

above 360°C.

Derivation: (a) By extraction with dilute sulfuric acid from the anthracene fraction from coal tar and adding potassium dichromate. The acridine chromate precipitated is recrystallized, treated with ammonia and recrystallized. (b) Synthetically.

Hazard: Carcinogenic agent. Tolerance, 0.2 mg per cubic meter in air.

Uses: Manufacture of dyes; derivatives, especially acriflavine, proflavine; analytical reagent.

acriflavine C₁₄H₁₄N₃Cl. A mixture of 3,6-diamino-10-methylacridinium chloride and 3,6-diaminoacridine.

Properties: Brownish or orange, odorless, granular powder. Soluble in 3 parts of water; incompletely soluble in alcohol; nearly insoluble in ether and chloroform; the aqueous solutions fluoresce green on dilution. Also available as the hydrochloride.

Uses: Antiseptic and bacteriostat.

"Acrilan."⁷⁵⁸ Trademark for a synthetic acrylic fiber.

Properties: Tenacity (wet and dry) 3 g/denier; softened by heat at 455°F; resistant to common solvents, mineral acids and weak alkalis. Can be satisfactorily wet-laundered. Ignites readily; not self-extinguishing.

Derivation: A solution of polymerized acrylonitrile is forced through minute holes of a spinneret, the solvent is removed, and the resulting fiber is stretched.

Uses: Woven and knitted clothing fabrics; carpets; drapes; upholstery; electrical insulation; laminates.

"Acrite" 100.¹²⁵ Trademark for a durable, non-nitrogenous textile reactant; a cross-linking agent for cellulose.

Containers: 55-gal drums.

Hazard: Strong irritant to eyes and skin.

"Acrival."⁷⁴⁶ Trademark for an aqueous acrylic emulsion. Used as a fabric finish, hand modifier, anticrock agent for pigment prints, non-woven binder, and upholstery backing.

"Acriviolet."⁷²⁴ Trademark for dye mixture used as oral antiseptic.

acroleic acid. See acrylic acid.

acrolein (2-propenal; acrylaldehyde; allyl aldehyde; acraldehyde) CH₂CHCHO.

Properties: Colorless or yellowish liquid; disagreeable choking odor. Soluble in water, alcohol and ether.

Polymerizes readily unless inhibitor (hydroquinone) is added. Very reactive. B.p. 52.7°C; m.p. -87.0°C; sp. gr. (20/20°C) 0.8427; wt/gal (20°C) 7.03 lb; flash point (COC) below 0°F. Autoignition temp. 532°F.

Derivation: (a) Oxidation of allyl alcohol or propylene; (b) by heating glycerol with magnesium sulfate; (c) from propylene with bismuth-phosphorus-molybdenum catalyst.

Method of purification: Rectification.

Grades: Technical.

Containers: Up to tanks.

Hazard: Toxic by inhalation and ingestion; strong irritant to eyes and skin. Tolerance, 0.1 ppm in air.

Flammable, dangerous fire risk. Explosive limits in air 2.8 to 31%. Safety data sheet available from Manufacturing Chemists Assn., Washington, D.C.

Uses: Intermediate for synthetic glycerol, polyurethane, and polyester resins, methionine, pharmaceuticals; herbicide; tear gas.

(4H) flammable liquid label. Not acceptable on passenger planes. (uninhibited) Not acceptable.

acrolein dimer (2-formyl-3,4-dihydro-2H-pyran)

OCH:CHCH₂CH₂CHCHO.

Properties: Liquid; sp. gr. 1.0775 (20°C); b.p. 151.3°C; freezing point -100°C; flash point (open cup) 118°F; wt/gal (20/20°C) 8.96 lb; soluble in water. Combustible.

Containers: 55-gal drums.

Hazard: Moderate fire risk.

Uses: Intermediate for resins, pharmaceuticals, dye-stuffs.

"Acronal."⁷⁴⁰ Trademark for dispersions, solutions, and solids of acrylate homo- and copolymers.

"Acrylafil."⁵³⁹ Trademark for styrene-acrylonitrile polymer with glass fiber reinforcement. Available with 35 and 40% glass fiber content.

acrylaldehyde. See acrolein.

acrylamide CH₂CHCONH₂.

