



SAFETY DATA SHEET
ALSAN TRAFIK HP 530

Offerte en français

GHS	PROTECTIVE CLOTHING	TRANSPORT INFORMATION
		PAINT Class 3 UN1263 P.G.: III

SECTION I: IDENTIFICATION

Use: Waterproofing polyurethane coloured resin single-component used for finishing.

Distributor: Soprema Australia Pty Ltd
 Level 36, 1 Macquarie Place
 Sydney, NSW 2000
 AUSTRALIA
 Tel.: +61 2 8051 3153

In case of emergency:

Poison Information Centre: 13 11 26

SECTION II: HAZARD(S) IDENTIFICATION

PRODUCT CONSIDERED A HAZARDOUS CHEMICAL, according to the Model WHS Regulations. **PRODUCT CONSIDERED A DANGEROUS GOOD**, according to the ADG Code.

DANGER. Highly flammable liquid and vapour. May be fatal if swallowed and enters airways. Harmful if swallowed. Harmful if inhaled. May cause respiratory irritation or drowsiness or dizziness. Causes skin irritation. Causes serious eye irritation. May cause damage to the central nervous system through prolonged or repeated exposure if inhaled. May cause allergy or asthma symptoms or breathing difficulties if inhaled. May cause an allergic skin reaction.

Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Keep away from heat, sparks, open flames and hot surfaces. No smoking. Use explosion proof electrical equipment. Use only non-sparking tools. Take precautionary measures against static discharge. Do not eat or drink when using this product. Avoid breathing vapours. Use only outdoors or in a well-ventilated area. Wash hands thoroughly after handling. Wear protective gloves, eye protection and an organic vapour respirator. Contaminated work clothing must not be allowed out of the workplace. Store in a well-ventilated place. Keep container tightly closed. Keep cool. Store locked up. Dispose of container in accordance with local, regional and national regulations.

SECTION III: COMPOSITION AND INFORMATION ON HAZARDOUS INGREDIENTS

NAME	CAS #	% WEIGHT	EXPOSURE LIMIT (ACGIH)	
			TLV-TWA	TLV-STEL
Light aromatic solvent naphtha (C8 to C10)	64742-95-6	10-30	Not established	Not established
Propyleneglycol methylethyl acetate (PGMEA)	108-65-6	3-7	50 ppm	Not established
Toluene	108-88-3	3-7	20 ppm	Not established
Carbamic acid, 1,6-hexanediylbis-, bis [2-[2-(1-Methylethyl)-3-oxazolidinyl] ethyl] ester	59719-67-4	3-7	Not established	Not established
Tris(nonylphenyl)phosphite	26523-78-4	0.5-1.5	Not established	Not established
Toluene diisocyanate (TDI)	26471-62-5	0.1-1	0.005 ppm	0.02 ppm
Para-toluene sulfonyl-isocyanate	4083-64-1	0.1-1	Not established	Not established
Isophorone diisocyanate (IPDI)	4098-71-9	0,1-1	0.005 ppm	Not established

Effects of Short-Term (Acute) Exposure

INHALATION

Light aromatic solvent naphtha: Forms high vapour concentration at normal temperatures. Mists or vapours can probably cause headache, nausea, dizziness, reduced concentration, incoordination and other symptoms of CNS depression. There is no specific human or animal information, but these effects have been observed in animals and humans exposed to comparable materials. (1)

PGMEA: PGMEA is not expected to cause any effects based on the low concentration level of this chemical in the product. Based on the effect of the chemically-similar propylene glycol monomethyl ether (PGME), irritation of the nose and throat from inhalation of propylene glycol monomethyl ether (PGMEA) vapour or mist would be expected. (1)

Toluene : The main effect of inhaling toluene vapour is on the CNS. Symptoms are related to exposure concentration. At approximately 50 ppm, slight drowsiness and headache have been reported. Irritation of

the nose, throat and respiratory tract has occurred between 50 and 100 ppm. Concentrations of about 100 ppm have caused fatigue and dizziness; over 200 ppm have caused symptoms similar to drunkenness (giddiness), numbness, and mild nausea; over 500 have caused mental confusion and incoordination. (1)

Carbamic acid, 1,6-hexanediylbis-, bis [2-[2-(1-Methylethyl)-3-oxazolidinyl] ethyl] ester: Harmful, and may cause sensitization by inhalation. Based on the available properties of the isocyanate content of this product, respiratory exposure may cause acute irritation and/or sensitization of the respiratory system, resulting in asthmatic symptoms, wheezing and a tightness of the chest. Sensitized persons may subsequently show asthmatic symptoms when exposed to airborne concentrations of isocyanates well below the occupational exposure limit. Repeated exposure may lead to permanent respiratory disability. Exposure to organic vapours may result in adverse health effects, especially when used in confined / unventilated areas, such as irritation of the mucus membrane and the respiratory system and adverse effects on the renal and CNS. Symptoms include headache, dizziness, fatigue,

muscular weakness, drowsiness and in extreme cases loss of consciousness. (2)

IPDI: Reports of occupational exposures to isophorone diisocyanate (IPDI) are restricted to spray painting operations. IPDI has a very low vapour pressure and airborne exposures are unlikely to occur unless IPDI is heated or forms an aerosol or mist during spraying operations. IPDI aerosol or mist can cause respiratory tract and mucous membrane irritation. Typical symptoms include eye and nose irritation, dry or sore throat, runny nose, shortness of breath, difficulty in breathing, wheezing and laryngitis. Coughing with chest pain or tightness may also occur, frequently at night. These symptoms may occur during exposure or may be delayed several hours. Short (1 to 5 minutes) exposures of volunteers to IPDI aerosol levels of 0.64 mg/m³ caused slight throat irritation. Aerosol levels of 1.37 mg/m³ caused unbearably strong nose and throat irritation. At 0.25 mg/m³, the odour was hardly perceptible. High aerosol concentrations could cause inflammation of the lungs (chemical pneumonitis), chemical bronchitis with severe asthma-like wheezing, severe coughing spasms and accumulation of fluid in the lungs (pulmonary oedema) which could prove fatal. Symptoms of pulmonary oedema may not appear until several hours after exposure and are aggravated by physical exertion. Some people may become sensitized to IPDI. (1)

Para-toluene sulfonyl-isocyanate: Isocyanate vapour/mists at concentration above the exposure limits can irritate (burning sensation) the mucous membranes in the respiratory tract. (2)

