1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING

Product information

Trade name : CyPlus® Sodium Cyanide, Bricks 98/99 %
Company : CyPlus GmbH
           Rodenbacher Chaussee 4
           D- 63457 Hanau-Wolfgang
Telephone : +49 (0)6181 59-3086
Telefax : +49 (0)6181 59-2083
Email address : sds-info@evonik.com
Emergency telephone number : +49 (0)2236 76-2222

Use of the Substance / Preparation
Function : Electroplating agent
           Gold mining

2. HAZARDS IDENTIFICATION

Classification
T+, Very toxic
R26/27/28: Very toxic by inhalation, in contact with skin and if swallowed.
R32: Contact with acids liberates very toxic gas.

N, Dangerous for the environment
R50: Very toxic to aquatic organisms.
R53: May cause long-term adverse effects in the aquatic environment.

Additional safety information for humans and the environment
Hydrocyanic acid may cause all degrees of poisoning.
Under the action of acids (as well as carbon dioxide !) hydrocyanic acid is released which is combustible and may react with air to explosive gas mixtures.
Avoid contact with acids, air humidity, water.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Information on ingredients / Hazardous components

- Sodium cyanide
  CAS-No. 143-33-9
  EC-No. 205-599-4
  T+: R26/27/28
  R32
  N: R50, R53
4. FIRST AID MEASURES

General advice
Pay attention to self-protection.
Remove affected persons from the hazard area.
Remove contaminated or soaked clothing immediately and dispose of safely.
Always use protective equipment items (e.g. suitable respiratory equipment and suitable protective clothing / protective gloves made of butyl rubber, fluoro rubber, chloroprene rubber, etc.).
Keep warm, position comfortably, and cover well.
Place patients who are unconscious but breathing in the stabilized lateral position.
In case of cardiac arrest, begin with cardiopulmonary reanimation (CPR) immediately.
Do not leave victims unattended.

Inhalation
Inhalation is possible if aerosols, mists, dusts, or smoke form.
No mouth-to-mouth or mouth-to-nose artificial respiration. Use artificial respiration bag or respirator.
Dander of poisoning!
Keep respiratory tract clear.
In case of difficulties in breathing, supply oxygen.
Call emergency doctor immediately (alarm report: cyanide / hydro-cyanic acid poisoning).

Skin contact
No cases of cyanide intoxication have been observed to date following contact with dry sodium or potassium cyanide on dry skin free of injuries.
Upon skin contact, wash with plenty of water and soap.
Summon an emergency physician immediately in case of intoxication symptoms (key terms: intoxication with cyanide / prussic acid).

Eye contact
Use of special rinsing solutions with high buffer capacities (e.g. borate buffer solutions, diphoterines, etc.) is recommended within the framework of first aid measures.

In case of difficulties in breathing, supply oxygen.
Call emergency doctor immediately (alarm report: cyanide / hydro-cyanic acid poisoning).

Ingestion
Rinse out mouth.
Immediately give large quantities of water to drink.
Do not induce vomiting.
Call emergency doctor immediately (alarm report: cyanide / hydro-cyanic acid poisoning).

Notes to physician
Possible signs of poisoning:

Discrimination in 2 stages seems appropriate:
1. Mild poisoning
2. Severe poisoning

The following symptoms are not sufficient to ensure correct prognosis:
symptoms of the central nervous system:

Early stage
headache, dizziness, somnolence (drowsiness), nausea.
advanced stage: seizures, coma.

Pulmonary symptoms:

Early stage: dyspnea, tachypnea.
advanced stage:
hypoventilation, Cheyne-Stokes respiration, apnea

Cardiovascular symptoms:

Early stage
hypertension, sinus arrhythmia, atrioventricular arrhythmia, bradycardia.
advanced stage:
tachycardia, complex arrhythmias, cardiac arrest.

Skin symptoms:

Early stage: rosy skin colour.
advanced stage: cyanosis.

Effect on the metabolism:
Lactate acidosis up to pH 7.1 and lactate level of 17 mmol/l are described.

Treatment:

Prevention of absorption and checking of vital functions only in the absence of risk to selfprotection!
Rapid treatment with antidotes can save lives and has priority over removal of poison!

Treatment:
Mild poisoning

Artificial respiration with 100% oxygen
Depending on the pathology and clinical findings, strictly monitored controls of the clinical findings, symptom-oriented treatment for pulmonary edema prophylaxis and a diagnosis (lung X-rays) are necessary.
Antidote treatment for example
Administration of sodium thiosulfate (12.5 g - 100-500 mg/kg weight) I.V. depending on the clinical presentation and symptoms.
Warning! Dosage level relevant for adults weighing 70 kg.
All cyanide exposed persons should undergo continued monitoring for several hours, even if patient feels well to ensure there are no residual or recurrent poisoning symptoms.

