SAFETY DATA SHEET

1. Identification

Covestro LLC
1 Covestro Circle
Pittsburgh, PA 15205
USA

TRANSPORTATION EMERGENCY
CALL CHEMTREC: (800) 424-9300
INTERNATIONAL: (703) 527-3887

NON-TRANSPORTATION
Emergency Phone: Call Chemtrec
Information Phone: (844) 646-0545

Product Name: DESMODUR RFE
Material Number: 04047842
Chemical Family: Isocyanate
Use: Raw material for coatings, adhesives, sealants, or elastomers in industrial applications
Restrictions on use: Do-It-Yourself Applications

2. Hazards Identification

GHS Classification
Flammable liquids: Category 2
Specific target organ toxicity - single exposure: Category 3 (Respiratory system, Central nervous system)

GHS Label Elements
Hazard pictograms:

Signal word: Danger

Hazard statements:
Highly flammable liquid and vapour.
May cause respiratory irritation.
May cause drowsiness or dizziness.

Precautionary statements:
Prevention:
Keep away from heat, sparks, open flames, and hot surfaces. - No smoking
Keep container tightly closed.
Ground/bond container and receiving equipment.
Use explosion-proof electrical, ventilating and lighting equipment.
Use only non-sparking tools.
Take precautionary measures against static discharge.

Avoid breathing dust, mist, gas, vapors or spray.
Use only outdoors or in a well-ventilated area.
Wear permeation resistant protective gloves and clothing. Wear eye and face protection.

Response:

IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.
IF INHALED: Remove person to fresh air and keep at rest in a position comfortable for breathing.
Call a doctor or emergency medical facility (i.e. 911) if you feel unwell.
In case of fire: Use dry chemical, carbon dioxide (CO2), foam, or water spray (for large fires) to extinguish.

Storage:

Store in a well-ventilated place. Keep cool.
Store locked up.

Disposal:

Dispose of contents and container in accordance with existing federal, state, and local environmental control laws.

3. Composition/Information on Ingredients

Hazardous Components

Weight Percent	Components	CAS-No.
60 - 100%	Ethyl Acetate	141-78-6
15 - 40%	Tris(4-Isocyanatophenyl) Thiophosphate	4151-51-3
1 - 5%	Monochlorobenzene	108-90-7

The specific chemical identity and/or exact percentage of component(s) have been withheld as a trade secret.

4. First Aid Measures

Most Important Symptom(s)/Effect(s)

Acute: Isocyanate vapors or mist at concentrations above the exposure limits or guidelines can irritate (burning sensation) the mucous membranes in the respiratory tract (nose, throat, lungs) with symptoms of runny nose, sore throat, coughing, chest discomfort, shortness of breath and reduced lung function (breathing difficulty). Persons with a preexisting, nonspecific bronchial hyperreactivity can respond to concentrations below the exposure limits or guidelines with similar symptoms as well as asthma attack or asthma-like symptoms. Exposure well above the exposure limits or guidelines may lead to bronchitis, bronchial spasm and pulmonary edema (fluid in lungs). Chemical or hypersensitivity pneumonitis, with flu-like symptoms (e.g. fever, chills), has also been reported. These symptoms can be delayed up to several hours after exposure. These effects are usually reversible.

May cause skin irritation with symptoms of reddening, itching, and swelling. Can cause sensitization. Persons previously sensitized can experience allergic skin reaction with symptoms of reddening, itching, swelling, and rash. Cured material is difficult to remove.

May cause eye irritation with symptoms of reddening, tearing, stinging, and swelling. May cause temporary corneal injury. Vapor or aerosol may cause irritation with symptoms of burning and tearing.

May cause irritation of the digestive tract; Symptoms may include abdominal pain, nausea, vomiting, and diarrhea.
,Inhalation of the solvents may cause central nervous system depression with symptoms of nausea, lightheadedness, drowsiness, dizziness and loss of co-ordination.,May cause defatting of the skin with symptoms of dryness and cracking.
Delayed: Symptoms affecting the respiratory tract can also occur several hours after overexposure.

Eye Contact
In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Use lukewarm water if possible. Use fingers to ensure that eyelids are separated and that the eye is being irrigated. Then remove contact lenses, if easily removable, and continue eye irrigation for not less than 15 minutes. Get medical attention if irritation develops.

Skin Contact
If direct skin contact with isocyanates occurs, immediately remove contaminated clothing and shoes. Wipe off the isocyanate product from the skin using dry towels or other similar absorbent fabric. If readily available, apply a polyglycol-based cleanser (e.g. Colorimetric Laboratories, Inc. (CLI) D-TAM™ Skin Cleanser) or corn oil. Wash with soap and warm water and pat dry. If a polyglycol-based cleanser is not available, wash with soap and warm water for 15 minutes. If available, use a wipe test pad to verify decontamination is complete (e.g. CLI SWYPE™). Get medical attention if irritation develops. Discard or wash contaminated clothing before reuse.

