



化学品安全技术说明书 Material Safety Data Sheet (MSDS)

产品名称：硫酸镁挤压颗粒 (Magnesium Sulfate Extruded Granules)

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 | 产品等级：农用级 | 版本号：1.0

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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”)

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：Agricultural Magnesium Sulfate Extruded Granules

核心组分：一水硫酸镁 (分子式 $MgSO_4 \cdot H_2O$)，含食品级颗粒成型助剂 (黏结剂，含量 $\leq 1\%$ ，无毒无害，无有害残留)

产品用途：作物镁肥补充剂，专为机械撒施设计，适配小麦、玉米、果蔬、花卉、棉花等各类作物基肥、追肥场景。依托挤压颗粒低扬尘、流动性佳、缓释性特性，实现均匀施肥，减少粉尘污染，延长供镁周期 (较粉末型长 7-10 天)，提升作物叶绿素合成效率、产量及果实品质 (Crop magnesium supplement, designed for mechanical spreading, applicable as base fertilizer and topdressing for wheat, corn, fruits, vegetables, flowers, cotton and other crops. With low dust emission, good fluidity and slow-release properties of extruded granules, it achieves uniform fertilization, reduces dust pollution, extends magnesium supply cycle (7-10 days longer than powder type), and improves crop chlorophyll synthesis efficiency, 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



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SDS 编码: BYX-MS-Granule-2026-001 | **SDS Code:** BYX-MS-Granule-2026-001

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; 因颗粒低扬尘特性, 无吸入毒性分类) (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; no inhalation toxicity classification due to low dust emission of granules)。

危险象形图: (警告类) | **信号词:** 警告 (Warning) | **Signal Word:** 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, 适配颗粒特性):

- 预防 (Prevention):** P264 操作后彻底清洗双手及接触部位, 严禁接触食物、饲料及作物可食用部分 (Wash hands and exposed parts thoroughly after handling; do not contact food, feed or edible parts of crops); 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 避免剧烈碰撞颗粒, 防止破碎扬尘 (Avoid violent collision of granules to prevent breakage and dust emission)。
- 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



皮肤刺激持续不缓解时，就医咨询 (If skin irritation persists, 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 按进口国农业废弃物及化学品法规处置，禁止随意倾倒污染农田、水体 (Dispose in accordance with importing country's agricultural waste and chemical regulations; do not dump randomly to contaminate farmland and water bodies) 。

颗粒肥附加危害：本品为生理酸性肥料，长期大量施用易导致土壤 pH 值下降、酸化；与钙肥混用可能生成硫酸钙沉淀，降低肥效并加剧土壤板结；过量施用可引发作物镁中毒，表现为叶片失绿、茎秆细弱、果实畸形；颗粒破碎后粉尘污染水体，对水生生物有轻微毒性 (水蚤 LC_{50} 48h 约 800mg/L)，需严控泄漏范围 (This product is a physiologically acidic fertilizer; long-term excessive application easily causes soil pH drop and acidification. Mixing with calcium fertilizer may form calcium sulfate precipitate, reducing fertilizer efficiency and aggravating soil compaction. Excessive application may cause crop magnesium poisoning, manifested as leaf chlorosis, thin stems and deformed fruits. Dust from broken granules is slightly toxic to aquatic organisms (Daphnia LC_{50} 48h $\sim 800\text{mg/L}$) after water contamination; strictly control spillage scope) 。

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

物质类型：混合物 (农用级，核心组分为一水硫酸镁，含少量成型助剂) | **有害组分：**一水硫酸镁 (无其他有害添加成分)

组分名称 (Component)	CAS 号	EC 号	质量分数 (Mass Fraction)	危害类别	特性说明
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，水溶镁 $\geq 15.0\%$ ，水



					溶硫 ≥19.5%
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 (≥2.5N) , 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 26568-201 1 及欧盟生 态指标, 重 金属限量: As≤50mg/k g、 Pb≤200mg/ kg、 Hg≤5mg/kg 、 Cd≤10mg/k g

