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|---------|----------------------------|----------|----------|
| Product | BENZENE CONCENTRATE | Date: | 11/01/10 |
| | | Edition: | 2 |

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

- **Trade name:** BENZENE CONCENTRATE **CAS: 68476-50-6**
- **Chemical name:** Hydrocarbons C_{>=5}; C5-6 enriched, low boiling point naphtha, distillation range 60°C/75°C to 75°C/110°C.
- **Product code:** 1000406
- **Registration number:**
- **Product use:** Intermediary product in refinery, raw material in petrochemical industry.
- **Producer/supplier:** **INA-INDUSTRIJA NAFTE d.d.**
- Address:** Av. Većeslava Holjevca 10, P.O.B. 555, 10002 Zagreb, CROATIA
- Phone** 00-385-1-6450-842 / 00-385-1-6451-075 (0-24 h)
- Fax** 00-385-1-6452-050 **e-mail:** sds@ina.hr
- **Responsible person:** **Organisational Design and Process Management Sector**
Hrvoje Raukar, B.Sc. Tel. 00-385-1-6450-602
Tatjana Benko, B.Sc.
- **Emergency Service Telephone Number:** **112**
- National Protection and Rescue Directorate** 00-385-1-3650-011
Nehajska 5, 10000 Zagreb 00-385-1-3650-084
e-mail: info@duzs.hr 00-485-1-3650-082
00-485-1-3650-083
- **Medical Information Telephone Number:** **00-385-01-23-48-342**

2. HAZARDS IDENTIFICATION

- **Classification of substances/preparations (per hazard):** This product is not hazardous if used under recommended conditions with the required personal protection equipment. Based on existing legal provisions this product is classified as hazardous.
- **The most important hazards and effects:**
- Human health hazards: Toxic: danger of serious damage to health by prolonged exposure through inhalation, in contact with skin and if swallowed. May cause cancer. May cause heritable genetic damage.
- Environmental hazards: Quickly evaporates, but due to its n-hexane content may be toxic to aquatic organisms and may cause long term adverse effects in the aquatic environment.
- Physical and chemical hazards: Highly flammable liquid and vapours! Vapours are heavier than air and explosive when mixed with air. Electrostatic charge may cause ignition or explosion. It can penetrate plastic and rubber.
- **Special hazards:** Evaporates at room temperature. Benzene can be absorbed into the body through inhalation, in contact with skin and if swallowed! See Section 10.

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- Main symptoms of effects:

Inhalation: Dizziness, stupor, headache, nausea, lack of air, convulsions, fainting.
 Skin: Dryness, redness, pain. (See also Inhalation since it can be absorbed).
 Eyes: Redness, pain.
 Ingestion: Stomach ache, dry throat, vomiting. (See also Inhalation since it can be absorbed).

- Overview of special conditions: Use of alcohol magnifies the adverse effects. Periodic medical check-ups are required depending on the level of exposure.

3. COMPOSITION / INFORMATION ON INGREDIENTS

- Substance: **Preparation:**

- Components contributing to product hazardousness:

| Name of the substance | Concentration [%] | EINECS number | CAS number | Hazard symbol | Risk phrase | Registration number |
|---|-------------------|---------------|------------|---------------|-------------------------------------|---------------------|
| Hydrocarbons C _{>=5} ; C ₅₋₆ enriched, low boiling point naphtha | ≤100 | 270-690-8 | 68476-50-6 | T | 45-46-65 | - |
| benzene* | >1 | 200-753-7 | 71-43-2 | F; T | 11-45-46-36/38-48/23/24/25/65-52/53 | - |
| n-hexane* | >1 | 203-777-6 | 110-54-3 | F; Xn; N | 11-38-48/20-62-65-67-51/53 | - |

* This components were not added deliberately.

