

## Datasheet: BUF012B

**BATCH NUMBER 157354**

<b>Description:</b>	alamarBlue®
<b>Name:</b>	alamarBlue®
<b>Format:</b>	Reagent
<b>Product Type:</b>	Accessory Reagent
<b>Quantity:</b>	100 ml

## Product Details

### Applications

This product has been reported to work in the following applications. This information is derived from testing within our laboratories, peer-reviewed publications or personal communications from the originators. Please refer to references indicated for further information. For general protocol recommendations, please visit [www.bio-rad-antibodies.com/protocols](http://www.bio-rad-antibodies.com/protocols).

	Yes	No	Not Determined	Suggested Dilution
ELISA	▪			
Immunofluorescence	▪			
Functional Assays	▪			

Where this product has not been tested for use in a particular technique this does not necessarily exclude its use in such procedures. Suggested working dilutions are given as a guide only. It is recommended that the user titrates the product for use in their own system using appropriate negative/positive controls.

### Product Form

Liquid

### Preservative Stabilisers

None present

### Product Information

The cell proliferation assay reagent alamarBlue® is designed to provide a rapid and sensitive measure of cell proliferation and cytotoxicity in various human and animal cell lines, bacteria and fungi.

alamarBlue® is an indicator dye, that incorporates an oxidation-reduction (REDOX) indicator that both fluoresces and changes colour in response to the chemical reduction of growth medium, resulting from cell growth. The alamarBlue® cell proliferation assay reagent is designed to quantitatively measure the proliferation of various human and animal cell lines, bacteria and fungi.

**Some variability in the absorbance may occur between batches of AlamarBlue® but all batches should fall between 0.84 and 0.95AU when measured between 600nm and 602nm on a spectrophotometer.**

Full cell proliferation assay instructions can be found [here](#)

Colorimetric and Fluorescence result calculators can be found [here](#).

**For further information and Technical help about alamarBlue<sup>®</sup>, the cell proliferation assay reagent, please visit [www.bio-rad-antibodies.com/alamarBlue](http://www.bio-rad-antibodies.com/alamarBlue)**

This site includes:

Frequently Asked Questions

Example calculations

Product-related references

---

#### Test Principle

Cell proliferation assay

- Growing cells cause a chemical reduction of alamarBlue<sup>®</sup>.
- Continued growth maintains a reduced environment. (fluorescent, red).
- Inhibition of growth maintains an oxidized environment. (non-fluorescent, blue).
- Data may be collected using either fluorescence-based or absorbance-based instrumentation.
- Fluorescence is monitored at 530-560nm excitation wavelength and 590nm emission wavelength.
- Absorbance is monitored at 570nm and 600nm.

---

#### Intended Use

- Cell proliferation assays.
- The reagent can be used to establish proliferation or relative cytotoxicity in a cell proliferation assay.
- Baseline data for predicting the toxicity of related novel agents can be compared to baseline data with known in-vivo toxicity.
- alamarBlue<sup>®</sup> is for use between pH6.8 and pH7.4.

---

#### Instructions For Use

Instructions for use can be found at [www.bio-rad-antibodies.com/uploads/IFU/BUF012B.pdf](http://www.bio-rad-antibodies.com/uploads/IFU/BUF012B.pdf)

---

#### References

1. Lewis, C.S. *et al.* (2010) Local Antibiotic Delivery with Bovine Cancellous Chips. [J Biomater Appl. 26: 491-506.](#)
2. Alsford, S. and Horn, D. (2011) Elongator Protein 3b Negatively Regulates Ribosomal DNA Transcription in African Trypanosomes. [Mol Cell Biol.31: 1822-32.](#)
3. Crilly, A. *et al.* (2011) Phosphodiesterase 4 (PDE4) regulation of proinflammatory cytokine and chemokine release from rheumatoid synovial membrane. [Ann Rheum Dis. 70: 1130-7.](#)
4. Paget, C. *et al.* (2011) Potential Role of Invariant NKT Cells in the Control of Pulmonary Inflammation and CD8+ T Cell Response during Acute Influenza A Virus H3N2 Pneumonia. [J Immunol. 186: 5590-602.](#)
5. Lakhkar, N. *et al.* (2011) Titanium and strontium-doped phosphate glasses as vehicles for strontium ion delivery to cells. [J Biomater Appl. 25: 877-93.](#)
6. Wilson, B.A. *et al.* (2011) High-throughput screen identifies novel inhibitors of cancer biomarker  $\alpha$ -methylacyl coenzyme A racemase (AMACR/P504S). [Mol Cancer Ther. 10: 825-38.](#)

