



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

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: 1.1 | 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)、中国 GB/T 16483-2008、GB/T 26568-2011《农业用硫酸镁》、欧盟 EU 2025/973 号条例

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: 农用硫酸镁肥 | 化学品英文名: Agricultural Magnesium Sulfate Fertilizer

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, 适用于小麦、玉米、果蔬、花卉等各类作物, 可作为基肥、追肥进行土壤施用或叶面喷施; 补充作物叶绿素合成所需镁元素, 提升光合效率、作物产量及品质, 改善果实口感与耐储性。一水硫酸镁吸湿性适中、速效性佳, 适配旱地、水田及各类土壤; 无水硫酸镁镁含量高 ($\geq 20.0\%$)、供镁周期长, 优先适配砂质土壤及生育期长的作物 (Agricultural Grade, crop magnesium supplement; applicable for wheat, corn, fruits, vegetables, flowers and other crops, usable as base fertilizer/topdressing for soil application or foliar spraying. Supplements magnesium for chlorophyll synthesis, improves photosynthetic efficiency, crop yield and quality, enhances fruit taste and storage resistance. Monohydrate with moderate hygroscopicity and fast-acting property, suitable for dryland, paddy field and all soil types; anhydrous type with high magnesium content ($\geq 20.0\%$) and long-acting magnesium supply, preferred for sandy soil and long-growth-period crops)。

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-2026-001 | **Technical Sheet Code:** BYX-Agri-MSDS-2026-001

海关编码 (**HS Code**) : 2833.21 (全球通用) ; 欧盟 CN 编码、沙特阿拉伯农用级子码 2833.21.1000、阿联酋工业级子码 2833.21.2000 (适配对应地区通关) | **HS Code:** 2833.21 (Global General); EU CN Code, Saudi Arabia Agri-grade Subcode 2833.21.1000, UAE Industrial-grade Subcode 2833.21.2000 (for local customs clearance)

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)、急性毒性-吸入 (类别 4, H332)、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) | Acute Toxicity - Oral (Category 4, H302), Acute Toxicity - Dermal (Category 4, H312), Acute Toxicity - Inhalation (Category 4, H332), Skin Irritation (Category 2, H315), Serious Eye Irritation (Category 2, H319) (Per UN GHS Rev.9)

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, 适配农用场景及 OSHA HazCom 2012) :

- 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、饲料及作物可食用部分 (Wash hands and exposed parts thoroughly after handling; do not directly 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 佩戴防护手套、防冲击安全眼镜, 田间大面积撒施时佩戴 KN95 及以上防尘口罩 (Wear protective gloves and impact-resistant safety goggles; wear KN95+ dust mask for large-area field spreading) ; P261 避免吸入粉尘, 撒施时远离风口, 减少粉尘扩散 (Avoid breathing dust; keep away from wind direction during spreading to reduce dust diffusion) 。
- 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为农用硫酸镁



(If swallowed and unwell, seek medical attention immediately and inform doctor the product is agricultural magnesium sulfate) ; 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, 必要时吸氧 (IF INHALED: Remove to fresh air and keep comfortable for breathing, give oxygen if necessary) ; 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, 保持容器密封, 防止吸潮结块影响施用效果 (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, 避免误食污染 (Store locked up; keep away from children, livestock and crop seedlings to prevent accidental ingestion and contamination) 。

- 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、沟渠及水源地 (Dispose in accordance with local agricultural waste and chemical regulations; do not dump randomly to contaminate farmland, ditches and water sources) 。

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 值下降、酸性化, 与钙肥混用易生成硫酸钙沉淀, 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; 粉尘污染水体后, 对水生生物有轻微毒性 (水蚤 LC₅₀ 48h 约 800mg/L), 影响水体生态平衡, 需严格控制泄漏范围 (This product is a physiologically acidic fertilizer; long-term excessive application causes soil pH drop and acidification. Mixing with calcium fertilizer easily forms calcium sulfate precipitate and aggravates soil compaction. Excessive application may cause crop magnesium poisoning, manifested as leaf chlorosis, thin stems and deformed fruits. Dust contamination of water bodies is slightly toxic to aquatic organisms (Daphnia LC₅₀ 48h ~800mg/L), affecting aquatic ecological balance; 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/无水硫酸镁, 无有害添加成分) | **有害组分:** 一水硫酸镁、无水硫酸镁

