

# NITROSET LLC

Intertek Safety Data Sheet (Conforms to Regulation (EC) No 1907/2006) (REVIEW)

Issue Date: 14-Apr-2010

NA160TCP

INTERTEK 1004141

Version No:2.0

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## Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

### PRODUCT NAME

NITROSET FASTENERS

### SUPPLIER

Company: Nitroset, LLC

Address:

5600 Bonhomme Road # D Houston, TX 77036

Email: CHRIS.LIN@NITROSET.COM

Telephone: 800- 5244649

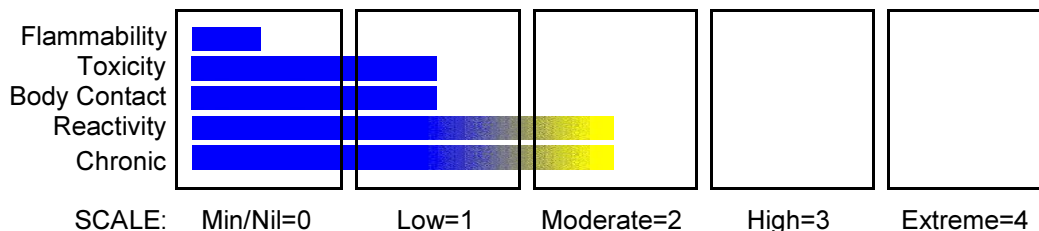
Fax: 713- 7815677

## Section 2 - HAZARDS IDENTIFICATION

### STATEMENT OF HAZARDOUS NATURE

**CONSIDERED A DANGEROUS SUBSTANCE ACCORDING TO DIRECTIVE 1999/45/EC AND ITS AMENDMENTS.**

### HAZARD RATINGS



### RISK

Risk Codes

R33

R52/53

Risk Phrases

■ Danger of cumulative effects.

■ Harmful to aquatic organisms, may cause long- term adverse effects in the aquatic environment.

## Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

NAME	CAS RN	INT HAZ	%
iron	7439-89-6	None	77
EC NO: 231-096-4			
carbon, activated	7440-44-0	None	5
EC NO: 231-153-3			
R CODES: R07, R10, R17			
styrene/ butadiene/ acrylonitrile copolymer	9003-56-9	None	4
nitrocellulose	9004-70-0	E	10
R CODES: R3			
methylcellulose	9004-67-5	None	2
diphenylamine	122-39-4	None	2

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## Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

EC NO: 204-539-4

R CODES: R23/24/25, R33, R50/53

## Section 4 - FIRST AID MEASURES

### SWALLOWED

- First aid is not generally required. If in doubt, contact a Poisons Information Centre or a doctor.

### EYE

- If this product comes in contact with the eyes:
  - Wash out immediately with fresh running water.
  - Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids.
  - If pain persists or recurs seek medical attention.
  - Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.
  - DO NOT attempt to remove particles attached to or embedded in eye.
  - Lay victim down, on stretcher if available and pad BOTH eyes, make sure dressing does not press on the injured eye by placing thick pads under dressing, above and below the eye.
  - Seek urgent medical assistance, or transport to hospital.

### SKIN

- If skin or hair contact occurs:
  - Flush skin and hair with running water (and soap if available).
  - Seek medical attention in event of irritation.

### INHALED

- If fumes or combustion products are inhaled remove from contaminated area.
- Lay patient down. Keep warm and rested.
- Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures.
- Apply artificial respiration if not breathing, preferably with a demand valve resuscitator, bag-valve mask device, or pocket mask as trained. Perform CPR if necessary.
- Transport to hospital, or doctor.

### NOTES TO PHYSICIAN

- Copper, magnesium, aluminium, antimony, iron, manganese, nickel, zinc (and their compounds) in welding, brazing, galvanising or smelting operations all give rise to thermally produced particulates of smaller dimension than may be produced if the metals are divided mechanically. Where insufficient ventilation or respiratory protection is available these particulates may produce "metal fume fever" in workers from an acute or long term exposure.
  - Onset occurs in 4-6 hours generally on the evening following exposure. Tolerance develops in workers but may be lost over the weekend. (Monday Morning Fever)
  - Pulmonary function tests may indicate reduced lung volumes, small airway obstruction and decreased carbon monoxide diffusing capacity but these abnormalities resolve after several months.
  - Although mildly elevated urinary levels of heavy metal may occur they do not correlate with clinical effects.
  - The general approach to treatment is recognition of the disease, supportive care and prevention of exposure.
  - Seriously symptomatic patients should receive chest x-rays, have arterial blood gases determined and be observed for the development of tracheobronchitis and pulmonary edema.

[Ellenhorn and Barceloux: Medical Toxicology].

For acute or short term repeated exposures to iron and its derivatives:

- Always treat symptoms rather than history.
- In general, however, toxic doses exceed 20 mg/kg of ingested material (as elemental iron) with lethal doses exceeding 180 mg/kg.
- Control of iron stores depend on variation in absorption rather than excretion. Absorption occurs through

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## Section 4 - FIRST AID MEASURES

aspiration, ingestion and burned skin.

- Hepatic damage may progress to failure with hypoprothrombinaemia and hypoglycaemia. Hepatorenal syndrome may occur.
- Iron intoxication may also result in decreased cardiac output and increased cardiac pooling which subsequently produces hypotension.
- Serum iron should be analysed in symptomatic patients. Serum iron levels (2-4 hrs post-ingestion) greater than 100 ug/dL indicate poisoning with levels, in excess of 350 ug/dL, being potentially serious. Emesis or lavage (for obtunded patients with no gag reflex) are the usual means of decontamination.
- Activated charcoal does not effectively bind iron.
- Catharsis (using sodium sulfate or magnesium sulfate) may only be used if the patient already has diarrhoea.
- Deferoxamine is a specific chelator of ferric (3+) iron and is currently the antidote of choice. It should be administered parenterally. [Ellenhorn and Barceloux: Medical Toxicology].

