1. IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

1.1 Product identifier

Product name: U-BOND 400FR

1.2 Relevant identified uses of the substance or mixture and uses advised against

One-component polyurethane adhesive for general bonding.

1.3 Details of the supplier of the safety data sheet

Name: N.P.T. S.r.l.
Full address: Via Guido Rossa,n. 2 – CAP: 40056 – Crespellano (BO)
Telephone number: ++39 051 969109
Fax : ++39 051 969837
E-mail address of the competent person responsible for the SDS: infoSDS@nptsrl.com

1.4 Emergency telephone number:

Telephone number of N.P.T. – Laboratories and manufacturing plant, Gropello Cairoli (PV):
+ +39 0382 815132 (available from Monday to Friday, only in the following office hours: 08:30 to 12:30, 13:30 to 17:00).

2. HAZARDS IDENTIFICATION

2.1 Classification of the mixture

This mixture is classified as dangerous according to EC Directive 1999/45/EC.
Major adverse effects: see sections 9 to 12.

2.2 Label elements

- Risk symbol(s):

- R-phrases: R36/37/38, R40, R42/43, R48/20 (*)
- S-phrases: S23, S36, S45, S60 (*)

Contains isocyanates. See the information submitted by the manufacturer.

(*) See section 16 for full text of R-phrases and S- phrases. (*) See section 16 for full text of R-phrases, H-statements and S-phrases.

2.3 Other hazards

None.

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

N.AV.

3.2 Mixtures

Substances presenting a health or environmental hazard within the meaning of the Dangerous Substances Directive 67/548/EEC or Regulation (EC) No. 1272/2008, assigned a Community workplace exposure limit, classified as PBT/vPvB or included in the Candidate List:

Name	Registration No	CAS No	EINECS No	Class.67/548/CE (**)	Class. CLP (**)	Conc.%
Difenilmethanediisocyanate (mixture isomers) [1] [2]	01-2119480143-45	26447-40-5	247-714-0	Xn, R20, R36/37/38, R40, R42/43, R48/20	H315, H317, H319, H332, H334, H335, H351, H373	10,0 - <25,0

[1] Substance that presents a danger to the environment or health.
[2] Substance with a workplace exposure limit.
[3] PBT-Substance.
[4] vPvB-Substance.
(**)See Section 16 for full text of R-phrases and H-statements.

4. FIRST AID MEASURES

4.1 Description of first aid measures

In all cases of doubt, or when symptoms persist, seek medical attention. Never give anything by mouth to an unconscious person. If unconscious lead in a safe place and seek medical advice. This mixture can cause irritation and /or sensitization of the respiratory system leading to an asthmatic condition, shortness of breath and chest tightness.
Routes of exposure:

- Skin contact: take away contaminated cloths, remove from skin with a cloth or paper and wash with soap and water. Don't use solvents or diluents. If possible, use cleaners that contain polyethylene glycol - PEG.
- Eye contact: remove with a clean cloth and rinse with plenty of water, fresh and clean, with eyelids open for at least 10 minutes. Consult a physician.
- Ingestion: in case of accidental contact with the mouth, rinse with plenty of water. If swallowed, seek medical advice. Do NOT induce vomiting.
- Inhalation: if feeling unwell remove patient to fresh air and keep warm.

4.2 Most important symptoms and effects, both acute and delayed

- Skin contact: Repeated or prolonged skin contact may lead to allergic contact dermatitis or remove the fat of the skin resulting in non-allergic contact dermatitis and absorption through the skin.
- Eye contact: may cause irritation and reversible damage
- Ingestion: N.AV.
- Inhalation: can cause acute irritation and / or sensitization of the respiratory system leading to tightness in the chest, shortness of breath and an asthmatic condition. Sensitised persons may subsequently show asthmatic symptoms when exposed to atmospheric concentrations well below the Occupational Exposure Limit. People with chronic respiratory diseases and allergy sufferers should not be designated for the 'use of this product.

