## Toxics Release Inventory (TRI) Basis of OSHA Carcinogens

Under the TRI Program, a chemical does not have to be counted towards threshold determinations and release and other waste management calculations if it is present in a mixture below a certain concentration. This is known as the "de minimus" concentration in mixture. When the rule was developed that implemented the reporting requirements of Section 313 of the Emergency Planning and Community Right-to-Know Act (EPCRA), EPA adopted the de minimus percentages from the Occupational Safety and Health Administration's (OSHA) Hazard Communication Standards (29 CFR 1910.1900) because much of the initial information that industry would have relating to chemicals in mixtures would most likely be from the material safety data sheet (MSDS) on that mixture. The OSHA de minimus limitation is 0.1 percent if the chemical is a known or suspect carcinogen by virtue of appearing in one of three sources:

1. National Toxicology Program (NTP), "Annual Report on Carcinogens" (Latest Editions);

2. International Agency for Research on Cancer (IARC) "Monographs" (Latest Editions);

3. 29 CFR 1910, Subpart Z, Toxic and Hazardous Substances, Occupational Safety and Health Administration.

The de minimus limitation is 1.0 percent for chemicals that do not meet the above OSHA carcinogen criteria. The carcinogen designation in the list of chemicals relates to any chemical that the Agency determined met the above OSHA criteria for the 0.1 percent de minimus limitation. Certain metal compound categories have two de minimus limitations. For example, hexavalent chromium compounds and inorganic arsenic compounds meet the OSHA carcinogen criteria, while trivalent chromium compounds and organic arsenic do not meet the OSHA criteria. In addition, there are no de minimus levels for persistent bioaccumulative toxic (PBT) chemicals, except for supplier notification purposes.

The following table shows the specific bases for which chemicals have been designated as a known or suspect carcinogens.

| Basis of OSHA Carcinogen Listing for TRI Chemicals | | | |
|---|---|---|---|
| **Chemical Name** | **IARC** | **NTP** | **OSHA–Z** |
| Acetaldehyde | 2B | P | – |
| Acetamide | 2B | – | – |
| 2-Acetylaminofluorene | – | P | Z |
| Acrylamide | 2A | P | – |
| Acrylonitrile | 2B | P | Z |
| 2-Aminoanthraquinone | – | P | – |
| 4-Aminoazobenzene | 2B | – | – |
| 4-Aminobiphenyl | 1 | K | Z |
| 1-Amino-2,4-dibromoanthraquinone | 2B | P | – |
| 1-Amino-2-methylanthraquinone | – | P | – |
| Amitrole | – | P | – |
| o-Anisidine | 2B | – | – |
| o-Anisidine hydrochloride | – | P | – |
| Arsenic and inorganic arsenic compounds | 1 | K* | Z |
| Asbestos (friable) | 1 | K | Z |
| Benzene | 1 | K | Z |
| Benzidine | 1 | K | Z |
| Benzoic trichloride | 2B | P | – |
| Beryllium and beryllium compounds | 1 | P* | – |
| 2,2-Bis(bromomethyl)-1,3-propanediol | 2B | P | – |
| Bis(chloromethyl)ether | 1 | K | Z |
| 1,3-Butadiene | 2A | K | – |
| 1,2-Butylene oxide | 2B | – | – |
| Cadmium and cadmium compounds | 1 | K* | Z |
| Carbon tetrachloride | 2B | P | – |
| Catechol | 2B | – | – |
| Chlordane | 2B | – | – |
| Chlorendic acid | 2B | P | – |
| p-Chloroaniline | 2B | – | – |
| Chloroform | 2B | P | – |
| Chloromethyl methyl ether | 1 | K | Z |
| 3-Chloro-2-methyl-1-propene | – | P | – |
| Chlorophenols | 2B | – | – |
| Chloroprene | 2B | P | – |
| Chlorothalonil | 2B | – | – |
| p-Chloro-o-toluidine | 2A | P | – |
| Chromium (VI) compounds | 1 | K | – |
| C.I. Acid Red 114 | 2B | – | – |
| C.I. Direct Black 38 | 2A | K | – |
| C.I. Direct Blue 6 | 2A | K | – |
| C.I. Direct Brown 95 | 2A | – | – |
| C.I. Food Red 5 | 2B | – | – |
| C.I. Solvent Yellow 3 (o-aminoazotoluene) | 2B | P | – |