TDI: Short-term exposure to isocyanates, such as toluene diisocyanate (TDI), can cause respiratory and mucous membrane irritation at vapour levels of 0.05 ppm and above. Symptoms include eye and nose irritation, dry or sore or burning throat, runny nose, shortness of breath, wheezing and laryngitis. Coughing with chest pain or tightness may also occur, frequently at night. These symptoms may occur during exposure or may be delayed for several hours. High exposures could cause inflammation of the lung tissue (chemical pneumonitis), chemical bronchitis with severe asthma-like wheezing, severe coughing spasms and accumulation of fluid in the lungs (pulmonary oedema), which could prove fatal. Symptoms of pulmonary oedema may not appear until several hours after exposure and are aggravated by physical exertion. Effects such as euphoria, muscle incoordination and loss of consciousness have been reported after a single severe exposure to TDI. Headache, difficulty in concentration, poor memory and confusion may persist for up to 4 years. (1)

SKIN CONTACT

Light aromatic solvent naphtha: Is probably not a skin irritant, based on animal information. There is no human information available. (1)

Carbamic acid, 1,6-hexanediybis-, bis [2-[2-(1-Methylethyl)-3-oxazolidinyl] ethyl] ester: May cause sensitization by skin contact. (2)

IPDI: Liquid IPDI can cause severe skin irritation. Prolonged contact can cause severe inflammation with redness, rash, swelling and blistering. Isocyanates, in general, can cause skin discolouration (staining) and hardening of the skin after repeated exposures. IPDI caused severe skin irritation when applied to rabbit skin. IPDI is a very strong skin sensitizer. Skin sensitization may occur after only one contact with IPDI. (1)

Para-toluene sulfonyl-isocyanate: Skin irritant. (2)

Tris(nonylphenyl)phosphite: Causes skin irritation. (2)

TDI: Liquid TDI produces a marked inflammatory reaction. Prolonged or further contact can cause severe inflammation, redness, rash, swelling, blistering and burns. Isocyanates, in general, can cause skin discolouration (staining) and hardening of the skin after repeated exposures. Skin contact is not expected to result in the absorption of harmful amounts. Skin sensitization may occur in some individuals, but it is not common. TDI vapour and aerosols may also cause skin irritation. Usually, this only happens at levels higher than those that cause respiratory effects. (1)

EYE CONTACT

Light aromatic solvent naphtha: Is probably not an eye irritant, based on animal information (1)

Carbamic acid, 1,6-hexanediybis-, bis [2-[2-(1-Methylethyl)-3-oxazolidinyl] ethyl] ester: May cause irritation. (2)

IPDI: IPDI liquid, aerosol or mist can cause eye irritation. People exposed to IPDI aerosol levels of 0.64 mg/m³ experienced slight eye irritation, while aerosol levels of 1.37 mg/m³ caused strong eye irritation. Liquid IPDI caused severe eye damage when applied to rabbit eyes. (1)

Para-toluene sulfonyl-isocyanate: Contact with eyes can cause severe damage. (2)

Tris(nonylphenyl)phosphite: May cause eye irritation. (2)

TDI: Liquid TDI can cause watering of the eyes, severe irritation and possible clouding of the cornea. Exposure to high TDI vapour concentrations can lead to formation of solid particles in the eye fluid which can cause mechanical irritation hours after exposure. (1)

INGESTION

Light aromatic solvent naphtha: Animal toxicity information indicates that this product is not very toxic following ingestion. Ingestion of large amounts would produce symptoms of CNS depression, as described in "Inhalation" above. Like other petroleum distillates, it may cause an aspiration hazard. If it is drawn into the lungs during ingestion or vomiting, it could cause a potentially life-threatening accumulation of fluid (pulmonary oedema). Ingestion is not a typical route of occupational exposure. (1)

Carbamic acid, 1,6-hexanediybis-, bis [2-[2-(1-Methylethyl)-3-oxazolidinyl] ethyl] ester: May cause discomfort and risk of lung damage if vomiting results. (2)

IPDI: There have been no reports of people ingesting IPDI and ingestion is unlikely to occur in the workplace. Animal studies indicate that IPDI has low oral toxicity. Ingestion could cause irritation of the tissues of the mouth, throat and digestive tract. (1)

Para-toluene sulfonyl-isocyanate: May cause severe irritation of the mouth, oesophagus and stomach. (2)

TDI: TDI is not expected to be toxic if ingested based on animal toxicity values. Swallowing TDI could cause irritation and corrosion of the tissues lining the mouth, throat and stomach. Ingestion is not a typical route of occupational exposure. (1)

Effects of Long-Term (Chronic) Exposure

SKIN CONTACT

Light aromatic solvent naphtha: Repeated or prolonged contact may cause red, dry, itchy, scaling skin (dermatitis). (1)

SKIN SENSITIZATION

IPDI: IPDI is a very strong sensitization agent. Sensitization may occur after a single exposure or develop gradually over time. Symptoms include a rash on the hands, arms, neck, face, chest or abdomen even upon contact with a small amount of IPDI. Other effects such as coughing, a burning sensations in the throat, or redness and swelling of the eyes. In a case study, a single 1-hour exposure to IPDI caused a rash in 3 of 4 workers. Only one worker had previous contact with IPDI, the rest had worked with TDI and MDI (suggesting cross-sensitization). Cross-sensitivity has been shown to occur between IPDI and isophorone diamine (IPD). (1)

Tris(nonylphenyl)phosphite: May cause skin sensitization. (2)

TDI: Repeated skin contact with TDI has caused skin sensitization in humans, although the condition is not common. Once a person is sensitized, contact with even a small amount of TDI can cause outbreaks of dermatitis with symptoms such as redness, rash, itching and swelling. This can spread from the hands or arms to the face and body. Some people who inhaled TDI developed extensive skin rashes

that lasted 1-1.5 weeks. There was no direct skin contact with the liquid. (1)

