**Table 2. List of Chemicals with Threshold Limit Values1 (TLV) primarily based on sensory irritation. No RD50 values are available for these chemicals.**

**This table includes only volatile organic chemicals (VOCs).**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **#** | **Chemicals** | **CAS #** | **Documentation**  **Date1** | **TLV-TWA or STEL2 (ppm)** | **TLV Basis3** |
| 1 | Acetic anhydride | 108-24-7 | 2010 | 10 | URT & eye irr; pulm func |
| 2 | Acetophenone | 98-86-2 | 2008 | 10 | URT irr; CNS impair,  Pregnancy lost |
| 3 | Acrylic acid | 79-10-7 | 1986 | 2 | URT irr |
| 4 | Adiponitrile | 111-69-3 | 1990 | 2 | URT & LRT irr |
| 5 | Allyl bromide | 106-95-6 | 2011 | 0.1 | Eye & URT irr |
| 6 | Ally propyl disulfide | 2179-59-1 | 2001 | 0.5 | URT & eye irr |
| 7 | Benzotrichloride | 98-07-7 | 1994 | 0.1 | Eye, skin & URT irr |
| 8 | Benzoyl chloride | 98-88-4 | 1992 | 0.5 | URT & eye irr |
| 9 | Benzyl acetate | 140-11-4 | 1990 | 10 | URT irr |
| 10 | sec-Butanol | 78-92-2 | 2001 | 100 | URT irr; CNS impair |
| 11 | iso-Butene | 115-11-7 | 2007 | 250 | URT irr; body weight eff |
| 12 | sec-Butyl acetate | 105-46-4 | 1965 | 200 | Eye & URT irr |
| 13 | n-Butyl acrylate | 141-32-2 | 1996 | 2 | Irr |
| 14 | n-Butyl mercaptan | 109-79-5 | 1968 | 0.5 | URT irr |
| 15 | o-sec-Butylphenol | 89-72-5 | 1977 | 5 | URT, eye & skin irr |
| 16 | Camphor (synthetic) | 76-22-2 | 1990 | 2 | Eye & URT irr; anosmia |
| 17 | Carbon tetrabromide | 558-13-4 | 1972 | 0.1 | Liver dam; eye, URT & skin irr. |
| 18 | Catechol | 120-80-9 | 1985 | 5 | Eye & URT irr; dermatistis |
| 19 | Chloracetaldehyde | 107-20-0 | 1990 | C 1 | URT & eye irr |
| 20 | Chloracetone | 78-95-5 | 1986 | C 1 | Eye & URT irr |
| 21 | Chloracetyl chloride | 79-04-9 | 1988 | 0.05 | Eye, URT, & skin irr |
| 22 | 1-Chloro-1-nitropropane | 600-25-9 | 1971 | 2 | Eye irr; pulm edema |
| 23 | ß-Chloroprene | 126-99-8 | 1990 | 10 | URT & eye irr |
| 24 | Cumene | 98-82-8 | 1997 | 50 | Eye, skin & URT irr; CNS impair |
| 25 | Cyanogen | 460-19-5 | 1966 | 10 | LRT & eye irr |
| 26 | Cyanogen bromide  (inorganic ?) | 506-68-3 | 2014 | C 0.3 | Eye & resp tract irr; pulmonary edema |
| 27 | Cyanogen chloride  (inorganic ?) | 506-77-4 | 2013 | C 0.3 | Pulm edema; eye, skin, & URT irr |
| 28 | Cyclohexanol | 108-93-0 | 1979 | 50 | Eye irr; CNS impair |
| 29 | Cyclohexene | 110-83-8 | 1964 | 300 | URT & eye irr |
| 30 | Cyclopentadiene | 542-92-7 | 1963 | 75 | URT & eye irr |
| 31 | Cyclopentane | 287-92-3 | 1978 | 600 | URT, eye, & skin; CNS impair |
| 32 | Diacetone alcohol | 123-42-2 | 1979 | 50 | URT & eye irr |
| 33 | Diazomethane | 334-88-3 | 1970 | 0.2 | URT & Eye irr |
| 34 | 2-N-Dibutylaminoethanol | 102-81-8 | 1980 | 0.5 | Eye & URT irr |
| 35 | Dichloroacetic acid | 79-43-6 | 2002 | 0.5 | URT & eye irr; testicular dam |
| 36 | 1,4-Dichloro-2-butene | 764-41-0 | 1990 | 0.005 | URT & eye irr |
| 37 | 1,1-Dichloroethane | 75-34-3 | 1990 | 100 | URT & eye irr; liver & kidney dam |
| 38 | Dichloroethyl ether | 111-44-4 | 1985 | 5 | URT & eye irr, nausea |
| 39 | 1,1 Dichloro-1-nitroethane | 594-72-9 | 1978 | 2 | URT irr |
| 40 | Dicyclopentadiene | 77-73-6 | 1973 | 5 | URT, LRT, &eye irr |