7. Lau, L.I. *et al.* (2011) The Effect of Photooxidative Stress and Inflammatory Cytokine on Complement Factor H Expression in Retinal Pigment Epithelial Cells. [Invest Ophthalmol Vis Sci. 52: 6832-41.](#)
8. Arlian, B.M. and Tinker, J.K. (2011) Mucosal Immunization with a Staphylococcus aureus IsdA-Cholera Toxin A2/B Chimera Induces Antigen-Specific Th2-Type Responses in Mice. [Clin Vaccine Immunol. 18: 1543-51.](#)
9. Voloshin, T. *et al.* (2011) G-CSF supplementation with chemotherapy can promote revascularization and subsequent tumor regrowth: prevention by a CXCR4 antagonist. [Blood. 118: 3426-35.](#)
10. Rao, T.D. *et al.* (2011) Dual-Fluorescence Isogenic High-Content Screening for MUC16/CA125 Selective Agents. [Mol Cancer Ther. 10: 1939-48.](#)
11. Uitdehaag, J.C. *et al.* (2011) Multidimensional Profiling of CSF1R Screening Hits and Inhibitors: Assessing Cellular Activity, Target Residence Time, and Selectivity in a Higher Throughput Way. [J Biomol Screen. 16: 1007-17.](#)
12. Rzhepishevskaya, O. *et al.* (2011) The antibacterial activity of ga3+ is influenced by ligand complexation as well as the bacterial carbon source. [Antimicrob Agents Chemother. 55: 5568-80.](#)
13. Xu, S. *et al.* (2011) Marek's disease virus type 1 microRNA miR-M3 suppresses cisplatin-induced apoptosis by targeting Smad2 of the transforming growth factor beta signal pathway. [J Virol. 2011 Jan;85\(1\):276-85.](#)
14. Ardakani, A.G. *et al.* (2014) Quantifying the correlation between spatially defined oxygen gradients and cell fate in an engineered three-dimensional culture model. [J R Soc Interface. 11. pii: 20140501.](#)
15. Nakayama, G.R. *et al.* (1997) Assessment of the Alamar Blue assay for cellular growth and viability in vitro. [J Immunol Methods. 204: 205-8.](#)
16. Diril, M.K. *et al.* (2012) Cyclin-dependent kinase 1 (Cdk1) is essential for cell division and suppression of DNA re-replication but not for liver regeneration. [Proc Natl Acad Sci U S A. 109: 3826-31.](#)
17. Warrior, T. *et al.* (2012) Antigen 85C inhibition restricts Mycobacterium tuberculosis growth through disruption of cord factor biosynthesis. [Antimicrob Agents Chemother. 56: 1735-43.](#)
18. Dreidax, D. *et al.* (2013) Low p14ARF expression in neuroblastoma cells is associated with repressed histone mark status, and enforced expression induces growth arrest and apoptosis. [Hum Mol Genet. 22: 1735-45.](#)
19. Wang, H. *et al.* (2014) Enhanced osteoblast responses to poly ether ether ketone surface modified by water plasma immersion ion implantation. [Colloids Surf B Biointerfaces. 117: 89-97.](#)
20. Park, K.H. *et al.* (2014) Expression of polysialylated neural cell adhesion molecules on adult stem cells after neuronal differentiation of inner ear spiral ganglion neurons. [Biochem Biophys Res Commun. pii: S0006-291X\(14\)00889-4.](#)
21. Moreira, A. *et al.* (2015) Adipocyte secreted factors enhance aggressiveness of prostate carcinoma cells. [PLoS One. 10 \(4\): e0123217.](#)
22. Rao, T.D. *et al.* (2015) Expression of the Carboxy-Terminal Portion of MUC16/CA125 Induces Transformation and Tumor Invasion. [PLoS One. 10 \(5\): e0126633.](#)
23. Mabuchi, Y. & Frankel, T.L. (2016) Functions of innate and acquired immune system are reduced in domestic pigeons (*Columba livia domestica*) given a low protein diet [Royal Society Open Science. 3 \(3\): 150408.](#)