Inhalation
Move to an area free from further exposure. Extreme asthmatic reactions that may occur in sensitized persons can be life threatening. Get medical attention immediately. Administer oxygen or artificial respiration as needed. Asthmatic symptoms may develop and may be immediate or delayed up to several hours.

Ingestion
Do NOT induce vomiting. Wash mouth out with water. Do not give anything by mouth to an unconscious person. Get medical attention.

Notes to Physician
Eyes: Stain for evidence of corneal injury. If cornea is burned, instill antibiotic/steroid preparation as needed. Workplace vapors could produce reversible corneal epithelial edema impairing vision. Skin: This compound is a skin sensitizer. Treat symptomatically as for contact dermatitis or thermal burn. Ingestion: Treat symptomatically. There is no specific antidote. Inducing vomiting is contraindicated because of the irritating nature of the compound. Inhalation: Treatment is essentially symptomatic. An individual having a dermal or pulmonary sensitization reaction to this material should be removed from further exposure to any diisocyanate.

5. Firefighting Measures

Suitable Extinguishing Media: Dry chemical, Carbon dioxide (CO2), Foam, water spray for large fires.

Unsuitable Extinguishing Media: High volume water jet

Fire Fighting Procedure
Firefighters should wear NFPA compliant structural firefighting protective equipment, including self-contained breathing apparatus and NFPA compliant helmet, hood, boots and gloves. Avoid contact with product. Decontaminate equipment and protective clothing prior to reuse. During a fire, isocyanate vapors and other irritating, highly toxic gases may be generated by thermal decomposition or combustion.

Hazardous Decomposition Products
By Fire and High Heat: Carbon dioxide (CO2), carbon monoxide (CO), oxides of nitrogen (NOx), dense black smoke., Hydrogen cyanide, Isocyanate, Isocyanic Acid, Other undetermined compounds

Unusual Fire/Explosion Hazards
Closed container may forcibly rupture under extreme heat or when contents are contaminated with water (CO2 formed). Use cold-water spray to cool fire-exposed containers to minimize the risk of rupture. Large fires can be extinguished with large volumes of water applied from a safe distance, since reaction between water and hot diisocyanate can be vigorous. Flammable Liquid. Vapors may spread long distances and ignite. Vapors or mist may be a fire and explosion hazard when exposed to high temperature or ignition. Vapors are heavier than air and may travel a considerable distance to a source of ignition and flashback. Vapors or fumes may form explosive mixture with air.

6. Accidental Release Measures

Spill and Leak Procedures
Implement site emergency response plan. Evacuate non-emergency personnel. The magnitude of the evacuation depends upon the quantity released, site conditions, and the ambient temperature. Isolate the area and prevent access of unauthorized personnel. Notify management. Call CHEMTREC at 1-800-424-9300 for assistance and advice.

Wear necessary personal protective equipment (PPE) as specified in the SDS or the site emergency response plan. Ventilate and remove ignition sources. Control the source of the leak. Contain the released material by damming, diking, retaining, or diverting into an appropriate containment area. Absorb or pump off as much of the spilled material as possible. When using absorbent, completely cover the spill area with suitable absorbent material (e.g., vermiculite, kitty litter, Oil-Dri®, etc…). Allow for the absorbent material to absorb the spilled liquid. Shovel the absorbent material into an approved metal container (i.e., 55-gallon salvage drum). Do not fill the container more than 2/3 full to allow for expansion, and do not tighten the lid on the container. Repeat application of absorbent material until all liquid has been removed from the surface. For spills involving a solid product, remove mechanically (sweep up, vacuum, shovel etc.) and collect and place into an approved metal container.

Decontaminate the spill surface area using a neutralization solution (see list of solutions on the SDS); scrubbing the surface with a broom or brush helps the decontamination solution to penetrate into porous surfaces. Wait at least 15 minutes after first application of the neutralization solution. Cover the area with absorbent material and shovel this into an approved metal container. Residual surface contamination can be checked using a wipe test pad to verify decontamination is complete (e.g. CLI Surface Swype™). If the wipe test pad demonstrates that isocyanate remains on the surface (red color on pad), repeat applications of neutralization solution, with scrubbing, followed by absorbent until the surface is decontaminated (no color change on wipe pad). Apply lid loosely to metal waste container (do not tighten the lid because carbon dioxide gas and heat can be generated from the neutralization process). With the lid still loosely in place, move the container to an isolated, well-ventilated area to allow release of carbon dioxide. After 72 hours, seal the container, and properly dispose of the waste material and any contaminated equipment (i.e., broom or brush) in accordance with existing federal, state and local regulations.

