



# 化学品安全技术说明书 (Safety Data Sheet, SDS)

## 产品名称：农用硫酸镁挤压颗粒 (Magnesium Sulfate Extruded Granules, Agricultural Grade)

核心组分：一水硫酸镁 (Magnesium Sulfate Monohydrate, CAS 号 14168-73-1) | EINECS 号: 231-298-2  
| 分子量: 120.37 | 版本号: 1.0 | 编制日期: 2026 年 1 月 28 日 | 修订日期: 无

编制依据: 联合国 GHS 第 9 版 (UN GHS Rev.9)、欧盟 REACH 法规 (EC No. 1907/2006)、美国 OSHA HazCom 2012 标准 (29 CFR 1910.1200)、韩国 K-REACH 法规、日本 CSCL 法、中国 GB/T 16483-2008、GB/T 26568-2011 《农业用硫酸镁》

HS 编码: 2833210000 (全球通用) | 地区细分编码: 欧盟 CN 编码 283321000000、韩国 KCS 编码 2833210000、日本 HS 编码 2833210000 (申报标注“农用挤压颗粒镁肥”)

## 产品名称：农用硫酸镁肥 (Agricultural Magnesium Sulfate Fertilizer)

核心组分：一水硫酸镁 (CAS 号 14168-73-1) / 无水硫酸镁 (CAS 号 7786-81-4) | EINECS 号: 231-298-2  
(一水) / 231-984-1 (无水) | 版本号: 1.0 | 编制日期: 2026 年 1 月 28 日 | 修订日期: 无

编制依据: 联合国 GHS 第 9 版 (UN GHS Rev.9)、欧盟 REACH 法规 (EC No. 1907/2006)、美国 OSHA HazCom 2012 标准、中国 GB/T 16483-2008、GB/T 26568-2011 《农业用硫酸镁》

## 第 1 部分：化学品及企业标识 (Section 1: Chemical Product and Company Identification)

## 第 1 部分：化学品及企业标识 (Section 1: Chemical Product and Company Identification)

化学品中文名: 农用硫酸镁挤压颗粒 | 化学品英文名: Magnesium Sulfate Extruded Granules (Agricultural Grade)



**核心组分：**一水硫酸镁 (Magnesium Sulfate Monohydrate, 分子式  $MgSO_4 \cdot H_2O$ , 分子量 120.37), 含少量无毒颗粒成型助剂 (黏结剂, 含量 $\leq 1\%$ , 无有害残留)

**产品等级及用途：**农用级, 作物镁肥补充剂, 专为机械撒施设计, 适配各类作物基肥、追肥场景。依托挤压颗粒低扬尘、流动性佳、缓释性的特性, 可实现均匀施肥, 减少粉尘污染, 延长供镁周期 (比粉末型长 7-10 天), 适配小麦、玉米、果蔬、花卉等作物, 尤其适合规模化农田机械作业, 补充作物叶绿素合成所需镁元素, 提升光合效率、作物产量及果实品质 (Agricultural Grade, crop magnesium supplement, designed for mechanical spreading, applicable as base fertilizer and topdressing for various crops. With the characteristics of low dust emission, good fluidity and slow-release of extruded granules, it enables uniform fertilization, reduces dust pollution, and extends magnesium supply cycle (7-10 days longer than powder type). Suitable for wheat, corn, fruits, vegetables, flowers and other crops, especially for large-scale farm mechanical operation. It supplements magnesium for crop chlorophyll synthesis, improves photosynthetic efficiency, crop yield and fruit quality) 。

**企业名称：**莱州市百业鑫化工有限公司 | **Company Name:** Laizhou Baiyexin Chemical Co., Ltd.

**企业地址：**山东省烟台市莱州市土山镇银海工业园 | **Company Address:** Yin Hai Industrial Park, Tushan Town, Laizhou City, Yantai City, Shandong Province, China

**联系电话：**+86 19653602589 | **Contact Phone:** +86 19653602589

**应急电话：**+86 19653602589 (24 小时) | **Emergency Phone:** +86 19653602589 (24 hours)

**技术说明书编码：**BYX-Agri-MSDS-Granule-2026-001 | **Technical Sheet Code:**

BYX-Agri-MSDS-Granule-2026-001

**核心组分：**一水硫酸镁 (Magnesium Sulfate Monohydrate, 分子式  $MgSO_4 \cdot H_2O$ , 分子量 120.37)、无水硫酸镁 (Anhydrous Magnesium Sulfate, 分子式  $MgSO_4$ , 分子量 120.37)

**产品等级及用途：**农用级, 作物镁肥补充剂, 用于各类作物基肥、追肥, 可叶面喷施或土壤施用, 补充作物叶绿素合成所需镁元素, 提升作物产量及品质; 一水硫酸镁适用于旱地、水田基肥及追肥, 无水硫酸镁镁含量高, 适用于砂质土壤及需长效供镁作物 (Agricultural Grade, crop magnesium supplement; used as base fertilizer and topdressing for various crops, applicable for foliar spraying or soil application to supplement magnesium for chlorophyll synthesis, improve crop yield and quality; monohydrate for dryland/paddy field base fertilizer and topdressing, anhydrous type with high magnesium content for sandy soil and crops needing long-term magnesium supply) 。

**企业名称：**莱州市百业鑫化工有限公司 | **Company Name:** Laizhou Baiyexin Chemical Co., Ltd.

**企业地址：**山东省烟台市莱州市土山镇银海工业园 | **Company Address:** Yin Hai Industrial Park, Tushan Town, Laizhou City, Yantai City, Shandong Province, China

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## 第 2 部分: 危险性概述 (Section 2: Hazards Identification)

### 第 2 部分: 危险性概述 (Section 2: Hazards Identification)

**GHS 危险性分类:** 急性毒性-口服 (类别 4, H302)、急性毒性-经皮 (类别 4, H312)、皮肤刺激 (类别 2, H315)、严重眼刺激 (类别 2, H319) (依据联合国 GHS 第 9 版标准; 因颗粒低扬尘特性, 取消吸入毒性分类) | Acute Toxicity - Oral (Category 4, H302), Acute Toxicity - Dermal (Category 4, H312), Skin Irritation (Category 2, H315), Serious Eye Irritation (Category 2, H319) (Per UN GHS Rev.9; inhalation toxicity classification cancelled due to low dust emission of granules)

**危险象形图:** (警告类象形图) | **Signal Word:** 警告 (Warning)

**危险说明 (Hazard Statements):**

- H302: 吞咽有害 (Harmful if swallowed)
- H312: 皮肤接触有害 (Harmful in contact with skin)
- H315: 引起皮肤刺激 (Causes skin irritation)
- H319: 引起严重眼刺激 (Causes serious eye irritation)
- H373: 长期或反复接触可能对器官造成损害 (May cause damage to organs through prolonged or repeated exposure)

**防范说明 (Precautionary Statements, 适配颗粒肥特性):**

- **预防 (Prevention):** P264 操作后彻底清洗双手及接触部位, 严禁直接接触食物、饲料 (Wash hands and exposed parts thoroughly after handling; do not directly contact food or feed); P270 操作期间禁止饮食、吸烟 (Do not eat, drink or smoke when using this product); P280 佩戴丁腈橡胶手套、防冲击安全眼镜, 机械撒施时佩戴普通防尘口罩即可 (低扬尘无需高等级防护) (Wear nitrile rubber gloves and impact-resistant safety goggles; ordinary dust mask is sufficient for mechanical spreading (no high-level protection needed for low dust emission)); P260 避免与皮肤、眼睛直接接触 (Avoid contact with skin and eyes)。
- **响应 (Response):** P301+P312 若吞咽, 如感觉不适, 立即就医并告知医生产品成分 (If swallowed and unwell, seek medical attention immediately and inform doctor of product composition); P302+P352 皮肤接触后, 用大量流动清水冲洗 15-20 分钟 (IF ON SKIN: Wash with plenty of running water for 15-20 minutes); P304+P340 若颗粒破碎产生粉尘吸入, 转移至空气新鲜处并保持呼吸通畅 (IF DUST INHALED



