



Søknad om utslippstillatelse

Søknadsskjema for industribedrifter

Utfyllt skjema skal sendes SFT i 7 eksemplarer. Se veiledningen for utfylling av de enkelte rubrikkene. I de fleste tilfeller vil det være nødvendig å benytte vedlegg til skjemaet. Det framgår av skjema/veiledning når opplysninger skal gis i vedlegg. Dessuten skal vedlegg benyttes ved plassmangel i tabeller. Vedlegg skal nummereres i samsvar med punktene i skjemaet/veiledningen. Vedlegg skal også sendes SFT i 7 eksemplarer.

1. Opplysninger om søkerbedrift**1.1** Navn, adresse m.v.:

Bedriftens navn	SiC Renseproduksjon A/S	Telefon (sentralbord)	
Gateadresse	Hydroveien, Herøya Industripark , bygg 630		
Postadresse	3908 Porsgrunn		
Postnr., -sted		Telefon (kontaktperson)	
Kontaktperson	Mr. Gaute Finstad	90145199	

1.2 Kommunenumr. Kommune ..

1.3 Bransjenr. **1.4** Foretaksnr. ...
Bedriftsnr. ...

1.5 Søknaden gjelder:

☒ Nyetablering	☐ Endrete utslippsforhold	☐ Annet, spesifiser:
☐ Endret produksjon	☐ Avfallsdisponering	

1.6 Dato(er) for start av ny virksomhet, produksjonsendring osv.

1.7 Dato(er) for eventuell(e) foreliggende utslippstillatelse(r)

1.8 Ansatte:	Antall personer	1.9 Driftstid:	Timer pr. døgn	Døgn pr. år
I dag		I dag		
Søkes om	30	Søkes om	24	365

2. Lokalisering2.1 Gårdsnr. ... Bruksnr. ... 2.2 UTM-angivelse: Sonebelte

Nord-sør Øst-vest

 UTM-koordinater
2.4 Er terrengbeskrivelse vedlagt? Ja ☐ Nei ☒
 2.5 Avstand til nærmeste bebyggelse Type bebyggelse
 Avstand til nærmeste bolig Type bolig
2.6 Er det fastsatt sikringssone? Ja ☒ Nei ☐ Fastsatt av 2.7 Er området regulert til industri? Ja ☒ Nei ☐ Annet 2.8 Transportmiddel/-midler for råstoffer/produkter .. Er redegjørelse angående transport vedlagt? Ja ☐ Nei ☒2.9 Er lokaliseringalternativer vurdert utfra miljøhensyn? Ja, beskrivelse vedlagt ☐ Nei ☒

2.3 Kartvedlegg Målestokk

situasjonsplan	1:5 000
Sjøkart	

3. Produksjonsforhold

3.1 Produkter som framstilles:

Produkt	Produsert mengde (volum) pr. år (døgn)	
	I dag	Søkes om
Regenerering av skjærevæske til ScanWafer		25.000 tonn

3.2 Produksjonsbeskrivelse inkludert flytskjemaer: Se vedlegg 3.2

3.3 Oversikt over innsatsstoffer: Se vedlegg 3.3.

3.4 Er teknisk miljøanalyse gjennomført? Ja, vedlagt ☐ Nei ☒

3.5 Energikilder/-forbruk:

Energikilde	Energiforbruk (MWh/år)	
	I dag	Søkes om
Strøm		21340

3.6 Er energisparetiltak med betydning for utslipp eller avfall vurdert? Ja, se vedlegg 3.6 ☐ Nei ☒

3.7 Miljømessige vurderinger av produksjonen: Se vedlegg 3.7

4.1	Prosessavløpsvann:	Utslippskilde	Fabrikk
		Utslippsted	Frierfjorden

	I dag	Søkes om		I dag	Søkes om
Utslippsdyp		1	pH ...		6-9
Avløpsstrøm (m ³ /h)		8			

Er renseanlegg for dette avløpsvannet forutsatt i søknaden? Ja, beskrivelse vedlagt ☐ Nei ☒

Utslippskomponenter	Mengde (kg) pr. døgn			Konsentrasjon (mg/l)		
	I dag	Søkes om		I dag	Søkes om	
	Gj.snittlig	Gj.snittlig	Maksimalt	Gj.snittlig	Gj.snittlig	Maksimalt
KOF		100	180		<500	< 1200
SS		30	50		20	100
Nitrogen TN						
Fosfor TP	-					
Tungmetaller X	-					
Organiske enkeltforbindelser		PEG- polyetylengly kol Inkl over	PEG – polyetylengly kol Inkl over			

Gjennomsnittsmengder og -konsentrasjoner er midlet over (tidsperiode)	5 dager
Maksimalmengder og -konsentrasjoner er midlet over (tidsperiode)	24 t

For nærmere beskrivelse av kilder til avløp, se vedlegg 4.1.

4.2 Vil støtutslipp forekomme? Ja, se vedlegg 4.2 ☐ Nei ☒

4.3 Er økotoksisitetstesting gjennomført? Ja, dokumentasjon vedlagt ☐ Nei ☒
Er kjemisk karakterisering utført? Ja, dokumentasjon vedlagt ☐ Nei ☒

4.4 Er tiltak for ytterligere reduksjon av utslippets størrelse og virkning vurdert? Ja, se vedlegg 3.7 ☐ Nei ☒

4.5 Kjølevann: Utslippssted Frierfjorden

	I dag	Søkes om		I dag	Søkes om
Utslippsdyp		1	Temperaturøkning (°C)		15
Vannstrøm (m ³ /h)		145	Tilsetningskjemikalier	Ingen	Ingen

Nærmere beskrivelse av eventuelle tilsetningskjemikalier: skal gis i vedlegg.

4.6 Vil sigevann fra deponier forekomme? Ja, beskrivelse vedlagt ☐ Nei ☒

4.7 Vil forurenset grunnvann/grunn forekomme? Ja, beskrivelse vedlagt ☐ Nei ☒

4.8 Resipient for utslipp til vann (unntatt sanitærløpsvann):

Kommunalt nett ☐ Direkte til vassdrag ☐ Direkte til sjø ☒

Lokalt vassdrag Hovedvassdrag

Vannføring: min. normal maks.

Lokalt fjordområde Frierfjorden Hovedfjord Grenlandsfjorden

Eventuelt terskeldyp 25m Største dyp Ca 100m

Nærmere beskrivelse av resipientforhold vedlagt? ☐ Nei ☒

Effekt av bedriftens utslipp i resipienten? Ja ☐ Nei ☒

4.9 Resipient for sanitærløpsvann:

Kommunalt nett ☒ Direkte til resipient ☐

Resipient Frierfjorden
Rensemetode Kjemisk Rensing

Mulighet for tilknytning til kommunalt nett ..

5. Utslipp til luft

5.1 Prosessavgasser: Utslippskilde Fabrikklokalet
 Utslippssted Over bygning

	I dag	Søkes om		I dag	Søkes om
Utslippshøyde over bakken ..	m	13m	Avgasstrøm (Nm ³ /h)		140
Utslippshøyde over tak	m	2m	Avgasstemperatur (°C) ..		25

Er renseanlegg for prosessavgasser forutsatt i søknaden? Ja, beskrivelse vedlagt ☒ Nei ☐

Utslippskomponenter	Menge (kg) pr. time			Konsentrasjon (mg/Nm ³)		
	I dag	Søkes om		I dag	Søkes om	
	Gj.snittlig	Gj.snittlig	Maksimalt	Gj.snittlig	Gj.snittlig	Maksimalt
Hydrogengass		0	1		0	10

Gjennomsnittsmengder og -konsentrasjoner er midlet over (tidsperiode) 1 uke
 Maksimalmengder og -konsentrasjoner er midlet over (tidsperiode) 1 døgn

5.2 Vil støtutslipp forekomme? Ja, beskrivelse vedlagt ☐ Nei ☒

5.3 Er kjemisk karakterisering utført? Ja, resultater vedlagt ☐ Nei ☒

5.4 Er tiltak for ytterligere reduksjon av utslippets størrelse og virkning vurdert? Ja, beskrivelse vedlagt ☐ Nei ☒

5.5 Avgasser fra anlegg kun for energiproduksjon:

Brenselforbruk/ kapasitet		Brensel/fyringsolje (type)		Utslipps- komponenter	Menge (kg) pr. døgn		Konsentrasjon (mg/Nm ³)	
					I dag	Søkes om	I dag	Søkes om

	I dag	Søkes om
Utslippshøyde over bakken ..		
Utslippshøyde over tak		

Sammensetning av eventuelle andre brenseltyper enn fyringsolje: skal oppgis i vedlegg.

Er nærmere redegjørelse for forbrenningstekniske data vedlagt? Ja ☐ Nei ☐

5.6 Rensing av avgasser fra anlegg kun for energiproduksjon? Ja, beskrivelse vedlagt ☐ Nei ☒

5.7 Diffuse utslipp:

Kilde/årsak	Utslippskomponenter	Utslippsmengde (kg) pr. time	
		I dag	Søkes om

5.8 Er det gjennomført/planlagt tiltak mot diffuse utslipp?

Ja, beskrivelse vedlagt ☐ Nei ☒

5.9 Er spredningsforhold m.v. beskrevet?

Ja, beskrivelse vedlagt ☐ Nei ☒

5.10 Er spredningsberegninger utført?

Ja, vedlagt ☐ Nei ☒

6. Avfall**6.1** Avfallstyper og –mengder, se også vedlegg 6.0.

Avfallstype	Menge pr. år		Disponeringsmåte	Evt. nærmere spesifisering av avfallet
	I dag	Søkes om		
Trevirke		5000kg	Avfallsmottak	
Papp/Papir		1000kg	Avfallsmottak	
Plast		1000kg	Avfallsmottak	
Slam filtermasse		131tonn	Avfallsmottak	Si, SiC, Fe, Zn, Glass, 12%H ₂ O, rester av PEG
Slam SiC		182tonn	Avfallsmottak	Fe(OH), SiC, Si
Skjærevæske filterkake	-	5100tonn	Langøya avfallsmottak	Filterkake fra regenerering av Skjærevæske. Hovedkomponenter Fe, Fe ₂ O ₃ , Si, Si-Oxides, rester av PEG, (12% vanninnhold)
Oppsamlet søl/vaskevann etc.		8000 m ³	Avfallsmottak/Renseanlegg	PEG / SiC / Aktivt kull / skjærevæske søl

6.2 Tiltak for å begrense avfallsmengdene er beskrevet i vedlegg 6.2.**6.3** Benyttes avfall/biprodukter fra andre i bedriftens produksjon?Ja, beskrivelse vedlagt ☒ Nei ☐

Se vedlegg 3.2

6.4 Omfatter virksomheten egen behandling/mellomlagring/deponering av avfall?Ja, beskrivelse vedlagt ☐ Nei ☒

Medfører avfallshåndteringen/-disponeringen fare for forurensning/ulempere i omgivelsene?

Ja, beskrivelse vedlagt ☐ Nei ☒

Er det gjennomført/planlagt tiltak for å begrense forurensningene/ulempene?

Ja, beskrivelse vedlagt ☐ Nei ☒

7. Støy

Se vedlegg 7.0.

7.1 Støykilder:

Støykilder som forårsaker ekstern støy	Varighet av støy		Støykildens karakter
	Pr. døgn	Pr. uke	
Ingen			

7.2 Støynivå ved nærmeste bebyggelse:

Lokalitet nr. (kartref.)	Type bebyggelse	Støyemisjon, dB(A)		Målt/ beregnet
		I dag	Søkes om	
Yttervegg produksjon	Industri		55db	Beregnet

7.3 Forekommer naboklager? Ja, beskrivelse vedlagt ☐ Nei ☒

7.4 Planlagte støyreduserende tiltak m/kostnader: skal beskrives i vedlegg.

8. Forebyggende tiltak og beredskap ved ekstraordinære utslipp

8.1 Vurdering av risiko er gitt i vedlegg 8.1 og Miljøriskorapport er utarbeidet av Norconsult per 26. Januar 2005 for eksisterende virksomhet. Det vil bli utarbeidet en ny miljørisikorapport etter ferdigstilling av det utvidede anlegget..