Additional Spill Procedures/Neutralization
Products or product mixtures that have been shown to be effective neutralization solutions for decontaminating surfaces, tools, or equipment that have been in contact with an isocyanate include, but are not limited to:

·Colorimetric Laboratories, Inc. (CLI): 1-847-803-3737
o Isocyanate Decontamination Solution

·Spartan Chemical Company: 1-800-537-8990
  o Spartan® ShineLine Emulsifier Plus (stripping solution)
  o Spartan® SC-200 Heavy Duty Cleaner
·ZEP Commercial Heavy Duty Floor Stripper
·A mixture of 90% water, 10% non-ionic surfactant (e.g. Plurafac SL-62, Tergitol TMN-10)
·A mixture of 75% water, 20% non-ionic surfactant, and 5% n-propanol
·A mixture of 80% water, 10% non-ionic surfactant, 5% isopropanol, 5% ammonium hydroxide (household ammonia)

For more information about neutralization solutions, please refer to spill cleanup and neutralization information available on Covestro's Product Safety First website. www.productsafetyfirst.covestro.com
Note: Always wear proper PPE when cleaning up an isocyanate spill or when decontaminating surfaces, tools, or equipment using a neutralization solution. It may take two or more applications of the neutralization solution to decontaminate the surface. Residual surface contamination can be checked using a surface wipe method such as the CLI Swype™ pad.

7. Handling and Storage

Handling/Storage Precautions
Do not breathe vapors, mists, or dusts. Use adequate ventilation to keep airborne isocyanate levels below the exposure limits. Wear respiratory protection if material is heated, sprayed, used in a confined space, or if the exposure limit is exceeded. Warning properties (irritation of the eyes, nose and throat or odor) are not adequate to prevent overexposure from inhalation. This material can produce asthmatic sensitization upon either single inhalation exposure to a relatively high concentration or upon repeated inhalation exposures to lower concentrations. Individuals with lung or breathing problems or prior allergic reactions to isocyanates must not be exposed to vapor or spray mist. Avoid contact with skin and eyes. Wear appropriate eye and skin protection. Wash thoroughly after handling. Do not breathe smoke and gases created by overheating or burning this material. Decomposition products can be highly toxic and irritating. Store in tightly closed containers to prevent moisture contamination. Do not reseal if contamination is suspected. Ground and bond containers and equipment before transferring to avoid static sparks.

Storage Period:
12 Months: after receipt of material by customer

Storage Temperature
Maximum: 30 °C (86 °F)

Storage Conditions
Store separate from food products.

Employee education and training in the safe use and handling of this product are required under the OSHA Hazard Communication Standard 29 CFR 1910.1200.

Substances to Avoid
Water, Amines, Strong bases, Alcohols, Copper alloys

8. Exposure Controls/Personal Protection

The recommendations in this section should not be a substitute for a personal protective equipment (PPE) assessment performed by the employer as required by 29 CFR 1910 Subpart I.

Exposure Limits

Ethyl Acetate (141-78-6**)**

US. ACGIH Threshold Limit Values
Time weighted average 400 ppm

US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)
Permissible exposure limit 400 ppm, 1,400 mg/m3

Monochlorobenzene (108-90-7**)**

US. ACGIH Threshold Limit Values
Time weighted average 10 ppm

US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)
Permissible exposure limit 75 ppm, 350 mg/m3

US. ACGIH Threshold Limit Values
Hazard Designation: Group A3 Confirmed animal carcinogen with unknown relevance to humans.

Any component which is listed in section 3 and is not listed in this section does not have a known ACGIH TLV, OSHA PEL or supplier recommended occupational exposure limit.

Industrial Hygiene/Ventilation Measures

Local exhaust should be used to maintain levels below the exposure standards or guidelines whenever this product is heated, sprayed, or aerosolized. Standard reference sources regarding industrial ventilation (e.g., ACGIH Industrial Ventilation Manual) should be consulted for guidance about adequate ventilation. To ensure that published exposure limits have not been exceeded, monitoring for airborne isocyanate should become part of the overall employee exposure characterization program. NIOSH, OSHA, Covestro, and others have developed sampling and analytical methods. Covestro methods can be made available, upon request.