Treatment:
Severe poisoning

Artificial respiration with 100% oxygen
Immediate antidote administration

The medical drugs in the following list may be used in antidote treatment:

Complexing agent
1. Administer hydroxocobalamin (Cyanokit®) 5 g i.v. (70 mg/kg b.w. in adults) by infusion over a period of 20 - 30 minutes. Administration of this dose can be repeated as required depending on the severity of poisoning. Infusion time for repeated dose: 30 minutes to 2 hours. The only permissible route of administration for hydroxocobalamin is i.v.!

2. Dicobalt edetate (Kelocyanor®) 300 mg (1 ampoule) in adults, i.v. infusion time 1 - 3 minutes

Methaemoglobin-forming agent

1. 4-Dimethylaminophenol, (4-DMAP) / sodium thiosulphate: The antidote is administered in the following order: 1.) 4-DMAP, 250 mg (3-4 mg/kg body weight) in 5 ml i.v. (1 vial) followed by 2.) Sodium thiosulphate 12.5 g in 50 ml i.v. infusion. If the antidote has been administered and the diagnosis is not cyanide poisoning and methaemoglobinemia >30% is present, toluidine blue or methylene blue can be administered to counteract the effect of the cyanide antidote. IMPORTANT: This procedure should be carried out very cautiously and only in a clinical setting due to the possible re-release of cyanide into the blood.

2. Sodium nitrite (Taylor, Lilly or Pasadena Cyanide Antidote Kit) 300 - 600 mg i.v., administered over a period of 5 to 15 minutes.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media
alkali powder quenching agent

Extinguishing media which must not be used for safety reasons
water, foam, acidic quenching agents, acidic powder quenching agents;, carbon dioxide (CO2)

Specific hazards during fire fighting
May be released in case of fire:
Hydro-cyanic acid

Special protective equipment for fire-fighters
In the case of fire, wear respiratory protective equipment independent of surrounding air and chemical protective suit.

Further information
Water used to extinguish fire should not enter drainage systems, soil or stretches of water. Ensure there are sufficient retaining facilities for water used to extinguish fire. Contaminated fire-extinguishing water must be disposed of in accordance with the regulations issued by the appropriate local authorities. Fire residues should be disposed of in accordance with the regulations.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions
Wear personal protective equipment.
Keep out unprotected persons.
Keep unauthorized persons away.

Avoid dust formation.

Ensure sufficient ventilation. Avoid skin contact because of the danger of skin absorption.

Environmental precautions
Do not allow the product into the following compartments:
stretches of water
drainage systems
soil
Cyanide-containing sewage water and solutions must be decontaminated before entering a public canal network or stretch of water.

Methods for cleaning up
1. solid:
   Pick up mechanically. Collect in suitable containers.
   Reuse or eliminate absorbed material according to the regulations in force.
2. solution:
   Absorb with liquid-binding material, e.g.: inert absorbent, diatomaceous earth or acid neutralizer
   Pick up mechanically. Collect in suitable containers.
   Reuse or eliminate absorbed material according to the regulations in force.
Waste to be packed like clean product and to be marked. Identification label on packages not to be removed until recycling.

7. HANDLING AND STORAGE

Handling
Safe handling advice
Store under lock and key or in a way that only skilled persons have access to it.
Ensure ventilation when opening container. Traces of HCN may adhere to product.
Seal container hermetically immediately after use.
Be careful when opening the package, since toxic and caustic gases and vapours may escape.

Advice on protection against fire and explosion
The product is not combustible.
see section 5.
In case of release hydrocyanic acid:
Formation of flammable or explosive dust/air mixtures possible.

Storage
Requirements for storage areas and containers
clean, dry, lockable.
Keep container tightly sealed and store in a dry, well-ventilated place.
Unsuitable materials aluminium
Advice on common storage
Do not store together with: acid and acidic salts.
Keep away from food, drink and animal feedingstuffs.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Components with workplace control parameters

Other information
Suitable measuring processes are:
Sodium cyanide
OSHA method ID 120
NIOSH method 7904
Hydro-cyanic acid
OSHA method ID 120

Engineering measures
Ensure suitable suction/aeration at the work place and with operational machinery.
see also section 7.