8.2 Angi om forebyggende tiltak er etablert og eventuelt hva slags tiltak:

	Ja	Nei	Tiltak
Lagringstanker	X		Plassering, fangvolum
Overfylling/overløp	X		Fangvolum
Lekkasjer til kjølevannsnnett			
Lekkasjer til grunnen fra avløpsnett			
Gasslekkasjer			
Utfall av renseanlegg			

8.3 Er det utarbeidet beredskapsplan for håndtering av ekstraordinære utslipp? Ja ☐ Nei ☒

Beredskapsplanen er:

Vedlagt ☐

Oversendt SFT tidligere ☐

9. Internkontrollsystem og utslippskontroll

9.1 Internkontroll: Se for øvrig vedlegg 9.1.

Er internkontrollsystem tatt i bruk? Ja ☐ Nei, nærmere redegjørelse vedlagt ☒

9.2 Utslippskontroll, overvåking:

Foretas regelmessige målinger av utslippene? Ja ☐ Nei ☐ Vil bli foretatt ☒

Utkast til måleprogram er gitt i vedlegg 9.2.

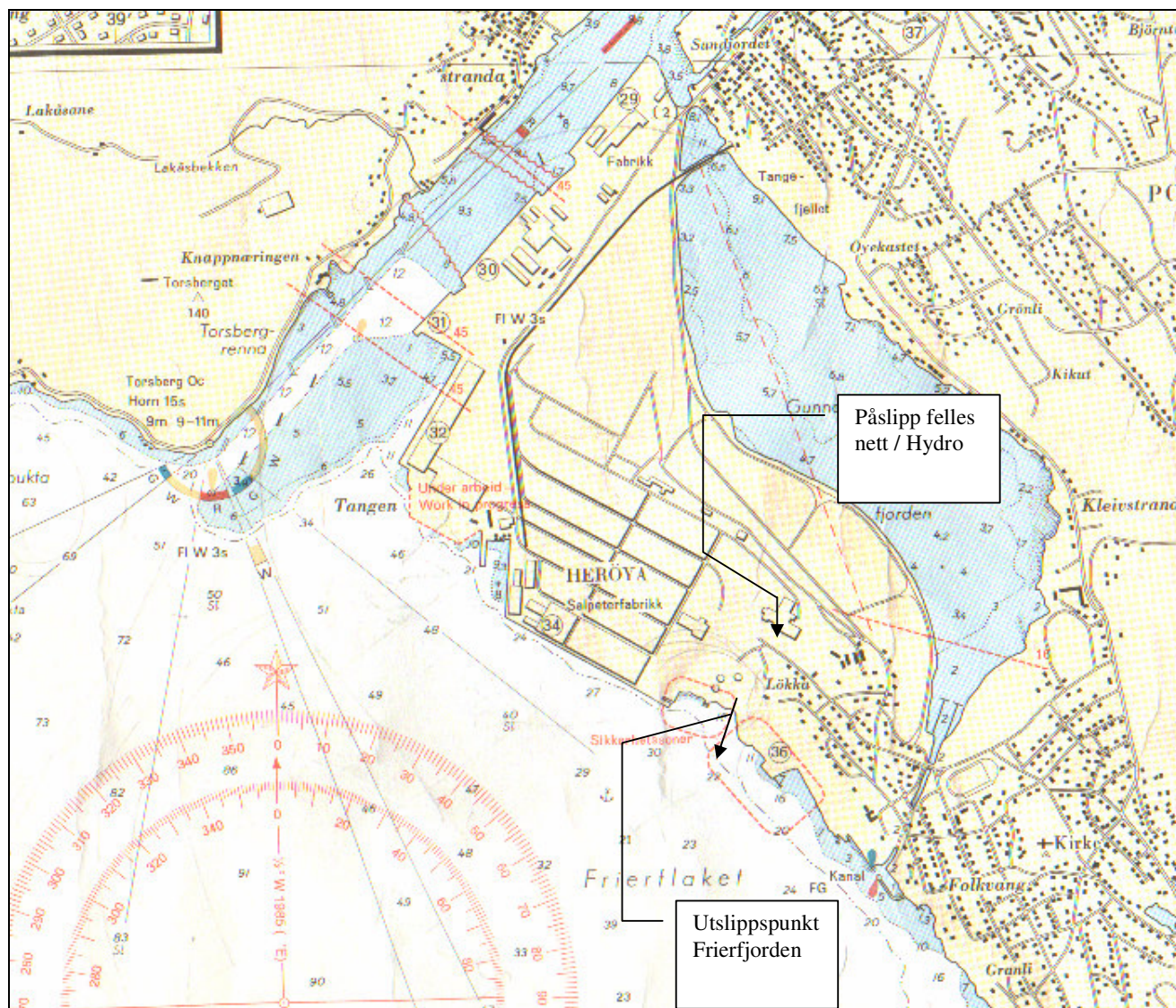
10. Underskrift

Sted:	Dato:
Underskrift:	

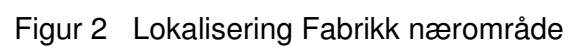
11. Vedleggsoversikt

Nr.	Innhold	Antall sider
2.2	Kart	
3.2	Produksjonsbeskrivelse	
3.3	Oversikt Innsatsstoffer	
3.4	Teknisk Miljøanalyse	
3.6	Energisparetiltak	
3.7	Miljømessig vurdering av produksjonen. Alternativ teknologi, - Best Available Technology – BAT.	
4.0	Utslipp til vann	
4.2	Støtutslipp	
4.8	Beskrivelse av resipientforhold og effekt av bedriftens utslipp til resipienten	
5.1	Rensing av støv i avgass	
7	Støy	
8.1	Risikovurdering	
9.1	Internkontroll	
9.2	Måleprogram	

VEDLEGG 2.2 KART



Figur 1 Sjøkart posisjon avløpsledning



Støymaling



Vedlegg 3.2

PRODUKSJONSBESKRIVELSE,

1. Generell beskrivelse av produksjonen.

SiC renseproduksjon tar imot brukt skjærevæske fra ScanWafers produksjon ved Herøya og Glomfjord. Brukt skjærevæske er i utgangspunktet et avfallsstoff fra produksjonen som renses og gjenvinnes i opprinnelige hovedkomponenter før den benyttes til produksjon av ny skjærevæske. Det forventes at 90% av den brukte skjærevæske kan gjenvinnes i anlegget og gjennom dette oppnås en betydelig reduksjon av avfall i produksjonen. Skjærevæske fra eksisterende produksjon blir i dag gjenvunnet i Tyskland. Det foreligger ikke tilstrekkelig kapasitet til å håndtere den økte skjærevæske mengden generert fra den planlagte utvidelse av produksjonskapasitet ved ScanWafers anlegg i Norge. Ved å lokalisere gjenvinning av skjærevæske til Herøya oppnås videre en betydelig reduksjon i transportbehov.

Skjærevæske overføres til SiC Renseproduksjon i rør mellom ScanWafers produksjon på Herøya samt transporteres i tankbil fra ScanWafers produksjon i Glomfjord.

2. Mottak av skjærevæske.

Skjærevæske fra ScanWafers produksjon på Herøya og i Glomfjord overføres på lagertanker for klargjøring til rensing og gjenvinning. Lagertankene er lokalisert sammen med ferdig regenerert skjærevæske i et felles område avgrenset av et fangvolum for å samle opp eventuelt søl eller lekkasje som følge av uhell eller feil på tanker / utstyr.

3. Klassifisering/Separasjon.

Første del av gjenvinningsprosessen består av klassifisering og separasjon av fast stoff i brukt skjærevæske. Fra en omrørt fødetank føres skjærevæske over en vibrasjons sikt til et klassifiseringstrinn bestående av hydrosykloner. Etter klassifisering i hydrosyklonene føres adskilt faststoff til gjenvinning av SiC. PEG løsning føres inn på PEG gjenvinningssteget.

4. PEG gjenvinning.

PEG løsningen føres igjennom to filtersteg der atskilte partikler oppkonsentreres i første steg og partikler separeres i andre steg. Fast stoffet inneholder i hovedsak Si og SiC. Faststoffet samles opp og lagres utendørs på eget område for videre avhending. Faststoffet kan utvikle noe varme og lagres derfor en periode før videre transport til egnet deponi eller alternativ utnyttelse.

PEG løsningen avfarges deretter med aktivt kull som skilles av i et etterfølgende filter. Fast stoffet fra dette trinnet inneholdende Si og SiC samt aktivt kull samles opp og sendes til egnet deponi.

Oppløste salter fjernes deretter fra PEG løsningen gjennom en ionebyttingsprosess. PEG / vann løsningen tilsettes trinnvis saltsyre og lut og filtreres. Filtrene vaskes med vann og avløpet samles opp og nøytraliseres. En del av avløpet resirkuleres i prosessen, og en del føres til felles avløpssystem (WW2 i skjema).

PEG løsningen føres til en inndampningsenhet der vann dampes av. Vannet kondenseres og føres til en kondenssattank til gjenbruk i prosessen. PEG løsningen kontrolleres for vanninnhold og tetthet før den føres over på lagertanker for klargjøring av ny skjærevæske.

5. SiC gjenvinning.

Filterkaken fra klassifisering i hydrosykloner vaskes for restfraksjon av PEG og avvannes i en bånd pressfilter. Rejektvannet føres tilbake til klassifisering/separasjonssteget. Etter avvanning og rensing føres filterkaken tilbake i væskeløsning ved tilsats av vann fra bånd pressfilter i etterfølgende trinn. Oksalsyre tilsettes for å fjerne jernpartikler fra SiC. Dette gjennomføres i 4 trinn. SiC andelen skilles deretter av i et hydrosyklonsteg og avvannes i en båndpressfilter.

Rejektvannet fra filterpressen føres tilbake til foregående vasketrinn.

Væskefasen fra hydrosyklonsteget føres til en nøytraliseringstank og tilsettes kalkmelk for deretter å tilføres et filterpresse. Kalsiumoksalat, jernoksyd samt jern skilles deretter av og avhendes til deponi. Filtratet inneholdende en lav andel salt samt organisk materiale ledes til avløp (WW1).

Faststoffet fra avvanning av SiC i filterpressen tørkes og føres over til lager.

Sluttbehandling består i siling der større partikler og aggregater fjernes. SiC lagres deretter på silo for bruk i produksjon av ny skjærevæske.

6. Produksjon av ny skjærevæske.

Ny skjærevæske produseres på tank ved innblanding i hovedsak av gjenvunnet SiC og PEG. Noe ny SiC og PEG tilføres gjenvunnet skjærevæske. Skjærevæske lagres på tank i samme område som mottatt brukt skjærevæske lagres. Området har egnet fangvolum.

The diagram illustrates the production process for PEG and SIC from a slurry. The process begins with the 'transport of slurry of the customer' via a pipeline to a 'slurry tank'. The slurry is then processed through 'hydrocyclones unit' to separate 'PEG / water + fines' and 'PEG / Water + SIC < 5 μm'. The 'PEG recovery section' involves 'filtration 1', 'filtration 2', and 'filtration 3', followed by 'decolouration by active carbon', 'hydrochloric acid', and 'cleaning PEG' with 'acetic acid', 'NaOH', and 'HCl'. The 'SIC recovery section' includes 'filtering and washing', 'breaching', 'separator', 'time milk', 'filter press', 'filter cake', and 'drying system'. The 'drying system' features 'refrigerated drying' and 'condensate from fresh air'. The final products are 'PEG rec. tank' and 'SIC rec. silo', both leading to 'transport of slurry to the customer' via tank cars. A 'back flow cooling water' system is also shown.

Vedlegg 3.3

OVERSIKT OVER INNSATSSTOFFER

Følgende oversikt over innsatsstoffer er beregnet for full produksjonskapasitet i hver fabrikk og samlet.

Produkt	Data blad	Form	Mengde kg/år
Oksalsyre	1	Pulver i sekk	51.300
Kalkmelk	2	Pulver i sekk	41.040
Saltsyre	3	30% løsning, palletank	174.800
Lut	4	30% løsning, palletank	157.000
Aktiv kull	5	Sekk	111.150
Filtermasse	6	Sekker	87.210
PEG ny	7	Væske , palletank	3.500.000
SiC ny	8	Pulver	3.200.000
Brukt skjærevæske	7 og 8	Væske	25.000.000

VEDLEGG 3.4

TEKNISK MILJØANALYSE

Etablering av teknisk miljøanalyse.

Bedriften er under etablering og derav er teknisk miljøanalyse ikke formalisert i organisasjonen. Det er under prosjektering av anlegget lagt særskilt vekt på evaluering av miljømessige konsekvenser i produksjonen.

Så raskt som mulig etter oppstart av produksjonen er det forutsatt at det skal etableres en teknisk miljøanalysegruppe i bedriften. Denne gruppen vil ledes av kvalitetsansvarlig ved bedriften og bestå av representanter fra alle ledd i produksjonen. Målsetningen vil være å gjennomføre teknisk miljøanalyse sammen med definerte styrings- og arbeidsgrupper innen organisasjonen.

