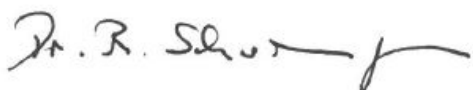


## Certificate of Analysis

**Product Name:** L-(+)-Tartaric acid  
ACS reagent,  $\geq 99.5\%$   
**Product Number:** 251380  
**Batch Number:** BCCD3530  
**Brand:** Sigma-Aldrich  
**CAS Number:** 87-69-4  
**Formula:**  $\text{HO}_2\text{CCH}(\text{OH})\text{CH}(\text{OH})\text{CO}_2\text{H}$   
**Formula Weight:** 150.09  
**Quality Release Date:** 09 JUN 2020

TEST	SPECIFICATION	RESULT
APPEARANCE (COLOR)	WHITE	WHITE
APPEARANCE (FORM)	POWDER OR CRYSTALS	CRYSTALS
TITRATION (T) NaOH 1M	99.45 - 100.55 %	100.01 %
PURITY (GC AREA %)	$\geq 99.45\%$	99.98 %
ENANTIOMERIC EXCESS	$\geq 98.5$	100.0 (GC)
SPECIFIC ROTATION (20/D)	$12.4 \pm 2.0$ DEGREES	12.3 DEGREES
CONCENTRATION	C=20%, WATER	C=20%, WATER
INSOLUBLE MATTER	$\leq 0.0050\%$	$< 0.005\%$
RESIDUE ON IGNITION	$\leq 0.02\%$	0.002 %
INFRARED SPECTRUM	CONFORMS TO STRUCTURE	CONFORMS
OXALATES	PASS CA. 0.1 % (AS OXALATE) BY GRAVIMETRIC ASSAY	PASS
HEAVY METALS	$\leq 5$ PPM	$< 5$ PPM (AS LEAD)
ACS SPECIFICATIONS	CURRENT ACS SPECIFICATION	CORRESPONDS TO ACS (11TH ED.)
METAL TRACE ANALYSIS (ICP)	CORRESPONDS TO REQUIREMENTS	PASSED
IRON (ICP)	$\leq 5$ PPM	$< 5$ PPM
TOTAL SULFUR AS SO <sub>4</sub> (ICP)	SULFUR COMPOUNDS $\leq 0.002\%$	$< 20$ MG/KG
CHLORIDE (CL)	$\leq 0.001\%$	$< 0.001\%$
PHOSPHATE (PO <sub>4</sub> )	$\leq 0.001\%$	$< 0.001\%$



Dr. Reinhold Schwenninger  
Quality Assurance  
Buchs, Switzerland

Sigma-Aldrich warrants that at the time of the quality release or subsequent retest date this product conformed to the information contained in this publication. The current specification sheet may be available at Sigma-Aldrich.com. For further inquiries, please contact Technical Service. Purchaser must determine the suitability of the product for its particular use. See reverse side of invoice or packing slip for additional terms and conditions of sale.