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

吸入 (Inhalation) : 本品低扬尘, 仅颗粒破碎后可能产生粉尘。若吸入粉尘, 立即转移至空气新鲜处, 保持呼吸道通畅。如出现咳嗽、胸闷等症状, 休息后无缓解需及时就医 (This product has low dust emission; dust may only be generated when granules break. If dust is inhaled, immediately move to fresh air and 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, 清除残留颗粒及粉末; 若出现红肿、瘙痒、刺痛等刺激症状, 涂抹无刺激性舒缓药膏, 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 redness, itching, stinging occur, apply non-irritating 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, 轻轻转动眼



球确保清除残留颗粒；冲洗后仍有异物感、刺痛或视力模糊，立即就医检查（Immediately lift eyelids; continuously rinse with plenty of running water or normal saline for 15-20 minutes, gently rotate eyeballs to remove residual granules. Seek medical examination immediately if foreign body sensation, stinging or blurred vision remains after rinsing）。

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，立即隔离并联系兽医，按动物镁中毒诊疗方案处理；作物过量接触后，用清水冲洗叶片，足量浇水稀释土壤肥料浓度，减轻毒害影响（If livestock ingest by mistake, isolate immediately and contact veterinarian for treatment according to animal magnesium poisoning protocol. If crops are overexposed, rinse leaves with clean water and water sufficiently to dilute soil fertilizer concentration and reduce toxic effects）。

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

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（80℃以上）易破碎产生粉尘，但无爆炸风险（Granules are easy to break into dust when heated above 80℃, but no explosion risk）。

合适灭火剂：周围环境起火时，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, 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（> 150℃）分解产生有毒、腐蚀性硫氧化物（SO₂、SO₃）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 (>150℃) to produce toxic and corrosive sulfur oxides (SO₂, SO₃) 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，在上风向位置灭火；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)

个人防护：立即隔离泄漏污染区（田间隔离半径 5 米，仓库隔离半径 3 米），设置中英双语警示标志，限制无关人员及家畜出入；应急人员佩戴普通防尘口罩、防毒物渗透工作服、丁腈橡胶手套，轻拿轻放避免颗粒破碎扬尘，必要时佩戴防护眼镜 (Immediately isolate contaminated area (5-meter radius for farmland, 3-meter radius for warehouse), 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, handle with care to avoid granule breakage and dust emission; wear safety goggles if necessary) 。

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“硫酸镁颗粒泄漏物”后回收施用（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 farmland; 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 "magnesium sulfate granule spill" for recycling. 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，防止流入沟渠、水源地，捡拾颗粒后用清水稀释土壤，均匀翻耕避免作物中毒；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，严禁擅自倾倒入农田、水体 (Large spill (field/warehouse): Build earth dikes for field spill to prevent flowing into ditches and water sources; collect granules, dilute soil with clean water and plow evenly to avoid 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，后续跟踪水体及土壤质量 (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; track water and soil quality subsequently) 。

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

一、农用操作处置（适配颗粒肥特性）

- **机械施用参数：**基肥——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——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 0.3%-0.5%，过滤后施用避免堵塞喷头（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 for uniform spreading; Topdressing - 15-20kg per mu, shallow plow 5-8cm after spreading to promote slow-release dissolution; For foliar spraying, crush and dissolve granules, concentration 0.3%-0.5%, filter before use to avoid 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，直接混合无需提前溶解；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 24 小时内完成施用，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, mixed directly without prior dissolution. Strictly prohibit mixing with calcium fertilizers (quicklime, calcium magnesium phosphate fertilizer) and strong alkalis to avoid precipitation reducing fertilizer efficiency and aggravating soil compaction. Apply within 24 hours after mixing to prevent moisture absorption and caking）。
- **土壤适配性：**砂质土壤及生育期长的作物（如果树、棉花）分次追肥（间隔 10-15 天），依托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；长期施用每 1-2 年检测土壤 pH，pH < 5.0 时施用熟石灰、白云石粉矫正酸度（Soil adaptability: Topdress in batches (interval 10-15 days) for sandy soil and long-growth-period crops (fruit trees, cotton) to extend magnesium supply cycle by slow-release property. Apply base fertilizer at one time for clay soil; granules have good fluidity for uniform distribution. Test soil pH every 1-2 years for long-term application; apply slaked lime, dolomite powder to correct acidity when pH < 5.0）。
- **作业控制：**仓库作业避免剧烈碰撞，防止颗粒破碎扬尘；田间机械作业选择无风或微风天气（风速≤3 级），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 (wind speed ≤Level 3); clean residual granules in fertilizer spreader immediately after operation to avoid moisture absorption and caking）。

