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 **SCHENECTADY INTERNATIONAL** INC.

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(Attn: Section 8(e) Coordinator)
Office of Pollution Prevention And Toxics
U.S. Environmental Protection Agency
1200 Pennsylvania Ave, NW
Washington, D.C. 20460

Contain NO CBI

Dear Sir/Madam:



8 8 0 3 0 0 0 0 2 0 9

Subject: This is a notice in accordance with TSCA Section 8(e) – Report on the skin condition of 16 employees potentially exposed to 4,4'-biphenol (CAS RN 92-88-6).

The following information is being submitted by Schenectady International, Inc. (SII) pursuant to current guidance issued by EPA indicating EPA's interpretation of Section 8(e) of the Toxic Substances Control Act.

The information contained herein is from SII's UK affiliate (Schenectady Europe Limited (SEL), Chemical Division, Wolverhampton, West Midlands) as a result of concern raised regarding instances of depigmentation of the skin (*vitiligo*) in some employees potentially exposed to 4,4'-biphenol. In addition, we have received a report of one (1) potential case at a customer's plant in the United States. The customer's employee presented with a case of skin depigmentation around the wrists, neck, scalp and eyelid. This employee has exposure to 4,4'-biphenol among other chemicals.

Summary:

Eighteen (18) potentially exposed SEL employees were identified. Each completed a questionnaire and was examined by a physician (Physicians Final Report attached). Of the 18 potentially exposed individuals, two (2) did not participate in medical examinations. The sixteen (16) participants were in four categories: manager and plant technologist (2), production plant (8), laboratory (4), and dispatch workers(2).

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www.siigroup.com

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Findings:

Neither of the managers and neither of the dispatch workers had any signs of depigmentation. Two of eight (2/8) production workers and two of four (2/4) laboratory workers had evidence of slight depigmentation. In all cases the depigmentation involved the head and neck and in the case of one production worker the skin of the forearm (above the area protected by gloves) was affected. There were no cases that were pronounced or extensive. The examining physician concluded that the cases of depigmentation were likely occupational vitiligo due to exposure to 4,4'-biphenol or one of the minor components present during the manufacturing process or in the product.

A careful computerized literature search failed to identify any reports of depigmentation, vitiligo or melanotoxicity associated with exposure to 4,4'-biphenol. However, vitiligo has been well described as a consequence of occupational exposure to various substituted phenols and catechols utilized for industrial production of resins, paints, lacquers, cosmetics, and pharmaceuticals. Examples include: p-tert-butylphenol, di-tert-butyl phenol, p-tert-amylphenol, p-tert-butylcatecol, hydroquinone and others. While this is the first report of which we are aware, potentially involving 4,4'-biphenol, examination of the minor components at various stages of the manufacturing process has revealed the presence of p-tert-butylphenol (PTBP, CAS RN 98-54-4) a long recognized cause of vitiligo. PTBP is however, present only at very low concentrations in the final product. While PTBP is certainly a potential confounder, based on prudence we are nevertheless assuming the findings are related to 4,4'-biphenol.

Actions:

We have notified our employees and customers of the potential relationship regarding occupational exposure to 4,4'-biphenol and vitiligo. Work practices are being reassessed and we are reevaluating existing protective clothing and gloves. The product material safety data sheet is being revised to include dermal depigmentation/vitiligo as a potential exposure hazard.

Should you have any questions do not hesitate to contact me.

Very truly yours,



Charles H. Gardner
Manager, Corporate Environmental, Health & Safety

Encl. Final report Jackson Hocking Limited "Report on the skin condition of 16 employees potentially exposed to 4,4'-biphenol."

Jackson Hocking Limited
Consultants in Occupational
and
Environmental
Health and Hygiene

**Report on the skin condition of
16 employees
potentially exposed to
4,4'-biphenol**

for

Schenectady Europe Limited
Chemical Division
Four Ashes, Wolverhampton
GB-WV10 7BT West Midlands

at the request of

Cheryl Perry

Introduction

4,4'-biphenol is a molecule with some shared characteristics with chemicals that cause depigmentation of the skin, causing the clinical condition *vitiligo*.

