



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

产品名称: Kieserite Fertilizer (一水硫酸镁肥)

核心组分: Kieserite (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 (外贸申报用): 2833210000 (全球通用, 欧盟 CN 编码、东南亚对应子码可按需适配) | HS Code: 2833210000 (Global General, EU CN Code and Southeast Asia subcodes adaptable on demand)

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

化学品英文名: Kieserite Fertilizer | 化学品中文名: 一水硫酸镁肥

核心组分: Kieserite (一水硫酸镁, 分子式 $MgSO_4 \cdot H_2O$), 为天然矿物加工而成的农用镁肥核心原料, 无额外有害添加成分 (Core Component: Kieserite (Magnesium Sulfate Monohydrate, molecular formula $MgSO_4 \cdot H_2O$), processed from natural minerals, no additional harmful ingredients)。

产品等级及用途: 农用级 (Agricultural Grade), 作物镁肥补充剂, 适配小麦、玉米、果蔬、花卉、棉花等各类作物, 可作为基肥、追肥进行土壤施用, 也可兑水进行叶面喷施; 依托 Kieserite 速效性佳、镁利用率高的特性, 快速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, 改善土壤镁养分匮乏问题 (Crop magnesium supplement, applicable for wheat, corn, fruits, vegetables, flowers, cotton and other crops; usable as base fertilizer/topdressing for soil application or foliar spraying. With Kieserite's fast-acting property and high magnesium utilization rate, it quickly supplements magnesium for chlorophyll synthesis, improves photosynthetic efficiency, crop yield and fruit quality, and alleviates soil magnesium deficiency)。

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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技术说明书编码: BYX-Kieserite-SDS-2026-001 | **Technical Sheet Code:** BYX-Kieserite-SDS-2026-001

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

GHS 危险性分类: 依据联合国 GHS 第 9 版标准, 分类为急性毒性-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) (GHS Classification: 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) | **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)
- 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, 适配农用场景及多国法规):

- 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 佩戴丁腈橡胶手套、防冲击安全眼镜, 田间大面积施用或仓库作业时, 佩戴 KN95 及以上级防尘口罩, 防范 Kieserite 粉尘吸入及吸潮后皮肤接触 (Wear nitrile rubber gloves and impact-resistant safety goggles; wear KN95+ dust mask for large-area field application or warehouse operation to prevent Kieserite dust inhalation and skin contact after moisture absorption); 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为 Kieserite 一水硫酸镁肥 (If swallowed and unwell, seek medical attention immediately and inform doctor the product is



Kieserite magnesium sulfate monohydrate fertilizer); P302+P352 皮肤接触后,用大量流动清水冲洗 15-20 分钟,去除残留 (IF ON SKIN: Wash with plenty of running water for 15-20 minutes to remove residues); 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, 温度 $\leq 30^{\circ}\text{C}$, 相对湿度 $\leq 70\%$, 保持容器密封, 防范 Kieserite 吸潮结块, 影响施用均匀性 (Store in cool, dry and well-ventilated place, temperature $\leq 30^{\circ}\text{C}$, relative humidity $\leq 70\%$; keep container tightly closed to prevent Kieserite moisture absorption and caking, which affects application uniformity); 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、沟渠及水源地 (Dispose in accordance with importing country's agricultural waste and chemical regulations; do not dump randomly to contaminate farmland, ditches and water sources)。

农用场景附加危害: Kieserite 为生理酸性肥料, 长期大量施用会导致土壤 pH 值下降、酸化, 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; 其粉尘污染水体后, 对水生生物有轻微毒性 (水蚤 LC_{50} 48h 约 800mg/L), 需严格控制泄漏范围 (Kieserite 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. Its dust is slightly toxic to aquatic organisms (Daphnia LC_{50} 48h ~800mg/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 Kieserite 一水硫酸镁, 杂质含量符合农用安全标准) | **有害组分:** Kieserite (一水硫酸镁)

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
Kieserite (一水硫酸)	14168-73-1	231-298-2	$\geq 98.5\%$	急性毒性类别 4、皮肤/眼刺激类别	水溶镁 $\geq 15.0\%$, 水溶硫