24. Santofimia-Castaño Patricia *et al.* (2014) Change in the Characteristics of Ca<sup>2+</sup> Signaling in Pancreatic Acinar Cells in Culture [The Open Access Journal of Science and Technology. 2: 1-12.](#)
25. Xu, S. *et al.* (2016) MicroRNA-33 promotes the replicative senescence of mouse embryonic fibroblasts by suppressing CDK6 [Biochem Biophys Res Com. Apr 6 \[Epub ahead of print\]](#)
26. Drong, C. *et al.* (2016) Effects of monensin and essential oils on immunological, haematological and biochemical parameters of cows during the transition period. [J Anim Physiol Anim Nutr \(Berl\). Mar 2. \[Epub ahead of print\]](#)
27. van Driel, P.B. *et al.* (2016) EGFR targeted nanobody-photosensitizer conjugates for photodynamic therapy in a pre-clinical model of head and neck cancer. [J Control Release. 229: 93-105.](#)
28. Howe GA *et al.* (2016) Focal Adhesion Kinase Inhibitors in Combination with Erlotinib Demonstrate Enhanced Anti-Tumor Activity in Non-Small Cell Lung Cancer. [PLoS One. 11 \(3\): e0150567.](#)
29. Fernández-Gutiérrez M *et al.* (2016) Stimuli-responsive chitosan/poly (N-isopropylacrylamide) semi-interpenetrating polymer networks: effect of pH and temperature on their rheological and swelling properties. [J Mater Sci Mater Med. 27 \(6\): 109.](#)
30. van Driel, P.B. *et al.* (2016) EGFR targeted nanobody-photosensitizer conjugates for photodynamic therapy in a pre-clinical model of head and neck cancer. [J Control Release. 229: 93-105.](#)
31. Grasy J *et al.* (2016) Content of Soluble Factors and Characteristics of Stromal Vascular Fraction Cells in Lipoaspirates from Different Subcutaneous Adipose Tissue Depots. [Aesthet Surg J. Feb 23. pii: sjw022. \[Epub ahead of print\]](#)
32. Liu, T.T. *et al.* (2016) Effects of processing methods on composition and functionality of volatile components isolated from immature fruits of atemoya. [Food Chem. 202: 176-83.](#)
33. Tuin, S.A. *et al.* (2016) Creating tissues from textiles: scalable nonwoven manufacturing techniques for fabrication of tissue engineering scaffolds. [Biomed Mater. 11 \(1\): 015017.](#)
34. Chauhan, S. *et al.* (2016) Cdk2 catalytic activity is essential for meiotic cell division *in vivo*. [Biochem J. 473 \(18\): 2783-98.](#)
35. Yu, Hui-Chieh. *et al.* (2016) Effects of fibroblast growth factor-2 on cell proliferation of cementoblasts [Journal of Dental Sciences. Nov 5 \[Epub ahead of print\]](#)
36. Bertoldi, S. *et al.* (2015) Exploiting novel sterilization techniques for porous polyurethane scaffolds. [J Mater Sci Mater Med. 26 \(5\): 182.](#)
37. Botero A *et al.* (2016) *In vitro* drug susceptibility of two strains of the wildlife trypanosome, *Trypanosoma copemani*: A comparison with *Trypanosoma cruzi*. [Int J Parasitol Drugs Drug Resist. 7 \(1\): 34-41.](#)
38. Zhang, Y-G, *et al.* (2016) Novel interconnected nanochannel hydroxyapatite ceramic: *in situ* synthesis, microstructure, and permeability [Ceramics International. Dec 23 \[Epub ahead of print\]](#)
39. Bernardini, F.P. *et al.* (2015) Superficial Enhanced Fluid Fat Injection (SEFFI) to Correct Volume Defects and Skin Aging of the Face and Periocular Region. [Aesthet Surg J. 35 \(5\): 504-15.](#)
40. Howe, G.A. *et al.* (2016) Focal Adhesion Kinase Inhibitors in Combination with