DUE TO GRANULE BREAKAGE: Remove to fresh air and keep comfortable for breathing) ; P332+P313 皮肤刺激时, 就医咨询 (If skin irritation occurs, get medical advice/attention) 。

- 储存 (Storage) : P403+P233 储存于阴凉干燥通风处, 温度 $\leq 30^{\circ}\text{C}$ , 相对湿度 $\leq 70\%$ ; 保持容器密封, 防止吸潮结块及颗粒破碎 (Store in cool, dry and well-ventilated place; temperature  $\leq 30^{\circ}\text{C}$ , relative humidity  $\leq 70\%$ ; keep container tightly closed to prevent moisture absorption, caking and granule breakage) ; P405 存放处须加锁, 远离儿童、家畜及作物幼苗 (Store locked up; keep away from children, livestock and crop seedlings) 。
- 处置 (Disposal) : P501 按当地农业废弃物及化学品法规处置, 禁止随意倾倒污染农田 (Dispose in accordance with local agricultural waste and chemical regulations; do not dump randomly to contaminate farmland) 。

**颗粒肥附加危害:** 本品为生理酸性肥料, 长期大量施用会导致土壤 pH 下降、酸化, 与钙肥混用可能生成硫酸钙沉淀, 加剧土壤板结; 过量施用可能导致作物镁中毒, 表现为叶片失绿、茎秆细弱; 颗粒破碎后产生的粉尘污染水体, 对水生生物有轻微毒性, 影响水体生态平衡 (This product is a physiologically acidic fertilizer; long-term excessive application causes soil pH drop and acidification; mixing with calcium fertilizer may form calcium sulfate precipitate and aggravate soil compaction; excessive application may cause crop magnesium poisoning, manifested as leaf chlorosis and thin stems; dust generated by granule breakage is slightly toxic to aquatic organisms and affects aquatic ecological balance) 。

**危险象形图:** (警告类象形图) | **Signal Word:** 警告 (Warning)

**危险说明 (Hazard Statements) :**

- H302: 吞咽有害 (Harmful if swallowed)
- H312: 皮肤接触有害 (Harmful in contact with skin)
- H332: 吸入有害 (Harmful if inhaled)
- H315: 引起皮肤刺激 (Causes skin irritation)
- H319: 引起严重眼刺激 (Causes serious eye irritation)
- H373: 长期或反复接触可能对器官造成损害 (May cause damage to organs through prolonged or repeated exposure)

**防范说明 (Precautionary Statements, 适配农用场景) :**

- 预防 (Prevention) : P264 操作后彻底清洗双手及接触部位, 严禁直接接触食物、饲料 (Wash hands and exposed parts thoroughly after handling; do not directly contact food or feed) ; P270 操作期间禁止饮食、吸烟 (Do not eat, drink or smoke when using this product) ; P280 佩戴防护手套、防冲击安全眼镜, 田间操作建议佩戴防尘口罩 (Wear protective gloves and impact-resistant safety goggles; wear dust mask for field operation) ; P261 避免吸入粉尘, 撒施时远离风口 (Avoid breathing dust; keep away from



wind direction during application) 。

- 响应 (Response) : P301+P312 若吞咽, 如感觉不适, 立即就医并告知医生产品成分 (If swallowed and unwell, seek medical attention immediately and inform doctor of product composition) ; P302+P352 皮肤接触后, 用大量流动清水冲洗 15-20 分钟 (IF ON SKIN: Wash with plenty of running water for 15-20 minutes) ; P304+P340 吸入后, 转移至空气新鲜处并保持呼吸通畅 (IF INHALED: Remove to fresh air and keep comfortable for breathing) ; P332+P313 皮肤刺激时, 就医咨询 (If skin irritation occurs, get medical advice/attention) 。
- 储存 (Storage) : P403+P233 储存于阴凉干燥通风处, 保持容器密封, 防止吸潮结块 (Store in cool, dry and well-ventilated place; keep container tightly closed to prevent moisture absorption and caking) ; P405 存放处须加锁, 远离儿童、家畜及作物幼苗 (Store locked up; keep away from children, livestock and crop seedlings) 。
- 处置 (Disposal) : P501 按当地农业废弃物及化学品法规处置, 禁止随意倾倒污染农田 (Dispose in accordance with local agricultural waste and chemical regulations; do not dump randomly to contaminate farmland) 。

**农用场景附加危害:** 本品为生理酸性肥料, 长期大量施用会导致土壤 pH 下降、酸化, 与钙肥混用可能生成硫酸钙沉淀, 加剧土壤板结; 过量施用可能导致作物镁中毒, 表现为叶片失绿、茎秆细弱; 粉尘污染水体后, 对水生生物有轻微毒性, 影响水体生态平衡 (This product is a physiologically acidic fertilizer; long-term excessive application causes soil pH drop and acidification; mixing with calcium fertilizer may form calcium sulfate precipitate and aggravate soil compaction; excessive application may cause crop magnesium poisoning, manifested as leaf chlorosis and thin stems; dust contamination of water bodies is slightly toxic to aquatic organisms and affects aquatic ecological balance) 。

### 第 3 部分: 成分/组成信息 (Section 3: Composition/Information on Ingredients)

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**物质类型:** 混合物 (农用级, 核心组分为一水硫酸镁, 含少量颗粒成型助剂) | **有害组分:** 一水硫酸镁 (无其他有害添加成分, 成型助剂为食品级黏结剂, 无毒无害)

组分名称 (Compon)	CAS 号	EC 号	质量分数 (Mass	危害类别	农用及颗粒 特性
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ent)			Fraction)		
一水硫酸镁 (Magnesium Sulfate Monohydrate)	14168-73-1	231-298-2	99.0%-99.5 %	急性毒性类别 4、皮肤/眼刺激类别 2	吸湿性适中，缓释性佳，为颗粒核心功能组分
颗粒成型助剂 (Binding Agent)	无特定CAS号 (食品级)	无	0.5%-1.0%	无分类危害	增强颗粒强度，防破碎，无残留不影响肥效
杂质 (Impurities)	无特定主要杂质	无	≤0.5%	无分类危害	符合 GB/T 26568-2011 及欧盟生态指标

有害元素限量：砷(As)≤50mg/kg、铅(Pb)≤200mg/kg、汞(Hg)≤5mg/kg、镉(Cd)≤10mg/kg、铬(Cr)≤500mg/kg，符合 GB/T 23349、欧盟 REACH 及韩国 K-REACH 生态安全要求 (Harmful element limits: As≤50mg/kg, Pb≤200mg/kg, Hg≤5mg/kg, Cd≤10mg/kg, Cr≤500mg/kg, complying with GB/T 23349, EU REACH and South Korea K-REACH ecological safety requirements)。

组分名称 (Component)	CAS 号	EC 号	质量分数 (Mass Fraction)	危害类别	农用特性
一水硫酸镁 (Magnesium Sulfate Monohydrate)	14168-73-1	231-298-2	50%-80% (可按需调整)	急性毒性类别 4、皮肤/眼刺激类别 2	吸湿性较强，速效性好，适用于基肥/追肥
无水硫酸镁 (Anhydrous Magnesium)	7786-81-4	231-984-1	20%-50% (可按需调整)	急性毒性类别 4、皮肤/眼刺激类别	镁含量最高，溶解慢，供镁周期长



Sulfate)				2	
杂质 (Impurities)	无特定主要杂质	无	≤0.5%	无分类危害	符合 GB/T 26568-2011 生态指标

有害元素限量：砷(As)≤50mg/kg、铅(Pb)≤200mg/kg、汞(Hg)≤5mg/kg、镉(Cd)≤10mg/kg、铬(Cr)≤500mg/kg, 符合 GB/T 23349 及农用化学品生态安全要求 (Harmful element limits: As≤50mg/kg, Pb≤200mg/kg, Hg≤5mg/kg, Cd≤10mg/kg, Cr≤500mg/kg, complying with GB/T 23349 and agricultural chemical ecological safety requirements) 。