## Section 5 - FIRE FIGHTING MEASURES

### EXTINGUISHING MEDIA

- Metal dust fires need to be smothered with sand, inert dry powders.

DO NOT USE WATER, CO2 or FOAM.

- Use DRY sand, graphite powder, dry sodium chloride based extinguishers, G-1 or Met L-X to smother fire.
- Confining or smothering material is preferable to applying water as chemical reaction may produce flammable and explosive hydrogen gas.
- Chemical reaction with CO2 may produce flammable and explosive methane.
- If impossible to extinguish, withdraw, protect surroundings and allow fire to burn itself out.
- DO NOT use halogenated fire extinguishing agents.

### FIRE FIGHTING

- Alert Fire Brigade and tell them location and nature of hazard.
- Wear breathing apparatus plus protective gloves for fire only.
- Prevent, by any means available, spillage from entering drains or water courses.
- Use fire fighting procedures suitable for surrounding area.
- DO NOT approach containers suspected to be hot.
- Cool fire exposed containers with water spray from a protected location.
- If safe to do so, remove containers from path of fire.
- Equipment should be thoroughly decontaminated after use.

### FIRE/EXPLOSION HAZARD

- Metal powders, while generally regarded as non-combustible, may burn when metal is finely divided and energy input is high.
- May react explosively with water.
- May be ignited by friction, heat, sparks or flame.
- Metal dust fires are slow moving but intense and difficult to extinguish.
- Will burn with intense heat.
- DO NOT disturb burning dust. Explosion may result if dust is stirred into a cloud, by providing oxygen to a large surface of hot metal.
- Containers may explode on heating.
- Dusts or fumes may form explosive mixtures with air.
- May REIGNITE after fire is extinguished.
- Gases generated in fire may be poisonous, corrosive or irritating.
- DO NOT use water or foam as generation of explosive hydrogen may result.

Decomposition may produce toxic fumes of: metal oxides.

May emit poisonous fumes.

May emit corrosive fumes.

### FIRE INCOMPATIBILITY

- Reacts with acids producing flammable / explosive hydrogen (H2) gas.

None known.

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## Section 5 - FIRE FIGHTING MEASURES

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### PERSONAL PROTECTION

Glasses:

Chemical goggles.

Gloves:

Leather Gloves.

Respirator:

Particulate

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## Section 6 - ACCIDENTAL RELEASE MEASURES

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### MINOR SPILLS

- Remove all ignition sources.
- Clean up all spills immediately.
- Avoid contact with skin and eyes.
- Control personal contact by using protective equipment.
- Use dry clean up procedures and avoid generating dust.
- Place in a suitable, labelled container for waste disposal.

### MAJOR SPILLS

- Moderate hazard.
  - CAUTION: Advise personnel in area.
  - Alert Emergency Services and tell them location and nature of hazard.
  - Control personal contact by wearing protective clothing.
  - Prevent, by any means available, spillage from entering drains or water courses.
  - Recover product wherever possible.
  - IF DRY: Use dry clean up procedures and avoid generating dust. Collect residues and place in sealed plastic bags or other containers for disposal. IF WET: Vacuum/shovel up and place in labelled containers for disposal.
  - ALWAYS: Wash area down with large amounts of water and prevent runoff into drains.
  - If contamination of drains or waterways occurs, advise Emergency Services.
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## Section 7 - HANDLING AND STORAGE

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### PROCEDURE FOR HANDLING

- Avoid all personal contact, including inhalation.
- Wear protective clothing when risk of exposure occurs.
- Use in a well-ventilated area.
- Prevent concentration in hollows and sumps.
- DO NOT enter confined spaces until atmosphere has been checked.
- DO NOT allow material to contact humans, exposed food or food utensils.
- Avoid contact with incompatible materials.
- When handling, DO NOT eat, drink or smoke.
- Keep containers securely sealed when not in use.
- Avoid physical damage to containers.
- Always wash hands with soap and water after handling.
- Work clothes should be laundered separately. Launder contaminated clothing before re-use.
- Use good occupational work practice.
- Observe manufacturer's storing and handling recommendations.
- Atmosphere should be regularly checked against established exposure standards to ensure safe working conditions are maintained.

### SUITABLE CONTAINER

- CARE: Packing of high density product in light weight metal or plastic packages may result in container

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## Section 7 - HANDLING AND STORAGE

collapse with product release.

- Heavy gauge metal packages / Heavy gauge metal drums.
- Polyethylene or polypropylene container.
- Check all containers are clearly labelled and free from leaks.

### STORAGE INCOMPATIBILITY

- **WARNING:** Avoid or control reaction with peroxides. All transition metal peroxides should be considered as potentially explosive. For example transition metal complexes of alkyl hydroperoxides may decompose explosively.
- The pi-complexes formed between chromium(0), vanadium(0) and other transition metals (haloarene-metal complexes) and mono-or poly-fluorobenzene show extreme sensitivity to heat and are explosive.
- Avoid reaction with borohydrides or cyanoborohydrides.
- Many metals may incandesce, react violently, ignite or react explosively upon addition of concentrated nitric acid.

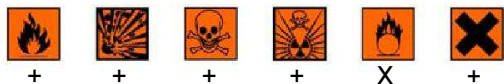
Metals exhibit varying degrees of activity. Reaction is reduced in the massive form (sheet, rod, or drop), compared with finely divided forms. The less active metals will not burn in air but:

- can react exothermically with oxidising acids to form noxious gases.
- catalyse polymerisation and other reactions, particularly when finely divided
- react with halogenated hydrocarbons (for example, copper dissolves when heated in carbon tetrachloride), sometimes forming explosive compounds.
- Many metals in elemental form react exothermically with compounds having active hydrogen atoms (such as acids and water) to form flammable hydrogen gas and caustic products.
- Elemental metals may react with azo/diazo compounds to form explosive products.
- Some elemental metals form explosive products with halogenated hydrocarbons.
- Reacts with acids producing flammable / explosive hydrogen (H<sub>2</sub>) gas.
- Metals and their oxides or salts may react violently with chlorine trifluoride and bromine trifluoride.
- These trifluorides are hypergolic oxidisers. They ignites on contact (without external source of heat or ignition) with recognised fuels - contact with these materials, following an ambient or slightly elevated temperature, is often violent and may produce ignition.
- The state of subdivision may affect the results.