Respiratory Protection

Airborne concentrations greater than the exposure standards or guidelines can occur in inadequately ventilated environments when this product is sprayed, aerosolized, or heated. In such cases, respiratory protection must be worn. The type of respiratory protection selected must comply with the requirements set forth in OSHA's Respiratory Protection Standard (29 CFR 1910.134). The type of respiratory protections available includes (1) an atmosphere-supplying respirator such as a self-contained breathing apparatus (SCBA) or a supplied air respirator (SAR) in the positive pressure or continuous flow mode, or (2) an air-purifying respirator (APR). If an APR is selected then (a) the cartridge must be equipped with an end-of-service life indicator (ESLI) certified by NIOSH, or (b) a change out schedule, based on objective information or data that will ensure that the cartridges are changed out before the end of their service life, must be developed and implemented. The basis for the change out schedule must be described in the written respirator program. Further, if an APR is selected, the airborne isocyanate concentration must be no greater than 10 times the exposure standards or guidelines. The recommended APR cartridge is an organic vapor/particulate filter combination cartridge (OV/P100).

Hand Protection

Ensure gloves remain in good condition during use and replace if any deterioration is observed.

Gloves should be worn. For protection from isocyanates, nitrile rubber, butyl rubber, or neoprene gloves are recommended. For protection from solvents in this product, nitrile rubber gloves may be appropriate, but a personal protective equipment (PPE) assessment should be performed by the employer.

Eye Protection

When handling liquid product, chemical goggles should be worn., Chemical safety goggles in combination with a full face shield if a splash hazard exists.

Skin Protection
Avoid all skin contact. Depending on the conditions of use, cover as much of the exposed skin area as possible with appropriate clothing to prevent skin contact., Gloves, long sleeved shirts and pants.

Medical Surveillance
All applicants who are assigned to an isocyanate work area should undergo a pre-placement medical evaluation. A history of eczema or respiratory allergies such as hay fever, are possible reasons for medical exclusion from isocyanate areas. Applicants who have a history of adult asthma should be restricted from work with isocyanates. Applicants with a history of prior isocyanate sensitization should be excluded from further work with isocyanates. A comprehensive annual medical surveillance program should be instituted for all employees who are potentially exposed to diisocyanates. Once a worker has been diagnosed as sensitized to any isocyanate, no further exposure can be permitted. Refer to the Covestro pamphlet (Medical Surveillance Program for Isocyanate Workers) for additional guidance.

Additional Protective Measures
Emergency showers and eye wash stations should be available. Educate and train employees in the safe use and handling of this product. Follow all label instructions.

9. Physical and Chemical Properties

State of Matter:	liquid
Color:	Yellow to brown
Odor:	ester-like
Odor Threshold:	No Data Available
pH:	No Data Available
Freezing Point:	No Data Available
Setting Point:	No Data Available
Melting Point:	No Data Available
Boiling Point:	ca. 77 °C (170.6 °F) @ 1,013 hPa
Flash Point:	ca. -4 °C (24.8 °F) (DIN 51755)
Evaporation Rate:	No Data Available
Lower explosion limit:	No Data Available
Upper Explosion Limit:	No Data Available
Vapor Pressure:	Approximately 97 hPa @ 20 °C (68 °F)
Vapor Density:	No Data Available
Density:	ca. 1 g/cm³ @ 20 °C (68 °F) (DIN 53217)
Relative Vapor Density:	No Data Available
Specific Gravity:	No Data Available
Solubility in Water:	Insoluble - Reacts slowly with water to liberate CO2 gas
Partition Coefficient: n-octanol/water:	No Data Available
Auto-ignition Temperature:	ca. 460 °C (860 °F)
Decomposition Temperature:	No decomposition below initial boiling point.
Dynamic Viscosity:	ca. 3 mPa.s @ 20 °C (68 °F) (DIN 53019)
Kinematic Viscosity:	No Data Available
Bulk Density:	Approximately 999.95 kg/m3 @ 20 °C (68 °F)
Self Ignition:	not applicable

10. Stability and Reactivity

Hazardous Reactions
Contact with moisture, other materials that react with isocyanates, or temperatures above 350 F (177 C), may cause polymerization

Stability
Stable under normal conditions of use and storage.

Materials to Avoid
Water, Amines, Strong bases, Alcohols, Copper alloys

Conditions to Avoid
Heat, flames and sparks.