VEDLEGG 3.6 ENERGISPARETILTAK

Varmegjenvinning.

SiC Renseproduksjon vil basere energitilførsel på damp og elektrisk strøm.

Kondensat av damp benyttes til oppvarming av lokalene. Øvrig kondensat føres sammen med takvann og prosessvann til felles avløp.

Mottakere av varme fra kondensatvann er ikke identifisert i området, men det er en målsetning å utnytte denne energikilden i fremtiden.

Vedlegg 3.7

Miljømessig vurdering av produksjonen. Alternativ teknologi, - Best Available Technology – BAT.

Gjenvinning av skjærevæske gjennomføres i en lukket prosess der forutsetningen er at alle gjenbrukbare komponenter gjenvinnes samt at avfallsmengdene tatt ut av prosessen minimaliseres.

Alt SiC i skjærevæske med partikkelstørrelse $> 4\mu\text{m}$ gjenvinnes.
KOF (PEG) inneholdende prosessvann gjenbrukes i lukket kretsløp.

Alle ikke nyttbare avfallsstoffer fra produksjonen kan avhendes direkte ved deponi.

Avløp fra søl, vask og rengjøring i produksjonen vil samles opp og avhendet som spesialavfall. Dette avløpet vil være begrenset i størrelse.

HMS risiko ved innsatsstoffer.

Innsatsstoffer som anses å ha risiko forbundet med anvendelse er gjennomgått i risikovurderingen, ref. Vedlegg 8.

Skjærevæske inneholder blant annet finpartikulær Si. I høyere konsentrasjoner kan denne finpartikulære Si utvikle noe hydrogengass under lagring i vannholdig løsning. Det etableres derfor overvåkning av hydrogengass i alle utsatte områder, samt i alle avtrekkskanaler for å sikre tilstrekkelig utblanding i luft. Videre etableres det avtrekksrør på alle tanker der brukt skjærevæske lagres.

Si/SiC produkt kan under lagring utvikle varme. Produktet lagres derfor utendørs under eget tak og oppsamlingsareal. Ved eventuell varmeutvikling i produktet lagret for deponering, medfører at produktet fraktes ut til området for oppbevaring ute.

Muligheter for avfallsreduksjon, resirkulering og gjenvinning.

Det skal gjennomføres full kildesortering av avfall i bedriften.

Avfall og avløp fra produksjonen.

Avløp fra kjemisk renseprosess av PEG består i hovedsak av pH nøytralisert vann inneholdende NaCl. Dette avløpet føres sammen med avløp fra vask av SiC skjærevæske bestående av rensed kalkholdig vann.

VEDLEGG 4.0**UTSLIPP TIL VANN****4.1 Kilder til avløp**

Forurenset utslipp fra produksjonen er definert fra følgende prosesser:

- SIC gjenvinning / kalkbehandling av SIC – WW1
- PEG gjenvinning / nøytralisert kjemisk vaskevann- WW2

Rent avløp fra produksjonen er definert fra følgende prosesser:

- Kjølevann fra prosessavsnitt
- Kondensert damp fra oppvarming av prosessen.

Figur pkt 4. viser avløpsstrømmer fra forskjellige produksjonsavsnitt.

pH i avløpet vil ligge i området 7-8.

Temperatur på samlet avløpsvann vil ligge i området 22- 25 °C.

Det er ikke forventet store variasjoner i avløpets mengde eller sammensetning.

Vann forbruk og avløp

Avløp	Kilde	Beregnet mengde per dag		Sammensetning
1	Kjølevann (18-26°C)	3,444	m ³	Som inntak
2	Avløp, WW1 (12-20°C)	160.8	m ³	COD peak < 850 mg/l 136.7 kg/d COD average < 500 mg/l 80.4 kg/d SS= 2...10 mg/l, pH 8...9 Ca-oxalate, Fe(OH) ₃ , Kieselguhr, SiC, Si
3	Avløp , WW2 (12-20°C)	16.8	m ³	SS=0 COD peak < 1200 mg/l, 20.2 kg/d COD average < 1000 mg/l 16.8 kg/d
4	Kondensat fra damp (50°C)	144	m ³	Anvendt til oppvarming av lokaler, deretter til avløp. SS=0 COD=0

4.2 Støtutslipp

Alle resulterende avløp fra nødvendig vedlikehold, oppstart/nedkjøring av utstyr, påfylling av tanker, utilsiktet tømning eller skade på utstyr medfører intet utslipp fra produksjonen. Avløp samles i felles avløpskanaler/kulvert til egen pumpesump og fylles tilbake på lagertanker. Avhengig av avløpets kvalitet vil dette tilbakeføres i produksjonen eller avhedes til godkjent ekstern behandling.

Lagringsvolum.

Skjærevæske og kjemikalietanker har nødvendig oppsamlingsareal/fangvolum som sikrer at støtutslipp ikke vil forekomme.

4.8 Resipient

Avløpet føres inn på Hydro's avløpsnett og videre ut i Frierfjorden.

Avløpet vil blandes inn i eksisterende avløpsmengde , hvilket vil medføre en betydelig utjevning.

VEDLEGG 5.1

Rensing av støv i avgass .

Alle avtrekk fra siloer gjennomgår støvfiltrering før avkast over tak.

VEDLEGG 6.0**Avfallstyper og – mengder.**

Avfallskomponenter fra selve produksjonsprosessen er angitt i prosesskjema pkt 3.2.

Avfallsfraksjonene lagres separat og avhendes på egnet deponi eller behandlingsplass.

Fraksjonene er følgende:

Item	Avfallskilde Prosess	Mengde pr år	Avfallshåndtering	Sammensetning
1	Vaskevann / tap / søl	8000m ³	Tilført behandlingsmottak avhengig av innhold av slam og organiske forbindelser. Behandling Langøy/ Renseanlegg Biogass / etc.	vann, PEG SiC, KP2, aktivt kull, søl SS= 300 g/l max = 180 g/l gjennomsnitt COD = 46,220 mg/l
2	KP1	182tonn	Deponi	Ca-oxalate, Fe(OH) ₃ , SiC, Si, 12% H ₂ O,
3	KP2	5100tonn	Deponi	Si, SiC, Fe, SiO _x , 12% H ₂ O COD=36 g/kg
4	KP3	131 tonn	Deponi	Si, SiC, Cu, Fe, Zn, glass, 12% H ₂ O COD= 116 g/kg

VEDLEGG 7.0 STØY

Beliggenhet av SiC Renseproduksjon er anvist på kart i vedlegg 2.2

SiC Renseproduksjon er lokalisert midt inne i Herøya Næringspark, og det er derfor vanskelig å måle bedriftens støy til nærmeste bebyggelse.

Produksjonen foregår innendørs. Støykilder kan i denne sammenheng defineres som luftavkast over tak eller tiltransport av materiell.

Produksjonslokalene ligger i et industriområde der støy fra eksisterende omliggende aktivitet er større enn støy fra fabrikklokalene eller dets omgivelser.

En kontrollmåling av generelt støynivå ved yttervegg vil bli foretatt for dokumentasjon.

VEDLEGG 8.1**Risikovurdering.**

Skjærevæske består i hovedsak av PEG, Si og SiC. Partikulært Si vil i vandig løsning kunne utvikle en mindre del hydrogengass. Produksjonen er tilrettelagt slik at kilder der hydrogengass kan oppstå er utført med god ventilasjon. Ytterligere er det installert måleutstyr for deteksjon av hydrogengass der det er en viss sannsynlighet for at dette kan oppstå i begrenset konsentrasjon.

Mottak av brukt skjærevæske til føres inn på ventilerte omrørte lagertanker. Disse lagertankene skal plasseres med tilstrekkelig katastrofebasseng for å samle opp eventuelle lekkasjer fra lagertankene.

Kjemikalietanker er utstyrt med oppsamlingsvolum for eventuelle lekkasjer eller andre utilsiktede utslipp.

Lagring av Si og SiC produkt utendørs kan utvikle en eksoterm reaksjon som kan medføre avdampning av vann fra produktet. Lagring av Si og SiC utføres utendørs under egnet tak og egnet betongdekke.

Det vil gjennomføres en egen risikovurdering etter at anlegget er ferdig igangkjørt.

Oppsummering av risiko momenter identifisert.

Aktivitet	Beskrivelse av risiko	Beskrivelse av forebyggende tiltak / sikring
Lager av skjærevæske Tank bytte Påfylling / Tømming	Uhell under påfylling/ tømming Støt / sprekk / kollisjon. Lekkasje av skjærevæske	Tankene plasseres innen et katastrofebasseng Avløp samles i egen pumpeump og tilbakeføres på kontainer.
Rengjøring av utstyr	Søl av skjærevæske	Søl og vaskevann føres til egen pumpeump og tilbake på container.
Kjemikaliehåndtering	Søl av kjemikalier	Drenering til pumpeump og tilbakeførsel til kontainer.
Big Bag transport	SiC-Si – product, varm eksoterm reaksjon $\text{Si} + 2\text{H}_2\text{O} \rightarrow \text{SiO}_2 + 2\text{H}_2$	Begrenset fylling i bag, oppsamling utendørs på egnet betongdekke.

VEDLEGG 9.1

INTERNKONTROLL

SiC Renseproduksjon skal etablere en egen HMS/internkontrollhåndbok som beskriver det systematiske helse-, miljø- og sikkerhetsarbeidet ved virksomheten. Håndboken vil omhandle virksomhetens mål for HMS, organisering av HMS-arbeidet samt retningslinjer for håndtering av avvik og myndighetsrapportering.

Det vil ble utført en miljørisikoanalyse som vil videreføres i etablering av tiltaksplaner for innarbeidelse av forhold som krever oppfølging og kontroll i internkontroll-håndboken.

VEDLEGG 9.2

MÅLEPROGRAM

Det gjennomføres følgende måleprogram i avløpet fra SiC Renseproduksjon:

Beskrivelse avløp:

Samlet avløp fra PEG – og SIC gjenvinning som føres inn på Hydro's avløpssystem.
Kjølevann fra prosessen som føres til Hydro's avløpssystem.

Måleprogram

Rent avløp.

Det er forventet begrenset variasjon i sammensetning av kjølevann. Prøver og målinger tas derfor som døgnblandeprøver en gang hver annen måned.

Forurenset avløp.

Det er forventet begrenset variasjon i sammensetning av kjølevann. Prøver og målinger tas derfor som døgnblandeprøver en gang i måneden.

PRODUCT DATA SHEET

Data sheet No.:

OXAC 01

Issue Date:

22.01.2002

Identification:

Product name:

Oxalic Acid, dihydrate

Registrations:

CAS: 6153-56-6

EINECS: 205-634-3

HS: 2917 1100 90

Appearance:

white to off-white powder

Specification:

Assay:

min. 99,5 %

Sulphates:

max. 0,10 %

Iron as Fe:

max. 0,001 %

Chlorides as Cl:

max. 0,002 %

Sulphated ash:

max. 0,02 %

Heavy metals as Pb:

max. 0,001 %

Calcium as Ca:

max. 0,001 %

Magnesium as Mg:

max. 0,001 %

Further Informations

Standard packing:

HDPE bags of 25 kgs

1050 kg per pallet shrink wrapped

Hazardous goods status:

non hazardous acc. to ADR

Changes of issue date and product data sheet number relate exclusively to changes within Section "specification".

PRODUCT DATA SHEET

Data sheet No.:

OXAC 01

Issue Date:

22.01.2002

Identification:

Product name:

Oxalic Acid, dihydrate

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white to off-white powder

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Chlorides as Cl:

max. 0,002 %

Sulphated ash:

max. 0,02 %

Heavy metals as Pb:

max. 0,001 %

Calcium as Ca:

max. 0,001 %

Magnesium as Mg:

max. 0,001 %

Further Informations

Standard packing:

HDPE bags of 25 kgs

1050 kg per pallet shrink wrapped

Hazardous goods status:

non hazardous acc. to ADR

Changes of issue date and product data sheet number relate exclusively to changes within Section "specification".

Safety Data Sheet

According to EC Directive 91/155/EEC

Date of issue:
Supersedes edition of

20.10.2004
29.01.2004

1. Identification of the substance/preparation and of the company/undertaking

Identification of the product

Catalogue No.: 102047

Product name: Calcium hydroxide GR for analysis ACS, Reag. Ph Eur

Use of the substance/preparation

Reagent for analysis

Chemical production

Pharmaceutical production and analysis

Company/undertaking identification

Company: Merck KGaA * 64271 Darmstadt * Germany * Tel: +49 (0)6151/72-0

Emergency telephone No.: +49 (0)6151/722440 * Fax: +49 (0)6151/72-7780

2. Composition/information on ingredients

Slaked lime.