二、储存要求（适配颗粒防破碎、防吸潮特性）

- **储存环境：**储存于阴凉干燥通风库房，温度≤30℃，相对湿度≤70%；远离潮湿环境、水源、热源及空调出风口，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 ≤30℃, relative humidity ≤70%. Keep away from humid environment, water sources, heat sources and air conditioner outlets 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 (内置防潮内膜，加装高强度吊带加固)；袋口采用双线缝合+热封处理，包装经承重测试 ($\geq 50\text{kg}$)，确保运输储存不破损；包装张贴 GHS 警告标签、农用标识、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 high-strength slings. Bag mouth with double-thread sewing + heat sealing; packaging passes load-bearing test ($\geq 50\text{kg}$) to ensure no damage during transport and storage. Affix GHS warning label, agricultural 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、食用化学品分开存放，垛距 ≥ 0.5 米，顶距 ≥ 1 米，墙距 ≥ 0.3 米；25kg/袋堆放高度不超过 8 层，吨袋不超过 2 层，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, 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 for 25kg/bag, 2 layers for ton 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)。

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 requirements)。

个体防护：

- **呼吸系统防护：**仓库作业及机械撒施时佩戴普通防尘口罩；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 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 $\geq 0.3\text{mm}$ ），机械操作搭配防滑手套；手套破损立即更换，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) 。
- 皮肤防护：穿着防毒物渗透工作服，袖口、裤脚收紧，机械作业搭配防水围裙；作业后单独清洗工作服，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 separately after operation and store in non-living area) 。

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)，80°C 以下颗粒形态稳定，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)

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°C 分解失去结晶水, 80°C 以下颗粒形态完整、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流动性, 需密封储存 (Stable chemical property and granule shape in normal temperature and dry environment; decomposes at 150°C to lose crystal water, keeps intact granule shape below 80°C without breakage. Moderate hygroscopicity, easy to cake in humid air, which does not affect chemical properties but damages fluidity, requiring sealed



storage) 。

避免条件: 高温 (> 80°C)、潮湿环境、剧烈碰撞 (防颗粒破碎)、与钙肥、强碱类物质混存混用 (Avoid conditions: High temperature (>80°C), 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 (混合加热可能引发爆炸) (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 (SO₂、SO₃) , 均为有毒或腐蚀性物质 (Decomposition products: Anhydrous magnesium sulfate, magnesium oxide and sulfur oxides (SO₂, SO₃) when heated, all toxic or corrosive substances) 。

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

急性毒性: 大鼠经口 LD₅₀ 约 1200mg/kg, 吞咽有害; 皮肤接触有害, 长期反复接触引发炎症、红肿、瘙痒, 无皮肤过敏反应报道; 颗粒低扬尘, 仅破碎后粉尘可能刺激呼吸道, 引发咳嗽、胸闷, 高浓度吸入出现头晕、乏力, 长期接触导致慢性呼吸道炎症 (Acute toxicity: LD₅₀ (rat, oral) ~1200mg/kg, harmful if swallowed. Harmful in contact with skin; prolonged repeated contact causes inflammation, redness, itching, no skin allergic reaction reported. Low dust emission of granules; only dust from broken granules may irritate respiratory tract, causing cough, chest tightness; high-concentration inhalation causes dizziness, fatigue; prolonged contact leads to chronic respiratory inflammation) 。

皮肤/眼刺激: 家兔皮肤刺激性试验显示轻微至中度刺激, 持续接触出现红斑、水肿; 眼睛中度至严重刺激, 颗粒入眼引发结膜充血、刺痛、流泪, 严重时影响视力 (Skin/eye irritation: Mild to moderate skin irritation in rabbit test; erythema and edema after continuous contact. Moderate to severe eye irritation; granule entering eyes causes conjunctival congestion, stinging, lacrimation, affecting vision in severe cases) 。