Hazardous Decomposition Products
By Fire and High Heat: Carbon dioxide (CO2), carbon monoxide (CO), oxides of nitrogen (NOx), dense black smoke., Hydrogen cyanide, Isocyanate, Isocyanic Acid, Other undetermined compounds

11. Toxicological Information

Likely Routes of Exposure: Skin Contact
Inhalation
Eye Contact

Health Effects and Symptoms

Acute: Isocyanate vapors or mist at concentrations above the exposure limits or guidelines can irritate (burning sensation) the mucous membranes in the respiratory tract (nose, throat, lungs) with symptoms of runny nose, sore throat, coughing, chest discomfort, shortness of breath and reduced lung function (breathing difficulty). Persons with a preexisting, nonspecific bronchial hyperreactivity can respond to concentrations below the exposure limits or guidelines with similar symptoms as well as asthma attack or asthma-like symptoms. Exposure well above the exposure limits or guidelines may lead to bronchitis, bronchial spasm and pulmonary edema (fluid in lungs). Chemical or hypersensitivity pneumonitis, with flu-like symptoms (e.g. fever, chills), has also been reported. These symptoms can be delayed up to several hours after exposure. These effects are usually reversible.

May cause skin irritation with symptoms of reddening, itching, and swelling. Can cause sensitization. Persons previously sensitized can experience allergic skin reaction with symptoms of reddening, itching, swelling, and rash. Cured material is difficult to remove.

May cause eye irritation with symptoms of reddening, tearing, stinging, and swelling. May cause temporary corneal injury. Vapor or aerosol may cause irritation with symptoms of burning and tearing.

May cause irritation of the digestive tract; Symptoms may include abdominal pain, nausea, vomiting, and diarrhea.
,Inhalation of the solvents may cause central nervous system depression with symptoms of nausea, lightheadedness, drowsiness, dizziness and loss of co-ordination.,May cause defatting of the skin with symptoms of dryness and cracking.
Chronic: As a result of previous repeated overexposures or a single large dose, certain individuals may develop sensitization to isocyanates (asthma or asthma-like symptoms) that may cause them to react to a later exposure to isocyanates at levels well below the exposure limits or guidelines. These symptoms, which can include chest tightness, wheezing, cough, shortness of breath or asthmatic attack, could be immediate or delayed up to several hours after exposure. Extreme asthmatic reactions can be life threatening. Similar to many non-specific asthmatic responses, there are reports that once sensitized an

individual can experience these symptoms upon exposure to dust, cold air, or other irritants. This increased lung sensitivity can persist for weeks and in severe cases for several years. Sensitization can be permanent.

Prolonged contact with skin can cause reddening, swelling, rash, and, in some cases, skin sensitization. Animal tests and other research indicate that skin contact with isocyanates can play a role in causing isocyanate sensitization and respiratory reaction. This data reinforces the need to prevent direct skin contact with isocyanates.

Prolonged vapor contact with the eyes may cause conjunctivitis.
,Reports have associated repeated and prolonged occupational overexposure to solvents with permanent brain and nervous system damage. Intentional misuse by deliberately concentrating and inhaling solvents may be harmful or fatal.
Delayed: Symptoms affecting the respiratory tract can also occur several hours after overexposure.

Toxicity Data for: DESMODUR RFE

Data is based on the product.

Acute Oral Toxicity
LD50: > 2,000 mg/kg (rat)

Acute Inhalation Toxicity
Acute toxicity estimate: > 10 mg/l, 4 h, dust/mist (Calculation method)

Skin Irritation
rabbit, OECD Test Guideline 404, slight irritant
Toxicological studies at the product

Eye Irritation
rabbit, OECD Test Guideline 405, slight irritant
Toxicological studies at the product

Sensitization
Skin sensitisation according to Buehler (epicutaneous test):: negative (Guinea pig, OECD Test Guideline 406)
Toxicological studies at the product

Mutagenicity
Genetic Toxicity in Vitro:
Salmonella/microsome test (Ames test): No indication of mutagenic effects.
Studies at the product.
Micronucleus test: negative (Chinese hamster V79 cell line, Metabolic Activation: with/without)
Studies at the product.
Point mutation in mammalian cells (HPRT test): negative (Chinese hamster V79 cell line, Metabolic Activation: with/without)
Studies at the product.

Toxicity Data for: Ethyl Acetate

Acute Oral Toxicity
LD50: 4,934 mg/kg (rabbit, male/female) (OECD Test Guideline 401)

Acute Inhalation Toxicity
LC50: 4,000 ppm, 4 h, aerosol (rat)

Acute Dermal Toxicity
LD50: > 20,000 mg/kg (rabbit, male)

Skin Irritation
rabbit, Non-irritating

Eye Irritation
Human, irritating

Sensitization
dermal: non-sensitizer (Guinea pig, Magnusson/Kligmann (Maximization Test))

Skin sensitisation according to Magnusson/Kligmann (maximizing test):: negative (Guinea pig, OECD Test Guideline 406)

Repeated Dose Toxicity
90 days, inhalation: NOAEL: 0.002 mg/l, (Rat,)

11 weeks, inhalation: NOAEL: 2000 ppm, (Guinea pig,)

Chronic exposure damages the brain and the central nervous system.

