, svær fuel, symaskineolie, Swift Fuel, terpentin, toluen, transformerolie, vaselineolie, xylene.

Men, principielt, ikke

Polyaromatiske kulbrinter, PAH, bortset fra naftalin.

Olieforurenet jord – Hvad er det ?

Olieforurenet jord er jord forurenet med olie

Men ikke vegetabiliske olie som fritureolie, amerikansk olie og linolie eller olier af appelsin, avokado, banan, citron, hasselnødder, hvedekim, kokos, majs, natlys, oliven, palme, raps, solsikke, valmue, valnødder, vindruer, kerner, m.v.

Ej heller animalske olie som levertran, hvalolie, hajolie, fiskeolie, hvalolie, benolie eller marvolie.

Eller menneskabte stoffer som alkydolie, silikoneolie og PCB-olie

Bionedbrydelige hydraulikolier og biobrændstof er heller ikke omfattet

Hvad er (mineral)olie

Mineralolie, stenolie/petroleum, er et blandingsprodukt bestående af flere tusinde forbindelser.

Olie er dannet ud fra marint plantemateriale.

Olie indeholder hovedsageligt kulbrinter med nogen NSO-forbindelser og metaller.

Kulbrinterne har typisk mellem 1 og 35-40 kulstofatomer.

Sammensætningen af råolie er meget forskellig, men indeholder alle følgende kulbrintegrupper i varierende indbyrdes forhold:

- a. n- og i-alkaner*
- b. Cycloalkaner*
- c. Monoaromater*
- d. Polyaromater, PAH*
- e. Komplekse kulbrinter*
- f. NSO-forbindelser*

Beskrivelse af olie

Teknisk beskrivelse omfatter typisk

Viskositet

Flammepunkt

Oktantal

Centantal

Kogepunktsinterval

Destillationsinterval

Brændværdi

Parafinfpunkt

Størkningspunkt

Damptryk

Kemisk beskrivelse omfatter typisk

Monoaromater

n-alkaner

Polyaromater

Komplekse kulbrinter

NSO-forbindelser

Krackningsgrad

C-intervaller

Damptryk

BTEX

Egenskaber for råolie

ECHA-KLASSIFIKATION

Petroleum (crude oil)

Substance identity

EC / List no.: 686-185-4

CAS no.: -

Mol. formula:

Hazard classification & labelling



Danger! According to the classification provided by companies to ECHA in **CLP notifications** this substance may be fatal if swallowed and enters airways, is an extremely flammable liquid and vapour, is harmful to aquatic life with long lasting effects and may cause drowsiness or dizziness.

The InfoCard summarises the non-confidential data on substances as held in the databases of the European Chemicals Agency (ECHA), including data provided by third parties. The InfoCard is automatically generated. Information requirements under different legislative frameworks may therefore not be up-to-date or complete. Substance manufacturers and importers are responsible for consulting official publications. This InfoCard is covered by the ECHA Legal Disclaimer:



about INFOCARD - Last updated: 04/02/2018

Egenskaber for benzin

ECHA-KLASSIFIKATION

Gasoline

A complex combination of hydrocarbons consisting primarily of paraffins, cycloparaffins, aromatic and olefinic hydrocarbons having carbon numbers predominantly greater than C3 and boiling in the range of 30°C to 260°C (86°F to 500°F).

Brief Profile - Last updated: 17/06/2019

Substance Description

Hazard classification & labelling

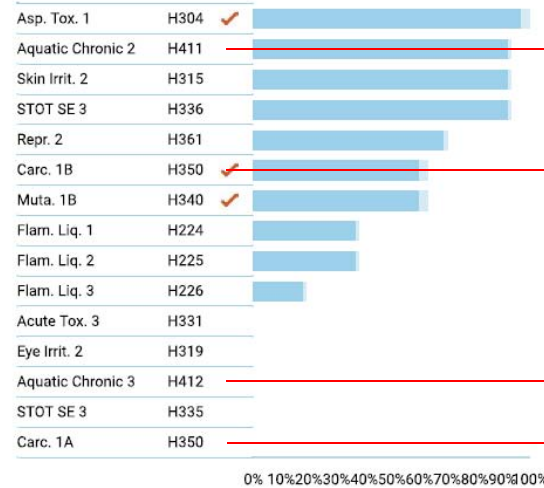


Danger! According to the **harmonised classification and labelling** (ATP01) approved by the European Union, this substance may be fatal if swallowed and enters airways, may cause genetic defects and may cause cancer.