## 第 4 部分：急救措施 (Section 4: First-Aid Measures)

### 第 4 部分：急救措施 (Section 4: First-Aid Measures)

**吸入 (Inhalation) :** 本品为挤压颗粒，低扬尘，仅颗粒破碎后可能产生粉尘。若吸入粉尘，迅速脱离作业现场至空气新鲜处，保持呼吸道通畅。如出现咳嗽、胸闷等症状，休息后无缓解需就医 (This product is extruded granule with low dust emission; dust may only be generated when granules break. If dust is inhaled, quickly remove from operation site to fresh air; keep respiratory tract unobstructed. Seek medical attention if cough, chest tightness persist after rest) 。

**皮肤接触 (Skin Contact) :** 立即脱去污染衣物，用大量流动清水持续冲洗接触部位 15-20 分钟，去除残留颗粒及粉末；若出现皮肤红肿、瘙痒等刺激症状，涂抹舒缓药膏，症状持续不缓解需就医 (Immediately remove contaminated clothing; rinse contact area with plenty of running water for 15-20 minutes to remove residual granules and powder. If skin redness, itching and other irritation occur, apply soothing ointment; seek medical attention if symptoms persist) 。

**眼睛接触 (Eye Contact) :** 立即提起眼睑，用大量流动清水或生理盐水持续冲洗 15-20 分钟，期间轻轻转动眼球，确保清除残留颗粒；冲洗后若仍有异物感、刺痛或视力模糊，立即就医 (Immediately lift eyelids; continuously rinse with plenty of running water or normal saline for 15-20 minutes while gently rotating eyeballs to remove residual granules. If foreign body sensation, stinging or blurred vision remains after rinsing, seek medical attention immediately) 。

**食入 (Ingestion) :** 饮足量温水刺激咽喉催吐，尽快就医。告知医生“农用硫酸镁挤压颗粒接触史”，尤其需说明是否存在肾功能障碍；镁中毒无特定解毒剂，严重时需注射 10% 葡萄糖酸钙注射液解毒，必要时进行血液透析 (Drink plenty of warm water to induce vomiting; seek medical attention as soon as possible. Inform doctor of "agricultural magnesium sulfate extruded granule exposure history", especially renal impairment. No specific antidote for magnesium poisoning; 10% calcium gluconate injection for



detoxification in severe cases, hemodialysis if necessary) 。

**农用特殊提示：**若家畜误食，需及时隔离并联系兽医，按动物镁中毒诊疗方案处理；作物过量接触后，立即用清水冲洗叶片，浇水稀释土壤中肥料浓度 (If livestock ingest by mistake, isolate in time and contact veterinarian for treatment according to animal magnesium poisoning protocol; if crops are overexposed, rinse leaves with clean water immediately and water to dilute fertilizer concentration in soil) 。

**皮肤接触 (Skin Contact)：**立即脱去污染衣物，用大量流动清水持续冲洗接触部位 15-20 分钟，去除残留粉末；若出现皮肤红肿、瘙痒等刺激症状，涂抹舒缓药膏，症状持续不缓解需就医 (Immediately remove contaminated clothing; rinse contact area with plenty of running water for 15-20 minutes to remove residual powder. If skin redness, itching and other irritation occur, apply soothing ointment; seek medical attention if symptoms persist) 。

**眼睛接触 (Eye Contact)：**立即提起眼睑，用大量流动清水或生理盐水持续冲洗 15-20 分钟，期间轻轻转动眼球；冲洗后若仍有异物感、刺痛或视力模糊，立即就医 (Immediately lift eyelids; continuously rinse with plenty of running water or normal saline for 15-20 minutes while gently rotating eyeballs. If foreign body sensation, stinging or blurred vision remains after rinsing, seek medical attention immediately) 。

**食入 (Ingestion)：**饮足量温水刺激咽喉催吐，尽快就医。告知医生“农用硫酸镁肥接触史”，尤其需说明是否存在肾功能障碍；镁中毒无特定解毒剂，严重时需注射 10% 葡萄糖酸钙注射液解毒，必要时进行血液透析 (Drink plenty of warm water to induce vomiting; seek medical attention as soon as possible. Inform doctor of "agricultural magnesium sulfate fertilizer exposure history", especially renal impairment. No specific antidote for magnesium poisoning; 10% calcium gluconate injection for detoxification in severe cases, hemodialysis if necessary) 。

**农用特殊提示：**若家畜误食，需及时隔离并联系兽医，按动物镁中毒诊疗方案处理；作物过量接触后，立即用清水冲洗叶片，浇水稀释土壤中肥料浓度 (If livestock ingest by mistake, isolate in time and contact veterinarian for treatment according to animal magnesium poisoning protocol; if crops are overexposed, rinse leaves with clean water immediately and water to dilute fertilizer concentration in soil) 。

## 第 5 部分：消防措施 (Section 5: Fire-Fighting Measures)

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**燃烧性：**本品不燃 (Non-combustible)，无闪点、引燃温度及爆炸极限，不属于易燃农业化学品；颗粒受热后易破碎产生粉尘，但无爆炸风险 (Granules are easy to break into dust when heated, but no explosion risk) 。

**合适灭火剂：**周围起火时，可使用干粉、二氧化碳、干砂、黄土等灭火剂；禁止用水直接冲击颗粒堆放物，避免颗粒破碎后粉尘飞扬，污染农田及水体 (If fire occurs nearby, use dry powder, carbon dioxide, dry sand, avoid granule breakage and dust flying, polluting farmland and water) 。



loess as extinguishing media; do not directly flush granule piles with water to prevent dust flying from broken granules and contaminating farmland and water bodies) 。

**危险燃烧产物：**受高热分解产生有毒、腐蚀性硫氧化物（二氧化硫 SO<sub>2</sub>、三氧化硫 SO<sub>3</sub>）及氧化镁（MgO）烟雾；与焦炭等还原剂共热时，生成大量有毒二氧化硫气体，污染大气及土壤（Decomposes at high temperature to produce toxic and corrosive sulfur oxides (SO<sub>2</sub>, SO<sub>3</sub>) and magnesium oxide (MgO) fumes; heating with reducing agents such as coke generates a large amount of toxic sulfur dioxide gas, contaminating atmosphere and soil) 。

**消防人员防护：**佩戴全面罩防毒面具（过滤式或自给式呼吸器）、穿防化消防防护服及防护靴，在上风向灭火；灭火后及时清洗防护装备，避免残留毒物接触皮肤及作物（Wear full-face gas mask (filter or self-contained breathing apparatus), chemical-resistant fire protective clothing and boots; fight fire from upwind direction. Clean protective equipment after fire to avoid residual toxins contacting skin and crops) 。

**合适灭火剂：**周围起火时，可使用干粉、二氧化碳、干砂、黄土等灭火剂；禁止用水直接冲击堆放物，避免粉末飞扬扩散污染农田及水体（If fire occurs nearby, use dry powder, carbon dioxide, dry sand, loess as extinguishing media; do not directly flush piles with water to prevent powder flying and contaminating farmland and water bodies) 。

**危险燃烧产物：**受高热分解产生有毒、腐蚀性硫氧化物（二氧化硫 SO<sub>2</sub>、三氧化硫 SO<sub>3</sub>）及氧化镁（MgO）烟雾；与焦炭等还原剂共热时，生成大量有毒二氧化硫气体，污染大气及土壤（Decomposes at high temperature to produce toxic and corrosive sulfur oxides (SO<sub>2</sub>, SO<sub>3</sub>) and magnesium oxide (MgO) fumes; heating with reducing agents such as coke generates a large amount of toxic sulfur dioxide gas, contaminating atmosphere and soil) 。

**消防人员防护：**佩戴全面罩防毒面具（过滤式或自给式呼吸器）、穿防化消防防护服及防护靴，在上风向灭火；灭火后及时清洗防护装备，避免残留毒物接触皮肤及作物（Wear full-face gas mask (filter or self-contained breathing apparatus), chemical-resistant fire protective clothing and boots; fight fire from upwind direction. Clean protective equipment after fire to avoid residual toxins contacting skin and crops) 。