4. FIRST-AID MEASURES

- General information:

- First-aid procedures:

after inhalation: Remove the person to fresh air, keep calm and call for medical assistance. If breathing is difficult give oxygen. If breathing has stopped, administer artificial respiration. In each case call for medical assistance.

after skin contact: Immediately remove contaminated clothing and shoes. Thoroughly flush the sites of contact with plenty of water and soap for at least 20 minutes. If symptoms persist call for medical assistance.

after eye contact: Remove contact lenses if the injured person is wearing them. Flush the eyes with running water for at least 15 minutes and seek medical assistance if symptoms persist.

after ingestion: Do NOT induce vomiting! If vomiting occurs, keep the head below the level of hips in order to prevent penetration into the lungs. Seek medical assistance.

- Note to first-aider/physician:

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5. FIRE-FIGHTING MEASURES

- Extinguishing media:

SUITABLE:

Dry powder or CO₂, for larger fires air foam or halons. Water mist can be used for smaller fires in confined spaces.

NOT SUITABLE:

Water jet.

- Fire-fighting measures for special hazards:

Cool the containers with water jet and eliminate all sources of ignition.

- Special fire-fighting measures:

Fire increases vapour explosion risk, particularly in confined spaces. Cool the containers with water jet.

- Fire-fighting special safety equipment:

Self-contained open circuit compressed air breathing apparatus (HRN EN 137/AC:2006), protective suit against heat radiation.

- Special exposure hazards:

Vapours are heavier than air, may form explosive vapour-air mixtures.

- Other information:

6. ACCIDENTAL RELEASE MEASURES

- Personal precautions:

Display a visible sign prohibiting entrance, use of open flame and sparking devices. Eliminate all sources of ignition. Measure the concentration of benzene fumes in the air, in compliance with regulations. Stand upwind of the spill site.

- Environmental precautions:

Prevent discharge into watercourses and drainage systems by setting up sand dams and partitions. Prevent the discharge of water remaining from the extinguishing into surface waters/groundwater. Notify the Emergency Service at the number 112.

- Methods for cleaning-up and recovery:

Pump the product from the damaged tank into an empty tank - container with the pump designed for use in a potentially explosive atmosphere. Absorb the remainders with absorbents (sand or other inert material). Store the waste material and contaminated surface layer of soil that was removed in tightly closed containers in well-ventilated premises until disposal. Hand over for disposal to legal entities for hazardous waste disposal, authorised by the Ministry in charge of environmental protection.

- Additional warnings:

Prevent release into the soil, waterways and air!

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7. HANDLING AND STORAGE

- Handling:

Safety precautions Use fully functioning equipment and devices. Take precautionary measures against static electricity by grounding. Keep away from sources of heat and eliminate all sources of ignition. Do not use sparking tools. Decant only in properly facilitated areas with sufficient air ventilation.

Make sure that the floor in the work premises and storage area is impervious and stable to solvents. Floors in areas with explosive atmosphere in the static electricity elimination system must have transfer resistance of <math><1\text{M}\Omega</math>.

Safe handling advice Do not smoke, eat, drink or store food in a room where this product is handled. Keep personal clothes separate from work clothes and workplace. Wear work clothes, protective gloves and goggles.

- Storage: technical measures and storage conditions:

SUITABLE: Store in tightly closed containers, properly built and equipped in a well-ventilated room and at appropriate temperature. Take preventive measures against electrostatic charge.

Make sure that receiving tank farms are below self-supporting tanks.

TO BE AVOIDED: Avoid storing with other chemicals, especially flammable ones. Do not use tools or devices that produce a spark or a flame.

- Packaging materials:

RECOMMENDED: Fireproof.

NOT SUITABLE: Any other.

- Special use:

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

8.1. Exposure limit values

| Hazardous substance | Limit values for exposure (Croatia) ppm | Biological limit values |
|---------------------|---|--|
| benzene | 1 | 0.12 (in the exhaled air – smoking enhances the value of test results) |
| n-hexane | 20 | 150 µg/L (in the blood) 40 ppm (in the exhaled air) |

- Monitoring procedures

8.2. Exposure controls

- Summary of risk management measures: Make sure work areas are well-ventilated.