### STORAGE REQUIREMENTS

- Store in original containers.
- Keep containers securely sealed.
- Store in a cool, dry, well-ventilated area.
- Store away from incompatible materials and foodstuff containers.
- Protect containers against physical damage and check regularly for leaks.
- Observe manufacturer's storing and handling recommendations.

### SAFE STORAGE WITH OTHER CLASSIFIED CHEMICALS



+: *May be stored together*

O: *May be stored together with specific preventions*

X: *Must not be stored together*

## Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

### EXPOSURE CONTROLS

The following materials had no OELs on our records

- styrene/ butadiene/ acrylonitrile copolymer:
- nitrocellulose:

CAS:9003- 56- 9

CAS:9004- 70- 0

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• methylcellulose:

CAS:9004- 67- 5

### EMERGENCY EXPOSURE LIMITS

Material	Revised IDLH Value (mg/m3)	Revised IDLH Value (ppm)
carbon, activated	1, 750	

### MATERIAL DATA

NITROSET LLC:

Not available

### IRON:

■ Sensory irritants are chemicals that produce temporary and undesirable side-effects on the eyes, nose or throat. Historically occupational exposure standards for these irritants have been based on observation of workers' responses to various airborne concentrations. Present day expectations require that nearly every individual should be protected against even minor sensory irritation and exposure standards are established using uncertainty factors or safety factors of 5 to 10 or more. On occasion animal no-observable-effect-levels (NOEL) are used to determine these limits where human results are unavailable. An additional approach, typically used by the TLV committee (USA) in determining respiratory standards for this group of chemicals, has been to assign ceiling values (TLV C) to rapidly acting irritants and to assign short-term exposure limits (TLV STELs) when the weight of evidence from irritation, bioaccumulation and other endpoints combine to warrant such a limit. In contrast the MAK Commission (Germany) uses a five-category system based on intensive odour, local irritation, and elimination half-life. However this system is being replaced to be consistent with the European Union (EU) Scientific Committee for Occupational Exposure Limits (SCOEL); this is more closely allied to that of the USA.

OSHA (USA) concluded that exposure to sensory irritants can:

- cause inflammation
- cause increased susceptibility to other irritants and infectious agents
- lead to permanent injury or dysfunction
- permit greater absorption of hazardous substances and
- acclimate the worker to the irritant warning properties of these substances thus increasing the risk of overexposure.

The recommended TLV is thought to reduce the likelihood of respiratory irritation and skin irritation from exposure to aerosols and mists of soluble iron salts.

### CARBON, ACTIVATED:

■ Sensory irritants are chemicals that produce temporary and undesirable side-effects on the eyes, nose or throat. Historically occupational exposure standards for these irritants have been based on observation of workers' responses to various airborne concentrations. Present day expectations require that nearly every individual should be protected against even minor sensory irritation and exposure standards are established using uncertainty factors or safety factors of 5 to 10 or more. On occasion animal no-observable-effect-levels (NOEL) are used to determine these limits where human results are unavailable. An additional approach, typically used by the TLV committee (USA) in determining respiratory standards for this group of chemicals, has been to assign ceiling values (TLV C) to rapidly acting irritants and to assign short-term exposure limits (TLV STELs) when the weight of evidence from irritation, bioaccumulation and other endpoints combine to warrant such a limit. In contrast the MAK Commission (Germany) uses a five-category system based on intensive odour, local irritation, and elimination half-life. However this system is being replaced to be consistent with the European Union (EU) Scientific Committee for Occupational Exposure Limits (SCOEL); this is more closely allied to that of the USA.

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- cause inflammation
- cause increased susceptibility to other irritants and infectious agents
- lead to permanent injury or dysfunction
- permit greater absorption of hazardous substances and
- acclimate the worker to the irritant warning properties of these substances thus increasing the risk of overexposure.

The TLV-TWA for carbon black is recommended to minimise complaints of excessive dirtiness and applies only to commercially produced carbon blacks or to soots derived from combustion sources containing absorbed

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polycyclic aromatic hydrocarbons (PAHs). When PAHs are present in carbon black (measured as the cyclohexane-extractable fraction) NIOSH has established a REL-TWA of 0.1 mg/m<sup>3</sup> and considers the material to be an occupational carcinogen.

The NIOSH REL-TWA was "selected on the basis of professional judgement rather than on data delineating safe from unsafe concentrations of PAHs".

This limit was justified on the basis of feasibility of measurement and not on a demonstration of its safety.

NOTE: This substance has been classified by the ACGIH as A4 NOT classifiable as causing Cancer in humans. - as fine dust: defined as a dust which can reach the alveolar region of the lung.

MAK Group C: There is no reason to fear risk of damage to the developing embryo when MAK and BAT values are observed.

MAK values, and categories and groups are those recommended within the Federal Republic of Germany. as carbon black CAS RN 1333-86-4

TLV TWA: 3.5 mg/m<sup>3</sup> A4

ES TWA: 3 mg/m<sup>3</sup>

MAK value: 6 mg/m<sup>3</sup>

### STYRENE/ BUTADIENE/ ACRYLONITRILE COPOLYMER:

■ These "dusts" have little adverse effect on the lungs and do not produce toxic effects or organic disease. Although there is no dust which does not evoke some cellular response at sufficiently high concentrations, the cellular response caused by P.N.O.C.s has the following characteristics:

- the architecture of the air spaces remain intact,
- scar tissue (collagen) is not synthesised to any degree,
- tissue reaction is potentially reversible.