RESPIRATORY SENSITIZATION

IPDI: In general, isocyanates are well known to cause respiratory sensitization. There are two case reports of respiratory sensitization caused by exposure to IPDI in spray paint. It has been suggested that IPDI is a weak respiratory sensitizer. Isocyanate respiratory sensitization is usually caused by a very large exposure, or by multiple exposures. Although varying periods of exposure (1 day to years) may elapse before sensitization occurs, it develops more often during the first few months of exposure. Sensitized individuals react to very low levels of airborne isocyanates that have no effect on unsensitized people. At first, the symptoms may appear to be a cold or mild hay fever. However, severe asthmatic symptoms can develop and include wheezing, tightness of the chest, shortness of breath, difficulty breathing and/or coughing. Fever, chills, general feelings of discomfort, headache, and fatigue can also occur. Symptoms may occur immediately upon exposure (within an hour), several hours after exposure or both, and/or at night. Typically, the asthma improves with removal from exposure (e.g. weekends or vacations) and returns, in some cases, in the form of an “acute attack”, on renewed exposure. Sensitized people who continue to be exposed to isocyanates at work may develop symptoms sooner after each exposure. The number and severity of symptoms may increase. Following removal from isocyanate exposure, some sensitized people may continue to show a slow decline in lung function and have persistent respiratory problems, such as chronic bronchitis for months or years. Others may recover fully and gradually lose their sensitivity within several years. Cross-sensitization between different isocyanates may occur. Exposure to isocyanates is likely to aggravate individuals with existing respiratory disease, such as chronic bronchitis and emphysema. (1)

Para-toluene sulfonyl-isocyanate: May cause sensitization by inhalation. This product is a recognized allergen that can cause chronic respiratory obstructive airway diseases. (2)

TDI: Respiratory sensitization has developed in people working with TDI. Sensitization is usually caused by a very large exposure, or by multiple exposures. However, symptoms of sensitization have occurred in some workers exposed frequently to low levels of TDI (0.0003 to 0.03 ppm). Although varying periods of exposure (1 day to years) may elapse before sensitization occurs, it develops more often during the first few months of exposure. Sensitized individuals react to very low levels of TDI (below 0.001 ppm) that have no effect on unsensitized people. At first, the symptoms may appear to be a cold or mild hay fever. However, severe asthmatic symptoms can develop and include wheezing, chest tightness, shortness of breath, difficulty breathing and/or coughing. Fever, chills, general feelings of discomfort, headache, and fatigue can also occur. Symptoms may occur immediately upon exposure (within an hour), several hours after exposure or both, and/or at night. Typically, the asthma improves with removal from exposure (e.g. weekends or vacations) and returns, in some cases, in the form of an “acute attack”, on renewed exposure. Sensitized people who continue to work with TDI may develop symptoms sooner after each exposure. The number and severity of symptoms may increase. Death has occurred in sensitized individuals accidentally exposed to relatively low concentrations of TDI. Animal studies indicate that respiratory sensitivity to TDI may result from dermal as well as inhalation exposures. Following removal from exposure, some sensitized workers may continue to show a slow decline in lung function and have persistent respiratory problems such as asthmatic symptoms, chronic bronchitis and hypersensitivity to TDI for months or years. Others recover complete lung function within months if they have no further isocyanate exposure. TDI may also cause hypersensitivity pneumonitis, another allergic lung disease, which is characterized by symptoms such as shortness of breath, fever, malaise, non-productive cough, and chills. Several studies have shown that long-term exposure to TDI at levels as low as 0.002-0.003 ppm may cause impaired lung function such as diminished respiratory capacity. Cross-sensitization between different isocyanates may occur.

People sensitized to TDI have shown sensitization to methylene bisphenyl isocyanate (MDI) and hexamethylene-1,6-diisocyanate (HDI), where no previous exposure to MDI or HDI was known. Exposure to isocyanates is likely to cause aggravation to individuals with existing respiratory disease, such as chronic bronchitis, and emphysema. (1)

PGMEA, Toluene: No human or animal information is available.

NERVOUS SYSTEM

Light aromatic solvent naphtha: Long-term, high level exposure to organic solvents has been associated with a condition called “organic solvent syndrome”. Symptoms such as excessive fatigue, reduced memory, pain and numbness in the legs, arms, hands and feet and behavioural changes have been observed in some people with long-term, high-level occupational exposure to organic solvents. (1)

Toluene: Inhalation of solvent such as toluene may cause nervous system problems. Numerous studies of rotogravure printers, painters and rubberized-matting workers with chronic exposure to toluene are inconclusive about chronic CNS damage. Some studies report changes such as memory loss, sleep disturbances, loss of ability to concentrate, or incoordination, while others report no effects. Recent studies using sensitive neurobehavioral tests have shown altered scores for exposed workers but whether or not these indicate CNS damage is not clear. (1)

PGMEA: No human or animal information is available.

TARGET ORGANS

Toluene: In two cases of acute occupational exposure of toluene, there were no blood disorders, liver or kidney damage. Historical reports of blood effects caused by toluene are more than likely due to benzene contamination. Liver and kidney effects, as well as heart disturbances, have been reported in cases of solvent abuse (glue-sniffing). These extreme exposures are not relevant to occupational situations. Reversible kidney failure has resulted from a severe occupational exposure in a paint factory. In epidemiological studies on workers exposed long-term to levels up to 200 ppm, there was no clear evidence of kidney damage. Occupational exposure to up to 500 ppm toluene has not been associated with liver effects. There is some evidence to suggest that long-term exposure to toluene may affect hearing. However, the limited information available does not allow a conclusion to be drawn. Although minor changes in blood parameters have been observed, it is generally accepted that toluene does not cause significant blood disorders. (1)

PGMEA: No human or animal information is available.

CARCINOGENICITY

Light aromatic solvent naphtha: There is no human or animal information available. The International Agency for Research on Cancer (IARC) has not evaluated the carcinogenicity of this chemical. The American Conference of Governmental Industrial Hygienists (ACGIH) has no listing for this chemical. The US National Toxicology Program (NTP) has not listed this chemical in its report on carcinogens. (1)

PGMEA: No human or animal information is available. The IARC has not evaluated the carcinogenicity of these chemicals. The ACGIH has no listing of these chemicals. The NTP has not listed these chemicals in its report on carcinogens. (1)

Toluene: There have been several human population studies which have examined the possible relationship between toluene exposure and cancer. Cancers of most sites were not significantly associated with toluene exposure in any study. Stomach cancer mortality, lung cancer rates and colorectal cancers were evaluated in some studies, but not others. Considering the multiple exposures in most studies and the inconsistencies in findings, it is not possible to conclude that toluene exposure is associated with cancer in humans. The IARC has concluded there is inadequate evidence for the carcinogenicity of toluene in humans. There is evidence suggesting a lack of carcinogenicity to o-toluene in experimental animals. The IARC has concluded that this chemical is not classifiable as to its carcinogenicity to humans (Group