Concern was raised with the identification of areas of depigmentation of the skin in some employees with potential exposure to 4,4'-biphenol.

A careful computerised literature search failed to identify any reports of depigmentation, vitiligo or melanotoxicity associated with exposure to 4,4'-biphenol. However, vitiligo has been described as a consequence of exposure to various substituted phenols and catechols.

An enquiry regarding the minor components at various stages of process yielded the list in Annex 1. p-tert-butylphenol is a recognised cause of vitiligo but is present only in very small concentration in the final product.

The Safety Data Sheet for 4,4'-biphenol is attached as Annex 2.

Methods

18 potentially exposed employees were identified by Schenectady. One was not available to attend for an examination and one did not keep the allocated appointment.

Each employee completed a questionnaire that is exhibited in Annex 3 and was examined by Dr John R Jackson FFOM. Where there any skin features, digital photographs were taken.

Employees were in four categories: Manager & Plant Technologist (2), Production Plant (8), Laboratory (4) and Despatch (2).

Results

Management

The Plant Manager has little exposure and has only worked for three months on the plant and the Plant Technologist could become involved in anything, but not on a daily basis. Both employees take samples. Neither had any skin problems.

Production

- 1 For the last four years, since working with biphenol, he has suffered from general flakiness of his hands and he reported 4 spots on his stomach. The hand skin was simply dry (ichthyosis) and the discreet spots on his stomach look like insect bites. He also reported that his left foot started to blister and peel a day after walking over locking room floor in bare feet. His left foot was peeling and the underlying skin was red. This could have been an acute tinea pedis (Athletes foot), but it seems to have become florid too quickly, or more probably an acute irritant reaction to something on the floor. He additionally reported that he had dryness of the skin of his face where his spectacles touch the skin.

Conclusion: No evidence of depigmentation.

- 2 This man had been working with biphenol since the start-up of production. He had consulted his GP in November 2002, complaining of redness round his eyes. Hydrocortisone had been prescribed with no benefit. In February 2003, he saw his GP complaining of pallor round his eyes. His GP referred him to a dermatologist who gave him a prescription for several topical preparations. Examination revealed a slightly pigmented skin with variably-shaped areas of pallor on his neck. There were areas of loss of beard hair and areas where beard hair had regrown, it was grey. He also had areas of hair loss on his scalp. See photos P2.1, P2.2 & P2.3.

The syndrome suggests some **melanotoxicity**. The employee gave me authority to write to his dermatologist.

- 3 This man had been working with biphenol since the start-up of the process about two years previously. After one year on the plant, he developed red and sore rough skin on the knuckles of his right hand that spreads on more exposure. He has had exposure to substituted catechols and phenols. He now wears two pairs of gloves - tru-touch vinyl gloves under gauntlets. This problem began before his current pattern of glove use.

Examination shows a patch of dry skin on the 5th metacarpo-phalangeal knuckle of the right hand that extends to the 3rd knuckle. This is simple ichthyosis that should respond to skin care. There is no evidence of depigmentation.

- 4 This man had been working with biphenol since the start-up of the process about two years previously. He reported rashes on the backs of his hands, on his forearms and on the (malar) eminences of his cheeks.

Examination revealed simply dry skin and I recommended moisturising creams. There is no evidence of depigmentation.

- 5 This man had been working with biphenol since the start-up of the process about two years previously. He reported eczema on the back of his hands. He reported no previous exposure to substituted catechols.

He had had dryness of his knuckles when he used riggers gloves for sampling. Since changing to long 'veterinary' gloves and the problem had resolved. He also queried whether the impregnated wipes used to cleanse his twins' nappy area could have contributed to the condition.

There was no evidence of any current skin problem. No depigmentation.

- 6 This man had been working with biphenol since the start-up of the process about two years previously. He reported light skin patches on the right side of his neck and his chin. The neck areas only show when his skin is tanned, but the chin patches are visible all the time.