Properties: Colorless, odorless crystals; m.p. 84.5°C; b.p. (25 mm) 125°C; sp. gr. 1.122 (30°C); soluble in water, alcohol, acetone; insoluble in benzene, heptane. The solid is stable at room temperature but may polymerize violently on melting.

Derivation: Hydration of acrylonitrile with sulfuric acid (84.5%) and neutralization.

Grade: Technical (approximately 97% pure).

Containers: Fiber drums.

Hazard: Toxic by skin absorption. Tolerance, 0.3 mg per cubic meter of air.

Uses: Synthesis of dyes, etc.; cross-linking agent; adhesives, paper and textile sizes, soil conditioning agents; flocculants; sewage and waste treatment; ore processing; permanent press fabrics.

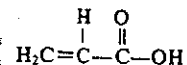
acrylate. (1) Any of several monomers used for the manufacture of thermosetting acrylic surface coating resins, e.g., 2-hydroxyethyl acrylate (HEA) and hydroxypropyl acrylate (HPA).

(2) Polymer of acrylic acid or its esters, used in surface coatings, emulsion paints, paper and leather finishes, etc.

See also acrylic acid; acrylic resin.

"Acrylene."⁷⁶⁵ Trademark for a modified acrylic latex particularly useful as an exterior paint vehicle.

acrylic acid (acroleic acid; propenoic acid)



Properties: Colorless liquid; acrid odor. Polymerizes readily. Miscible with water, alcohol and ether. B.p. 140.9°C; m.p. 12.1°C; sp. gr. (20/20°C) 1.052; vapor pressure (20°C) 3.1 mm; wt/gal (20°C) 8.6 lb; refractive index (20°C) 1.4224; flash point (open cup) 130°F. Combustible.

Derivation: (a) Condensation of ethylene oxide with hydrocyanic acid followed by reaction with sulfuric acid at 320°F; (b) acetylene, carbon monoxide and water, with nickel catalyst; (c) propylene is vapor-oxidized to acrolein, which is oxidized to acrylic acid at 300°C with molybdenum-vanadium catalyst.

Grades: Technical (esterification and polymerization grades); glacial (97%).

Containers: Bottles; drums; tank cars.

Superior numbers refer to Manufacturers of Trade Mark Products. For page number see Contents.

NIOSH/OSHA Pocket Guide to Chemical Hazards

Chemical Name and Formula	Synonyms	Permissible Exposure Limit	IDLH Level	Physical Description	Chemical and Physical Properties	Incompatibilities	Measurement Method and Set (See Table 1)
Acetylene tetrabromide $\text{CHBr}_2\text{CHBr}_2$	Tetrabromoethane; Symmetrical tetrabromoethane; 1,1,2,2-Tetrabromoethane	1 ppm (14 mg/m ³)	10 ppm	Pale yellow liquid with a pungent odor	MW: 346 BP: 462 F Sol: 0.07% Not combustible	VP: < 0.1 mm MP: 30 F Chemically active metals, strong caustics; hot iron, aluminum, zinc in presence of steam	SiO ₂ ; THF; GC; I
Acrolein $\text{CH}_2=\text{CHCHO}$	Acrylic aldehyde; Acrylaldehyde; Propenal; Allylaldehyde	0.1 ppm (0.25 mg/m ³)	5 ppm	Clear colorless or yellowish liquid with a piercing, disagreeable odor, causes tears	MW: 56 BP: 125 F Sol: 22% F.I.P.: -15 F	VP: 214 mm MP: -125 F UEL: 3% LEL: 2.8%	Imp (sodium bisulfite); TCA; color; C
Acrylamide $\text{CH}_2=\text{CHCONH}_2$	Propenamide; Acrylamide monomer; Acrylic amide	0.3 mg/m ³ (NIOSH) 0.3 mg/m ³ 10 hr TWA	N.A.	Colorless solid	MW: 71 BP: Decomposes Sol: 216% F.I.P.: ?	VP: 0.007 mm MP: 183 F UEL: ? LEL: ? Strong oxidizers	-
Acrylonitrile $\text{CH}_2=\text{CHCN}$	Propenenitrile; AN; Vinyl cyanide	2 ppm 10 ppm 15 min cell	4000 ppm Ca	Colorless to pale yellow liquid with a pungent odor	MW: 53 BP: 171 F Sol: 7.1% F.I.P.: 30 F	VP: 83 mm MP: -117 F UEL: 17% LEL: 3% Strong oxidizers (especially bromine), strong bases, copper, copper alloys, ammonia, amines	Char; CH ₃ OH; GC; K
Aldrin $\text{C}_{12}\text{H}_{10}\text{Cl}_6$	1,2,3,4,10,10-Hexachloro-1,4,4a,5,8,8a-hexahydroendo, exo-1,4,5,8-dimethanonaphthalene; Octalene	0.25 mg/m ³	100 mg/m ³	Tan to dark brown solid with a mild chemical odor	MW: 365 BP: Decomposes Sol: Insoluble Not combustible, flamm solv	VP: 0.000006 mm MP: 220 F None Hazardous	Filt/bub (iso-octane); iso-octane; GC; S