4.3 Indication of any immediate medical attention and special treatment needed

Follow medical orders. See section 4.1

5. FIRE-FIGHTING MEASURES

5.1 Extinguishing media

- Appropriate extinguishing media: water spray, CO_2, foam, powder.
- Information about suitable extinguishing media: preferable 'use of resistant foam' alcohol.
- Extinguishing inappropriate: do not use jets of 'water as it may spread fire.
- Indicate whether certain methods of extinction are inadequate in a specific situation related to substance: none in particular.

5.2 Special hazards arising from the substance or mixture

The fire will produce dense black smoke. Exposure to decomposition products may be harmful to health. The product reacting with water may lead to violent reactions with production of heat and gas.

5.3 Advice for fire-fighters

Use breathing apparatus and protective clothing. Avoid, if possible, the water usage. In the absence of other means of extinguishing only use in spray form. Do not allow water runoff contaminate the sewage.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Isolate the area. Ventilate area where the spill occurred. Wear appropriate personal protective equipment. If exposed to fumes, dust or aerosol exposure wear respiratory system.

6.2 Environmental precautions

None in particular.

6.3 Methods and material for containment and cleaning up

- Recommendations on how to contain a spill: contain spill with absorbent, non-combustible materials.
- Recommendations on how to clean a spill: collect mechanically picking up and place in appropriate containers before you start the disposal of the waste regulation. Contaminated area should be cleaned immediately with a suitable decontaminant.

6.4 Reference to other sections

For information on personal protective equipment and disposal refer to sections 7, 8 and Section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Avoid contact with skin and eyes. Avoid inhalation of vapor and spray mist arising from 'application of this mixture. Smoking, eating and drinking should be prohibited in scope. Comply with the regulations regarding health and safety as provided by law. Do not allow to enter drains or watercourses. See also section 8.

7.2 Conditions for safe storage, including any incompatibilities

Keep containers closed. Protect from water and sources of ignition. For more storage information follow the instructions on the label.

7.3 Specific end use(s)

N.AV. refer to section 1.2.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

4,4' – methylenediphenyl diisocyanate (n° CAS: 101-68-8; n° EC: 202-966-0).
Limit value for occupational exposure:
National (IT):
TLV-TWA = N.AV.
TLV-STEL = N.AV.
ACGIH 2009:
TLV-TWA = 0,005 ppm.
TLV-STEL/C = N.AV.

Biological limit values: N.AV.
DNEL:

Workers (short-term):
Dermal DNEL - systemic effects: 50 mg/kg body weight/day.
Inhalation DNEL - systemic effects: 0,1 mg/m³ air.
Dermal DNEL - local effects: 28,7 mg/cm ².
Inhalation DNEL - local effects: 0,1 mg/m³ air.
Workers (long-term):
Dermal DNEL - systemic effects: N.A.
Inhalation DNEL - systemic effects: 0,05 mg/m³ air.
Dermal DNEL - local effects: N.A.
Inhalation DNEL - local effects: 0,05 mg/m³ air.
PNEC:
Fresh water:> 1 mg/l.Sea water:> 0,1 mg/l.Sediments: N.AP.Soil:> 1 mg/kg Dry weight.Sewage Treatment Plant:> 1 mg/l.
Oral: N.A.

8.2 Exposure controls

Avoid contact with eyes and skin. Avoid inhalation of vapor and aerosol effects of this mixture. Provide adequate ventilation. When reasonably possible, this may be achieved by the use of local exhaust ventilation and good general aspiration. If these measures are not sufficient to maintain concentrations below the occupational exposure limit, must be worn the proper respiratory protection.
Individual protection measures, such as personal protective equipment:
Eye/face protection/face (ref. standard EN 166:2004): use glasses to protect against splash of liquids. Contact lenses should not be worn in case of risk of splashing.
Skin protection: use suitable clothing to avoid contact.
Hand protection: use chemical resistant gloves classified under Standard EN 374: protective gloves against chemicals and micro-organisms. Acceptable PVC or nitrile ones.
Respiratory protection: when exposed to concentrations above the exposure limit (see section 8.1), wear respiratory protection appropriate to isocyanates. If environment is not ventilated using air respirators. In well ventilated areas may be enough a combination of charcoal filter and anti-particulate mask.