Extensive concentrations of P.N.O.C.s may:

- seriously reduce visibility,
- cause unpleasant deposits in the eyes, ears and nasal passages,
- contribute to skin or mucous membrane injury by chemical or mechanical action, per se, or by the rigorous skin cleansing procedures necessary for their removal. [ACGIH]

This limit does not apply:

- to brief exposures to higher concentrations
- nor does it apply to those substances that may cause physiological impairment at lower concentrations but for which a TLV has as yet to be determined.

This exposure standard applies to particles which

- are insoluble or poorly soluble\* in water or, preferably, in aqueous lung fluid (if data is available) and

• have a low toxicity (i.e., are not cytotoxic, genotoxic, or otherwise chemically reactive tissue, and do not emit ionizing radiation, cause immune sensitization, or cause toxic effects other than by inflammation or by a mechanism of lung overload).

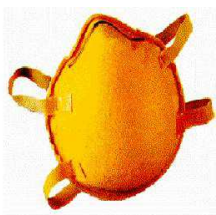
### NITROCELLULOSE:

as dust not otherwise classified

### DIPHENYLAMINE:

- Not available. Refer to individual constituents.

## PERSONAL PROTECTION



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## Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

### EYE

- Safety glasses with side shields.
- Chemical goggles.
- Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants. A written policy document, describing the wearing of lens or restrictions on use, should be created for each workplace or task. This should include a review of lens absorption and adsorption for the class of chemicals in use and an account of injury experience. Medical and first-aid personnel should be trained in their removal and suitable equipment should be readily available. In the event of chemical exposure, begin eye irrigation immediately and remove contact lens as soon as practicable. Lens should be removed at the first signs of eye redness or irritation - lens should be removed in a clean environment only after workers have washed hands thoroughly. [CDC NIOSH Current Intelligence Bulletin 59].

### HANDS/FEET

- Suitability and durability of glove type is dependent on usage. Factors such as:

- frequency and duration of contact,
- chemical resistance of glove material,
- glove thickness and
- dexterity,

are important in the selection of gloves.

- Protective gloves eg. Leather gloves or gloves with Leather facing.

Experience indicates that the following polymers are suitable as glove materials for protection against undissolved, dry solids, where abrasive particles are not present.

- polychloroprene
- nitrile rubber
- butyl rubber
- fluorocautchouc
- polyvinyl chloride

Gloves should be examined for wear and/ or degradation constantly.

### OTHER

- Overalls.
- P.V.C. apron.
- Barrier cream.
- Skin cleansing cream.
- Eye wash unit.

- Respirators may be necessary when engineering and administrative controls do not adequately prevent exposures.
- The decision to use respiratory protection should be based on professional judgment that takes into account toxicity information, exposure measurement data, and frequency and likelihood of the worker's exposure - ensure users are not subject to high thermal loads which may result in heat stress or distress due to personal protective equipment (powered, positive flow, full face apparatus may be an option).
- Published occupational exposure limits, where they exist, will assist in determining the adequacy of the selected respiratory . These may be government mandated or vendor recommended.
- Certified respirators will be useful for protecting workers from inhalation of particulates when properly selected and fit tested as part of a complete respiratory protection program.
- Use approved positive flow mask if significant quantities of dust becomes airborne.
- Try to avoid creating dust conditions.

### RESPIRATOR

- Selection of the Class and Type of respirator will depend upon the level of breathing zone contaminant and the chemical nature of the contaminant. Protection Factors (defined as the ratio of contaminant outside and inside the mask) may also be important.

Breathing Zone Level ppm (volume)	Maximum Protection Factor	Half- face Respirator	Full- Face Respirator
1000	10	- AUS P	-
1000	50	-	- AUS P

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## Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

5000	50	Airline *	-
5000	100	-	- 2 P
10000	100	-	- 3 P
	100+		Airline**

\* - Continuous Flow

\*\* - Continuous-flow or positive pressure demand.

The local concentration of material, quantity and conditions of use determine the type of personal protective equipment required. For further information consult site specific CHEMWATCH data (if available), or your Occupational Health and Safety Advisor.

### ENGINEERING CONTROLS

- Metal dusts must be collected at the source of generation as they are potentially explosive.
- Vacuum cleaners, of flame-proof design, should be used to minimise dust accumulation.
- Metal spraying and blasting should, where possible, be conducted in separate rooms. This minimises the risk of supplying oxygen, in the form of metal oxides, to potentially reactive finely divided metals such as aluminium, zinc, magnesium or titanium.
- Work-shops designed for metal spraying should possess smooth walls and a minimum of obstructions, such as ledges, on which dust accumulation is possible.
- Wet scrubbers are preferable to dry dust collectors.
- Bag or filter-type collectors should be sited outside the workrooms and be fitted with explosion relief doors.
- Cyclones should be protected against entry of moisture as reactive metal dusts are capable of spontaneous combustion in humid or partially wetted states.
- Local exhaust systems must be designed to provide a minimum capture velocity at the fume source, away from the worker, of 0.5 metre/sec.

Air contaminants generated in the workplace possess varying "escape" velocities which, in turn, determine the "capture velocities" of fresh circulating air required to effectively remove the contaminant.

Type of Contaminant:

welding, brazing fumes (released at relatively low velocity into moderately still air)

Air Speed:

0.5- 1.0 m/s (100- 200 f/min.)

Within each range the appropriate value depends on:

Lower end of the range

- 1: Room air currents minimal or favourable to capture
- 2: Contaminants of low toxicity or of nuisance value only.
- 3: Intermittent, low production.
- 4: Large hood or large air mass in motion

Upper end of the range

- 1: Disturbing room air currents
- 2: Contaminants of high toxicity
- 3: High production, heavy use
- 4: Small hood- local control only

Simple theory shows that air velocity falls rapidly with distance away from the opening of a simple extraction pipe. Velocity generally decreases with the square of distance from the extraction point (in simple cases). Therefore the air speed at the extraction point should be adjusted, accordingly, after reference to distance from the contaminating source. The air velocity at the extraction fan, for example, should be a minimum of 1-2.5 m/s (200-500 f/min.) for extraction of gases discharged 2 meters distant from the extraction point. Other mechanical considerations, producing performance deficits within the extraction apparatus, make it essential that theoretical air velocities are multiplied by factors of 10 or more when extraction systems are installed or used.