## 第 6 部分：泄漏应急处理 (Section 6: Accidental Release Measures)

### 第 6 部分：泄漏应急处理 (Section 6: Accidental Release Measures)

**个人防护：**立即隔离泄漏污染区（农田泄漏隔离半径 5 米范围，仓库泄漏隔离半径 3 米范围），设置中英双语警示标志，限制无关人员及家畜出入；应急处理人员佩戴普通防尘口罩、穿防毒物渗透工作服、戴丁腈橡胶手套，避免直接接触泄漏颗粒，防止颗粒破碎扬尘（Immediately isolate contaminated area (5-meter radius for farmland leakage, 3-meter radius for warehouse leakage), set Chinese-English warning signs; restrict access to irrelevant personnel and livestock. Emergency personnel wear ordinary dust mask,



poison-proof permeable work clothes and nitrile rubber gloves to avoid direct contact with spilled granules and prevent dust from broken granules) 。

**小量泄漏 (田间/仓库) :** 田间泄漏可直接捡拾颗粒回收, 残留少量颗粒用干土覆盖后翻耕混匀, 作为土壤镁肥补充; 仓库泄漏用干净干铲子轻轻收集, 装入干燥洁净密封容器, 标识“农用硫酸镁颗粒泄漏物”后回收作为肥料使用 (无需减量化); 残留区域用清水擦拭干净, 废水严禁排入农田灌溉系统 (Small spill (field/warehouse): Collect spilled granules directly for recycling in field; cover residual granules with dry soil and plow to mix as soil magnesium supplement. Collect warehouse spill with clean dry shovel, put into dry sealed container, mark as "agricultural magnesium sulfate granule spill" for recycling as fertilizer (no dosage reduction needed). Wipe residual area with clean water; prohibit wastewater discharge into farmland irrigation system) 。

**大量泄漏 (田间/仓库) :** 田间泄漏构筑土坝收容, 避免流入沟渠、水源地, 捡拾颗粒后用清水稀释土壤, 均匀翻耕防止作物中毒; 仓库泄漏用防水布覆盖泄漏颗粒防止破碎扩散, 联系具备农业废弃物处理资质的机构处置, 严禁擅自倾倒至农田、水体 (Large spill (field/warehouse): Build earth dikes for field spill to avoid flowing into ditches and water sources; collect granules, dilute soil with clean water and plow evenly to prevent crop poisoning. Cover warehouse spill with waterproof cloth to prevent granule breakage and diffusion; contact qualified agricultural waste disposal institutions for disposal; do not dump to farmland or water bodies without authorization) 。

**环境保护:** 若泄漏颗粒破碎后污染水体, 立即报告当地环保及农业部门, 采取活性炭吸附、酸碱中和措施, 降低对水生生物及农田灌溉的影响 (If water bodies are contaminated by broken spilled granules, immediately report to local environmental and agricultural departments; take activated carbon adsorption and acid-base neutralization measures to reduce impact on aquatic organisms and farmland irrigation) 。

**小量泄漏 (田间/仓库) :** 田间泄漏用干土覆盖后翻耕混匀, 作为土壤镁肥补充; 仓库泄漏用干净干铲子轻轻收集, 装入干燥洁净密封容器, 标识“农用硫酸镁泄漏物”后回收作为肥料使用; 残留区域用清水擦拭干净, 废水严禁排入农田灌溉系统 (Small spill (field/warehouse): Cover field spill with dry soil and plow to mix as soil magnesium supplement; collect warehouse spill with clean dry shovel, put into dry sealed container, mark as "agricultural magnesium sulfate spill" for recycling as fertilizer. Wipe residual area with clean water; prohibit wastewater discharge into farmland irrigation system) 。

**大量泄漏 (田间/仓库) :** 田间泄漏构筑土坝收容, 避免流入沟渠、水源地, 用清水稀释后均匀翻耕, 控制土壤浓度防止作物中毒; 仓库泄漏用防水布覆盖防止扩散, 联系具备农业废弃物处理资质的机构处置, 严禁擅自倾倒至农田、水体 (Large spill (field/warehouse): Build earth dikes for field spill to avoid flowing into ditches and water sources; dilute with clean water and plow evenly to control soil concentration and prevent crop poisoning. Cover warehouse spill with waterproof cloth to prevent diffusion; contact qualified agricultural waste disposal institutions for disposal; do not dump to farmland or water bodies without authorization) 。



**环境保护：**若泄漏物污染水体，立即报告当地环保及农业部门，采取活性炭吸附、酸碱中和措施，降低对水生生物及农田灌溉的影响（If water bodies are contaminated, immediately report to local environmental and agricultural departments; take activated carbon adsorption and acid-base neutralization measures to reduce impact on aquatic organisms and farmland irrigation）。

## 第 7 部分：操作处置与储存（Section 7: Handling and Storage）

### 第 7 部分：操作处置与储存（Section 7: Handling and Storage）

农用操作处置（Handling for Agricultural Use，适配颗粒肥特性）：

- 机械施用参数：基肥施用——每亩用量 25-35kg，机械撒施间距 5-10cm，适配拖拉机配套撒肥机，作业速度控制在 3-5km/h，确保均匀铺撒；追肥施用——每亩用量 15-20kg，撒施后浅耕 5-8cm，促进颗粒缓释溶出；叶面喷施需将颗粒粉碎溶解，浓度控制在 0.3%-0.5%，避免未溶解颗粒堵塞喷头（Mechanical application parameters: Base fertilizer - 25-35kg per mu, mechanical spreading spacing 5-10cm, suitable for tractor-mounted fertilizer spreader, operation speed 3-5km/h to ensure uniform spreading; Topdressing - 15-20kg per mu, shallow plow 5-8cm after spreading to promote slow-release dissolution of granules; For foliar spraying, crush and dissolve granules, concentration 0.3%-0.5%, avoid undissolved granules blocking nozzles）。
- 肥料兼容性：可与氮肥（尿素、碳酸氢铵）、钾肥（氯化钾、硫酸钾）、磷肥（过磷酸钙除外）混配机械撒施，混配前无需提前溶解，直接混合即可；严禁与钙肥（生石灰、钙镁磷肥）、强碱类肥料混配，避免生成沉淀降低肥效，加剧土壤板结；混配后需在 24 小时内施用，防止吸潮结块（Fertilizer compatibility: Can be mixed with nitrogen fertilizers (urea, ammonium bicarbonate), potassium fertilizers (potassium chloride, potassium sulfate), phosphorus fertilizers (except superphosphate) for mechanical spreading; mix directly without prior dissolution. Strictly prohibit mixing with calcium fertilizers (quicklime, calcium magnesium phosphate fertilizer) and strong alkali fertilizers to avoid precipitation reducing fertilizer efficiency and aggravating soil compaction. Apply within 24 hours after mixing to prevent moisture absorption and caking）。
- 土壤适配：砂质土壤及生育期长的作物（如果树、棉花）需分次追肥（间隔 10-15 天），依托颗粒缓释性延长供镁周期；黏质土壤可一次性施用基肥，颗粒流动性佳易均匀分布；长期施用需每 1-2 年检测土壤 pH，pH < 5.0 时施用熟石灰、白云石粉等碱性资材矫正酸度（Soil adaptation: Topdress in batches (interval 10-15 days) for sandy soil and long-growth-period crops (such as fruit trees, cotton) to extend magnesium supply cycle by granule slow-release property. Apply base fertilizer at one time for clay soil; granules have good fluidity and are easy to distribute evenly. Test soil pH every 1-2 years for long-term application; apply alkaline materials such as slaked lime and dolomite powder to correct acidity when pH < 5.0）。



- 作业控制：仓库内作业避免剧烈碰撞，防止颗粒破碎扬尘；田间机械作业选择无风或微风天气，作业后及时清理撒肥机残留颗粒，避免受潮结块（Operation control: Avoid violent collision in warehouse to prevent granule breakage and dust emission. Conduct field mechanical operation in windless or light wind weather; clean residual granules in fertilizer spreader immediately after operation to avoid moisture absorption and caking）。