- Erlotinib Demonstrate Enhanced Anti-Tumor Activity in Non-Small Cell Lung Cancer. [PLoS One. 11 \(3\): e0150567.](#)
41. Li, G. *et al.* (2017) Antimicrobial susceptibility and MIC distribution of 41 drugs against clinical isolates from China and reference strains of nontuberculous mycobacteria. [Int J Antimicrob Agents. 49 \(3\): 364-374.](#)
42. Deschamps, E. *et al.* (2014) Characterization of indoor dust from Brazil and evaluation of the cytotoxicity in A549 lung cells. [Environ Geochem Health. 36 \(2\): 225-33.](#)
43. Lara, D. *et al.* (2010) Anti-trypanosomatid activity of ceragenins. [J Parasitol. 96 \(3\): 638-42.](#)
44. Lee, Y.W. *et al.* (2017) Effects of Redox Modulation on Cell Proliferation, Viability, and Migration in Cultured Rat and Human Tendon Progenitor Cells. [Oxid Med Cell Longev. 2017: 8785042.](#)
45. DiSpigna, G. *et al.* (2017) Human cardiac multipotent adult stem cells in 3D matrix: new approach of tissue engineering in cardiac regeneration post-infarction. [J Biol Regul Homeost Agents. 31 \(4\): 911-921.](#)
46. Martínez-morcillo, S. *et al.* (2018) The organophosphorus pesticide dimethoate decreases cell viability and induces changes in different biochemical parameters of rat pancreatic stellate cells. [Toxicol In Vitro. 54: 89-97.](#)
47. Jyotsana, N. *et al.* (2019) Lipid nanoparticle-mediated siRNA delivery for safe targeting of human CML *in vivo*. [Ann Hematol. 98 \(8\): 1905-18.](#)
48. Looi, C.Y. *et al.* (2013) Induction of apoptosis in human breast cancer cells via caspase pathway by vernodalin isolated from *Centratherum anthelminticum* (L.) seeds. [PLoS One. 8 \(2\): e56643.](#)
49. Shechter, D. *et al.* (2020) Breast Cancer-Derived Microparticles Reduce Cancer Cell Adhesion, an Effect Augmented by Chemotherapy. [Cells. 9 \(10\) 2269.](#)
50. Jiménez-Holguín, J. *et al.* (2020) Strontium-Modified Scaffolds Based on Mesoporous Bioactive Glasses/Polyvinyl Alcohol Composites for Bone Regeneration. [Materials \(Basel\). 13 \(23\) Dec 03 \[Epub ahead of print\].](#)
51. Perut, F. *et al.* (2020) Citrate Supplementation Restores the Impaired Mineralisation Resulting from the Acidic Microenvironment: An *In Vitro* Study. [Nutrients. 12 \(12\)Dec 09 \[Epub ahead of print\].](#)
52. Huber, L. *et al.* (2020) FGF Expression in HPV16-positive and -negative SCC After Treatment With Small-molecule Tyrosine Kinase Inhibitors and Everolimus. [Anticancer Res. 40 \(10\): 5621-30.](#)
53. Ansari, Z. *et al.* (2020) *In-Situ* Synthesis and Characterization of Chitosan/Hydroxyapatite Nanocomposite Coatings to Improve the Bioactive Properties of Ti6Al4V Substrates. [Materials \(Basel\). 13 \(17\)Aug 26 \[Epub ahead of print\].](#)
54. Yang, P.M. *et al.* (2020) Carbon monoxide-releasing molecules protect against blue light exposure and inflammation in retinal pigment epithelial cells. [Int J Mol Med. 46 \(3\): 1096-106.](#)
55. Calejo, I. *et al.* (2019) A Textile Platform Using Continuous Aligned and Textured Composite Microfibers to Engineer Tendon-to-Bone Interface Gradient Scaffolds. [Adv Healthc Mater. 8 \(15\): e1900200.](#)
56. Huang, C.L. *et al.* (2020) Antimicrobial Activity of Electrospun Polyvinyl Alcohol Nanofibers Filled with Poly[2-(tert-butylaminoethyl) Methacrylate]-Grafted Graphene Oxide Nanosheets. [Polymers \(Basel\). 12 \(7\)Jun 28 \[Epub ahead of print\].](#)
57. Wu, L. *et al.* (2020) Human airway-like multilayered tissue on 3D-TIPS printed

thermoreponsive elastomer/collagen hybrid scaffolds. [Acta Biomater. 113: 177-95.](#)