3). The ACGIH has designated this chemical as not classifiable as a human carcinogen (A4). The NTP has not listed this chemical in its report on carcinogens. (1)

IPDI: No human or animal information is available on the carcinogenicity of IPDI. The IARC has not evaluated the carcinogenicity of this chemical. The ACGIH has not assigned a carcinogenicity designation to this chemical. The NTP has not listed this chemical in its report on carcinogens. (1)

TDI: The IARC has concluded that this chemical is possibly carcinogenic to humans (Group 2B). The ACGIH has designated this chemical as not classifiable as a human carcinogen (A4). ACGIH has published a Notice of Intended Change proposing that the carcinogenicity designation be changed to A3 (animal carcinogen). The NTP has listed this chemical as reasonably anticipated to be a human carcinogen. (1)

TERATOGENICITY, EMBRYOTOXICITY, FETOTOXICITY

Light aromatic solvent naphtha: There is no human information available. Harmful effects have been observed in the offspring of rats and mice exposed by inhalation, but only in the presence of maternal toxicity. (1)

PGMEA: Animal studies have shown that the chemically-similar PGME has no teratogenic or embryotoxic effects. Thus, none are expected for PGMEA. (1)

Toluene: Toluene is a developmental toxicity hazard, based on information obtained from animal studies. Fetotoxicity (reduced foetal weight), behavioural effects (effects on learning and memory) and hearing loss (in males) have been observed in the offspring of rats exposed by inhalation to 1 200 or 1 800 ppm of toluene. These effects were observed in the absence of maternal toxicity. A detailed review of toluene and its potential to cause teratogenicity/embryotoxicity in occupational situations has been published. This review concludes that although many occupational studies have evaluated general solvent exposure in general or to some solvent classes, with toluene exposure addressed as a co-exposure or identified as a common exposure in a sub-group. Outcomes of concern included spontaneous abortion (miscarriage) and teratogenicity (congenital malformations). Six studies examined the association of toluene exposure with spontaneous abortions. Four of the six studies were performed on similar groups of Finnish workers, by the same group of researchers, which can reduce overall confidence in the conclusions. Despite this and other limitations (e.g. recall bias, multiple chemical exposures), these studies do provide evidence suggesting there may be an association between occupational toluene exposure and the occurrence of spontaneous abortions. Nevertheless, further research is required before it will be possible to conclude that there is a causal relationship between toluene exposure and an increased incidence of spontaneous abortions. One study has reported an increased incidence particularly toluene. However, it is not possible to draw specific conclusions regarding toluene from this study, because the toluene-specific results were based on a very small number of workers who were exposed to multiple chemicals. Concerns about the potential teratogenicity of toluene in humans have also arisen due to effects (usually renal/urinary) seen in solvent abuse cases (glue-sniffing). These extreme exposures to toluene, as well as other confounding factors such as tobacco and alcohol abuse, are not relevant

IPDI, TDI: No human or animal information is available. (1)

REPRODUCTIVE TOXICITY

Light aromatic solvent naphtha: There is no human information available. A three-generation study showed no consistent effects on reproductive parameters in rats, despite significant toxicity. (1)

Toluene: No conclusions can be drawn based on the available human information. Reproductive effects have not been observed in animal studies. A review of toluene and its potential to cause reproductive toxicity in workers has been published. Three cross-sectional studies evaluated fertility in women exposed to toluene or in the wives of exposed men. No conclusions can be drawn based on these studies, due to limitations such as selection bias, recall bias, and the fact that the

workers were exposed to other potentially harmful chemicals. Another study suggests that menstrual function is not affected by exposure to toluene. Another report describes testicular atrophy and reduced spermatogenesis in one man who abused toluene for 10 years. This extreme exposure situation is not relevant to occupational exposures. (1)

IPDI, PGMEA, TDI: No human or animal information is available. (1)

MUTAGENICITY

Light aromatic solvent naphtha: No reports of mutagenicity in humans or human cell cultures were located. Consistently negative results have been obtained in studies using live animals, cultured mammalian cells and bacteria. (1)

Toluene: Results from the available human studies are inconclusive. Both positive and negative results have been obtained in human studies, but no studies were carried out with toluene exposure only, or with adequate control of other factors. Positive results have been obtained in some studies using live animals, but the studies either used an irrelevant route of exposure (intraperitoneal) or there are insufficient details available for evaluation. (1)

IPDI: No studies are available. (1)

PGMEA: No human or animal information is available.

TDI: It is not possible to conclude that TDI is mutagenic. There is no human information available. (1)

TOXICOLOGICALLY SYNERGISTIC MATERIALS:

Toluene: Exposure to other solvents such as benzene, xylene and ethanol (alcohol) slows the rate of clearance of toluene from the body, thereby enhancing the toxicity of toluene. (1)

IPDI, PGMEA, TDI: No human or animal information is available. (1)

POTENTIAL FOR ACCUMULATION

Light aromatic solvent naphtha: Probably does not accumulate in the body. In general, alkyl benzenes are metabolized in the liver and converted to substituted benzoic acids and phenols. Phenolic compounds are subsequently metabolized and excreted in the urine. (1)

PGMEA: Does not accumulate. PGMEA is rapidly metabolized to PGME and acetic acid. Animal studies indicate that PGME is rapidly metabolized and eliminated from the body. PGMEA was rapidly and extensively metabolized to propylene glycol monomethyl ether and acetic acid (which is a normal body substance), and eliminated in the same manner as propylene glycol monomethyl ether (in the expired air as carbon dioxide, in the urine and very small amounts in the feces). At very high doses of PGMEA, the acetic acid formed in the hydrolysis, may have adverse effects. (1)

IPDI: Information about the absorption, metabolism and excretion of IPDI is limited. Like other isocyanates, it probably does not accumulate. (1)

Toluene: Toluene is readily absorbed by inhalation or ingestion and tends to be deposited more in tissues that are fatty or have a rich blood supply (e.g. brain, liver, kidney, fat). There was no evidence of accumulation in rats with repeated inhalation exposure to 300 ppm. Toluene is metabolized in the liver and excreted by the kidneys in the urine. It can also be exhaled unchanged. (1)

TDI: TDI probably does not accumulate in the body. It can enter the body by inhalation or by ingestion. It is probably metabolized to toluenediamine, which is metabolized further and excreted. (1)

SECTION IV: FIRST-AID MEASURES

SKIN CONTACT

Wash with plenty of water. If skin irritation or rash occurs: Get medical advice. Take off immediately all contaminated clothing and wash it before reuse.