Examination revealed areas of **depigmentation** on his chin and barely-discernible depigmentation of this right neck. See photos P6.1 & P6.2

- 7 This man had been working with biphenol since the start-up of the process about two years previously. He reported redness of skin and very dry skin that frequently cracks and bleeds. This affected the palms of his hands, inside his shins, the creases of his ears and his knuckles. He has had exposure to both substituted phenols and catechols. He had no skin problems prior to the start-up of the 4,4'-biphenol process. He has been using E45 cream.

Examination revealed dermatitis of the thenar eminence and the cuticle of his long finger

on the right hand and on the knuckles and the cuticle of his index finger on the left side.

There was some hair loss on the medial aspect of his calves, probably as a result of friction. There was a doubtful loss of pigmentation, but the affected areas are not map-like and the area affected is unusual. I do not think there is clear evidence of melanotoxicity.

- 8 This man had been working with biphenol since the start-up of the process about two years previously. He reported exacerbation of pre-existing dermatitis of his hands since starting to work on biphenol. He is using a moisturising cream (Vaseline Intensive Care) and Dermovate. He has had asthma since birth and this too has got worse since working on the plant. He gets sneezing and watering of his eyes when bagging off. He gets dermatitis when using detergents to cleanse his hands after working on his car. This has been better since wearing long gloves.

Examination revealed flexural dermatitis of his fingers. There is no evidence of depigmentation.

Laboratory

- 1 This man had been working with biphenol since the start-up of the process about two years previously. He has no skin problems of any kind.
- 2 This man had been working with biphenol since the start-up of the process about two years previously. He reports loss of pigmentation and loss of hair follicles. He gets inflammation of the skin with stinging and burning sensations. He has patches of dry, discoloured skin and sore and itchy eyes. He has worked with substituted phenols and catechols in small, laboratory quantities.

Direct questions indicated that initial symptoms were burning and redness of the skin when the number of samples to be processed. The symptoms resolved when he had a week without exposure. See photos L2.1, L2.2 and L2.3.

- 3 This woman does not often work with biphenol, but she works close to where it is being handled in the lab. She reported itchiness around her chin and rough skin and itchiness on the back of her hands. Sometimes this becomes rough and flakes and becomes sore and may bleed.

Examination revealed mild ichthyosis. There was some dermatitis of her right little finger suggestive of a cause related to writing, but she wears gloves or puts a loose sheet of paper over documents on which she is writing. There is no evidence of depigmentation.

- 4 This man had been working with biphenol since the start-up of the process about two years previously. He had dermatitis at a younger age and reacts to peanuts and detergents. He sometimes gets urticaria. He has dermatitis/flaking, redness of the shin on his hands and fingers. He wears cotton gloves under vinyl gloves. His GP prescribed dermovate.

Examination revealed quite marked dermatitis of his palms and punctate leukoderma on his chin. See photos L4.1, L4.2 and L4.3

Despatch

- 1 This man has been working in the warehouse packing and despatching 4,4'-biphenol for about 1 year. He reports red marks on his cheek and neck. These cause some itching. He also reports a chemical burn on his left leg. He sneezes when bagging the product. He has had previous exposure to hydroquinone. There is no evidence of depigmentation.

On examination, there were two areas of macular (unraised) redness on his neck that were smaller than the size of a 5p piece. See photo D1.

- 2 This man has been working in the warehouse packing and despatching 4,4'-biphenol for about 1 year. He reports transient (1 hour) itching and redness of the skin and itching of the eyes and sneezing when he works with biphenol. He has had previous exposure to substituted catechols and to hydroquinone.

Examination showed some dermatitis of the back of the hands, the knuckles and the web spaces. This is probably a simple irritant dermatitis. There is no evidence of depigmentation.

Conclusions

Neither of the managers and neither of the Despatch workers had signs of depigmentation.

Two production workers out of eight and two laboratory staff out of four had evidence of slight depigmentation.

In all cases, the depigmentation involved the head and neck region. In one production case, skin of the forearm above the area protected by gloves was affected. This probably means that fingering the face with contaminated gloved hands is the cause.

This is almost certainly occupational vitiligo due to 4,4'-biphenol or one of the minor components in the reaction.

Fortunately, no case is yet very pronounced or very extensive, but every effort must be made to minimise further exposures.