Additionally, the classification provided by companies to ECHA in **REACH registrations** identifies that this substance is toxic to aquatic life with long lasting effects, is an extremely flammable liquid and vapour, is suspected of damaging fertility or the unborn child, causes skin irritation and may cause drowsiness or dizziness.

Breakdown of all 3473 C&L notifications submitted to ECHA



✓ Harmonised Classification
■ REACH registration dossiers notifications
■ CLP notifications

Koncentrations
Grænse

25.000

1.000

1000

250.000

10.000

1000

Egenskaber for diesel

ECHA-KLASSIFIKATION

Fuels, diesel

A complex combination of hydrocarbons produced by the distillation of crude oil. It consists of hydrocarbons having carbon numbers predominantly in the range of C9 through C20 and boiling in the range of approximately 163°C to 357°C (325°F to 675°F).

Brief Profile - Last updated: 05/06/2019

Substance Description

Hazard classification & labelling

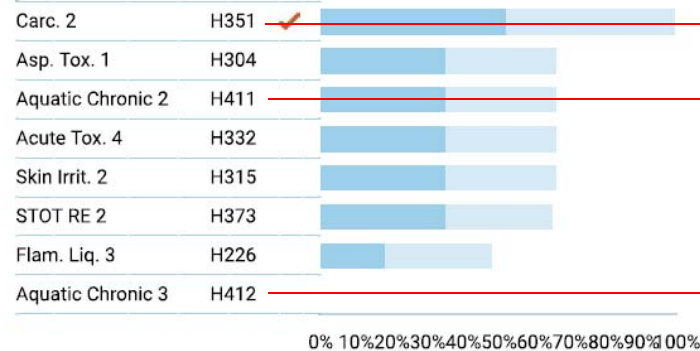


Warning! According to the **harmonised classification and labelling** (CLP00) approved by the European Union, this substance is suspected of causing cancer.



Additionally, the classification provided by companies to ECHA in **REACH registrations** identifies that this substance may be fatal if swallowed and enters airways, is toxic to aquatic life with long lasting effects, is harmful if inhaled, may cause damage to organs through prolonged or repeated exposure, is a flammable liquid and vapour and causes skin irritation.

Breakdown of all 1279 C&L notifications submitted to ECHA



- ✓ Harmonised Classification
- REACH registration dossiers notifications
- CLP notifications

Koncentrations
Grænse

Afskærings-
værdi

10.000

25.000

1.000

250.000

10.000

Egenskaber for smøreolier

ECHA-KLASSIFIKATION

Lubricating oils

A complex combination of hydrocarbons obtained from solvent extraction and dewaxing processes. It consists predominantly of saturated hydrocarbons having carbon numbers in the range C15 through C50.

Brief Profile - Last updated: 05/06/2019

Substance Description

Hazard classification & labelling

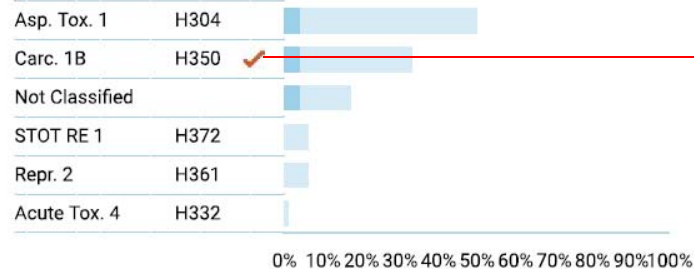


Danger! According to the **harmonised classification and labelling** (CLP00) approved by the European Union, this substance may cause cancer.

Additionally, the classification provided by companies to ECHA in **REACH registrations** identifies that this substance may be fatal if swallowed and enters airways.

Additionally, the classification provided by companies to ECHA in **CLP notifications** identifies that this substance causes damage to organs through prolonged or repeated exposure and is suspected of damaging fertility or the unborn child.

Breakdown of all 957 C&L notifications submitted to ECHA



- ✓ Harmonised Classification
- REACH registration dossiers notifications
- CLP notifications

Koncentrations -
Grænse

1.000
Hvis DMSO-
ekstrakt > 3%.

Egenskaber for bitumen

ECHA-KLASSIFIKATION

Asphalt

A very complex combination of high molecular weight organic compounds containing a relatively high proportion of hydrocarbons having carbon numbers predominantly greater than C25 with high carbon-to-hydrogen ratios. It also contains small amounts of various metals such as nickel, iron, or vanadium. It is obtained as the non-volatile residue from distillation of crude oil or by separation as the raffinate from a residual oil in a deasphalting or decarbonization process.