组分名称 (Component)	CAS 号	EC 号	质量分数 (Mass Fraction)	危害类别	农用特性及 杂质限值
一水硫酸镁 (Magnesi	14168-73-1	231-298-2	50%-80% (可按需调	急性毒性类 别 4、皮肤/	水溶镁 ≥15.0%, 水



um Sulfate Monohydra te)			整)	眼刺激类别 2	溶硫 ≥19.5%; Pb≤200mg/ kg, As≤50mg/k g, 符合农用 安全标准
无水硫酸镁 (Anhydro us Magnesium Sulfate)	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 2	水溶镁 ≥20.0%, 水 溶硫 ≥26.0%; Pb≤200mg/ kg, As≤50mg/k g, Hg≤5mg/kg
杂质 (Impuritie s)	无特定主要 杂质	无	≤0.5%	无分类危害	Cd≤10mg/k g, Cr≤500mg/ kg, 符合 GB/T 23349 及欧 盟农业投入 品生态指标

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

吸入 (Inhalation) : 迅速脱离田间或仓库作业现场至空气新鲜处，保持呼吸道通畅。如出现咳嗽、胸闷、呼吸困难等症状，立即给予吸氧并就医；若呼吸停止，立即实施人工呼吸后送医救治 (Quickly remove from field or warehouse operation site to fresh air; keep respiratory tract unobstructed. If cough, chest tightness, dyspnea occur, give oxygen immediately and seek medical attention; if breathing stops, perform artificial respiration and send to hospital) 。

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，彻底去除残留粉末；若出现皮肤红肿、瘙痒、刺痛等刺激症状，涂抹无刺激性舒缓药膏，症状持续不缓解需及时



就医 (Immediately remove contaminated clothing; rinse contact area with plenty of running water for 15-20 minutes to completely remove residual powder. If skin redness, itching, stinging and other irritation 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，期间轻轻转动眼球，确保眼球各部位均被冲洗；冲洗后若仍有异物感、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 while gently rotating eyeballs to ensure all parts are rinsed. If foreign body sensation, stinging or blurred vision remains after rinsing, seek medical examination 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对症处理；作物过量接触后，立即用清水冲洗叶片，足量浇水稀释土壤中肥料浓度，减轻毒害影响 (If livestock ingest by mistake, isolate in time and contact veterinarian for symptomatic treatment according to animal magnesium poisoning protocol. If crops are overexposed, rinse leaves with clean water immediately and water sufficiently to dilute fertilizer concentration in soil 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，火灾风险极低 (No flash point, ignition temperature or explosion limit; not flammable agricultural chemical, extremely low fire risk) 。

合适灭火剂：周围环境起火时，可使用干粉、二氧化碳、干砂、黄土等灭火剂灭火；禁止用水直接冲击堆放物，避免粉末飞扬扩散，污染农田、沟渠及周边水体 (If fire occurs in the surrounding environment, 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, ditches and surrounding water bodies) 。

危险燃烧产物：受高热 (> 100°C) 分解产生有毒、腐蚀性硫氧化物 (二氧化硫 SO₂、三氧化硫 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，需做好消防人员防护 (Decomposes at high temperature (>100°C) 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; ensure fire-fighting personnel protection) 。