CAS-No.: 1305-62-0

M: 74.10 g/mol

EC-No.: 215-137-3

Formula Hill: CaH_2O_2

Chemical formula: $\text{Ca}(\text{OH})_2$

3. Hazards identification

Risk of serious damage to eyes.

4. First aid measures

After inhalation: fresh air.

After skin contact: wash off with plenty of water. Remove contaminated clothing.

After eye contact: rinse out with plenty of water with the eyelid held wide open. Call in ophthalmologist.

After swallowing: immediately make victim drink plenty of water. Call in physician.

5. Fire-fighting measures

Suitable extinguishing media:

In adaption to materials stored in the immediate neighbourhood.

Special risks:

Non-combustible.

Special protective equipment for fire fighting:

Do not stay in dangerous zone without self-contained breathing apparatus.

Other information:

Prevent fire-fighting water from entering surface water or groundwater.

Merck Safety Data Sheet

According to EC Directive 91/155/EEC

Catalogue No.: 102047
Product name: Calcium hydroxide GR for analysis ACS, Reag. Ph Eur

6. Accidental release measures

Person-related precautionary measures:

Avoid generation of dusts; do not inhale dusts. Avoid substance contact. Ensure supply of fresh air in enclosed rooms.

Environmental-protection measures:

Do not allow to enter sewerage system.

Procedures for cleaning / absorption:

Take up dry. Forward for disposal. Clean up affected area.

7. Handling and storage

Handling:

No further requirements.

Storage:

Tightly closed. Dry. Storage temperature: no restrictions.

Requirements for storage rooms and containers:

Do not use light-weight-metal containers.

8. Exposure controls/personal protection

Specific control parameter

TRGS 900

Name	Calcium hydroxide
Value	5 mg/m ³ inhalable fraction

Personal protective equipment:

Protective clothing should be selected specifically for the working place, depending on concentration and quantity of the hazardous substances handled. The resistance of the protective clothing to chemicals should be ascertained with the respective supplier.

Respiratory protection: required when dusts are generated. Filter P 2 (acc. to DIN 3181) for solid and liquid particles of harmful substances.

Eye protection: required

Merck Safety Data Sheet

According to EC Directive 91/155/EEC

Catalogue No.: 102047
Product name: Calcium hydroxide GR for analysis ACS, Reag. Ph Eur

Hand protection:

In full contact:

Glove material: nitrile rubber
Layer thickness: 0.11 mm
Breakthrough time: > 480 Min.

In splash contact:

Glove material: nitrile rubber
Layer thickness: 0.11 mm
Breakthrough time: > 480 Min.

The protective gloves to be used must comply with the specifications of EC directive 89/686/EEC and the resultant standard EN374, for example KCL 741 Dermatrill® L (full contact), 741 Dermatrill® L (splash contact). The breakthrough times stated above were determined by KCL in laboratory tests acc. to EN374 with samples of the recommended glove types.

This recommendation applies only to the product stated in the safety data sheet and supplied by us as well as to the purpose specified by us. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN374 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).

Industrial hygiene:

Immediately change contaminated clothing. Apply skin-protective barrier cream. Wash hands and face after working with substance.

9. Physical and chemical properties

Form:	solid		
Colour:	white		
Odour:	odourless		
pH value	(20 °C)	12.6	(saturated solution)
Melting point		550 °C	(decomposition)
Boiling point		2850 °C	(decomposition)
Ignition temperature		not combustible	
Flash point		not flammable	
Explosion limits	lower	not applicable	
	upper	not applicable	
Vapour pressure		not applicable	
Density	(20 °C)	2.24 g/cm ³	
Bulk density		~ 400 kg/m ³	
Solubility in water	(20 °C)	1.7 g/l	
Thermal decomposition		550-600 °C	

Merck Safety Data Sheet

According to EC Directive 91/155/EEC

Catalogue No.: 102047
Product name: Calcium hydroxide GR for analysis ACS, Reag. Ph Eur

10. Stability and reactivity

Conditions to be avoided

no information available

Substances to be avoided

acids, hydrogen sulfide, light metals, phosphorus, organic nitro compounds.

Hazardous decomposition products

no information available

Further information

sensitive to moisture, exothermic dissolution process with water.

11. Toxicological information

Acute toxicity

LD₅₀ (oral, rat): 7340 mg/kg.

Specific symptoms in animal studies:

Eye irritation test (rabbit): Severe irritations.

Skin irritation test (rabbit): No irritation.

Hen's egg-membrane test for irritation (HET-CAM): mucosal irritations.

Subacute to chronic toxicity

Sensitization:

In animal experiments: No sensitizing effect.

No carcinogenic properties suspected.

Further toxicological information

After inhalation of dust: mucosal irritations, coughing.

After skin contact: in case of perspiration/moisture corrosive.

After eye contact: Severe irritations. Risk of corneal clouding. Risk of blindness!

After swallowing: Irritations of: gastrointestinal tract.

Further data

Further hazardous properties cannot be excluded.

The product should be handled with the care usual when dealing with chemicals.

Merck Safety Data Sheet

According to EC Directive 91/155/EEC

Catalogue No.: 102047
Product name: Calcium hydroxide GR for analysis ACS, Reag. Ph Eur

12. Ecological information

Biologic degradation:

Methods for the determination of biodegradability are not applicable to inorganic substances.

Behavior in environmental compartments:

Concentration in organisms is not to be expected.

Ecotoxic effects:

Biological effects:

Harmful effect due to pH shift. Forms corrosive mixtures with water even if diluted. Neutralization possible in waste water treatment plants.

Fish toxicity: *Gambusia affinis* LC₅₀: 160 mg/l /96 h.

Further ecologic data:

Do not allow to enter waters, waste water, or soil!

13. Disposal considerations

Product:

Chemicals must be disposed of in compliance with the respective national regulations. Under www.retrologistik.de you will find country- and substance-specific information as well as contact partners.

Packaging:

Merck product packaging must be disposed of in compliance with the country-specific regulations or must be passed to a packaging return system. Under www.retrologistik.de you will find special information on the respective national conditions as well as contact partners.

14. Transport information

Not subject to transport regulations.

15. Regulatory information

Labelling according to EC Directives

Symbol:	Xi	Irritant
R-phrases:	41	Risk of serious damage to eyes.
S-phrases:	22-24-26-39	Do not breathe dust. Avoid contact with skin. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. Wear eye/face protection.

Reduced labelling (1999/45/EC, Art. 10, 4)

Symbol:	Xi	Irritant
R-phrases:	41	Risk of serious damage to eyes.
S-phrases:	26-39	In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. Wear eye/face protection.

Merck Safety Data Sheet

According to EC Directive 91/155/EEC

Catalogue No.: 102047
Product name: Calcium hydroxide GR for analysis ACS, Reag. Ph Eur

German regulations

Water pollution class 1 (slightly polluting substance) VwVwS Anh. 2 KennNr. 320

Storage class VCI 10-13

Data sheet of the Chemical Professional Association M004 Irritant substances/corrosive substances

M050 Dealing with harmful substances

The employment restrictions for young workers in accordance with section 22 of the Youth Employment Protection Law (JArbSchG) are to be observed.

16. Other information

Reason for alteration

Chapter 1: change in product name.

General update.

Contact for information:

HSSE-C/CI * Tel: +49 (0)6151/722775 * Fax: +49 (0)6151/726433 * e-mail: prodsafe@merck.de

The information contained herein is based on the present state of our knowledge. It characterizes the product with regard to the appropriate safety precautions. It does not represent a guarantee of the properties of the product.

SAFETY DATA SHEET according to EC directive 2001/58/EC

Salzsäure 31 % Techn.Version 1.2
Revision Date 12.10.2004

Print Date 14.09.2005

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND THE COMPANY/UNDERTAKING**Product information**

Trade name : SALZSÄURE 31 % TECHN.
Use : chemical intermediate
Supplier : Brenntag GmbH
Stinnes-Platz 1
DE 45472 Muelheim
Responsible Department : Einkauf Technik Sicherheit (ETS)
Telephone : +49 (0)208-7828-0
Telefax : +49 (0)208-7828-7299
Emergency telephone : +49 (0)208-7828-0
number

2. COMPOSITION/INFORMATION ON INGREDIENTS**Chemical nature**aqueous solution
hydrochloric acid

Concentration: 31,00 %

CAS-No.: 7647-01-0

Symbol(s) C

EC-No.: 231-595-7

R-phrases(s): R34, R37

Nota B

Index-No.: 017-002-01-X

For the full text of the R phrases mentioned in this Section, see Section 16.

3. HAZARDS IDENTIFICATION**Risk advice to man and the environment**

Symbol(s) : C Corrosive

R34 Causes burns.

R37 Irritating to respiratory system.

4. FIRST AID MEASURES

General advice : Take off all contaminated clothing immediately.
Inhalation : If unconscious place in recovery position and seek medical advice. Remove to fresh air.
Skin contact : Wash off immediately with soap and plenty of water. If skin irritation persists, call a physician.
Eye contact : Rinse thoroughly with plenty of water, also under the eyelids. Consult a physician.
Ingestion : Clean mouth with water and drink afterwards plenty of water. If swallowed, do not induce vomiting - seek medical advice.

SAFETY DATA SHEET according to EC directive 2001/58/EC

Salzsäure 31 % Techn.

Version 1.2
Revision Date 12.10.2004

Print Date 14.09.2005

Notes to physician

Hazards : Extremely corrosive and destructive to tissue.

5. FIRE-FIGHTING MEASURES

- Suitable extinguishing media : water; Use extinguishing measures that are appropriate to local circumstances and the surrounding environment. The product itself does not burn.
- Specific hazards during fire fighting : Hydrogen chloride gas; Gives off hydrogen by reaction with metals.
- Special protective equipment for fire-fighters : In the event of fire, wear self-contained breathing apparatus. protective suit
- Additional advice : Collect contaminated fire extinguishing water separately. This must not be discharged into drains.

6. ACCIDENTAL RELEASE MEASURES

- Personal precautions : Use personal protective equipment. Keep people away from and upwind of spill/leak. Provide adequate ventilation.
- Environmental precautions : Do not flush into surface water or sanitary sewer system. If the product contaminates rivers and lakes or drains inform respective authorities. Local authorities should be advised if significant spillages cannot be contained.
- Methods for cleaning up : Ensure adequate ventilation. This material and its container must be disposed of as hazardous waste. Neutralize with lime milk or soda and flush with plenty of water. Soak up with inert absorbent material.

7. HANDLING AND STORAGE**Handling**

- Advice on safe handling : Keep tightly closed in a dry and cool place. Handle and open container with care.
- Advice on protection against fire and explosion : The product is not flammable. Gives off hydrogen by reaction with metals. risk of explosion

Storage

- Requirements for storage areas and containers : Keep in an area equipped with acid resistant flooring
- Advice on common storage : Corrodes base metals. Materials to avoid; sodium hypochlorite
- Further information on storage conditions : Keep container tightly closed. Keep in a well-ventilated place.
- German storage class : 8: Corrosive Substances

SAFETY DATA SHEET according to EC directive 2001/58/EC

Salzsäure 31 % Techn.

Version 1.2
Revision Date 12.10.2004

Print Date 14.09.2005

8. EXPOSURE CONTROLS / PERSONAL PROTECTION**Components with workplace control parameters**

CAS-No.: 7647-01-0	hydrogen chloride	
MAK:	8 mg/m ³ ,	TRGS 900
Top limit: =1=		
If in compliance with the MAK and BAT values, then there should be no risk to the fetus.		TRGS 900
TWA:	8 mg/m ³ , 5 ppm,	EU ELV
STEL:	15 mg/m ³ , 10 ppm,	EU ELV

Personal protective equipment

- Respiratory protection : In case of insufficient ventilation wear suitable respiratory equipment. Required, if exposure limit is exceeded (e.g. OEL); Combination filter:E-P2
- Hand protection : Wear suitable gloves. The glove material has to be impermeable and resistant to the product / the substance / the preparation. Take note of the information given by the producer concerning permeability and break through times, and of special workplace conditions (mechanical strain, duration of contact).
- | Material | strength of material | Break through time |
|----------------|----------------------|--------------------|
| butyl-rubber | 0,5 mm | >= 8 h |
| nitrile rubber | 0,35 mm | >= 8 h |
- Eye protection : tightly fitting safety goggles
- Body Protection : Wear suitable protective clothing.
- Hygiene measures : Take off all contaminated clothing immediately. Do not inhale gas/smoke/vapour/aerosol. Avoid contact with the skin and the eyes. Keep away from food, drink and animal feedingstuffs. Smoking, eating and drinking should be prohibited in the application area. Wash hands before breaks and at the end of workday.