Brief Profile - Last updated: 05/06/2019

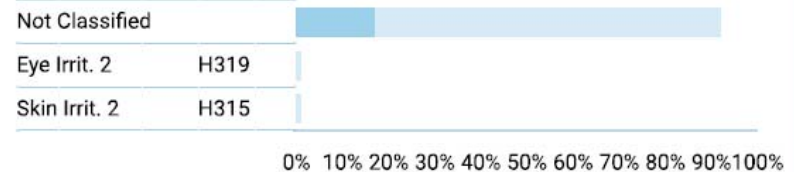
Substance Description

Hazard classification & labelling

According to the notifications provided by companies to ECHA in REACH registrations no hazards have been classified.

According to the majority of notifications provided by companies to ECHA in CLP notifications no hazards have been classified.

Breakdown of all 529 C&L notifications submitted to ECHA



- ✓ Harmonised Classification
- REACH registration dossiers notifications
- CLP notifications

Egenskaber for vakuum residualer af råolie

ECHA-KLASSIFIKATION

Residues (petroleum), vacuum

A complex residuum from the vacuum distillation of the residuum from atmospheric distillation of crude oil. It consists of hydrocarbons having carbon numbers predominantly greater than C34 and boiling above approximately 495°C (923°F).

Brief Profile - Last updated: 16/05/2019

Substance Description

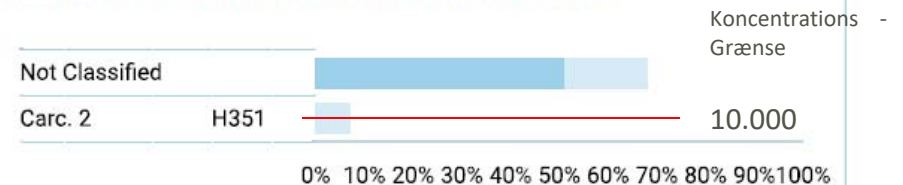
Hazard classification & labelling

According to the notifications provided by companies to ECHA in REACH registrations no hazards have been classified.



Additionally, the classification provided by companies to ECHA in **CLP notifications** identifies that this substance is suspected of causing cancer.

Breakdown of all 124 C&L notifications submitted to ECHA



- ✓ Harmonised Classification
- REACH registration dossiers notifications
- CLP notifications

Regneeksempel med HP 14

BENZIN. OG DIESELFORURENET JORD

Summeringsregler:

Kronisk farlige for vandmiljøet kategori 1, 2 eller 3:

$$[100 \times \Sigma c (H410) + 10 \times \Sigma c (H411) + \Sigma c (H412) \geq 25 \%]$$

Kronisk farlige for vandmiljøet, kategori 1, 2, 3 eller 4:

$$[\Sigma c H410 + \Sigma c H411 + \Sigma c H412 + \Sigma c H413 \geq 25 \%]$$

Jord forurenet med 2430 mg C₆-C₁₀, benzin, og 6000 mg C₁₀-C₂₅, diesel.

Benzin: H411 og H412.

Diesel: H411 og H412

$$\text{Værdi: } 10 \times (2430+6000) + (2430+6000) = 84300 + 8430 = 92730$$

eller

$$10 \times (2430+6000) = 84300$$

Regneeksempel, fortsat

BENZIN. OG DIESELFORURENET JORD

Hvis scenarie 1, hvor det samme stofs koncentrationer medregnes for både H411 og H412, er korrekt, betyder det, at den samlede koncentration af benzin og diesel, ca. C_6 - C_{20} , ikke må overskride $250.000/11 = 22728$ mg/kg.

Hvis scenarie 2 er korrekt, dvs. at der kun regnes for H411, betyder det at den samlede koncentration af benzin og diesel, ca. C_6 - C_{20} , ikke må overskride $250.000/1 = 25.000$ mg/kg.

Re-klassifikation af olieforurennet jord.

BENZIN. OG DIESELFÖRURENET JORD

Jord forurennet med mere end 1000 mg benzin / kg er farligt affald p.g.a. Carc. 1A/HP350

Jord forurennet med mere end 10.000 mg diesel er farligt affald, p.g.a. Carc. 2/HP351.

Regneeksempel på reklassificering:

Jord indeholder 3.600 mg benzin C₆-C₁₀. Det er derfor farligt affald p.g.a. Carc. 1A/HP350.

Analysen viser også, at jorden indeholder 500 mg benzen, 1000 mg toluen, 350 mg ethylbenzen og 1200 mg xylener.

Benzen har en grænse for farligt affald på 1000 mg/kg p.g.a. Carc. 1A.

Toluen har en grænse på 3000 mg/kg p.g.a. Repr. 1A.