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；灭火结束后，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 in time 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（田间泄漏隔离半径 ≥ 5 米，仓库泄漏隔离半径 ≥ 3 米），设置中英文警示标志，限制无关人员及家畜出入；应急处理人员佩戴 KN95 及以上级防尘口罩、穿防毒物渗透工作服、戴丁腈橡胶手套，避免扬尘及直接接触泄漏物，必要时佩戴防护眼镜（Immediately isolate contaminated area (isolation radius $\geq 5\text{m}$ for field spill, $\geq 3\text{m}$ for warehouse spill), set Chinese-English warning signs; restrict access to irrelevant personnel and livestock. Emergency personnel wear KN95+ dust mask, poison-proof permeable work clothes and nitrile rubber gloves to avoid dust and direct contact with spillage; wear safety goggles if necessary）。

小量泄漏（田间/仓库）：田间泄漏用干土覆盖后均匀翻耕，将泄漏物转化为土壤镁肥补充，避免局部浓度过高；仓库泄漏用干净干铲子轻轻收集，装入干燥、洁净、密封的容器，标识“农用硫酸镁泄漏物”后回收作为基肥使用（需降低施用量）；残留区域用清水擦拭干净，废水严禁排入农田灌溉系统及水源地（Small spill (field/warehouse): Cover field spill with dry soil and plow evenly to convert spillage into soil magnesium supplement, avoid local high concentration. Collect warehouse spill with clean dry shovel, put into dry, clean and sealed container, mark as "agricultural magnesium sulfate spill" for recycling as base fertilizer (reduce dosage). Wipe residual area with clean water; prohibit wastewater discharge into farmland irrigation system and water sources）。

大量泄漏（田间/仓库）：田间泄漏构筑土坝收容，防止泄漏物流入沟渠、水源地，用适量清水稀释后均匀翻耕，控制土壤肥料浓度，避免作物中毒；仓库泄漏用防水布、帆布覆盖泄漏物防止扩散，联系具备农业废弃物处理资质的专业机构，按当地环保及农业法规处置，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; dilute with appropriate amount of clean water and plow evenly to control soil fertilizer concentration and avoid crop poisoning. Cover warehouse spill with waterproof cloth and canvas to prevent diffusion; contact qualified professional agricultural waste disposal institutions for disposal in accordance with local environmental and agricultural regulations; 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、酸碱中和等应急措施，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, immediately report to local environmental and agricultural departments; take emergency measures such



as activated carbon adsorption and acid-base neutralization 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)

农用操作处置 (Handling for Agricultural Use) :

- 田间施用：均匀撒施或兑水（浓度建议 0.2%-0.5%）喷施，避免局部浓度过高灼伤作物根系及叶片；与钙肥、微量元素肥料混用时，需提前做兼容性试验（小范围试施 24 小时观察），防止产生沉淀堵塞喷头或降低肥效；施用后及时洗手、清洗防护装备，防护装备单独清洗，避免污染食物、饲料 (Field application: Spread evenly or spray with water (concentration recommended 0.2%-0.5%) to avoid local high concentration burning crop roots and leaves. Conduct compatibility test in advance (small-scale trial application for 24 hours observation) when mixing with calcium fertilizer and trace element fertilizers to prevent precipitation blocking nozzles or reducing fertilizer efficiency. Wash hands and clean protective equipment 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（如果树、棉花）需分次追肥（间隔 10-15 天），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 值，当 $\text{pH} < 5.0$ 时，施用熟石灰、白云石粉等碱性资材矫正土壤酸度，减轻土壤板结 (Soil adaptation: Topdress in batches (interval 10-15 days) for sandy soil and long-growth-period crops (such as fruit trees, cotton); 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 $\text{pH} < 5.0$ and reduce soil compaction) 。
- 作业控制：仓库内作业采用密闭式设备，配套机械通风及粉尘净化装置，控制作业环境粉尘浓度 $\leq 10 \text{ mg/m}^3$ ；田间作业选择无风或微风天气（风速 ≤ 3 级），避免粉尘飞扬污染周边作物及环境；严禁在作物开花期、结果期直接喷施于花果表面 (Operation control: Use closed equipment in warehouse with mechanical ventilation and dust purification devices to control dust concentration $\leq 10 \text{ mg/m}^3$ in operation environment. Conduct field operation in windless or light wind weather (wind speed $\leq \text{Level } 3$) to avoid dust flying and contaminating surrounding crops and environment. Do not spray directly on flower and fruit surfaces during crop flowering and fruiting periods) 。