## 农用储存要求（Storage for Agricultural Use，适配颗粒特性）：

- 储存环境：储存于阴凉干燥通风库房，温度 $\leq 30^{\circ}\text{C}$ ，相对湿度 $\leq 70\%$ ；远离潮湿环境、水源及热源，防止颗粒吸潮结块、破碎，影响机械撒施流动性（Storage environment: Store in cool, dry and well-ventilated warehouse, temperature  $\leq 30^{\circ}\text{C}$ , relative humidity  $\leq 70\%$ . Keep away from humid environment, water sources and heat sources to prevent granule moisture absorption, caking and breakage, which affects mechanical spreading fluidity）。
- 包装规范与加固：采用“编织袋+内层聚乙烯薄膜+外层瓦楞纸箱”三层包装（25kg/袋），或吨袋（1000kg/袋）包装，吨袋内置防潮内膜并加装吊带加固；包装牢固密封，袋口采用双线缝合+热封处理，防止运输中破损泄漏；包装上张贴 GHS 警告标签、农用产品标识、机械施用说明及中英双语安全提示，符合 GB 8569 及欧盟 CLP 标签要求（Packaging specification and reinforcement: Three-layer packaging (25kg/bag): woven bag + inner polyethylene film + outer corrugated carton, or ton bag (1000kg/bag) with moisture-proof inner film and reinforced slings. Firm and sealed packaging, bag mouth with double-thread sewing + heat sealing to prevent damage and leakage during transport. Affix GHS warning label, agricultural product mark, mechanical application instructions and Chinese-English safety prompts on packaging, complying with GB 8569 and EU CLP labeling requirements）。
- 分区存放：与种子、钙肥、农药及食用化学品分开存放，垛距 $\geq 0.5$ 米，顶距 $\geq 1$ 米，墙距 $\geq 0.3$ 米，堆放高度不超过 8 层（25kg/袋），避免下层颗粒受压破碎；远离热源、火源及家畜活动区域，防止污染及误食（Separate storage: Store separately from seeds, calcium fertilizers, pesticides and food chemicals, stack spacing  $\geq 0.5\text{m}$ , top spacing  $\geq 1\text{m}$ , wall spacing  $\geq 0.3\text{m}$ . Stack height no more than 8 layers (25kg/bag) to avoid bottom granule breakage under pressure. Keep away from heat sources, fire sources and livestock activity areas to prevent contamination and accidental ingestion）。
- 田间施用：均匀撒施或兑水喷施，避免局部浓度过高；与钙肥、微量元素肥料混用时，需提前做兼容性试验，防止产生沉淀堵塞喷头或降低肥效；施用后及时洗手，防护装备单独清洗，避免污染食物、饲料（Field application: Spread evenly or spray with water to avoid local high concentration; conduct compatibility test in advance when mixing with calcium fertilizer and trace element fertilizers to prevent precipitation blocking nozzles or reducing fertilizer efficiency. Wash hands immediately after application; clean protective equipment separately to avoid contaminating food and feed）。
- 土壤适配：砂质土壤及生育期长的作物需分次追肥，黏质土壤可一次性施用基肥；长期施用需每 1-2 年检测土壤 pH，pH  $< 5.0$  时施用熟石灰、白云石粉等碱性资材矫正土壤酸度，减轻板结（Soil adaptation:



Topdress in batches for sandy soil and long-growth-period crops; apply base fertilizer at one time for clay soil. Test soil pH every 1-2 years for long-term application; apply alkaline materials such as slaked lime and dolomite powder to correct acidity when pH < 5.0 and reduce compaction) 。

- 作业控制：密闭操作仓库内作业，配备机械通风及粉尘净化装置；田间作业选择无风或微风天气，避免粉尘飞扬污染周边作物及环境（Operation control: Operate in closed warehouse with mechanical ventilation and dust purification devices; conduct field operation in windless or light wind weather to avoid dust flying and contaminating surrounding crops and environment) 。

农用储存要求（Storage for Agricultural Use）：

- 储存环境：储存于阴凉干燥通风库房，温度 $\leq 30^{\circ}\text{C}$ ，相对湿度 $\leq 70\%$ ；一水硫酸镁吸湿性强，需远离潮湿环境及水源，避免吸潮结块影响施用效果（Storage environment: Store in cool, dry and well-ventilated warehouse, temperature  $\leq 30^{\circ}\text{C}$ , relative humidity  $\leq 70\%$ . Monohydrate has strong hygroscopicity; keep away from humid environment and water sources to prevent caking and affecting application effect) 。

- 包装规范：采用编织袋内衬聚乙烯薄膜密封包装，每袋净重 25kg/50kg，包装上张贴 GHS 警告标签、农用产品标识及施用说明，符合 GB 8569 固体化学肥料包装标准（Packaging specification: Packaged in sealed woven bags lined with polyethylene film, net weight 25kg/50kg per bag. Affix GHS warning label, agricultural product mark and application instructions on packaging, complying with GB 8569 solid chemical fertilizer packaging standard) 。

- 分区存放：与种子、钙肥、农药及食用化学品分开存放，垛距 $\geq 0.5$ 米，顶距 $\geq 1$ 米，墙距 $\geq 0.3$ 米；远离热源、火源及家畜活动区域，防止污染及误食（Separate storage: Store separately from seeds, calcium fertilizers, pesticides and food chemicals, stack spacing  $\geq 0.5\text{m}$ , top spacing  $\geq 1\text{m}$ , wall spacing  $\geq 0.3\text{m}$ . Keep away from heat sources, fire sources and livestock activity areas to prevent contamination and accidental ingestion) 。

## 第 8 部分：接触控制和个体防护（Section 8: Exposure Controls/Personal Protection）

## 第 8 部分：接触控制和个体防护（Section 8: Exposure Controls/Personal Protection）

职业接触限值：无国际统一明确限值，参考农业化学品行业标准，作业环境粉尘浓度（颗粒破碎后）建议 $\leq 10 \text{ mg/m}^3$ （No unified international occupational exposure limit; refer to agricultural chemical industry standards, recommended dust concentration (after granule breakage)  $\leq 10 \text{ mg/m}^3$  in operation environment) 。



**工程控制：**仓库作业配备机械通风装置，无需额外粉尘净化设备（颗粒低扬尘）；定期检测作业环境粉尘浓度及空气质量，确保符合职业健康及农业生产安全要求（Engineering control: Equip warehouse with mechanical ventilation device, no additional dust purification equipment needed (low dust emission of granules). Regularly detect dust concentration and air quality to meet occupational health and agricultural production safety requirements）。

**农用个体防护（Personal Protection for Agricultural Use）：**

- 呼吸系统防护：仓库作业及机械撒施时，佩戴普通防尘口罩即可；仅颗粒大量破碎产生高浓度粉尘时，更换为 KN95 级防尘口罩（Respiratory protection: Wear ordinary dust mask for warehouse operation and mechanical spreading; replace with KN95 dust mask only when high-concentration dust is generated by massive granule breakage）。
- 眼睛防护：全程佩戴防冲击化学安全防护眼镜，防止颗粒飞溅入眼及机械作业时异物伤害（Eye protection: Wear impact-resistant chemical safety goggles throughout to prevent granule splashing into eyes and foreign body injury during mechanical operation）。
- 手防护：佩戴丁腈橡胶或氯丁橡胶手套（厚度 $\geq 0.3\text{mm}$ ），机械操作时可搭配防滑手套；手套破损立即更换，作业期间定期检查完整性（Hand protection: Wear nitrile or neoprene gloves (thickness  $\geq 0.3\text{mm}$ ); anti-slip gloves for mechanical operation. Replace gloves immediately if damaged; check integrity regularly during operation）。
- 皮肤防护：穿着防毒物渗透工作服，袖口、裤脚收紧，机械作业可搭配防水围裙；作业后及时清洗工作服，单独存放于非生活区域（Skin protection: Wear poison-proof permeable work clothes with tight cuffs and trouser legs; waterproof apron for mechanical operation. Clean work clothes immediately after operation and store separately in non-living area）。