While vitiligo is generally regarded as irreversible, these patches of depigmentation may not have reached the point of irreversibility. If this is true, and there is no further melanotoxicity, the conditions may regress. Some shrinkage of the areas may be expected as unaffected surrounding melanocytes grow into the affected area.

A discussion of the treatment and prognosis is given in Annex 4.

Action required

It is necessary to prevent direct skin contact with the product and intermediates and side products. Part of this may be achieved by the use of PPE that discourages face contact and also prevents deposition on the face, such as an AirStream Helmet. Part may also be achieved by assisting people to recognise how they are contaminating their skin - e.g., by providing video feedback.

This may be reportable under Riddor and a modification of the SDS may be called for. There is a notification requirement under the Existing Chemicals Regulation for newly recognised effects of chemicals.

ANNEX 1

Minor components at various stages in the process

ANNEX 2

SDS for 4,4'-biphenol

SCHENECTADY EUROPE LIMITED

QUESTIONNAIRE FOR DR. JACKSON

DATE: _____

NAME: _____

WORK AREA: PRODUCTION PLANT / LABORATORY / DESPATCH

- 1) HOW LONG HAVE YOU BEEN EMPLOYED ON THIS SITE?
- 2) HOW LONG HAVE YOU BEEN WORKING IN YOUR CURRENT DEPARTMENT?
- 3) HOW LONG HAVE YOU BEEN WORKING WITH 4,4'-BIPHENOL?
- 4) WHAT TYPE OF WORK YOU NORMALLY DO INVOLVING 4,4'-BIPHENOL (BRIEF DESCRIPTION)?
- 5) WHAT TYPE OF PPE ARE YOU USING?
- 6) WHAT TYPE OF RPE ARE YOU USING?
- 7) WHAT TYPE OF VENTILATION IS AVAILABLE?
- 8) ARE THERE ANY OTHER CONTROL MEASURES IN PLACE TO LIMIT DIRECT CONTACT WITH 4,4'-BIPHENOL?
- 9) WHAT TYPE OF UNUSUAL/MAINTENANCE JOBS DO YOU CARRY OUT WHERE YOU COULD COME IN CONTACT WITH 4,4'-BIPHENOL?
- 10) HOW OFTEN DO YOU CARRY OUT THESE TYPES OF JOBS? (WEEKLY / MONTHLY / 6 MONTHLY / YEARLY)
- 11) DO YOU SUFFER FROM ANY TYPE OF SKIN CONDITION OR PROBLEM?
- 12) PLEASE STATE TYPE OF SKIN CONDITION OR PROBLEM

- 13) HOW LONG HAD YOU BEEN WORKING WITH 4,4'-BIPHENOL BEFORE YOU NOTICED ANY KIND OF SKIN CONDITION OR PROBLEM?
- 14) WHERE ON THE BODY IS THE SKIN CHANGE?
- 15) PLEASE DESCRIBE SIZE OF SKIN CHANGE (< 50P PIECE, < PALM OF HAND, < HAND, > HAND, BIGGER THAN THAT)
- 16) PLEASE DESCRIBE TYPE OF SKIN REACTION AND / OR DISCOLOURATION
- 17) IS THIS SKIN CONDITION OR PROBLEM ALWAYS VISIBLE OR ONLY SHOWS WHEN SUN-TANNED?
- 18) HAVE YOU REPORTED THIS CONDITION TO THE COMPANY?
- 19) HAVE YOU EVER USED SUBSTITUTED CATECHOLS IN YOUR WORK HERE OR AT OTHER COMPANIES?
- 20) HAVE YOU EVER USED SUBSTITUTED PHENOLS IN YOUR WORK HERE OR AT OTHER COMPANIES?
- 21) HAVE YOU EVER USED HYROQUINONE HERE OR AT OTHER COMPANIES?

MANY THANKS FOR YOUR CO-OPERATION IN FILLING OUT THIS QUESTIONNAIRE FOR DR. JACKSON. PLEASE TAKE IT WITH YOU WHEN YOU GO FOR YOUR APPOINTMENT ON WEDNESDAY 2ND JULY 2003

ANNEX 4

The following is an excerpt from

Handbook of Dermatology & Venereology (Social Hygiene Handbook - 2nd Edition)

Vitiligo

Dr. R. SU

CHAPTER 7

Educate the patient about the nature of the disease, that treatment may be difficult and prolonged, and the results may not be predictable. While the patient should not have unrealistic expectation they need not be discouraged. More important is to take good care of their own skin, concentrate on what can be done even if the condition can not be cured at present.