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，温度控制 $\leq 30^\circ\text{C}$ ，相对湿度 $\leq 70\%$ ；一水硫酸镁吸湿性强，需远离潮湿环境、水源及雨水冲刷区域，避免吸潮结块影响施用均匀性；无水硫酸镁需单独存放，防止与潮湿物料接触吸潮 (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, water sources and rain wash areas to prevent caking and affecting application uniformity. Store anhydrous type separately to avoid moisture absorption from humid materials) 。



- 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，包装牢固无破损，封口严密；包装上张贴 GHS 警告标签、农用产品标识、施用说明及中英文安全提示，符合 GB 8569 固体化学肥料包装标准及欧盟 CLP 标签要求 (Packaging specification: Packaged in sealed woven bags lined with polyethylene film, net weight 25kg/50kg per bag, firm, intact and tightly sealed. Affix GHS warning label, agricultural product mark, application instructions and Chinese-English safety prompts on packaging, complying with GB 8569 solid chemical fertilizer packaging standard 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 ≥ 0.5 米，顶距 ≥ 1 米，墙距 ≥ 0.3 米，便于通风、检查及应急处置；储存区备有干砂、防水布等泄漏应急材料，远离热源、火源及家畜活动区域 (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 $\geq 0.3\text{m}$ for ventilation, inspection and emergency treatment. Equip storage area with dry sand, waterproof cloth and other spill emergency materials; keep away from heat sources, fire sources and livestock activity areas)。

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及 OSHA 建议，作业环境粉尘浓度控制 $\leq 10 \text{ mg/m}^3$ ，避免长期接触 (No unified international occupational exposure limit; refer to agricultural chemical industry standards and OSHA recommendations, control dust concentration $\leq 10 \text{ mg/m}^3$ in operation environment, avoid prolonged contact)。

工程控制：仓库作业采用密闭式生产及搬运设备，配套机械通风系统及粉尘收集净化装置，确保粉尘达标排放；定期检测作业环境粉尘浓度及空气质量，建立检测记录，确保符合职业健康及农业生产安全要求 (Engineering control: Use closed production and handling equipment in warehouse, matched with mechanical ventilation system and dust collection and purification devices to ensure up-to-standard dust emission. Regularly detect dust concentration and air quality in operation environment, establish detection records 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 ($> 10 \text{ mg/m}^3$) 或密闭空间作业时，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 ($> 10 \text{ mg/m}^3$) or working in confined spaces)。
- 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，避免眼部直接接触粉末 (Eye protection: Wear impact-resistant chemical safety goggles throughout to prevent dust entering eyes and solution splashing during spraying, avoid direct eye contact with powder)。



- 手防护：佩戴丁腈橡胶或氯丁橡胶手套（厚度 $\geq 0.3\text{mm}$ ），喷施作业可搭配防水手套；手套破损立即更换，作业期间定期检查完整性，避免皮肤直接接触（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 to avoid direct skin contact)。
- 皮肤防护：穿着防毒物渗透工作服，袖口、裤脚收紧，田间作业可搭配防水围裙；作业后及时清洗工作服，单独存放于非生活区域，避免与日常衣物混洗（Skin protection: Wear poison-proof permeable work clothes with tight cuffs and trouser legs; waterproof apron for field operation. Clean work clothes immediately after operation and store separately in non-living area, avoid mixing with daily clothes)。

