AuSaMicS™ Life Science

Technical Data Sheet

TDS-BA-1023

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Product Identification

Product Name	Creatine Monohydrate
IUPAC Name	2-(carbamimidoyl-methyl-amino)acetic acid monohydrate
Catalog No.	BA-1023
CAS No. (Monohydrate)	6020-87-7
CAS No. (Anhydrous)	57-00-1
Molecular Formula	C4H9N3O2.H2O
Molecular Weight (Monohydrate)	149.15 g/mol
Molecular Weight (Anhydrous)	131.14 g/mol
Lot No.	CRE260301
Mfg. Date	March 2026
Retest Date	March 2029
Grade	Biochemical Grade (>98%)

Physical & Chemical Properties

Appearance	White to off-white crystalline powder; free-flowing
Physical State	Divided solid (crystalline)
Molecular Weight (Monohydrate)	149.15 g/mol
Molecular Weight (Anhydrous)	131.14 g/mol
Water Content	~12.1% w/w (monohydrate form)
Solubility (water)	Partly miscible — ~13.3 mg/mL (1:75) at 20 °C; Kb = 9.6 x 10-12 (20 °C)

pH Stability	Stable in slightly acidic to neutral solutions; converts to creatinine in alkaline or strongly acidic conditions
Melting / Decomposition	~300 °C dec.; decomposition temp: 303 °C
Flash Point	Not available (non-flammable solid)
Vapour Pressure	Not available
Odour	Odourless
Hygroscopicity	Low; reseal container after use

Quality Control Specifications

Parameter	Specification	Method
Appearance	White to off-white crystalline powder; no discolouration	Visual inspection
Purity (HPLC)	>98.0% (anhydrous basis)	HPLC reversed phase, UV 210 nm
Identity (IR)	Conforms to reference spectrum of Creatine Monohydrate	IR spectroscopy (KBr disc)
Identity (NMR/MS)	Confirmed by 1H NMR and LC-MS; [M+H]+ consistent with MW 132 (anhydrous)	1H NMR / LC-MS
Water Content (KF)	11.5 - 13.5% w/w	Karl Fischer titration (Ph. Eur. method)
Loss on Drying	<= 14.0% w/w	105 °C / 2 h (gravimetric)
Heavy Metals (Pb equiv.)	<= 20 ppm	ICP-MS
Arsenic (As)	<= 1 ppm	ICP-MS
Creatinine (impurity)	<= 1.0% w/w	HPLC
Dicyandiamide (DCD)	<= 10 ppm	HPLC (industrial contaminant check)
pH (1% aqueous solution)	6.5 - 8.0	Potentiometry (ISO 10523)

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Parameter	Specification	Method
Solubility	Partly miscible at 13 mg/mL (1:75) in purified water	Solution test

Preparation & Use Guidelines

Aqueous Stock Solution	Dissolve in warm purified water (40-50 °C) to improve dissolution; maximum practical concentration ~50 mg/mL. Stir or sonicate.
Cell Culture Supplement	Typical working concentration: 1-10 mM. Prepare in sterile water; filter through 0.22 µm; store at 4 °C. Use within 2 weeks.
ATP Regenerating System	Combine with creatine phosphate (phosphocreatine) and creatine kinase in cell-free translation buffers. Standard: 8 mM creatine + 20 mM phosphocreatine + 0.02 mg/mL CK.
CK Assay Substrate	Prepare 100 mM stock in 50 mM HEPES pH 7.4; use at 20-50 mM in kinetic CK assay.
Solution Stability	Fresh aqueous solutions: stable at 4 °C for up to 7 days. Neutral-to-slightly acidic pH preferred (pH 6-7) to minimise creatinine formation. Alkaline solutions degrade rapidly.
Incompatibilities	Avoid alkaline conditions (pH >8), strong acids, oxidising agents, and prolonged heating in solution
Autoclave	Not recommended for aqueous solutions — converts to creatinine. Use filter sterilisation (0.22 µm).

Contamination Awareness — Industrial Production

Dicyandiamide (DCD)	By-product of industrial creatine synthesis; potential health concern at elevated levels. AuSaMicS tests all lots: specification <= 10 ppm.
Dihydrotriazine (DHT)	Creatine synthesis contaminant; specification: not detected by HPLC.
Creatinine	Natural degradation product in solution; monitored in solid product: <= 1.0% w/w.
Heavy Metals	All lots tested by ICP-MS for Pb, As, Hg, Cd, and other heavy metals.

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Creatine Kinase Assay	Eppenberger H.M. et al. (1967). The ontogeny of creatine kinase isoenzymes. Dev Biol 15:361
Cell-Free Systems	Spirin A.S. et al. (1988). A continuous cell-free translation system capable of producing polypeptides in high yield. Science 242:1162
CAS Registry	CAS 6020-87-7 (monohydrate); CAS 57-00-1 (anhydrous)
Ph. Eur. Monograph	Creatine Monohydrate — Ph. Eur. 9.0 / BP 2017 monograph
Sports Nutrition Evidence	Lanhers C. et al. (2017). Creatine supplementation and upper limb strength performance: A systematic review. Sports Med 47:163