9. PHYSICAL AND CHEMICAL PROPERTIES

General information

- Appearance:	liquid
- Odour:	Light Typical
- Odour threshold:	N.AV.

9.1 Information on basic physical and chemical properties

- pH:	N.AP. (undiluted)
- Melting point/freezing point (92/69/EEC, A1):	N.AP.
- Initial boiling point and boiling range (92/69/EEC, A2):	N.AP.
- Flash point:	> 200°C.
- Evaporation rate:	N.AV.
- Flammability (solid, gas):	N.AV.
- Upper/lower flammability or explosive limits:	N.AV.
- Vapour tension:	N.AV.
- Vapour density (air=1):	N.AV.
- Relative density (92/69/EEC, A3):	1,41 g/ml (20°C) [Method: immersed body]
- Solubility in water (92/69/EEC, A6):	Insoluble [Method: preliminary test]
- Solubility in organic solvents:	Complete.
- Partition coefficient: n-octanol/water:	N.AV.
- Auto-ignition temperature:	> 250°C.
- Decomposition temperature:	N.AV.
- Viscosity:	5000-10000 cps (23°C) [Method: plate/cone]
- Explosive properties:	no
- Oxidising properties:	no

9.2 Other information:

- VOC	3,0 g/l.

10. STABILITY AND REACTIVITY

10.1 Reactivity

Reacts slowly with water (humidity) produces carbon dioxide and trun into a rubbery solid.

10.2 Chemical stability

Stable under recommended storage and handling conditions (see section 7).

10.3 Possibility of hazardous reactions

Reacts with oxidizing agents, amines, strong bases, strong acids and alcohols producing heat and CO_2.

10.4 Conditions to avoid

Do not expose to high temperatures or flames because in such randomness can produce hazardous decomposition products. Avoid umidity because the product reacts with water, releasing carbon dioxide which can cause pressure increase and rupture of closed containers.

10.5 Incompatible materials

Oxidizing agents, amines, strong bases, strong acids, alcohols and water.

10.6 Hazardous decomposition products

Isocyanate monomers, carbon monoxide and carbon dioxide, smoke, oxides of nitrogen, etc...

11. TOXICOLOGICAL INFORMATION

There are no data available on the mixture itself. Set out below is the toxicological information relating to the main substances in the mixture.
Hazardous effects to health from exposure to the mixture: see Sections 2 and 4.

11.1 Information on toxicological effects

- *4,4' – methylenediphenyl diisocyanate:*

- Acute toxicity, by oral route: LD50 rat => 2000 mg/kg. Directive 84/449/EEC method B.1 - Tests on comparable product.
- Acute toxicity, dermal toxicity: LD50 rabbit => 9400 mg/kg. Method OECD TG 402 - Tests on similar product.
- Acute inhalation toxicity: LC50 rat = 0,368 mg/l, 4 h,> 2,24 mg/l, 1h. (Atm. dust / mist). Method OECD TG 403 - Substance tested in forms other than commercial and in which is supposed to be used rationally. It therefore justifies a different classification of the acute inhalation toxicity.
- Primary skin irritation: rabbit = irritant, causes skin irritation. Method OECD TG 404 – Tests on comparable product.
- Primary irritations of the mucous membranes: rabbit = non-irritating. Method OECD TG 405 – Tests on comparable product.
- Skin sensitization according to Buehler (skin test): guinea pigs = negative, does not cause skin sensitization. Method OECD TG 406.
- Skin sensitization (LLNA (Local Lymph Node Assay)): mouse = positive. Method OECD TG 429.
- Respiratory sensitization: guinea pigs = positive, may cause sensitization by inhalation.
- Subacute, subchronic and prolonged toxicity: rat NOAEL = 0,2 mg/m^3, 1 mg/m^3LOAEL; irritation to the nasal cavity and lungs. Method OECD TG 453 - Tests on similar product.
- Carcinogenicity: rat (inalativo) = if applicable of tumors in the higher dose (6 mg/m^3). Method OECD TG 453 - Tests on similar product.
- Reproductive toxicity / teratogenicity: rat = NOAEL (teratogenicity) 12 mg/m^3NOAEL (maternal) 4 mg/m^3 NOAEL (developmental toxicity) 4 mg/m^3, did not show teratogenic effects in animal experiments. Method OECD TG 414 – Tests on similar product.
- Genotoxicity in vitro test Salmonella / microsome (Ames test) = negative. Method OECD TG 471 – Tests on comparable product.
- Genotoxicity in vivo micronucleus assay, rat = negative. Method OECD TG 474.
- Specific toxicity in the target organ (single exposure): = inalativo may irritate the respiratory tract.
- Specific toxicity in the target organ (repeated exposure): = inalativo can cause damage to organs in the event of prolonged or repeated exposure.