EYE CONTACT

Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical advice.

INHALATION

If breathing is difficult, remove person to fresh air and keep comfortable for breathing. If experiencing respiratory symptoms: Call a poison center.

SWALLOWING

Immediately call a poison center. Do NOT induce vomiting. Rinse mouth.

SECTION V: FIRE-FIGHTING MEASURES

FLAMMABILITY:	Flammable Class IC (NFPA 30)
EXPLOSION DATA:	Sensitivity to mechanical impact: No Sensitivity to static charge: Can accumulate static charge by flow, agitation or pouring. Vapours from the heated liquid at concentrations in the flammable range, can probably be ignited by a static discharge.
FLASH POINT:	≈ 30°C
AUTO-IGNITION TEMPERATURE:	Not available
FLAMMABILITY LIMITS IN AIR: (% in volume)	Not available

FIRE AND EXPLOSION HAZARDS

This product and its vapours are easily ignited by heat, sparks or flames. Vapours may form explosive mixtures with air. Vapours are heavier than air and may travel a considerable distance to a source of ignition and flash back to a leak or open container. The product may ignite on contact with strong oxidizing agents. Do not cut, puncture or weld empty containers.

COMBUSTION PRODUCTS

Toxic and/or irritating gases or fumes may be generated by thermal decomposition or combustion (1-methoxy-2-methylene (vinyl ether), acetic acid carbon oxides, nitrogen oxides, trace of hydrocyanic acid, trace of hydrochloric acid, formaldehyde, acetaldehyde, methylglyoxal, hydrogen cyanide, phosphorous oxides). Toxic and/or irritating gases or fumes can emanate from empty containers when submitted to high temperatures.

FIRE FIGHTING INSTRUCTIONS

Toxic and/or irritating gases or fumes may be generated by thermal decomposition or combustion. Approach fire from upwind. Evacuate area and fight fire from maximum distance or use unmanned hose holders or monitor nozzles. Always stay away from containers because of the high risk of explosion. Wear self-contained breathing apparatus and appropriate protective clothing in accordance with standards. Stop leak before attempting to put out the fire. If leak cannot be stopped, and if there is no risk to the surrounding area, let the fire burn itself out. Move containers from fire area if this can be done without risk. Cool containers with flooding quantities of water until well after fire is out.

TDI: Water or water-based foam, if used in very large quantities, may be effective for fighting fires involving toluene diisocyanate (TDI). However, care must be taken since the reaction between water or water-based foam and hot TDI can be vigorous. TDI and its decomposition products, such as hydrogen cyanide and nitrogen oxides, are extremely hazardous to health. (1)

MEANS OF EXTINCTION

Dry chemical powder, CO₂, foam. Use of water spray when fighting fire may be inefficient because of the low flash point of the product.

SECTION VI: ACCIDENTAL RELEASE MEASURES

RELEASE OR SPILL

Ventilate area. Wear appropriate protective equipment during cleanup. Eliminate all sources of ignition. Shut off source of leak if you can do it without risk. Contain the spill. Absorb with absorbents or cover with

dry earth, sand or other non-combustible material and transfer to containers. Sweep or shovel into containers with lids, use clean non-sparking tools to collect absorbed material. Cover and remove to appropriate well-ventilated area until disposal. Do not touch or walk through spilled material. Wash spill area with soap and water. Prevent entry into waterways, sewers, basements or confined areas. Dispose of this product according to environmental regulations.

SECTION VII: HANDLING AND STORAGE

HANDLING

This product is flammable and toxic. Avoid contact with eyes, skin and clothing. Do not ingest. Avoid breathing mist, vapour or dust. Wash thoroughly after handling. Before handling, it is very important that ventilation controls are operating and protective equipment requirements are being followed. People working with this product would be properly trained regarding its hazards and its safe use. Eliminate all ignition sources (e.g. sparks, open flames, hot surfaces). Keep away from heat. Tightly reseal all partially used containers. Do not cut, puncture or weld empty containers.

STORAGE

Store in areas/building designed to comply with appropriate dangerous goods regulations and Australian Standards. Store containers in a cool well-ventilated area out of direct sunlight and away from humidity, heat and ignition sources. Keep storage areas clear of combustible materials. No smoking near storage area. Store away from incompatible materials. Store the product according to occupational health and safety regulations and fire and building codes. Storage area should be clearly identified, clear of obstruction and accessible only to trained and authorized personnel. Inspect periodically for damage or leaks. Have appropriate fire extinguishers and spill clean-up equipment near storage area. Inspect all containers to make sure they are properly labelled.

SECTION VIII: EXPOSURE CONTROLS / PERSONAL PROTECTION

HANDS: Wear gloves made from butyl rubber, nitrile, polyvinyl alcohol or Teflon in accordance with AS 2161.10.1 and AS 2161.1.

RESPIRATORY: If the exposure limit is exceeded, if use is performed in a poorly ventilated confined area, use an approved respirator in accordance with AS 1716& 1715.

EYES: Wear chemical safety goggles in accordance with AS 1336.

OTHERS: Eye bath and safety shower.

CONTROL OF VAPOURS: Local exhaust is needed to control vapour and dust level to below recommended limits.

SECTION IX: PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE:	Liquid
ODOUR AND APPEARANCE:	Grey liquid with solvent odour
ODOUR THRESHOLD:	Not available
VAPOUR DENSITY (air = 1):	Heavier than air
EVAPORATION RATE (ether = 1):	Not available
BOILING POINT (760 mm Hg):	Not available
FREEZING POINT:	Not available
SPECIFIC GRAVITY (H₂O = 1):	1.09
SOLUBILITY IN WATER (20°C):	Insoluble
VOLATILE ORGANIC COMPOUND (V.O.C.) CONTENT:	280 g/L
VISCOSITY:	1 500 cP

SECTION X: STABILITY AND REACTIVITY

STABILITY

This material is stable at handling and storage conditions recommended under the section VII.

CONDITIONS OF REACTIVITY

Avoid excessive heat. Exposed to high temperatures, this product can emit dangerous decomposition products such as fumes, carbon oxide, nitrogen oxide, hydrocyanic acid, amines and alcohols.

INCOMPATIBILITY

Keep away from oxidizing agents and from highly acid and basic materials to avoid exothermic reactions.

Strong oxidizing agents – Reacts violently with fire or explosion risk.