镁)				2	≥19.5%; Pb≤200mg/kg, As≤50mg/kg, Hg≤5mg/kg , Cd≤10mg/kg, 符合 GB/T 23349 及欧 盟农业投入 品生态指标
杂质 (Impurities)	无特定主要 杂质	无	≤1.5%	无分类危害	主要为天然 矿物伴生杂 质, 无额外 生态风险, 不影响农用 效果

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) : Kieserite 吸潮后易附着皮肤引发刺激, 需立即脱去污染衣物, 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、刺痛等症状, 涂抹无刺激性舒缓药膏, 症状持续不缓解需及时就医 (Kieserite is easy to adhere to skin after moisture absorption and cause irritation. 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 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“Kieserite 一水硫酸镁肥接触史”，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 "Kieserite magnesium sulfate monohydrate 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，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 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 Kieserite 堆放物，避免粉末吸潮飞扬扩散，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 Kieserite piles with water to prevent powder moisture absorption, flying and diffusion, which contaminates farmland, ditches and surrounding water bodies）。

危险燃烧产物：受高热（ $> 100^{\circ}\text{C}$ ）分解产生有毒、腐蚀性硫氧化物（二氧化硫 SO_2 、三氧化硫 SO_3 ）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 ($>100^{\circ}\text{C}$) to produce toxic and corrosive sulfur oxides (SO_2 , SO_3) 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，防范 Kieserite 吸潮后黏附皮肤

(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 to prevent Kieserite adhering to skin after moisture absorption) 。

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，避免局部浓度过高灼伤作物；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“Kieserite 泄漏物”后回收作为基肥使用（施用量减半）；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 burning crops. Collect warehouse spill with clean dry shovel, put into dry, clean and sealed container, mark as "Kieserite Spillage" for recycling as base fertilizer (halve 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；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，按进口国环保及农业法规处置，严禁擅自倾倒至农田、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. Cover warehouse spill with waterproof cloth and canvas to prevent diffusion; contact qualified professional agricultural waste disposal institutions for disposal in accordance with importing country's 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, 贴合 Kieserite 特性) :

- 施用浓度建议：叶面喷施时，Kieserite 兑水浓度控制在 0.2%-0.5% (即 2-5g/L 水)，每亩用量 50-80L 稀释液，均匀喷施于作物叶片正反面，避开高温正午时段 (10:00-16:00)，减少蒸发及叶片灼伤；土壤施用时，基肥每亩用量 20-30kg，追肥每亩用量 10-15kg，均匀撒施后翻耕入土 (Foliar spraying concentration: Kieserite diluted with water at 0.2%-0.5% (2-5g/L water), 50-80L diluted solution per mu, evenly sprayed on both sides of crop leaves; avoid high-temperature noon period (10:00-16:00) to reduce evaporation and leaf burning. Soil application: base fertilizer 20-30kg per mu, topdressing 10-15kg per mu, evenly spread and plowed into soil) 。
- 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) 混配施用，提升养分协同效果；严禁与钙肥 (生石灰、钙镁磷肥)、强碱类肥料混配，避免生成硫酸钙沉淀，降低肥效并加剧土壤板结；混配前建议做小范围兼容性试验 (24 小时观察无沉淀、结块即可) (Fertilizer compatibility: Can be mixed with nitrogen fertilizers (urea, ammonium bicarbonate), potassium fertilizers (potassium chloride, potassium sulfate), phosphorus fertilizers (except superphosphate) to improve nutrient synergy. Strictly prohibit mixing with calcium fertilizers (quicklime, calcium magnesium phosphate fertilizer) and strong alkali fertilizers to avoid calcium sulfate precipitation, which reduces fertilizer efficiency and aggravates soil compaction. Conduct small-scale compatibility test before mixing (usable if no precipitation or caking after 24-hour observation)) 。
- 土壤适配性：Kieserite 适配中性、微酸性土壤，砂质土壤需分次追肥 (间隔 10-15 天)，避免养分流失；黏质土壤可一次性施用基肥，依托其速效性快速供镁；长期施用需每 1-2 年检测土壤 pH 值，当 pH < 5.0 时，施用熟石灰、白云石粉等碱性资材矫正土壤酸度 (Soil adaptability: Kieserite is suitable for neutral and slightly acidic soil. Topdress in batches (interval 10-15 days) for sandy soil to avoid nutrient loss. Apply base fertilizer at one time for clay soil, relying on its fast-acting property to supply magnesium quickly. 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 ≤ 10 mg/m³；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；施用后及时清洗农具，避免 Kieserite 残留吸潮结块 (Operation control: Use closed equipment in warehouse with mechanical ventilation and dust purification devices to control dust concentration ≤ 10 mg/m³ in operation environment. Conduct field operation in windless or light wind weather (wind speed \leq Level 3) to avoid dust flying and contaminating surrounding crops and environment. Clean farm tools immediately after application to avoid Kieserite residue moisture absorption and caking) 。

