### MATERIAL SAFETY DATA SHEET FOR CHEMICAL PRODUCTS (MSDS)

DRAFTED ACCORDING TO THE PROVISIONS STIPULATED IN THE REGULATION ON THE Compiling of the MATERIAL SAFETY DATA SHEET [EC No:1907/2006 (REACH), Annex II]

Name of the Product: FRACTIONS OF AGGREGATE GENERATED BY CRUSHING OF THE SILICOMANGANESE AND FERROMANGANESE SLAG

**1. IDENTIFICATION OF SUBSTANCE/COMPOUND AND INFORMATION ABOUT THE LEGAL OR NATURAL PERSON**

1.1. Identification of substance or compound

Name of the Product: FRACTIONS OF AGGREGATE GENERATED BY CRUSHING OF THE SILICOMANGANESE AND FERROMANGANESE SLAG

- 0/4 mm; 4/8 mm; 8/11 mm; 11/16 mm; 4/25 mm

1.2. Use of substance / compound

Aggregate for bituminous mixtures of pavement structures

1.3. Information about the legal or natural person

Manufacturer and distributor: "MLM group-Zagreb" d.o.o.
Vlaška 68, 10000 Zagreb, Hrvatska
Tel/fax: 00385 1 4572 878
Mob: 00385 99 4572 871

In case of accident: notify the Institute of Medical Research and Occupational Medicine, The Centre for the Control of Poisoning in Zagreb, Jordanovac 104, tel: 01 23 48 342 or the Emergency Service tel: 112

### 2. IDENTIFICATION OF HAZARDS

The biggest hazards and effects of the product
- on human health: - no
- on the environment: - no
- physical and chemical hazards: - no
- special hazards: - no

Main symptoms
- inhalation: - in case of exceeding the ELV coughing is possible, breathing with difficulty, irritation of upper respiratory tract
- skin: - dry skin, itching, redness (mechanical effects at higher concentrations of dust in the air)
- eyes: - possible blurred vision, redness, pain (mechanical effects at contact)
- swallowing: - swallowing not expected, if occurred, possible abdominal pain, nausea, vomiting

### 3. COMPOSITION / INFORMATION ABOUT THE INGREDIENTS

Substance: compound: X

Chemical composition of the compound: Aggregate generated by the silicomanganese and ferromanganese slag

Ingredients associated with product hazards: (for more information, see the Section 16., indication of warning marked with the letter R)

<table>
<thead>
<tr>
<th>Name of ingredient</th>
<th>%</th>
<th>EINECS/CAS</th>
<th>Hazard marks</th>
<th>Warning marks</th>
<th>Registration number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barium sulphate</td>
<td></td>
<td>231-784-4</td>
<td></td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>7727-43-7</td>
<td></td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Graphite dust</td>
<td></td>
<td>231-965-3</td>
<td></td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>7722-42-5</td>
<td></td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Crystalline SiO₂</td>
<td>&lt;1</td>
<td></td>
<td>☢ Xn</td>
<td>R: 48/20</td>
<td></td>
</tr>
<tr>
<td>(chrysotbaltite+quartz)</td>
<td>&lt; 10 μm (respirable)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kristallin SiO₂</td>
<td></td>
<td>238-455-4</td>
<td></td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>(chrysotbaltite)</td>
<td></td>
<td>14464-46-1</td>
<td></td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>
4. FIRST AID MEASURES

- **inhalation**
  - if symptoms occur the person should be taken out for some fresh air, enabled to repose and in case symptoms remain (such as inhalation of possibly generated dust) medical advice should be provided.

- **skin contact**
  - in case of smaller contamination, blowing compressed air will help, in case of bigger contamination the person should take off the contaminated clothes and footwear and wash the area of the skin thoroughly with water. If redness occurs in the skin contact area, medical advice should be provided.

- **eye contact**
  - wash thoroughly with water with eyelids open (for 15 minutes) and in case symptoms remain, medical advice should be provided.

- **swallowing**
  - do not provoke vomit, rinse the mouth with water and spit out. Drink a glass of water for the rinsing of throat and esophagus mucosa. In case symptoms remain, medical advice should be provided.

**Note for the doctor / medical aid administrator:**

Special medical aid administration instruments:

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5. FIRE PROTECTION MEASURES

Fire extinguishing measures
- **adequate**
  - the product itself is not combustible. Fire extinguishing instruments should be adjusted to the environment.