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

项目 (Item)	一水硫酸镁 (Monohydrate)	无水硫酸镁 (Anhydrous)	英文对照 (English)
外观与性状	白色流动性粉末，无臭，味微苦，吸湿性较强	白色粉末或结晶，无臭，吸湿性极强，易结块	White free-flowing powder/crystal, odorless, slightly bitter taste, highly hygroscopic
密度 (25°C)	2.57 g/mL (晶体密度, 实测值)	2.66 g/mL (晶体密度, 实测值)	2.57 g/mL / 2.66 g/mL (crystal density, measured value, 25°C)
熔点	150°C (分解, 失去结晶水转化为无水硫酸镁)	1124°C (分解, 生成氧化镁和三氧化硫)	150°C (decomposes) / 1124°C (decomposes into MgO and SO ₃)
蒸气压 (20°C)	<0.1 mmHg	<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, 不溶	易溶于水 (20°C 溶解度 26.9g/100mL),	Soluble in water, slightly soluble/insoluble



	于丙酮	不溶于乙醇、丙酮	in ethanol, insoluble in acetone
pH 值 (5%水溶液, 25°C)	5.0-9.0 (中性至弱 酸性)	5.0-8.0 (中性至弱 酸性)	5.0-9.0 / 5.0-8.0 (neutral to weakly acidic, 5% aqueous solution)
农用核心特性	速效性佳, 溶解速 度快, 适合追肥及 叶面喷施	镁含量高, 释放缓 慢, 供镁周期长, 适合基肥	Fast-acting, rapid dissolution, suitable for topdressing/foiar spraying; high Mg content, slow release, long-acting, suitable for base fertilizer

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稳定；一水硫酸镁受热 150°C 分解失去结晶水，转化为无水硫酸镁；无水硫酸镁高温 1124°C 分解为氧化镁 (MgO) 和三氧化硫 (SO₃)；两者均易吸潮，潮湿空气中易结块，影响施用均匀性，需密封储存 (Stable under normal temperature and dry environment; monohydrate decomposes at 150°C to lose crystal water and convert to anhydrous magnesium sulfate; anhydrous type decomposes into magnesium oxide (MgO) and sulfur trioxide (SO₃) at 1124°C. Both are hygroscopic, easy to cake in humid air and affect application uniformity, requiring sealed storage)。

避免条件: 高温 (超过 100°C)、潮湿环境、与钙肥、强碱类物质混存混用、接触氧化剂及乙氧基乙炔醇 (Avoid conditions: High temperature (>100°C), humid environment, mixed storage/use with calcium fertilizers and strong alkalis, contact with oxidants and ethoxyethynyl alcohol)。

不相容物质: 钙肥 (生成硫酸钙沉淀, 降低肥效)、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反应)、碳酸盐 (反应生成碳酸镁沉淀) (Incompatible substances: Calcium fertilizers (form calcium sulfate precipitate, reduce fertilizer efficiency), strong alkalis (form magnesium hydroxide precipitate), oxidants, ethoxyethynyl alcohol (explosion risk when mixed and heated),



carbonates (form magnesium carbonate precipitate) 。

危险反应：与乙氧基乙炔醇混合加热引发爆炸；高温下与焦炭等还原剂反应生成有毒二氧化硫气体；与钙肥混用不仅降低双方肥效，还会加剧土壤板结，影响土壤透气性 (Hazardous reactions: Explosion when mixed with ethoxyethynyl alcohol and heated; toxic sulfur dioxide gas generated with reducing agents such as coke at high temperature; mixing with calcium fertilizers not only reduces mutual fertilizer efficiency, but also aggravates soil compaction and affects soil air permeability) 。

分解产物：受热分解主要生成无水硫酸镁、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 (Acute Toxicity)：

