EMERGENCY RESPONSE PLANNING GUIDELINE (ERPG)
Public Comment Draft

N-BUTYL ACRYLATE
(2026)

ERPG-3: 250 ppm (1308 mg/m^3)
ERPG-2: 25 ppm (131 mg/m^3)
ERPG-1: 0.01 ppm (0.05 mg/m^3)

ERPG™ Maximum Airborne Concentration Levels

ERPG 1
MILD

The maximum airborne concentration below which nearly all individuals could be exposed for up to one hour without experiencing more than mild, transient adverse health effects or without perceiving a clearly defined objectionable odor.

ERPG 2
SERIOUS

The maximum airborne concentration below which nearly all individuals could be exposed for up to one hour without experiencing or developing irreversible or other serious health effects or symptoms that could impair an individual's ability to take action.

ERPG 3
SEVERE

The maximum airborne concentration below which nearly all individuals could be exposed for up to one hour without experiencing or developing life-threatening health effects.

AIHA® | GUIDELINE FOUNDATION

EMERGENCY RESPONSE PLANNING GUIDELINE (ERPG)
Public Comment Draft

N-BUTYL ACRYLATE
(2026)

ERPG-3: 250 ppm (1308 mg/m^3)
ERPG-2: 25 ppm (131 mg/m^3)
ERPG-1: 0.01 ppm (0.05 mg/m^3)

I. Recommended ERPGs and Supporting Rationales

ERPG-3: 250 ppm (1308 mg/m^3)

250 ppm of n-butyl acrylate is the maximum airborne concentration below which nearly all individuals could be exposed for up to one hour without experiencing or developing life-threatening health effects. An acute inhalation lethality study in rodents showed 1,990 ppm to be slightly below the threshold of lethal effects based on a 4-hour exposure and demonstrated an LC_{50} value of 2,730 ppm (Oberly and Tansy, 1985). These data supported derivation of a $BMCL_{05}$ value of 1,652 ppm (NAS 2007a). Earlier studies produced lethality in rodents as a result of 4-hour exposures to 1,000 ppm (Smyth et al., 1951; Carpenter et al., 1974). One-hour exposures resulted in death of 4/5 female rats exposed to 5,100 ppm and 2/5 male rats exposed to 6,360 ppm (Vernot et al., 1977). More recently, no deaths were observed in mice following a 30-minute exposure to concentrations as high as 900 ppm (Kirkpatrick, 2003). Mortality (40%) was observed in hamsters (but not rats) repeatedly exposed to approximately 820 ppm for 6 hours/day (Engelhardt and Klimisch, 1983). Although there is some variability in the results of these studies, 1,000 ppm is the lowest reported concentration that produced lethality in animals following a single exposure. The recommended ERPG–3 value of 250 ppm is below the threshold of lethal effects in animals and takes into consideration the uncertainty of extrapolating results from animal studies to humans.

ERPG-2: 25 ppm (131 mg/m³)

25 ppm of n-butyl acrylate is the maximum airborne concentration below which nearly all individuals could be exposed for up to one hour without experiencing or developing irreversible or other serious adverse health effects or symptoms that could impair an individual's ability to take protective action. Fetal resorptions and reductions in maternal weight gain have been reported in rats exposed to butyl acrylate 6 hours/day on GD 6-15 (Merkel and Klimisch, 1983). The no observable adverse effect level (NOAEL) for both effects was 25 ppm, and the lowest observed adverse effect level (LOAEL) was 137 ppm. Respiratory depression was not observed at 30 ppm, but was observed at 100 ppm (Kirkpatrick, 2003). Animal toxicity data indicate that exposure to 25 ppm n-butyl acrylate should not lead to other serious health effects or produce symptoms that could impair an individual's ability to take protective action (Oberly and Tansy, 1985; Keller and Klimisch, 1978; Kirkpatrick, 2003).

ERPG-1: 0.01 ppm (0.05 mg/m³)

0.01 ppm of n-butyl acrylate is the maximum airborne concentration below which nearly all individuals could be exposed for up to one hour without experiencing or developing effects other than mild transient health effects or without perceiving a clearly defined objectionable odor. This value is based on a reported odor threshold concentration of 0.00055 ppm. Using the methodology of Ruijten et al. (2009), a "Level of distinct Odor Awareness (LOA)" was estimated to be 0.009 ppm for an intensity described as distinct and unpleasant. ERPG-1 was established using the rounded LOA value.

II. History of n-Butyl Acrylate ERPGs

First Published in 1995: ERPG-1=0.05 ppm, ERPG-2=25 ppm, ERPG-3=250 ppm

Updated and republished in 2005 with no change in values.

Updated and republished in 2026: ERPG-1= 0.01 ppm, ERPG-2=25 ppm, ERPG-3=250 ppm

The literature search used to develop the current document was conducted in April 2026.