- **not allowed to use**
  - water jets (aggregate)

- **special exposure hazards**
  - not known

- **fire protection measures for special hazards**
  - no special measures

- **special fire extinguishing measures**
  - not known

- **special firemen protection equipment**
  - adjust to the fire in the environment

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6. PROTECTION MEASURES IN CASE OF ACCIDENTAL LEAKING

- **personal protection measures**
  - air the room, use personal protection means if necessary (see the Section 8.)

- **environment protection measures**
  - avoid getting the product in the environment

- **way of cleaning and collecting**
  - dry mechanical collecting, aspiration, avoid dust rising (see the Section 13.)

- **additional advice**
  - no additional advice

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7. HANDLING AND STORAGE

7.1 Handling

Instructions for safe operation
- Do not dust, carry in closed packaging (if possible)
- Do not inhale dust, avoid contact with skin and eyes, use personal protection means if necessary (Section 8.)

7.2 Storage: technical measures and conditions

adequate
- No conditions recommended

inadequate
- Not known

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8. EXPOSURE CONTROL/PERSONAL PROTECTION

8.1 Exposure Limit Value

<table>
<thead>
<tr>
<th>Name of hazardous substance</th>
<th>ELV - Exposure Limit Value</th>
<th>BLV - Biological Limit Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Berium sulphate</td>
<td>10 (U)</td>
<td>4 (R), mg/m³</td>
</tr>
<tr>
<td></td>
<td>10 (U)</td>
<td>4 (R)</td>
</tr>
<tr>
<td>--------------------------</td>
<td>--------</td>
<td>-------</td>
</tr>
<tr>
<td>Graphite dust</td>
<td></td>
<td></td>
</tr>
<tr>
<td>kristalni SiO₂, chrysobalite</td>
<td>0.05</td>
<td></td>
</tr>
<tr>
<td>crystalline SiO₂, quartz</td>
<td>0.1</td>
<td></td>
</tr>
<tr>
<td>Manganese and its anorganic compounds (as Mn)</td>
<td>0.5</td>
<td></td>
</tr>
<tr>
<td>Iron-salts (as Fe)</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

### 8.2. Exposure control

- **summary of risk management measures**: adhere to the instructions set out in the Section 7, using personal protection means if necessary.

#### 8.2.1. Exposure control at workplace

- **description of work procedure and technological control**: there is no exposure scenario that accompanies the document, but it is expected that in handling the product adequate organizational and technical measures must be provided especially in handling the finest fraction, such as lower concentrations of the named substance in the air than the exposure limit values (avoiding the generation of dust). If it is not possible to do so, personal protection means for the protection of respiratory tract must be used.

- **general protection measures**:
  - **Personal protection equipment for**:
    - the protection of respiratory system: in case of dust, use filter half-masks P2( HRN EN 149)
    - hand protection: use protective leather gloves (risk of mechanical injuries)(HRN EN 388 and 420) or protective cotton gloves lined with PVC, nytril or neopren (HRN EN 374)
    - eye protection: in contact with dust, use protective glasses well-adhering to the face skin, not allowing for the dust particles to flow in from any direction whatsoever(HRN EN 166)
    - skin and body protection: wear cotton clothes with long sleeves and legs, and adequate footwear that covers the entire foot(HRN EN 340)
    - special hygienic measures: while handling the product, it is not allowed to eat, drink or smoke. It is necessary to wash hands after handling the product.

#### 8.2.2. Environment protection control

- **summary of risk management measures**: avoid getting of the product into sewage system, surface waters and groundwater.

### 9. PHYSICAL AND CHEMICAL PROPERTIES

#### 9.1. General information

- Physical state: solid
- Form: aggregate
- Colour: Depending on the batch
- Odour: characteristic

#### 9.2. Information related to health, safety and environment

- Boiling point/burning range: °C Not known
- Flaming point: °C Not known
- Combustion temperature: °C Not known
- Explosivity range: vol. % Not explosive
- Steam pressure: (at 23° C) hPa Very small
- Steam density: kg/m³ insignificant
- Density: (at 23° C) kg/dm³ 2.8-3.1
- Solubility (with type of solvent marked): g/L Insoluble(water)
- Viscosity: Pas Not applicable
- pH value (water dispersion): 8.83
- Distribution coefficient – octanol/water: logPow Not applicable

#### 9.3. Other information

#### 10. STABILITY AND REACTIVITY

- **stability**: stable
- **10.1 Conditions to be avoided**: Not known
### 11. TOXICITY INFORMATION