| | | | |
|---|---|---|---|
| C.I. Solvent Yellow 34 (Auramine) | 2B | – | – |
| Cobalt and cobalt compounds | 2B | P* | – |
| Creosote | 2A | K | – |
| p-Cresidine | 2B | P | – |
| Cupferron | – | P | – |
| 2,4-D** | 2B | – | – |
| 2,4-D butoxyethyl ester** | 2B | – | – |
| 2,4-D butyl ester** | 2B | – | – |
| 2,4-D chlorocrotyl ester** | 2B | – | – |
| 2,4-D 2-ethylhexyl ester** | 2B | – | – |
| 2,4-D 2-ethyl-4-methylpentyl ester** | 2B | – | – |
| 2,4-Diaminoanisole | 2B | – | – |
| 2,4-Diaminoanisole sulfate | – | P | – |
| 4,4'-Diaminodiphenyl ether | 2B | – | – |
| 2,4-Diaminotoluene | 2B | P | – |
| Diaminotoluene (mixed isomers) | 2B | P | – |
| 1,2-Dibromo-3-chloropropane | 2B | P | Z |
| 1,2-Dibromoethane | 2A | P | – |
| 1,4-Dichlorobenzene | 2B | P | – |
| Dichlorobenzene (mixed isomers) | 2B | P | – |
| 3,3'-Dichlorobenzidine | 2B | P | Z |
| 3,3'-Dichlorobenzidine dihydrochloride | 2B | P | Z |
| 3,3'-Dichlorobenzidine sulfate | 2B | P | Z |
| Dichlorobromomethane | 2B | P | – |
| 1,2-Dichloroethane | 2B | P | – |
| Dichloromethane | 2B | P | Z |
| trans-1,3-Dichloropropene | 2B | – | – |
| 1,3-Dichloropropylene | 2B | P | – |
| Dichlorvos | 2B | – | – |
| Diepoxybutane | 2B | P | – |
| Di-(2-ethylhexyl)phthalate | – | P | – |
| Diethyl sulfate | 2A | P | – |
| Diglycidyl resorcinol ether | 2B | P | – |
| Dihydrosafrole | 2B | – | – |
| 3,3'-Dimethoxybenzidine | 2B | P | – |
| 3,3'-Dimethoxybenzidine dihydrochloride | 2B | P | – |
| 3,3'-Dimethoxybenzidine hydrochloride | 2B | P | – |
| 4-Dimethylaminoazobenzene | 2B | P | Z |
| 3,3'-Dimethylbenzidine | 2B | P | – |
| 3,3'-Dimethylbenzidine dihydrochloride | 2B | P | – |
| 3,3'-Dimethylbenzidine dihydrofluoride | 2B | P | – |
| Dimethylcarbamyl chloride | 2A | P | – |
| 1,1-Dimethylhydrazine | 2B | P | – |
| Dimethyl sulfate | 2A | P | – |
| 2,4-Dinitrotoluene | 2B | – | – |
| 2,6-Dinitrotoluene | 2B | – | – |

| | | | |
|---|---|---|---|
| 1,4-Dioxane | 2B | P | – |
| 1,2-Diphenylhydrazine | – | P | – |
| 2,4-D isopropyl ester** | 2B | – | – |
| 2,4-DP** | 2B | – | – |
| 2,4-D propylene glycol butyl ether ester** | 2B | – | – |
| 2,4-D sodium salt** | 2B | – | – |
| Epichlorohydrin | 2A | P | – |
| Ethyl acrylate | 2B | – | – |
| Ethyl benzene | 2B | – | – |
| Ethyleneimine | – | – | Z |
| Ethylene oxide | 1 | K | Z |
| Ethylene thiourea | – | P | – |
| Formaldehyde | 1 | K | Z |
| Furan | 2B | P | – |
| Glycidol | 2A | P | – |
| Heptachlor | 2B | – | – |
| Hexachlorobenzene | 2B | P | – |
| alpha-Hexachlorocyclohexane | 2B | P | – |
| Hexachloroethane | 2B | P | – |
| Hexamethylphosphoramide | 2B | P | – |
| Hydrazine | 2B | P | – |
| Hydrazine sulfate | – | P | – |
| Isoprene | 2B | P | – |
| Lead and inorganic lead compounds | 2A | P | Z |
| Lindane | 2B | P | – |
| Mecoprop** | 2B | – | – |
| Methoxone** | 2B | – | – |
| Methoxone sodium salt** | 2B | – | – |
| 4,4-Methylenebis (2-chloroaniline) | 1 | P | – |
| 4,4'-Methylenebis (N,N-dimethyl) benzeneamine | 2B | P | – |
| 4,4'-Methylenedianiline | 2B | P | Z |
| Methyleugenol | 2B | P | – |
| Michler's ketone | – | P | – |
| Mustard gas | 1 | K | – |
| Naphthalene | 2B | P | – |
| alpha-Naphthylamine | – | – | Z |
| beta-Naphthylamine | 1 | K | Z |
| Nickel | 2B | P | – |
| Nickel compounds | 1 | P* | – |
| Nitrilotriacetic acid | – | P | – |
| o-Nitroanisole | 2B | P | – |
| Nitrobenzene | 2B | P | – |
| 4-Nitrobiphenyl | – | – | Z |
| Nitrofen | 2B | P | – |
| Nitrogen mustard | 2A | – | – |
| Nitromethane | 2B | P | – |