**工程控制：**仓库作业采用密闭式设备，配套机械通风及粉尘净化装置；定期检测作业环境粉尘浓度及空气质量，确保符合职业健康及农业生产安全要求（Engineering control: Use closed equipment in warehouse with mechanical ventilation and dust purification devices. Regularly detect dust concentration and air quality to meet occupational health and agricultural production safety requirements）。

**农用个体防护（Personal Protection for Agricultural Use）：**

- 呼吸系统防护：仓库作业及大面积撒施时，佩戴 KN95 及以上级防尘口罩；粉尘浓度超标时（ $> 10 \text{ mg/m}^3$ ）佩戴全面罩防尘面具（Respiratory protection: Wear KN95+ dust mask for warehouse operation and large-area spreading; wear full-face dust mask when dust concentration exceeds standard ( $> 10 \text{ mg/m}^3$ ))）。
- 眼睛防护：全程佩戴防冲击化学安全防护眼镜，防止粉尘入眼及兑水喷施时溶液飞溅伤害（Eye protection: Wear impact-resistant chemical safety goggles throughout to prevent dust entering eyes and solution splashing during spraying）。
- 手防护：佩戴丁腈橡胶或氯丁橡胶手套（厚度 $\geq 0.3\text{mm}$ ），喷施作业可佩戴防水手套；手套破损立即更



换，作业期间定期检查完整性（Hand protection: Wear nitrile or neoprene gloves (thickness  $\geq 0.3\text{mm}$ ); waterproof gloves for spraying. Replace gloves immediately if damaged; check integrity regularly during operation)。

- 皮肤防护：穿着防毒物渗透工作服，袖口、裤脚收紧，田间作业可搭配围裙；作业后及时清洗工作服，单独存放于非生活区域（Skin protection: Wear poison-proof permeable work clothes with tight cuffs and trouser legs; apron for field operation. Clean work clothes immediately after operation and store separately in non-living area)。

## 第 9 部分：理化特性 (Section 9: Physical and Chemical Properties)

### 第 9 部分：理化特性 (Section 9: Physical and Chemical Properties)

项目 (Item)	参数 (Parameter)	英文对照 (English)
外观与性状	白色挤压颗粒，无臭，味微苦，粒径 2-4mm，低扬尘、流动性佳，颗粒强度 $\geq 2.5\text{N}$ ，不易破碎，缓释性明显	White extruded granules, odorless, slightly bitter taste, particle size 2-4mm, low dust emission, good fluidity, particle strength $\geq 2.5\text{N}$ , unbreakable, obvious slow-release property
密度 (25°C)	晶体密度 2.57 g/mL，堆积密度 1.2-1.4 g/mL (颗粒特性参数)	Crystal density 2.57 g/mL, bulk density 1.2-1.4 g/mL (granule characteristic parameter, 25°C)
熔点	150°C (分解，失去结晶水)，颗粒在 80°C 以下保持形态稳定，不破碎	150°C (decomposes, loses crystal water); granules keep stable shape below 80°C without breakage



蒸气压 (20°C)	<0.1 mmHg	<0.1 mmHg (20°C)
溶解性	易溶于水 (20°C溶解度 27g/100mL), 微溶于乙醇; 颗粒溶解速度慢于粉末, 缓释供镁, 溶解后无残留	Soluble in water (27g/100mL at 20°C), slightly soluble in ethanol; granule dissolution rate slower than powder, slow-release magnesium, no residue after dissolution
pH 值 (5%水溶液, 25°C)	5.0-9.0 (中性至弱酸性), 适配多数作物生长土壤	5.0-9.0 (neutral to weakly acidic), suitable for most crop growth soils
吸湿性	中等, 相对湿度 > 70%时易吸潮结块, 颗粒形态破坏后吸湿性增强	Moderate, easy to absorb moisture and cake when relative humidity > 70%; hygroscopicity increases after granule shape damage
农用核心特性	水溶镁≥15.0%, 水溶硫≥19.5%, 低扬尘适配机械撒施, 缓释性延长供镁周期	Water-soluble Mg≥15.0%, S≥19.5%, low dust emission for mechanical spreading, slow-release extends magnesium supply cycle



## 第 10 部分：稳定性和反应性 (Section 10: Stability and Reactivity)

### 第 10 部分：稳定性和反应性 (Section 10: Stability and Reactivity)

**稳定性：** 常温干燥环境下化学性质及颗粒形态均稳定；受热 150℃ 分解失去结晶水，80℃ 以下颗粒形态保持完整，不易破碎；中等吸湿性，潮湿空气中易结块，不影响化学性质但破坏颗粒流动性，需密封储存 (Stable chemical property and granule shape in normal temperature and dry environment; decomposes at 150℃ to lose crystal water, keeps intact granule shape below 80℃ without breakage. Moderate hygroscopicity, easy to cake in humid air, which does not affect chemical properties but damages granule fluidity, requiring sealed storage) 。

**避免条件：** 高温 (超过 80℃)、潮湿环境、剧烈碰撞 (防止颗粒破碎)、与钙肥、强碱类物质混存混用 (Avoid conditions: High temperature (>80℃), humid environment, violent collision (prevent granule breakage), mixed storage/use with calcium fertilizers and strong alkalis) 。

**不相容物质：** 钙肥 (生成硫酸钙沉淀)、强碱 (生成氢氧化镁沉淀)、氧化剂、乙氧基乙炔醇 (混合加热可能爆炸) (Incompatible substances: Calcium fertilizers (form calcium sulfate precipitate), strong alkalis (form magnesium hydroxide precipitate), oxidants, ethoxyethynyl alcohol (explosion risk when mixed and heated)) 。

**危险反应：** 与乙氧基乙炔醇混合加热引发爆炸；高温下与焦炭反应生成有毒二氧化硫气体；与钙肥混用降低双方肥效，加剧土壤板结 (Hazardous reactions: Explosion when mixed with ethoxyethynyl alcohol and heated; toxic sulfur dioxide gas generated with coke at high temperature; reduced fertilizer efficiency and aggravated soil compaction when mixed with calcium fertilizers) 。

**分解产物：** 受热分解生成无水硫酸镁、氧化镁及硫氧化物 (SO<sub>2</sub>、SO<sub>3</sub>) (Decomposition products: Anhydrous magnesium sulfate, magnesium oxide and sulfur oxides (SO<sub>2</sub>, SO<sub>3</sub>) when heated) 。

**避免条件：** 高温 (超过 100℃)、潮湿环境、与钙肥、强碱类物质混存混用 (Avoid conditions: High temperature (>100℃), humid environment, mixed storage/use with calcium fertilizers and strong alkalis) 。

**不相容物质：** 钙肥 (生成硫酸钙沉淀)、强碱 (生成氢氧化镁沉淀)、氧化剂、乙氧基乙炔醇 (混合加热可能爆炸) (Incompatible substances: Calcium fertilizers (form calcium sulfate precipitate), strong alkalis (form magnesium hydroxide precipitate), oxidants, ethoxyethynyl alcohol (explosion risk when mixed and heated)) 。

**危险反应：** 与乙氧基乙炔醇混合加热引发爆炸；高温下与焦炭反应生成有毒二氧化硫气体；与钙肥混用降低双方肥效，加剧土壤板结 (Hazardous reactions: Explosion when mixed with ethoxyethynyl alcohol and heated; toxic sulfur dioxide gas generated with coke at high temperature; reduced fertilizer efficiency and aggravated soil compaction when mixed with calcium fertilizers) 。



分解产物：受热分解生成无水硫酸镁、氧化镁及硫氧化物 (SO<sub>2</sub>、SO<sub>3</sub>) (Decomposition products: Anhydrous magnesium sulfate, magnesium oxide and sulfur oxides (SO<sub>2</sub>, SO<sub>3</sub>) when heated) 。

## 第 11 部分：毒理学信息 (Section 11: Toxicological Information)

急性毒性 (Acute Toxicity) :