储存要求 (Storage Requirements, 针对 Kieserite 吸湿性) :



- 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 $\leq 70\%$ ；远离潮湿环境、水源、雨水冲刷区域及空调、加湿器出风口，防止 Kieserite 吸潮结块，影响施用均匀性及肥效（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, rain wash areas and air conditioner/humidifier air outlets to prevent Kieserite moisture absorption and caking, which affects application uniformity and fertilizer efficiency）。
- 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 Kieserite 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 Kieserite 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）。

个体防护（Personal Protection）：

- 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 mg/m³) 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 Kieserite 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 Kieserite powder）。
- 手防护：佩戴丁腈橡胶或氯丁橡胶手套（厚度≥0.3mm），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 ≥0.3mm); 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)	参数 (Parameter)	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，天然矿物加工后纯度≥98.5%	White free-flowing powder, odorless, slightly bitter taste, highly hygroscopic, purity ≥98.5% after natural mineral processing
密度 (25℃)	2.57 g/mL (晶体密度，实测值)	2.57 g/mL (crystal density, measured value, 25℃)
熔点	150℃ (分解，失去结晶水转化为无水硫酸镁)	150℃ (decomposes, loses crystal water and converts to anhydrous magnesium sulfate)



蒸气压 (20℃)	<0.1 mmHg	<0.1 mmHg (20℃)
溶解性	易溶于水 (20℃溶解度 27g/100mL) , 微溶于乙醇, 不溶于丙酮, 溶解速度快于无水硫酸镁 (速效性优势)	Soluble in water (27g/100mL at 20℃), slightly soluble in ethanol, insoluble in acetone; dissolution rate faster than anhydrous magnesium sulfate (fast-acting advantage)
pH 值 (5%水溶液, 25℃)	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	较强, 相对湿度 > 70%时易吸潮结块, 需密封储存	Strong, easy to absorb moisture and cake when relative humidity > 70%, requiring sealed storage
农用核心特性	速效性佳, 镁利用率高, 水溶镁≥15.0%, 适合追肥及叶面喷施	Fast-acting, high magnesium utilization rate, water-soluble magnesium ≥15.0%, suitable for topdressing and foliar spraying

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; 受热 150℃分解失去结晶水, 转化为无水硫酸镁; 易吸潮, 潮湿空气中易结块, 不影响化学性质但降低施用便利性, 需密封储存 (Stable under normal temperature and dry environment; decomposes at 150℃ to lose crystal water and convert to anhydrous magnesium sulfate. Easy to absorb moisture and cake in humid air, which does not affect chemical properties but reduces application convenience, requiring sealed storage) 。

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、接触氧化剂及乙氧基乙炔醇 (Avoid conditions: High temperature (>100℃), 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 约 1200mg/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; 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：**Kieserite 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: Kieserite 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，符合欧盟 REACH 及美国 OSHA 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 and US OSHA 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，符合东南亚地区农业环保法规（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, complying with Southeast Asian agricultural environmental regulations) 。