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## Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

### Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

#### PHYSICAL PROPERTIES

Molecular Weight:	Boiling Range (°C):	Melting Range (°C):
Specific Gravity (water=1):	Solubility in water (g/L):	pH (as supplied):
pH (1% solution):	Vapour Pressure (kPa):	Volatile Component (%vol):
Evaporation Rate:	Relative Vapour Density (air=1):	Flash Point (°C):
Lower Explosive Limit (%):	Upper Explosive Limit (%):	Autoignition Temp (°C):
Decomposition Temp (°C): Not available	State:	Viscosity: Not available

Material	Value
DIPHENYLAMINE:	
log Kow	3.22- 3.50

### Section 10 - CHEMICAL STABILITY AND REACTIVITY INFORMATION

#### CONDITIONS CONTRIBUTING TO INSTABILITY

No data for this material.

*For incompatible materials - refer to Section 7 - Handling and Storage.*

### Section 11 - TOXICOLOGICAL INFORMATION

#### POTENTIAL HEALTH EFFECTS

##### ACUTE HEALTH EFFECTS

##### SWALLOWED

■ Although ingestion is not thought to produce harmful effects (as classified under EC Directives), the material may still be damaging to the health of the individual, following ingestion, especially where pre-existing organ (e.g liver, kidney) damage is evident. Present definitions of harmful or toxic substances are generally based on doses producing mortality rather than those producing morbidity (disease, ill-health). Gastrointestinal tract discomfort may produce nausea and vomiting. In an occupational setting however, ingestion of insignificant quantities is not thought to be cause for concern.

##### EYE

■ Limited evidence exists, or practical experience suggests, that the material may cause eye irritation in a substantial number of individuals and/or is expected to produce significant ocular lesions which are present twenty-four hours or more after instillation into the eye(s) of experimental animals. Repeated or prolonged eye contact may cause inflammation characterised by temporary redness (similar to windburn) of the conjunctiva (conjunctivitis); temporary impairment of vision and/or other transient eye damage/ulceration may occur.

##### SKIN

■ The material is not thought to produce adverse health effects or skin irritation following contact (as classified by EC Directives using animal models). Nevertheless, good hygiene practice requires that exposure be kept to a minimum and that suitable gloves be used in an occupational setting.

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## Section 11 - TOXICOLOGICAL INFORMATION

### INHALED

■ The material is not thought to produce adverse health effects or irritation of the respiratory tract (as classified by EC Directives using animal models). Nevertheless, good hygiene practice requires that exposure be kept to a minimum and that suitable control measures be used in an occupational setting.

### CHRONIC HEALTH EFFECTS

■ Limited evidence shows that inhalation of the material is capable of inducing a sensitisation reaction in a significant number of individuals at a greater frequency than would be expected from the response of a normal population. Pulmonary sensitisation, resulting in hyperactive airway dysfunction and pulmonary allergy may be accompanied by fatigue, malaise and aching. Significant symptoms of exposure may persist for extended periods, even after exposure ceases. Symptoms can be activated by a variety of nonspecific environmental stimuli such as automobile exhaust, perfumes and passive smoking.

### NITROSET LLC

#### TOXICITY AND IRRITATION

■ Not available. Refer to individual constituents.

#### IRON:

■ unless otherwise specified data extracted from RTECS - Register of Toxic Effects of Chemical Substances.

#### TOXICITY

Oral (rat) LD50: 98600 mg/kg

#### IRRITATION

Nil Reported [Patty]

#### CARBON, ACTIVATED:

■ unless otherwise specified data extracted from RTECS - Register of Toxic Effects of Chemical Substances.

■ No significant acute toxicological data identified in literature search.

The substance is classified by IARC as Group 3:

NOT classifiable as to its carcinogenicity to humans.

Evidence of carcinogenicity may be inadequate or limited in animal testing.

#### STYRENE/ BUTADIENE/ ACRYLONITRILE COPOLYMER:

■ unless otherwise specified data extracted from RTECS - Register of Toxic Effects of Chemical Substances.

#### TOXICITY

Oral (Rat) LD50: 5010 mg/kg

Dermal (Rabbit) LD50: 5010 mg/kg

■ The substance is classified by IARC as Group 3:

NOT classifiable as to its carcinogenicity to humans.

Evidence of carcinogenicity may be inadequate or limited in animal testing.

#### IRRITATION

#### NITROCELLULOSE:

■ No significant acute toxicological data identified in literature search.

#### METHYLCELLULOSE:

■ unless otherwise specified data extracted from RTECS - Register of Toxic Effects of Chemical Substances.

#### TOXICITY

Oral (rat) LD50: > 10000 mg/kg

#### IRRITATION

Nil Reported [Manufacturer]

#### DIPHENYLAMINE:

■ unless otherwise specified data extracted from RTECS - Register of Toxic Effects of Chemical Substances.

#### TOXICITY

Oral (Rat) LD50: 1120 mg/kg

Oral (Mouse) LD50: 1230 mg/kg

#### IRRITATION

continued...