CMR Rating:
Carcinogenicity: Product is suspected to cause cancer if inhaled (Carc 2).
Mutagenicity: In vitro and in vivo studies showed no mutagenic effects. Based on the dataavailable data, the classification criteria are not met.
Teratogenicity: Did not show teratogenic effects in animal experiments. On the basis ofavailable data, the classification criteria are not met.
Toxicity to reproduction/fertility: Based on the available data, the classification criteria are not satisfied.
Toxicological evaluation:
Acute Effects: harmful if inhaled. The product causes irritation of eyes, skin and mucous membranes.
Sensitization: may cause sensitization by inhalation and skin contact.
Additional information:
particular characteristics/effects: If there is a danger of overexposure, dependingconcentration, irritation of the eyes, nose, throat and respiratory tract.Possible the delayed appearance of disorders and development of a form of hypersensitivity (disordersbreathing, coughing, asthma). In the case of people who are hypersensitive reactions may occur as earlyconcentrations of isocyanate very low, even below the TLV value. In case of contact prolonged, skin irritating and dehydrating effects are possible.

12. ECOLOGICAL INFORMATION

Use according to standards of good practice and avoid release to the environment (see also sections 6,7,13,14, 15).
There are no ecotoxicological data on the mixture itself. Set out below is the toxicological information relating to the main substances in the mixture.

12.1 Toxicity

- *4,4' – methylenediphenyl diisocyanate:*

- Acute toxicity to fish (LC50): Danio rerio (zebra fish), 96h. = 1000 mg/l. Method OECD TG 203 - Tests on similar product.
- Acute toxicity for daphnia (EC50): Daphnia magna (water flea), 24h. => 1000 mg/l. Method OECD TG 202 – Tests on similar product.
- Chronic Toxicity to Daphnia: Daphnia magna (water flea), 21d, NOEC (reproduction) => 10 mg/l. Method OECD TG 202 – Tests on similar product.
- Acute toxicity to algae (ErC50): Scenedesmus subspicatus, 72h. (Inhibitor of growth) => 1640 mg/l. Method OECD TG 201 - Tests on similar product.
- Acute bacterial toxicity (EC50): activated sludge, 3h. (Inhibitor of respiration) => 100 mg/l. Method OECD TG 209 - Tests on similar product.
- Toxicity to soil dwelling organisms: Eisenia fetida (earthworm), 14 d NOEC (mortality) => 1000 mg/kg. Method OECD TG 207 - Tests on similar product.
- Toxicity to terrestrial plants: Avena sativa (oats), 14d NOEC (germination) => 1000 mg/kg, Avena sativa (oats), 14d NOEC (growth rate) => 1000 mg/kg; Lactuca sativa (lettuce), 14d NOEC (germination) => 1000 mg / kg; Lactuca sativa (lettuce), 14d NOEC (growth rate) => 1000 mg/kg. Method OECD TG 208 - Tests on similar product.

Ecotoxicological assessment:
Acute aquatic environment: based on the available data, the classification criteriaare not satisfied.
Chronic toxicity to the aquatic environment: there is no evidence of chronic aquatic toxicity.
Bitoxicity data on soil: is not expected adsorption to soil. The substance is evaluated as not critical for soil organisms.
Impact on the treatment of waste: due to the low toxicity to bacteria in biological purification plants there is no risk of yield reduction treatment.