Personal protective equipment

Respiratory protection
If Hydrogen cyanide occurs:
wear a self contained respiratory apparatus
Note time limit for wearing respiratory protective equipment.
If dust / aerosols occurs:
Respirator with B-P3 combination filter
Respirator with ABEK-P3 combination filter
(Germany)

Hand protection
Glove material: Natural rubber (NR), for example, Cama Clean 708, Kächele-Cama Latex GmbH (KCL), Germany
Material thickness: 0.5 mm
Break through time: \(\geq 480\) min
Method: DIN EN 374

Glove material: Nitrile, for example, Dermatril 740, Kächele-Cama Latex GmbH (KCL), Germany
Material thickness: 0.11 mm
Break through time: \(\geq 480\) min
Method: DIN EN 374

Glove material: Nitrile, for example, Camatril (735), Kächele-Cama Latex GmbH (KCL), Germany
Material thickness: 0.33 mm
Break through time: \(\geq 480\) min
Method: DIN EN 374

Glove material: Polychloroprene with natural-latex liner., for example, Camapren 722, Kächele-Cama Latex GmbH (KCL), Germany
Material thickness: 0.6 mm
Break through time: \(\geq 480\) min
Method: DIN EN 374

Eye protection
wear basket-shaped glasses

Skin and body protection
Wear chemical protective suit.
During cleaning work: rubber or plastic boots.

Hygiene measures
Avoid contact with skin.
After contact with skin, wash immediately with plenty of water.
No eating, drinking, smoking, or snuffing tobacco at work. Wash face and/or hands before break and end of work.

preventive skin protection

Keep working clothes separately.

Avoid contaminating clothes with product.

Immediately change moistened and saturated work clothes.

Immediately rinse contaminated or saturated clothing with water.

**Protective measures**

Wear suitable protective clothing, gloves and eye/face protection.

The personal protective equipment used must meet the requirements of directive 89/686/EEC and amendments (CE certification).

It should be defined in the work place in the form of a risk analysis according to directive 89/686/EEC and amendments.

The work-place related airborne concentrations have to be kept below of the indicated exposure limits.

If the limits at the workplace are exceeded and/or larger amounts are released (leakage, spilling, dust) the indicated respiratory protection should be used.

The work-place related airborne concentrations have to be kept below of the indicated exposure limits.

If the limits at the workplace are exceeded and/or larger amounts are released (leakage, spilling, dust) the indicated respiratory protection should be used.

All precautionary measures indicated have to be observed.

---

**9. PHYSICAL AND CHEMICAL PROPERTIES**

**Appearance**

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Form</td>
<td>solid</td>
</tr>
<tr>
<td>Colour</td>
<td>white</td>
</tr>
<tr>
<td>Odour</td>
<td>distinct, similar to bitter almond</td>
</tr>
</tbody>
</table>

**Safety data**

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>pH</td>
<td>ca. 11 - 12 (20 g/l)</td>
</tr>
<tr>
<td>Medium</td>
<td>water</td>
</tr>
<tr>
<td>Melting point/range</td>
<td>562 °C</td>
</tr>
<tr>
<td>Boiling point/range</td>
<td>1497 °C</td>
</tr>
<tr>
<td>Flash point</td>
<td>Not combustible.</td>
</tr>
<tr>
<td>Flammability</td>
<td>not flammable</td>
</tr>
<tr>
<td>Ignition temperature</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>Autoinflammability</td>
<td>no</td>
</tr>
<tr>
<td>Vapour pressure</td>
<td>100 Pa (800 °C)</td>
</tr>
<tr>
<td>Density</td>
<td>ca. 1.6 g/cm³ (20 °C)</td>
</tr>
<tr>
<td>Bulk density</td>
<td>ca. 750 - 950 kg/m³ (powder)</td>
</tr>
<tr>
<td></td>
<td>(granulate) (compacts)</td>
</tr>
<tr>
<td>Water solubility</td>
<td>ca. 370 g/l (20 °C)</td>
</tr>
</tbody>
</table>
10. STABILITY AND REACTIVITY

Conditions to avoid Hydrogen cyanide forms if heated above 300 °C.

Materials to avoid Under the action of acids (as well as carbon dioxide !) hydrocyanic acid is released which is combustible and may react with air to explosive gas mixtures. Keep away from acidic salts.

Hazardous decomposition products HCN: Hydrogen cyanide (hydrocyanic acid)

11. TOXICOLOGICAL INFORMATION

Acute oral toxicity LD50 Rat: 5 mg/kg
Method: literature

Acute dermal toxicity LD50 Rabbit(female): 11,8 mg/kg
Method: literature

Skin irritation Due to acute dermal toxicity, the irritative effect on the skin cannot be determined.