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## Section 11 - TOXICOLOGICAL INFORMATION

Oral (Guinea) pig: LD50 300 mg/kg

■ Asthma-like symptoms may continue for months or even years after exposure to the material ceases. This may be due to a non-allergenic condition known as reactive airways dysfunction syndrome (RADS) which can occur following exposure to high levels of highly irritating compound. Key criteria for the diagnosis of RADS include the absence of preceding respiratory disease, in a non-atopic individual, with abrupt onset of persistent asthma-like symptoms within minutes to hours of a documented exposure to the irritant. A reversible airflow pattern, on spirometry, with the presence of moderate to severe bronchial hyperreactivity on methacholine challenge testing and the lack of minimal lymphocytic inflammation, without eosinophilia, have also been included in the criteria for diagnosis of RADS. RADS (or asthma) following an irritating inhalation is an infrequent disorder with rates related to the concentration of and duration of exposure to the irritating substance. Industrial bronchitis, on the other hand, is a disorder that occurs as result of exposure due to high concentrations of irritating substance (often particulate in nature) and is completely reversible after exposure ceases. The disorder is characterised by dyspnea, cough and mucus production. Acute toxicity: Diphenylamine and its substituted derivatives all show a slight to moderate order of toxicity following oral administration, with LD50 values ranging from >500 to > 34,000 mg/kg. Overall, the acute dermal LD50 for these materials was greater than the 2000 mg/kg limit dose indicating a very low order of toxicity.

Mutagenicity: Of five substituted diphenylamines tested, there was one weakly positive mutagenic respo with in the bacterial mutagenicity test, with diphenylamine (122-39-4). Overall weight of evidence for this material, as well as the category indicates a negative evaluation for bacterial mutagenicity.

Substituted diphenylamines have been tested for mutagenicity in tests for gene mutations and chromosomal aberrations. The assays included point mutations in bacterial cells, in vitro chromosomal aberrations in mammalian cells, and in vivo chromosomal aberrations. With one exception, the data consistently demonstrate no evidence of genotoxicity for this category of materials. This suggests that all members of the category lack genotoxicity due to their similarity in chemical structures and physicochemical properties

Repeat Dose Toxicity: Diphenylamine (122-39-4) was tested in a 28 day oral study with rats. A NOAEL of 111 mg/kg/day was identified. Diphenylamine is not only the common precursor for the materials of this category, but also theoretically the most toxic of the class since it is the smallest member of the class. The addition of alkyl groups onto the diphenylamine molecule results in even lower water solubility and, therefore, becomes less bioavailable. Diphenylamine, styrenated (68442-68-2) was tested in a 28day oral gavage study in rats. A NOAEL of 100 mg/kg/day was identified. Diphenylamine styrenated was tested in a 28-day gavage study in rats; 100 mg/kg/day was selected as the NOAEL. Diphenylamine-, reaction products with styrene and 2,4,4-trimethylpentene (68921-45-9) was tested in a 64 week rat dietary study; a LOEL of 2500 ppm was identified. .

Reproductive and Developmental Toxicity: Diphenylamine was administered in feed at 0.1, 0.25 or 0.5% (ca. 67, 167 or 333 mg/kg/day) to rats in a two-generation reproductive toxicity study. In general, the average size of the litters decreased as the concentration of dietary diphenylamine increased. A NOEL was not established. A developmental study was also conducted with diphenylamine in rabbits. The test article was administered by gavage at dose levels of 0, 33, 100 and 300 mg/kg/day for gestation days 7-19. The test article produced minimal effects (decreased food consumption and mean body weight) to maternal rats at 300 mg/kg during pregnancy; there were no other signs of maternal toxicity. NOAEL for maternal toxicity was established at 100 mg/kg/day. The NOAEL for teratogenicity/developmental effects was greater than 300 mg/kg/day.

ADI: 0.02 mg/kg/day

NOEL: 1.5 mg/kg/day

### CARCINOGEN

Carbon black	International Agency for Research on Cancer (IARC) - Agents Reviewed by the IARC Monographs	Group	2B
Acrylonitrile- butadiene- styrene copolymers	International Agency for Research on Cancer (IARC) - Agents Reviewed by the IARC Monographs	Group	3

continued...

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## Section 12 - ECOLOGICAL INFORMATION

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Refer to data for ingredients, which follows:

IRON:

DIPHENYLAMINE:

NITROCELLULOSE:

CARBON, ACTIVATED:

- DO NOT discharge into sewer or waterways.

IRON:

CARBON, ACTIVATED:

NITROCELLULOSE:

■ The nitrates are of environmental concern because of their high water solubility and consequent leaching, diffusion, and environmental mobility in soil and water. Nitrate can contaminate groundwater to unacceptable levels. Nitrite is formed from nitrate or ammonium ion by micro-organisms in soil, water, sewage and the alimentary tract. The concern with nitrate in the environment is related to its conversion to nitrite.

Methaemoglobinaemia is caused following exposure to high levels of nitrite and produces difficulties in oxygen transport in the blood. Thousands of cases involving poisoning of infants, particularly in rural areas, have been reported as a result of drinking nitrate rich well-water.

Other concerns deriving from exposure to environmental nitrates relate to the production of nitrosamines following the reaction of food nitrites and secondary amines. Other nitroso-compounds may result following reaction with nitrites and amides, ureas, carbamates and other nitrogenous compounds. Nitrosamines produce liver damage, haemorrhagic lung lesions, convulsions and coma in rats, and teratogenic effects in experimental animals.

The N-nitroso class of compounds include potent carcinogens and mutagens: induction of tumors by single doses of N-nitroso compounds testify to this.

DIPHENYLAMINE:

■ Half- life Soil - High (hours):	672
■ Half- life Soil - Low (hours):	168
■ Half- life Air - High (hours):	2.47
■ Half- life Air - Low (hours):	0.247
■ Half- life Surface water - High (hours):	672
■ Half- life Surface water - Low (hours):	31
■ Half- life Ground water - High (hours):	1344
■ Half- life Ground water - Low (hours):	336
■ Aqueous biodegradation - Aerobic - High (hours):	672
■ Aqueous biodegradation - Aerobic - Low (hours):	168
■ Aqueous biodegradation - Anaerobic - High (hours):	2688
■ Aqueous biodegradation - Anaerobic - Low (hours):	672
■ Aqueous biodegradation - Removal secondary treatment - High (hours):	99%
■ Aqueous biodegradation - Removal secondary treatment - Low (hours):	65%
■ Photolysis maximum light absorption - High (nano- m):	281.5
■ Photooxidation half- life water - High (hours):	2.47
■ Photooxidation half- life water - Low (hours):	0.247

■ Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

■ Do NOT allow product to come in contact with surface waters or to intertidal areas below the mean high water mark. Do not contaminate water when cleaning equipment or disposing of equipment wash-waters.