1) **Sunscreen (SPF 15-30)**

These are recommended for three reasons: 1) Vitiliginous areas are more susceptible to sunburn, 2) Sunburn injury can further extend area of depigmentation (Kobner response). 3) Sun-induced darkening of the surrounding normal skin causes accentuation of the cosmetic disfigurement. Sunscreens which shield both UVB and UVA light should be used.

For the same reason, avoiding outdoor activities under the strong mid-day sun, together with protective clothing, will reduce ultraviolet damage to depigmented skin which is devoid of protective melanin.

2) **Camouflage Cosmetics (Covermark, Dermablend etc.)**

Covermark and Dermablend are cosmetic that can be used to match most skin hues.

Quick-tanning preparations containing dihydroxy-acetone may be used to tan the vitiligo a more acceptable colour. It can produce different shades. Instructions and guidance from a cosmetic instructor are required to give the best cosmetic results and safety. These preparations are especially useful on the eyelids where potent topical corticosteroids and ultraviolet-light should not be used.

3) **Repigmentation therapies**

Moderately potent to potent **topical corticosteroids**

e.g. Sicorten Cream (0.5% halometasone)

This may be applied to affected area twice daily as a trial. Therapy should be discontinued if repigmentation has not begun after six to twelve months. The patient needs to be seen every 1-2 months to check for signs of cutaneous atrophy from treatment. Caution is needed when applying it to the face and flexures (once daily/alternate day). It should not be applied to eyelids and periorbital areas to avoid the risk of steroid-induced glaucoma and cataract.

PUVA Therapy: Topical or systemic (Refer to chapter 17)

Topical PUVA involves ultra-violet A irradiation 30 minutes after application of meladinine (topical methoxsalen) to the localized vitiliginous area. Systemic PUVA involves ingestion of methoxsalen (0.6 mg/kg) two hours before irradiation.

Treatment should be attempted under the supervision of a dermatologist or those experienced in its use. In inexperienced hands PUVA may carry the risk of phototoxic reaction, ocular damage etc.

Careful patient selection is also required. Within the Social Hygiene Service, predominantly facial lesions (except eyelids) of recent onset are considered for PUVA, because they tend to give better results. Some degree of repigmentation occurs in 50-75% of cases compared with 15-20% in controls.

The patient undergoes treatment 2 times per week, and needs to avoid sunlight for 2 days after each treatment, using sunscreens both indoor and outdoor. It takes at least 2-3 months to begin having an effect and therapy needs to be continued for at least one year (100-200 treatment sessions) before maximum benefit is reached. Hence a long term commitment to therapy is required, and this must be appreciated by the patient before embarking on therapy. The physician also needs to take into consideration the patients' age, sex and disease severity, medical, social, occupational and psychological factors.

If perifollicular pigmentation has not appeared after three months of therapy, it is unlikely to occur; treatment might as well be stopped. But once repigmentation has begun, it tends to persist and spread with continuous treatment. However complete repigmentation occurs in 15-20% only.

Systemic PUVA is less often used than topical PUVA in vitiligo.

Contra-indications for systemic PUVA include:

Pregnancy, children <12 year old, photosensitivity, cardiac, hepatic and renal disease, aphakia, and cataracts, and history of skin cancers.

4) **Depigmentation** therapies using bleaching agents such as 20% monobenzyl ether of hydroquinone (Benzoquin 20%) once or twice daily is indicated when vitiligo is extensive (>50% involvement or near universal). Benzoquin may cause a contact dermatitis, hence as a test before generalized therapy, it should be applied to a single pigmented spot daily for 1 week. Thereafter large pigmented areas are treated twice daily for up to 6 months. The compound is cytotoxic to melanocytes and destroys them. This process which removes pigment from the remaining normal skin is irreversible. The skin becomes albinoid, but the cosmetic appearance is improved substantially. The patient must remember they are sun-sensitive and need protective sunscreen.