13 w, Oral: NOAEL: 900 mg/kg, LOAEL: 3,600 mg/kg, (rat, male/female, daily)

94 days, inhalation: NOAEL: 350 ppm, LOAEL: 750 ppm, (Rat, male/female, 6 hrs/day 5 days/week)

Mutagenicity
Genetic Toxicity in Vitro:
Ames: negative (Salmonella typhimurium, Metabolic Activation: with/without)
Positive and negative results were seen in various in vitro studies.
Chromosome aberration test: negative (Chinese hamster ovary (CHO) cells, Metabolic Activation: with/without)
Positive and negative results were seen in various in vitro studies.

Genetic Toxicity in Vivo:
Micronucleus Assay: negative (Mouse,)
negative

Micronucleus Assay: negative (hamster, male/female, Oral)
negative

Carcinogenicity
Mouse, Male/Female, intraperitoneal, 8 weeksDid not show carcinogenic effects in animal experiments.

Developmental Toxicity/Teratogenicity
rat, female, Inhalative, GD 1-19, 7 hrs/day, NOAEL (teratogenicity): 20000 ppm, NOAEL (maternal): 16000 ppm Studies of a comparable product.

Other Relevant Toxicity Information
May cause drowsiness or dizziness.

May cause irritation of respiratory tract.

Toxicity Data for: Tris(4-Isocyanatophenyl) Thiophosphate

Toxicity Note
Data is based on the product, including residual monomer and solvent.

Acute Oral Toxicity
LD50: > 675 mg/kg (rat) (OECD Test Guideline 423)

Acute Inhalation Toxicity
LC50: 5.721 mg/l, 4 h, dust/mist (rat, male) (OECD Test Guideline 403)

Skin Irritation
rabbit, OECD Test Guideline 404, slight irritant
Toxicological studies at the product containing solvent.

Eye Irritation
rabbit, OECD Test Guideline 405, slight irritant
Toxicological studies at the product containing solvent.

Sensitization
Skin sensitisation according to Buehler (epicutaneous test):: negative (Guinea pig, OECD Test Guideline 406)
Toxicological studies at the product containing solvent.

Repeated Dose Toxicity
28 d, Inhalative: NOAEL: 2.8 mg/m3, (rat, male/female, (6 hours a day, 5 days a week))

Mutagenicity
Genetic Toxicity in Vitro:
Salmonella/microsome test (Ames test): No indication of mutagenic effects.
Toxicological studies at the product containing solvent.
Point mutation in mammalian cells (HPRT test): negative (Chinese hamster V79 cell line, Metabolic Activation: with/without)
Toxicological studies at the product containing solvent.
Micronucleus test: negative (Chinese hamster V79 cell line, Metabolic Activation: with/without)
Toxicological studies at the product containing solvent.

Toxicity Data for: Monochlorobenzene

Acute Oral Toxicity
LD50: > 2,000 mg/kg (rat, male/female) (OECD Test Guideline 401)

Acute Inhalation Toxicity
LC50: 20.85 mg/l, 4 h, vapour (rat, male)
4 hour test is calculated.

Acute Dermal Toxicity
LD50: > 7,940 mg/kg (rabbit, male/female)

Skin Irritation
rabbit, OECD Test Guideline 404, Exposure Time: 4 h, irritating

Eye Irritation
rabbit, OECD Test Guideline 405, Non-irritating

Sensitization
dermal: non-sensitizer (Guinea pig, Magnusson/Kligmann (Maximization Test))

Skin sensitization (local lymph node assay (LLNA)):: negative (Mouse, OECD Test Guideline 429)

Repeated Dose Toxicity
24 Weeks, inhalation: NOAEL: < 75 ppm, (Rat)

168 Days, inhalation: NOAEL: < 75 ppm, (rabbit)

13 Weeks, Oral: NOAEL: 125 mg/kg, LOAEL: 250 mg/kg, (Rat, male/female, 5 days/week)

Mutagenicity
Genetic Toxicity in Vitro:
Ames: negative
Chromosome aberration test: negative (Chinese hamster ovary (CHO) cells, Metabolic Activation: with/without)

Genetic Toxicity in Vivo:
Micronucleus Assay: negative (Mouse, male, intraperitoneal)
negative

Carcinogenicity
Rat, male/female, oral, 2 Years, 5 times/week ambiguousMouse, oral, 2 Yearsnegative

Toxicity to Reproduction/Fertility
Two generation study, inhalation, 6 hrs/day 7 days/week, (Rat, Male/Female) NOAEL (F1): > 450 ppm, NOAEL (F2): 50 ppm No effects on Reproductive parameters observed at doses tested.Two generation study, inhalation, 6 hrs/day 7 days/week, (Rat, Male/Female)

Developmental Toxicity/Teratogenicity
Rat, inhalation, 6 hrs/day 7 days/week, NOAEL (teratogenicity): 590 ppm, No Teratogenic effects observed at doses tested.rabbit, female, inhalation, gestation, 6 hrs/day 7 days/week, NOAEL (teratogenicity): > 590 ppm, NOAEL (maternal): > 590 ppm

Carcinogenicity:
No carcinogenic substances as defined by IARC, NTP and/or OSHA

12. Ecological Information

Ecological Data for: DESMODUR RFE

Data is based on the product.