| 41 | Diethylene triamine | 111-40-0 | 1985 | 1 | URT & eye irr |
| 42 | N,N-Diethylhydroxylamine | 3710-84-7 | 2012 | 2 | URT irr |
| 43 | Diethyl ketone | 96-22-0 | 1995 | 200 | URT irr, CNS impair |
| 44 | Difluorodibromomethane | 75-61-6 | 1962 | 100 | URT irr, CNS impair, liver dam |
| 45 | Diglycidyl ether | 108-83-8 | 1979 | 25 | URT & eye irr |
| 46 | bis(2-Dimethylaminoethyl)ether | 3033-62-3 | 1997 | 0.05 | URT, eye, & skin irr |
| 47 | Dimethyl carbamoyl chloride | 79-44-7 | 2006 | 0.005 | Nasal cancer, URT irr |
| 48 | Dimethyl disulfide | 624-92-0 | 2006 | 0.5 | URT irr, CNS impair |
| 49 | Dimethylethoxysilane | 14857-34-2 | 1991 | 0.5 | URT & eye irr; headache |
| 50 | 1,1 Dimethylhydrazine | 57-14-7 | 1993 | 0.01 | URT irr; nasal cancer |
| 51 | Dimethyl sulfate | 77-78-1 | 1985 | 0.1 | Eye &URT irr |
| 52 | Dimethyl sulfide | 75-18-3 | 2001 | 10 | URT irr |
| 53 | Dodecyl mercaptan | 112-55-0 | 2001 | 0.1 | URT irr |
| 54 | Ethanolamine | 141-43-5 | 1985 | 3 | Eye & skin irr |
| 55 | Ethyl tert-butyl ether | 637-92-3 | 2012 | 25 | URT irr; kidney dam (nephropathy); cochlear impair |
| 56 | Ethyleneimine | 151-56-4 | 2008 | 0.05 | URT irr, liver& kidney dam |
| 57 | Ethyl formate | 109-94-4 | 2011 | 100 | URT irr |
| 58 | Ethyl isocyanate | 109-90-0 | 2013 | 0.02 | URT & eye irr |
| 59 | Ethyl mercaptan | 75-08-1 | 2003 | 0.5 | URT irr; CNS impair |
| 60 | N-ethylmorpholine | 100-74-3 | 1985 | 5 | URT irr; eye dam |
| 61 | Ethyl silicate | 78-10-4 | 1979 | 10 | URT & eye irr, kidney dam |
| 62 | Formamide | 75-12-7 | 1985 | 10 | Eye & skin irr; kidney & liver dam |
| 63 | Furfuryl alcohol | 98-00-0 | 1979 | 10 | URT & eye irr |
| 64 | Glycidol | 556-52-5 | 1993 | 2 | URT, eye, & skin irr |
| 65 | Hexachlorocyclopentadiene | 77-47-4 | 1979 | 0.01 | URT irr |
| 66 | Hexanediamine | 124-09-4 | 1990 | 0.5 | URT & skin irr |
| 67 | sec-Hexyl acetate | 108-84-9 | 1963 | 50 | Eye & URT irr |
| 68 | Hexylene glycol | 107-41-5 | 1974 | C 25 | Eye & URT irr |
| 69 | 2-Hydroxypropyl acrylate | 999-61-1 | 1997 | 0.5 | Eye irr; eye dam |
| 70 | Isooctyl alcohol | 26952-21-6 | 1990 | 50 | URT irr |
| 71 | Isopropyl ether | 108-20-3 | 1979 | 250 | Eye & URT irr |
| 72 | Isopropyl glycidyl ether | 4016-14-2 | 1979 | 50 | URT & eye; dermatitis |
| 73 | Ketene | 463-51-4 | 1962 | 0.5 | URT irr; pulm edema |
| 74 | Methacrylic acid | 79-41-4 | 1992 | 20 | Skin & eye irr |
| 75 | 2-(Methoxymethylethoxy)propanol | 34590-94-8 | 1979 | 100 | Eye & URT irr; CNS impair |
| 76 | Methyl acrylate | 96-33-3 | 1997 | 2 | Eye, skin |
| 77 | Methylal | 109-87-5 | 1970 | 1000 | Eye irr; CNS impair |
| 78 | Methyl cyclohexane | 108-87-2 | 1962 | 400 | URT irr; CNS impair; liver & kidney dam |
| 79 | Methylcyclohexanol | 25639-42-3 | 2005 | 50 | URT & eye irr |
| 80 | o-Methylcyclohexanone | 583-60-8 | 1970 | 50 | URT &eye irr; CNS impair |
| 81 | Methyl ethyl ketone peroxide | 1338-23-4 | 1992 | C 0.2 | Eye & skin irr; liver & kidney damage |
| 82 | Methyl formate | 107-31-3 | 2014 | 50 | CNS impair; URT irr |
| 83 | Methyl hydrazine | 60-34-4 | 1991 | 50 | URT & eye irr; lung cancer; liver dam |