III. References

American Conference of Governmental Industrial Hygienists. 2015. Annual TLVs (Threshold Limit Values) and BEIs (Biological Exposure Indices) booklet. Cincinnati, OH: ACGIH Signature Publications.

Amoore, J.E., and E. Hautala. 1983. Odor as an Aid to Chemical Safety: Odor Thresholds Compared with Threshold Limit Values and Volatiles for 214 Industrial Chemicals in Air and Water Dilution. *J. Appl. Toxicol.* 3(6):272–290.

AIHA (American Industrial Hygiene Association). 2024. *Odor thresholds for chemicals*, 4th ed., AIHA, Falls Church, VA.

BASF. 1985. *2-Year Inhalation Study with n-Butyl Acrylate in Rats with a 6-Month Follow-up Period* (Report A 0135/1531). Ludwigshafen, Germany: BASF Aktiengesellschaft. [German.]

BASF. 1979. Unpublished studies (78/623). Department of Toxicology, BASF AG. 23 January 1979. Cited in 40 IUCLID Data Set for butyl acrylate 19Jan2004. (as cited by NIOSH 2016)

Calabrese, E.J. and E. Kenyon. 1991. *Air Toxics and risk assessment*, Lewis Publishers.

Carpenter, C.P., C.S. Well, and H.F. Smyth Jr. 1974. Range-Finding Toxicity Data: List VIII. *Toxicol Appl. Pharmacol.* 28:313–319.

Chebotarev, P.A. 1985. Biological Effect and Hygienic Assessment of Butyl Acrylate and Methyl Methacrylate as Air Pollutants in Populated Areas. *Gig. Sanit.* 1:9–12. [Russian.]

DePass, L.R., E.H. Fowler, D.R. Meckley, and C.S. Weil. 1984. Dermal Oncogenicity Bioassays of Acrylic Acid. Ethyl Acrylate, and Butyl Acrylate. *Toxicol. Environ. Health* 14:115–120.

Engelhardt, G., and H.-J. Klimisch. 1983. n-Butyl Acrylate: Cytogenetic Investigations in the Bone Marrow of Chinese Hamsters and Rats after 4-Day Inhalation. *Fund Appl. Toxicol 3*:640–641.

Foureman, P., J.M Mason, R. Valencia and S. Zimmering. 1994. Chemical Mutagenesis Testing in Drosophila. *Environ. and Mol. Mutat. 23*:208–227.

Greim, H., Ahlers, J., Bias, R., Broecker, B., Hollander, H.,Gelbke, H.P., Jacobi, S., Klimisch, H.J., Mangelsdorf, I., Mayr, W., et al. 1995. Assessment of structurally related chemicals: toxicity and ecotoxicity of acrylic acid and acrylic acid alkyl esters (acrylates), methacrylic acid and methacrylic acid alkyl esters (methacrylates). *Chemosphere*. 31(2):2637–2659.

Ghanayem, B.I., R.R. Maronpot, and H.B. Matthew. 1985. Ethyl Acrylate-Induced Gastric Toxicity (II. Structure-Toxicity Relationships and Mechanism). *Toxicol. Appl. Pharmacol. 80*:336–344.

International Agency for Research on Cancer (IARC). 1999. *Re-evaluation of some organic chemicals*, Vol 71:359–366. World Health Organization.

Kirkpatrick, D.T. 2003. Airway irritation/respiratory depression (RD50) study of butyl acrylate in albino mice. WIL Research Laboratories, Inc., Ashland, OH. Study No. WIL-496001. 74pp.

Little, A.D. 1983. *Laboratory Evaluation of Odors from a Complex Industrial Facility* (Report to Rohm and Haas Company).

Maibach, H, N. Hjorth, S. Fregert, C. Menghini, H.-J. Bandman, K. Malten, V. Pirilia, B. Magnusson, K. Cronin, C. Calnan, D. Wilkinson, and F. Marzulli. 1978. Butyl Methacrylate monomer—ethyl Methacrylate monomer: Frequency of Reaction. *Contact. Derm. 4*:60.

Marks, T.A. 1979. *Teratogenic Potential of Environmental Agents*. (Status Report Prepared for the National Institute of Environmental Health Sciences [Contract No. ES-6-2127].)

McCollister, S.B., D.C. Morden, C.E. Wade, R.V. Kalnins, D.A. Dittenber, R.R. Albee, E.A. Hermann, G.C. Jersey, and S.J. Gorzinski. 1980. *Butyl Acrylate: Results of 96–97 Day Oral Toxicity Studies in Drinking Water or via Gavage in Rats*. The Dow Chemical Company. Midland, MI.

Merkle, J., and H.-J. Klimisch. 1983. n-Butyl Acrylate: Prenatal Inhalation Toxicity in the Rat. *Fund. Appl. Toxicol.* 3:443–447.