Experimental Repigmentation modalities:

These can be tried in stationary vitiligo which are not extending any further. They have achieved variable success in different individuals.

Grafts from uninvolved skin containing viable melanocytes; punch mini-grafting using autologous pigmented donor sites is the simplest least invasive surgical approach. Alternatives include growing melanocytes *in vitro* from the patients' normal skin, and injecting them into artificially induced blister cavities in the depigmented areas. Repigmentation by tattooing has also been tried with some success.

8. COURSE AND PROGNOSIS

Variable and somewhat unpredictable. May remain static, spread or repigment. But usually the condition is gradually progressive, sometimes extending rapidly over a period of several months and then remaining quiescent for many years. Spontaneous repigmentation is noted in about 10-20% of patients.

Factors indicating good prognosis for repigmentation are: Recent onset < 6 months, in a young individual on the facial area.

Conversely factors which indicate an unfavorable prognosis are: Late onset in life, long-standing persistent lesions, located on the extremities and on the lips.

Repigmentation begins within the affected area from the hair follicles where there may be residual melanocytes; or else they occur from the normal pigmented skin immediately adjacent to the vitiliginous area. Once repigmentation begins it tends to continue, albeit slowly and sometimes trivial.

PHOTOGRAPHS

SAFETY DATA SHEET

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

Product Name: Biphenol - draft no 1
Datasheet Number: Biphenol 1.0.0
Chemical Name: 4,4'-Biphenol
Synonyms: p,p'-biphenol
4,4'-Biphenyldiol
4,4'-bisphenol
1,1'-Biphenyl)-4,4'-diol
p,p'-Dihydroxybiphenyl
p-Dihydroxydiphenyl
4'-dihydroxydiphenyl
p,p'-Diphenol
4,4'-Diphenol
p,p'-Biphenol



Name of Supplier: Schenectady Europe Ltd,
Address of Supplier: Chemical Division,
Four Ashes,
Wolverhampton,
WV10 7BP
England

Telephone: 44(0)1902 790555
Fax: 44(0)1902 797509

Responsible Person: HSE Manager

Emergency Telephone: 44(0)1902 797536/7

2 Composition/information on ingredients

Chemical Name	Concentration	CAS Number	EC Number	R Phrases	Symbols
4,4'-Biphenol	97%	92-88-6	202-200-5	21-36/37/38-40-52	Xn

3 Hazards identification

- Harmful in contact with skin (R21)
- Irritating to eyes, respiratory system and skin (R36/37/38)
- Reproductive Effects: Category 3 Mutagen
- Possible risk of irreversible effects (R40)
- Harmful to aquatic organisms (R52)

4 First aid measures

Contact with skin

- Causes irritation
- Remove contaminated clothing
- Wash affected area with plenty of soap and water
- Contaminated clothing should be laundered before reuse
- Seek medical attention if ill effects occur

4 First aid measures (....)

Contact with eyes

- Causes redness and irritation
- If substance has got into eyes, immediately wash out with plenty of water for at least 15 minutes
- Irrigate eyes thoroughly whilst lifting eyelids
- Seek medical advice

Ingestion

- May cause irritation
- Do not induce vomiting
- If swallowed, rinse mouth with water (only if the person is conscious) (S64)
- Seek medical advice

Inhalation

- Causes irritation
- Remove patient to fresh air
- In cases of severe exposure, shortness of breath may develop
- If breathing is difficult, oxygen should be given by a trained person
- When in doubt or symptoms persist, seek medical attention

General

- Seek medical attention if ill effects occur
- NOTE TO PHYSICIANS: Treat by observation and supportive measures as indicated by the patients condition
- Treat symptomatically

5 Fire-fighting measures

- Not flammable but will support combustion, Flash point - not applicable
- May form explosive dust/air mixtures
- May give off noxious and toxic fumes in a fire, Decomposition products may include carbon oxides
- In case of fire use water spray or fog, alcohol resistant foam.
- Do not use water jets
- Do not use carbon dioxide or dry agent
- Wear Chemical Protection Suit and Positive-Pressure Breathing Apparatus