Wastes resulting from use of the product must be disposed of on site or at approved waste sites.

■ for diphenylamine

Environmental Fate:

Soil:

When [14C-ring]diphenylamine was incubated in a loam soil at a nominal rate of 10 mg/kg under aerobic conditions at 25 °C in the dark for 12 months, diphenylamine initially disappeared rapidly, but after about 7

continued...

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## Section 12 - ECOLOGICAL INFORMATION

days the disappearance was quite

slow. After 12 months 15% of the dose remained as diphenylamine, 49% was unextractable, and 18% was mineralized. The metabolites were polymeric and not identified. When [14C-ring]diphenylamine was tested for adsorption and desorption on four soils and a sediment, its mobility ratings were slight, immobile, immobile, slight and low in a loam, a silty clay loam lake sediment, a clay, a loamy sand and a silt loam, respectively.

Residues of [14C-ring]diphenylamine were aerobically aged on four soils for 1 day and then leached through columns of the soils with 0.01 mol/L CaCl<sub>2</sub>. The mobility ratings for the aged residues were: loam, slight; loam sand, low; silt loam, low; clay, immobile. Metabolites were identified in extracts from the soil columns as N,N-diphenylformamide (2.0%.7% of dose) and 4-nitro-N-phenylbenzenamine (1.3%.3% of dose). Water-Sediment:

In a photolysis study, carbazole was identified as a major product when diphenylamine in an aqueous solution was subjected to UV irradiation, with approximately 7% formed within 0.5 h and a maximum of 52% at 10.5 h. Hydroxydiphenylamine was also identified, reaching a maximum value of 16% by 36 h. A third product, an indenohydroxyindole, reached a value of 93% by the end of the 192-h irradiation period. Small amounts of trimeric products were also formed.

When [14C-ring]diphenylamine was incubated with a lake water and sediment under anaerobic conditions in the dark at 25 °C, the half-life for disappearance was approximately 60 days. The products of decomposition were soil-bound or soil-incorporated residues, which mineralised slowly (2.7% of the dose in 1 year).

■ Aromatic amines (arylamines), particularly primary aromatic amines, covalently and irreversibly bind to humic substances present in most natural waters.

All metabolites with moieties of: anilines, benzidines and toluidines are of environmental concern. Anilines and benzidines are both acutely toxic and toxic depending on the specific aquatic species (except algae). Toluidines represent a similar concern, It has been speculated that aqueous solutions of aromatic amines can be oxidised by organic radicals, but there are no actual data on reaction rates. Based on a study of reaction rate data for these compounds an estimate of the half-life of aromatic amines in water is approximately 100 days, assuming a peroxy radical concentration of 10<sup>-10</sup> mole/L in sunlit, oxygenated water.

log Kow: 3.22-3.50

COD: 90%

ThOD: 2.39

Toxicity Fish: LC50(96)1.3-5.2mg/L

Toxicity invertebrate: LC50(48)0.73-3.65mg/L

Degradation Biological: sig

processes Abiotic: some oxid

### Ecotoxicity

Ingredient	Persistence: Water/Soil	Persistence: Air	Bioaccumulation	Mobility
NITROSET LLC		No data		
iron		No data	LOW	
carbon, activated		No data		
styrene/ butadiene/ acrylonitrile copolymer		No data		
nitrocellulose		No data		
methylcellulose	HIGH	No data	LOW	HIGH
diphenylamine	LOW	LOW	LOW	MED

## Section 13 - DISPOSAL CONSIDERATIONS

■ Legislation addressing waste disposal requirements may differ by country, state and/ or territory. Each user must refer to laws operating in their area. In some areas, certain wastes must be tracked.

A Hierarchy of Controls seems to be common - the user should investigate:

- Reduction,
- Reuse
- Recycling
- Disposal (if all else fails)

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## Section 13 - DISPOSAL CONSIDERATIONS

This material may be recycled if unused, or if it has not been contaminated so as to make it unsuitable for its intended use. Shelf life considerations should also be applied in making decisions of this type. Note that properties of a material may change in use, and recycling or reuse may not always be appropriate.

- DO NOT allow wash water from cleaning or process equipment to enter drains.
- It may be necessary to collect all wash water for treatment before disposal.
- In all cases disposal to sewer may be subject to local laws and regulations and these should be considered first.
- Where in doubt contact the responsible authority.
- Recycle wherever possible or consult manufacturer for recycling options.
- Consult State Land Waste Management Authority for disposal.
- Bury residue in an authorised landfill.
- Recycle containers if possible, or dispose of in an authorised landfill.

■ According to the European Waste Catalogue, Waste Codes are not product specific but application specific. Waste Codes should be assigned by the User based on the application in which the product is used.

## Section 14 - TRANSPORTATION INFORMATION

HAZCHEM: None

NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS: ADR, IATA, IMDG

## Section 15 - REGULATORY INFORMATION

### RISK

Risk Codes

R33

R52/53

Risk Phrases

- Danger of cumulative effects.
- Harmful to aquatic organisms, may cause long- term adverse effects in the aquatic environment.

### SAFETY

Safety Codes

S22

S24

S39

S51

S09

S26

Safety Phrases

- Do not breathe dust.
- Avoid contact with skin.
- Wear eye/face protection.
- Use only in well ventilated areas.
- Keep container in a well ventilated place.
- In case of contact with eyes, rinse with plenty of water and contact Doctor or Poisons Information Centre.