12.2 Persistence and degradability

Biodegradation: 0%, 28d, or not inherently biodegradable. Method OECD TG 302C – Tests on similar product.
Stability in 'water: hydrolysis half-life = 20h. at 25 ° C, the substance is rapidly hydrolyzes in water – Tests on similar product.
Photodegradation: phototransformation in air, half-life (indirect photolysis) = 0,92 d., as a result of evaporation or exposure to the air, the product is moderately degraded via photochemical processes. Method SRC - AOP (calculation).
Volatility (Henry's law constant): calculated value = 0,0229 $Pa \cdot m^3/mol$, the substance should be classified as slightly volatile in 'water.

12.3 Bioaccumulative potential

Bioaccumulation (BCF 200): Cyprinus carpio (Carp), 28d, concentration = 0,00008 mg/l, it is not to be expected the accumulation in aquatic organisms.

12.4 Mobility in soil

The mobility is limited by the transformation into a solid insoluble by reaction with 'humidity and CO_2 emissions.

12.5 Results of PBT and vPvB assessment

The components of the mixture, based on available information, do not meet the vPvB and PBT criteria.

12.6 Other adverse effects

None.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Recover if possible. Operate according to local and national regulations: 91/156/EEC, 91/689/EEC, 94/62/EEC.
Disposal of uncured material (according to Directive 2000/532/EC):
waste code EWC 080409 * - adhesives and sealants containing organic solvents or other dangerous substances.
Disposal of hardened product (according to Directive 2000/532/EC):
EWC waste code 080410 - waste adhesives and sealants other than those mentioned in 080409 *.
Empty containers must be disposed of or recycled.
Containers containing uncured product are hazardous wastes.

14. TRANSPORT INFORMATION

Not classified as dangerous under transport regulations.

14.1 UN number

N.AP.

14.2 UN proper shipping name

N.AP.

14.3 Transport hazard class(es)

N.AP.

14.4 Packing group

N.AP.

14.5 Environmental hazards

N.AP.

14.6 Special precautions for user

Not dangerous for transport.
Irritating to skin or eyes.

Protect from 'moisture.
Keep away from foodstuffs, acids and alkalis.

14.7 Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code

N.AP.

Additional information for Transport in accordance with IMDG, ADR/RID and ICAO/IATA

- ADR / RID: non-dangerous goods.
- ADN: non-dangerous goods.
- IATA: non-dangerous goods.
- IMDG: Not dangerous goods.

15. REGULATORY INFORMATION

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

Commission Regulation (EU) No 453/2010 of 20 May 2010 amending Regulation (EC) No 1907/2006 of the European Parliament and of the Council on the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH); Directive 67/548/EEC (Classification, packaging and labelling of dangerous substances) and subsequent amendments; Directive 1999/45/EC (Classification, packaging and labelling of dangerous preparations) and subsequent amendments; Regulation (EC) No 1907/2006 (Reach); Regulation (EC) No 1272/2008 (CLP); Regulation (EC) No 790/2009 of 10 August 2009 amending, for the purposes of its adaptation to technical and scientific progress, Regulation (EC) No 1272/2008 of the European Parliament and of the Council on classification, labelling and packaging of substances and mixtures. Commission Directive 92/69/EEC of 31 July 1992 adapting to technical progress for the seventeenth time Council Directive 67/548/EEC on the approximation of laws, regulations and administrative provisions relating to the classification, packaging and labelling of dangerous substances

The "Threshold Limit Values"of the substances are taken from: a) Italian legislation: Decree 9 April 2008, n. 81 - Appendix XXXVIII and XLIII, 3 August 2009 Legislative Decree no. 106 - Annex XXXVIII; b) EU Legislation: Directive of 2009/161/CE 17dec. 2009; c) the substances not listed by the National legislation and by the EU Legislation are taken from the volume A.C.G.I.H 2009 *"Threshold Limit Value (TLV's) for Chemical Substances and Physical Agents & Biological Exposure Indices (BEIs)* "[Source Federchimica - Italian National Association of Chemical Industry : "*Threshold limit values and biological indices of exposure to the Risks related to chemicals in the workplace "2010 edition]*.

Other requirements, restrictions and ban regulations: none

15.2 Chemical Safety Assessment

N.AV.