Personal Protection and Sanitation (See Table 2)	Respirator Selection		Health Hazards			
	Upper Limit	Devices Permitted (See Table 3)	Route	Symptoms (See Table 4)	First Aid (See Table 5)	Target Organs
Clothing: Repeat prolong Goggles: Reason prob Wash: Promptly upon contam Change: N.A. Remove: Promptly contam non-imperv	10 ppm:	SA/SCBA Escape: GMOV/SCBA	Inh Ing Con	Irrit eyes, nose; anor. nau; severe head; abdom pain; jaun; monocy	Eye: Irr immed Skin: Water flush promptly Breath: Art resp Swallow: Ipecac, vomit	Eyes, upper resp sys, liver
Accrolein - continued						
Clothing: Any poss Goggles: Any poss Wash: Immed upon contam Change: N.A. Remove: Any wet immed (flamm) Provide: Eyewash, quick drench	5 ppm:	CCROVF/GMOV/SAF/SCBAF Escape: GMOV/SCBAF	Inh Ing Con	Irrit eyes, skin, muc memb; abnormal pulm func; delayed pulm edema, chronic resp disease	Eye: Irr immed Skin: Water flush immed Breath: Art resp Swallow: Ipecac, vomit	Heart, lungs, eyes, skin, resp sys
Clothing: Repeat prolong Goggles: Reason prob Wash: Immed upon contam Change: After work if may be contam Remove: Immed contam non-imperv Provide: Quick drench	15 mg/m ³ : 600 mg/m ³ :	SAF/SCBAF SAF:PD,PP,CF Escape: GMOV/SCBA	Inh Abs Ing Con	Atax; numb limbs, pares; musc weak; absent deep tendon reflex; hand sweat; itg lethargy; irrit eyes, skin	Eye: Irr immed Skin: Water flush immed Breath: Art resp Swallow: Water, vomit	CNS, PNS, skin, eyes.
Clothing: Repeat prolong Goggles: Reason prob Wash: Immed upon wet Change: N.A. Remove: Any wet immed (flamm) Provide: Quick drench	20 ppm:CCROV/SA 100 ppm:CCROVF/GMOV/SAF/SCFAF 4000 ppm:SAF:PD,PP,CF Escape: CCROV/SCBA:PD,PP		Inh Abs Ing Con	Asphy; irrit eyes, head; sneez; nau; vomit; weak, li-head; skin vesicles; scaling derm	Eye: Irr immed Skin: Water wash immed Breath: Art resp/Amyl Nitrate Swallow: Water, vomit	CVS, liver, kidneys, CNS, skin
Clothing: Any poss Goggles: Reason prob Wash: Immed upon contam Change: After work any poss contam Remove: Immed contam non-imperv Provide: Quick drench	2.5 mg/m ³ : CCROVDMPEst/SA/SCBA 12.5 mg/m ³ : CCROVFDMPest/ GMOVFDMPest/SAF/SCBAF 100 mg/m ³ : SA:PD,PP,CF/CCROVHiEPest Escape: GMOV PEst/SCBA		Inh Abs Ing Con	Head, dizz; nau, vomit, mal; myoclonic jerks of limbs; clonic, tonic convuls; coma; hema, azotemia	Eye: Irr immed Skin: Soap wash immed Breath: Art resp Swallow: Water, vomit	CNS, liver, kidneys, skin

Aldrin