BRAMANTE BIOLOGICS

NOMINAL FORMULATION

Ham's F-10 Nutrient Mixture, with L-glutamine

Product: MD-HAMF10

Reference revision v2. Updated 2026-11-11.

Internal nominal composition for Ham’s F-10 with 1.0 mM L-glutamine, 1.1 g/L D-glucose, 1.2 g/L sodium bicarbonate, and phenol red, without HEPES. Based on Sigma-Aldrich N6635, including its bicarbonate reconstitution supplement. All amounts are grams of the specified form per litre of final medium.

Calcium chloride dihydrate and magnesium sulfate heptahydrate replace the anhydrous forms at equal molarity. The conversions use 147.01/110.98 and 246.47/120.37 respectively. Glutamine is 0.14614 g/L (1.0 mM at 146.14 g/mol).

Hypoxanthine is the free base. Cysteine is the hydrochloride monohydrate, tyrosine is the disodium salt dihydrate, and phenol red is the sodium salt. These forms follow the Sigma reference.

The listed amounts describe the finished medium. Manufacturing must account for any low-mass or solution additions during Fill finish using the same pinned composition. Verify the exact lot forms, water, mixing and filtration method, and QC criteria before use.

Revision 2 aligns L-glutamine with the nominal 1.0 mM target in the Sigma-Aldrich N6635 reference. The other ingredient quantities and chemical forms carry forward from revision 1.

Nominal amounts are per final litre and rounded for display. Chemical forms define the amounts; water brings the solution to final volume.

L-Alanine (Free amino acid): 9 mg/L

L-Arginine hydrochloride (Monohydrochloride): 211 mg/L

L-Asparagine (Monohydrate): 15.01 mg/L

L-Aspartic acid (Free acid): 13.3 mg/L

L-Cysteine hydrochloride (Monohydrochloride monohydrate): 35 mg/L

L-Glutamic acid (Free acid): 14.7 mg/L

L-Glutamine (Free amino acid): 146.1 mg/L

Glycine (Free amino acid): 7.51 mg/L

L-Histidine hydrochloride (Monohydrochloride monohydrate): 21 mg/L

L-Isoleucine (Free amino acid): 2.6 mg/L

L-Leucine (Free amino acid): 13.1 mg/L

L-Lysine hydrochloride (Monohydrochloride): 29.3 mg/L

L-Methionine (Free amino acid): 4.48 mg/L

L-Phenylalanine (Free amino acid): 4.96 mg/L

L-Proline (Free amino acid): 11.5 mg/L

L-Serine (Free amino acid): 10.5 mg/L

L-Threonine (Free amino acid): 3.57 mg/L

L-Tryptophan (Free amino acid): 600 µg/L

L-Tyrosine disodium salt (Dihydrate): 2.61 mg/L

L-Valine (Free amino acid): 3.5 mg/L

Calcium chloride ($CaCl_2 \cdot 2H_2O$ dihydrate): 44.11 mg/L

Copper(II) sulfate ($CuSO_4 \cdot 5H_2O$ pentahydrate): 2.5 µg/L

Iron(II) sulfate ($FeSO_4 \cdot 7H_2O$ heptahydrate): 834 µg/L

Magnesium sulfate ($MgSO_4 \cdot 7H_2O$ heptahydrate): 152.8 mg/L

Potassium chloride (KCl): 285 mg/L

Potassium phosphate monobasic (Anhydrous KH_2PO_4): 83 mg/L

Sodium chloride (NaCl): 7.4 g/L

Sodium phosphate dibasic (Anhydrous Na_2HPO_4): 153.7 mg/L

Zinc sulfate ($ZnSO_4 \cdot 7H_2O$ heptahydrate): 28.8 µg/L

Sodium bicarbonate ($NaHCO_3$): 1.2 g/L

D-Biotin (Anhydrous): 24 µg/L

Choline chloride (Anhydrous-basis material): 698 µg/L

Folic acid (Anhydrous): 1.32 mg/L

myo-Inositol (Anhydrous): 541 µg/L

Niacinamide (nicotinamide) (Anhydrous): 615 µg/L

D-Calcium pantothenate (Calcium salt; anhydrous-basis assay): 715 µg/L

Pyridoxine hydrochloride (Hydrochloride): 206 µg/L

Riboflavin (Anhydrous): 376 µg/L

Thiamine hydrochloride (Hydrochloride): 1 mg/L

Cyanocobalamin (vitamin B12) (Cyanocobalamin): 1.36 mg/L

D-Glucose (Anhydrous): 1.1 g/L

Hypoxanthine (Free base): 4.08 mg/L

Phenol red sodium salt (Monosodium salt): 1.3 mg/L

Sodium pyruvate (Anhydrous sodium salt): 110 mg/L

DL-α-Lipoic acid (Racemic free acid): 210 µg/L

Thymidine (Anhydrous): 730 µg/L

For lot-specific quality-control results, see the Certificate of Analysis.