Water – Reacts non-violently at room temperature with release of heat to form carbon dioxide and inert material made up of polyureas which could rupture closed containers. Toluenediamine is formed as an intermediate product in the reaction. Above 50°C, the reaction becomes progressively more vigorous.

Amines, alcohols, acids, or bases – May react violently with generation of heat and flammable compounds.

Metal compounds (e.g. organometallic catalysts, such as organotin compounds) – May polymerize with the generation of heat and pressure.

Alkaline metals – The reaction is exothermal and flammable compounds can emanate.

Halogens – The reaction is exothermal and flammable compounds can emanate.

Amides, phenols, mercaptans, urethanes, ureas and surface active agents (surfactants, e.g. non-ionic detergents) – May react vigorously or violently with the generation of heat.

HAZARDOUS DECOMPOSITION PRODUCTS

This product slowly reacts with water and may cause an emanation of carbonic gas which would lead to pressure increasing in closed containers. Peroxides can also form and generate the same situation. TDI will produce toluenediamine in reaction with water. IPDI will form isophorone diamine by contact with water.

HAZARDOUS POLYMERISATION

IPDI can be subjected to an uncontrolled exothermal polymerisation in case of contact with incompatible materials, more specifically strong bases, some metallic compounds and heat. TDI can be subjected to an uncontrolled exothermal polymerisation by contact with water at high temperatures.

STABILITY AND REACTIVITY COMMENTS

Isocyanates are very reactive compounds and are highly reactive toward a large number of compounds with active hydrogens, particularly at high temperatures and in the presence of catalysts. (1)

SECTION XI. TOXICOLOGICAL INFORMATION

TOXICOLOGICAL DATA

Light aromatic solvent naphtha: (1)

LD₅₀ (oral, rat): 2 900-3 200 mg/kg (unconfirmed)

Toluene: (1)

LC₅₀ (inhalation, rat): 7 350 ppm (4-hour exposure)

LD₅₀ (oral, rat): 2 600-7 500 mg/kg

LD₅₀ (dermal, rabbit): 12 225 mg/kg

IPDI: (1)

LC₅₀ (rat) : 123-160 mg/m³ (13,6 – 17,6 ppm) (4-hour exposure) (aerosol)

LD₅₀ (oral, rat) : > 2 500 mg/kg

LD₅₀ (dermal, rat) : approx. 1 000 mg/kg (4-hour exposure);

approx. 500 mg/kg (4-day exposure)

Tris(nonylphenyl)phosphite: (2)

DL₅₀ (inhalation, rat): > 2 000 mg/kg

TDI: (1)

LC₅₀ (inhalation, rat) : 14 ppm (4-hour exposure) (composition unspecified)

LD₅₀ (oral, rat) : > 4 000 mg/kg (80% 2,4-TDI:20% 2,6-TDI)

LD₅₀ (dermal, rabbit): 10 000 mg/kg (composition unspecified)

PGMEA, Carbamic acid, 1,6-hexanediylbis-, bis [2-[2-(1-Methylethyl)-3-oxazolidinyl] ethyl] ester, Para-toluene sulfonyl-isocyanate: No information available.

EYE IRRITATION

Light aromatic solvent naphtha: Slight redness was observed in rabbits following application of an unspecified amount of a commercial product which is comparable to light aromatic solvent naphtha. (1)

TDI: Application of 80% toluene-2,4-diisocyanate (2,4-TDI):20% 2,6-TDI (possibly undiluted) caused moderate pain, redness, swelling and discharge in rabbits. Washed eyes healed completely in 14 days. Corneal injury and redness were seen in the unwashed eyes at 21 days. (1)

SKIN IRRITATION

Light aromatic solvent naphtha: Essentially no irritation was observed in rabbits following the application of an unspecified amount of a commercial product that is comparable to light aromatic solvent naphtha. (1)

TDI: Application of 0.5 ml in a covered test for 4 hours caused corrosion in 6/6 rabbits tested. Prolonged contact with the skin can cause redness, swelling, blistering and burns. (1)

Effects of Short-Term (Acute) Exposure

INHALATION

Light aromatic solvent naphtha: Female rats were exposed to 8.7 mg/L (8 700 mg/m³) of a high aromatic solvent aerosol for 8 hours. This material is similar to light aromatic solvent naphtha, but has a higher C10 component. This high aromatic solvent is expected to be less volatile, but to have similar toxicity. Observed effects included eye and nose irritation and salivation within 20 minutes, progressive tremors, incoordination, unconsciousness, convulsions and death in 2/10 animals within 24 hours following exposure. In survivors, recovery was noted after 4 days. Four male cats exposed to 8.2 mg/L (8 200 mg/m³) high aromatic solvent aerosol for 6 hours showed muscle incoordination, tremors, salivation and a decrease in constriction of the pupils when exposed to light. No deaths were reported. Recovery occurred within one day. (1)

Toluene: The major effect of toluene is on the CNS. Studies with rats have shown that up to approximately 1 000 ppm caused excitation and increased activity. At approximately 2 000 ppm, there is CNS depression with drowsiness, incoordination and unconsciousness. Death at higher concentrations is from respiratory failure. Animal studies have indicated that toluene is not directly toxic to the cardiovascular system. Recovery is rapid following cessation of exposure. Studies indicate no permanent damage to body systems. Studies in rats have shown hearing loss at high frequencies following toluene exposure both by inhalation (threshold concentration between 700 and 1 000 ppm) and orally (620 mg/kg/day for 4 weeks). This effect has also been observed in a mouse strain that had a genetic predisposition to hearing loss. (1)

IPDI: IPDI causes respiratory irritation in rats. (1)

TDI: Inhalation of sublethal concentrations by mice, rats, rabbits and Guinea pigs caused severe respiratory effects such as bronchitis, bronchopneumonia, emphysema, and bleeding of the lungs. TDI is a sensory irritant. Sensory irritants inhibit respiration. (1)

PGMEA: No information available.