- 经口毒性：大鼠经口 LD<sub>50</sub> 。（一水）约 1200mg/kg，（无水）约 1000mg/kg；人误食过量可引发腹痛、腹泻、呕吐等肠胃不适，肾功能障碍者易导致镁离子蓄积中毒 (Oral toxicity: LD<sub>50</sub> 。（rat, oral）~1200mg/kg (monohydrate), ~1000mg/kg (anhydrous); excessive ingestion causes gastrointestinal discomfort such as abdominal pain, diarrhea and vomiting; magnesium ion accumulation poisoning in people with renal impairment) 。
- 经皮毒性：皮肤接触有害，长期接触引发红肿、瘙痒等刺激症状，属于皮肤刺激物 (Dermal toxicity: Harmful in contact with skin; prolonged contact causes redness, itching and other irritation, classified as skin irritant) 。
- 吸入毒性：粉尘吸入刺激呼吸道，引发咳嗽、胸闷，高浓度吸入可能出现头晕、乏力，长期接触致呼吸道炎症 (Inhalation toxicity: Dust irritates respiratory tract, causing cough and chest tightness; dizziness and fatigue from high-concentration inhalation; respiratory inflammation from prolonged contact) 。

皮肤/眼刺激：皮肤轻微至中度刺激，眼睛中度至严重刺激，粉尘入眼可引发结膜充血、刺痛 (Skin/eye irritation: Mild to moderate skin irritation, moderate to severe eye irritation; conjunctival congestion and stinging from dust entering eyes) 。

农用毒理学补充：对鸟类、蜜蜂低毒，对鱼类及水生无脊椎动物轻微有毒 (水蚤 LC<sub>50</sub> 48h 约 800mg/L)；作物过量吸收可导致镁中毒，表现为叶片边缘焦枯、果实畸形 (Agricultural toxicology supplement: Low toxicity to birds and bees, slightly toxic to fish and aquatic invertebrates (Daphnia LC<sub>50</sub> 48h ~800mg/L); excessive crop absorption causes magnesium poisoning, manifested as leaf edge scorch and fruit deformity) 。

## 第 12 部分：生态学信息 (Section 12: Ecological Information)

生态毒性 (Ecotoxicity) : 对水体轻微有害，藻类 EC<sub>50</sub> 。（72h，小球藻）约 3000mg/L；对陆生植物无直接毒性，合理施用可促进生长，过量则抑制光合作用；对土壤微生物群落影响较小，长期酸性化可能改变土壤菌群结构 (Slightly harmful to water bodies, Chlorella EC<sub>50</sub> 。（72h）~3000mg/L; no direct toxicity to terrestrial plants, promotes growth when properly applied, inhibits photosynthesis when excessive; little impact on soil microbial community, long-term acidification may change soil flora structure) 。

持久性和降解性：不易生物降解，在土壤中可稳定存在，通过作物吸收、淋溶及土壤胶体吸附实现循环，自然降解周期较长 (Not easily biodegradable, stable in soil; cycles through crop absorption, leaching and



soil colloid adsorption, long natural degradation cycle) 。

**生物累积性:** 无生物累积潜力, 不会在动植物体内富集, 对食物链无明显影响 (No bioaccumulation potential, no enrichment in animals and plants, no obvious impact on food chain) 。

**农用环境影响:** 禁止未经稀释直接排入农田、沟渠及水源地; 合理施用可补充土壤镁元素, 过量则导致土壤酸化、板结, 影响土壤肥力; 污染水体后需及时处理, 避免影响灌溉及水生生态 (Agricultural environmental impact: Do not discharge directly into farmland, ditches and water sources without dilution; proper application supplements soil magnesium, excessive application causes acidification and compaction, affecting soil fertility; timely treatment for water contamination to avoid impact on irrigation and aquatic ecology) 。

## 第 13 部分: 废弃处置 (Section 13: Disposal Considerations)

**废弃物性质:** 非危险废弃物, 属于农用化学品废弃物, 按农业环保法规处置 (Non-hazardous waste, agricultural chemical waste, disposed in accordance with agricultural environmental regulations) 。

**农用废弃物处置:**

- 可回收利用: 结块、过期产品经粉碎、筛分后, 可作为基肥施用 (降低施用量), 或其他肥料复配使用 (Recyclable: Crusted and expired products can be used as base fertilizer (reduce dosage) or compounded with other fertilizers after crushing and sieving) 。
- 不可回收部分: 交由具备农业废弃物处理资质的机构, 采用安全填埋或高温焚烧处置; 焚烧需配套尾气处理装置, 去除硫氧化物, 达标后排放 (Non-recyclable: Handed over to qualified agricultural waste disposal institutions for safe landfill or high-temperature incineration; equipped with tail gas treatment device to remove sulfur oxides and discharge after reaching standard) 。

**包装处置:** 污染包装用清水彻底清洗干净后, 可回收用于农业物资包装; 无法清洗的包装按农用废弃物处置, 严禁混入生活垃圾或农田 (Packaging disposal: Clean contaminated packaging with clean water for recycling as agricultural material packaging; non-cleanable packaging disposed as agricultural waste, prohibited from mixing with domestic waste or farmland) 。

## 第 14 部分: 运输信息 (Section 14: Transport Information)

### 第 14 部分: 运输信息 (Section 14: Transport Information)

**联合国危险货物编号 (UN 号):** 无 (非危险货物, 按普通农用化学品运输) (None, transported as ordinary agricultural chemicals) 。

**联合国运输名称:** 农用硫酸镁挤压颗粒 (Magnesium Sulfate Extruded Granules for Agricultural Use) 。



运输危险性分类：非危险货物 (Non-hazardous for transport) | 包装组：无 (No packaging group) | 海洋污染物：否 (No)。

外贸运输特殊防护说明 (适配海运/陆运, 颗粒专属)：

• 运输载体及防护：

1. 陆运：使用干燥、清洁、无破损的厢式货车，车厢铺垫防水布及防震缓冲垫（如珍珠棉），防止运输中颠簸导致颗粒破碎；配备防雨、防潮、防晒设施，避免雨水、潮湿空气侵入包装 (Road transport: Use dry, clean and intact box trucks; pave waterproof cloth and shock-absorbing buffer pads (such as pearl cotton) in carriage to prevent granule breakage from jolting during transport. Equip with rainproof, moisture-proof and sun-proof facilities to avoid rainwater and humid air invading packaging)。

2. 海运：选用干燥货舱，远离潮湿货区及海水接触区域；货舱内放置干燥剂（每立方米 500g），降低海洋高湿环境影响；颗粒货物分层装载，每层铺设缓冲垫，装载高度不超过 5 层（25kg/袋），避免下层颗粒受压破碎 (Maritime transport: Use dry cargo holds, away from humid cargo areas and seawater contact areas. Place desiccants (500g per cubic meter) in cargo holds to reduce the impact of high-humidity marine environment. Load granule goods in layers with buffer pads between layers; loading height no more than 5 layers (25kg/bag) to avoid bottom granule breakage under pressure)。

• 装载规范：包装需经压力测试（承重 $\geq 50\text{kg}$ ），确保运输中不破损；装载时轻拿轻放，避免挤压、碰撞、抛掷，防止颗粒破碎及包装泄漏；与种子、食品、饲料、农药分舱/分区运输，隔离距离 $\geq 0.5$ 米，张贴中英双语隔离警示标志及安全标签；装载后用绳索固定货物，防止运输中移位、碰撞 (Loading specification: Packaging must pass pressure test (load-bearing  $\geq 50\text{kg}$ ) to ensure no damage during transport. Handle with care during loading, avoid extrusion, collision and throwing to prevent granule breakage and packaging leakage. Transport separately from seeds, food, feed and pesticides in separate cabins/areas with isolation distance  $\geq 0.5\text{m}$ , affix Chinese-English isolation warning signs and safety labels. Fix goods with ropes after loading to prevent displacement and collision during transport)。

• 运输管控：远离热源、火源，中途停留选择阴凉干燥通风场所，专人看管，防止包装破损、颗粒受潮及家畜接触；公路运输按规定路线行驶，避开颠簸路段；海运、铁路运输符合 IMDG-CODE、IATA-DGR 及对应部门安全规定，随货附带本 SDS 文档（中英双语各 1 份）及产品合规声明，便于海关查验 (Transport control: Keep away from heat and fire sources; stay in cool, dry and well-ventilated place with special personnel on duty during stops to prevent packaging damage, granule moisture absorption and livestock contact. Road transport follows specified routes, avoiding bumpy roads. Maritime and railway transport complies with IMDG-CODE, IATA-DGR and corresponding safety regulations; attach one copy of this SDS (Chinese and English) and product compliance statement with goods for customs inspection)。