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8.2.1. Occupational exposure controls

- Description of operating procedure and technological control:

Monitor benzene fumes concentration in the air, pursuant to regulations.

- Personal protective equipment:

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|------------------------------|---|
| Respiratory tract protection | Wear full face protective mask (HRN EN 136/AC:2006) with A filter (HRN EN 14387) at concentrations above 5 ppm. |
| Hand protection | Wear gloves resistant to organic solvents: PVA (polyvinyl alcohol) Teflon, Viton. Do NOT use rubber gloves! |
| Eye protection | Protective goggles or a visor at lower concentrations, protective mask at higher concentrations. |
| Skin and body protection | 8-hour exposure: PVA (polyvinyl alcohol (gloves), PE/EVAL (4H™ and Silver Shield™ brand gloves), Barricade, CPF3™ clothing, Responder™ clothing, Tychem 10000™ clothing. 4-hour exposure: Teflon and Viton. Protective suit against heat radiation. |

- Special hygienic and safety precautions:

Maintain the prescribed hygiene standards for working with hazardous substances. Remove contaminated clothing and footwear. Do not smoke, eat, and drink when handling the product. Wash hands before breaks and at the end of work.

8.2.2. Environmental exposure controls

- Summary of risk management measures

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1. General information:

- State: liquid
- Colour: colourless
- Odour: characteristic of benzene

9.2. Important health, safety and environmental information:

| | | |
|---|--------------------|--|
| - pH value (indicate conc. and temp.): | | No data available. |
| - Boiling point/Boiling range: | °C | 60/75 - 75/110 |
| - Flash point: | °C | -11 (from literature) |
| - Flammability (solid, gas): | | No data available. |
| - Explosive properties: | vol. % | 1.2 – 8.0 (from literature) |
| - Oxidizing properties: | | No data available. |
| - Vapour pressure at 20°: | kPa | 10.1 (from literature) |
| - Density at 15 °C: | kg/m ³ | 740.0 – 820.0 |
| - Solubility (indicate solvent): | g/L | Soluble in most organic solvents, and in mineral, vegetable, animal fats and oils. |
| - Solubility in water: | g/L | 1.770 (from literature) |
| - Partition coefficient n-octanol / water | logPow | 2.65 (from literature) |
| - Viscosity at 20 °C: | mm ² /s | 0.75 (from literature) |

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|--------------------------------|-------------------|-----------------------|
| - Vapour density: | kg/m ³ | No data available. |
| - Volatility: | | No data available. |
| 9.3. Other data: | | |
| - Melting point/Melting range: | °C | No data available. |
| - Disintegration temperature: | °C | No data available. |
| - Auto-ignition temperature: | °C | 498 (from literature) |
| - Conductivity | | No data available. |
| - Miscibility | | No data available. |

10. STABILITY AND REACTIVITY

| | |
|--|--|
| - Stability: | Stable under recommended conditions of storage and use. |
| - Conditions to avoid: | Sources of heat, flame, spark. |
| - Materials to avoid: | Halogens, strong acids (such as e.g. nitrate and sulphur) and strong oxidants. |
| - Hazardous decomposition products: | Carbon oxides – thermal decomposition products. |
| - Special hazards | |

11. TOXICOLOGICAL INFORMATION

| | |
|--|--|
| - Acute toxicity: | |
| Oral (LD ₅₀) | 930 mg/kg (rat) (from literature) |
| Inhalation (LC ₅₀) | 2000 ppm/5 h (human) (from literature) |
| Dermal (LD ₅₀) | 340 mg/kg (mouse) (from literature) |
| - Local effects: | |
| Skin irritation | Irritating effect. Defatting effect on skin; may cause dermatitis. |
| Eye irritation | Irritating effect. |
| Skin sensitization | Irritating effect. |
| Inhalation sensitization | |
| - Chronic poisoning or long exposure: | Exposure to higher concentrations than MAC can cause cancer, leukaemia and death. |
| - Exposure effects | Irritating effect on skin, eyes and respiratory system. Ingestion may lead to aspiration into lungs and pneumonia (pneumonitis). |
| Single-term: | |
| Recurrent: | Nausea, vomiting, dizziness, blood pressure drop, damages to the central nervous system. |

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Long-term: Serious damages to the central nervous system, immune system and blood or blood-forming organs (e.g. red bone marrow, lymph glands, spleen, lymph tissue in the lungs etc.)