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、过期的 Kieserite 肥料经粉碎、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 Kieserite fertilizer 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：Kieserite Fertilizer (一水硫酸镁肥) | UN Transport Name: Kieserite Fertilizer (Magnesium Sulfate Monohydrate Fertilizer)

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，贴合全球外贸需求)：

- 运输车辆/船舶：陆运用干燥、清洁、无破损的厢式货车，配备防雨、防潮、防晒、防尘设施，车厢内铺垫防水布；海运选用干燥货舱，远离潮湿货区及水源，货舱内放置干燥剂，防范海洋高湿环境导致 Kieserite 吸潮结块 (Transport vehicles/ships: Road transport uses dry, clean and intact box trucks, equipped with



rainproof, moisture-proof, sun-proof and dust-proof facilities; waterproof cloth paved in carriage. Maritime transport uses dry cargo holds, away from humid cargo areas and water sources; desiccants placed in cargo holds to prevent Kieserite moisture absorption and caking in high-humidity marine environment) 。

- 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，张贴隔离警示标志及中英文安全标签；装载后检查固定情况，避免运输过程中货物移位、挤压（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 and Chinese-English safety labels. Check fixation after loading to avoid cargo displacement and extrusion during transport) 。
- 运输管控：陆运远离热源、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；避开人口密集区及农田灌溉区，按规定路线行驶。海运符合 IMDG-CODE 标准，随货附带本 SDS 文档（一式两份，中英文各一份），供海关及承运人查验；运输过程中避免货物接触海水、雨水，防止吸潮变质（Transport control: Road transport keeps away from heat sources, fire sources, water sources and humid areas; stays in cool, dry and well-ventilated place with special personnel on duty during stops to prevent livestock contact and rain wash. Avoid densely populated areas and farmland irrigation areas, follow specified routes. Maritime transport complies with IMDG-CODE standard; attach two copies of this SDS document (one Chinese, one English) with the goods for customs and carrier inspection. Prevent cargo from contacting seawater and rain during transport to avoid moisture absorption and deterioration) 。
- 通关适配：按 HS 编码 2833210000 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；随货提供产品合格证书、本 SDS 文档，确保通关顺畅（Customs clearance adaptation: Declare under HS Code 2833210000; tariff rate 0%-6.5% in EU, US, Southeast Asia and other regions. Confirm importing country's sub-code and tariff policy in advance. Provide product qualification certificate and this SDS document with the goods to ensure smooth customs clearance) 。

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，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，标签需标注全部危险说明及暴露场景信息；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. 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. 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，允许作为农用镁肥合法使用；遵循 ANSI Z400.1 标准分类标签，包装及 SDS 内容需明确暴露控制及急救措施；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，跨境运输时随货附带 SDS 及产品合规声明 (Complies with OSHA HazCom 2012 standard (29 CFR 1910.1200), listed in TSCA inventory, legally usable as agricultural magnesium fertilizer. Follows ANSI Z400.1 standard for classification and labeling; exposure control and first-aid measures shall be clearly stated in packaging and SDS. 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; attach SDS and product compliance statement with goods for cross-border transport) 。

东南亚法规：符合韩国 K-REACH 法规，作为农用化学品需完成产品登记并提交生态安全性评估报告，标签需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，进口时需提供 SDS 及农林水产省认可的产品合格证明；适配东南亚各国农业投入品管理要求，禁止含重金属超标 (符合当地 $Pb \leq 150\text{mg/kg}$ 、 $Cd \leq 5\text{mg/kg}$ 限值) 产品入境 (Complies with South Korea K-REACH Regulation; as agricultural chemical, product registration and ecological safety assessment report submission are required, and Korean hazard statements and application warnings shall be marked on labels. Complies with Japan CSCL Act, included in non-controlled list of "specific chemical substances"; Japanese product name, company information and emergency contact shall be marked on packaging; SDS and product qualification certificate recognized by Ministry of Agriculture, Forestry and Fisheries shall be provided for import. Adapts to agricultural input management requirements of Southeast Asian countries; prohibits entry of products with excessive heavy metals (meeting local limits of $Pb \leq 150\text{mg/kg}$, $Cd \leq 5\text{mg/kg}$)) 。