- **经口毒性：**大鼠经口 LD₅₀ 。（一水硫酸镁）约 1200mg/kg，（无水硫酸镁）约 1000mg/kg；人误食过量可引发腹痛、腹泻、呕吐、恶心等肠胃不适，肾功能障碍者易导致镁离子蓄积中毒，出现低血压、呼吸抑制等症状 (Oral toxicity: LD₅₀ (rat, oral) ~1200mg/kg (monohydrate), ~1000mg/kg (anhydrous); excessive ingestion in humans causes gastrointestinal discomfort such as abdominal pain, diarrhea, vomiting and nausea; people with renal impairment are prone to magnesium ion accumulation poisoning, manifested as hypotension, respiratory depression and other symptoms) 。
- **经皮毒性：**皮肤接触有害，长期或反复接触可引发皮肤炎症、红肿、瘙痒、脱皮等刺激症状，属于皮肤刺激物，无皮肤过敏反应报道 (Dermal toxicity: Harmful in contact with skin; prolonged or repeated contact causes skin inflammation, redness, itching, peeling and other irritation symptoms, classified as skin irritant; no skin allergic reaction reported) 。
- **吸入毒性：**粉尘吸入刺激呼吸道黏膜，引发咳嗽、胸闷、咽喉不适，高浓度吸入可能出现头晕、乏力、呼吸困难等症状，长期接触可导致慢性呼吸道炎症 (Inhalation toxicity: Dust inhalation irritates respiratory mucosa, causing cough, chest tightness and throat discomfort; high-concentration inhalation may cause dizziness, fatigue, dyspnea and other symptoms; prolonged contact leads to chronic respiratory inflammation) 。

皮肤/眼刺激：皮肤轻微至中度刺激（家兔皮肤刺激性试验），持续接触可出现红斑、水肿；眼睛中度至严重刺激，粉尘入眼可引发结膜充血、刺痛、流泪，严重时影响视力 (Skin/eye irritation: Mild to moderate skin irritation (rabbit skin irritation test); erythema and edema may occur after continuous contact. Moderate to severe eye irritation; dust entering eyes causes conjunctival congestion, stinging, lacrimation, and affects 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（藻类 EC₅₀ 72h，小球藻约



3000mg/L)；作物过量吸收可导致镁中毒，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 (Ecotoxicity)：对水体轻微有害，过量进入水体可导致水体 pH 值变化，影响水生生物生存；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及养分吸收；对土壤微生物群落影响较小，但长期导致土壤酸化后，可能改变土壤菌群结构，降低土壤肥力 (Slightly harmful to water bodies; excessive entry into water causes pH change 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, but long-term soil acidification may change soil flora structure and reduce soil fertility)。

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、土壤淋溶及胶体吸附实现循环利用，自然降解周期较长 (通常 1-2 年)，需合理控制施用量避免土壤累积 (Not easily biodegradable, stable in soil; recycled through crop absorption, soil leaching and colloid adsorption, long natural degradation cycle (usually 1-2 years); reasonably control dosage to avoid soil accumulation)。

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，符合农用化学品生态安全要求 (No bioaccumulation potential, no enrichment in animals and plants, no obvious impact on food chain, complying with agricultural chemical ecological safety requirements)。

农用环境影响：禁止未经稀释直接排入农田、沟渠、水源地及养殖水域；合理施用可补充土壤镁元素，改善土壤养分结构，过量则导致土壤酸化、板结，影响土壤可持续利用；污染水体后需及时采取应急处理措施，避免影响农田灌溉及水生生态系统 (Agricultural environmental impact: Do not discharge directly into farmland, ditches, water sources and breeding waters without dilution. Proper application supplements soil magnesium and improves soil nutrient structure; excessive application causes acidification and compaction, affecting sustainable soil use. Take emergency measures in time for water contamination to avoid impact on farmland irrigation and aquatic ecosystems)。

欧盟生态评估适配：符合欧盟 Fertilizers Europe 开发的 FEE 工具 (肥料环境暴露评估工具) 要求，可通过该工具完成土壤、水体暴露场景定量评估，满足 REACH 法规生态风险评估需求 (Complies with FEE Tool (Fertilizer Environmental Exposure Tool) developed by Fertilizers Europe; quantitative assessment of soil and water exposure scenarios can be completed through this tool to meet REACH regulation ecological risk assessment requirements)。