Ethylbenzen har en grænse på 25.000 mg/kg p.g.a. H411

Xylener har en grænse på 10.000 mg/kg p.g.a. STOT RE 1 og STOT SE 1.

Med redegørelsen for BTEX er der 550 mg benzin tilbage, og jorden er ikke farligt affald.

Se uden for kassen med farligt affald

REGLER ER IKKE ALTID FORNUFTIGE



Kvarts

ER ALT JORD FARLIGT AFFALD ?



"En sten kan ikke flyve. Morlille kan ikke flyve. Ergo er morlille en sten!"

Kvarts

ER ALT JORD FARLIGT AFFALD ?

Jord består af
mellem
30 og 100 %
 SiO_2 i form af
kvarts,
cristobalit,
tridymit,
flint
m.m.



Kvarts

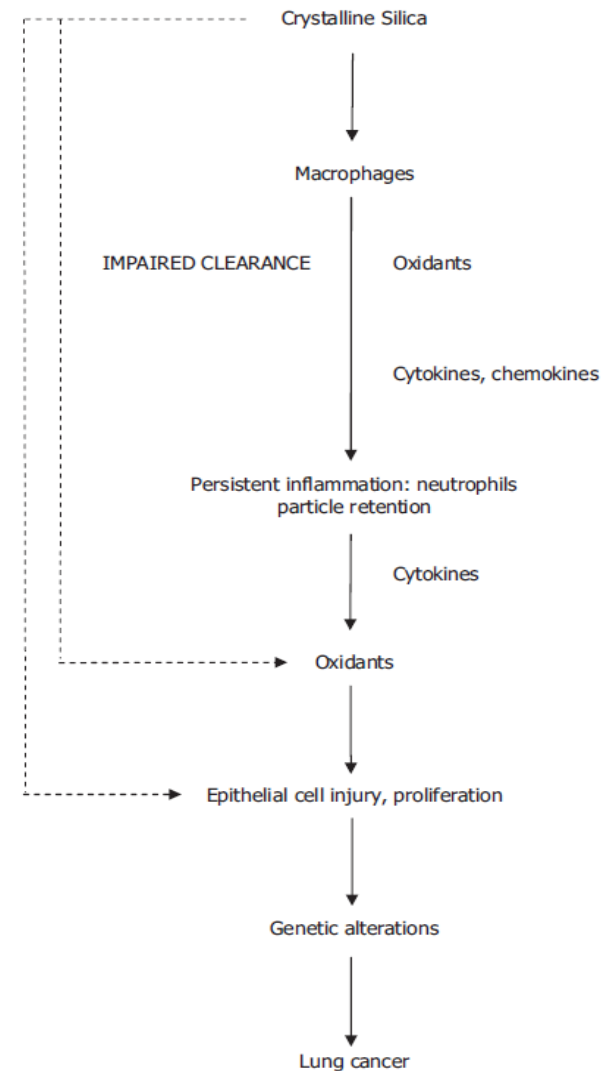
ER ALT JORD FARLIGT AFFALD ?



Kvarts

ER ALT JORD FARLIGT AFFALD ?

Proposed mechanisms for the carcinogenicity of crystalline silica in rats



Kvarts

ER ALT JORD FARLIGT AFFALD ?

Evaluation

There is *sufficient evidence* in humans for the Carcinogenicity of crystalline silica in the form of quartz or cristobalite. Crystalline silica in the form of quartz or cristobalite dust causes cancer of the lung.

There is *sufficient evidence* in experimental animals for the carcinogenicity of quartz dust.

There is *limited evidence* in experimental animals for the carcinogenicity of tridymite dust and cristobalite dust.

Crystalline silica in the form of quartz or cristobalite dust is *carcinogenic to humans (Group 1)*.

Kvarts

ER ALT JORD FARLIGT AFFALD ?



Kvarts er kræftfremkaldende. Jord indeholder kvarts.
Ergo er jord farligt affald.

Hvordan håndterer vi kassens rammer ?

REGLER ER IKKE ALTID FORNUFTIGE



Farligt affald ?

Hvordan håndterer vi kassens rammer ?

REGLER ER IKKE ALTID FORNUFTIGE

Danmark har et meget velfungerende system til håndtering og rensning af forurenede jord.

Olieforurenede jord kan næsten altid renses. Megen jord der er klassificeret som farligt affald på grund af indhold af olie, kan re-klassificeres, ved at anvende mere detaljerede analyseresultater.

I enkelte tilfælde skal man klassificere jord som farligt affald allerede ved et indhold på 1000 mg olie/kg.

Spørgsmål ?



Thomas Hougaard. Telefon: +45 24 61 97 12. Mail: thomas_hougaard@golder.com