| 84 | Methyl isobutyl carbinol | 108-11-2 | 1966 | 25 | URT & eye irr; CNS impair |
| 85 | Methyl methacrylate | 80-62-6 | 1992 | 50 | URT & eye irr; body weight eff; pulm edema |
| 86 | Methyl silicate | 681-84-5 | 1978 | 1 | URT irr; eye dam |
| 87 | Methyl vinyl ketone | 78-94-4 | 2009 | C 0.2 | URT & eye irr; CNS impair |
| 88 | Monochloroacetic acid | 79-11-8 | 2005 | 0.5 | URT irr |
| 89 | Morpholine | 110-91-8 | 2005 | 20 | Eye dam; URT irr |
| 90 | Naphtalene | 91-20-3 | 2013 | 10 | URT irr; cataracts; hemolytic anemia |
| 91 | Nitroethane | 79-24-3 | 1979 | 100 | URT irr; CNS impair; liver dam |
| 92 | 1-Nitropropane | 108-03-2 | 1992 | 25 | URT &eye irr; liver dam |
| 93 | Perchloromethyl mercaptan | 594-42-3 | 1988 | 0.1 | Eye & URT irr |
| 94 | Perfluoroisobutylene | 382-21-8 | 1989 | C 0.01 | URT irr; hematologic eff |
| 95 | Phenyl ether | 101-84-8 | 1979 | 1 | URT & eye irr; nausea |
| 96 | Phenyl isocyanate | 103-71-9 | 2014 | 0.005 | URT irr |
| 97 | Phosgene | 75-44-5 | 1992 | 0.1 | URT irr; pulm edema; pulm emphysema |
| 98 | Phtalic anhydride | 85-44-9 | 1992 | 1 | URT, eye &skin irr |
| 99 | 2-Propanol | 67-63-0 | 2001 | 200 | Eye & URT irr; CNS impair |
| 100 | Propargyl alcohol | 107-19-7 | 1992 | 1 | Eye irr; liver & kidney 110dam |
| 101 | Proprionaldehyde | 123-38-6 | 1998 | 20 | URT irr |
| 102 | Propionic acid | 79-09-4 | 1977 | 10 | Eye, skin & URT irr |
| 103 | Propylene | 115-07-1 | 2005 | 500 | Asphyxia; URT irr |
| 104 | Propylene dichloride | 78-8-5 | 2005 | 10 | URT irr; body weight eff |
| 105 | Propylene oxide | 75-56-9 | 2000 | 2 | Eye & URT irr |
| 106 | Propyleneimine | 75-55-8 | 2008 | 0.2 | URT; kidney damage |
| 107 | Quinone | 106-51-4 | 1970 | 0.1 | Eye irr; skin dam |
| 108 | Resorcinol | 108-46-3 | 1992 | 10 | Eye & skin irr |
| 109 | 1,1,2,2,-Tetrabromoethane | 79-27-6 | 2005 | 0.1 | Eye & URT irr; pulm edema; liver dam |
| 110 | Tetrahydrofuran | 109-99-9 | 2002 | 50 | URT irr; CNS impair; kidney dam |
| 111 | Tetranitromethane | 509-14-8 | 1992 | 0.005 | Eye & URT irr; URT cancer |
| 112 | Trichloroacetic acid | 76-03-9 | 2013 | 0.5 | Eye & URT irr |
| 113 | 1,2,4-Trichlorobenzene | 120-82-1 | 1975 | C 5 | Eye & URT irr |
| 114 | Vinyl acetate | 108-05-4 | 1992 | 10 | URT, eye & skin irr, CNS impair |

Notes: Prepared by Yves Alarie, Ph.D. University of Pittsburgh, 2015.

1. From: Booklet of The American Conference of Governmental Industrial Hygienists (ACGIH) (2015). TLVs and BEIs Based on the Documentation of the Threshold Limit Values for Chemical Substances and Physical Agents & Biological Exposure Indices. For each chemical listed the last Documentation Date is listed as given in the 2015 Booklet.

2. The number listed is for TLV-TWA or STEL and the notation Ceiling (C) if applicable. When both a TLV-TWA and TLV-Ceiling are given, the lowest value is entered. Note that for some chemicals a revision is contemplated, so check the last publication year of the Booklet.

3. The abbreviation, as written in the Booklet: URT: Upper respiratory tract; irr: irritation; CNS: Central Nervous System; impair: impairment; LRT: Lower respiratory tract; eff: effects; pulm: pulmonary; func: function.