EYE IRRITATION

PGMEA (rabbit): Somewhat painful and irritating to the eyes. (1)

Toluene: Toluene is a mild eye irritant. In an OECD-compliant test, application of 0.1 ml undiluted toluene produced no to mild irritation in rabbits. Application of 0.1 ml of undiluted toluene in another OECD-compliant test protocol produced slight irritation in rabbits. Application of 0.005 ml of an excess of a 40% solution of toluene caused severe eye injury in rabbits. These results are not consistent with the reports that used undiluted toluene in OECD-compliant tests. The results of this study are therefore questionable. (1)

Tris(nonylphenyl)phosphite: Not irritating for eyes of rabbits. (2)

SKIN SENSITIZATION

PGMEA (rabbit): Repeated applications were not very irritating to rabbit and did not cause absorption of significant amounts, even when applied repeatedly for a 2-week period. (1)

Toluene: Toluene is a moderate skin irritant. In an OECD-compliant test, administration of 0.5 ml of undiluted toluene to intact skin, under a semi-occlusive cover, for 4 hours produced moderate irritation in rabbits. Another OECD-compliant test, showed slight irritation in rabbits following the application of 0.5 ml of undiluted toluene for 4 hours. There is insufficient information provided to properly evaluate these test results. Other test protocols have shown moderate irritation in intact and abraded skin, with prolonged exposure (23 hours), and in a study that does not strictly meet OECD guidelines. Application of 0.5 ml of undiluted toluene for 4 hours, to intact and abraded skin, produced moderate irritation in rabbits. Application of 0.5 ml of undiluted toluene for 23 hours, to intact and abraded skin, produced moderate irritation in rabbits. Application of 0.01 of undiluted toluene produced moderate irritation in rabbits. (1)

IPDI: IPDI caused moderate skin sensitization in Guinea pigs. Mice showed statistically significant allergic response when sensitized with a concentration of 1% IPDI. It was estimated that IPDI was probably equivalent to toluene diisocyanate in sensitizing potential. (1)

Para-toluene sulfonyl-isocyanate: Isocyanates are known to cause skin sensitization in humans. (2)

Tris(nonylphenyl)phosphite: Skin irritant for rabbit. (2)

INGESTION

Light aromatic solvent naphtha: Rats exposed to lethal oral doses showed CNS effects, such as decreased activity, abnormal gait, body tremors and laboured breathing, as well as diarrhea. Rats were administered 3 000 or 5 000 mg/kg of a commercial product which is comparable to light aromatic solvent naphtha. Observations included salivation, tearing of the eyes, decreased activity, prostration, laboured breathing and diarrhea. (1)

TDI: TDI has been reported to have gastrointestinal and liver effects when administered orally to animals. (1)

Effects of Long-Term (Chronic) Exposure

INHALATION

Light aromatic solvent naphtha: Reduced body weight was observed in male rats following a 13-week exposure to very high concentrations. Increased liver and kidney weights were observed in male rats exposed to high concentrations for up to 12 months. Females had reduced blood cell (eosinophil) counts that persisted throughout a 4-month recovery period. No signs of neurotoxicity or harmful changes were observed. (1)

PGMEA (rat, mouse): Repeated exposures at 300 and 1 000 ppm for two weeks (6 hours/day, 5 days first week, 4 days second week) produced no adverse effects. There were minor changes found at very high exposures (3 000 ppm) – slight increase in liver weight for females, slight effect on kidney function and slight to moderate injury to the lining of the nose. The latter effect was more severe with mice. It was suggested that this effect was related to acetic acid resulting from hydrolysis of PGMA in the nose. There were no effects on thymus and spleen weights, on bone marrow or blood. (1)

TDI: Rats, Guinea pigs and rabbits exposed to 0.1 ppm, 6 hours/day, 5 days/week for up to 58 exposures or 6 hours/day for 38 consecutive days, developed lung inflammation. Lung damage generally increased in severity for several days after exposure ended. (1)

Toluene: Daily inhalation by rats of toluene concentrations below 400 ppm for up to 24 months resulted in no significant toxicity. Evidence for chronic CNS neurotoxicity is inconclusive. Numerous studies on rats and mice have shown reduced performance on some neurobehavioral tests but not others, both during and after toluene inhalation exposures (usually at greater than 500 ppm). Where tests were repeated after an exposure-free period, most results were the same

as controls. The significance of minor changes in brain cells or in behavioural tests is not known. (1)

Para-toluene sulfonyl-isocyanate: This product may cause chronic respiratory and obstructive airway diseases. Allergic reactions may develop after inhalation of low concentrations, also several hours after exposure. (2)

SKIN SENSITIZATION

Para-toluene sulfonyl-isocyanate: This product may cause skin disorders and allergies. (2)

Tris(nonylphenyl)phosphite: Sensitizing for Guinea pig. (2)

TDI: Skin and respiratory sensitization were produced in animals by direct application of 2,4-TDI to the skin. No dermal or respiratory sensitization was detected in animals exposed to 0.02 ppm for 15 weeks. (1)

RESPIRATORY SENSITIZATION

Para-toluene sulfonyl-isocyanate: Isocyanates are known to cause respiratory sensitization in humans. (2)

TDI: Concentration dependent respiratory sensitization has been produced in Guinea pigs. Threshold levels of 0.25 to 0.36 ppm TDI (80% 2,4-TDI:20% 2,6-TDI) have been observed. (1)

INGESTION

PGMEA (rat): A single dose of 3 ml/kg produced no death; 10 ml/kg caused death in 3 of 5 animals tested. (1)

Toluene: No significant toxicity was seen after oral administration of up to 590 mg/kg to female rats for up to six months. (1)

CARCINOGENICITY

Toluene: The IARC has concluded there is inadequate evidence for the carcinogenicity of toluene in experimental animals. Toluene was not carcinogenic in mice and rats exposed by inhalation to up to 1 200 ppm for 24 months. (1)

TDI: The IARC has determined there is sufficient evidence for the carcinogenicity of toluene diisocyanate to experimental animals. (1)

PGMEA: No information available.