Engineering measures

Refer to protective measures listed in sections 7 and 8.

9. PHYSICAL AND CHEMICAL PROPERTIES**Appearance**

- Form : liquid
- Colour : colourless
- Odour : stinging

SAFETY DATA SHEET according to EC directive 2001/58/EC

Salzsäure 31 % Techn.

Version 1.2
Revision Date 12.10.2004

Print Date 14.09.2005

Safety data

Solidification point	: -40 °C
Boiling point/range	: 77 °C
Explosive properties	: Product is not explosive.
Vapour pressure	: 20 hPa; 20 °C
Density	: 1,15 g/cm ³ ; 20 °C
Water solubility	: completely soluble
pH	: < 1; 20 °C
Viscosity, dynamic	: 1,7 mPa.s; 20 °C

10. STABILITY AND REACTIVITY

Materials to avoid	: metals
Hazardous decomposition products	: Hydrogen chloride gas
Hazardous reactions	: Hydrogen, by reaction with metals alkalines
General advice	: No decomposition if stored and applied as directed.

11. TOXICOLOGICAL INFORMATION

Acute oral toxicity	: LD50 rabbit 900 mg/kg
Acute inhalation toxicity	: LC50 rat 3.940 mg/l 0,5 h
Acute dermal toxicity	: LD50 rabbit > 5.010 mg/kg
Skin irritation	: Extremely corrosive and destructive to tissue.
Sensitization	: Did not cause sensitization on laboratory animals.
Further information	: If ingested, severe burns of the mouth and throat, as well as a danger of perforation of the oesophagus and the stomach.

12. ECOLOGICAL INFORMATION**Elimination information (persistence and degradability)**

Biodegradability	: The methods for determining the biological degradability are not applicable to inorganic substances.
------------------	--

Ecotoxicity effects

Toxicity to fish	: LC50 Toxicity to fish 862 mg/l
------------------	----------------------------------

Further information on ecology

Additional ecological information	: Behaviour in environmental compartments; Neutralization is normally necessary before waste water is discharged into water treatment plants. Harmful to aquatic organisms. AOX; Do not flush into surface water or sanitary sewer system.
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SAFETY DATA SHEET according to EC directive 2001/58/EC

Salzsäure 31 % Techn.

Version 1.2
Revision Date 12.10.2004

Print Date 14.09.2005

13. DISPOSAL CONSIDERATIONS

Product : Disposal together with normal waste is not allowed. Special disposal required according to local regulations. Do not let product enter drains.

packaging : Dispose of as unused product.

14. TRANSPORT INFORMATION

ADR : UN-No **1789**
Class 8
Packaging group II
Classification Code C1
ADR/RID-Labels 8
Risk No. 80
Description of the goods HYDROCHLORIC ACID

RID : UN-No **1789**
Class 8
Packaging group II
Classification Code C1
ADR/RID-Labels 8
Risk No. 80
Description of the goods HYDROCHLORIC ACID

IMDG : UN-No **1789**
Class 8
Packaging group II
ADR/RID-Labels 8
EmS 8-03
Description of the goods HYDROCHLORIC ACID

15. REGULATORY INFORMATION**Labelling according to EEC Directive**

The product is classified and labelled in accordance with EC directives or respective national laws.

Symbol(s) C Corrosive

R-phrases(s) R34 Causes burns.
R37 Irritating to respiratory system.

SAFETY DATA SHEET according to EC directive 2001/58/EC**Salzsäure 31 % Techn.**

Version 1.2
Revision Date 12.10.2004

Print Date 14.09.2005

S-phrases(s)	S26	In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
	S45	In case of accident or if you feel unwell, seek medical advice immediately (show label where possible).

National legislation

hydrochloric acid WGK (DE)	:	WGK Identification Number:: 238 WGK:1; slightly water endangering; Classification source is Annex 2.
Risk classification according to VbF (Germany)	:	Not applicable.
Major Accident Hazard Legislation	:	Does not fall under the German StörfallV. -
Regulation	:	Occupational restrictions: Take note of Dir 92/85/EEC on the safety and health of pregnant workers at work and of Dir 94/33/EC on the protection of young people at work.

16. OTHER INFORMATION**Text of R-phrases referred to under headings 2 and 3:**

R34	Causes burns.
R37	Irritating to respiratory system.

Further information

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text. Restricted to professional users. Attention - Avoid exposure - obtain special instructions before use.

This safety datasheet only contains information relating to safety and does not replace any product information or product specification.

Indicates updated section.

Safety Data Sheet according to Directive 91/155/EEC

LAMSORB TK/L

Revision 04.11.2004

(dd.mm.yyyy)

1. Identification of the Substance/Preparation and the Company Undertaking

Product name	LAMSORB TK/L
Chemical identification	Carbon physically activated with vapor
CAS Number	Preparation
Use	--
Producer/Supplier	CIBA SPECIALTY CHEMICALS S.P.A. VIA PILA 6/3 40044 SASSO MARCONI (BOLOGNA) ITALIA
Phone number	+39 051 678 61 11
Telefax	+39 051 678 11 24
Information	Product Safety
Phone number	+39 051 678 62 20
Telefax	+39 051 678 11 24
Emergency Phone Number (24h)	+39 051 678 61 11

2. Composition/Information on Ingredients

This product contains no substances classified as hazardous to health in concentrations which should be taken into account according to EC directive.

3. Hazards Identification

Not classified as hazardous according the EU directives.

4. First Aid Measures

Skin contact

Wash off with soap and plenty of water. Contaminated clothing should be washed before re-use.

Eye contact

Rinse immediately with plenty of water for at least 15 minutes. In case of eye irritation, seek medical attention.

Inhalation

Move to fresh air. Clear any blocked airways. If affected person feels unwell, seek medical advice.

Ingestion

Do not make the casualty vomit. Give anything by mouth in cases of unconsciousness or convulsion. Check for breathing and pulse, if present, place in the recovery position and obtain medical attention. If conscious rinse out the mouth with water. Give 1 pint (600 ml) of water to drink immediately and repeated drinks of water at a rate of a capful (1/3 pint/200 ml) every 10 minutes. Call a physician immediately.

5. Fire Fighting Measures

Extinguishing media

Foam.

Extinguishing media which must not be used for safety reasons

Water in confined area.

Special exposure hazards

Oxides of carbon.

Safety Data Sheet according to Directive 91/155/EEC

LAMSORB TK/L

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Special protective equipment for firefighters

As for all fire involving chemicals: chemical protection suit, suitable gloves and boots and self-contained breathing apparatus.

6. Accidental Release Measures

Personal precautions

Avoid dust formation. Use personal protective equipment. Effective dust mask.

Environmental precautions

Do not flush into surface water, sanitary sewer or ground water system.

Methods for cleaning up

Sweep up and shovel into suitable containers for disposal. Residues or small spillages should be hosed away completely with plenty of water. Contain wash water and dispose of in accordance with local regulations.

7. Handling And Storage

Handling

As with many organic powders flammable dust clouds may be formed. Avoid dust formation and ignition sources. Ensure good local exhaust ventilation. It is recommended to use effective dust mask. Do not eat, drink or smoke at the workplace. Remove contaminated clothing immediately and launder before reuse. Wash hands before breaks and immediately after handling the product.

Storage

Protect from humid conditions. Keep in a dry, cool place. Avoid extremes of temperature. Avoid contact with solvents and strong oxidizing agents which vapours could be adsorbed by carbon.

8. Exposure Controls / Personal Protection

Exposure limit(s)

Not tested.

Technical measures/Precautions

Ensure adequate ventilation, especially in confined areas. Provide appropriate exhaust ventilation at places where dust is formed.

Respiratory protection

If dust is created. Effective dust mask (disposable, EN149 FFP2S). Half or full face mask with a particle filter type P2 (European Standard).

Hand protection

PVC or other plastic material gloves / Rubber gloves.

Eye protection

Goggles.

Skin and body protection

Lightweight protective clothing.

9. Physical and Chemical Properties

Colour	black
Form	powder
Odour	none
pH (5 g/l water)	8 - 10
Boiling point/range	not applicable
Melting point/range	not available
Flash point	not available
Ignition point	>300°C
Flammability (solid, gas)	not available
Autoignition temperature	not available
Explosive properties	not available
Oxidizing properties	not available
Vapour pressure	not available
Bulk density	370-400 kg/m ³

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Water solubility	insoluble
Partition coefficient (n-octanol/water)	not available

10. Stability And Reactivity

Stability

Stable at ambient temperature.

Conditions to avoid

Slow combustion without flame if the product is in compact mass, fast combustion with liquid oxygen, ozone and strong oxidising agents.

Materials to avoid

Avoid contact with solvents and strong oxidizing agents which vapours could be adsorbed by carbon.

Hazardous decomposition products

Combustion may result in the formation of Oxides of carbon.

11. Toxicological Information

Acute oral toxicity <i>rat</i>	LD ₅₀	>10000 mg/kg
Acute eye irritation/corrosion <i>rabbit</i>		Not available
Acute dermal irritation/corrosion <i>rabbit</i>		Not available
Acute skin sensitisation <i>guinea pig</i>		Not available

12. Ecological Information

Acute toxicity to fish <i>96 h</i>	LC ₅₀	Not available
Acute toxicity to Daphnia <i>48h</i>	EC ₅₀	Not available
Acute toxicity to Alghe <i>72h</i>	EC ₅₀	Not available
Bioconc. Factor (BCF)		Not available

13. Disposal Consideration

Waste from residues / unused products

Local regulations must be observed.

Contaminated packaging

Contaminated packaging material should be treated equivalent to residual chemical. Clean packaging material should be subjected to waste management schemes (recovery recycling, reuse) according to local legislation.

14. Transport Information

Flash point	not available
ADR/RID	Class: Free
IMO	Class: Free

Safety Data Sheet according to Directive 91/155/EEC

LAMSORB TK/L

Revision 04.11.2004

(dd.mm.yyyy)

ICAO

Class: Free

15. Regulatory Information**Classification**

Classification not required

Additional labeling information

16. Other Information**R-Phrases from chapter 2****Essential changes*****Important***

THIS MATERIAL IS NOT INTENDED FOR USE IN PRODUCTS FOR WHICH PROLONGED CONTACT WITH MUCOUS MEMBRANES, BODY FLUIDS OR ABRADED SKIN, OR IMPLANTATION WITHIN THE HUMAN BODY, IS SPECIFICALLY INTENDED, UNLESS THE FINISHED PRODUCT HAS BEEN TESTED IN ACCORDANCE WITH NATIONALLY AND INTERNATIONALLY APPLICABLE SAFETY TESTING REQUIREMENTS. BECAUSE OF THE WIDE RANGE OF SUCH POTENTIAL USES, CIBA IS NOT ABLE TO RECOMMEND THIS MATERIAL AS SAFE AND EFFECTIVE FOR SUCH USES AND ASSUMES NO LIABILITY FOR SUCH USES.

The information contained in this safety data sheet is given in good faith. It is accurate to the best of our knowledge and belief and represents the most up to date information. The information given in this data does not constitute or replace the user's own assessment of workplace risk as required by other health and safety legislation.

HEALTH AND SAFETY DATA SHEET - EEC – 91\155

1 – IDENTIFICATION

1.1 Product Identification

Trade Name: Celatom (Kieselgur, Calcined Diatomaceous Earth)
Product Code: FP-4, FW-6, FW-12, FW-14, FW-20, FW-40, FW-50, FW-60, FW-80, MW-25, MW-27, MW-31, SP and CELABRITE

1.2 Application

Filter Aid / Filler

1.3 Supplier Information

Address: EaglePicher Filtration & Minerals Europe GmbH & Co. KG
 Rehrhofer Weg 115
 D-29633 Munster, Germany
Telephone Number: ++49/(0) 51 92 / 9897-0

**Manufacturer
 Address:**

EaglePicher Filtration & Minerals, Inc.
 9785 Gateway Drive, Suite 1000
 Reno, NV, 89521, USA
 ++1-775-824-7600

Telephone Number:

1.4 Emergency Telephone Number:

++49/(0) 51 92 / 9897-0

2 – COMPOSITION – INFORMATION ON INGREDIENTS

2.1 Chemical Composition:

<u>CAS Number</u>	<u>EINECS</u>	<u>Description</u>	<u>Concentration</u>	<u>Risk Factors</u>
68855-54-9	272-489-0	Diatomaceous earth flux calcined (Kieselgur)	100%	R20, R48
14464-46-1	238-455-4	Crystalline silica (Cristobalite)	< 60%	R20, R48

3 – HAZARD INFORMATION

Breathing dust containing crystalline silica over a prolonged period of time may cause lung damage. Crystalline silica (Cristobalite) is a known cause of silicosis, a progressive, sometimes fatal lung disease. Avoid breathing dust (see section 11 for additional information).