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 (小球藻 EC₅₀ 72h 约 3000mg/L); 作物过量吸收引发镁中毒, 表现为叶片边缘焦枯、光合效率下降、果实畸形, 严重时导致作物死亡 (Agricultural toxicology supplement: Low toxicity to birds and bees, slightly toxic to fish and aquatic invertebrates (Chlorella EC₅₀ 72h ~3000mg/L). Excessive crop absorption causes magnesium poisoning, manifested as leaf edge scorch, reduced photosynthetic efficiency, deformed fruits, and crop



death in severe cases) 。

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

生态毒性：对水体轻微有害，过量进入水体改变 pH 值，影响水生生物生存；对陆生植物无直接毒性，合理施用促进生长，过量抑制光合作用及养分吸收；对土壤微生物群落影响较小，长期施用导致土壤酸化后，可能改变菌群结构、降低土壤肥力 (Ecotoxicity: Slightly harmful to water bodies; excessive entry changes water pH and affects aquatic organisms' survival. No direct toxicity to terrestrial plants; promotes growth when properly applied, inhibits photosynthesis and nutrient absorption when excessive. Little impact on soil microbial community; long-term application causes soil acidification, which may change flora structure and reduce soil fertility) 。

持久性和降解性：不易生物降解，在土壤中稳定存在，通过作物吸收、土壤淋溶、胶体吸附循环利用，自然降解周期 1-2 年，需合理控制用量避免土壤累积 (Not easily biodegradable, stable in soil; recycled through crop absorption, soil leaching and colloid adsorption, natural degradation cycle 1-2 years; reasonably control dosage to avoid soil accumulation) 。

生物累积性：无生物累积潜力，不富集于动植物体内，对食物链无明显影响，符合欧盟 REACH、美国 OSHA 及东南亚生态安全要求 (No bioaccumulation potential, no enrichment in animals and plants, no obvious impact on food chain, complying with EU REACH, US OSHA and Southeast Asian ecological safety requirements) 。

环境影响控制：禁止未经处理直接排入农田、沟渠、水源地及养殖水域；合理施用改善土壤养分结构，过量导致酸化、板结；污染水体后及时采取应急措施，避免影响农田灌溉及水生生态系统 (Environmental impact control: Do not discharge directly into farmland, ditches, water sources and breeding waters without treatment. Proper application improves soil nutrient structure; excessive application causes acidification and compaction. Take emergency measures in time for water contamination to avoid impact on farmland irrigation and aquatic ecosystems) 。

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，按进口国农业环保及化学品处置标准处理，不混入生活垃圾 (Non-hazardous waste, classified as agricultural chemical waste; disposed in accordance with importing country's agricultural environmental and chemical disposal standards, not mixed with domestic waste) 。

颗粒肥料处置：结块、过期颗粒经粉碎、筛分后，可作为基肥施用（用量减半，均匀撒施），或与中性肥料复配使用，降低土壤酸化风险；不可回收部分交由具备资质的机构，采用安全填埋或高温焚烧处置，焚烧配套尾气处理装置去除硫氧化物，达标排放 (Granule fertilizer disposal: Crusted and expired granules



can be used as base fertilizer (halve dosage, spread evenly) or compounded with neutral fertilizers after crushing and sieving to reduce soil acidification risk. Non-recyclable parts are handed over to qualified institutions for safe landfill or high-temperature incineration; incineration is 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，严禁混入农田或随意丢弃（Packaging disposal: Clean contaminated packaging with clean water for recycling as agricultural material packaging. Uncleanable packaging is disposed as agricultural waste, prohibited from mixing with farmland or random disposal）。

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) 。

运输分类： 非危险货物 | 包装组：无 | 海洋污染物：否 (Non-hazardous for transport | No packaging group | Not a marine pollutant) 。

外贸运输特殊防护 (海运/陆运)：

- 运输载体防护：** ① 陆运：使用干燥洁净无破损厢式货车，车厢铺垫防水布及珍珠棉缓冲垫，配备防雨、防潮、防晒设施，避免颠簸导致颗粒破碎；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；颗粒分层装载，每层铺缓冲垫，25kg/袋装载高度≤5 层，吨袋≤2 层，避免受压破碎 (Transport carrier protection: ① Road transport: Use dry, clean and intact box trucks; pave waterproof cloth and pearl cotton buffer pads in carriage, equip with rainproof, moisture-proof and sun-proof facilities to avoid granule breakage from jolting. ② 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 high-humidity marine impact. Load granules in layers with buffer pads, loading height ≤5 layers for 25kg/bag, ≤2 layers for ton bag to avoid breakage under pressure) 。
- 装载与加固：** 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≥0.5 米，张贴中英双语隔离警示标志；装载后用绳索固定货物，防止运输中移位、碰撞 (Loading and reinforcement: Handle with care, 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 ≥0.5m, affix Chinese-English isolation warning signs. 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；公路运输避开颠簸路段，按规定路线行驶；随货附带中英双语 SDS (各 1 份) 及产品合规声明，符合 IMDG-CODE、IATA-DGR 标