### REGULATIONS

Regulations for ingredients

**iron (CAS: 7439-89-6) is found on the following regulatory lists;**

"European Customs Inventory of Chemical Substances (English)", "European Union - European Inventory of Existing Commercial Chemical Substances (EINECS) (English)", "OECD Representative List of High Production Volume (HPV) Chemicals", "WHO Guidelines for Drinking-water Quality - Chemicals for which guideline values have not been established"

**carbon, activated (CAS: 7440-44-0) is found on the following regulatory lists;**

"European Union - European Inventory of Existing Commercial Chemical Substances (EINECS) (English)", "International Air Transport Association (IATA) Dangerous Goods Regulations", "International Air Transport Association (IATA) Dangerous Goods Regulations - Prohibited List", "OECD Representative List of High Production Volume (HPV) Chemicals", "UK Workplace Exposure Limits (WELs)"

**styrene/ butadiene/ acrylonitrile copolymer (CAS: 9003-56-9) is found on the following regulatory lists;**

"EU Directive 96/61/EC concerning integrated pollution prevention and control, Annex III"

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## Section 15 - REGULATORY INFORMATION

### nitrocellulose (CAS: 9004-70-0) is found on the following regulatory lists;

"EU Directive 2002/72/EC Plastic materials and articles intended to come into contact with foodstuffs - Annex II Section A: List of authorised monomers and other starting substances","European Customs Inventory of Chemical Substances (English)","European Union (EU) Annex I to Directive 67/548/EEC on Classification and Labelling of Dangerous Substances - updated by ATP: 31","European Union (EU) Inventory of Ingredients used in Cosmetic Products","European Union (EU) Regulation (EC) No 1272/2008 on Classification, Labelling and Packaging of Substances and Mixtures - Annex VI","OECD Representative List of High Production Volume (HPV) Chemicals"

### methylcellulose (CAS: 9004-67-5) is found on the following regulatory lists;

"CODEX General Standard for Food Additives (GSFA) - Additives Permitted for Use in Food in General, Unless Otherwise Specified, in Accordance with GMP","EU Directive 2002/72/EC Plastic materials and articles intended to come into contact with foodstuffs - Annex III Section A Incomplete list of additives fully harmonised at Community level","European Customs Inventory of Chemical Substances (English)","European Union (EU) Inventory of Ingredients used in Cosmetic Products"

### diphenylamine (CAS: 122-39-4) is found on the following regulatory lists;

"EU Cosmetic Directive 76/768/EEC Annex II: List of Substances which must not form part of the Composition of Cosmetic Products(English)","European Customs Inventory of Chemical Substances (English)","European Union - European Inventory of Existing Commercial Chemical Substances (EINECS) (English)","European Union (EU) Annex I to Directive 67/548/EEC on Classification and Labelling of Dangerous Substances - updated by ATP: 31","European Union (EU) Control of Major Accident Hazards Involving Dangerous Substances - Seveso Category","European Union (EU) Regulation (EC) No 1272/2008 on Classification, Labelling and Packaging of Substances and Mixtures - Annex VI","GESAMP/EHS Composite List of Hazard Profiles - Hazard evaluation of substances transported by ships","IMO IBC Code Chapter 17: Summary of minimum requirements","OECD Representative List of High Production Volume (HPV) Chemicals","UK Workplace Exposure Limits (WELs)"

### No data for NITROSET LLC (CW: 1004141)

*This safety data sheet is in compliance with the following EU legislation and its adaptations – as far as applicable - : 67/548/EEC, 1999/45/EC, 76/769/EEC, 98/24/EC, 92/85/EEC, 94/33/EC, 91/689/EEC, 1999/13/EC, as well as the following British legislation:*

- *The Control of Substances Hazardous to Health Regulations (COSHH) 2002*
- *COSHH Essentials*
- *The Management of Health and Safety at Work Regulations 1999*

## Section 16 - OTHER INFORMATION

### LIMITED EVIDENCE

- Inhalation may produce health damage\*.
- May produce discomfort of the eyes and respiratory tract\*.
- Limited evidence of a carcinogenic effect\*.
- Possible respiratory and skin sensitiser\*.

\* (limited evidence).

### RISK

#### Explanation of risk codes used on this MSDS

Risk Codes	Risk Phrases
R07	■ May cause fire.
R10	■ Flammable.
R17	■ Spontaneously flammable in air.
R23/24/25	■ Toxic by inhalation, in contact with skin and if swallowed.
R33	■ Danger of cumulative effects.
R3	■ Extreme risk of explosion by shock, fire, friction or other sources of ignition.
R50/53	■ Very toxic to aquatic organisms, may cause long- term adverse effects in the aquatic environment.
R52/53	■ Harmful to aquatic organisms, may cause long- term adverse effects in the aquatic environment.

### ANNEX 2: Indications of Danger

E Explosive

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## Section 16 - OTHER INFORMATION

### EXPOSURE STANDARD FOR MIXTURES

■ "Worst Case" computer-aided prediction of spray/ mist or fume/ dust components and concentration:

■ Composite Exposure Standard for Mixture (TWA) :3 mg/m<sup>3</sup>.

■ Operations which produce a spray/mist or fume/dust, introduce particulates to the breathing zone.

If the breathing zone concentration of ANY of the components listed below is exceeded, "Worst Case" considerations deem the individual to be overexposed.

Component	Breathing Zone ppm	Breathing Zone mg/m3	Mixture Conc (%)
Component	Breathing zone (ppm)	Breathing zone (mg/m3)	
Mixture Conc (%)	carbon, activated	3.0000	
5.0			

■ Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.

A list of reference resources used to assist the committee may be found at:

[www.chemwatch.net/references](http://www.chemwatch.net/references).

■ The (M)SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios. Scale of use, frequency of use and current or available engineering controls must be considered.

■ For detailed advice on Personal Protective Equipment, refer to the following EU CEN Standards:

EN 16 Personal eye-protection

EN 340 Protective clothing

EN 374 Protective gloves against chemicals and micro-organisms

EN 13832 Footwear protecting against chemicals

EN 133 Respiratory protective devices.

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Issue Date: 14-Apr-2010

Print Date: 14-Apr-2010