4 – FIRST AID

4.1 General Advice:

Not an acute health hazard

4.2 Inhalation:

Acute inhalation may cause dryness of the nasal passages and congestion of the upper respiratory tract. Remove person to fresh air when exposed to high concentrations.

4.3 Ingestion:

Short-term exposure not considered harmful. Drink generous amounts of water to reduce bulk and drying effects.

4.4 Contact with Eyes:

May cause irritation or inflammation. Wash with generous quantities of water. Avoid rubbing eyes. Consult physician if irritation persists.

4.5 Contact with Skin:

Not absorbed by skin. May cause dryness. Use moisture renewing lotions.

**FP-4, FW-6, FW-12, FW-14, FW-20, FW-40, FW-50, FW-60, FW-60S, FW-70, FW-80
MW-25, MW-27, MW-31, SP and CELABRITE**

5 – FIRE AND EXPLOSION HAZARD

- 5.1 Recommended means of extinction:** Not applicable – product is non-flammable
- 5.2 Means of extinction to avoid:** Not applicable
- 5.3 Particular risks:** None – avoid creating dust
- 5.4 Particular measures of protection:** None

6 – ACCIDENTAL RELEASE MEASURES

- 6.1 Individual protection:** Avoid breathing dust. Wear respirator when airborne dust is present
- 6.2 Environmental protection:** Not considered hazardous to the environment
- 6.3 Cleaning methods:** Avoid creating dust. Vacuum clean spillage

7 – HANDLING AND STORAGE

- 7.1 Handling:** Avoid creating dust. Repair broken packages immediately
- 7.2 Storage:** Store in dry place to protect package and to maintain product quality

8 – EXPOSURE CONTROL – PERSONAL PROTECTION

- 8.1 General disposition:** Avoid creating dust. Wear respirator when airborne dust is present.

8.2 Occupational exposure limits:

<u>Countries</u>	<u>EXPOSURE LIMITS TABLE</u>	
	<u>Quartz mg/m³</u>	<u>Cristobalite mg/m³</u>
Belgium, Denmark, United States, France, Portugal, Italy, Sweden, Norway, Greece Netherlands	0,10 (RD)	0,05 (RD)
Germany, Switzerland, Austria	0,075 (RD)	0,075 (RD)
Finland	0,15 (FD)	0,15 (FD)
Bulgaria	0,20 (FD)	0,10 (FD)
CIS	0,07	0,07
Poland	1,0	1,0
Czech, Slovakia Republics		0,4 to 1 0,5 to 1
Ireland	0,40 (RD)	0,40 (RD)
United Kingdom	0,30 (RD)	0,30 (RD)
	<i>RD – Respirable Dust</i>	<i>FD – Fine Dust</i>

8.3 Personal protection:

- Respiratory protection:** Respirators approved for protection against dust containing crystalline silica recommended.
- Protection of hands:** Not normally necessary.
- Protection of eyes:** Goggles to protect from dust.
- Protection of skin:** Not normally necessary.

**FP-4, FW-6, FW-12, FW-14, FW-20, FW-40, FW-50, FW-60, FW-60S, FW-70, FW-80
MW-25, MW-27, MW-31, SP and CELABRITE**

9 – PHYSICAL AND CHEMICAL PROPERTIES

9.1	Appearance:	Pink to white powder
9.2	Odor:	Odorless (slightly earthy when moist)
9.3	pH:	8-10 (10% aqueous slurry)
9.4	Boiling point:	Not applicable
9.5	Melting point:	Not applicable
9.6	Flash point:	Not applicable
9.7	Inflammability (solid / gas):	Not flammable
9.8	Auto inflammability:	Not applicable
9.9	Explosive properties:	None
9.10	Oxidizing properties:	None
9.11	Vapour pressure:	Not applicable
9.12	Relative density:	2.3
9.13	Solubility:	Water solubility: < 2% Fat solubility: Not applicable
9.14	Partition co-efficient (n-octanol/water):	Not applicable
9.15	Other data:	None

10 – STABILITY REACTIVITY

10.1	Conditions:	Not applicable
10.2	Materials to avoid:	Hydrofluoric acid- products containing silica may react violently with Hydrofluoric acid. Silicon tetrafluoride is evolved, which is hazardous.
10.3	Hazardous decomposition:	None
10.4	Other considerations:	None

**FP-4, FW-6, FW-12, FW-14, FW-20, FW-40, FW-50, FW-60, FW-60S, FW-70, FW-80
MW-25, MW-27, MW-31, SP and CELABRITE**

11 – TOXICOLOGICAL INFORMATION

Calcined diatomaceous earth (Kieselgur) contains crystalline silica, which is a known cause of silicosis, a progressive, sometimes fatal lung disease. In a 1997 monograph (Volume 68, "Silica, Some Silicates, Coal Dust and Para-aramid Fibrils"), the International Agency for Research on cancer (IARC) has classified "inhaled crystalline silica from occupational sources" in Group 1 as a substance "carcinogenic to humans". In making the overall evaluation, the IARC Working Group noted that carcinogenicity in humans was not detected in all industrial circumstances studied. Crystalline silica has also been classified by the German MAK Commission as a human carcinogen (Category A1).

Although the recent IARC determination was, in part, based on a 1992 study of diatomite workers, a 1996 follow-up, which was issued by the University of Washington and Tulane University was not available to the Working Group. The follow-up study reported a Standardized Mortality Ratio (SMR) of 2.01 for non-malignant respiratory disease (NMRD) and an SMR of 1.29 for lung cancer when compared to national and regional populations. This is a reduction in the levels reported in the 1992 report (SMR=2.59 for NMRD and SMR=1.43 for lung cancer).

As noted in the 1992 study, relatively intense exposures to crystalline silica that occurred before the 1950's were probably the most important contributors to the excesses in NMRD and lung cancer. The 1996 report continues to support the conclusion that recent improvements in dust control in the industry appear to have abated any excess risk of silicosis or lung cancer in today's work environment. In a 1997 report issued by Tulane University researchers, it was noted that "(t)he low prevalence of opacities observed among the post 1950 hires...is consistent with prevalences observed in many unexposed populations." These findings are consistent with, and supportive of, current occupational exposure limits for cristobalite, a form of crystalline silica associated with DE. A more detailed report discussing the IARC classification and the diatomite worker studies is available on request.

12 – ECOLOGICAL INFORMATION

Diatomaceous earth (Kieselgur) is a non-toxic, non-biodegradable mineral. Waste generated from this product would only be considered hazardous when mixed with a substance, which would be hazardous by itself.

13 – DISPOSAL INFORMATION

May be disposed of in a non-hazardous sanitary landfill when not mixed with a hazardous substance. Check with local and government agencies prior to disposal.

14 – TRANSPORTATION INFORMATION

No special requirements or placarding necessary.

15 – REGULATORY INFORMATION

The following regulations / directives should be reviewed when handling products containing crystalline silica:

EEC: Directive 67/548 of June 27, 1967 relating to the classifying, packaging and labeling of dangerous substances. Amended March 1, 1991.
Directive 2001/58/EC of July 27, 2001:
Xn
R20 – Harmful by Inhalation.
R48 – Danger of serious damage to health by prolonged exposure.

Great Britain: Control of Substances Hazardous to Health, Regulations 1988, No 1857.

**FP-4, FW-6, FW-12, FW-14, FW-20, FW-40, FW-50, FW-60, FW-60S, FW-70, FW-80
MW-25, MW-27, MW-31, SP and CELABRITE**

15 – REGULATORY INFORMATION (cont.)

The following regulations / directives should be reviewed when handling products containing crystalline silica:

- Germany:** UBG 119 – Quartz-protection against mineral dusts injurious to health.
UBG 100 – Rule G.1.1 – Legislation concerning medical care.
Gefstoff 8.86 – specifies labeling requirements.
- France:** - Decree No. 50.1289 of October 16, 1950 modified by Decree No. 63.576 of June 11, 1963 establishes special medical preventive measures for occupational silicosis.
- Circular No. 11453 of July 19, 1982 establishes the levels accepted for concentrations in the air of work areas.
- Decree No. 87-200 of March 25, 1987 safety data sheets for hazardous substances.
- Code of Labour Article L 231-6 – Decree of October 10, 1983 modified by Decree of November 28, 1984 lists hazardous substances and establishes packing and labeling requirements.
- Spain:** Royal Decree of November 27, 1985 relating to the classification and labeling of dangerous substances.
- Italy:** Law No. 256 of May 29, 1974 Decree No. 927 of November 24, 1981 and No. 141 of February 20, 1988 on classification and labeling for warning of hazardous materials.

16 – OTHER INFORMATION:

None

DATE: January 1, 2005

MATERIAL SAFETY DATA SHEET

POLYETHYLENGLYCOL 300

Date of emission: 21 Oct 2002

Numbers of pages: 6

1 – IDENTIFICATION OF THE PRODUCT AND COMPANY INFORMATION

COMPANY ***SiC Processing Srl***

Via Prati Nucovi
I – 28065 Cerano (NO) a

PRODUCT NAME: Polyethylene Glycol 300
FORMULA (C₂H₆O₂)-n with n = 300
CAS NO. : 25322-68-3
Common Synonyms: PEG 300 ; Polyglycol 300

2 – COMPONENTS/ INFORMATION OF COMPONENTS

Polyethylene Glycol

Hazard Components not applicable

3 – HAZARDS IDENTIFICATION

This product is not hazardous for the health and the environment after the criteria of CEE.

Inhalation of vapours may cause coughing, chest pains, or noise and throat irritation. Contact can cause eyes irritation.

4 – FIRST AID MEASURES

Emergency and First Aid Procedures

INGESTION:

- if swallowed the person in conscious, immediately give large amounts of water. Get medical attention

INHALATION:

- if a person breathes in large amounts, move the exposed person to fresh air.

EYE CONTACT:

- immediately flush with plenty of water for at least 15 minutes. Get medical attention

SKIN CONTACT:

immediately wash with plenty of soap and water for at least 15 minutes

5 – FIRE FIGHTING MEASURES

FLAMMABLE PROPERTIES

- Flash Point 196 °C

AUTOIGNITION TEMPERATURE:

- Unknown

HAZARDOUS COMBUSTION PRODUCTS:

- Thermal decomposition may produce oxides of carbon.

EXTINGUISHING MEDIA:

- Water/ Fog Spray
- Foam resistent to alcohol
- Carbonic Anidride
- Chemical Extinguisher

SPECIAL FIRE FIGHTING PROCEDURES:

- do not spray pool fires directly; a solid stream of water directed into hot burning liquid could cause frothing. Use supplies breathing air and protective clothing

UNUSUAL FIRE AND EXPLOSION HAZARDS:

- Emits toxic fumes under fire conditions

6 – ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS:

- Wearing appropriate personal protective equipment, contain spill, collect onto inert absorbent

ENVIRONMENTAL PRECAUTIONS:

- Prevent contamination of surface and groundwater

7 – HANDLING AND STORAGE

- Keep containers closed. Store in cool, dry well – ventilated area away from heat, sparks, or flame.
- Store below 35 ° C.
- Isolate from incompatible materials.
- Avoid skin and eye contact when handling product.

8 – EXPOSURE CONTROLS / PERSONAL PROTECTION

- **RESPIRATORY PROTECTION:** *none required in normal use of product*
- PROTECTIVE GLOVES: Butyl Rubber, PVC or Neoprene
- EYE PROTECTION: Safety glasses or chemical splash goggles
- SKIN PROTECTION: Wear clothing suitable to prevent skin contact.
Have eyewash fountain and safety shower available in the work area.
- VENTILATION: Local ventilation recommended – mechanical ventilation may be used.
- EXPOSURE LIMITS: None on product
- IDLH (Immediately Dangerous to Life or Health Concentration): Not determined.

