INCO Material Safety Data Sheet

INCO special products

INCO® Black Nickel Oxide F-Grade

** THIS DATA SHEET IS PREPARED IN COMPLIANCE WITH EU DIRECTIVE 2001/58/EC**

1. Chemical Composition and Company Identification

INCO Black Nickel Oxide F -Grade

Ni-O C.A.S. Number 1314-06-3
EEC Label No. 215-215-7

$Ni(OH)_2$ C.A.S. Number 12054-48-7
EEC Label No. 235-008-5

INCO Europe Ltd.
Clydach Refinery Clydach Swansea
SA6 5QR
24 hr Emergency Tel No. 44-01792-842-501
Fax 44-01792-841-357

2. Composition

Ni	Cu	Fe	S	O
76.6%	<0.0005%	0.009%	0.0002%	22.0%

Hazardous Ingredients	Typical Composition	TRK (1) mg/m³ *	TLV (2) mg/m³ *	MEL (3) mg/m³
Nickel Oxide	99.5%	0.5	0.2	0.5
Nickel Hydroxide	0.5%	0.5	0.1	0.5

*as Ni in inhalable size fraction

3. Hazards Identification

Nickel Oxide

T; Toxic. Category 1 carcinogen.
May cause cancer by inhalation. R49
May cause sensitisation by skin contact. R43
Avoid exposure, obtain special instructions before use. S53
In case of accident or if you feel unwell seek medical attention immediately. (Show label where possible.) S45

Nickel Hydroxide

Xn; Harmful Category 3 carcinogen.
Harmful by inhalation and if swallowed. R20/22
Possible risk of irreversible effects. R40
May cause sensitisation by skin contact. R43
Do not breath dust. S22
Wear suitable protective clothing. S36

Ingestion Nickel Oxide - no problems recognized, low oral toxicity, LD_{50} (rat) >5000mg/kg).
Nickel Hydroxide - harmful if swallowed, LD_{50} (rat)1600mg/kg.

Inhalation Nickel oxide dust may cause respiratory irritation. Do not breathe the dust.

Skin Contact May cause sensitization by skin contact.

Environment Classification not yet decided.

4. First Aid Measures

Ingestion Large quantities of water should be drunk. Seek medical attention.

Inhalation	Remove from exposure. Seek medical attention.
Skin	Wash thoroughly with water. For rashes seek medical advice. Show label if possible
Eyes	Irrigate eyeball thoroughly with water for at least 10 minutes. If discomfort persists seek medical attention.
Wounds	Cleanse thoroughly to remove any nickel oxide particles

5. Fire Fighting Measures

Non flammable. Extinguish surrounding fires with appropriate methods.

6. Accidental Release Measures

Collect spills by wet sweeping or vacuuming with the vacuum exhaust passing through a high efficiency particulate arresting (HEPA) filter if exhaust is discharged into the work place. Wear appropriate nationally approved respirators if collection and disposal of spills is likely to cause the concentration limits of airborne nickel to exceed the locally prescribed exposure limits.

7. Handling and Storage

Keep in the container supplied and keep container closed when not in use. Wear suitable protective clothing including gloves. As packed nickel oxide may constitute a manual handling risk. Nickel oxide is subject to the Control of Major Accident Hazards Directives 82/501EEC, 96/82/EC & 98/433/EC (The Seveso Directive). Local consent needs to be obtained to store quantities in excess of 1 tonne.

8. Exposure Controls / Personal Protection

For exposure limits see Section 2. Maintain airborne nickel oxide levels as low as possible. Do not inhale dust. Ventilation is normally required when handling or using this product to keep airborne nickel oxide below the nationally authorized limits. If ventilation alone cannot control exposure, use respirators nationally approved for the purpose.

Avoid repeated skin and eye contact. Wear goggles or face shield. Wear suitable protective clothing and gloves. Wash skin thoroughly after handling and before eating, drinking or smoking. Launder clothing and gloves as needed.

9. Physical and Chemical Properties

Black, odourless powder.

Ingredient	Mol. Wt.
NiO	74.71

Viscosity	N/A
Melting point	1984 ^{o}C
Boiling point	N/A
Flash Point	N/A
Autoflammability	N/A
Explosive properties	Not explosive
Vapour pressure	N/A
Tap density	1.7 g/cm^3 [5]
Particle size	1 µm [14]
Solubility cold water	N/A
Solubility hot water	N/A
Partition coefficient	N/A
Magnetic properties	Paramagnetic

10. Stability and Reactivity

Stable and non reactive.