Eye irritation Rabbit irritating
Method: literature
Test substance: solid product

Repeated dose toxicity Oral Rat
Testing period: 11,5 month
NOEL: 75 mg/kg
target organ/effect: thyroid., brain
Feeding experiments chronic
related to substance: Potassium cyanide

Oral Rat
Testing period: 90 d
NOAEL ca. 0,3 mg/kg
target organ/effect: reproductive system
drinking water analysis
Subchronic toxicity related to substance: Potassium cyanide

Oral mouse
NOAEL ca. 16,2 mg/kg
target organ/effect: reproductive system
drinking water analysis
Subchronic toxicity
related to substance: Potassium cyanide

Gentoxicity in vitro
Ames test Salmonella typhimurium
negative
Method: literature

mammalian cells
negative
Method: literature

Human experience
Inhaling of (at already approx. 200 ppm HCN in the air breathed) or
swallowing (approx. 200 - 300 mg KCN) can result in immediate
unconsciousness and death.

Can be absorbed through the skin.

Following long-term exposition (15 ppm) individual cases of thyroid
dysfunction have been described.
related to substance: Hydro-cyanic acid

12. ECOLOGICAL INFORMATION

Elimination information (persistence and degradability)
Biodegradability
Result: potentially biodegradable

Abiotic degradation
hydrolysis

Behaviour in environmental compartments
Bioaccumulation
low

Adsorption am in the ground:
possible

Mobility
\[ \text{logKOC: (air)} \]
high
related to substance: Hydro-cyanic acid

Ecotoxicity effects
Toxicity to fish
LC50 Oncorhynchus mykiss: \(0,042 \text{ mg/l} / 96 \text{ h}\)
Method: literature
related to substance: \(\text{C N -}\)

EC 10 Salvelinus fontinalis: \(0,011 \text{ mg/l} / 144 \text{ d}\)
Method: literature
reproduction
related to substance: \(\text{C N -}\)

NOEC Salvelinus fontinalis: \(0,006 \text{ mg/l} / 144 \text{ d}\)
Method: literature
reproduction
related to substance: \(\text{C N -}\)
13. DISPOSAL CONSIDERATIONS

Product
Disposal according to local authority regulations.
Recommendation:
Offer surplus and non-recyclable solutions to a licensed disposal company.
Waste to be packed like clean product and to be marked. Identification label on packages not to be removed until recycling.
Refer to manufacturer/supplier for information on recovery/recycling.

Cyanide-containing sewage water and solutions must be decontaminated before entering a public canal network or stretch of water. Observe national regulations.

Uncleaned packaging
Rinse empty containers with water three times, test the last rinsing water for content of cyanide residues.
Treat and detoxify with: Hydrogen peroxide.
Hydrogen peroxide and pH Value 11)
Recommended cleaning agent: water

Waste Key Number

duty of proof: yes;
No waste key number as per the European Waste Types List can be assigned to this product, since such classification is based on the (as yet undetermined) use to which the product is put by the consumer., The waste key number must be determined as per the European Waste Types List (decision on EU Waste Types List 2000/532/EC) in cooperation with the disposal firm / producing firm / official authority.

14. TRANSPORT INFORMATION

**Land transport ADR/RID/GGVSEB (Germany)**

<table>
<thead>
<tr>
<th>Class</th>
<th>6.1</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADR/RID-Labels</td>
<td>6.1</td>
</tr>
<tr>
<td>UN-No</td>
<td>1689</td>
</tr>
<tr>
<td>Packaging group</td>
<td>I</td>
</tr>
<tr>
<td>orange warning plate</td>
<td>66 / 1689</td>
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<tr>
<td>Tunnel Restriction Code (ADR)</td>
<td>(C/E)</td>
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<tr>
<td>Description of the goods (Technical name)</td>
<td>SODIUM CYANIDE, SOLID</td>
</tr>
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</table>

**Sea transport IMDG-Code/GGVSee (Germany)**

<table>
<thead>
<tr>
<th>Class</th>
<th>6.1</th>
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</thead>
<tbody>
<tr>
<td>UN-No</td>
<td>1689</td>
</tr>
<tr>
<td>Packaging group</td>
<td>I</td>
</tr>
<tr>
<td>Marine pollutant</td>
<td>Marine pollutant</td>
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<tr>
<td>EmS</td>
<td>F-A, S-A</td>
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<tr>
<td>Proper technical name (Proper shipping name)</td>
<td>SODIUM CYANIDE, SOLID</td>
</tr>
</tbody>
</table>