9 – PHYSICAL AND CHEMICAL PROPERTIES

• APPEARANCE:	<i>Clear liquid, mild odor</i>
• ODOR THRESHOLD:	No data available
• pH (10 % IN WATER):	5,0 – 8,0
• WATER SOLUBILITY:	Soluble
• SPECIFIC GRAVITY (WATER =1):	1.13 at 25 °C
• BOILING POINT (° F):	> 300
• MELTING POINT (°F):	Not available
• FREEZE POINT (°F):	- 14
• VAPOR PRESSURE (MM OF HG):	< 0.01 at 20 °C
• VAPOR DENSITY (AIR =1):	> 1
• EVAPORATION RATE:	< 0.01
• LOSS ON DRYING:	Not available
• OCTANOL/WATER PARTITION COEFFICIENT	No data available

10 – STABILITY AND REACTIVITY

CONDITIONS TO AVOID:

Product degrades slowly when stored at elevated temperatures in presence of air. Degradation occurs rapidly at temperatures approaching the flash point.

MATERIALS TO AVOID:

Oxidising agents. Acids

12 – ECOLOGICAL INFORMATION

Based on actual testing or on data for similar material(s).

MOBILITY AND BIOACCUMULATION POTENTIAL

- Non bioconcentration is expected because of the high water solubility. Log octanol/water partition coefficient is estimated to be <3.

DEGRADATION

- Biodegradation reached in closed bottle test (OECD Test No. 301 D) after 28 days: > 40 %. Biodegradation rate may increase in soil and/or water with acclimation.

AQUATIC TOXICITY

- Acute LC50 for fathead minnow (*Pimephales promelas*) is 87'209 mg/l. Acute EC50 for water flea *Daphnia magna* is 53'484 mg/l. Material is not harmful to aquatic organisms (LC50/EC50/IC50 greater than 100 mg/l)

13 – DISPOSAL CONSIDERATIONS

DISPOSAL

- Burn in adequate incinerator according to local regulations.

CONTAMINATED PACKING

- Empty containers can only be disposed of when the remaining waste products adhering to the container walls have been removed. Remove all labels.

14 – TRANSPORT INFORMATION

THE PRODUCT IS NOT CLASSIFIED FOR ANY MODE OF TRANSPORTATION

**SIC Processing S.r.l.**

Sede Legale: Corso Torino 45 - 28100 Novara
Sede Operativa : Via Prati Nuovi - 28065 Cerano (NO)
Tel. +39-0321726523
Fax +39-0321771894
e-mail: main-office@garbo-servizi.it
Reg. Imprese di Novara, C.F. e P.IVA 06495970011
REA Novara n. 202407
Codice ISO IT 06495970011
Cap. Soc. 15.300,00 Euro int.vers.

15 – REGULATORY INFORMATION

EEC CLASSIFICATION AND USER LABEL INFORMATION

- This product does not require classification according to criteria of the commission of the European communities

EINECS STATUS

- Existing polymer According to be the definition in the 7th amendment to directive 67/548/EEC and all starting materials and additives are listed in EINECS

CARBOREX Silicon Carbide – General Data

Chemical Properties

Silicon carbide will not dissolve in acids or in bases, but is easily attacked by alkaline melts and by most metal and metal oxide melts. For practical applications the temperature limits are 1 500 °C in an inert gas or reducing atmosphere. The impurities in technical silicon carbide primarily consist of free C and SiO₂ in varying amounts depending on type of product. In addition, some Si and Fe and small quantities of Al and Ca occur.

Mol weight: 40.096. Pure SiC is composed of 29.95 % C and 70.05 % Si.

Physical Properties

Chemically pure silicon carbide is colourless. Traces of nitrogen in the atomic grid give a green colour, while presence of aluminium changes the colour towards grey to blue/black. Extreme hardness, high thermal conductivity and low linear thermal expansion are some of the properties that make silicon carbide an outstanding material in its main areas of usage. The following physical data can be considered as guidelines:

Hardness:

Moh's scale	Between 9 and 10
Knoop scale	25.000–30.000 N/mm ²

Thermal conductivity:

20 °C	0.41 W/cm °C
1000 °C	0.21 W/cm °C

Linear thermal expansion:

25–1000 °C	$5.1 \cdot 10^{-6} / ^\circ\text{C}$
25–2000 °C	$5.8 \cdot 10^{-6} / ^\circ\text{C}$



CARBOREX Silicon Carbide – General Data (cont'd)

Specific heat:

25 °C	0,67 J/g °C
1000 °C	1,26 J/g °C
Specific density	3,21 g/cm ³
Bulk density	0,7–1,7 g/cm ³

Melting point:

Silicon Carbide does not
melt, but dissociation
starts at about 2300 °C.

Safety data:

Chemical composition	SiC
Physical condition	Solid
Solubility in water	None
Appearance	Granular
Colour	Black, Green
Smell	None
Storage/handling	No special precautions
Transport	Not classified – not hazardous
Fire-/explosion hazard	No risk
Toxicology	Not toxic – no skin or eye irritation
Health hazard	Minimal/None
Industrial hygiene	Use dust mask when prescribed national values are exceeded
Environmental consequences	None
Special remarks	None

Further information regarding Health and Safety is given in our "Safety Data Sheet for CARBOREX Silicon Carbide" based on ISO 11014-1 1994 (E).



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www.orex.no



CARBOREX Silicon Carbide - For wiresawing usage

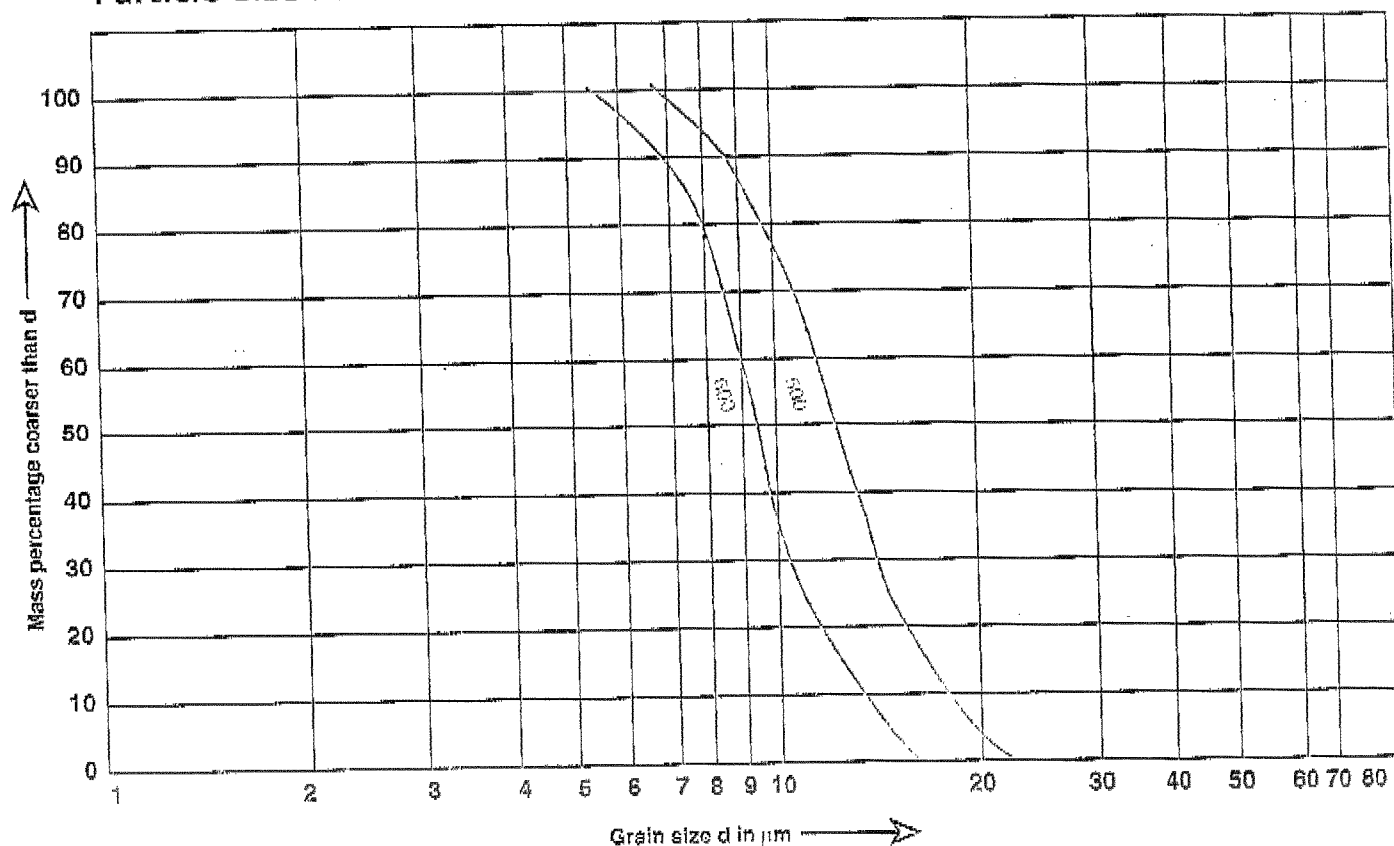
GW and BW Micro F 500 and F 600

The green and black silicon carbide micro grits F 500 and F 600 are micro grits specially made for the wiresawing of silicon wafers for the semiconductor and photovoltaic industry.

The grits are carefully classified with our unique process technology to meet the particle size distribution required for this manufacturing process.

In addition to chemical analyses and particle size these grits will be analysed systematically for their circularity and abrasive efficiency, which are very critical parameters for these applications.

Particle Size Distribution - CARBOREX F 500 to F 600 (Coulter Counter)



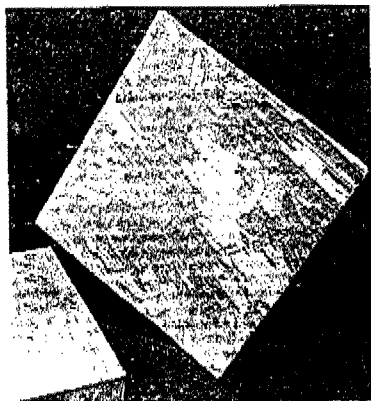
*FEPA - Fédération Européenne des Fabricants de Produits Abrasifs



Orkla Exolon



CARBOREX Silicon Carbide - For wiresawing usage



Cutting Edge Materials

When it comes to wiresawing of silicon wafers, we produce tailored silicon carbide qualities which are efficient, pure and consistent.

Grain Size Distribution of Micro Grits F 500 and F 600

Typical standard

Grain size classification	Max. value max. µm	Median grain size d ₅₀ - value µm	d ₉₀ - value µm
F 500	20	12,8 ±1,0	9
F 600	15	9,3 ±1,0	5

Grain Size Distribution measured
by Coulter Multisizer III according
to FEPA 42-GB-1985 R1993

Surface Chemical Values

Typical standard

Product	Grain size	% SiC	% FeC	% Si	% SiO ₂	% Fe ₂ O ₃
GW Micro	F 500 - F 600	99,5	0,10	0,10	0,10	0,05
BW Micro	F 500 - F 600	99,2	0,15	0,15	0,25	0,05

Chemical Analysis (in weight) according to FEPA 42-GB-1986, R1993 resp. ISO 9286.