- **Momentary effects:** Headache, nausea, vomiting, dizziness.

- **Delayed effects:** May induce cancer and hereditary genetic damage.

- **Special effects** (carcinogenicity, mutagenicity and toxicity for reproduction): Due to presence of benzene (canc. cat. 1 and mut. cat. 2) and n-hexane (repr. cat. 3)

12. ECOLOGICAL INFORMATION

- Mobility:

| | |
|---|---|
| Known or predicted distribution to environmental compartments | Relatively soluble in water. Highly mobile once it enters the soil. |
| Surface tension | No data available. |
| Soil absorption/desorption | No data available. |
| Other physical and chemical properties | See Section 9. |

- Persistence/degradability:

| | |
|----------------------------------|---|
| Biotic or abiotic degradation | No data available. |
| Aerobic or anaerobic degradation | In aerobic conditions it is subject to bio-degradation, while in anaerobic conditions it probably isn't bio-degradable. |
| Persistence | Evaporates quickly from the surface. |

- Bio-accumulation:

| | |
|--------------------------------|--------------------|
| bio-concentration factor (BCF) | No data available. |
|--------------------------------|--------------------|

- Results of PBT assessment:

- Product effect on the environment:

| | |
|-------|---|
| Water | Evaporates quickly from the surface. Not expected to accumulate in significant amounts in the sediment or to bio-accumulate in aquatic organisms. |
| Air | Reacts with hydroxyl radicals. Products of photo-oxidation include phenols, nitrophenols, nitrobenzene, formic acid. |
| Soil | Evaporates quickly from the surface. In case of soil penetration poses a threat to groundwater. |

- Eco-toxicity:

| | |
|---|---|
| For aquatic organisms (LD ₅₀) | 18 mg/L (24h, Daphnia magna), from literature |
| For ground organisms (LD ₅₀) | No data available. |
| For plants and land animals (LD ₅₀) | 25 µ/L (24 days, frogs), from literature |

- Other harmful effects:

| | | | |
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13. DISPOSAL CONSIDERATIONS

- Preferred disposal considerations:

Waste from residues: There is no classic waste from this product, except in case of unintentional release. For such cases see Section 6.

Contaminated packaging: Not applicable.

Local applicable regulations: Waste Act (OG 178/04, OG 153/05, OG 111/06 and 60/08), Decree on Waste Categories, Types, and Classification and Hazardous Waste List (OG 50/05, 39/09), Regulations on Waste Management Conditions (OG 123/97, OG 112/01), Decree on Conditions for Hazardous Waste Management (OG 32/98).

Obligatory compliance with the EU, national, and/or local laws and regulations. User shall be responsible for knowledge of all relevant national and local regulations.

14. TRANSPORT INFORMATION

- Transport classification signs:

- Name of hazardous chemical according to international contracts on transport of hazardous substances:

Road/Rail transport (ADR / RID):

UN number: 1268 **class:** 3 **packaging group:** II

Inland Waterway (ADNR):

UN number: 1268 **class:** 3 **packaging group:** II

Sea transport (IMDG):

UN number: 1268 **class:** 3 **packaging group:** II

Air transport (ICAO/IATA):

UN number: 1268 **class:** 3 **packaging group:** II

- Additional regulations: Hazardous Materials Transport Act (OG 79/07), European Agreement on International Road Transport of Hazardous Materials (ADR – Appendixes A and B) (OG MU 11/08), Regulations on the Manner of Hazardous Materials Transport in Road Transport (OG 53/06), Regulations on Handling Hazardous Materials, Conditions and Manner of Transport in Sea Transport, Loading and Unloading of Hazardous Materials, Bulk and Other Cargo in Harbours, and the Manner of Preventing Oil Spills in Harbours (OG 51/05).