Acute and Prolonged Toxicity to Fish
(Danio rerio (zebra fish), 96 h)
No toxic effects with saturated solution.

Acute Toxicity to Aquatic Invertebrates
(Daphnia magna (Water flea), 48 h)
No toxic effects with saturated solution.

Toxicity to Aquatic Plants
(scenedesmus subspicatus,72 h)
No toxic effects with saturated solution.

Toxicity to Microorganisms

EC50: > 10,000 mg/l, (activated sludge)

Ecological Data for Ethyl Acetate
Biodegradation
Aerobic, 100 %, Exposure time: 28 Days

Biochemical Oxygen Demand (BOD)
293 mg/g

Chemical Oxygen Demand (COD)
1,816 mg/g

Theoretical Biological Oxygen Demand (ThBOD)
1,820 mg/g

Bioaccumulation
Leuciscus idus (Golden orfe), Exposure time: 3 d, 30 BCF

Acute and Prolonged Toxicity to Fish
LC50: 270 - 333 mg/l (Golden orfe (Leuciscus idus), 96 h)

LC50: 484 mg/l (Rainbow (Donaldson)Trout (Oncorhynchus mykiss), 96 h)

LC50: 230 mg/l (Fathead minnow (Pimephales promelas), 96 h)

Acute Toxicity to Aquatic Invertebrates
EC50: 717 mg/l (Water flea (Daphnia magna), 48 h)

EC50: Approximately 3,090 mg/l (Water flea (Daphnia magna), 48 h)

Toxicity to Aquatic Plants
3,300 mg/l, End Point: biomass (Green algae (Scenedesmus subspicatus), 48 h)

EC50: 2,000 mg/l, (Green algae (Selenastrum capricornutum), 96 h)

Toxicity to Microorganisms
EC50: 5,870 mg/l, (Photobacterium phosphoreum, 15 min)

EC0: 650 mg/l, (Pseudomonas putida, 16 h)

Ecological Data for Tris(4-Isocyanatophenyl) Thiophosphate
Biodegradation
aerobic, 58.2 %, Exposure time: 28 d, i.e. not readily degradable

Acute and Prolonged Toxicity to Fish
No toxic effects with saturated solution.: (Danio rerio (zebra fish), 96 h)
Studies at the product containing solvent

Acute Toxicity to Aquatic Invertebrates
No toxic effects with saturated solution.: (Daphnia magna (Water flea), 48 h)
Studies at the product containing solvent

Toxicity to Aquatic Plants
No toxic effects with saturated solution.: (Desmodesmus subspicatus (Green algae), 72 h)
Studies at the product containing solvent

Toxicity to Microorganisms
EC50: > 10,000 mg/l, (activated sludge, 3 h)
Studies at the product containing solvent

Ecological Data for Monochlorobenzene
Biodegradation
15 %, Exposure time: 28 d, i.e. not readily degradable

Biochemical Oxygen Demand (BOD)
55 %

Bioaccumulation
3.9 - 40 BCF

Acute and Prolonged Toxicity to Fish
LC50: Approximately 16 mg/l (Bluegill (Lepomis macrochirus), 96 h)

LC50: 7.4 mg/l (Bluegill (Lepomis macrochirus), 96 h)

LC50: 10 mg/l (Sheepshead minnow (Cyprinodon variegatus), 96 h)

Acute Toxicity to Aquatic Invertebrates
EC50: 19.9 mg/l (Water flea (Daphnia magna), 48 h)

Toxicity to Aquatic Plants
IC50: 12.5 mg/l, (Pseudokirchneriella subcapitata (green algae), 96 h)

NOEC: 3.3 mg/l, (Desmodesmus subspicatus (Green algae), 72 h)

Toxicity to Microorganisms
EC50: 140 mg/l, (Activated sludge microorganisms, 30 min)

13. Disposal Considerations

Waste Disposal Method
Waste disposal should be in accordance with existing federal, state and local environmental control laws. Incineration is the preferred method.