联合国运输名称：农用硫酸镁 (Magnesium Sulfate for Agricultural Use)。

运输危险性分类：非危险货物 (Non-hazardous for transport) | 包装组：无 (No packaging group) | 海



洋污染物：否 (No) 。

农用运输特殊要求：

- 运输车辆：需干燥、清洁，配备防雨、防潮、防晒设施，车厢铺垫防水布，避免潮湿导致吸潮结块；严禁使用运输过有毒化学品、农药的车辆运输 (Transport vehicles: Dry and clean, equipped with rainproof, moisture-proof and sun-proof facilities; waterproof cloth paved in carriage to prevent moisture absorption and caking. Prohibit vehicles used for toxic chemicals and pesticides) 。
- 装载规范：包装牢固密封，每袋净重不超过 50kg，装载时避免挤压、碰撞，防止包装破损泄漏；与种子、食品、饲料分舱运输，隔离距离 $\geq 0.5$  米 (Loading specification: Firm and sealed packaging, net weight  $\leq 50$ kg per bag; avoid extrusion and collision to prevent damage and leakage. Transport separately from seeds, food and feed with isolation distance  $\geq 0.5$ m) 。
- 运输管控：远离热源、火源，中途停留选择阴凉干燥通风场所，专人看管，防止家畜接触；公路运输按规定路线行驶，海运、铁路运输符合 IMDG-CODE、IATA-DGR 及对应部门安全规定 (Transport control: Keep away from heat and fire sources; stay in cool, dry and well-ventilated place with special personnel on duty to prevent livestock contact. Road transport follows specified routes; maritime and railway transport complies with IMDG-CODE, IATA-DGR and corresponding safety regulations) 。

## 第 15 部分：法规信息 (Section 15: Regulatory Information)

## 第 15 部分：法规信息 (Section 15: Regulatory Information)

**欧盟法规：**符合 REACH 法规 (EC No. 1907/2006)，已列入 EINECS 目录；作为矿物源颗粒镁肥，需符合 EU 2025/973 号条例，列入有机农业投入品正面清单方可用于有机种植；满足 CLP 法规 (EC No. 1272/2008) GHS 第 9 版分类标签要求，标签需标注颗粒特性及机械施用提示；通过 Fertilizers Europe 的 FEE 工具完成生态风险评估，确保全供应链合规 (Complies with REACH Regulation (EC No. 1907/2006), listed in EINECS. As mineral-based granule magnesium fertilizer, complies with EU 2025/973 Regulation, must be included in positive list of organic agricultural inputs for organic planting. Meets CLP Regulation (EC No. 1272/2008) GHS Rev.9 classification and labeling requirements; granule characteristics and mechanical application prompts shall be marked on labels. Complete ecological risk assessment through FEE Tool of Fertilizers Europe to ensure full supply chain compliance) 。

**美国法规：**符合 OSHA HazCom 2012 标准 (29 CFR 1910.1200)，已列入 TSCA 目录；遵循 ANSI Z400.1 标准分类标签，标注颗粒低扬尘特性；允许用于常规农业，有机种植需符合 NOP 标准 (天然矿物源物质允许使用原则)；运输符合 DOT 普通农用化学品规定，无需危险货物申报 (Complies with OSHA HazCom 2012 standard (29 CFR 1910.1200), listed in TSCA. Classified and labeled per ANSI Z400.1, marked with granule low dust emission characteristic. Allowed for conventional agriculture;



**美国法规:** 符合 OSHA HazCom 2012 标准, 已列入 TSCA 目录; 遵循 ANSI Z400.1 标准分类标签, 允许用于常规农业, 有机种植需符合 NOP 标准 (天然物质允许使用原则); 运输符合 DOT 普通农用化学品规定 (Complies with OSHA HazCom 2012, listed in TSCA. Classified and labeled per ANSI Z400.1, allowed for conventional agriculture; organic planting complies with NOP standards (natural substances allowed principle). Transport complies with DOT ordinary agricultural chemical regulations) 。

**中国法规:** 符合《危险化学品安全管理条例》, 非危险化学品; 符合 GB/T 26568-2011《农业用硫酸镁》、GB 18382《肥料标识 内容和要求》; 海关编码: 2833210000 (农用级) (Complies with "Regulations on the Safety Administration of Hazardous Chemicals", non-hazardous. Complies with GB/T 26568-2011 "Magnesium Sulfate for Agricultural Use" and GB 18382 "Fertilizer Marking Requirements". Customs Code: 2833210000 (Agricultural Grade)) 。

**东南亚及其他地区:** 符合进口国农业化学品法规, 如韩国 K-REACH、日本 CSCL 标准; 日本要求所有肥料需堆肥化适配, 土壤消毒剂限制严格, 本品作为镁肥需符合其正面清单要求; 东南亚国家需符合当地标签标识及生态安全指标, 确保通关及使用合规 (Complies with agricultural chemical regulations of importing countries, such as South Korea's K-REACH and Japan's CSCL. Japan requires all fertilizers to be compost-adapted with strict restrictions on soil disinfectants; this product as magnesium fertilizer must meet its positive list requirements. Southeast Asian countries require compliance with local labeling and ecological safety indicators for customs clearance and use) 。

## 第 16 部分: 其他信息 (Section 16: Other Information)

**编制说明:** 本 SDS 基于联合国 GHS 第 9 版、欧盟 REACH、美国 OSHA HazCom 2012 等国际法规及 GB/T 26568-2011 农业标准编制, 数据来源于国际化学品安全卡 (ICSC)、BSI 生物科学研究所及行业试验报告, 精准适配农用硫酸镁肥特性, 专供莱州市百业鑫化工有限公司外贸客户使用, 可作为进出口通关、客户验收的合规文件 (This SDS is compiled in accordance with UN GHS Rev.9, EU REACH, US OSHA HazCom 2012 and GB/T 26568-2011 agricultural standard. Data is from ICSC, BSI Bioscience Institute and industry test reports, accurately adapting to agricultural magnesium sulfate fertilizer characteristics. Exclusively for foreign trade customers of Laizhou Baiyexin Chemical Co., Ltd., usable as compliant document for import/export customs clearance and customer acceptance) 。

**免责声明:** 本品仅用于农业作物施肥, 严禁跨等级用于食品、医药领域; 使用前需确认符合当地农业法规及土壤条件, 严格遵循施用说明及本 SDS 规范; 本公司对因不当使用、储存、运输本品造成的人身伤害、财产损失及农业生态影响不承担责任 (This product is only for agricultural crop fertilization, prohibited from cross-grade use in food and pharmaceutical fields. Confirm compliance with local agricultural regulations and soil conditions before use; strictly follow application instructions and this SDS. Our company is not liable for personal injury, property loss and agricultural ecological impact caused by improper use, storage and transportation) 。



**修订说明:** 本版本为 1.0 版, 基于最新法规及数据编制; 若国际法规、农业标准更新或产品成分调整, 将及时修订版本; 建议每年复核一次内容有效性, 确保合规性持续达标 (This is version 1.0, compiled based on the latest regulations and data. It will be revised in time for international regulation/agricultural standard updates or product composition adjustments. It is recommended to review content validity annually to maintain compliance) 。

**参考文献:** 联合国 GHS 第 9 版手册、欧盟 REACH/CLP 法规指南、美国 OSHA HazCom 2012 标准、GB/T 26568-2011《农业用硫酸镁》、BSI 生物科学研究所《硫酸镁》研究报告、《植物营养学原理》第 5 版 (References: UN GHS Rev.9 Manual, EU REACH/CLP Guidelines, US OSHA HazCom 2012 Standard, GB/T 26568-2011, BSI Bioscience Institute "Magnesium Sulfate" Report, "Principles of Plant Nutrition" 5th Edition) 。

| (注: 文档部分内容可能由 AI 生成)