11. Toxicological Information

Nickel Oxide

Evidence for the association of nickel compound exposures and cancer risk comes mainly from workers in now obsolete nickel refining operations. The studies of nickel workers suggest that respiratory cancer risks are primarily related to exposure to relatively insoluble forms of nickel notably sulphidic and oxidic nickel at concentrations greater than 10mg/m^3. Toxic respiratory effects in animals may be caused by reduced particle clearance capacity.

The International Agency for Research on Cancer (IARC) (ref. 4) in 1990 and the U.S. Tenth Report on Carcinogens (ref. 5) in 2002 concluded there was sufficient evidence that nickel compounds are carcinogenic to humans. The Report of the International Committee on Nickel Carcinogenesis in Man reported that workers who have been primarily exposed to nickel oxide showed some evidence of increased lung cancer.

The European Union Commission in 1991 classified nickel oxide and work involving exposure to dusts, fumes and sprays produced during the roasting and electrorefining of nickel-copper mattes as carcinogenic processes.

ACGIH has re-evaluated the data regarding the carcinogenicity of nickel and nickel compounds and has classified nickel oxide as a confirmed human carcinogen, Class A1.

There is some evidence that the inhalation of nickel oxide has resulted in an increased incidence of malignant lung tumors in rats. Inhalation of nickel oxide at concentrations 50 times the TLV, produced pneumoconiosis in hamsters. Repeated intratracheal instillation of nickel oxide produced an increased incidence of malignant lung tumors in rats.

Wounds: Nickel oxide has caused tumors at the site of injection in rodents.

Ingestion: The U.S. National Institute for Occupational Safety and Health (NIOSH) concluded there is no evidence that nickel and its inorganic compounds are carcinogenic when ingested. The U.S. Food and Drug Administration has affirmed that nickel is generally recognized as safe (GRAS) as a direct human food ingredient.

Preexisting Conditions: Prolonged and intimate skin contact can cause an allergic skin rash in previously sensitized individuals.

Reproductive Toxicity: There is no evidence of mutagenesis. Animal experiments indicate that soluble nickel ingestion causes adverse effects on fetal development at a threshold oral exposure of 2.2 mg/Ni/kg/day by pregnant rats. Data are insufficient to determine if this effect occurs in humans and no regulatory agency has classified soluble forms of nickel as reproductive risks for humans.

Nickel Hydroxide
No information currently available.

12. Ecological Information

The environmental classification has not been decided.

13. Disposal Considerations

Nickel-containing material is normally collected to recover nickel values. Should disposal be deemed necessary follow local regulations.

14. Transport Information

International Maritime Dangerous Goods Code	Not regulated.
International Civil Aviation Organization Technical Instructions for the Carriage of Dangerous Goods by Air	Not regulated.
U.S. Dept. of Transportation Regulations	Not regulated.
Canadian Transportation of Dangerous Goods Act	Not regulated.
European Agreement Concerning the International Carriage of Dangerous Goods by Road	Not regulated.

15. Regulatory Information

Nickel oxide is classified as a Category 1 carcinogen "substances or processes known to be carcinogenic to man" by the EU in Directive 67/548/EEC (Classification, Packaging and Labeling Directive) and in the UK in the Chemicals Hazard Information and Packaging for Supply Regulations [11] and as such it requires to be labelled with the following risk and safety phrases.

Nickel Oxide
T; Toxic. Category 1 carcinogen.
May cause cancer by inhalation. R49
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Avoid exposure, obtain special instructions before use. S53
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Nickel hydroxide is classified as a Category 3 carcinogen, "a substance which causes concern for man owing to the possible carcinogenic effect but in respect of which the available information is not adequate for making a satisfactory assessment", by the EU in Directive 67/548/EEC (Classification, Packaging and Labelling Directive) and in the UK in the Chemicals Hazard Information and Packaging for Supply Regulations and as such it requires to be labelled with the following risk and safety phrases.

Nickel Hydroxide
Xn; Harmful Category 3 carcinogen.
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16. Other Information

Medical staff should note that this data sheet has been lodged with the following Poisons Information Centre:
National Poison Centre Phone line : 44-0870 6006266
Fax : 44-02920 704357
E- Mail : wnpu@compuserve.com

17. Notes and Bibliography

INCO is the Trademark of the INCO family of companies.

Disclaimer: The information in this Data Sheet is provided in good faith and is accurate to INCO's best knowledge and belief but except as implied by law, no representation or warranty is given in relation to the information and INCO accepts no liability.

1 T.R.K. is Technische Richtkonzentrationen as defined in the Deutsche Forschungsgemeinschaft, List of MAK & BAT values. 1998
2 Threshold Limit Values of the American Conference of Governmental Industrial Hygienists. 1998
3 Maximum Exposure Limit of the Health and Safety Executive in the U.K. in EH40 1998.