Empty Container Precautions
Empty containers retain product residue; observe all precautions for product. Do not heat or cut empty container with electric or gas torch because highly toxic vapors and gases are formed. Do not reuse without thorough commercial cleaning and reconditioning.

14. Transportation Information

Land transport (DOT)

Proper Shipping Name:	Ethyl acetate solution
Hazard Class or Division:	3
UN/NA Number:	UN1173
Packaging Group:	II
Hazard Label(s):	FLAMMABLE LIQUID

RSPA/DOT Regulated Components:

Ethyl Acetate
Monochlorobenzene

Reportable Quantity: 3194 kg (7042 lb)

Sea transport (IMDG)
Proper Shipping Name: ETHYL ACETATE SOLUTION
Hazard Class or Division: 3
UN number: UN1173
Packaging Group: II
Hazard Label(s): FLAMMABLE LIQUIDS

Air transport (ICAO/IATA)
Proper Shipping Name: Ethyl acetate solution
Hazard Class or Division: 3
UN number: UN1173
Packaging Group: II
Hazard Label(s): FLAMMABLE LIQUIDS

15. Regulatory Information

United States Federal Regulations
US. Toxic Substances Control Act: Listed on the TSCA Inventory.

No substances are subject to TSCA 12(b) export notification requirements.
US. EPA CERCLA Hazardous Substances (40 CFR 302) Components:
Ethyl Acetate Reportable quantity: 5000 lbs
Monochlorobenzene Reportable quantity: 100 lbs

SARA Section 311/312 Hazard Categories:
Refer to hazard classification information in Section 2.

US. EPA Emergency Planning and Community Right-To-Know Act (EPCRA) SARA Title III Section 302 Extremely Hazardous Substance (40 CFR 355, Appendix A) Components:
None

US. EPA Emergency Planning and Community Right-To-Know Act (EPCRA) SARA Title III Section 313 Toxic Chemicals (40 CFR 372.65) - Supplier Notification Required Components:
Monochlorobenzene

US. EPA Resource Conservation and Recovery Act (RCRA) Composite List of Hazardous Wastes and Appendix VIII Hazardous Constituents (40 CFR 261):
Under RCRA, it is the responsibility of the person who generates a solid waste, as defined in 40 CFR 261.2, to determine if that waste is a hazardous waste., In its purchased form, this product meets the criteria of ignitability under 40 CFR 261.21(a), and, when discarded in that form, should be managed as a hazardous waste.

State Right-To-Know Information
The following chemicals are specifically listed by individual states; other product specific health and safety data in other sections of the SDS may also be applicable for state requirements. For details on your regulatory requirements you should contact the appropriate agency in your state.

Massachusetts, New Jersey or Pennsylvania Right to Know Substance Lists:

Weight percent	Components	CAS-No.

60 - 100%	Ethyl Acetate	141-78-6
15 - 40%	Tris(4-Isocyanatophenyl) Thiophosphate	4151-51-3
1 - 5%	Monochlorobenzene	108-90-7

New Jersey Environmental Hazardous Substances List and/or New Jersey RTK Special Hazardous Substances Lists:

Weight percent	Components	CAS-No.
60 - 100%	Ethyl Acetate	141-78-6
1 - 5%	Monochlorobenzene	108-90-7

California Proposition 65 List:
None.

CFATS (Chemical Facility Anti-Terrorism Standards) Chemicals
To the best of our knowledge, this product does not contain Appendix A Chemicals of Interest (COI), at or above the Screening Threshold Quantity (STQ), as defined by the Department of Homeland Security Chemical Facility Anti-terrorism Standard (CFATS, 6 CFR Part 27.

Based on information provided by our suppliers, this product is considered "DRC Conflict Free" as defined by the SEC Conflict Minerals Final Rule (Release No. 34-67716; File No. S7-40-10; Date: 2012-08-22).

16. Other Information

The method of hazard communication for Covestro LLC is comprised of product labels and safety data sheets. Safety data sheets for all of our products and general product declarations are available for download at www.productsafetyfirst.covestro.com.

Contact:	Product Safety Department
Telephone:	(412) 413-2835
SDS Number:	112000015160
Version Date:	05/11/2018
SDS Version:	2.8

Information contained in this SDS is believed to be accurate but is furnished without warranty, express or implied, including warranties of merchantability or fitness for a particular purpose. The information relates only to the specific material designated herein. Covestro LLC. assumes no legal responsibility for use of or reliance upon the information in this SDS and such information shall in no case be considered a part of our terms and conditions of sale. The user is responsible for determining whether the Covestro product is suitable for user's method of use or application. Covestro is not liable for any failure to observe the precautionary measures described in this SDS or for any misuse of the product.

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