TERATOGENICITY, EMBRYOTOXICITY, FETOTOXICITY

Light aromatic solvent naphtha: Harmful effects have been observed in the offspring of rats and mice exposed by inhalation, but only in the presence of maternal toxicity. Mice were exposed by inhalation to 0, 100, 500 or 1 500 ppm on days 6-15 of pregnancy. Exposure to 100 ppm produced a significant decrease in the number of live foetuses/litter. However, this effect was not dose-related, as it did not occur at the 500 ppm exposure. No significant maternal toxicity was noted at 100 ppm. At 500 ppm, a significant reduction in foetal body weight was observed in the presence of maternal toxicity (reduced weight gain). At 1 500 ppm, teratogenicity, embryotoxicity and fetotoxicity were observed in the presence of severe maternal toxicity (44% mortality and clinical observations). Rats were continuously exposed to approximately 120, 200 or 400 ppm (cited as 600, 1 000 or 2 000 mg/m³) Aromatol on days 7-15 of pregnancy. A significant increase in foetal skeletal retardation was observed at all exposures. Foetal weight was retarded at 200 or 400 ppm and overall malformations were increased at 400 ppm. Toxic effects in the mothers were described as slight and dose-dependant. The authors of this paper and authors of a subsequent review indicate that no significant effects were observed in rat offspring at the low dose. Rats were exposed to 0, 120, 200 or 400 ppm (cited as 600, 1 000 or 2 000 mg/m³) Aromatol during days 7-15 of pregnancy with subsequent behavioural evaluation of the pups. No effects were observed in the behavioural parameters evaluated, birth weight, postnatal weight gain or survival or nervous system development. Mice exposed continuously to approximately 100 ppm (500 mg/m³) on days 6-15 of pregnancy showed embryotoxicity (post-implantation loss) and an increase in overall malformations. There was no evaluation of maternal toxicity. (1)

SECTION XII: ECOLOGICAL INFORMATION

ENVIRONMENTAL EFFECTS

Do not allow product or runoff from fire control to enter storm or sanitary sewers, lakes, rivers, streams, or public waterways. Block off drains and ditches. Provincial regulations and federal regulations may require that environmental and / or other agencies be notified of a spill incident. Spill area must be cleaned and restored to original condition or to the satisfaction of authorities. May be harmful to aquatic life.

SECTION XIII: DISPOSAL CONSIDERATIONS

WASTE DISPOSAL

Consult local, state, provincial or territory authorities to know disposal methods.

SECTION XIV: TRANSPORT INFORMATION

CLASSIFICATION: Class 3

IDENTIFICATION NUMBER: UN 1263

SHIPPING NAME: Paint

PACKING GROUP: III

CONTAINERS FOLLOW THE STANDARDS.

Classification based on Section V of this document

SECTION XV: REGULATORY INFORMATION

AICS: All the ingredients of this product are on the Australian Inventory of Chemical Substances.

SECTION XVI: OTHER INFORMATION

GLOSSARY

ACGIH: American Conference of Governmental Industrial Hygienists

ADG: Australian Dangerous Goods

AICS: All the ingredients of this product are on the Australian Inventory of Chemical Substances.

CAS: Chemical Abstract Services

GHS: Globally Harmonized System

IARC: International Agency for Research on Cancer

LD₅₀/LC₅₀: Less high lethal dose and lethal concentration published

NIOSH: National Institute for Occupational Safety and Health

TLV-TWA: Threshold Limit Value – Time-Weighted Average

WHS: Work Health and Safety (Australia)

Reference:

- (1) CHEMINFO (2015) Canadian Centre for Occupational Health and Safety, Hamilton (Ontario) Canada
- (2) Safety Data Sheet of the supplier

Code of SDS: CA U DRU SS FS 123

For more information: +61 2 8051 3153

Justification of the update:

- GHS format.

To the best of our knowledge, the information contained herein is accurate. However, neither the above named supplier nor any of its subsidiaries assumes any liability whatsoever for the accuracy of completeness of the information contained herein. Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

Toluene: Toluene does cause developmental effects in animals, based on fetotoxicity (reduced foetal weight), behavioural effects (effects on learning and memory) and hearing loss (in males) observed in the offspring of rats exposed by inhalation to 1 200 or 1 800 ppm toluene. These effects were observed in the absence of maternal toxicity. Rats (16/group) were exposed to 1 800 ppm of toluene or clean air on days 7-20 of pregnancy. The dose was targeted so as not to induce marked toxicity in the mothers and no toxicity was seen. Fetotoxicity, as evidenced by reduced birth weight, was observed in the offspring. (1)

PGMEA, TDI: No information available.

REPRODUCTIVE TOXICITY

Light aromatic solvent naphtha: A three-generation study showed no consistent effects on reproductive parameters in rats despite significant toxicity. Rats were exposed to 0, 100, 500 or 1 500 ppm in a three-generation study. The first generation (F0) was exposed for 10 weeks with exposure continuing during a 2-week mating period. Females were then exposed on days 0-20 of pregnancy and allowed to deliver their litters with exposure beginning again on post-natal day 5 until weaning. One week after weaning, rats in the second generation (F1) were exposed for 10 weeks and then were mated. Immediately after weaning the third generation (F2) began exposure. The majority of F2 pups in the high dose group died during the first week of exposure. Most fertility indices were not affected for any generation despite significant parental toxicity at 500 ppm and above. Those indices that were affected (e.g. reduced male fertility and reduced litter size in F1 at 1500 ppm) occurred at toxic doses, did not show a dose-response relationship and did not appear in other generations. (1)

Toluene: No adverse effects on reproduction were observed in several studies on both rats and mice, even at maternally toxic exposures. Two generations of mice exposed intermittently by inhalation to 2000 ppm

PGMEA: No information available.

MUTAGENICITY

Light aromatic solvent naphtha: Negative results were observed in the bone marrow cytogenicity test following inhalation exposure of rats to 150, 500 or 1 500 ppm for 5 days, despite evidence of toxicity (reduced body weight gain) in the animals. Negative results were obtained in cultured mammalian cells (the CHO/HGPRT forward mutation assay, and sister chromatid exchanges and chromosomal aberration in CHO cells), with or without metabolic activation. Negative results were obtained in a gene mutation assay, both with and without metabolic activation, at exposure levels that were toxic to some of the bacteria strains tested. (1)

Toluene: There is insufficient information available to conclude that toluene is mutagenic. There is some evidence that toluene can cause chromosome damage in vivo when administered to mice by injection, although conflicting results have been obtained and this route of exposure is not considered relevant to occupational situations. Negative results were obtained following oral administration. There is one report of positive results (chromosomal aberrations) in the bone marrow cells of rats exposed by inhalation. Insufficient details are available in English to evaluate this report. Positive and negative results have been obtained in tests using cultured mammalian cells. Negative results have been obtained in tests using bacteria. Positive and negative results have been obtained in fruit flies. (1)

Tris(nonylphenyl)phosphite: This material was not mutagenic in an Ames bacterial assay. (2)

TDI: Production-grade TDI (80:20 mixture) gave negative results in the in vivo mouse and rat white blood cell micronucleus test (exposure to 0.05 or 0.15 ppm TDI for 4 weeks. Negative results were obtained for the 80:20 mixture in cultured mammalian cells. There are conflicting reports in bacterial tests. (1)

PGMEA: No information available.