6 Accidental release measures

Immediate Actions

- Contain spillage by any means possible

Clean Up Actions

- Ventilate area
- Sweep or shovel-up spillage and remove to a safe place
- Collect as much as possible in clean container for reuse or disposal

Special Precautions

- Use non-sparking handtools
- Avoid raising dust
- Wear protective clothing as per section 8
- If contamination of drainage systems or water courses is unavoidable, immediately inform appropriate authorities

7 Handling and storage

Handling

- See Section 8
- The usual precautions for handling chemicals should be observed
- Wash thoroughly after use
- Use good personal hygiene practices
- Keep working clothes separate
- Do not allow dust to accumulate on surfaces and equipment
- Take precautionary measures against static discharges (S33)
- Do not breathe dust (S22)
- Avoid contact with skin and eyes (S24/25)

Storage

- Keep in a cool, dry place
- Keep container tightly closed (S7)

8 Exposure controls/personal protection

Engineering controls

- Engineering controls should be provided which maintain airborne concentrations as low as practicable

Precautionary measures

- Keep working clothes separately and do not take them home

Personal protection

- Wear suitable protective clothing, including eye/face protection and gloves (plastic or rubber are recommended)
- Wear dustproof working clothes
- In case of insufficient ventilation, wear suitable respiratory equipment (S38)
- Seek specialist advice

Exposure Limits

- There are no recommended or established controls for this product
- The UK HSE (EH40) recommends the following limits for dusts: 10 mg/m³ (8hr TWA) total inhalable dust; 5 mg/m³ (8hr TWA) total respirable dust

4,4'-Biphenol

- No information available but must be considered harmful
- The UK HSE (EH40) recommends the following limits for dusts: 10 mg/m³ (8hr TWA) total inhalable dust; 5 mg/m³ (8hr TWA) total respirable dust

9 Physical and chemical properties

- Odour: Odourless
- Appearance: white, powder
- pH - not known
- Decomposes
- Melting point 282 °C
- Water solubility <10 g/l
- Not flammable but will support combustion, Flash point - not applicable

10 Stability and reactivity

- This article is considered stable under normal conditions
- Keep away from heat and sources of ignition
- Incompatible with strong oxidizing substances
- Decomposition products may include carbon oxides

11 Toxicological information

Toxicological information

- LD50 (oral,rat) 4920 mg/kg
- LD50 (skin,rabbit) 1780 mg/kg

Mutagenicity

- Some evidence of mutagenic effects
- Mutagenicity (Ames Test) : Negative
- Category 3 Mutagen

12 Ecological information

Ecotoxicology

- Harmful to aquatic organisms (R52)
- Non-standard test indicates possible adverse environmental effect.

Environmental Fate

- To the best of our knowledge, the properties of this material have not been fully evaluated
- Water solubility <10 g/l

Environmental Hazard Values

- IC50 (bacteria) 13.4-18.5 mg/l (0.1-0.5 hr)
- To the best of our knowledge, the properties of this material have not been fully evaluated

13 Disposal considerations

Classification

- This material and/or its container must be disposed of as hazardous waste

Disposal considerations

- Disposal should be in accordance with local, state or national legislation
- In the EU, surplus product should be classified in accordance with regulations made under Directive 78/319/E95

14 Transport information

- Not classified as hazardous for transport

15 Regulatory information

Classification and labelling

- The data given here is based on current knowledge and experience. This Safety Data Sheet describes the product in terms of safety requirements and does not signify any warranty with regard to the product's properties

15 Regulatory information (...)

Applicable Laws

- This substance is covered by The Dangerous Substances Directive (67/548/EEC) as amended

Risk Phrases

- Harmful in contact with skin (R21)
- Irritating to eyes, respiratory system and skin (R36/37/38)
- Possible risk of irreversible effects (R40)
- Harmful to aquatic organisms (R52)

Safety Phrases

- In case of contact with eyes, rinse immediately with plenty of water and seek medical advice (S26)
- Wear suitable protective clothing and gloves (S36/37)
- This material and its container must be disposed of as hazardous waste (S60)

16 Other information