中国法规：符合 GB/T 16483-2008 《化学品安全技术说明书 内容和项目顺序》、GB/T 26568-2011 《农业用硫酸镁》及 GB 8569 《固体化学肥料包装》标准；作为农用肥料，需通过肥料登记备案，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，避免与危险化学品混装；废弃处置遵循《农业废弃物资源化利用通则》，禁止污染农田及水源 (Complies with GB/T 16483-2008 "Safety Data Sheet for Chemical Products - Content and Order of Items", GB/T 26568-2011 "Magnesium Sulfate for Agricultural Use" and GB 8569 "Packaging for Solid Chemical Fertilizers". As agricultural fertilizer, it needs to complete fertilizer registration and filing, and mark the fertilizer registration certificate number. Transport complies with "Regulations on the Administration of Road Transport of Dangerous Goods", transported as ordinary agricultural chemicals, avoiding mixed loading with dangerous chemicals. Waste



disposal follows "General Rules for Resource Utilization of Agricultural Wastes", prohibiting pollution of farmland and water sources) 。

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，编制负责人：张工，审核人：李工，批准人：王工；编制日期：2026 年 1 月 28 日，修订日期：无，下次修订计划：2028 年 1 月（每 2 年复核一次，若法规更新或产品特性变更将提前修订）（Preparation Information: This SDS is prepared by the Technology Department of Laizhou Baiyexin Chemical Co., Ltd. Prepared by: Engineer Zhang, Reviewed by: Engineer Li, Approved by: Engineer Wang. Preparation Date: January 28, 2026, Revision Date: None, Next Revision Plan: January 2028 (review every 2 years, revise in advance if regulations are updated or product characteristics change)) 。

免责声明：本 SDS 基于当前可获得的科学数据及法规要求编制，仅适用于本公司生产的 Kieserite Fertilizer（一水硫酸镁肥，农用级）产品。使用者应结合实际应用场景（施用、储存、运输）严格遵循本 SDS 提示的安全要求，本公司不对因违规操作、产品误用或超出适用范围导致的损失承担责任。若需获取最新版本 SDS 或补充合规证明，可联系企业 24 小时应急电话咨询（Disclaimer: This SDS is prepared based on currently available scientific data and regulatory requirements, and only applies to Kieserite Fertilizer (magnesium sulfate monohydrate fertilizer, agricultural grade) produced by our company. Users shall strictly follow the safety requirements prompted in this SDS in combination with actual application scenarios (application, storage, transport). Our company shall not be liable for losses caused by illegal operation, product misuse or exceeding the scope of application. For the latest version of SDS or supplementary compliance certificate, please contact the enterprise's 24-hour emergency phone) 。

附加提示：1. 本产品 HS 编码 2833210000 适用于全球多数国家，欧盟进口可对应 CN 编码 283321000000，韩国进口对应 KCS 编码 2833210000，日本进口对应 HS 编码 2833210000（需在申报时标注“农用矿物源镁肥”）；2. 叶面喷施时若遇高温干旱天气，可适当降低浓度至 0.2%-0.3%，并在傍晚时段施用，提升作物吸收效率；3. 外贸海运时建议选择干燥季节发货，货舱内干燥剂用量按每立方米 500g 配置，降低吸潮风险（Additional Tips: 1. The HS Code 2833210000 of this product is applicable to most countries in the world; for EU import, it can correspond to CN Code 283321000000, for South Korea import to KCS Code 2833210000, and for Japan import to HS Code 2833210000 (mark "agricultural mineral source magnesium fertilizer" when declaring). 2. For foliar spraying in high-temperature and dry weather, the concentration can be appropriately reduced to 0.2%-0.3% and applied in the evening to improve crop absorption efficiency. 3. For foreign trade maritime transport, it is recommended to ship in dry season, and the desiccant dosage in the cargo hold is 500g per cubic meter to reduce moisture absorption risk) 。

| (注：文档部分内容可能由 AI 生成)