16. OTHER INFORMATION

Full text of R-phrases, Hazard Statements-h AND S-phrases appearing in section 2 and 3:
H226 - Flammable liquid and vapor.
H315 - Causes skin irritation.
H317 - May cause an allergic skin reaction.
H319 - Causes severe eye irritation.
H332 - Harmful if inhaled.
H334 - May cause allergy or asthma symptoms or breathing difficulties if inhaled.
H335 - May cause respiratory irritation.
H351 - Suspected of causing cancer.
H373 - May cause damage to organs through prolonged exposure or repeated.
R20 - Harmful by inhalation.
R36/37/38 - Irritating to eyes, respiratory system and skin.
R40 - Limited evidence of a carcinogenic effect.
R42/43 - May cause sensitization by inhalation and/or skin contact.
R48/20 - Danger of serious damage to health by prolonged exposure through inhalation.
S23 - Do not breathe gas/fumes/vapor/spray.
S36- Wear suitable protective clothing.
S45 - In case of accident or if you feel unwell, seek medical advice immediately.
S60 - This material and its container must be disposed of as hazardous waste.

The information contained in this Safety Data Sheet is based on the present state of knowledge and current national legislation.
It provides guidance on health, safety and environmental aspects of the product and should not be construed as any guarantee of technical performance or suitability for particular applications.
The product should not be used for purposes other than those shown in Section 1 without first referring to the supplier and obtaining written handling instructions.
As the specific conditions of use of the product are outside the supplier's control, the user is responsible for ensuring that the requirements of relevant legislation are complied with.
The information contained in this safety data sheet does not constitute the user's own assessment of workplace risks, as required by other health and safety legislation.

This sheet replaces all previous versions.

Bibliography

ESIS – European chemical Substances Information System - Joint Research Centre;
Federchimica – Book series of the Committee for Substances Safety , No. 2 “THE MSDS Part 2 - Examples of Safety Data Sheet of a substance and a mixture prepared according to Regulation (EU) 453/2010, July 2010”.

Acronyms

ACGIH: American Conference of Governmental Industrial Hygienists.
ADN: european Agreement concerning the international carriage of Dangerous good by iNland goods
ADR: Agreement concerning the international carriage of Dangerous goods by Road
BCF: Bio Concentration Factor
CLP: Classification, Labelling and Packaging
CMR: Cancérogène (ou cancérigène), Mutagène et Reprotoxique (Carcinogenic, mutagenic and toxic).
EC50: Effective Concentration of a substance that causes 50% of the maximum response.
ErC50: Effective Concentration of a substance that causes a 50% reduction in the growth rate.
EWC: European Waste Catalogue.
IATA: international air transport association.
IBC, code : International Code for the Construction and Equipment of ships carrying dangerous chemical in Bulk.
IMDG: International maritime dangerous goods.
LC 50: Lethal Concentration for 50% of individuals.
LD 50: Lethal Dose for 50% of individuals.
LLNA: Local Lymph Node Assay.
LOAEL: Lowest Observed Adverse Effect Level.
NOAEL: No Observed Adverse Effect Level.
NOEC: No Observed Effect Concentration.
OECD: Organisation for Economic Co-operation and Development: Guideline for Testing of Chemicals.
MARPOL73/78: Convenzione internazionale per la prevenzione dell'inquinamento causato da navi 1973, come modificata dal protocollo del 1978.
PBT: Persistent, bioaccumulative and toxic.
PNEC: Predicted no effect concentration.
RID: Règlement concernent le transport International ferroviaire des marchandises Dangereuses (Regulation concenring the International carriage od Dangerous goods).
STEL: short term exposure limit.
TLV: threshold limit value.
TWA: Time Weighted Average.
UE: Unione Europea.
vPvB: Very persistent very bioaccumulative.

Decoding:
(#) = This symbol indicates that the information has been updated to the review date.
N.AV. = Not available.
N.AP = Not applicable .
[…] = Bibliographic reference.

This safety data sheet was reviewed in all its sections in accordance to the Commission Regulation (EU) No 453/2010 of 20 May 2010 amending Regulation (EC) No 1907/2006 of the European Parliament and of the Council on the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH).

All subsequent updates will be marked with #.