**Air transport ICAO-TI/IATA-DGR**

<table>
<thead>
<tr>
<th>Class</th>
<th>6.1</th>
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</thead>
<tbody>
<tr>
<td>UN-No</td>
<td>1689</td>
</tr>
<tr>
<td>Packaging group</td>
<td>I</td>
</tr>
<tr>
<td>Proper technical name (Proper shipping name)</td>
<td>Sodium cyanide, solid</td>
</tr>
</tbody>
</table>

**Inland waterway transport ADN/ADNR/GGVSEB (Germany)**

<table>
<thead>
<tr>
<th>Class</th>
<th>6.1</th>
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</thead>
<tbody>
<tr>
<td>ADR/RID-Labels</td>
<td>6.1</td>
</tr>
<tr>
<td>UN-No / Substance number</td>
<td>1689</td>
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<tr>
<td>Packaging group</td>
<td>I</td>
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</table>
SAFETY DATA SHEET (EC 1907/2006)
CyPlus® Sodium Cyanide, Bricks 98/99 %

Material no. 129615  
Specification  
VA-Nr  
Version 7.5 / REG_EU  
Revision date 06.07.2009  
Print Date 07.07.2009  
Page 12 / 14

Description of the goods (Technical name)
SODIUM CYANIDE, SOLID

Loading instructions/Remarks
IATA_C ERG-Code 6L
IATA_P ERG-Code 6L
IMDG Keep separate from acids.
IMDG Do not stow in external container rows

Transport/further information
Do not store together with acids (danger of toxic gases) or with foodstuffs, consumables and feedstuffs.

15. REGULATORY INFORMATION

Labelling according to EC Directives
hazard-defining component(s)
• Sodium cyanide

Symbol(s) T+ Very toxic
N Dangerous for the environment

R-phrase(s) R26/27/28 Very toxic by inhalation, in contact with skin and if swallowed.
R32 Contact with acids liberates very toxic gas.
R50/53 Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

S-phrase(s) S 7 Keep container tightly closed.
S28 After contact with skin, wash immediately with plenty of water.
S29 Do not empty into drains.
S45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
S60 This material and its container must be disposed of as hazardous waste.
S61 Avoid release to the environment. Refer to special instructions/safety data sheets.

National legislation
Major Accident Hazard Legislation SEVESO
The product is subject to the EC directive 82/501/EEC and amendments (see regulations concerning malfunctions).

Other regulations Please note Directive 76/769/EEC (Marketing and use restrictions Directive) and amendments.

16. OTHER INFORMATION

registration
Switzerland listed/registered
<table>
<thead>
<tr>
<th>Region</th>
<th>Listed/Registered</th>
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<tbody>
<tr>
<td>Europe (EINECS/ELINCS)</td>
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<tr>
<td>USA (TSCA)</td>
<td>listed/registered</td>
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<tr>
<td>Canada (DSL)</td>
<td>listed/registered</td>
</tr>
<tr>
<td>Australia (AICS)</td>
<td>listed/registered</td>
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<tr>
<td>Philippines (PICCS)</td>
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</tr>
<tr>
<td>Japan (MITI)</td>
<td>listed/registered</td>
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<tr>
<td>Korea (TCCL)</td>
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</tr>
<tr>
<td>China</td>
<td>listed/registered</td>
</tr>
</tbody>
</table>

### Risk phrase (R phrase) texts

- **Sodium cyanide**
  - R26/27/28 Very toxic by inhalation, in contact with skin and if swallowed.
  - R32 Contact with acids liberates very toxic gas.
  - R50 Very toxic to aquatic organisms.
  - R53 May cause long-term adverse effects in the aquatic environment.

### Further information

Data for the production of the safety data sheet from the studies available and from the literature. Further information about the characteristics of the product can be found in the product code of practice or in the Product-Brochure.

Changes since the last version are highlighted in the margin. This version replaces all previous versions.

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.
<table>
<thead>
<tr>
<th>Material no.</th>
<th>Version</th>
<th>7.5 / REG_EU</th>
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<tbody>
<tr>
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<tr>
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<td>07.07.2009</td>
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<tr>
<td></td>
<td>Page</td>
<td>14 / 14</td>
</tr>
</tbody>
</table>

SAFETY DATA SHEET (EC 1907/2006)

CyPlus® Sodium Cyanide, Bricks 98/99 %

SDB(P04/019) / 05.07.2009 22:43