- Special precautions and transport conditions:

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15. REGULATORY INFORMATION

| | | | | |
|--|-----|--|----|--|
| - Chemical Safety Assessment carried out (CSA): | YES | | NO | |
|--|-----|--|----|--|

Data on hazards and safety measures (according to label):

Level of substance utility is encompassed by limitation (limitations) in accordance with relevant explanation (explanations) for Chapter (5) of Amendment XVII to Regulation (EC) No. 1907/2006 of the European Parliament and Council.

Packaging of such substances and preparations must have a legible and indelible label stating: **“For professional use only”**

Danger symbol

T



Toxic

F



Flammable

N



Dangerous
for the
Environment

Risk phrases

| | | |
|----|-------------|---|
| R: | 11 | Highly flammable |
| | 45 | May cause cancer |
| | 46 | May cause heritable genetic damage |
| | 36/38 | Irritating to eyes and skin |
| | 48/23/24/25 | Toxic: danger of serious damage to health by prolonged exposure through inhalation, in contact with skin and if swallowed |
| | 52/53 | Harmful to aquatic organisms; May cause long-term adverse effect in the aquatic environment |
| | 62 | Possible risk of impaired fertility |
| | 65 | Harmful: may cause lung damage if swallowed |

Safety phrases

| | | |
|----|----|--|
| S: | 45 | In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible) |
| | 53 | Avoid exposure – obtain special instructions before use |

- Applicable provisions, regulations and directives:

Chemicals Act (OG 150/05, 53/08), Regulations on Hazardous Chemicals Classification, Marking, Labelling and Packaging (OG 23/08), Regulations on Hazardous Substance Exposure Limit Values and Biological Limit Values (OG 13/09), Regulations on Filling in the Material Safety Data Sheet (OG 39/09).

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16. OTHER INFORMATION

| | | | |
|---|----------|-------|--|
| Risk phrases (for ingredients) | R | 51/53 | Toxic to aquatic organisms, may cause long term adverse effects in the aquatic environment |
| | | 48/20 | Harmful: danger of serious damage to health by prolonged exposure through inhalation |
| | | 62 | Possible risk of impaired fertility |
| | | 67 | Vapours may cause drowsiness and dizziness |
| Safety phrases (for ingredients) | S | 9 | Keep container in a well ventilated place |
| | | 16 | Keep away from sources of ignition - no smoking |
| | | 29 | Do not empty into drains |
| | | 33 | Take precautionary measures against static discharge |
| | | 36/37 | Wear suitable protective clothing and gloves |
| | | 61 | Avoid release to the environment. Refer to special instructions/safety data sheets |
| | | 62 | If swallowed, do not induce vomiting: seek medical advice immediately and show this container or label |

Statement:

This SDS is in compliance with Croatian legislation. Users are responsible for adherence to local laws and regulations. SDS contains information important for users' health and safety, as well as environmental protection. Data contained in this document correspond to our knowledge acquired on the product so far. The product should not be used for the purposes other than those mentioned in instructions. In case of mixing with other products, existence of additional risks/hazards should be checked. We shall assume no responsibility for any failure to meet the requirements of this SDS.

Data source:

- <http://www.ilo.org/public/english/protection/safework/cis/products/icsc/dtasht.htm>
- <http://www.nature.nps.gov/hazardssafety/toxic/benzene.pdf>
- <http://www.epa.gov/OGWDW/dwh/t-voc/benzene.htm>
- <http://www.hzt.hr>

Revision indicators:

Section: **Subject of change:**

APPENDIX: EXPOSURE SCENARIOS ACCORDING TO CHEMICAL SAFETY REPORT