Nagata Y. 2003. Odor measurement review. Tokyo (Japan): Office of Odor, Noise and Vibration, Environmental Management Bureau, Ministry of Environment. Measurement of odor threshold by triangle odor bag method; pp. 118–127.

NAS. 2007a. Interim Acute Exposure Guideline Levels (AEGLs) for selected airborne chemicals. Butyl acrylate (CAS Reg. No. 141-32-2). National Academy of Sciences, National Research Council, Committee on Toxicology, Subcommittee on Acute Exposure Guideline Levels. Washington, DC: National Academy Press, https://www.epa.gov/sites/default/files/2014-08/documents/butylacrylate_tsd_interim1version_2_08_2007.pdf

NAS. 2007b. Interim Acute Exposure Guideline Levels (AEGLs) for selected airborne chemicals. Cumene (CAS Reg. No. 98-82-8). National Academy of Sciences, National Research Council, Committee on Toxicology, Subcommittee on Acute Exposure Guideline Levels. Washington, DC: National Academy Press, https://www.epa.gov/sites/production/files/2014-08/documents/cumene_tsd_interimversion1_8_28_07_0.pdf

National Institute for Occupational Safety and Health (NIOSH). 2016. Immediately dangerous to life and health (IDLH) profile for n-butyl acrylate. By Dotson GS, Maier A, Parker A and Haber L. Cincinnati, OH: US Department of Health and human Services, Centers for Disease Control and Prevention, National Institute for Occupational Safety and health, DHHS (NIOSH) publication 2016-173.

National Institute for Occupational Safety and Health (NIOSH). 2007. Pocket Guide to Chemical Hazards (third edition). Department of Health and Human Services, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health. DHHS (NIOSH) Publication No. 2005-149.

National Institute for Occupational Safety and Health (NIOSH). 1981. Occupational Health Guidelines for Chemical Hazards. DHHS (NIOSH) Publication Number 81-123. https://www.cdc.gov/niosh/docs/81-123/pdfs/0075.pdf

New Jersey Department of Health. 2017. Hazardous Chemical Fact Sheet for butyl acrylate. http://www.nj.gov/health/eoh/rtkweb/documents/fs/0278.pdf

Oberly, R., and M.F. Tansy. 1985. LC_{50} Values for Rats Acutely Exposed to Vapors of Acrylic and Methacrylic Acid Esters. *J. Toxicol. Environ. Health.* 16:811–822.

Parker, D. and J.L. Turk. 1983. Contact sensitivity to acrylate compounds in guinea pigs. *Contact Derm.* 9:55–60.

Rohm and Haas, Co. 1992. Initial submission: 2-Propenoic acid, butyl ester: translation of German article on industrial hygiene and toxicology describing studies in rats with cover letter dated 081292. Doc ID 88-920005597.

Ruijten, M.W.M.M., R. van Doorn, and A.P. van Harreveld. 2009. Assessment of Odour Annoyance in Chemical Emergency Management. RIVM Report 609200001/2009. RIVM, Bithoven, The Netherlands: RIVM [online]. Available: http://www.rivm.nl/bibliotheek/rapporten/609200001.pdf

Sanders, J.M., L.T. Burka and H.B. Matthews. 1988: Metabolism and Distribution of Butyl Acrylate in Male Fischer Rats. *Drug Metab. and Dispos. 16*:429–434.

Sapota, S. 1991. The Dynamics of Distribution and Excretion of C14 Butyl Acrylate in Male Wistar Albino Rats. Pol. *J. Occup. Med. & Environ. Health.* 4(1):55–56.

Smyth, H.F., Jr., C.P. Carpenter, and C.S. Weil 1951. Range-Finding Toxicity Data: List IV. *Arch. Ind. Hyg.* 4:119–122.

Vernot, E.H., J.D. MacEwen, C.C. Haun, and E.R. Kinkead. 1977. Acute Toxicity and Skin Corrosion Data for Some Organic and Inorganic Com- pounds and Aqueous Solutions. *Toxicol. Appl. Pharmacol.* 42:417–423.

Waegemaekers, T.H.J.M., and M.P.M. Bensink. 1984. Non-mutagenicity of 27 Aliphatic Acrylate Esters in the Salmonella-Microsome Test. *Mutat. Res.* 137:95–102.

Wiegand, H.J., D. Schiffmann, and D. Henschler. 1989. Non-genotoxicity of Acrylic Acid and n- Butyl Acrylate in a Mammalian Cell System (SHE Cells). *Arch. Toxicol.* 63:250–251. [Letter to the Editor.]

Zeller, H., and H.-J. Klimisch. 1978. *Bericht uber die Prufung der subakuten Toxizatat von n-Butylacrlat im Inhalationsversuch an Sprague-Dawley-Ratten* (BASF Report MBL-2 148). [German.]