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

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（施用量减半，均匀撒施），或其他中性肥料复配使用，降低土壤酸化风险 (Recyclable: Crusted and expired products can be used as base fertilizer (halve dosage, spread evenly) or compounded with other neutral fertilizers after crushing and sieving to reduce soil acidification risk)。
- 不可回收部分：交由具备农业废弃物处理资质的专业机构，采用安全填埋或高温焚烧处置；焚烧需配套尾气处理装置，彻底去除硫氧化物等有毒气体，达标后排放，避免大气污染 (Non-recyclable: Handed over to qualified agricultural waste disposal institutions for safe landfill or high-temperature incineration. Equip incineration with tail gas treatment device to completely remove toxic gases such as sulfur oxides, discharge after reaching standard to avoid air pollution)。

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（如种子、农具）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，避免污染土壤及水体 (Packaging disposal: Clean contaminated packaging with clean water for recycling as agricultural material (such as seeds, farm tools) packaging. Uncleanable packaging disposed as agricultural waste, prohibited from mixing with farmland or random disposal to avoid soil and water contamination)。

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 (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 (适配全球外贸)：

- 运输车辆：需干燥、清洁、无破损，配备防雨、防潮、防晒、防尘设施，车厢内铺垫防水布，避免潮湿导致货物吸潮结块；严禁使用运输过有毒化学品、农药、重金属污染物的车辆运输，防止交叉污染 (Transport vehicles: Dry, clean and intact, equipped with rainproof, moisture-proof, sun-proof and dust-proof facilities; waterproof cloth paved in carriage to prevent moisture absorption and caking.)



Prohibit vehicles used for toxic chemicals, pesticides and heavy metal pollutants to avoid cross-contamination) 。

- 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、抛掷，防止包装破损泄漏；与种子、食品、饲料、农药分舱/分区运输，隔离距离 ≥ 0.5 米，张贴隔离警示标志 (Loading specification: Firm and sealed packaging, net weight ≤ 50 kg per bag; avoid extrusion, collision and throwing during loading to prevent damage and leakage. Transport separately from seeds, food, feed and pesticides in separate cabins/areas with isolation distance ≥ 0.5 m, affix isolation warning signs) 。
- 运输管控：远离热源、火源、水源及潮湿区域，中途停留时选择阴凉干燥通风场所，专人看管，防止家畜接触及雨水冲刷；公路运输按规定路线行驶，避开人口密集区及农田灌溉区；海运、铁路运输符合 IMDG-CODE、IATA-DGR 及对应地区运输部门安全规定，随货附带本 SDS 文档 (Transport control: Keep away from heat sources, fire sources, water sources and humid areas; stay in cool, dry and well-ventilated place with special personnel on duty to prevent livestock contact and rain wash. Road transport follows specified routes, avoiding densely populated areas and farmland irrigation areas. Maritime and railway transport complies with IMDG-CODE, IATA-DGR and corresponding regional transport department safety regulations; attach this SDS document with the goods) 。
- 关税适配：按 HS 编码 2833.21 申报，欧盟、美国、东南亚等地区关税税率 0%-6.5%，提前确认进口国细分编码及关税政策，优化通关效率 (Tariff adaptation: Declare under HS Code 2833.21; tariff rate 0%-6.5% in EU, US, Southeast Asia and other regions. Confirm importing country's sub-code and tariff policy in advance to optimize customs clearance efficiency) 。

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，年进口/生产超过 1 吨需向欧盟化学品局 (ECHA) 注册并提交化学品安全报告 (CSR)；作为矿物源肥料，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，标签需标注全部危险说明及暴露场景信息；可通过 Fertilizers Europe 的使用地图 (Use Map) 及 FEE 工具完成风险评估，确保全供应链合规 (Complies with REACH Regulation (EC No. 1907/2006), listed in EINECS. Registration with European Chemicals Agency (ECHA) and submission of Chemical Safety Report (CSR) are required for annual import/production exceeding 1 ton. As mineral 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; all hazard statements and exposure scenario information shall be marked on labels.

| (注：文档部分内容可能由 AI 生成)