| | | | |
|---|---|---|---|
| 2-Nitropropane | 2B | P | – |
| N-Nitrosodi-n-butylamine | 2B | P | – |
| N-Nitrosodiethylamine | 2A | P | – |
| N-Nitrosodimethylamine | 2A | P | Z |
| N-Nitrosodi-n-propylamine | 2B | P | – |
| N-Nitroso-N-ethylurea | 2A | P | – |
| N-Nitroso-N-methylurea | 2A | P | – |
| N-Nitrosomethylvinylamine | 2B | P | – |
| N-Nitrosomorpholine | 2B | P | – |
| N-Nitrosonornicotine | 1 | P | – |
| N-Nitrosopiperidine | 2B | P | – |
| o-Nitrotoluene | 2A | P | – |
| Pentachlorophenol | 2B | – | – |
| Phenolphthalein | 2B | P | – |
| Phenytoin | 2B | P | – |
| Polybrominated biphenyls (PBBs) | 2B | P | – |
| Polychlorinated alkanes ($C_{12}$, 60% chlorinated) | – | P | – |
| Polychlorinated biphenyls (PCBs) | 2A | P | – |
| Polycyclic aromatic compounds (PACs): | 2B | | – |
| Benz(a)anthracene | 2A | P | – |
| Benzo(b)fluoranthene | 2B | P | – |
| Benzo(j)fluoranthene | 2B | P | – |
| Benzo(k)fluoranthene | 2B | P | – |
| Benzo(rst)pentaphene | 2B | – | – |
| Benzo(a)pyrene | 2A | P | – |
| Dibenz(a,h)acridine | 2A | P | – |
| Dibenz(a,j)acridine | 2B | P | – |
| Dibenzo(a,h)anthracene | 2B | P | – |
| 7H–Dibenzo(c,g)carbazole | 2B | P | – |
| Dibenzo(a,e)pyrene | 2B | P | – |
| Dibenzo(a,h)pyrene | 2B | P | – |
| Dibenzo(a,l)pyrene | 2B | P | – |
| 7,12–Dimethylbenz(a)anthracene | 2B | – | – |
| 1,6-Dinitropyrene | 2B | P | – |
| 1,8-Dinitropyrene | 2B | P | – |
| Indeno[1,2,3–cd]pyrene | 2B | P | – |
| 5–Methylchrysene | 2B | P | – |
| 6-Nitrochrysene | 2B | P | – |
| 1-Nitropyrene | 2B | P | – |
| 4-Nitropyrene | 2B | P | – |
| Potassium bromate | 2B | – | – |
| Propane sultone | 2B | P | – |
| beta-Propiolactone | 2B | P | Z |
| Propyleneimine | 2B | P | – |
| Propylene oxide | 2B | P | – |
| Safrole | 2B | P | – |

| | | | |
|---|---|---|---|
| Sodium o-phenylphenoxide | 2B | – | – |
| Styrene | 2B | P | – |
| Styrene oxide | 2A | – | – |
| Tetrachloroethylene | 2B | P | – |
| 2,3,7,8-Tetrachlorodibenzo-p-dioxin | 1 | K | – |
| Tetrafluoroethylene | 2B | P | – |
| Tetranitromethane | 2B | P | – |
| Thioacetamide | 2B | P | – |
| 4,4'-Thiodianiline | 2B | P | – |
| Thiourea | – | P | – |
| Toluene-2,4-diisocyanate | 2B | P | – |
| Toluene-2,6-diisocyanate | 2B | P | – |
| Toluene diisocyanate (mixed isomers) | 2B | P | – |
| o-Toluidine | 1 | P | – |
| o-Toluidine hydrochloride | – | P | – |
| Toxaphene | 2B | P | – |
| Trichloroethylene | 2A | P | – |
| 2,4,6-Trichlorophenol | 2B | P | – |
| 1,2,3-Trichloropropane | 2A | P | – |
| Tris(2,3-dibromopropyl)phosphate | 2A | P | – |
| Trypan blue | 2B | – | – |
| Urethane | 2B | P | – |
| Vinyl acetate | 2B | – | – |
| Vinyl bromide | 2A | – | – |
| Vinyl chloride | 1 | K | Z |
| Vinyl fluoride | 2A | P | – |
| 2,6-Xylidine | 2B | – | – |

**Note**: The list of TRI chemicals meeting the OSHA carcinogen standard and, therefore, not reported when in a mixture at a concentration level below the de minimus level of 0.1% has been updated, and this list reflects the update.

IARC: 1–The chemical is carcinogenic to humans; 2A–The chemical is probably carcinogenic to humans; 2B–The chemical is possibly carcinogenic to humans.

NTP: K–The chemical is known to be a human carcinogen; P–The chemical is reasonably anticipated to be a human carcinogen.

OSHA: Z–The chemical appears at 29 CFR part 1910 Subpart Z.

* Certain compounds.

** Chlorophenoxy herbicides (IARC 2B).