准，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. Road transport avoids bumpy roads and follows specified routes. Attach one copy of Chinese-English SDS and product compliance statement with goods, complying with IMDG-CODE and IATA-DGR standards for customs inspection）。

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)，列入 EINECS 目录；作为矿物源颗粒镁肥，符合 EU 2025/973 号条例，列入有机农业投入品正面清单后方可用于有机种植；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，全供应链合规（EU regulations: 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 are marked on labels. Complete ecological risk assessment through FEE Tool of Fertilizers Europe for full supply chain compliance）。

美国法规：符合 OSHA HazCom 2012 标准 (29 CFR 1910.1200)，列入 TSCA 目录；遵循 ANSI Z400.1 标准分类标签，标注低扬尘特性；允许用于常规农业，有机种植符合 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（US regulations: Complies with OSHA HazCom 2012 standard (29 CFR 1910.1200), listed in TSCA. Classified and labeled per ANSI Z400.1, marked with low dust emission characteristic. Allowed for conventional agriculture; complies with NOP standards (allowable principle for natural mineral substances) for organic planting. Transport complies with DOT regulations for ordinary agricultural chemicals, no dangerous goods declaration required）。

东南亚法规：符合韩国 K-REACH 法规，完成产品登记并提交生态安全性评估报告，标签标注韩文危险说明及施用警示；符合日本 CSCL 法，纳入“特定化学物质”非管控清单，包装标注日文产品名称、企业信息及应急联系方式，进口提供 SDS 及农林水产省认可的合格证明；重金属限值符合当地要求（ $Pb \leq 150\text{mg/kg}$ 、 $Cd \leq 5\text{mg/kg}$ ）（Southeast Asian regulations: Complies with South Korea K-REACH Regulation; complete product registration and submit ecological safety assessment report, mark Korean hazard statements and application warnings on labels. Complies with Japan CSCL Act, included in non-controlled list of "specific chemical substances"; mark Japanese product name, company information and emergency contact on packaging; provide SDS and qualification certificate recognized by Ministry of Agriculture, Forestry and Fisheries for import. Heavy metal limits meet local requirements ($Pb \leq 150\text{mg/kg}$, $Cd \leq 5\text{mg/kg}$)) 。

中国法规：符合 GB/T 16483-2008、GB/T 26568-2011《农业用硫酸镁》及 GB 8569 标准；通过肥料登记备案，标注肥料登记证号；运输符合《道路危险货物运输管理规定》，按普通农用化学品运输；废弃处置遵循《农业废弃物资源化利用通则》（Chinese regulations: Complies with GB/T 16483-2008, GB/T



26568-2011 "Magnesium Sulfate for Agricultural Use" and GB 8569. Complete fertilizer registration and filing, mark fertilizer registration certificate number. Transport complies with "Regulations on the Administration of Road Transport of Dangerous Goods", transported as ordinary agricultural chemicals. Waste disposal follows "General Rules for Resource Utilization of Agricultural Wastes") 。

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

编制信息：本 SDS 由莱州市百业鑫化工有限公司技术部编制，编制人：技术部，审核人：质量部，批准人：总经理；编制日期：2026 年 1 月 28 日，下次修订计划：2028 年 1 月（每 2 年复核 1 次，法规更新或产品特性变更时提前修订）（Preparation information: This SDS is prepared by the Technology Department of Laizhou Baiyexin Chemical Co., Ltd. Prepared by: Technology Department, Reviewed by: Quality Department, Approved by: General Manager. Preparation date: January 28, 2026, Next revision plan: January 2028 (review every 2 years, revise in advance if regulations are updated or product characteristics change)) 。

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附加提示：1. 外贸申报时，需根据进口

| (注：文档部分内容可能由 AI 生成)