58. Cometa, S. *et al.* (2021) A 3D Printed Composite Scaffold Loaded with Clodronate to Regenerate Osteoporotic Bone: *In Vitro* Characterization. [Polymers \(Basel\). 13\(1\):150.](#)

59. Badwelan, M. *et al.* (2020) Poly( $\delta$ -valerolactone)/Poly(ethylene-co-vinylalcohol)/ $\beta$ -Tricalcium Phosphate Composite as Scaffolds: Preparation, Properties, and *In Vitro* Amoxicillin Release. [Polymers \(Basel\). 13\(1\):46.](#)

60. Alhuthali, H.M. *et al.* (2020) The natural alkaloid Jerantinine B has activity in acute myeloid leukemia cells through a mechanism involving c-Jun. [BMC Cancer. 20 \(1\): 629.](#)

61. Ho, C.L. *et al.* (2020) Eucalyptus essential oils inhibit the lipopolysaccharide-induced inflammatory response in RAW264.7 macrophages through reducing MAPK and NF- $\kappa$ B pathways. [BMC Complement Med Ther. 20 \(1\): 200.](#)

62. Fatima, S. *et al.* (2021) Selenium Nanoparticles by Moderating Oxidative Stress Promote Differentiation of Mesenchymal Stem Cells to Osteoblasts. [Int J Nanomedicine. 16: 331-43.](#)

63. Mojena-Medina, D. *et al.* (2020) Design, Implementation, and Validation of a Piezoelectric Device to Study the Effects of Dynamic Mechanical Stimulation on Cell Proliferation, Migration and Morphology. [Sensors \(Basel\). 20 \(7\): 2155.](#)

64. Gonzalez, A. *et al.* (2020) Melatonin modulates red-ox state and decreases viability of rat pancreatic stellate cells. [Sci Rep. 10 \(1\): 6352.](#)

65. Juillerat-Jeanneret, L. *et al.* (2008) Heterogeneity of human glioblastoma: glutathione-S-transferase and methylguanine-methyltransferase. [Cancer Invest. 26 \(6\): 597-609.](#)

66. Scialla, S. *et al.* (2019) Bioactive chitosan-based scaffolds with improved properties induced by dextran-grafted nano-maghemite and l-arginine amino acid. [J Biomed Mater Res A. 107 \(6\): 1244-52.](#)

<b>Further Reading</b>	1. Rampersad SN (2012) Multiple applications of Alamar Blue as an indicator of metabolic function and cellular health in cell viability bioassays. <a href="#">Sensors (Basel). 12 (9): 12347-60.</a>
<b>Storage</b>	Store at +4°C. DO NOT FREEZE. This product should be stored undiluted. This product is photosensitive and should be protected from light.
<b>Guarantee</b>	Guaranteed until date of expiry. Please see product label.
<b>Acknowledgements</b>	Manufactured for Bio-Rad by Trek Diagnostic System. U.S. patent 5,501,959.
<b>Health And Safety Information</b>	Material Safety Datasheet documentation #10289 available at: <a href="https://www.bio-rad-antibodies.com/SDS/BUF012B">https://www.bio-rad-antibodies.com/SDS/BUF012B</a> 10289
<b>Regulatory</b>	For research purposes only

## Related Products

### Recommended Useful Reagents

[alamarBlue® \(BUF012A\)](#)

To find a batch/lot specific datasheet for this product, please use our online search tool at: [bio-rad-antibodies.com/datasheets](https://www.bio-rad-antibodies.com/datasheets)

**North & South** Tel: +1 800 265 7376

**America** Fax: +1 919 878 3751

Email: [antibody\\_sales\\_us@bio-rad.com](mailto:antibody_sales_us@bio-rad.com)

**Worldwide**

Tel: +44 (0)1865 852 700

Fax: +44 (0)1865 852 739

Email: [antibody\\_sales\\_uk@bio-rad.com](mailto:antibody_sales_uk@bio-rad.com)

'M360660:200108'

**Europe**

Tel: +49 (0) 89 8090 95 21

Fax: +49 (0) 89 8090 95 50

Email: [antibody\\_sales\\_de@bio-rad.com](mailto:antibody_sales_de@bio-rad.com)

**Printed on 21 Jun 2024**

---

© 2024 Bio-Rad Laboratories Inc | [Legal](#) | [Imprint](#)