<table>
<thead>
<tr>
<th>Intake/Exposure</th>
<th>Acute Intake</th>
<th>Chronic Intake</th>
<th>Irritation/Erosion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oral (LD 50):</td>
<td>No data</td>
<td>No data</td>
<td>Not irritating</td>
</tr>
<tr>
<td>Inhaled (LC 50):</td>
<td>No data</td>
<td>No data</td>
<td>Not irritating</td>
</tr>
<tr>
<td>Dermal (LD 50):</td>
<td>No data</td>
<td>No data</td>
<td>Not irritating</td>
</tr>
</tbody>
</table>

- **Skin**: Not irritating
- **Eyes**: Not irritating
- **Respiratory system**: Not irritating
- **Hypersensitivity**: Not known
- **Permanent effects of acute or chronic exposure**: No special effects
- **Toxic and kinetic properties**: No data

### 12. ECOLOGICAL DATA

12.1. Ecotoxicity
- Organisms living in water: No data
- Organisms living in the ground: No data

12.2. Mobility
- Known or expected distribution per segments of environment: Aggregate insoluble in water
- Surface tension: Not applicable
- Absorption/desorption: No data
- Other physical and chemical properties: No data

12.3. Stability/degradability
- Biodegradability: Contains mostly anorganic substances
- Other degradability processes: No data
- Degradability in wastewaters: No data

12.4. Bioaccumulation potential
- Bioconcentration factor (BCF): No data

12.5. Evaluation of Stability, bioaccumulation and toxicity
- Data from the chemical safety report: No data

### 13. DISPOSAL

**Ways of waste disposal**
- **Product waste**: Dispose of the waste according to the national regulation (inert waste NR 10 02 99), the redundant material, contaminated with the binder, we carry away as civil construction waste (NR 17 02 01 or 17 03 01). At handling the product the end user must assign the appropriate key number in compliance with the Provision on the categories, types and classification of waste, together with the waste catalogue and list of hazardous waste
- **Contaminated packaging**: Delivered in bulk
- **Local bylaws in force**: Law on waste and its sublegal acts

### 14. TRANSPORT DATA
### Transport classification marks

<table>
<thead>
<tr>
<th>Land</th>
<th>(ADR/RID)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water</td>
<td>(ADN)</td>
</tr>
<tr>
<td>Sea</td>
<td>(IMDG)</td>
</tr>
<tr>
<td>Air</td>
<td>(ICAO/IATA)</td>
</tr>
</tbody>
</table>

**Sea contaminator**

**UN classification number**

The product does not present hazardous freight as to national and international regulation.

### 15. REGULATION DATA

- **Applicable regulation:** Law on chemicals and its sublegal acts on chemicals classification and labeling. Regulation on exposure limit values of hazardous substances and biological limit values.
- **Chemical safety testing:** Not carried out.

### Information on safety and security measures:

<table>
<thead>
<tr>
<th>Indication of risk and danger</th>
<th>No</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Indication of warning</th>
<th>No</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Notification marks</th>
<th>S: 22</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Do not inhale dust</td>
</tr>
</tbody>
</table>

### 16. OTHER DATA

The meaning of Indication of warning (R) for substances enumerated in the Section 3:

R 48/20  Hazardous: danger of serious danger to health by prolonged exposure if inhaled.

Information presented in this Material Safety Data Sheet is based on laws and regulations on chemicals in force. Information contained in this document correspond to our present knowledge and experience in safety handling, storing, transport of chemicals and safe waste disposal. We shall not face any responsibility whatsoever for the consequences that could result from disregard of the above mentioned Material Safety Data Sheet.

Drafted by:
Ing. Mirko Kovač

The Material Safety Data Sheet was drafted based on the following tests and research:

1. **CSS d.o.o. - Central laboratory - Zagreb**
   The study on the adequacy assessment of aggregate fractions obtained by crushing of silicomanganese and ferromanganese slag and generated by the separation process in "Cmica" Šibenik

2. **Institute "Rudar Bošković" - Zagreb**
   Report on measuring of radioactivity of samples and expert opinion

3. **Institute of public health - Zagreb**
   Report on testing physical and chemical properties of waste for permanent disposal

4. **Mineralogical and petrographic Institute, o-petrografski zavod, The Faculty of Science - Zagreb**
   Analysis of the composition of slag from the area of Cmica in Šibenik