Orkla Exolon

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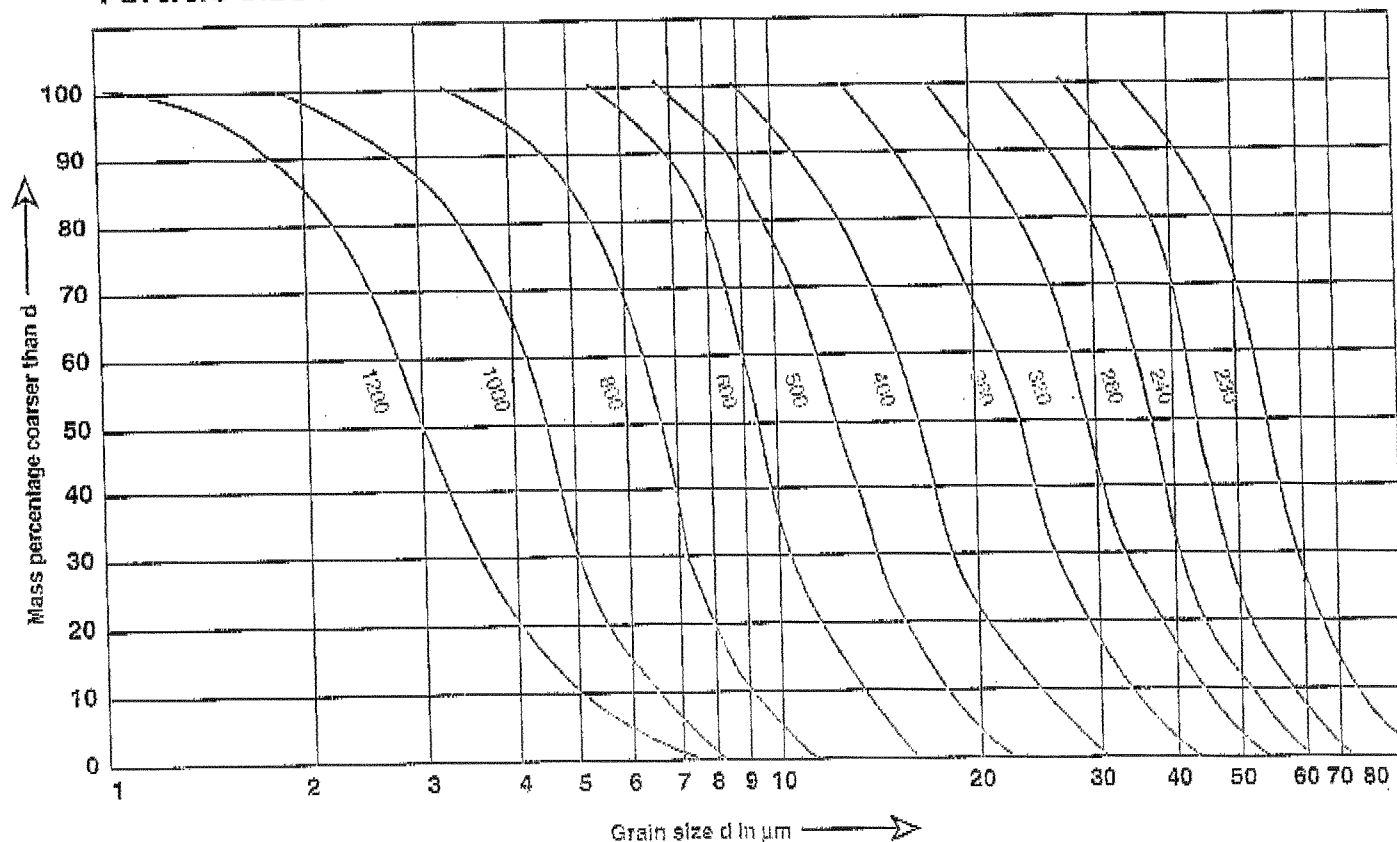


CARBOREX Silicon Carbide GW and BW Micro Grits Grains for Abrasive and Ceramic Usage.

CARBOREX micro grits are silicon carbide grains of high quality supplied in two varieties: light green (GW) and black (BW). The micro grits have a wide range of applications from lapping and polishing to technical ceramics, wiresawing of silicon wafers and more. CARBOREX micro grits are manufactured and graded using the most sophisticated processes in order to ensure quality and consistency. A strict quality standard is adhered to at every point of production, and our quality programme certified with ISO 9001:2000 ensures predictable and consistent results.

The letter "F" signifies that CARBOREX GW and BW are manufactured to the internationally accepted FEPA* - standard for bonded abrasives and general usage.

Particle Size Distribution - CARBOREX F230 to F1200 (Coulter Counter)



*FEPA - Fédération Européenne des Fabricants de Produits Abrasifs



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CARBOREX GW and BW Micro Grits

Grain Size Distribution of Micro Grits

F 230 - F 1200

Typical standard

Grit designation	d ₉₀ -value max. µm	Median grain size d ₅₀ -value µm	d ₁₀ -value min. µm
F 230	82	53,0±3,0	34
F 240	70	44,5±2,0	28
F 280	59	36,5±1,5	22
F 320	49	29,2±1,5	16,5
F 360	40	22,8±1,5	12
F 400	32	17,3±1,0	8
F 500	25	12,8±1,0	5
F 600	19	9,3±1,0	3
F 800	14	6,5±1,0	2
F 1000	10	4,5±0,8	1
F 1200	7	3,0±0,5	1 (for 80 %)

Grain Size Distribution measured
by Coulter Multisizer III according
to FEPA 42-GB-1986 R1993

Surface Chemical Values

Typical standard

Product	Grit designation	% SiO ₂	% H ₂ O	% Si	% SO ₂	% Fe ₂ O ₃
GW Micro	F 240 - F 800	99,5	0,10	0,10	0,10	0,05
	F 1000 - F 1200	99,0	0,25	0,25	0,30	0,05
BW Micro	F 240 - F 800	99,2	0,15	0,15	0,25	0,05
	F 1000 - F 1200	98,0	0,25	0,20	0,40	0,1

Chemical Analysis (in weight) according to FEPA 45-GB-1986, R1993 resp. ISO 9286.

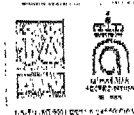


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NATRONLAUGE 30%, ECSO 8690Version 1.0
Revision Date 30.11.2004

Print Date 10.06.2005

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING**Product information**

Trade name : NATRONLAUGE 30%, ECSO 8690
Supplier : Brenntag GmbH
Stinnes-Platz 1
DE 45472 Muelheim
Responsible Department : Einkauf Technik Sicherheit (ETS)
Telephone : +49 (0)208-7828-0
Telefax : +49 (0)208-7828-7299
Emergency telephone : +49 (0)208-7828-0
number

2. COMPOSITION/INFORMATION ON INGREDIENTS**Chemical nature**

sodium hydroxide
Concentration: 30,00 %
CAS-No.: 1310-73-2
Symbol(s) C

EC-No.: 215-185-5
R-phrases: R35

Index-No.: 011-002-00-6

For the full text of the R phrases mentioned in this Section, see Section 16.

3. HAZARDS IDENTIFICATION**Risk advice to man and the environment**

Symbol(s) : C Corrosive

R35 Causes severe burns.

4. FIRST AID MEASURES

General advice : Remove from exposure, lie down. Take off all contaminated clothing immediately. Call a physician immediately. First aider needs to protect himself.

Inhalation : Remove to fresh air. Obtain medical attention.

Skin contact : Wash off immediately with plenty of water for at least 15 minutes. Immediate medical treatment is necessary as untreated wounds from corrosion of the skin heal slowly and with difficulty.

Eye contact : Rinse thoroughly with plenty of water, also under the eyelids. Consult a physician.

Ingestion : Clean mouth with water and drink afterwards plenty of water. If swallowed, do not induce vomiting - seek medical advice.

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5. FIRE-FIGHTING MEASURES

- | | | |
|--|---|---|
| Suitable extinguishing media | : | Use extinguishing measures that are appropriate to local circumstances and the surrounding environment. The product itself does not burn. |
| Special protective equipment for fire-fighters | : | In the event of fire, wear self-contained breathing apparatus. Wear appropriate body protection (full protective suit) |
| Additional advice | : | Collect contaminated fire extinguishing water separately. This must not be discharged into drains. |

6. ACCIDENTAL RELEASE MEASURES

- | | | |
|---------------------------|---|--|
| Personal precautions | : | Use personal protective equipment. Keep people away from and upwind of spill/leak. Danger of slipping if spilled. Avoid contact with skin and eyes. Do not inhale gas/smoke/vapour/aerosol. |
| Environmental precautions | : | Do not flush into surface water or sanitary sewer system. Avoid subsoil penetration. If the product contaminates rivers and lakes or drains inform respective authorities. Local authorities should be advised if significant spillages cannot be contained. |
| Methods for cleaning up | : | This material and its container must be disposed of as hazardous waste. Neutralize with hydrochloric or sulphuric acids. Soak up with inert absorbent material. |

7. HANDLING AND STORAGE**Handling**

- | | | |
|---|---|---|
| Advice on safe handling | : | Keep container tightly closed. Handle and open container with care. Avoid formation of aerosol. |
| Advice on protection against fire and explosion | : | The product is not flammable. |

Storage

- | | | |
|---|---|--|
| Requirements for storage areas and containers | : | Keep container tightly closed in a dry and well-ventilated place. Keep in an area equipped with alkali resistant flooring. Materials to avoid; aluminium; zinc; tin Sn |
| Advice on common storage | : | Do not store near acids. |
| Further information on storage conditions | : | Keep container tightly closed. |
| Storage temperature | : | > 10 °C |

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8. EXPOSURE CONTROLS / PERSONAL PROTECTION**Components with workplace control parameters**

Not applicable.

Personal protective equipment

- Respiratory protection : Required, if exposure limit is exceeded (e.g. OEL);
Combination filter: B-P2
- Hand protection : Wear suitable gloves. The glove material has to be impermeable and resistant to the product / the substance / the preparation. Take note of the information given by the producer concerning permeability and break through times, and of special workplace conditions (mechanical strain, duration of contact).
- | Material | strength of material | Break through time |
|--------------|----------------------|--------------------|
| butyl-rubber | 0,5 mm | 8 h |
- Eye protection : tightly fitting safety goggles
- Body Protection : impervious clothing
- Hygiene measures : Take off all contaminated clothing immediately. Do not inhale gas/smoke/vapour/aerosol. Avoid contact with the skin and the eyes. Keep away from food, drink and animal feedingstuffs. Smoking, eating and drinking should be prohibited in the application area. Wash hands before breaks and at the end of workday.

Engineering measures

Refer to protective measures listed in sections 7 and 8.

9. PHYSICAL AND CHEMICAL PROPERTIES**Appearance**

- Form : liquid
- Colour : colourless
- Odour : odourless

Safety data

- Melting point/range : approx. 1 °C
- Boiling point/range : 120 °C
- Flash point : not applicable
- Ignition temperature : not applicable
- Explosive properties : Product is not explosive.
- Density : approx. 1,33 g/cm³; 20 °C

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Water solubility : completely miscible
pH : 14; 20 °C
Viscosity, dynamic : approx. 13 mPa.s; 20 °C

10. STABILITY AND REACTIVITY

Materials to avoid : acids; light metals; aluminium; zinc
Hazardous decomposition products : None known.
Hazardous reactions : Exothermic reaction with strong acids. Reacts violently with water. Avoid amines.
General advice : No decomposition if stored and applied as directed.

11. TOXICOLOGICAL INFORMATION

Skin irritation : Causes burns.
Sensitization : Did not cause sensitization on laboratory animals.
Further information : If ingested, severe burns of the mouth and throat, as well as a danger of perforation of the oesophagus and the stomach.

12. ECOLOGICAL INFORMATION**Ecotoxicity effects**

Toxicity to fish : Toxicity to fish LC50 189 mg/l

Further information on ecology

Additional ecological information : Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

13. DISPOSAL CONSIDERATIONS

Product : Disposal together with normal waste is not allowed. Special disposal required according to local regulations. Do not let product enter drains. Dispose of as special waste in compliance with local and national regulations; Waste codes should be assigned by the user based on the application for which the product was used.
packaging : Methods for cleaning up; Rinse with plenty of water. Dispose of in accordance with local regulations.

14. TRANSPORT INFORMATION

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ADR	:	UN-No	1824
		Class	8
		Packaging group	II
		Classification Code	C5
		ADR/RID-Labels	8
		Risk No.	80
		Description of the goods	Sodium hydroxide solution
RID	:	UN-No	1824
		Class	8
		Packaging group	II
		Classification Code	C5
		ADR/RID-Labels	8
		Risk No.	80
		Description of the goods	Sodium hydroxide solution
IMDG	:	UN-No	1824
		Class	8
		Packaging group	II
		ADR/RID-Labels	8
		EmS	8-06
		Description of the goods	SODIUM HYDROXIDE SOLUTION

15. REGULATORY INFORMATION**Labelling according to EC Directives**

The product is classified and labelled in accordance with EC directives or respective national laws.

Symbol(s)	C	Corrosive
R-phrased(s)	R35	Causes severe burns.
S-phrased(s)	S37/39	Wear suitable gloves and eye/face protection.
	S26	In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
	S45	In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

Hazardous components which must be listed on the label:

- sodium hydroxide

National legislationsodium hydroxide
WGK (DE): WGK Identification Number:: 142 WGK:1; slightly water
endangering; Classification source is Annex 2.

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Risk classification : Not applicable.
according to VbF
(Germany)

Major Accident Hazard : Does not fall under the German StörfallV. -
Legislation

Regulation : Occupational restrictions: Take note of Dir 92/85/EEC on the
safety and health of pregnant workers at work and of Dir
94/33/EC on the protection of young people at work.

16. OTHER INFORMATION**Text of R-phrases referred to under headings 2 and 3:**

R35 Causes severe burns.

Further information

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text. Restricted to professional users. Attention - Avoid exposure - obtain special instructions before use.

This safety datasheet only contains information relating to safety and does not replace any product information or product specification.

Indicates updated section.